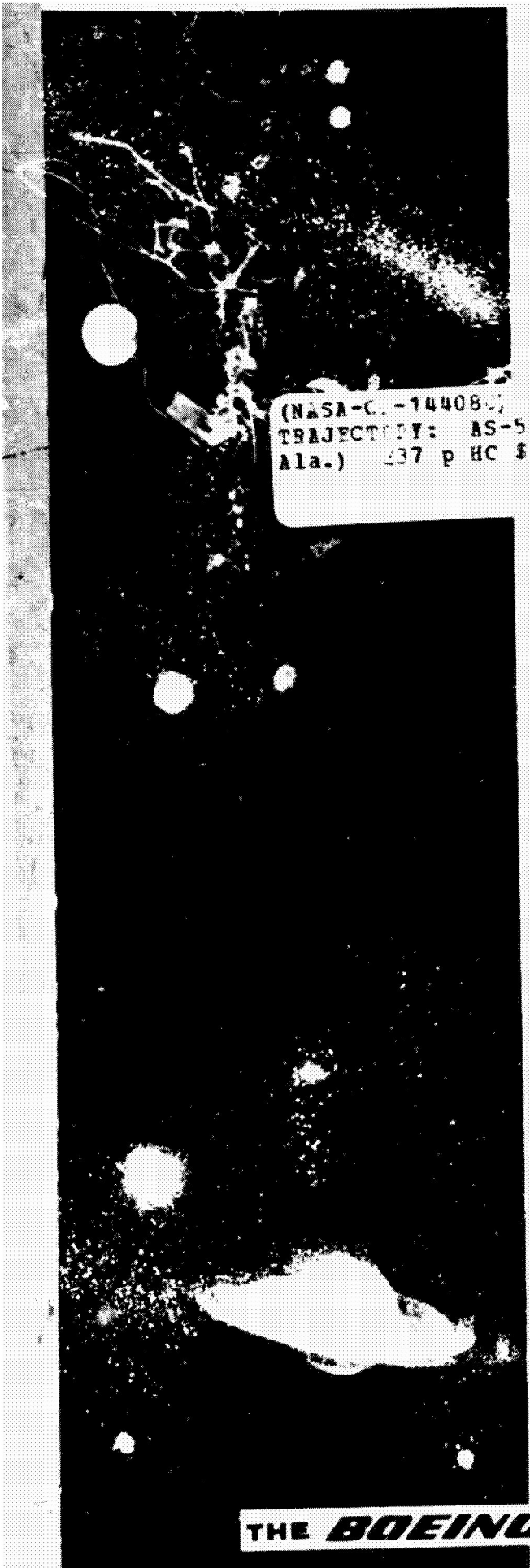

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APOLLO/SATURN V POSTFLIGHT TRAJECTORY - AS-512

APRIL 11, 1973

THE BOEING COMPANY - SPACE DIVISION

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TRACKING AND FLIGHT RECONSTRUCTION
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ABSTRACT AND LIST OF KEY WORDS

This document presents the postflight trajectory for the Apollo/Saturn V AS-512 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 range, and the magnitude of total velocity and acceleration as a function of range time for the powered flight trajectories are presented.

Apollo/Saturn V
AS-512
Postflight Trajectory
Powered Flight Trajectory
Orbital Trajectory
Spent Stage Trajectory
Apollo 17

CONTENTS

ILLUSTRATIONS

ILLUSTRATIONS (Continued)

ILLUSTRATIONS (Continued)

TABLES

REFERENCES

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

2. NASA Document MPR-SAT-FE-73-1, "Saturn V Launch Vehicle Flight Evaluation Report - AS-512 Apollo 17 Mission," February 28, 1973.

3. MSFC Memorandum MFT-200-72, "AS-512 Postlaunch Operational Trajectory," December 8, 1972.

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

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GLOSSARY OF TERMS

Altitude	The distance between the vehicle and its subvehicle point on the surface of the Fischer Ellipsoid.
Ascent Phase	The segment of the vehicle flight from launch to parking orbit insertion.
Average Range Rate	The change in range per unit time computed over a finite interval.
Azimuth Angle	The angle, positive clockwise, from true north to the projection of the range vector on the ground station tangent plane (PACSS3a).
Cross Range	The vehicle lateral position measured in the earth-fixed launch site centered coordinate system (PACSS10).
Descending Node	The angle measured in the equatorial plane from the launch meridian at TGRR to the descending node of the orbit at the specified time.
Dynamic Pressure	The force per unit area of the atmosphere on the vehicle resulting from its motion through the atmosphere.
Elevation Angle	The angle between the range vector and its projection on the ground station tangent plane. This angle is positive above the ground station tangent plane (PACSS3a).
Flight Path Angle	The angle between the vehicle space-fixed velocity vector and a plane normal to a vector from the center of the earth to the vehicle. This angle is positive above the plane.
Heading Angle	The angle between the north direction in a plane normal to a vector from the center of the earth to the vehicle and the projection of the space-fixed velocity vector on the plane.

GLOSSARY OF TERMS (Continued)

Inclination	The angle between the earth's north polar axis and the orbital angular momentum vector.
Inertial Acceleration	The magnitude of the vehicle acceleration in the launch vehicle platform accelerometer coordinate system (PACSS12).
Instantaneous Range Rate	The rate of change of the distance from the receiving tracker to the vehicle at the specified time.
Latitude (geodetic)	The angle between the equatorial plane and the line normal to the ellipsoidal surface at a specified point, measured positive north in the meridian of the point.
Longitude	The angle between the plane of the Greenwich Meridian and the plane of the meridian containing the specified point measured positive eastward from the Greenwich Meridian.
Mach Number	The ratio of the vehicle velocity relative to the surrounding atmosphere to the speed of sound in the atmosphere.
Measured Parameter	A primary measurement made by any ground station, e.g., elevation angle.
Parking Orbit Phase	The segment of the vehicle flight from parking orbit insertion to S-IVB restart preparation.
Range	The average of the uplink and downlink signal travel distances (PACSS3a, PACSS3c, and PACSS3d).
Second Burn Phase	The segment of the vehicle flight from S-IVB restart preparation to TLI.
Space-Fixed Velocity	The magnitude of the vehicle velocity in the launch vehicle navigation coordinate system (PACSS13).

GLOSSARY OF TERMS (Continued)

Subvehicle Point	The point of intersection of the ellipsoidal surface and a line normal to this surface passing through the vehicle center of mass.
Surface Range	The arc length between the launch site and subvehicle point measured along the surface of the Fischer Ellipsoid.
Translunar Orbit Phase	The segment of the vehicle flight from TLI to CSM separation.
X-Angle	30' Antennas - The angle measured in the plane of the ground station prime vertical from the zenith to the projection of the slant range vector onto this plane, positive eastward (PACSS3c) 85' Antennas - The angle measured in the meridian plane of the ground station from the zenith to the projection of the slant range vector onto this plane, positive southward (PACSS3d)
Y-Angle	30' Antennas - The angle between the slant range vector and its projection onto the plane of the ground station prime vertical, positive when the slant range vector is north of the plane (PACSS3c) 85' Antennas - The angle between the slant range vector and its projection onto the meridian plane of the radar site, positive when the slant range vector is east of the meridian plane (PACSS3d)

LIST OF ABBREVIATIONS

ABBREVIATION	DEFINITION/STATION
ACN3	Ascension S-Band
ANTQ	Antigua C-Band
BDAF (67.16)	Bermuda (FPS-16M) C-Band
BDAQ (67.18)	Bermuda (FPQ-6) C-Band
BDA3	Bermuda S-Band
CECO	Center Engine Cutoff
CROQ	Carnarvon C-Band
CRO3	Carnarvon S-Band
CSM	Command Service Module
EMR	Engine Mixture Ratio
EPO	Earth Parking Orbit
GATE	Guidance and Tracking Evaluation Program
GCS1 (First GCS)	First Guidance Cutoff Signal
GCS2 (Second GCS)	Second Guidance Cutoff Signal
GDS8	Goldstone, California S-Band
GRR	Range Time of Guidance Reference Release
GTKT (7.18)	Grand Turk C-Band
HAW3	Hawaii S-Band
HSK8	Honeysuckle S-Band
IP Raw MP	Impact Predictor Raw Measured Parameters
IU	Instrument Unit
LH2	Liquid Hydrogen
LID	Lunar Impact Determination Program
LM	Lunar Module
MIL3	Merritt Island S-Band
MLAT (19.18)	Merritt Island C-Band
MSFN	Manned Space Flight Network
OCP	Orbital Correction Program
OECO	Outboard Engine Cutoff
OMPT	Observed Mass Point Trajectory
PACSS	Project Apollo Coordinate System Standards
PATQ (0.18)	Patrick Air Force Base C-Band
POI	Parking Orbit Insertion
REV	Revolution
rss	Root Sum Square
STDV	Start Tank Discharge Valve
TEX3	Corpus Christi S-Band
TLI	Translunar Injection
USB	Unified S-Band

SOURCE DATA PAGE

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

EXHIBIT FF LINE ITEM NUMBER	GFD TITLE	DATE RECEIVED
S&E-AERO-P-#35c	OMPT Format	8/15/72
S&E-AERO-P-#17	Tracking and Network Specifications	11/15/72
	Postlaunch Operational Trajectory Certified Data	12/8/72
I-MO-#4a	Insertion Point and/or Orbital Elements	12/8/72
I-MO-#4c	Six Seconds Raw Radar	12/7/72
I-MO-#4f	Meteorological Data (Final)	12/9/72
I-MO-#6	IP Raw MP	12/7/72
I-MO-#9	Pulse Radar: BDAF, BDAQ, MLAT, and CROQ Data	12/7/72
	USB: MIL3, BDA3, HAW3, TEX3, ACN3, CRO3, and GDS8 Data	12/8/72
I-MO-#17c	Final Significant Time of Events	3/1/73
I-MO-#18b	Final Guidance Velocities	
	Ascent Phase	12/9/72
	2nd Burn Phase	12/9/72
I-MO-#18c	Orbital Venting Acceleration Data Cards	12/15/72

SECTION 1

SUMMARY AND INTRODUCTION

The Apollo Saturn V AS-512 vehicle was launched from Launch Complex 39, Pad A, at the Kennedy Space Center on December 7, 1972, at 00:33:00 A.M. Eastern Standard Time at an azimuth of 90 degrees east of north. Guidance Reference Release occurred at -16.960 seconds. First motion occurred at 0.2 second. A roll maneuver was initiated at 12.9 seconds to place the vehicle on a flight azimuth of 91.503 degrees east of north.

All trajectory parameters were close to nominal from liftoff to parking orbit insertion. The vehicle was inserted into parking orbit at 712.65 seconds at an altitude of 170.5 km (92.1 nmi) and a total space-fixed velocity of 7,804.1 m/s (25,604.0 ft/s). The vehicle remained in orbit for approximately two revolutions. The S-IVB stage was restarted during the second revolution at 11,556.6 seconds.

At 11,917.64 seconds, the vehicle was injected into a near-nominal translunar trajectory at an altitude of 313.7 km (169.4 nmi) and a total space-fixed velocity of 10,837.3 m/s (35,555.4 ft/s). At 13,347.6 seconds, the CSM separated from the launch vehicle at an altitude of 6,605.8 km (3,566.8 nmi) and a total space-fixed velocity of 7,725.1 m/s (25,344.8 ft/s).

The impact location of the spent S-IC stage was determined to be 28.219 degrees north latitude and 73.878 degrees west longitude at 551.7 seconds. The impact location of the spent S-II stage was determined to be 20.056 degrees north latitude and 39.604 degrees west longitude at 1,196.9 seconds.

A more detailed description of the postflight mass point launch vehicle trajectory and launch parameters is given in Section 2. The trajectory is divided into the following phases, each discussed in a separate subsection of Section 2:

a. Ascent (guidance reference release to parking orbit insertion)
b. Parking orbit (orbit insertion to S-IVB restart preparation)
c. Second burn (S-IVB restart preparation to translunar injection)
d. Translunar orbit (translunar injection to CSM separation)
e. Free flight (expended S-IC and S-II stages)

SECTION 1 (Continued)

The trajectories for the first four of the above phases were established from external C-band radar and S-band tracking data and ST-124M inertial platform guidance velocity data. Since no tracking data were available for the S-IC and S-II spent stages, the trajectory phases outlined in (e) above were simulated using actual separation conditions and nominal drag and retrorocket performance data.

Section 3 contains a description of the trajectory reconstruction methods, a summary of the tracking data used in the analysis with the resulting residual plots, and an estimate of the uncertainty in the reconstructed trajectory.

Appendix A provides a definition of the symbols, nomenclature, and coordinate systems used in the report. Appendix B is a tabular history of selected trajectory parameters in metric units. Appendix C presents the same parameters expressed in English units.

SECTION 2

TRAJECTORY DESCRIPTION

This section describes the reconstructed trajectory, referenced to the Instrument Unit, by providing plotted histories of pertinent variables and tables of important parameters at significant event times. The complete time history of selected Observed Mass Point Trajectory parameters, in both metric and English units, is tabulated in Appendices B and C, respectively. These tabulations are given in accordance with "Project Apollo Coordinate System Standards" (PACSS, Reference 1) and are in earth-fixed launch site (PACSS10), launch vehicle navigation (PACSS13), and geographic polar (PACSS1) coordinate systems. Computations of the transformations relating the various coordinate systems are based on the earth's spin axis as it was oriented at GRR. For convenience, these systems are described in Appendix A along with a definition of other terms and symbols used.

A comparison of actual and nominal times for significant flight events is presented in Table 2-I. The actual times for these events are taken from Reference 2. The nominal data and times are taken from Reference 3. Range time, which is referenced to Range Time Zero, is used throughout this documentation unless otherwise specified. Range Time Zero was established at 29:33:00 Greenwich Mean Time on December 6, 1972.

The Fischer Ellipsoid of 1960 (Reference 4) is used as the representative model for the earth and its gravitational field. All latitude and longitude coordinates are defined with respect to this ellipsoid.

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

Geodetic Latitude	28.608422 degrees north
Longitude	80.604133 degrees west

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

The azimuth alignments are as follows:

Launch Azimuth	90.0 degrees east of north
Flight Azimuth	91.503 degrees east of north
ST-124M Platform Azimuth	91.504 degrees east of north

SECTION 2 (Continued)

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

2.1 ASCENT PHASE

The trajectory parameters from guidance reference release to parking orbit insertion were close to nominal. The space-fixed velocity and altitude at S-IC OECO were 2.0 m/s (6.5 ft/s) greater than nominal and 0.2 km (0.1 nmi) less than nominal, respectively. At S-II OECO, the space-fixed velocity and altitude were 25.6 m/s (84.0 ft/s) and 0.5 km (0.3 nmi) greater than nominal. The altitude was 0.1 km (0.1 nmi) greater than nominal, and the space-fixed velocity was 0.3 m/s (1.0 ft/s) less than nominal at S-IVB first guidance cutoff signal. The maximum acceleration was 37.95 m/s^2 (3.87g) during the S-IC phase.

Some significant trajectory parameters are tabulated in Table 2-II at key events such as Mach 1, maximum acceleration, etc. Trajectory parameters at engine cutoff times are presented in Table 2-III. Table 2-IV shows trajectory parameters at stage separation times.

To supplement these discrete time tabulations, a number of parameters are plotted over the entire ascent phase. Figure 2-1 shows the vehicle ground track and the location of the tracking stations used in the reconstruction. Altitude, surface range, and cross range are plotted versus time in Figures 2-2 through 2-4, respectively. Space-fixed velocity and flight path angle are shown in Figure 2-5. Figure 2-6 gives total inertial acceleration. Dynamic pressure and mach number are plotted in Figure 2-7. The ascent phase trajectory is tabulated in Tables B-I through B-III in metric units, and in Tables C-I through C-III in English units.

2.2 PARKING ORBIT PHASE

The parking orbit phase spans the inerval from insertion to S-IVB restart preparation at 10,978.6 seconds. Figure 2-8 illustrates the vehicle ground track following parking orbit insertion and shows the vehicle location at significant event times (see Table 2-I).

2.2 (Continued)

The S-IVB/LM/CSM was inserted into a near circular earth parking orbit at 712.65 seconds, 4.09 seconds earlier than nominal. The earlier insertion time resulted mainly from the greater than nominal S-II performance. The parking orbit insertion conditions were close to nominal. Table 2-V gives the actual parking orbit insertion conditions and provides a comparison with the nominal values.

During the parking orbit, no major thrusting occurred; however, the orbit was continuously perturbed by low-level LH_2 venting. The resulting small velocity perturbations were considered in this analysis. An acceleration model was built from the ST-124M guidance platform velocity data. The guidance velocity data were fitted in segments by polynomials in time. The polynomials were analytically differentiated to model the component accelerations sensed by the guidance platform. Table 2-VI lists the acceleration polynomials derived by this method. Figure 2-9 reflects the best estimate of the total parking orbit acceleration (rss of components) after modeling biases have been removed.

The parking orbit phase is tabulated in Table B-IV in metric units and in Table C-IV in English units.

2.3 SECOND BURN PHASE

The second burn trajectory phase spans the interval from S-IVB restart preparation at 10,978.6 seconds to translunar injection and is divided into two segments. The two segments are the S-IVB restart preparation segment (10,978.6 seconds to 11,500 seconds) and the S-IVB second burn powered segment (11,500 seconds to TLI). The S-IVB stage was restarted 1.9 seconds earlier than nominal at 11,556.6 seconds (see Table 2-I for significant event times). The vehicle ground track during this trajectory phase is shown in Figure 2-8 as a continuation of the parking orbit phase. Vehicle altitude is plotted in Figure 2-10. Figure 2-11 shows the space-fixed velocity and the flight path angle. Total inertial acceleration is shown in Figure 2-12.

The second guidance cutoff signal conditions, depicted in Table 2-III, were near nominal. Cutoff occurred 2.10 seconds later than nominal with the altitude 5.8 km (3.1 nmi) greater than nominal, the space-fixed velocity 4.7 m/s (15.4 ft/s) less than nominal, and the flight path angle 0.140 degree greater than nominal. The longer S-IVB second burn was a result of the shortened S-IVB first burn time discussed above.

The second burn phase is tabulated in Tables B-V through B-VII in metric units and Tables C-V through C-VII in English units.

2.4 TRANSLUNAR ORBIT PHASE

The translunar orbit phase spans the interval from injection to S-IVB/CSM separation. Figure 2-8 shows the ground track continued through this trajectory phase.

Translunar injection occurred at 11,917.64 seconds, 2.10 seconds later than nominal (see Table 2-I). The translunar injection conditions were close to nominal. Table 2-VII gives the actual translunar orbit injection conditions and provides a comparison with the nominal values.

Accelerations during the period between translunar injection and CSM separation were treated as in parking orbit, representing them as segmented polynomials. Table 2-VIII lists these polynomial coefficients and time spans. The best estimate of the total translunar orbit acceleration (rss of components) after modeling biases have been removed is plotted in Figure 2-13.

Trajectory parameters at CSM separation (defined as the end of the launch vehicle trajectory) are listed in Table 2-IX. The translunar orbit phase is tabulated in Tables B-V through B-VII in metric units and Tables C-V through C-VII in English units.

2.5 FREE FLIGHT PHASES

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

2.5.1 S-IC Spent Stage Trajectory

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.

2.5.1 (Continued)

Results of the t' ~ee computed S-IC spent stage trajectories are summarized in Table 2-IX. The ground track is shown in Figure 2-14.

2.5.2 S-II Spent Stage Trajectory

Three separate theoretical trajectories, corresponding to the zero-degree, ninety-degree, and tumbling entry conditions were also 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 2-X. The ground track is shown in Figure 2-14.

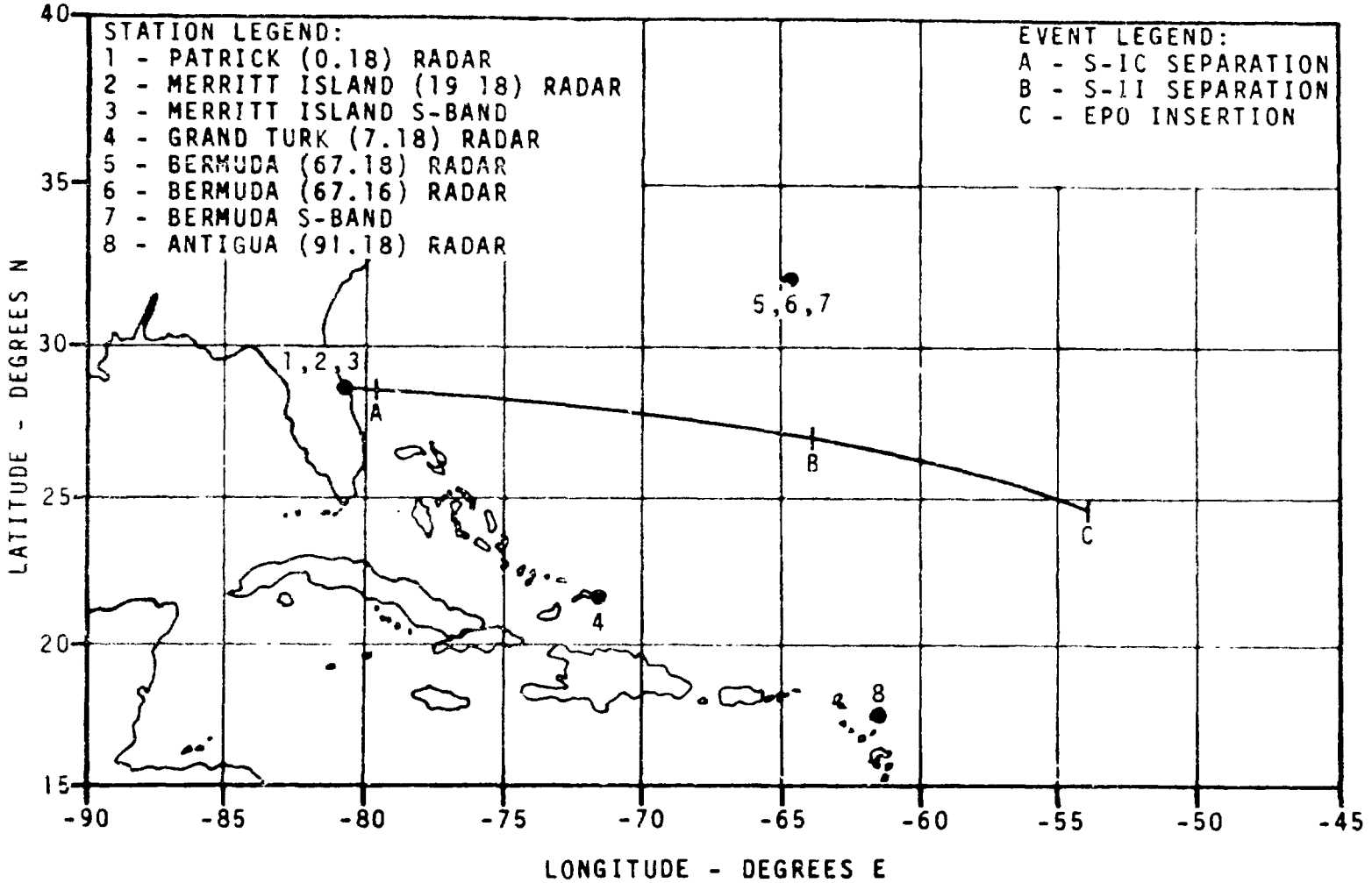

FIGURE 2-1. GROUND TRACK AND TRACKING STATIONS - ASCENT PHASE

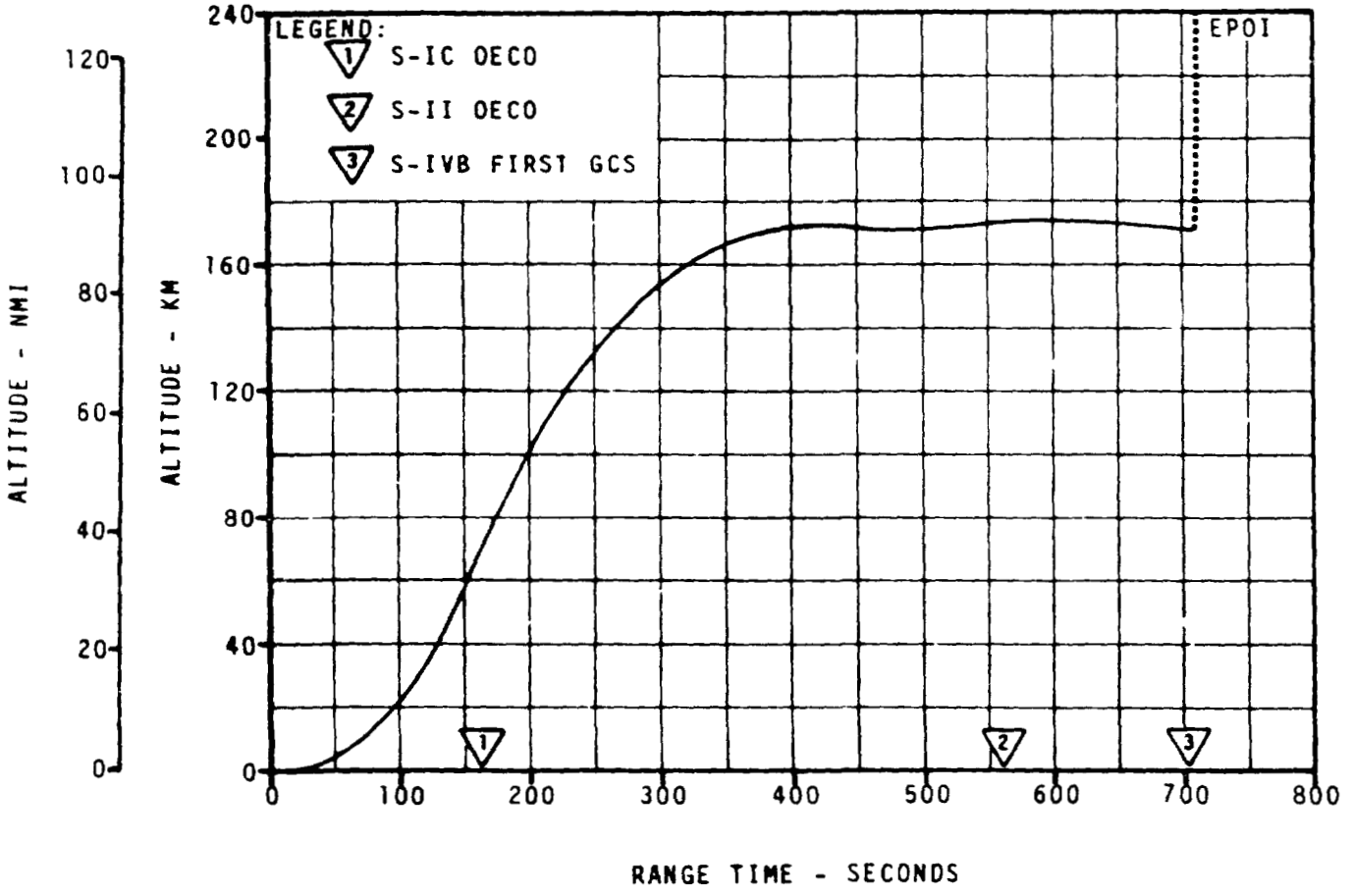

FIGURE 2-2. ALTITUDE - ASCENT PHASE

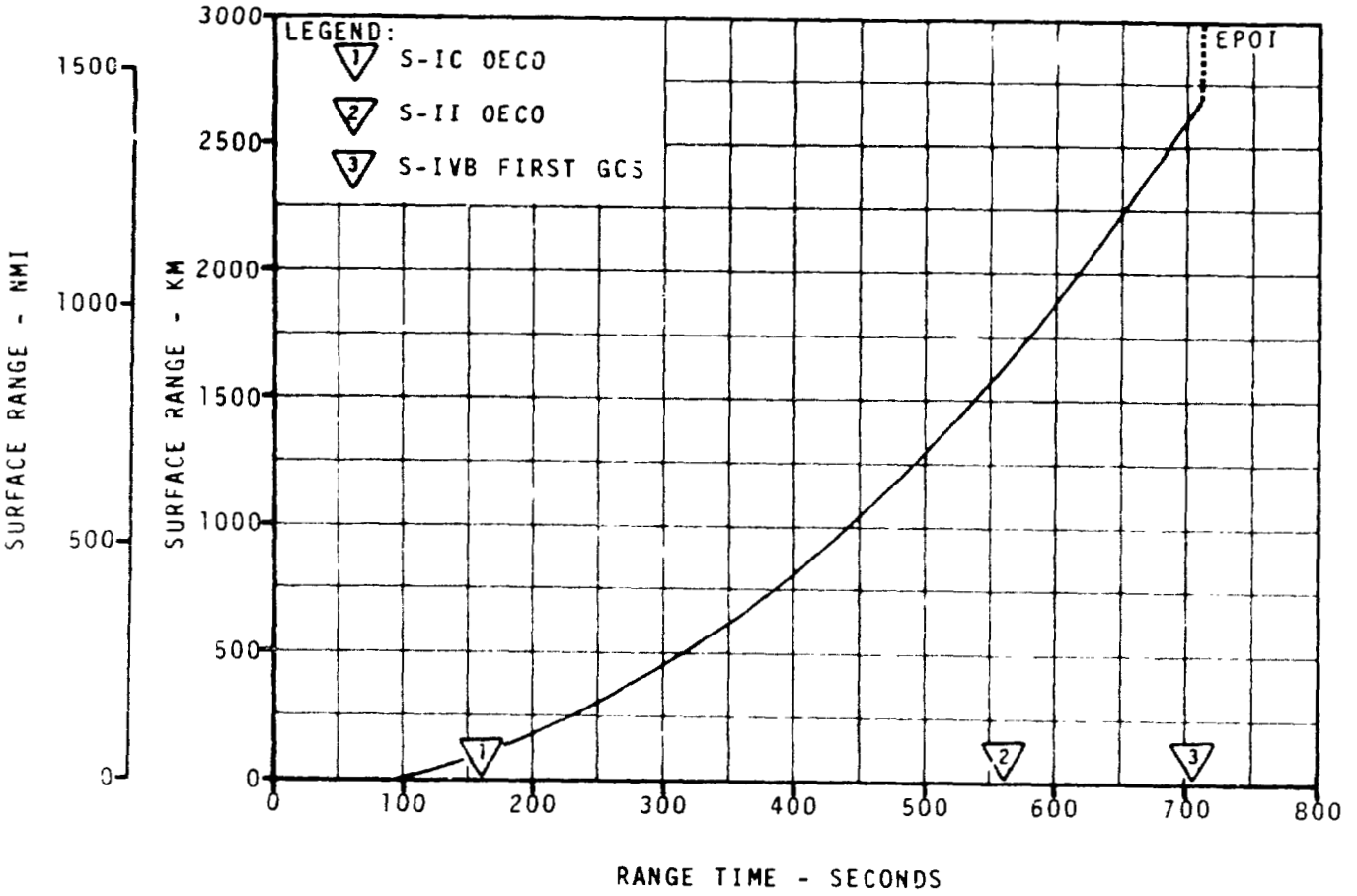

FIGURE 2-3. SURFACE RANGE - ASCENT PHASE

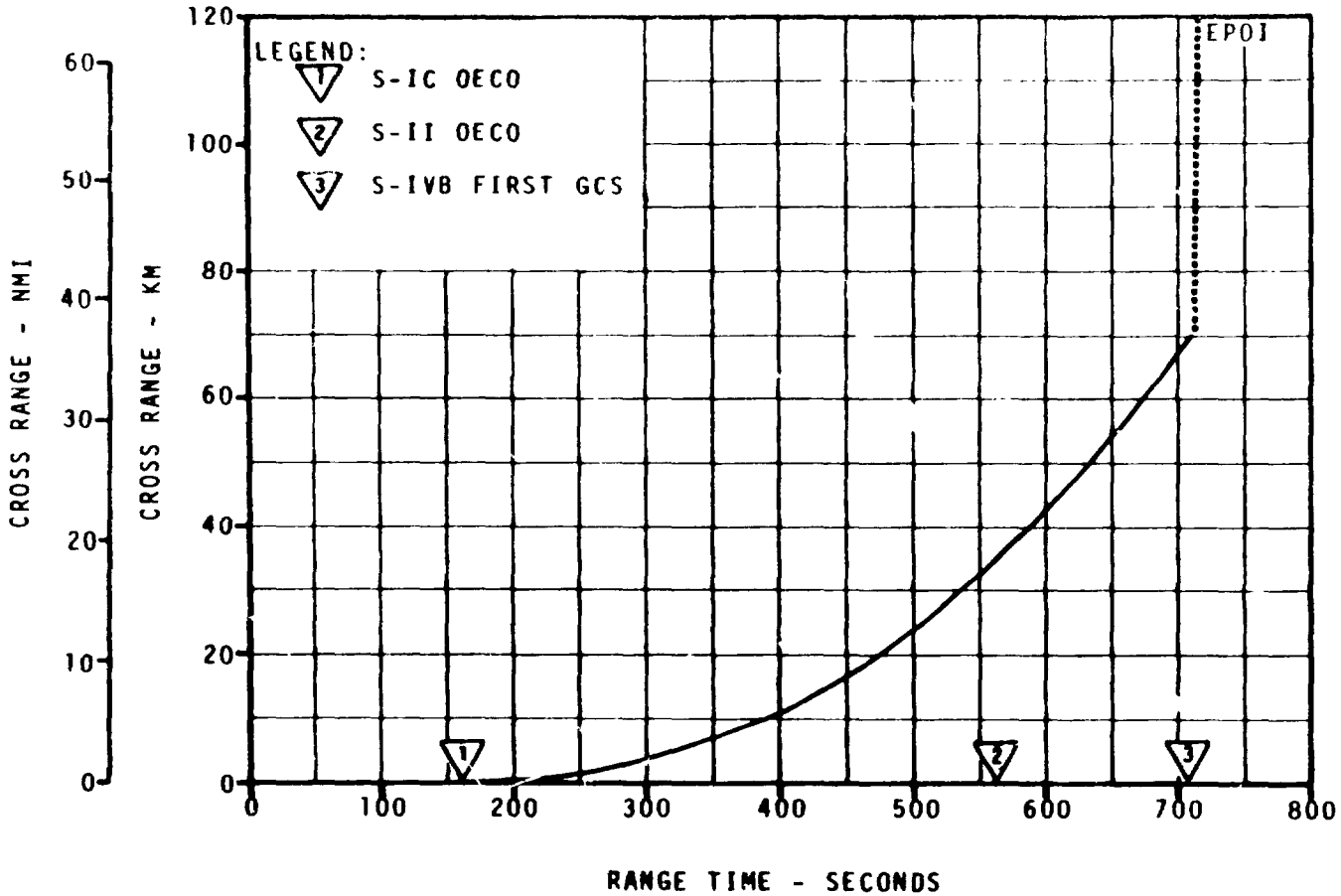

FIGURE 2-4. CROSS RANGE - ASCENT PHASE

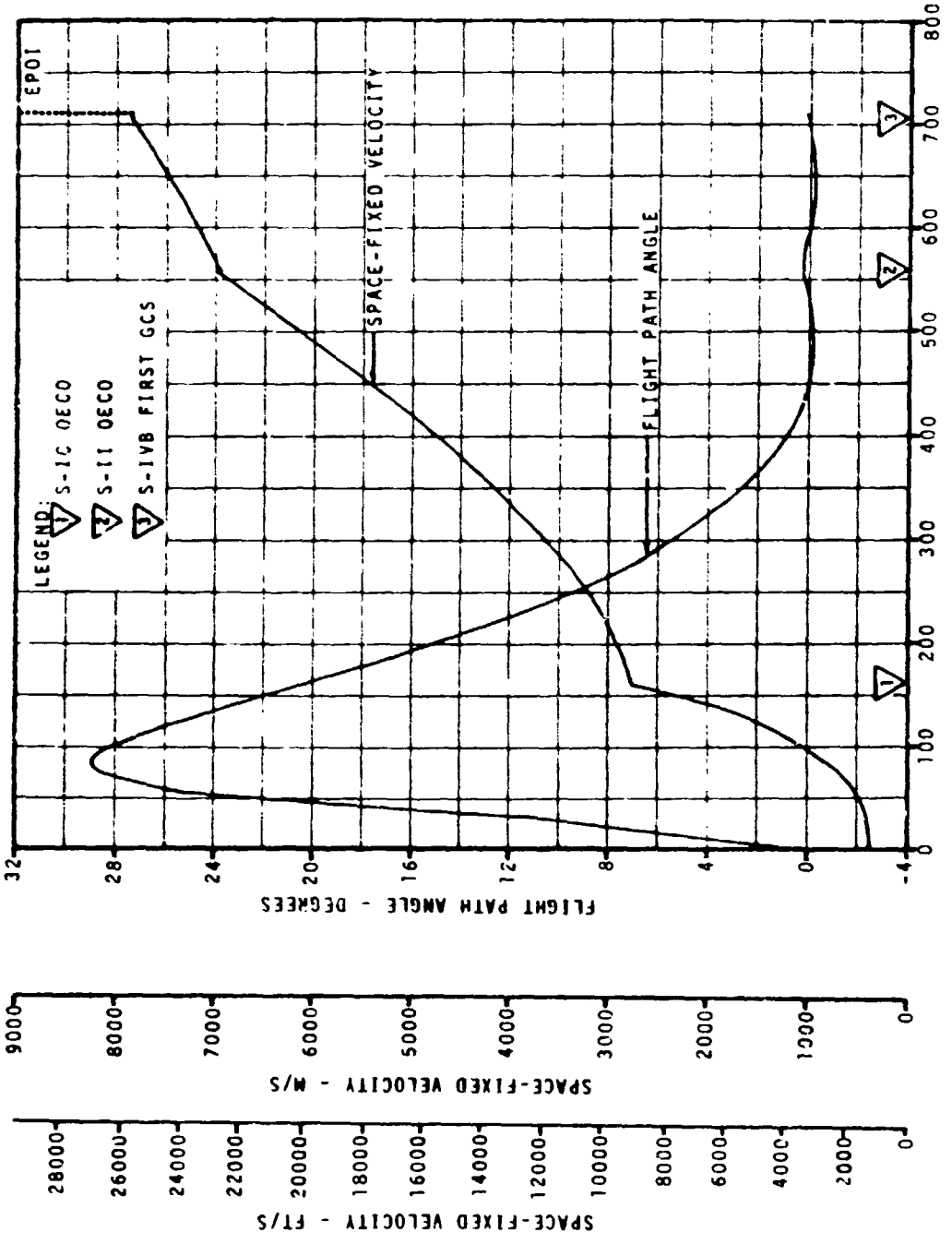

FIGURE 2-5. SPACE-FIXED VELOCITY AND FLIGHT PATH ANGLE - ASCENT PHASE

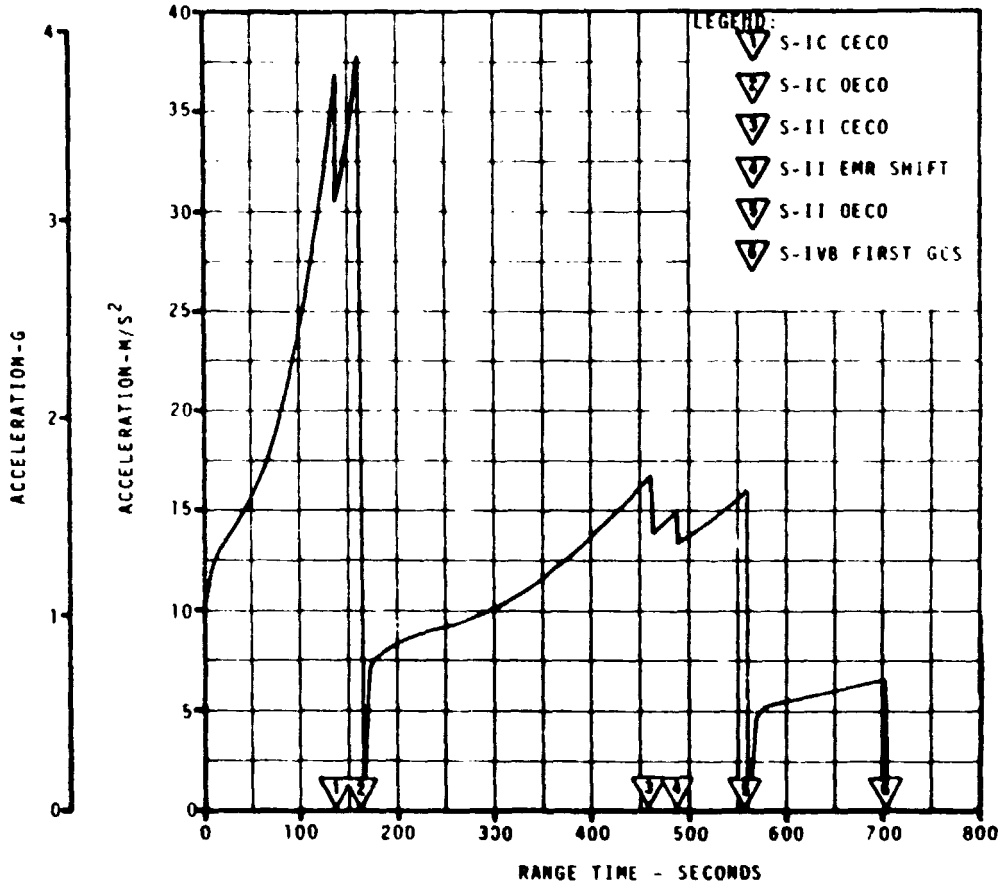

FIGURE 2-6. TOTAL INERTIAL ACCELERATION - ASCENT PHASE

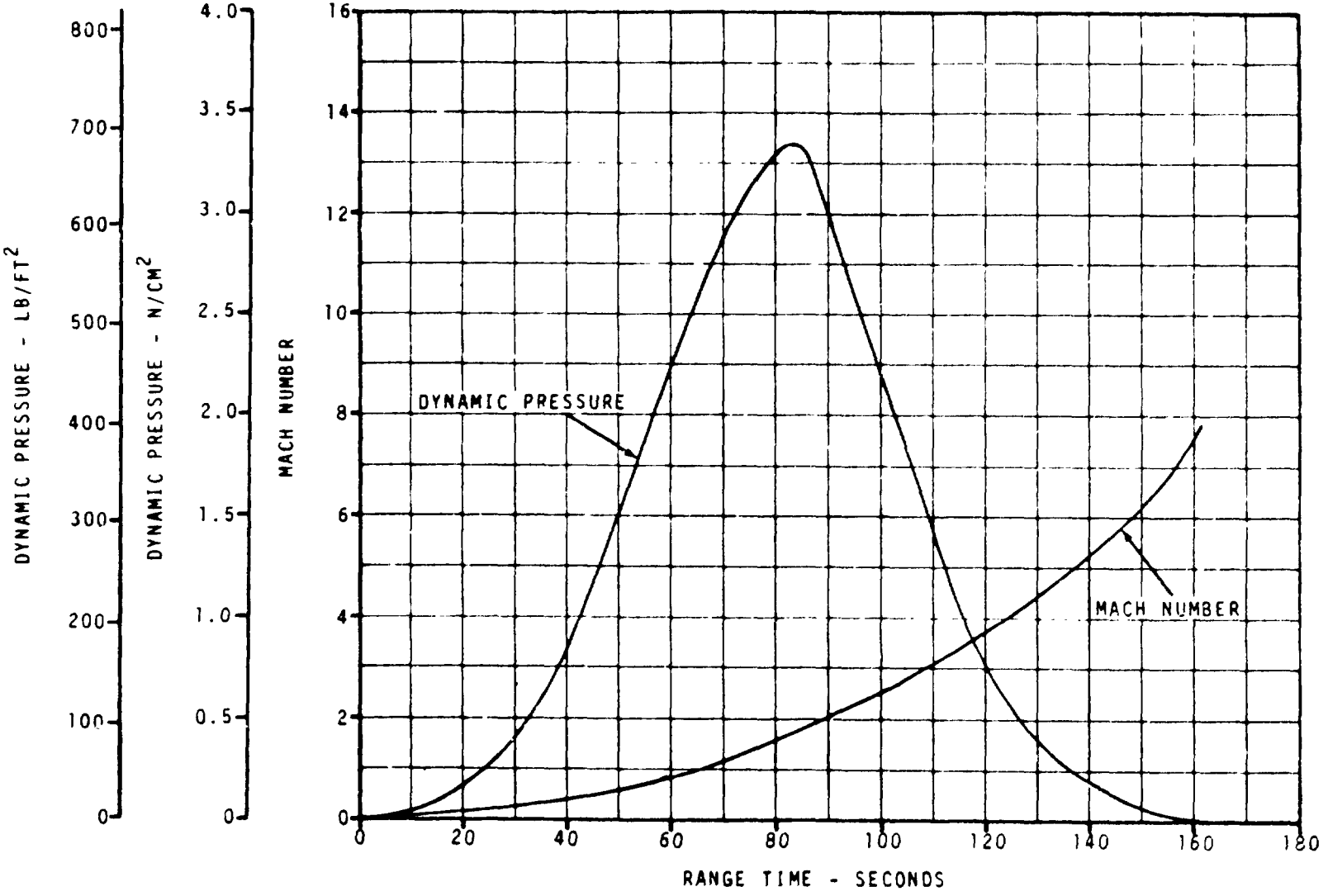

FIGURE 2-7. MACH NUMBER AND DYNAMIC PRESSURE - ASCENT PHASE

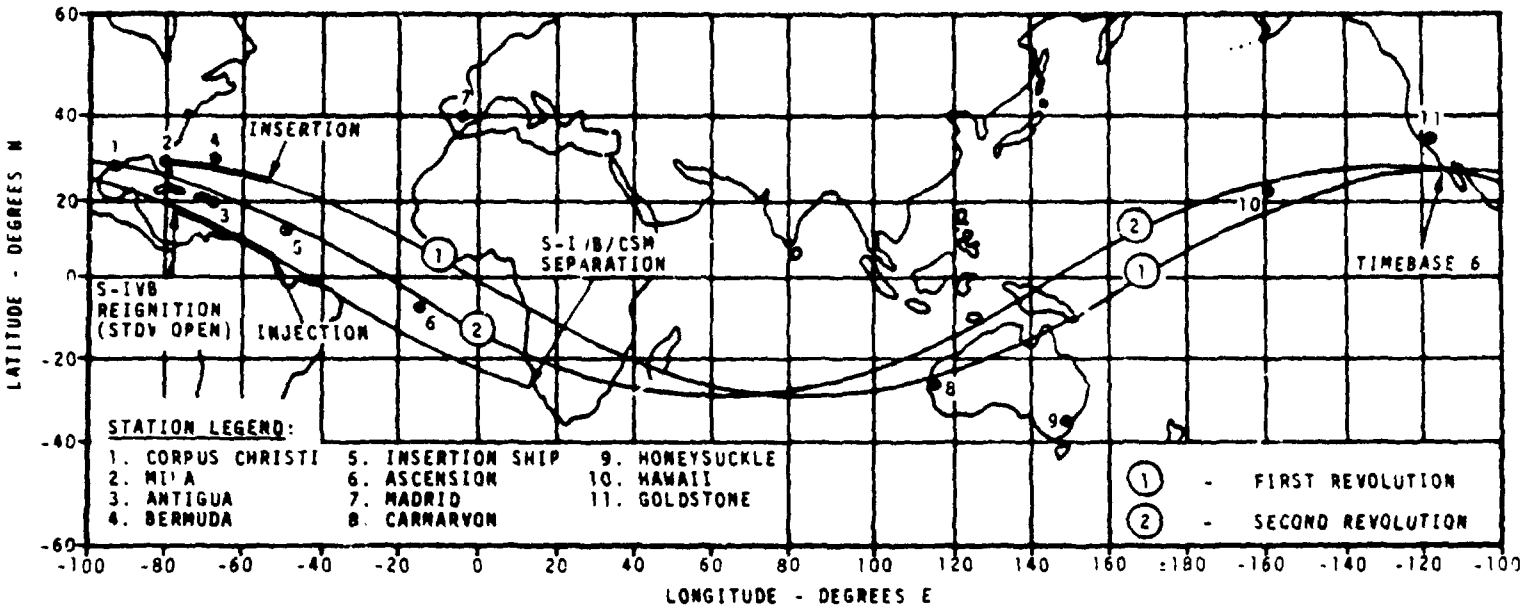

FIGURE 2-8. AS-512 LAUNCH VEHICLE GROUNDTRACK

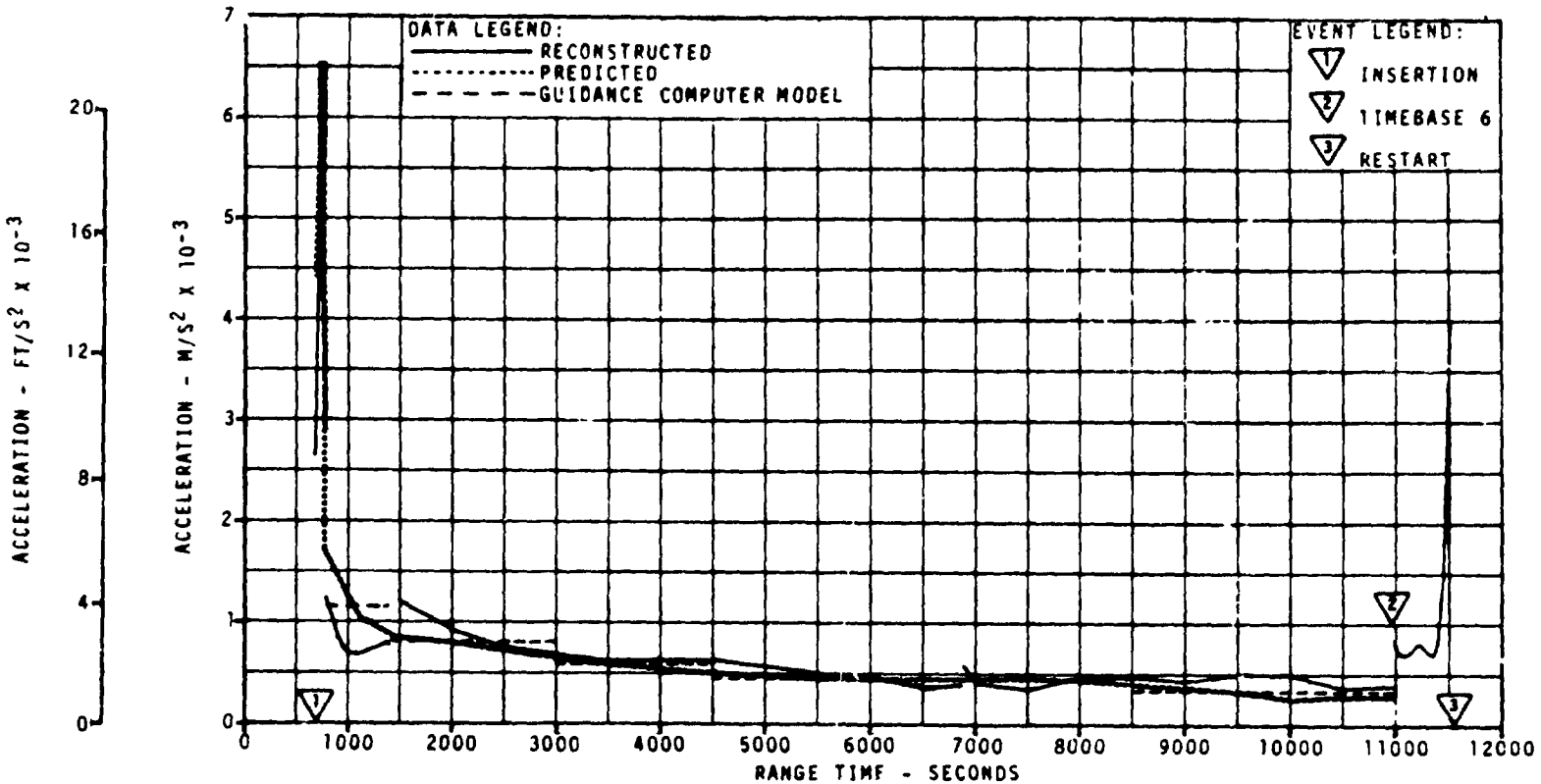

FIGURE 2-9. PARKING ORBIT NON-GRAVITATIONAL ACCELERATION

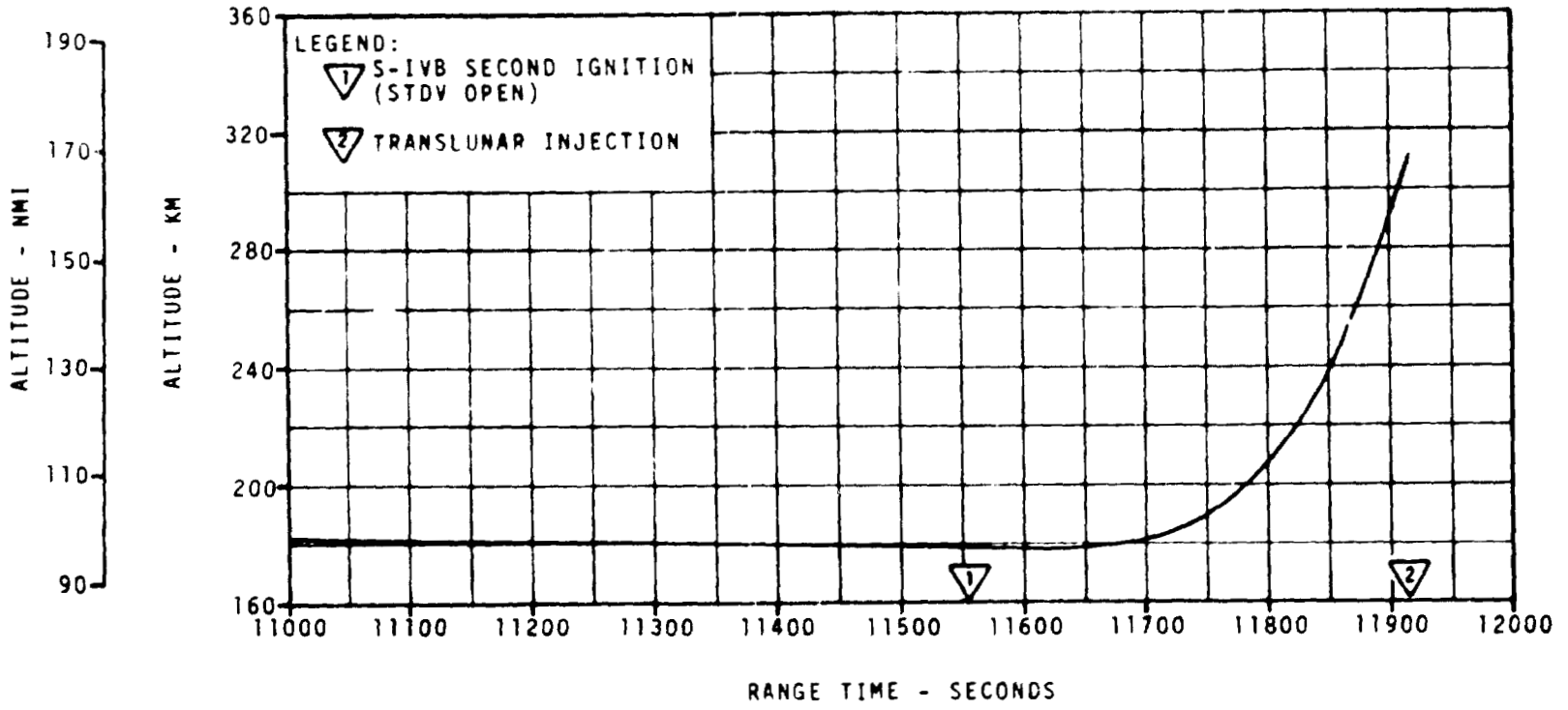

FIGURE 2-10. ALTITUDE - SECOND BURN PHASE

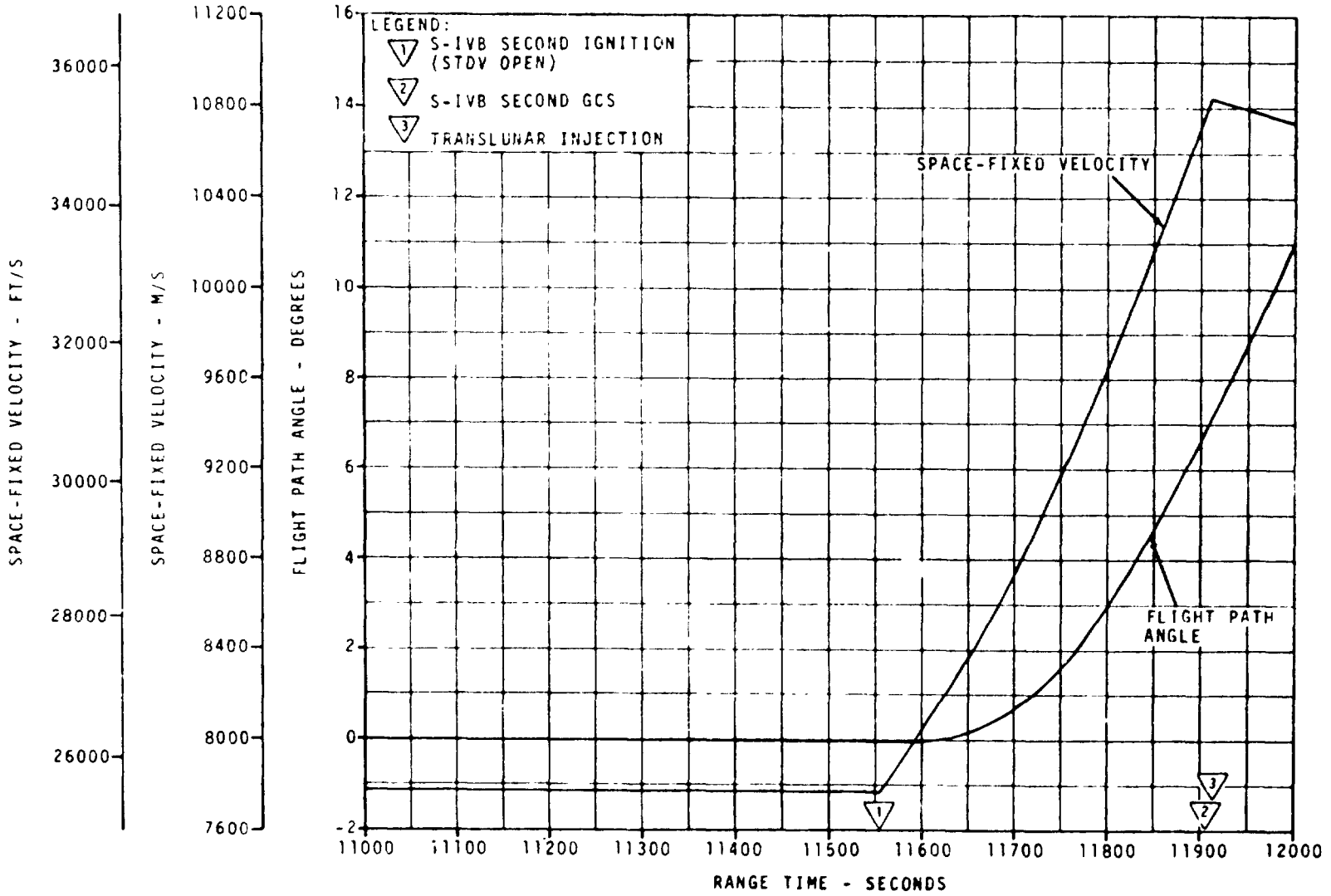

FIGURE 2-11. SPACE-FIXED VELOCITY AND FLIGHT PATH ANGLE - SECOND BURN PHASE

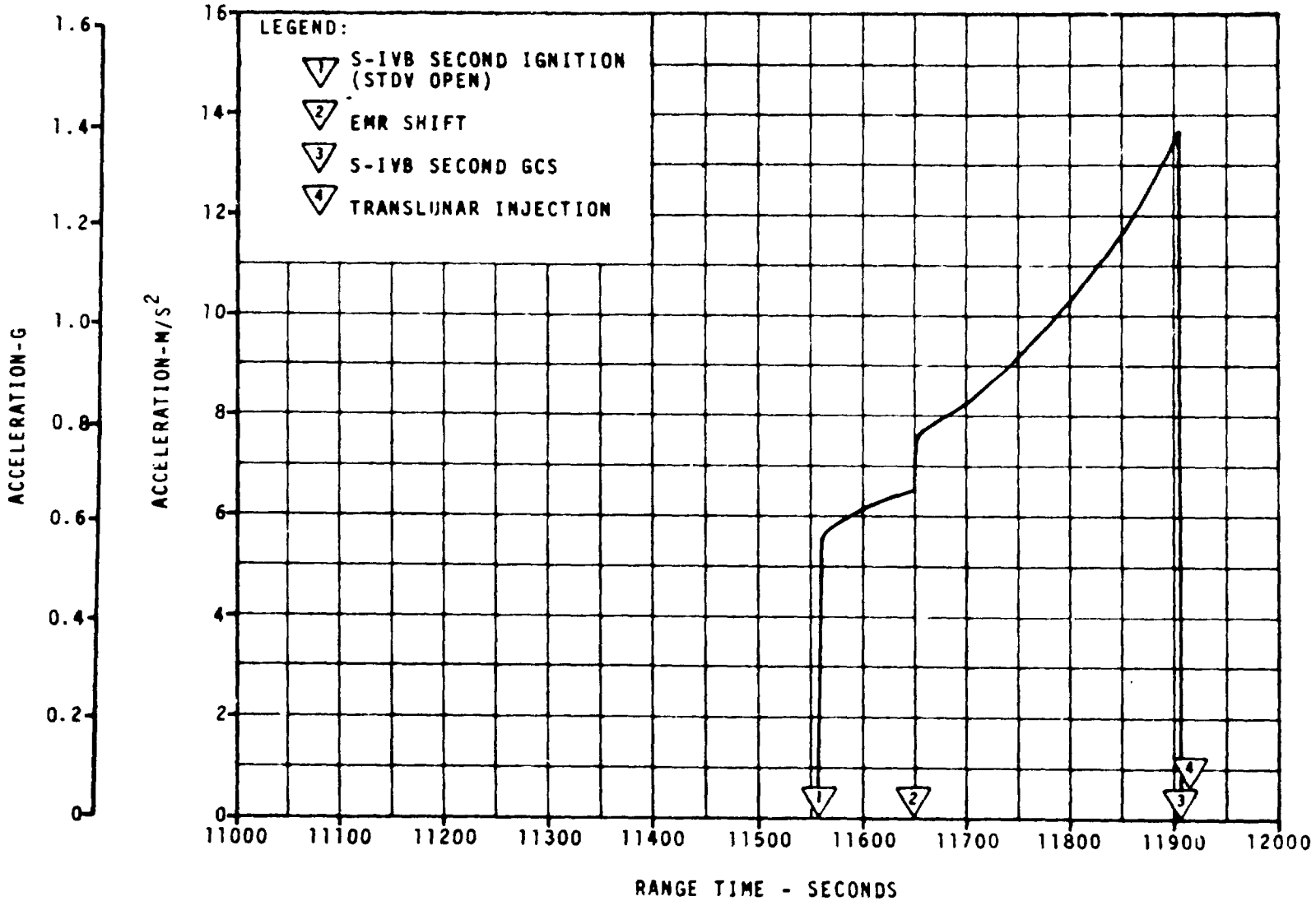

FIGURE 2-12. TOTAL INERTIAL ACCELERATION - SECOND BURN PHASE

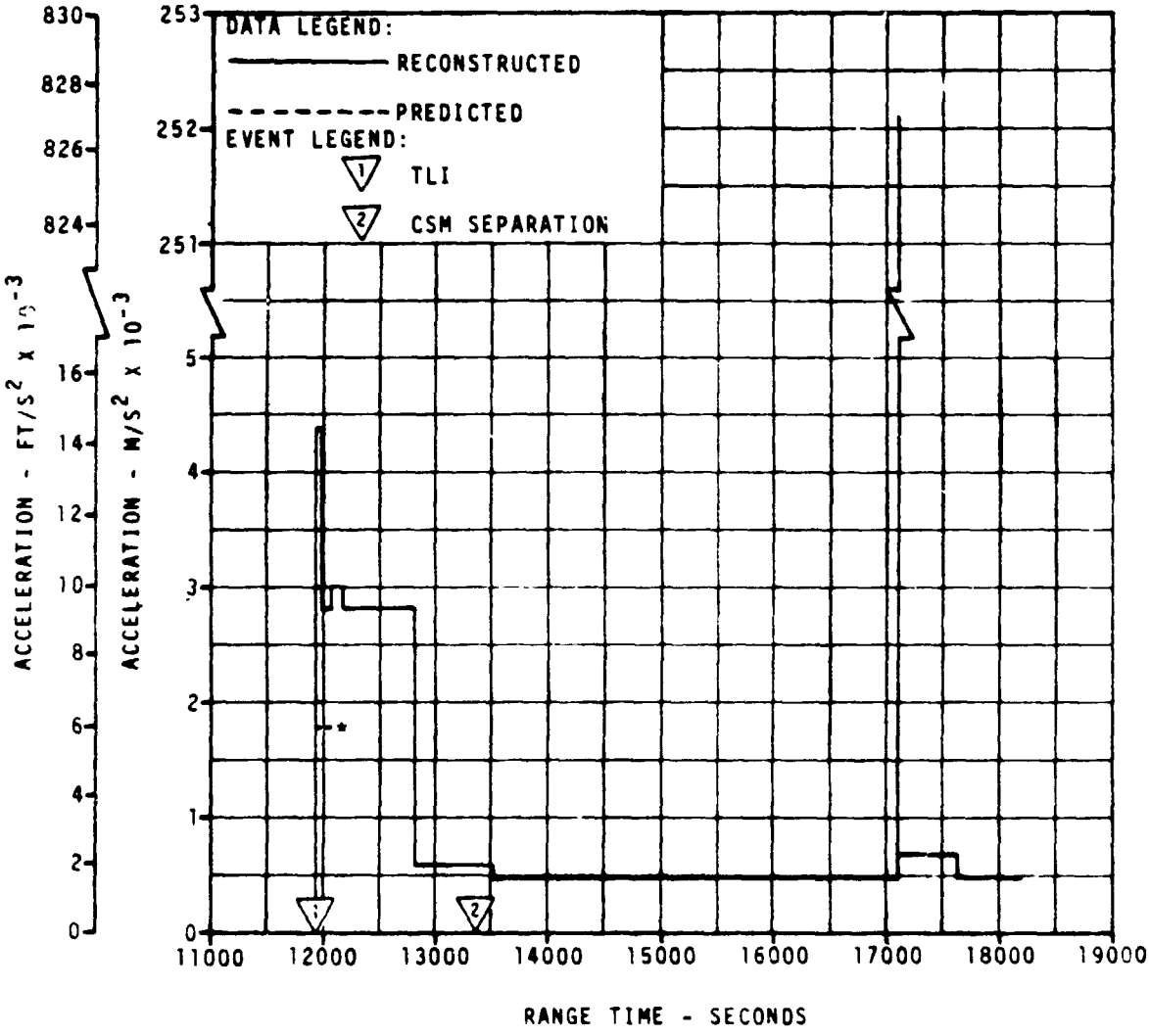

FIGURE 2-13. TRANSLUNAR ORBIT NON-GRAVITATIONAL ACCELERATION

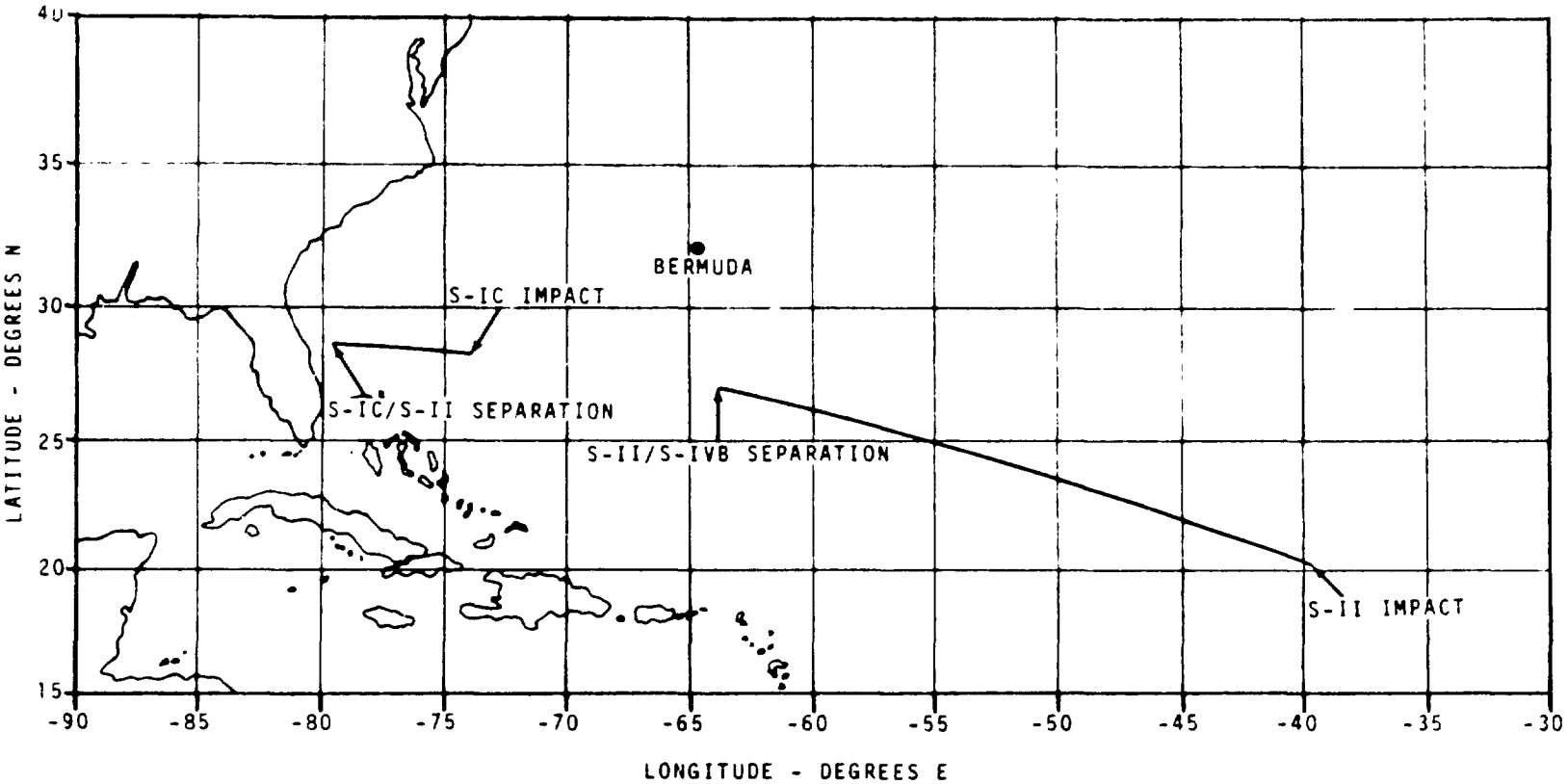

FIGURE 2-14. GROUND TRACKS FOR S-IC AND S-II SPENT STAGES

TABLE 2-I. TIMES OF SIGNIFICANT EVENTS

EVENT	ACTUAL	NOMINAL	ACT-NOM
Guidance Reference Release	-16.960	-17.010	0.050
First Motion	0.2	0.2	0.0
Start of Timebase 1	0.6	0.6	0.0
Mach 1	67.5	67.4	0.1
Maximum Dynamic Pressure	82.5	83.5	-1.0
S-IC Center Engine Cutoff	139.30	139.34	-0.04
S-IC Outboard Engine Cutoff	161.20	161.67	-0.47
S-IC/S-II Separation Command	162.9	163.4	-0.5
S-II Center Engine Cutoff	461.21	461.68	-0.47
S-II Outboard Engine Cutoff	559.66	560.13	-0.47
S-II/S-IVB Separation Command	560.6	561.1	-0.5
S-IVB First Guidance Cutoff	702.65	706.74	-4.09
Parking Orbit Insertion	712.65	716.74	-4.09
Begin S-IVB Restart Preparations	10,978.6	10,980.5	-1.9
S-IVB Engine Reignition (STDV Open)	11,556.6	11,558.5	-1.9
S-IVB Second Guidance Cutoff	11,907.64	11,905.54	2.10
Translunar Injection	11,917.64	11,915.54	2.10
CSM Separation (Initial)	13,347.6	13,405.5	-57.9

NOTE: Times used are vehicle times.

TABLE 2-II. SIGNIFICANT TRAJECTORY PARAMETERS

EVENT	PARAMETER	VALUE
First Motion	Range Time, sec	0 2
	Total Inertial Acceleration, m/s^2	10.60
	(ft/s^2)	(34 78)
	(g)	(1.08)
Mach 1	Range Time, sec	67.5
	Altitude, km	8.0
	(n mi)	(4.3)
Maximum Dynamic Pressure	Range T'me, sec	82.5
	Dynamic Pressure, N/cm^2	3 36
	(lbf/ft^2)	(701 75)
	Altitude, km	13.1
	(n mi)	(7.1)
*Maximum Total Inertial Acceleration S-IC	Range Time, sec	161.20
	Acceleration, m/s^2	37.95
	(ft/s^2)	(124.51)
	(g)	(3.87)
S-II	Range Time, sec	461 21
	Acceleration, m/s^2	17.07
	(ft/s^2)	(56.00)
	(g)	(1.74)
S-IVB First Burn	Range Time, sec	702 65
	Acceleration, m/s^2	6.54
	(ft/s^2)	(21.46)
	(g)	(0 67)
S-IVB Second Burn	Range Time, sec	11,907.64
	Acceleration, m/s^2	13.85
	(ft/s^2)	(45.44)
	(g)	(1.41)
*Maximum Earth-Fixed Velocity S-IC	Range Time, sec	162.0
	Velocity, m/s	2,374.4
	(ft/s)	(7,790.0)
S-II	Range Time, sec	560.6
	Velocity, m/s	6,573.8
	(ft/s)	(21,567.6)
S-IVB First Burn	Range Time, sec	712 7
	Velocity, m/s	7,385.6
	(ft/s)	(24,231.0)
S-IVB Second Burn	Range Time, sec	11,908 5
	Velocity, m/s	10,424 9
	(ft/s)	(34,202.4)

*NOTE: Maximums are taken at the nearest time point available.

TABLE 2-III. ENGINE CUTOFF CONDITIONS

PARAMETER	S-IC CECO	S-IC OECO	S-II CECO	S-II OECO	S-IVB FIRST GUIDANCE CUTOFF	S-IVB SECOND GUIDANCE CUTOFF
Range Time, sec	139.30	161.20	461.21	559.66	702.65	11,907.64
Altitude, km (n mi)	47.0 (25.4)	66.5 (35.9)	173.0 (93.4)	172.6 (93.2)	170.5 (92.1)	300.3 (162.1)
Space Fixed Velocity, m/s (ft/s)	2,091.8 (6,862.9)	2,746.9 (9,012.1)	5,620.4 (18,439.6)	6,990.1 (22,933.4)	7,802.3 (25,598.1)	10,844.6 (35,579.4)
Flight Path Angle, deg	23.199	20.429	-0.058	0.254	0.001	6.926
Heading Angle, deg	91.355	91.718	97.647	100.395	104.718	118.040
Surface Range, km (n mi)	51.5 (27.8)	91.0 (49.1)	1,095.0 (591.3)	1,657.6 (895.0)	2,625.2 (1,417.5)	
Cross Range, km (n mi)	0.2 (0.1)	0.3 (0.2)	18.6 (10.0)	34.8 (18.8)	67.4 (36.4)	
Cross Range Velocity, m/s (ft/s)	1.5 (4.9)	6.4 (21.0)	135.4 (444.2)	194.9 (639.4)	261.1 (856.6)	
Inclination, deg						28.466
Descending Node, deg						86.041
Eccentricity						0.9708
C_3, m^2/s^2 (ft^2/s^2)						-1,767,343 (-19,023,522)

TABLE 2-IV. STAGE SEPARATION CONDITIONS

S-IC/S-II SEPARATION		S-II/S-IVB SEPARATION		S-IVB/CSM SEPARATION	
PARAMETER	VALUE	PARAMETER	VALUE	PARAMETER	VALUE
Range Time, sec	162.9	Range Time, sec	560.6	Range Time, sec	13,347.6
Altitude, km (n mi)	68.1 (36.8)	Altitude, km (n mi)	172.6 (93.2)	Altitude, km (n mi)	6,605.8 (3,566.8)
Space-Fixed Velocity, m/s (ft/s)	2,754.2 (9,036.1)	Space-Fixed Velocity, m/s (ft/s)	6,992.8 (22,942.3)	Space-Fixed Velocity, m/s (ft/s)	7,725.1 (25,344.8)
Flight Path Angle, deg	20.151	Flight Path Angle, deg	0.244	Flight Path Angle, deg	44.177
Heading Angle, deg	.741	Heading Angle, deg	100.424	Heading Angle, deg	102.769
Surface Range, km (n mi)	94.7 (51.1)	Surface Range, km (n mi)	1,663.6 (898.3)	Geodetic Latitude, deg N	-25.703
Cross Range, km (n mi)	0.3 (0.2)	Cross Range, km (n mi)	35.0 (18.9)	Longitude, deg E	11.906
Cross Range Velocity, m/s (ft/s)	6.7 (22.0)	Cross Range Velocity, m/s (ft/s)	195.3 (640.7)		
Geodetic Latitude, deg N	28.580	Geodetic Latitude, deg N	26.865		
Longitude, deg E	-79.637	Longitude, deg E	-63.931		

TABLE 2-V. PARKING ORBIT INSERTION CONDITIONS AND COMPARISONS

PARAMETER	ACTUAL	NOMINAL	ACT-NOM
Range Time, sec	712.65	716.74	-4.09
Altitude, km (n mi)	170.5 (92.1)	170.3 (92.0)	0.2 (0.1)
Space-Fixed Velocity, m/s (ft/s)	7,804.1 (25,604.0)	7,804.3 (25,604.7)	-0.2 (-0.7)
Flight Path Angle, deg	0.003	-0.001	0.004
Heading Angle, deg	105.021	105.082	-0.061
Inclination, deg	28.526	28.524	0.002
Descending Node, deg	86.978	87.024	-0.046
Eccentricity	0.0000	0.0001	-0.0001
Apogee*, km (n mi)	167.2 (90.3)	167.4 (90.4)	-0.2 (-0.1)
Perigee*, km (n mi)	166.6 (90.0)	166.6 (90.0)	0.0 (0.0)
Period, min	87.83	87.83	0.00
Geodetic Latitude, deg N	24.681	24.642	0.039
Longitude, deg E	-53.811	-53.633	-0.178

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

TABLE 2-VI. PARKING ORBIT NON-GRAVITATIONAL ACCELERATION POLYNOMIALS

SEG. NO.	START TIME	END TIME	C_0	C_1	C_2	C_3	C_4	C_5
X1	712.65	803.00	-1.24120×10^{-3}	2.84650×10^{-6}	0.0	0.0	0.0	0.0
X2	803.00	1,483.00	-8.77093×10^{-4}	7.31293×10^{-6}	-1.22639×10^{-8}	5.86486×10^{-11}	-4.97957×10^{-14}	1.59583×10^{-17}
X3	1,483.00	6,783.00	-1.10461×10^{-3}	6.58418×10^{-7}	2.92023×10^{-10}	-7.79176×10^{-14}	-2.00010×10^{-17}	4.02550×10^{-21}
X4	6,783.00	10,971.00	-4.69404×10^{-4}	1.21982×10^{-6}	-1.48170×10^{-9}	9.98793×10^{-13}	-2.78952×10^{-16}	2.63195×10^{-20}
X5	10,971.00	11,520.00	-3.86104×10^{-4}	-6.16050×10^{-7}	2.78860×10^{-8}	-2.50014×10^{-10}	8.11566×10^{-13}	-8.66406×10^{-16}
Y1	712.65	803.00	-2.87543×10^{-4}	0.0	0.0	0.0	0.0	0.0
Y2	803.00	1,483.00	-7.29901×10^{-4}	2.98498×10^{-6}	-2.56485×10^{-9}	-1.03493×10^{-11}	1.74852×10^{-14}	-7.02658×10^{-18}
Y3	1,483.00	6,783.00	-2.95806×10^{-4}	1.70975×10^{-8}	-2.92437×10^{-12}	0.0	0.0	0.0
Y4	6,783.00	10,971.00	-2.72578×10^{-4}	-5.19706×10^{-9}	0.0	0.0	0.0	0.0
Y5	10,971.00	11,520.00	-3.77831×10^{-4}	3.78389×10^{-7}	0.0	0.0	0.0	0.0
Z1	712.65	803.00	2.31910×10^{-3}	1.35390×10^{-4}	-1.49180×10^{-6}	0.0	0.0	0.0
Z2	803.00	1,483.00	6.60398×10^{-4}	-1.00437×10^{-6}	6.38252×10^{-9}	-2.02060×10^{-11}	2.15679×10^{-14}	-7.60045×10^{-18}
Z3	1,483.00	6,783.00	9.12796×10^{-5}	-9.70418×10^{-7}	-1.90527×10^{-11}	3.61365×10^{-13}	-1.07363×10^{-16}	8.77125×10^{-21}
Z4	6,783.00	10,971.00	1.05365×10^{-4}	-2.91997×10^{-7}	-7.56821×10^{-10}	7.24517×10^{-13}	-1.98008×10^{-16}	1.74834×10^{-20}
Z5	10,971.00	11,520.00	7.13286×10^{-4}	-2.62257×10^{-6}	-6.00016×10^{-9}	2.07347×10^{-10}	-7.97807×10^{-13}	8.84850×10^{-16}

POLYNOMIAL MODEL
ACCELERATION BIAS TERMS
(SEE SECTION 3.1.2)

712.65 TO 11,520.0

X = -1.33156×10^{-4}
Y = 3.22395×10^{-4}
Z = -3.75742×10^{-5}

3,600.0 TO 7,200.0

X = 7.71847×10^{-6}
Y = 4.68097×10^{-6}
Z = -9.40748×10^{-6}

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 (M/SEC^2) AND $t = T-T_S$ WHERE $T_S<t<T_E$

THE START TIME (T_S) AND END TIME (T_E) FOR EACH SEGMENT ARE EXPRESSED IN SECONDS RANGE TIME

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

TABLE 2-VII. TRANSLUNAR INJECTION CONDITIONS AND COMPARISONS

PARAMETER	ACTUAL	NOMINAL	ACT-NOM
Range Time, sec	11,917.64	11,915.54	2.10
Altitude, km (n mi)	313.7 (169.4)	307.7 (166.1)	6.0 (3.3)
Space-Fixed Velocity, m/s (ft/s)	10,837.3 (35,555.4)	10,842.1 (35,571.2)	-4.8 (-15.8)
Flight Path Angle, deg	7.379	7.240	0.139
Heading Angle, deg	118.110	118.039	0.071
Inclination, deg	28.466	28.423	0.043
Descending Node, deg	86.042	86.149	-0.107
Eccentricity	0.9722	0.9721	0.0001
C_3, m^2/s^2 (ft^2/s^2)	-1,686,397 (-18,152,226)	-1,689,026 (-18,180,525)	2,629 (28,299)

TABLE 2-VIII. TRANSLUNAR ORBIT NON-GRAVITATIONAL ACCELERATION POLYNOMIALS

SEG. NO.	START TIME	END TIME	C_0	C_1	C_2	C_3	C_4	C_5
X1	11,917.64	11,978.00	-3.33333×10^{-3}	0.0	0.0	0.0	0.0	0.0
X2	11,978.00	12,058.00	0.0	0.0	0.0	0.0	0.0	0.0
X3	12,058.00	12,158.00	-5.00000×10^{-4}	0.0	0.0	0.0	0.0	0.0
X4	12,158.00	12,810.00	1.63400×10^{-4}	0.0	0.0	0.0	0.0	0.0
X5	12,810.00	13,517.00	2.82490×10^{-4}	0.0	0.0	0.0	0.0	0.0
X6	13,517.00	17,101.00	1.57920×10^{-4}	0.0	0.0	0.0	0.0	0.0
X7	17,101.00	17,102.00	3.00000×10^{-2}	0.0	0.0	0.0	0.0	0.0
X8	17,102.00	17,592.00	3.46940×10^{-4}	0.0	0.0	0.0	0.0	0.0
X9	17,592.00	18,180.00	1.95580×10^{-4}	0.0	0.0	0.0	0.0	0.0
Y1	11,917.64	12,810.00	-2.80270×10^{-3}	0.0	0.0	0.0	0.0	0.0
Y2	12,810.00	13,517.00	-3.81360×10^{-4}	0.0	0.0	0.0	0.0	0.0
Y3	13,517.00	17,101.00	-2.87380×10^{-4}	0.0	0.0	0.0	0.0	0.0
Y4	17,101.00	17,102.00	-1.50000×10^{-1}	0.0	0.0	0.0	0.0	0.0
Y5	17,102.00	17,592.00	-3.26530×10^{-4}	0.0	0.0	0.0	0.0	0.0
Y6	17,592.00	18,180.00	-2.80610×10^{-4}	0.0	0.0	0.0	0.0	0.0
Z1	11,917.64	11,978.00	1.00000×10^{-3}	0.0	0.0	0.0	0.0	0.0
Z2	11,978.00	12,058.00	6.66667×10^{-4}	0.0	0.0	0.0	0.0	0.0
Z3	12,058.00	12,158.00	-6.25000×10^{-4}	0.0	0.0	0.0	0.0	0.0
Z4	12,158.00	12,810.00	9.47710×10^{-5}	0.0	0.0	0.0	0.0	0.0
Z5	12,810.00	13,517.00	4.51980×10^{-5}	0.0	0.0	0.0	0.0	0.0
Z6	13,517.00	17,101.00	3.20860×10^{-5}	0.0	0.0	0.0	0.0	0.0
Z7	17,101.00	17,102.00	-2.00000×10^{-1}	0.0	0.0	0.0	0.0	0.0
Z8	17,102.00	17,592.00	-1.02040×10^{-4}	0.0	0.0	0.0	0.0	0.0
Z9	17,592.00	18,180.00	3.22130×10^{-5}	0.0	0.0	0.0	0.0	0.0

POLYNOMIAL MODEL
ACCELERATION BIAS TERMS

X = 1.56532×10^{-5}

Y = 1.16840×10^{-5}

Z = -3.88771×10^{-4}

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 (M/SEC^2) AND $t = T-T_S$ WHERE $T_S<t<T_E$

THE START TIME (T_S) AND END TIME (T_E) FOR EACH SEGMENT ARE EXPRESSED IN SECONDS RANGE TIME

THE ACCELERATION COMPONENTS ARE EXPRESSED IN THE LAUNCH VEHICLE PLATFORM - ACCELEROMETER SYSTEM (PACS512)

TABLE 2-IX. S-IC SPENT STAGE TRAJECTORY PARAMETERS

EVENT	PARAMETER	VALUE
Impact: Tumbling Case	Range Time, sec	551.708
	Latitude, deg N	28.219
	Longitude, deg E	-73.878
	Surface Range, km	660.4
	(n mi)	(356.6)
Impact: 0° Angle-of-Attack	Range Time, sec	511.070
	Latitude, deg N	28.210
	Longitude, deg E	-73.769
	Surface Range, km	669.2
	(n mi)	(361.3)
Impact: 90° Angle-of-Attack	Range Time, sec	586.175
	Latitude, deg N	28.224
	Longitude, deg E	-73.938
	Surface Range, km	654.5
	(n mi)	(353.4)
Apex: Tumbling Case	Range Time, sec	273.689
	Altitude, km	120.2
	(n mi)	(64.9)
	Surface Range, km	328.1
	(n mi)	(177.2)

TABLE 2-X. S-II SPENT STAGE TRAJECTORY PARAMETERS

EVENT	PARAMETER	VALUE
Impact: Tumbling Case	Range Time, sec	1,196.947
	Latitude, deg N	20.056
	Longitude, deg E	-39.604
	Surface Range, km	4,246.2
	(n mi)	(2,292.8)
Impact: 0° Angle-of-Attack	Range Time, sec	1,163.163
	Latitude, deg N	19.960
	Longitude, deg E	-39.355
	Surface Range, km	4,274.3
	(n mi)	(2,307.9)
Impact: 90° Angle-of-Attack	Range Time, sec	1,236.019
	Latitude, deg N	20.155
	Longitude, deg E	-39.862
	Surface Range, km	4,217.1
	(n mi)	(2,277.1)
Apex: Tumbling Case	Range Time, sec	574.527
	Altitude, km	172.8
	(n mi)	(93.3)
	Surface Range, km	1,752.4
	(n mi)	(946.2)

SECTION 3

TRAJECTORY ACCURACY

Trajectory reconstruction is an estimation process with the resulting confidence level or accuracy of the trajectory dependent upon the following factors:

a. Quantity of tracking data
b. Quality of tracking data
c. Consistency between tracking and guidance velocity data
d. Continuity between trajectory phases (boost, parking orbit, second burn, and translunar orbit)

These factors vary from flight to flight so that a rigorous statistical error analysis of the reconstructed trajectory is difficult to obtain. However, the extent to which systematic errors can be identified and corrected, plus random errors averaged out, determines the accuracy of the reconstruction. This section summarizes the results for the AS-512 flight and leads to the position and velocity uncertainties for the reconstructed trajectory. In addition, the basic analysis methods used in the reconstruction are presented in this section.

3.1 TRAJECTORY RECONSTRUCTION METHODS

The trajectory reconstruction process takes place in three stages:

a. Initial data preparation
b. Main analysis
c. Output data processing

The initial data preparation converts the raw tracking and guidance velocity data to a form compatible with the estimation programs. This includes correction for atmospheric refraction (for OCP and GATE), conversion of doppler count to instantaneous range rate, data editing, and data reformatting.

The main analysis effort is conducted with three separate estimation tools. The tools are:

a. The Guidance and Tracking Evaluation program that uses a Kalman estimation method to fit C-band and S-band measurements during powered and non-powered flight phases. The GATE program employs the Cowell formulation of the differential equations of motion to model tracker angles, range, and instantaneous range rate.

3.1 (Continued)

b. The Orbital Correction Program that uses a weighted least squares estimation method to fit C-band and S-band measurements during non-powered flight phases. The OCP employs the Cowell formulation of the differential equations of motion to model tracker angles, range, and instantaneous range rate.

c. The Lunar Impact Determination program that uses a Kalman estimation method to fit C-band and S-band measurements during non-powered flight phases. The LID program employs the Encke formulation of the differential equations of motion to model tracker angles, range, and average range rate.

These three tools were used to iteratively develop the separate powered and unpowered flight trajectory segments. Capability exists with the three tools to incorporate end point constraints as required to provide trajectory continuity and consistency. The residual plots (see Paragraph 3.2.2) depicted in this section were produced with the GATE program for the ascent phase and with the LID program for the coast phases.

After the main analysis is completed, the separate trajectory segments are merged together and transformed to several coordinate systems to provide the output trajectory listings and tapes. Included in this output data processing is a rework of the first 20 seconds of the ascent phase to better represent the early launch portion of the trajectory. Also, the engine start, cutoff, and mixture ratio shift transient areas of the powered flight portions of the trajectory are reshaped in order to better represent the conditions and to incorporate the specific event times.

3.1.1 Powered Flight Trajectory Determination

The GATE program is used to determine the powered flight phases of the trajectory (ascent phase and second burn powered segment). Telemetered guidance velocity data from on-board the vehicle are used as generating parameters in conjunction with a comprehensive gravity model to produce a trajectory to fit the available tracking data. The Kalman estimation scheme is generally used to solve for coefficients of a guidance error model and, when desired, for corrections to initial position and velocity.

3.1.2 Non-Powered Flight Trajectory Determination

The three above mentioned tools were used for non-powered or coasting orbit determination. The OCP uses a polynomial to represent the non-gravitational accelerations (see Section 2.2). The GATE and LID programs use either polynomial or

3.1.2 (Continued)

tabular representations of the perturbing accelerations. The perturbing accelerations are used in conjunction with a comprehensive gravity model to simulate the trajectory used to fit the tracking data. The estimation techniques are applied to obtain, generally, the initial vehicle position and velocity plus acceleration bias terms. For the AS-512 parking orbit, several iterations were made to determine biases needed to adjust the polynomial accelerations to produce a consistent orbit. It was noted that an additional bias was needed during the latter part of the first revolution and the early part of the second revolution to adequately fit the tracking data. The constant terms of the polynomial were adjusted by the biases specified in Table 2-VI from 712.65 to 11,520 seconds. A subsequent set of iterations were then made to determine the additional acceleration needed from 3,600 to 7,200 seconds. These additional biases are also listed in Table 2-VI.

3.1.3 Estimation of Trajectory Segments

With these three programs, the analysis proceeds by successive iterations to eliminate poor-quality and inconsistent tracking data from the solutions. Other estimation controls, such as relative data weights, are varied from run to run until an overall best-estimate trajectory is obtained. State vectors from adjacent segments can be used in a particular segment and weighted appropriately to provide initial or final constraining state vectors. This constraint feature permits the development of a continuous and consistent trajectory when the segments are later merged. The criteria for evaluating a particular solution include the magnitudes and shapes of tracking residuals (differences between actual tracking and the reconstructed trajectory), the values of the guidance error model coefficients or polynomial bias terms, and the consistency between the separately estimated trajectory segments. A state vector comparison is used for judging the consistency between the various state vectors developed at time points common to two trajectory segments. Generally, the time points used for this state vector consistency judgment are Earth Parking Orbit Insertion, Restart Preparation (somewhere in Timebase 6), and Translunar Injection.

3.2 TRAJECTORY DATA SOURCES

3.2.1 Tracking Data-Quantity

Time periods for which C-band radar and S-band tracking data were available for AS-512 reconstruction are illustrated in Figure 3-1. The geographic locations of the tracking stations are shown on ground track Figures 2-1 and 2-8 and are itemized

3.2.1 (Continued)

in Table 3-I. Most of the tracking data were used except for isolated points or for data segments which were inconsistent with adjacent data.

The C-band tracking data were provided in azimuth angle, elevation angle, and range measured parameters. These measurements are defined in Reference 1 and are designated as PACSS3a. The USB tracking data were provided in X-angle, Y-angle, range and range rate measured parameters. These, also, are defined in Reference 1, and are designated as PACSS3c and 3d, for the 30-foot and 85-foot antennas, respectively.

As shown in Figure 3-1, adequate data existed in order to determine the AS-512 trajectory. In general, tracking coverage was redundant except for the second burn powered segment where no tracking data were available.

3.2.2 Tracking Data-Quality

Measured parameter comparisons between the tracking data and the reconstructed trajectory were calculated as required in the various PACSS3 coordinate systems. The position components of the trajectory in PACSS10 were transformed into the measured parameters of the PACSS3 system appropriate to each tracker. To more accurately model the tracking measurements, precession and nutation of the earth and aberration effects are modeled in the analysis programs. Residual differences or deviations (observed tracking data minus calculated tracking data, O-C) were determined for the various tracking data sets. These residual differences are used for assessing the quality of the tracking data as well as determining how well the reconstructed trajectory fits the data.

The ascent phase measured parameter residuals are shown in Figures 3-2 through 3-9. Merritt Island, Patrick, Grand Turk, Bermuda and Antigua C-band residuals are given in Figures 3-2 through 3-7. Residuals for the Merritt Island and Bermuda S-band trackers are shown in Figures 3-8 and 3-9.

Measured parameter residuals during the parking orbit phase are given chronologically in Figures 3-10 through 3-27. Figures 3-10, 3-11, 3-16, and 3-18 give first pass residuals for the Antigua, Carnarvon, Merritt Island and Bermuda C-band radars, respectively. Carnarvon, Hawaii, Goldstone, Texas, Merritt Island and Bermuda S-band first pass residuals are shown in Figure 3-12 through 3-15, 3-17, and 3-19, respectively, Second pass residuals for the Carnarvon and Merritt Island

3.2.2 (Continued)

radars are shown in Figures 3-21 and 3-26, respectively. Ascension, Carnarvon, Hawaii, Goldstone, Texas and Merritt Island S-band second pass residuals are given in Figures 3-20, 3-22 through 3-25, and 3-27, respectively.

The translunar phase measured parameter residuals are given in Figures 3-28 through 3-30. S-band residuals for the Ascension and Carnarvon trackers are shown in Figures 3-28 and 3-30. Figure 3-29 shows the Carnarvon C-band radar residuals.

It is to be noted that the above measured parameter residuals for all phases of the flight depict the consistent data sets which were used in the reconstruction of the various trajectory phases.

3.2.3 Guidance Velocity Data

Guidance velocity data throughout the separate trajectory phases were received from the ST-124M inertial platform. The velocity data during the powered phases (ascent and second burn) were used directly by the GATE program as non-gravitational generating parameters. Velocity data during the orbit phases (parking and translunar) were fitted with polynomials and used by the OCP, GATE, and LID programs to provide non-gravitational effects (see Paragraphs 2.2 and 2.4, and Figures 2-9 and 2-13).

3.3 CONSISTENCY BETWEEN TRACKING AND GUIDANCE VELOCITY DATA

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

The guidance velocity error plots for the ascent phase had reasonable shapes and magnitudes. The maximum error amounted to 0.8 m/s (2.6 ft/s) in the vertical direction, 2.8 m/s (9.2 ft/s) in the crossrange direction, and 0.2 m/s (0.7 ft/s) in the downrange direction, referenced to the launch vehicle platform accelerometer coordinate system (PACSS12).

The downrange and vertical guidance velocity error plots for the second burn powered segment also had reasonable shapes and magnitudes. The crossrange error component had a reasonable shape, but a larger magnitude than has been observed on

3.3 (Continued)

previous flights. Guidance analysis has shown the crossrange error magnitude to be compatible with the ascent phase crossrange error magnitude (Reference 2). Due to the constraint of exactly matching restart and TLI vectors, the velocity errors also reflect trajectory uncertainties at 11,500 seconds and TLI. The maximum error amounted to 1.1 m/s (3.6 ft/s) in the vertical direction, 11.8 m/s (38.7 ft/s) in the crossrange direction, and 1.4 m/s (4.6 ft/s) in the downrange direction, referenced to PACSS12.

3.4 CONTINUITY BETWEEN TRAJECTORY PHASES

The continuity between independently estimated trajectory segments is used as one of the indicators of the trajectory accuracy. A measure of the continuity between two adjacent trajectory segments is obtained by differencing the state vectors at a time point common to both segments. As noted in Paragraph 3.1.3, the time points normally used for continuity judgments are parking orbit insertion, a point somewhere during S-IVB restart preparation after TB6, and translunar injection. Comparisons at these time points were made for the AS-512 analysis and are described below. Following these comparisons, the separate trajectory segments were merged together, in the manner also described below, to provide the complete trajectory from GRR to CSM separation.

Comparisons of the state vectors at parking orbit insertion obtained independently by the powered flight and parking orbit analyses yielded excellent agreement. The position and velocity components of the two best-estimate solutions had a spread of 161 m (528 ft) and 0.5 m/s (1.6 ft/s) in the vertical direction, 37 m (121 ft) and 0.5 m/s (1.6 ft/s) in the cross range direction, and 101 m (331 ft) and 0.0 m/s (0.0 ft/s) in the downrange direction, referenced to the earth-fixed launch site coordinate system (PACSS10). Since these differences are very small and since the confidence for the boost trajectory segment is greater at EPO than the parking orbit segment (because the boost fit had available more data near EPO), the EPO point quoted in this document is taken from the boost trajectory segment. The parking orbit segment, however, is generated from the state vector which was obtained by the composite fit of the available parking orbit tracking data.

Since no tracking data were available during the second burn powered segment, a parking orbit state vector at 11,500 seconds range time was used to initialize the second burn powered segment. The confidence in the parking orbit state vector is high due to the excellent fit of the tracking data

3.4 (Continued)

available during the restart preparation segment.

The second burn powered segment was developed by using the ST-124 guidance data as generating parameters and integrating from the parking orbit state vector at 11,500 seconds to the translunar orbit state vector at translunar injection. Two second burn trajectories were simulated, one constrained to the TLI vector and one unconstrained. State vector differences at TLI (presented below) between the constrained integration and an unconstrained second burn integration are compatible with possible guidance errors. It should be pointed out that no tracking data were available to establish the post-TLI trajectory until 1,079 seconds after TLI. Also, only two trackers provided data during TB7 (see Figure 3-1). This increases the uncertainties in the TLI vector, and constraining the solution to fit this TLI state vector will cause the guidance errors to reflect these uncertainties. The position and velocity components of the two second burn integrations had a spread at TLI of 901 m (2,956 ft) and 3.4 m/s (11.2 ft/s) in the vertical direction, 2,436 m (7,992 ft) and 8.0 m/s (26.2 ft/s) in the cross range direction, and 1,186 m (3,891 ft) and 3.4 m/s (11.2 ft/s) in the downrange direction, referenced to the PACSS10 system.

Several injection vectors were obtained by solving for different translunar trajectory segments using various tracking data combinations. The position and velocity components from a set of these solutions had a spread at TLI of 67 m (220 ft) and 0.9 m/s (3.0 ft/s) in the vertical direction, 1,238 m (4,062 ft) and 1.1 m/s (3.6 ft/s) in the cross range direction and 194 m (636 ft) and 0.1 m/s (0.3 ft/s) in the downrange direction, referenced to the PACSS10 system. The constrained second burn trajectory was used because the set of TLI solutions were all in good agreement.

As an additional validity check on the translunar phase, the reconstructed CSM separation state vector was propagated forward to lunar impact with the various S-IVB velocity increments modeled. The resultant lunar impact point is in excellent agreement with AS-512 lunar impact points quoted in Reference 2.

As noted above, the TLI state vector from the translunar segment was used for the end of the second burn segment. The continuity thus provided at TLI plus the continuity at restart, discussed above, provides a completely continuous trajectory from the start of the parking orbit segment to the end of the translunar orbit segment at CSM separation.

3.5 TRAJECTORY UNCERTAINTIES

As an aid in estimating the trajectory accuracy, some of the tracking data throughout the various trajectory phases were transformed into the earth-fixed launch site coordinate system (PACSS10) position components and differenced with the reconstructed trajectory. The resulting residuals or deviations provide a direct indication of the spread of the tracking data about the trajectory.

The position deviations during the ascent phase are shown for the C-band trackers in Figures 3-31 through 3-35. Deviations for parking orbit are shown in Figures 3-36 through 3-48 for the C-band and S-band stations. Translunar deviations are given in Figure 3-49.

Based upon the information of the above paragraphs and a priori knowledge, the trajectory uncertainties were conservatively estimated. The uncertainties for the ascent phase are shown in Figure 3-50. At S-IC OECO, the uncertainties in position and velocity components in PACSS10 are ±70 m (±230 ft) and ±0.4 m/s (±1.3 ft/s), respectively. At S-II OECO, the uncertainties in position and velocity components in PACSS10 are ±360 m (±1,181 ft) and ±0.7 m/s (2.3 ft/s), respectively. At insertion and throughout the parking orbit, the uncertainties in position and velocity components in PACSS10 are ±500 m (±1,640 ft) and ±1.0 m/s (3.3 ft/s), respectively. The trajectory uncertainties increased to ±2,000 m (±6,562 ft) in position components and ±2.0 m/s (±6.6 ft/s) in velocity components at TLI and throughout the post-TLI trajectory. The total radius and velocity magnitude uncertainties throughout the parking orbit phase are estimated at ±300 m (±984 ft) and ±0.5 m/s (±1.6 ft/s). Similarly, the total radius and velocity magnitude uncertainties throughout the translunar orbit phase are estimated at ±1,500 m (±4,921 ft) and ±1.5 m/s (±4.9 ft/s).

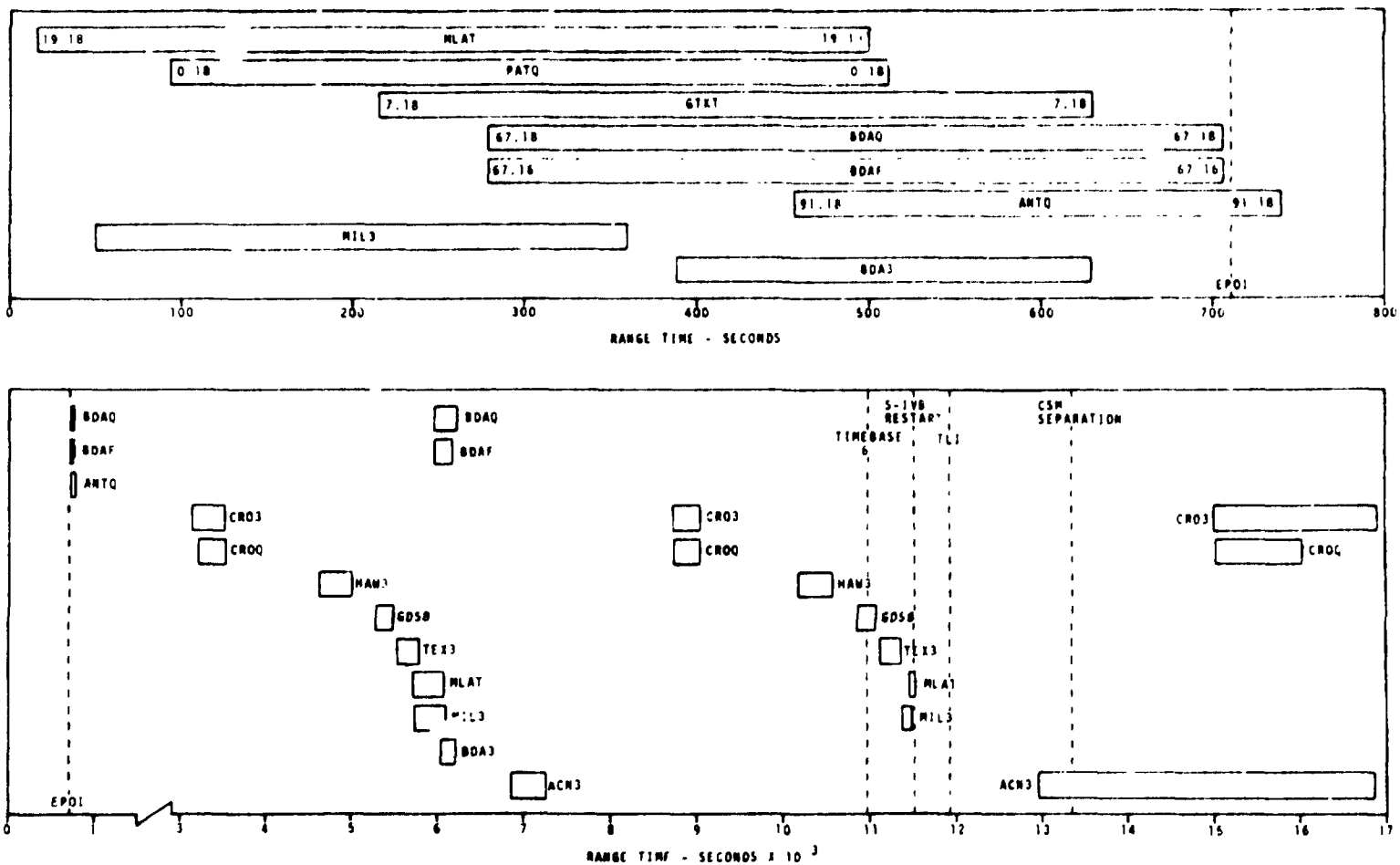

FIGURE 3-1. AS-512 TRACKING DATA UTILIZATION

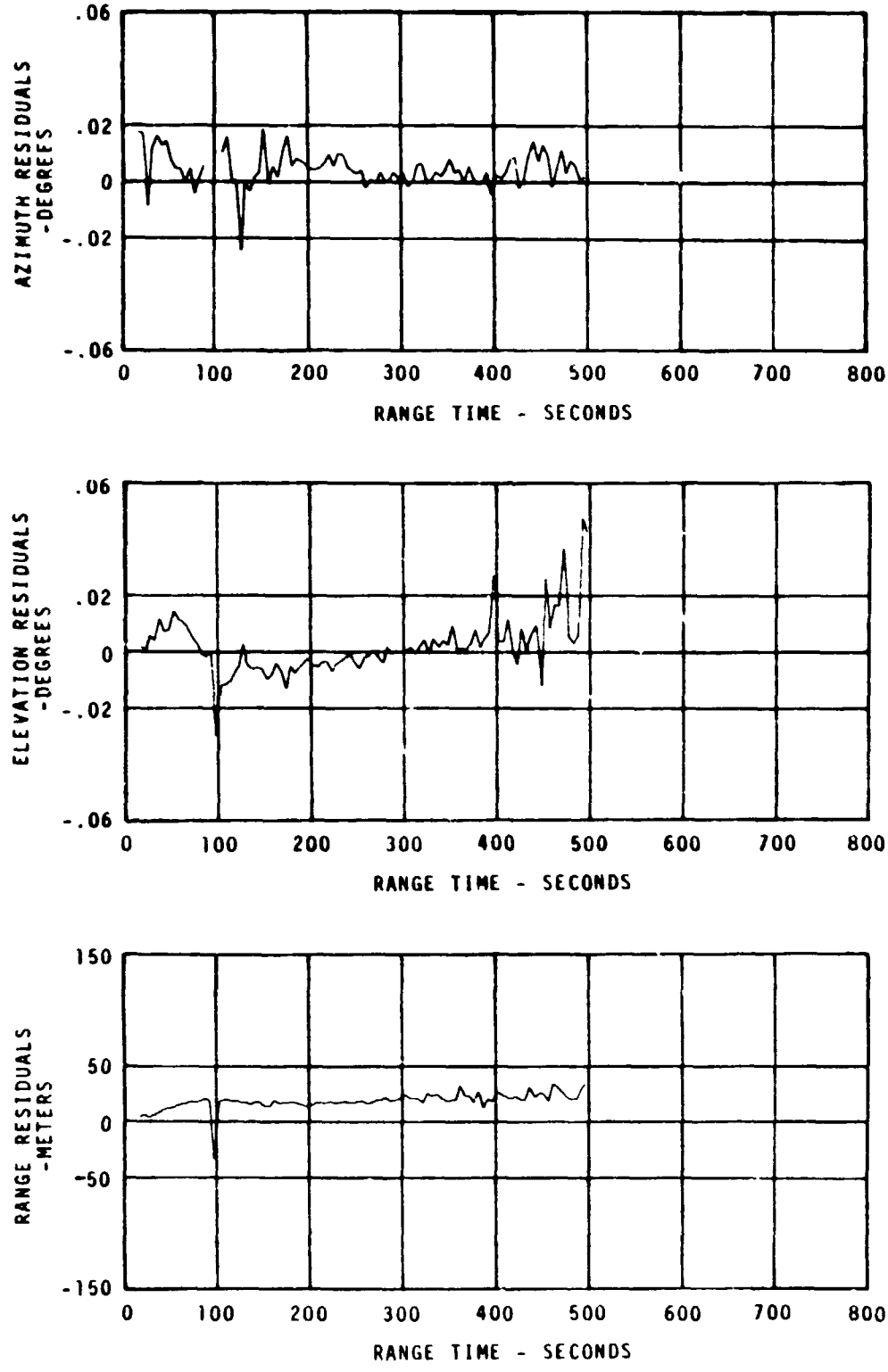

FIGURE 3-2. MERRITT ISLAND C-BAND RADAR TRACKING DEVIATIONS - ASCENT PHASE (MLAT)

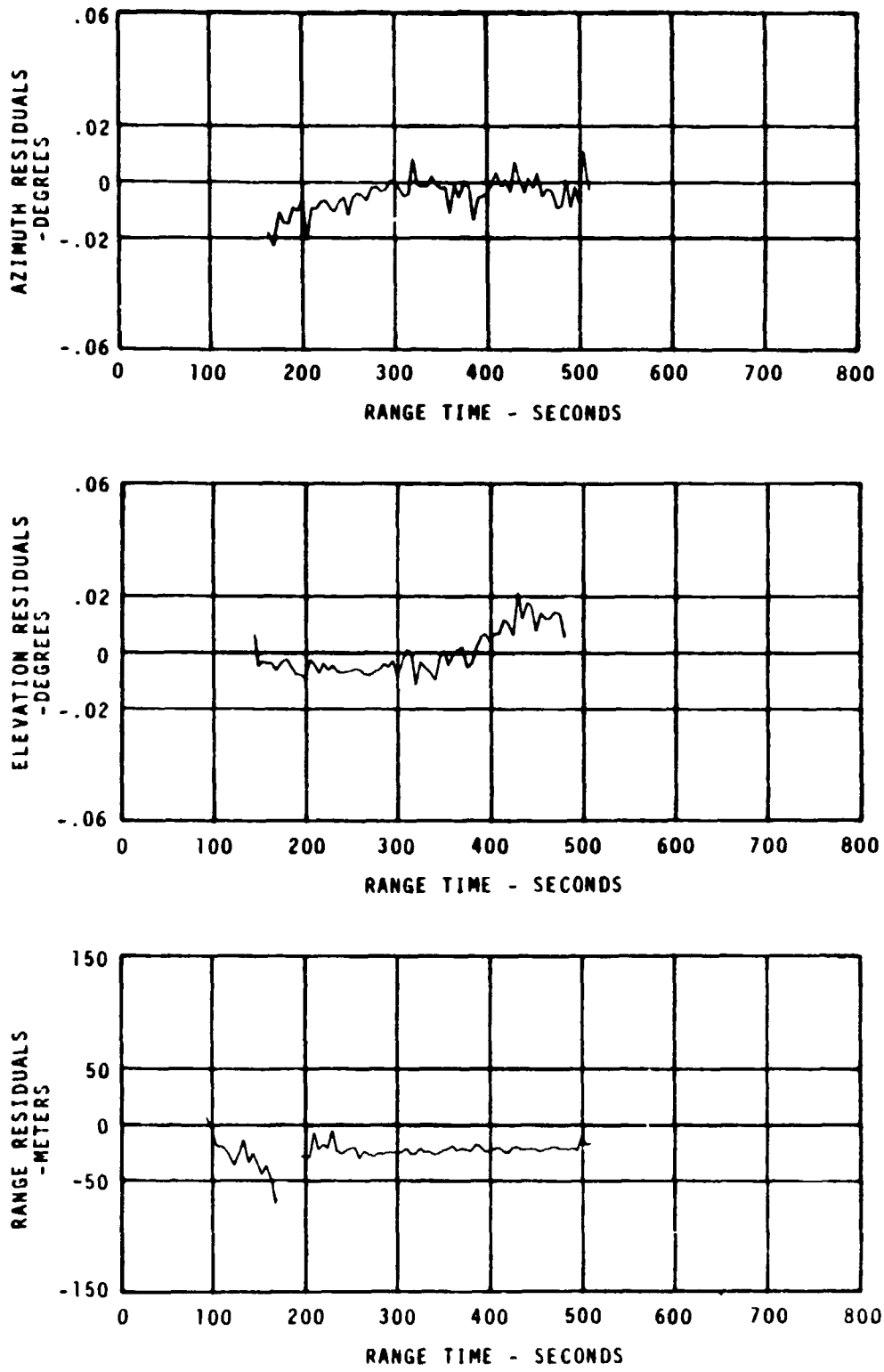

FIGURE 3-3. PATRICK AFB C-BAND RADAR TRACKING DEVIATIONS - ASCENT PHASE (PATQ)

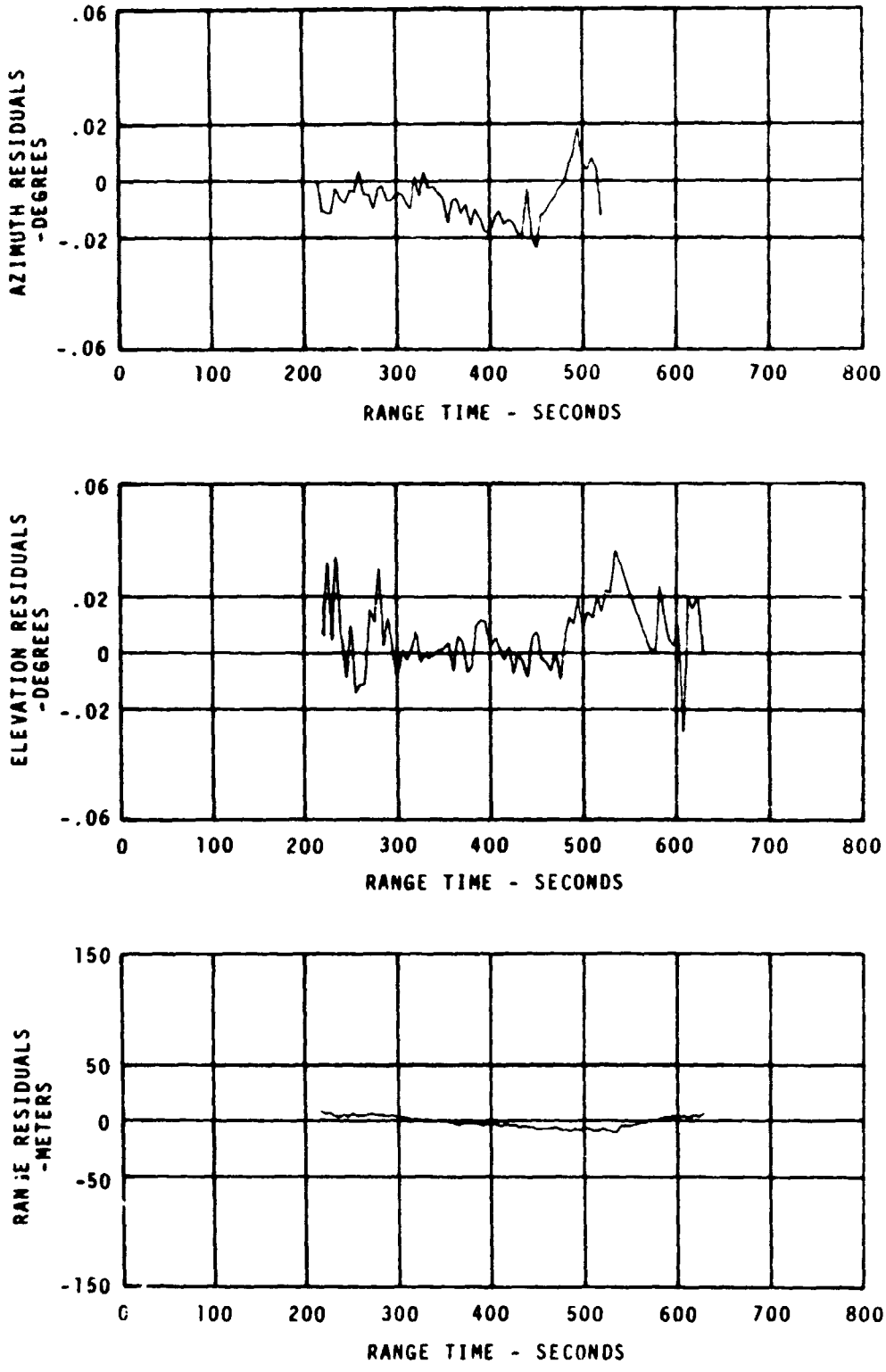

FIGURE 3-4. GRAND TURK ISLAND C-BAND RADAR TRACKING DEVIATIONS - ASCENT PHASE (GTKT)

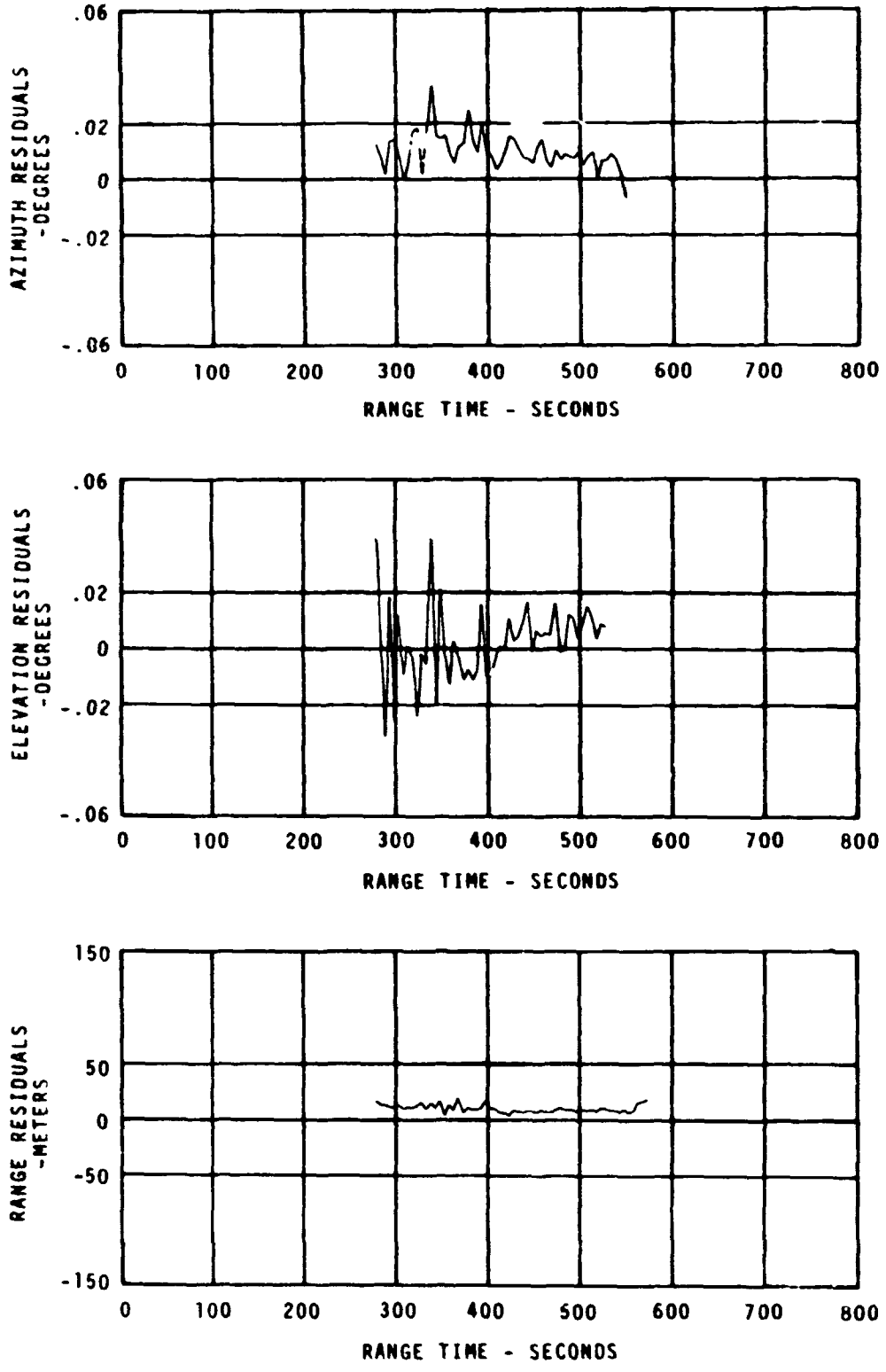

FIGURE 3-5. BERMUDA C-BAND RADAR TRACKING DEVIATIONS - ASCENT PHASE (BDAF)

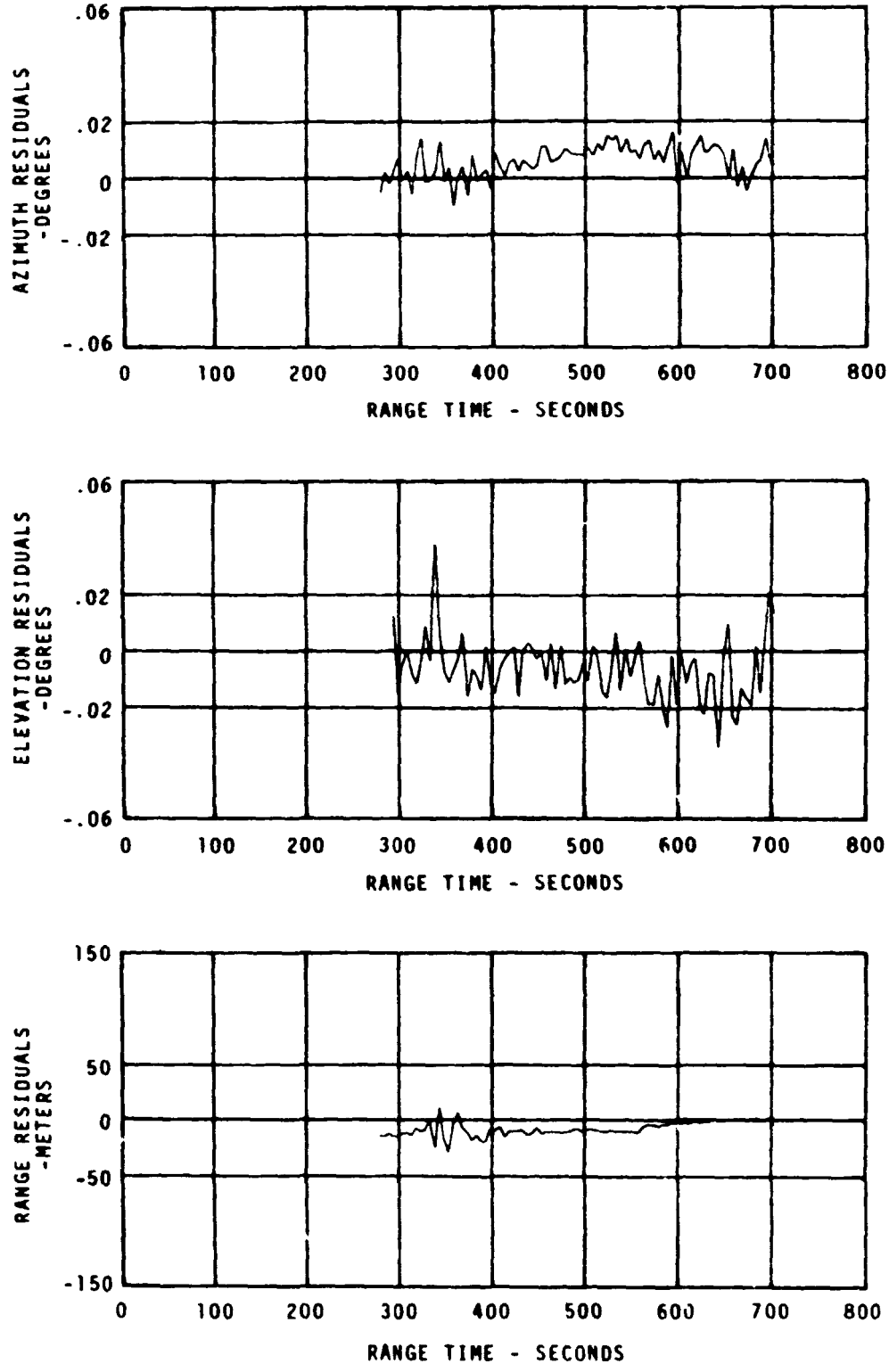

FIGURE 3-6. BERMUDA C-BAND RADAR TRACKING DEVIATIONS - ASCENT PHASE (BDAQ)

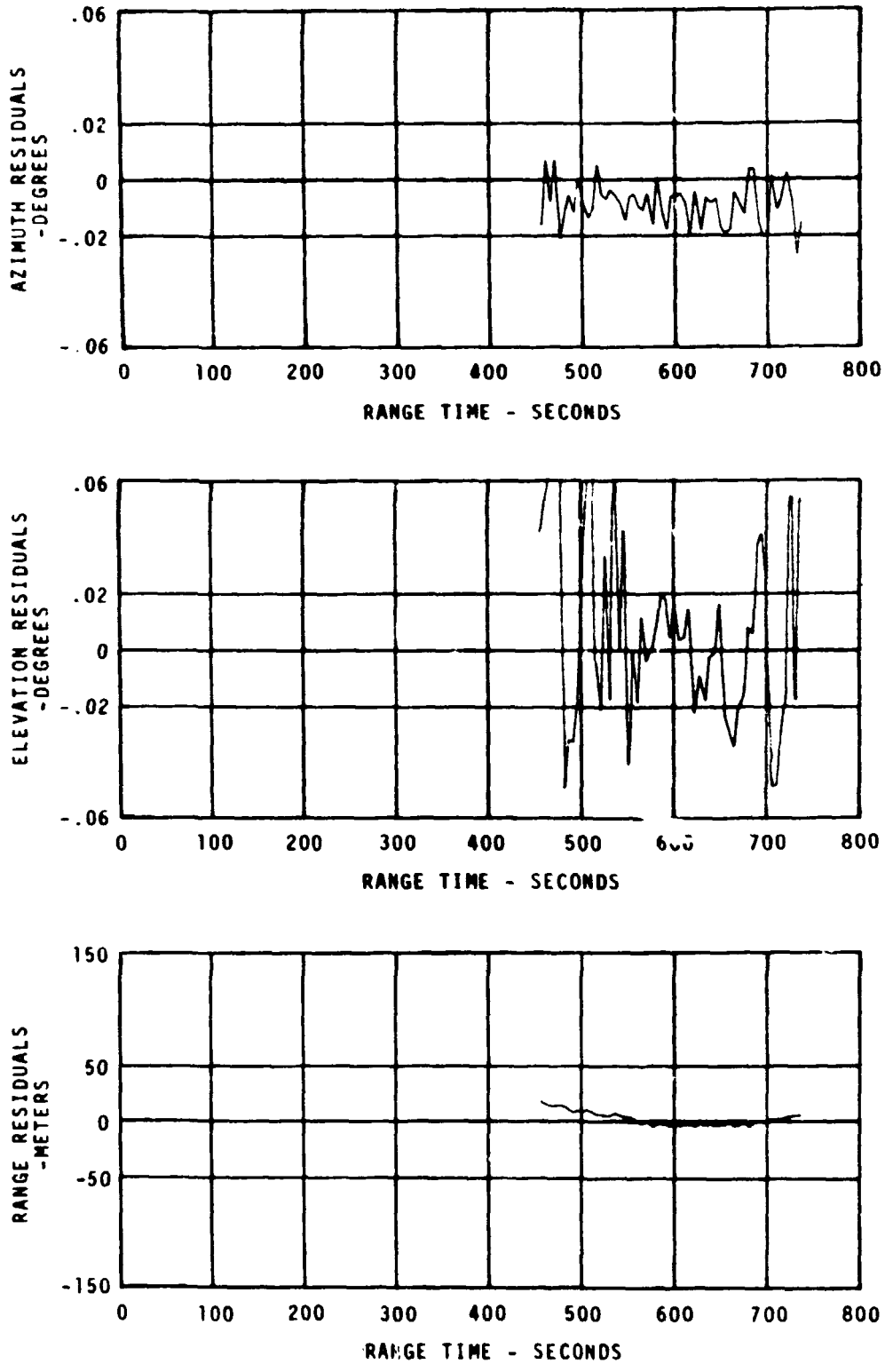

FIGURE 3-7. ANTIGUA C-BAND RADAR TRACKING DEVIATIONS - ASCENT PHASE (ANTQ)

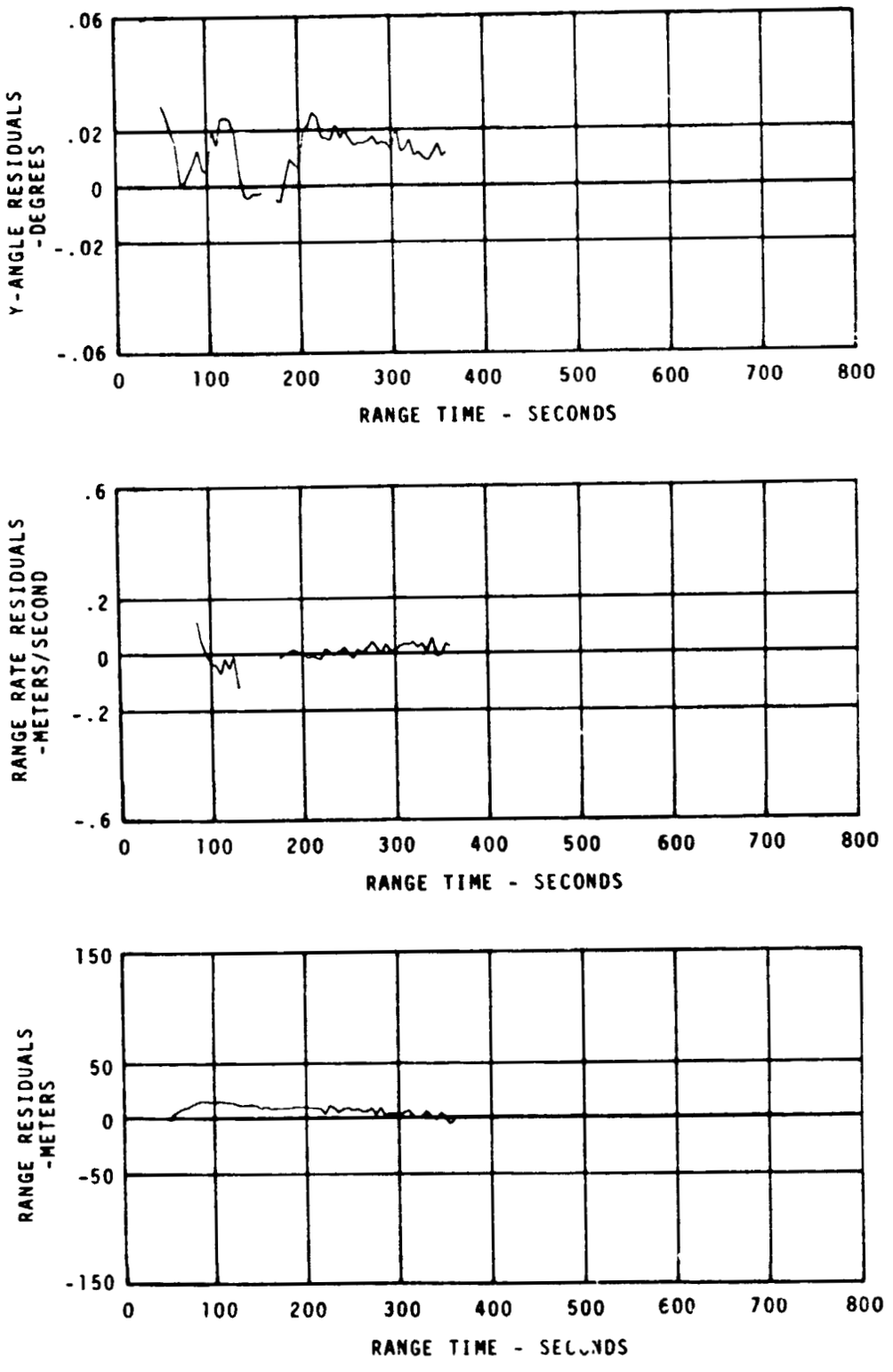

FIGURE 3-8. MERRITT ISLAND S-BAND TRACKING DEVIATIONS - ASCENT PHASE (MIL3)

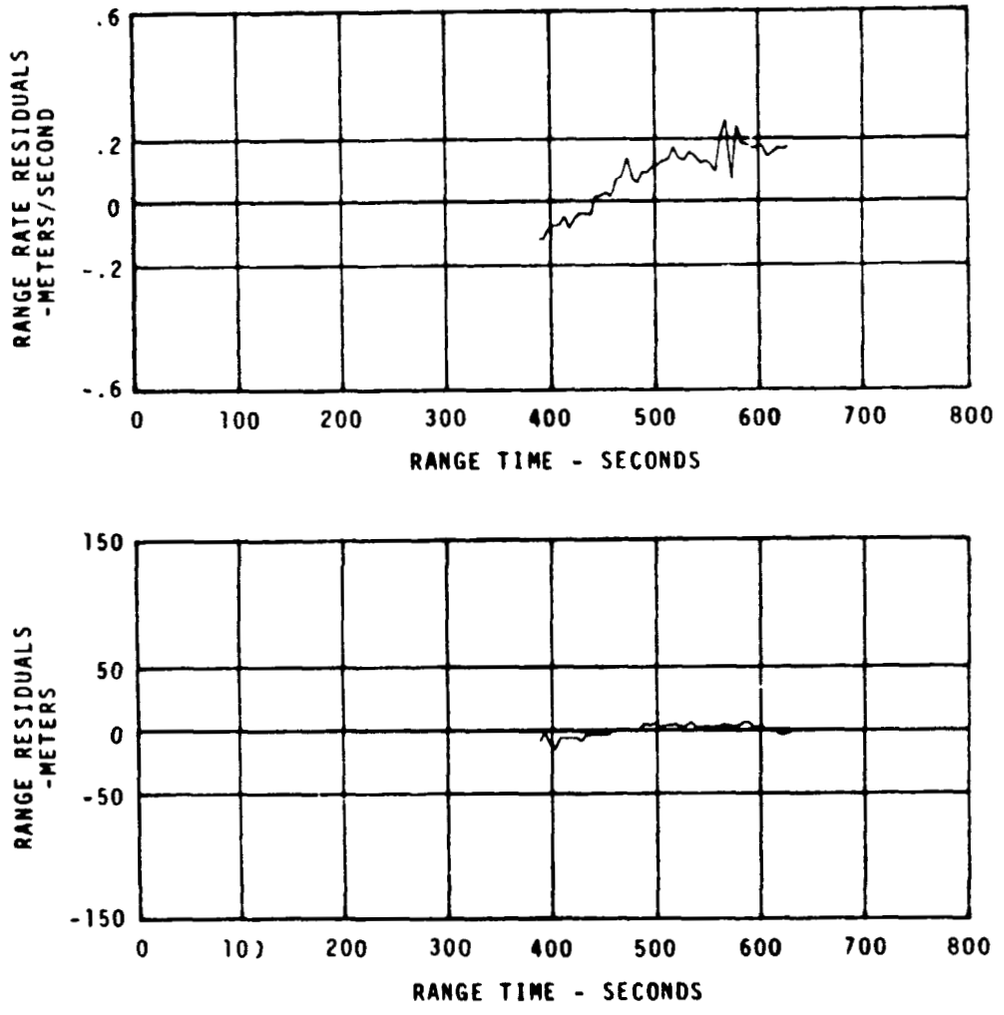

FIGURE 3-9. BERMUDA S-BAND TRACKING DEVIATIONS - ASCENT PHASE (BDA3)

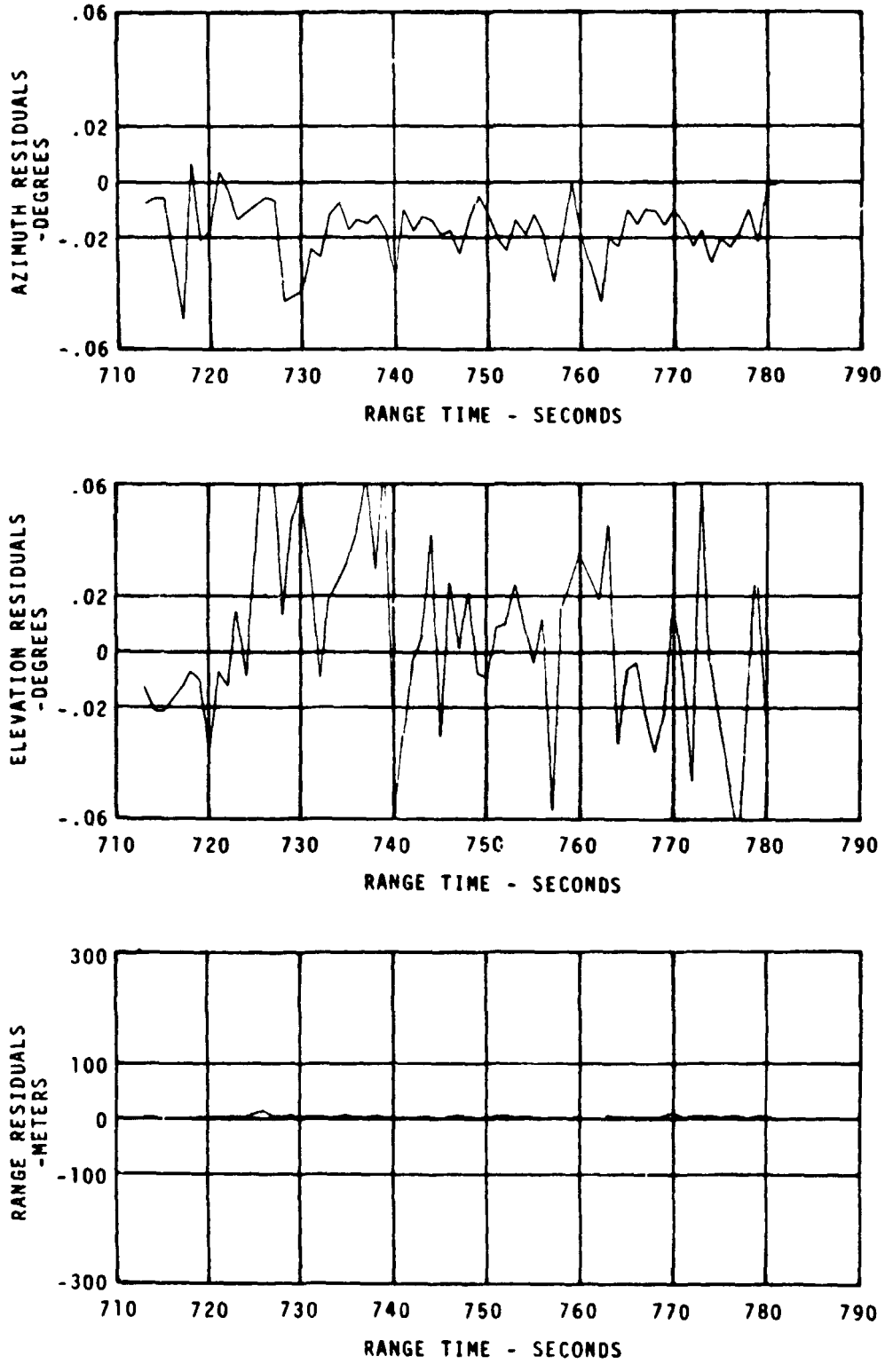

FIGURE 3-10. ANTIGUA C-BAND RADAR TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (ANTQ)

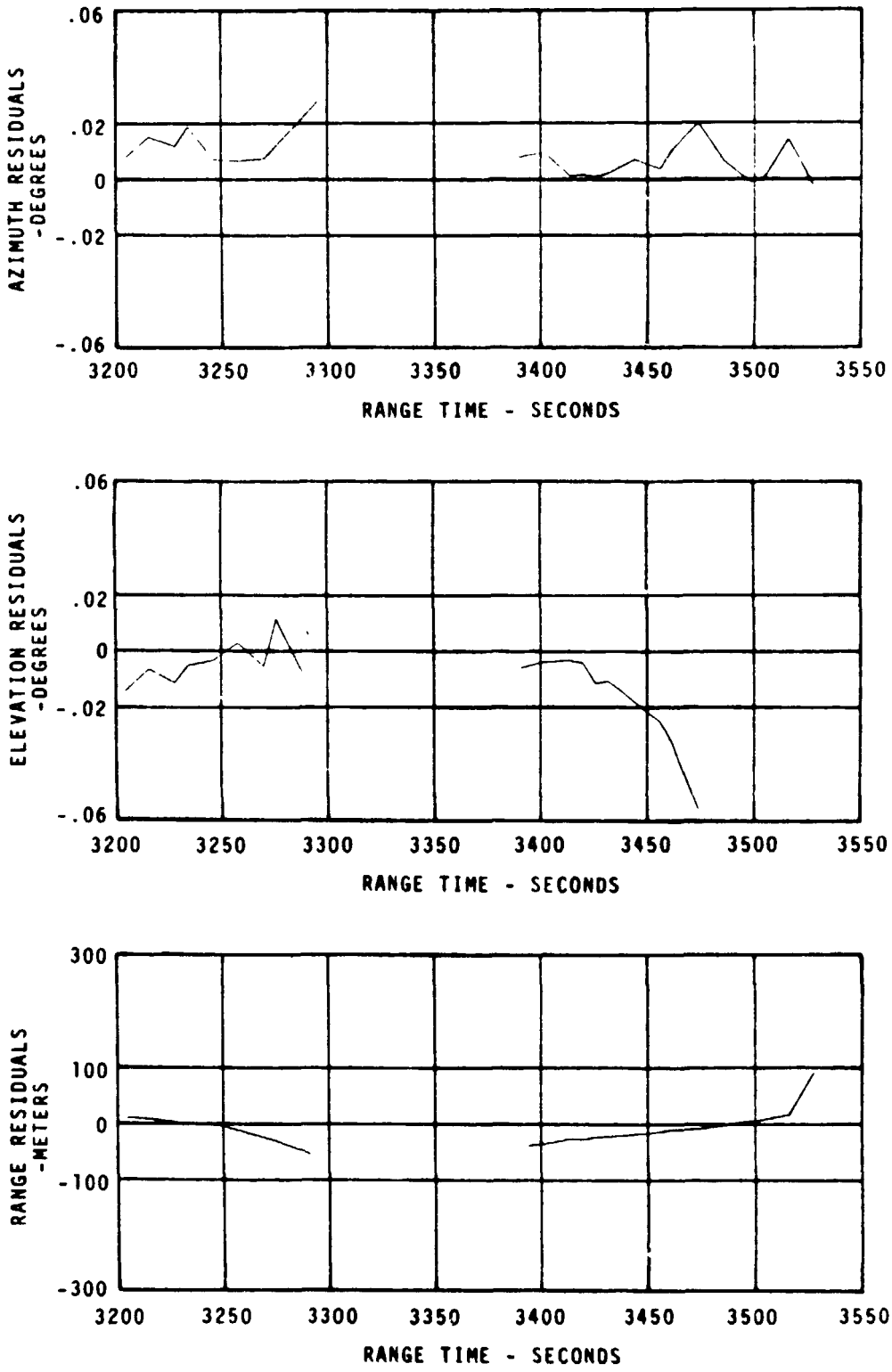

FIGURE 3-11. CARNARVON C-BAND RADAR TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (CROQ)

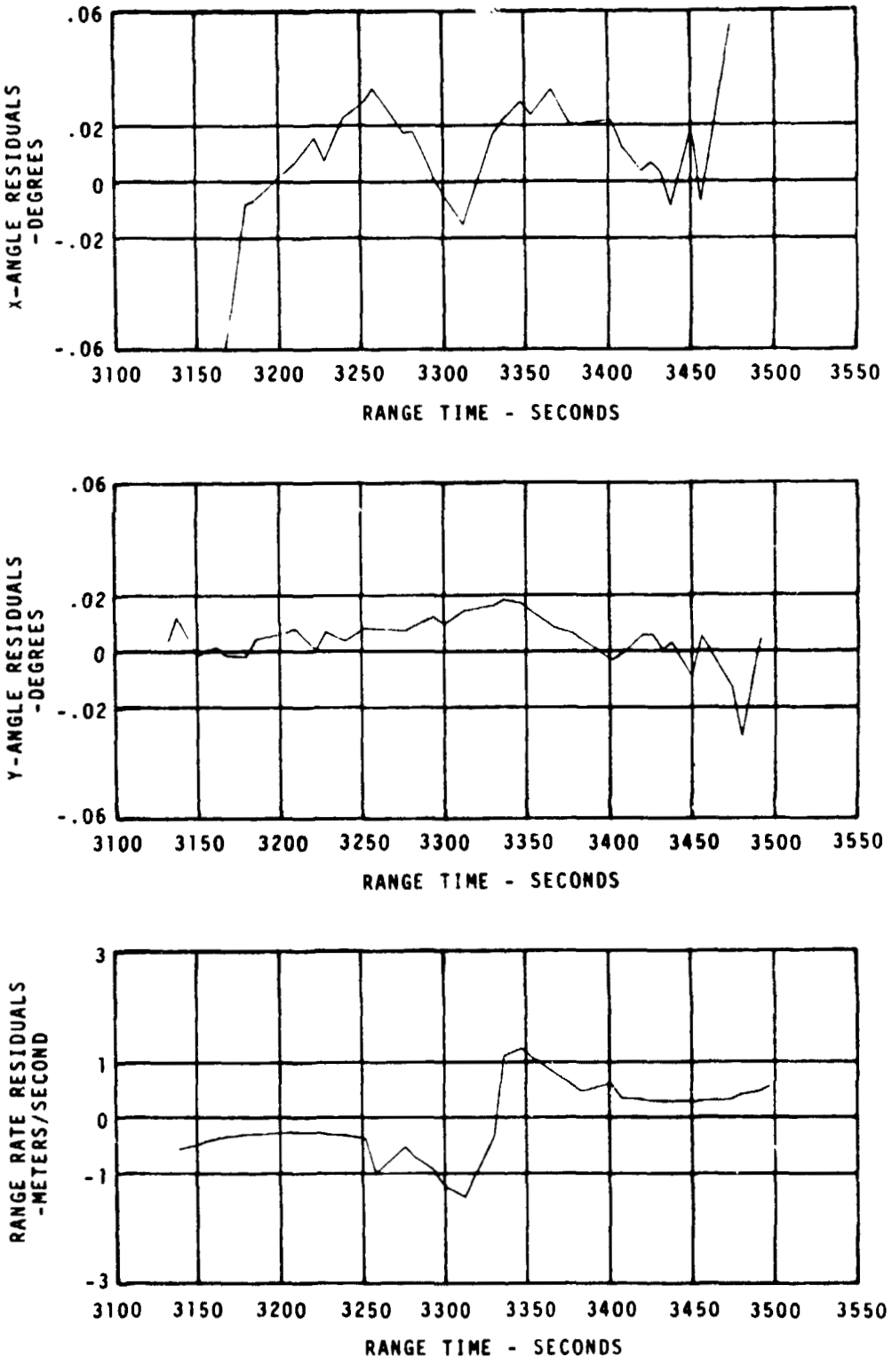

FIGURE 3-12. CARNARVON S-BAND TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (CRO3)

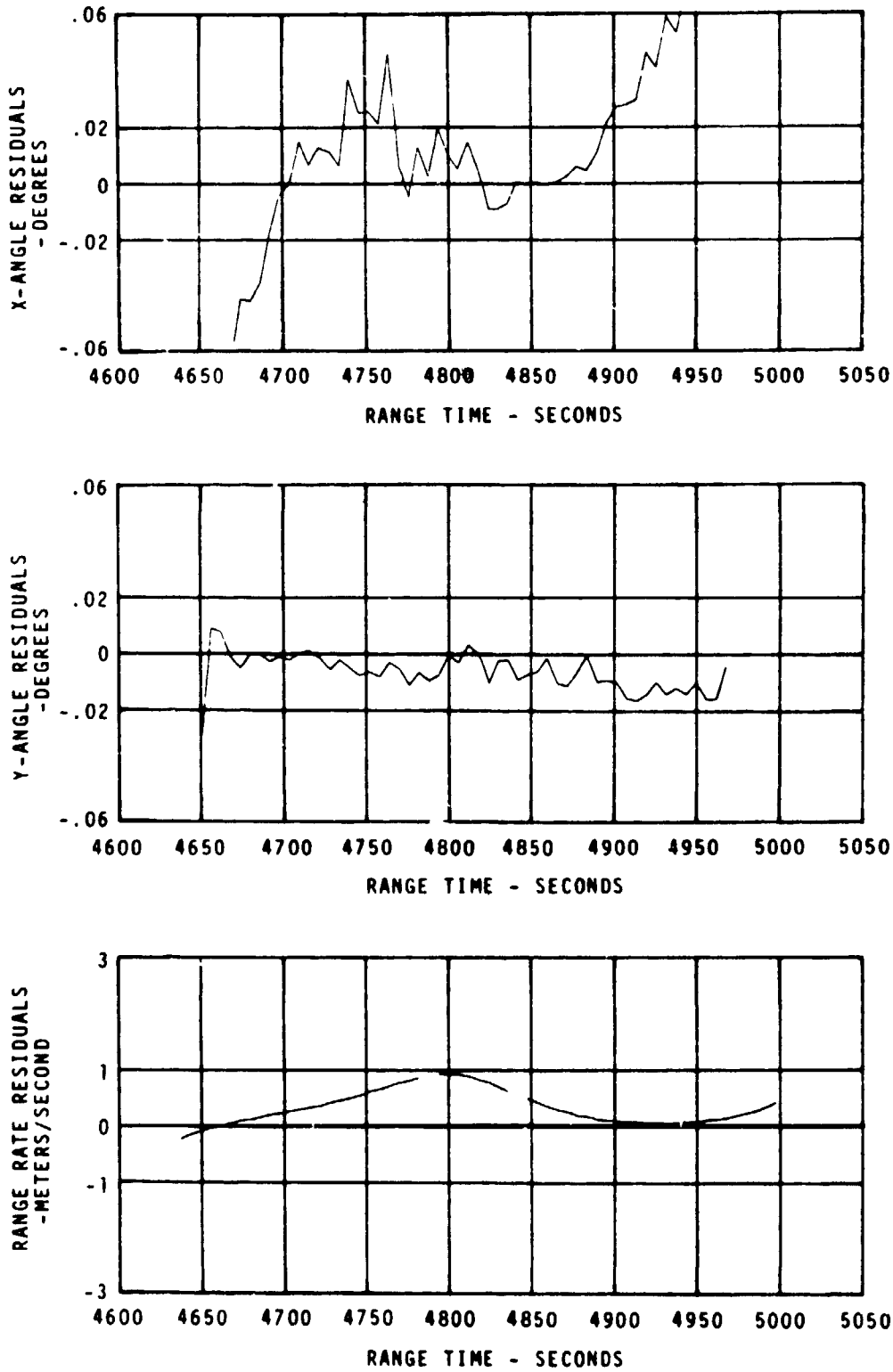

FIGURE 3-13. HAWAII S-BAND TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (HAW3)

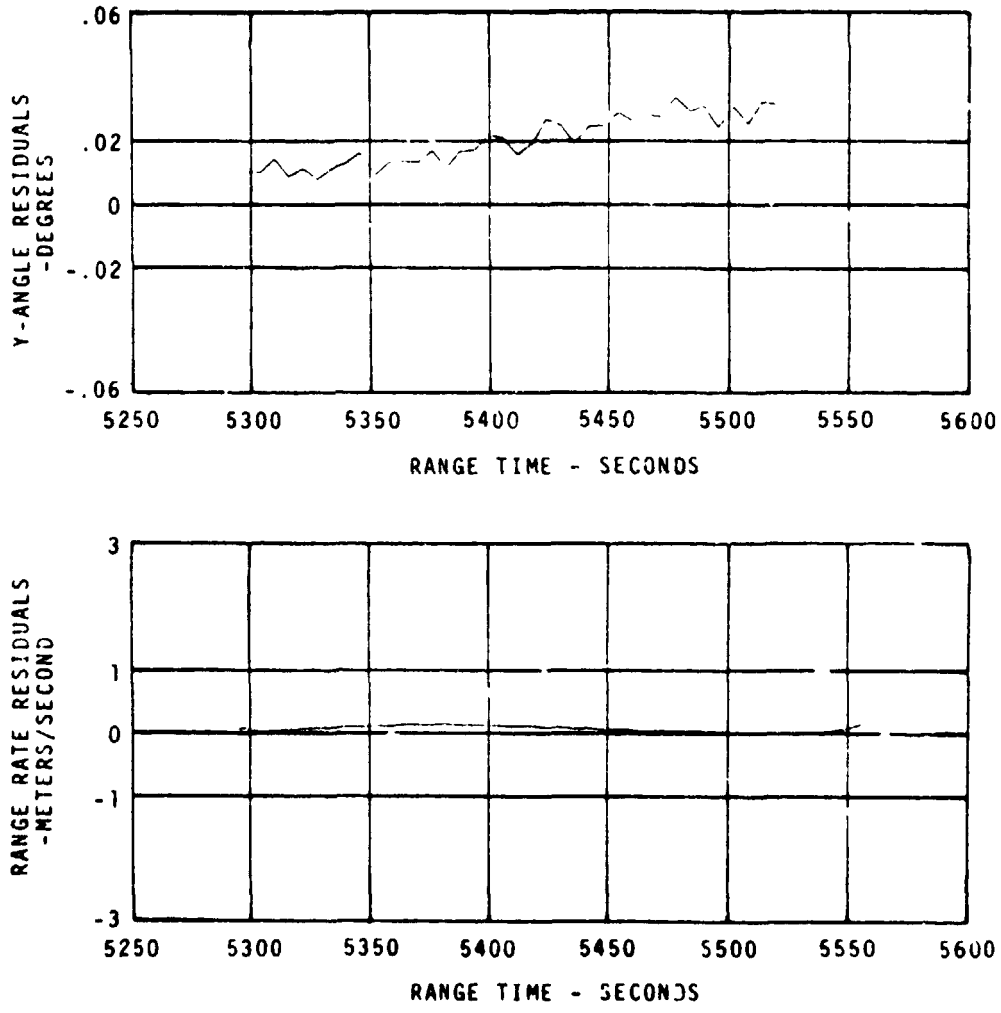

FIGURE 3-14. GOLDSTONE S-BAND TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (GDS8)

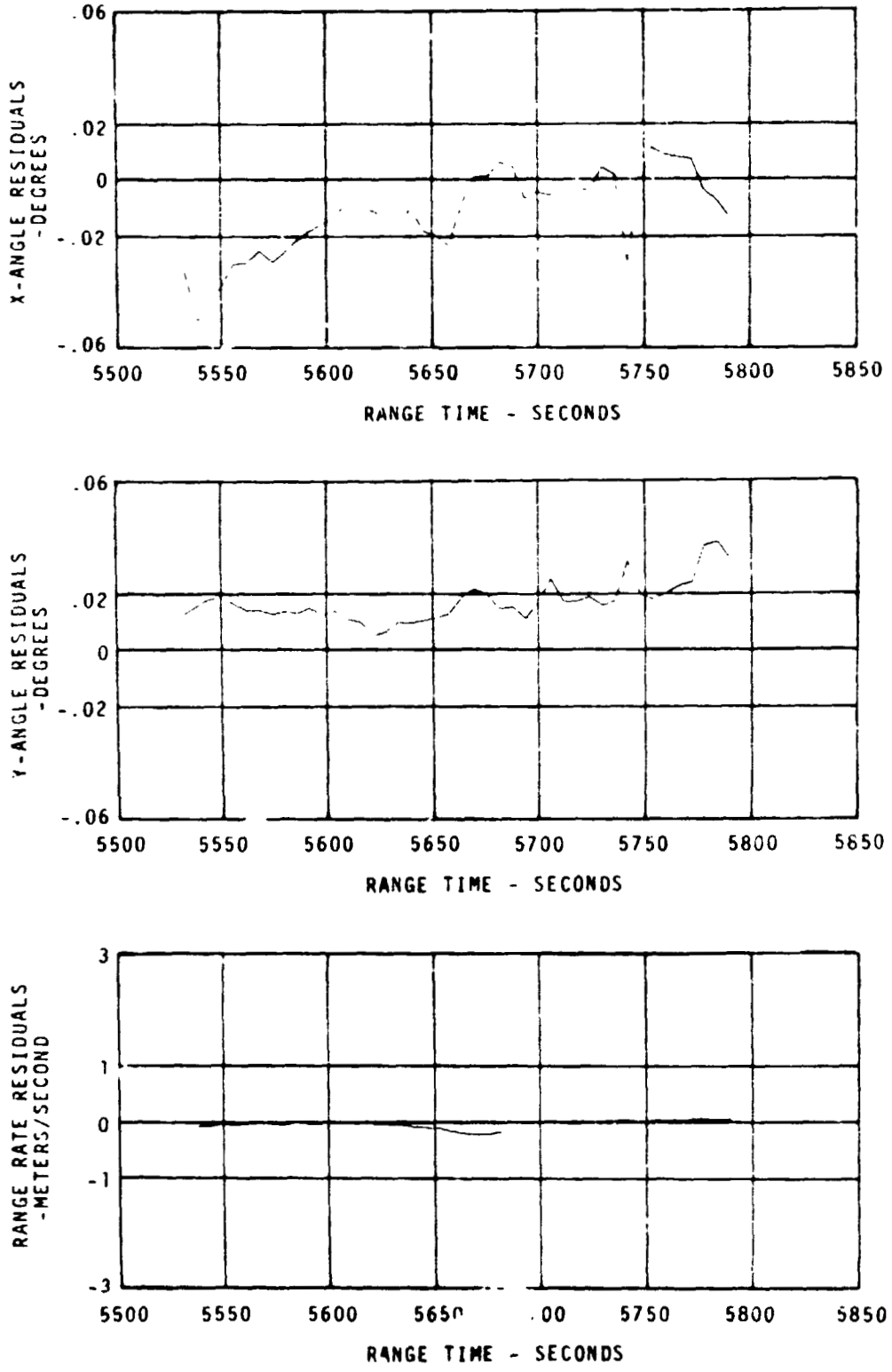

FIGURE 3-15. TEXAS S-BAND TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (TEX3)

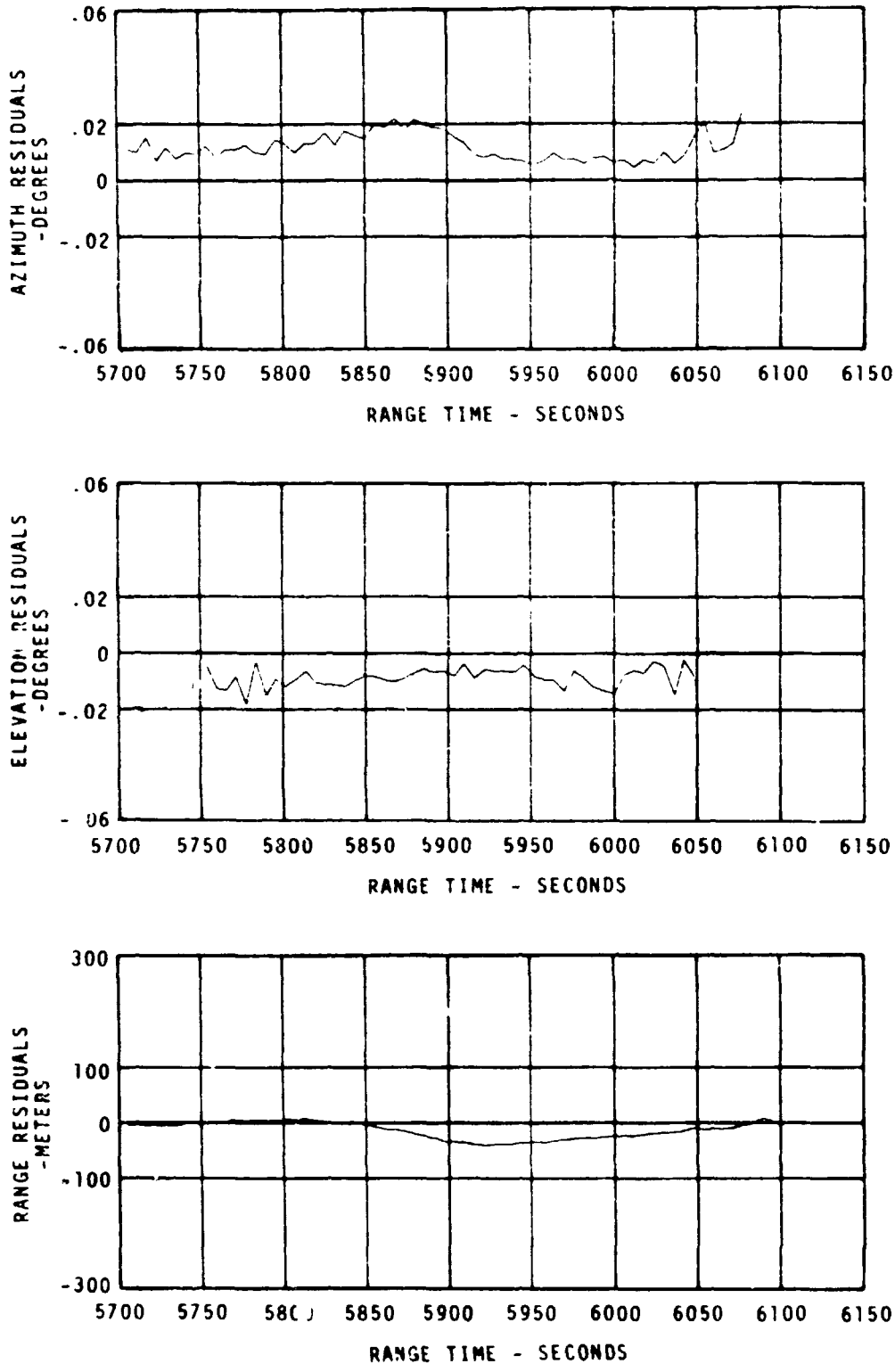

FIGURE 3-16. MERRITT ISLAND C-BAND RADAR TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (MLAT)

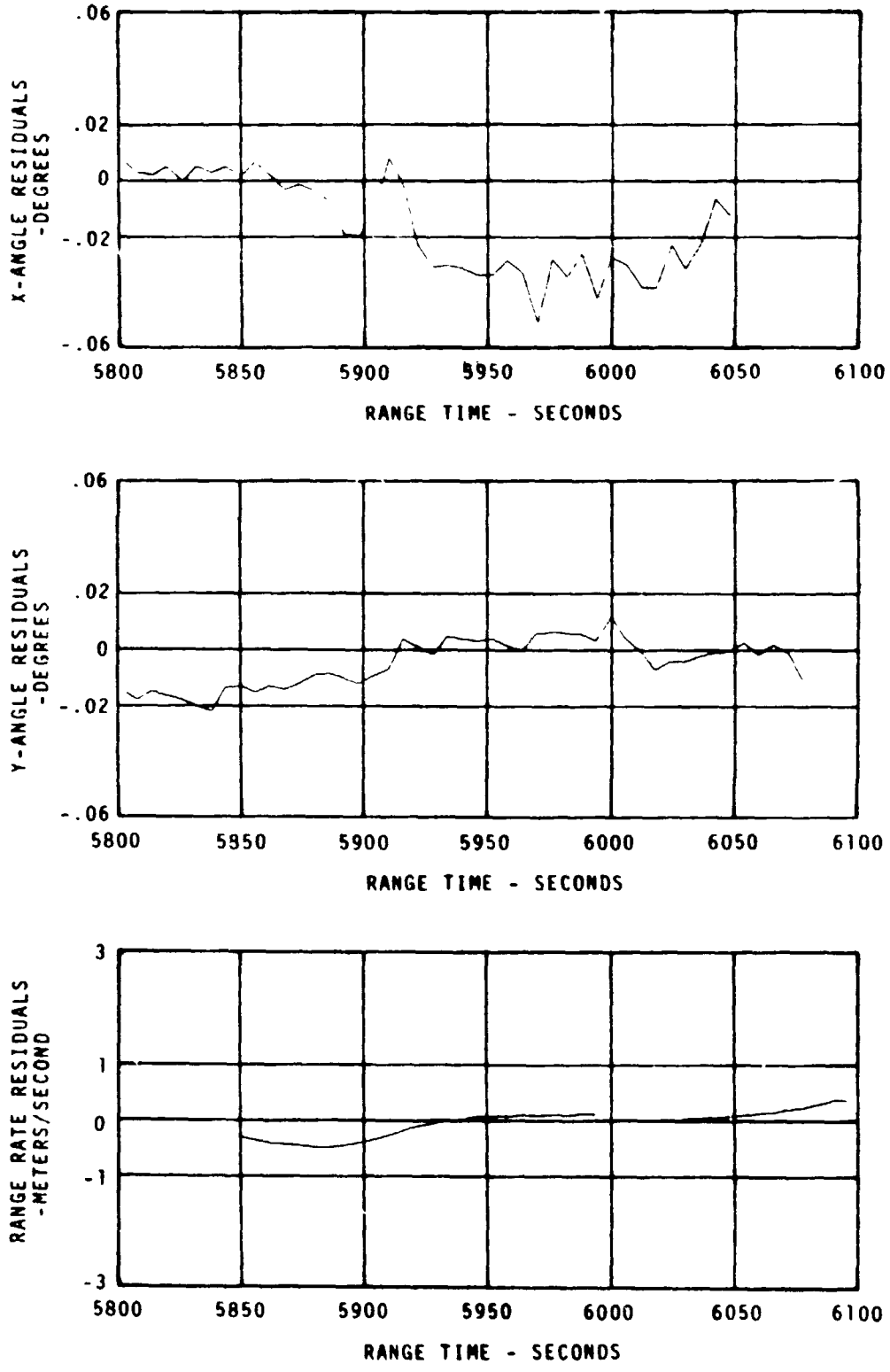

FIGURE 3-17. MERRITT ISLAND S-BAND TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (MIL3)

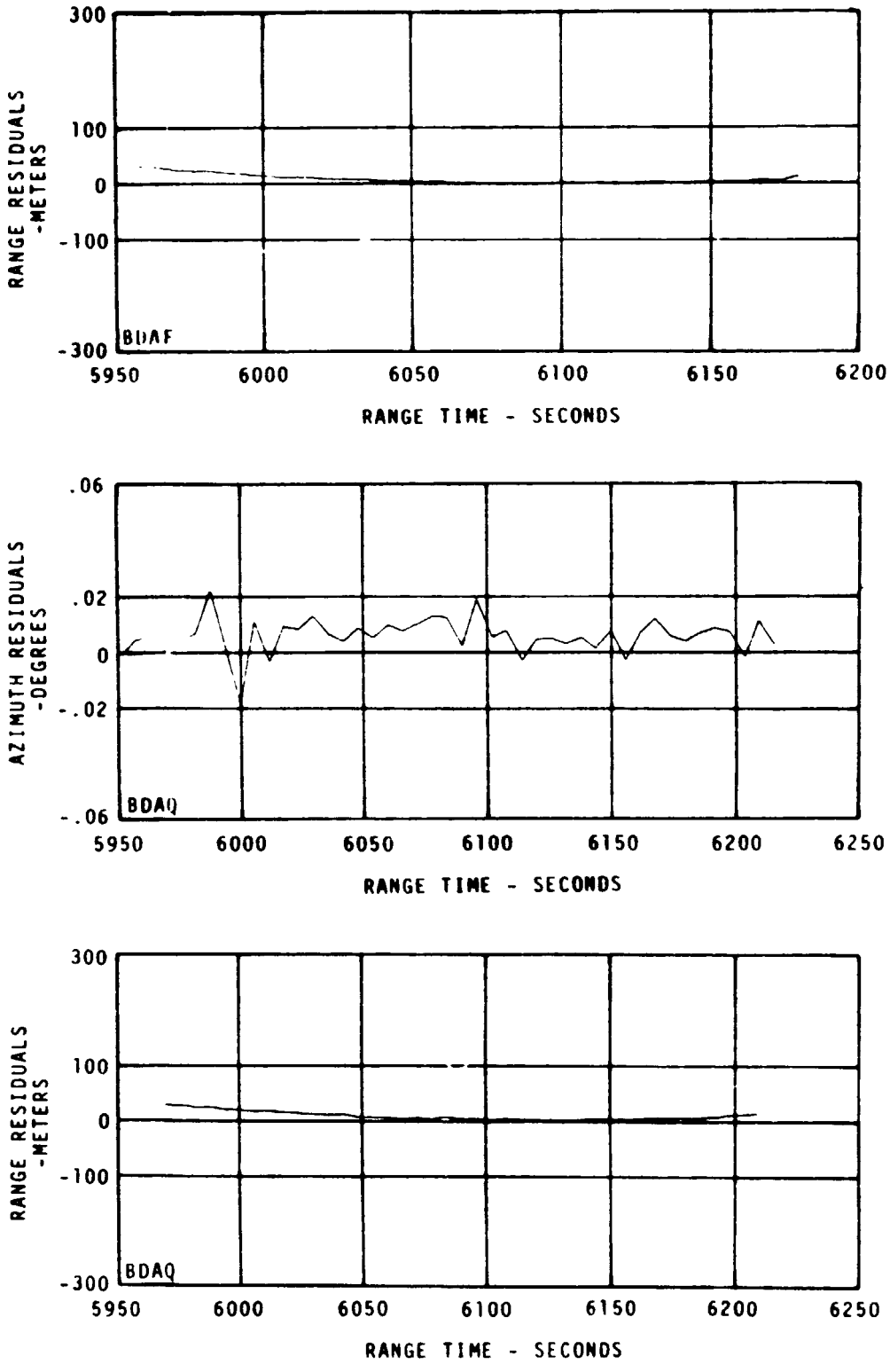

FIGURE 3-18. BERMUDA C-BAND RADAR TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (BDAF AND BDAQ)

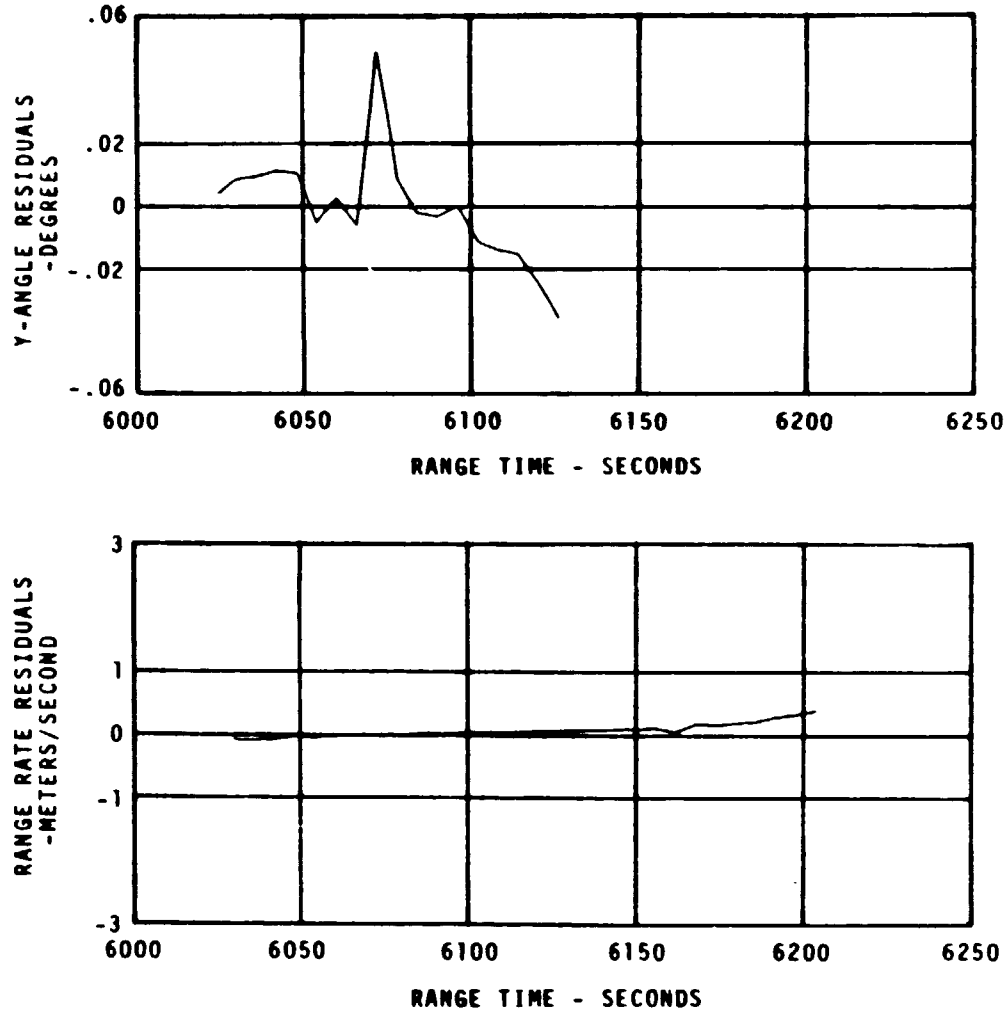

FIGURE 3-19. ℄ RMUDA S-BAND TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (BDA3)

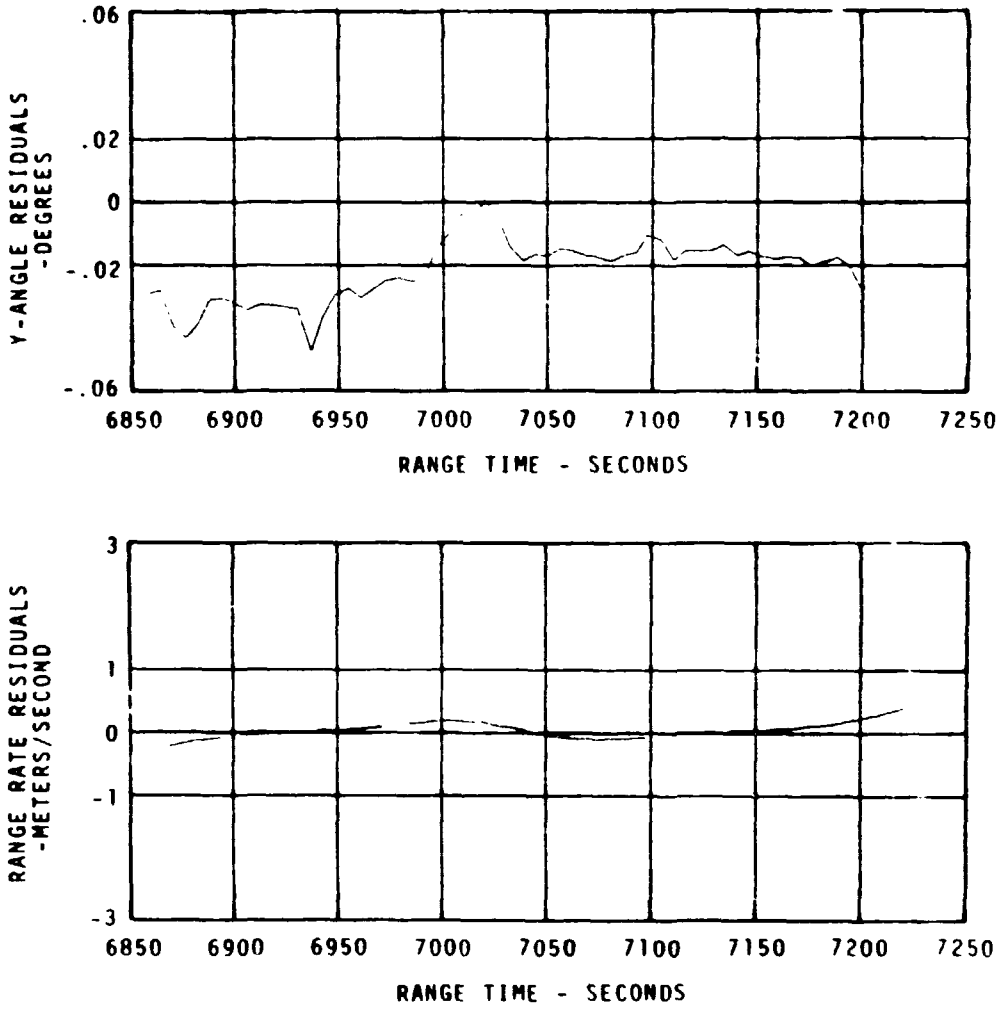

FIGURE 3-20. ASCENSION S-BAND TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 2 (ACN3)

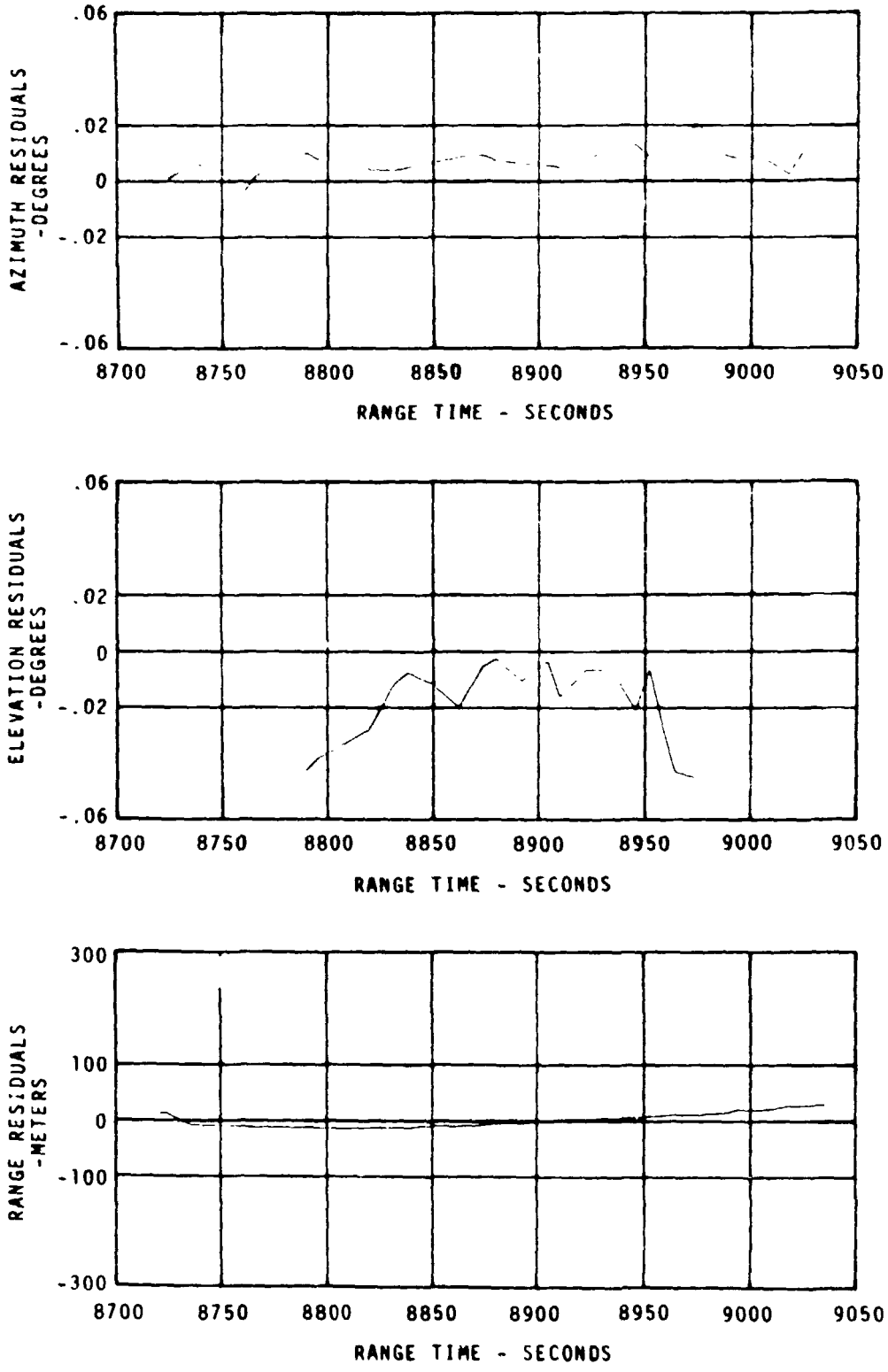

FIGURE 3-21. CARNARVON C-BAND RADAR TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 2 (CROQ)

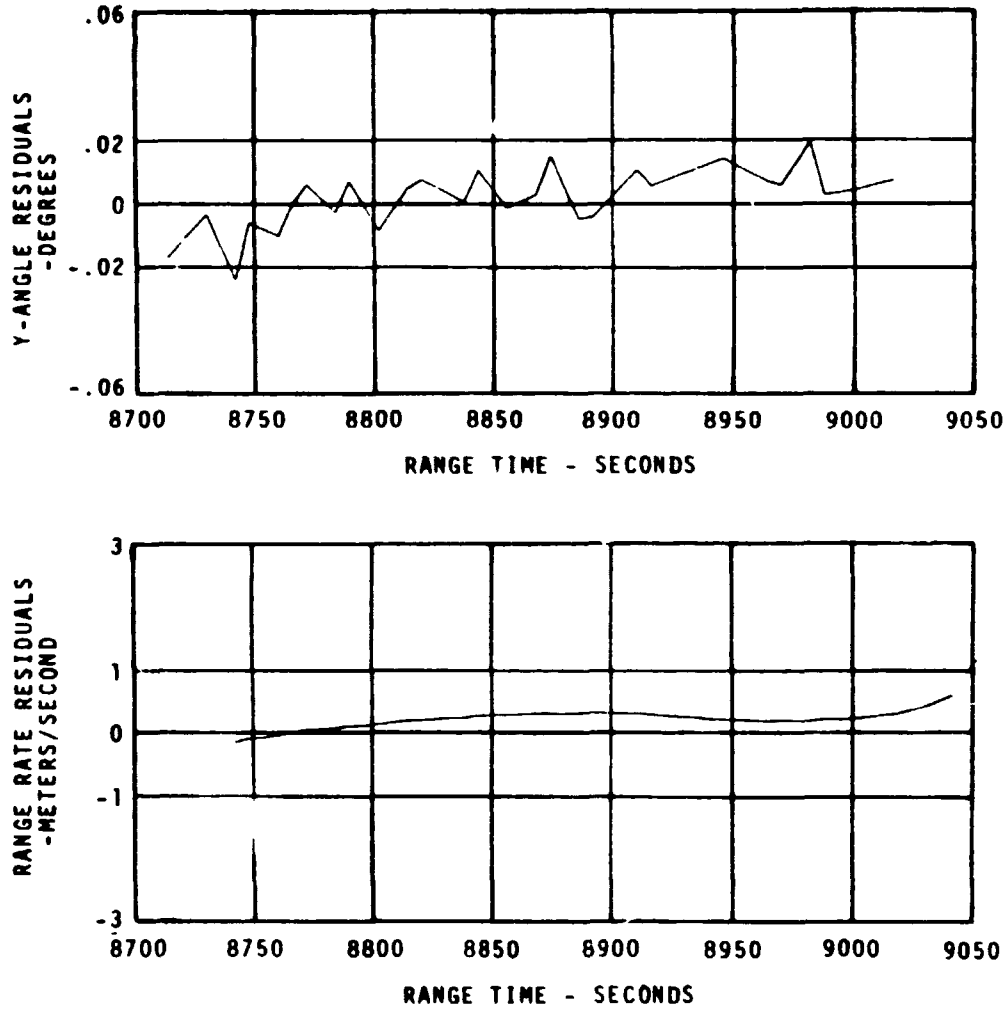

FIGURE 3-22. CARNARVON S-BAND TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 2 (CRO3)

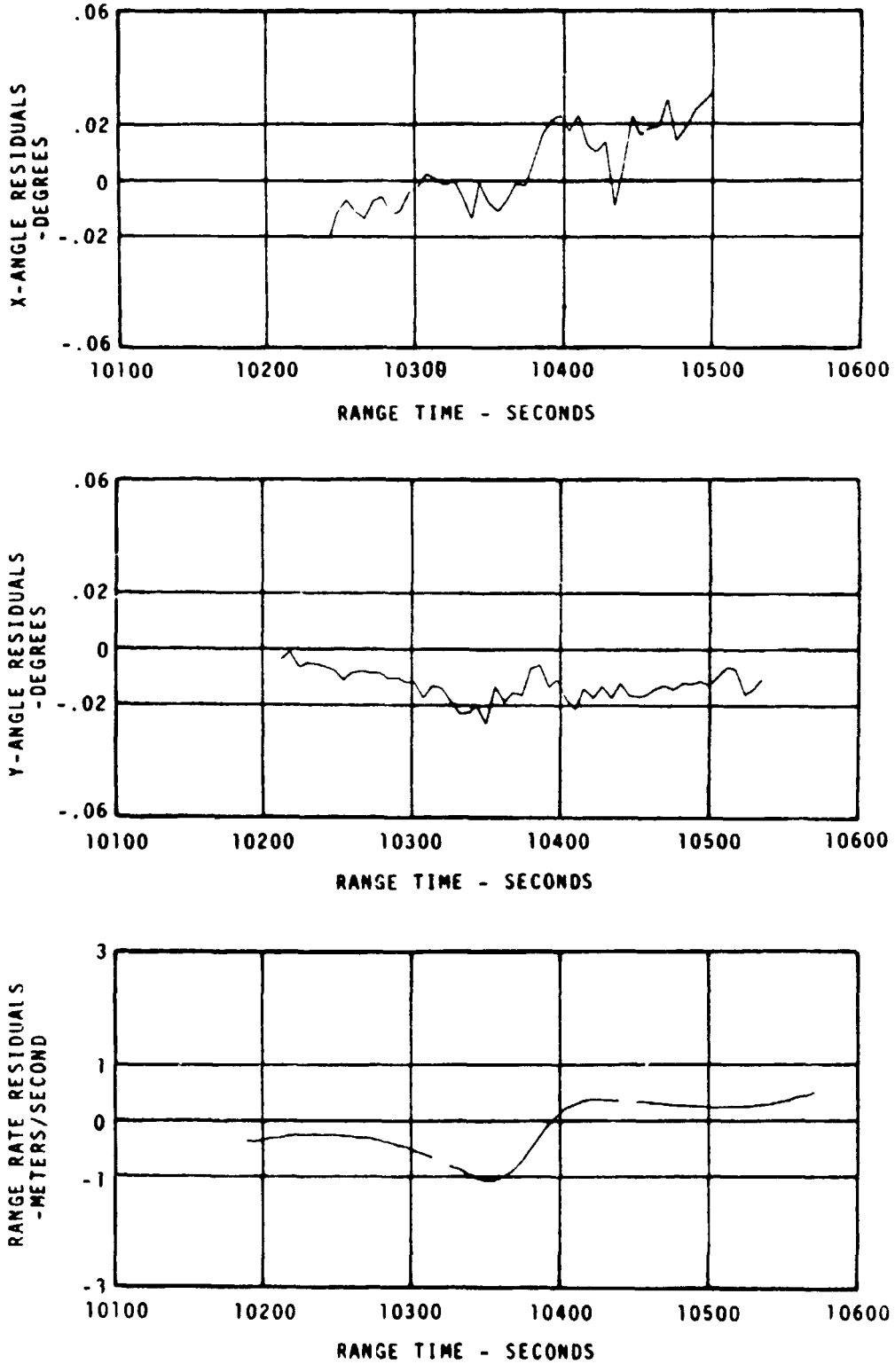

FIGURE 3-23. HAWAII S-BAND TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 2 (HAW3)

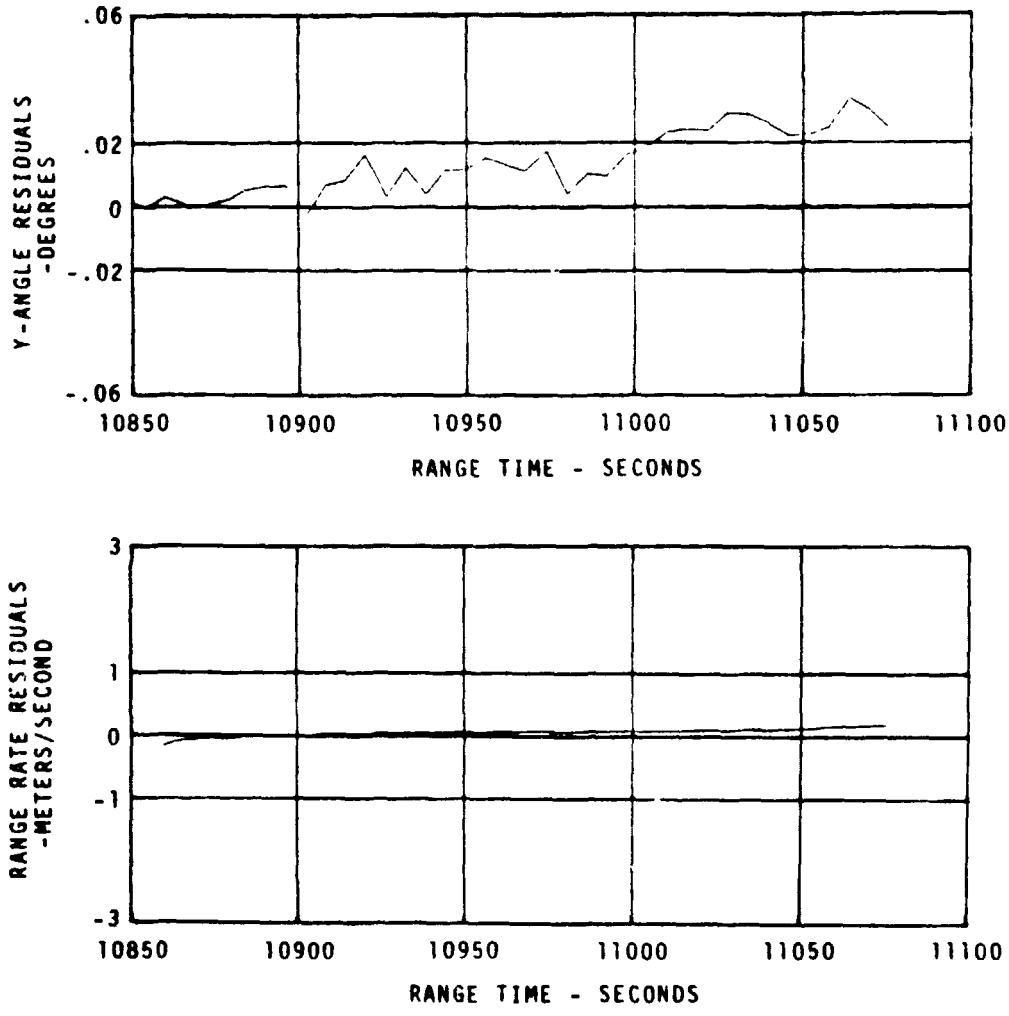

FIGURE 3-24. GOLDSTONE S-BAND TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 2 (GDS8)

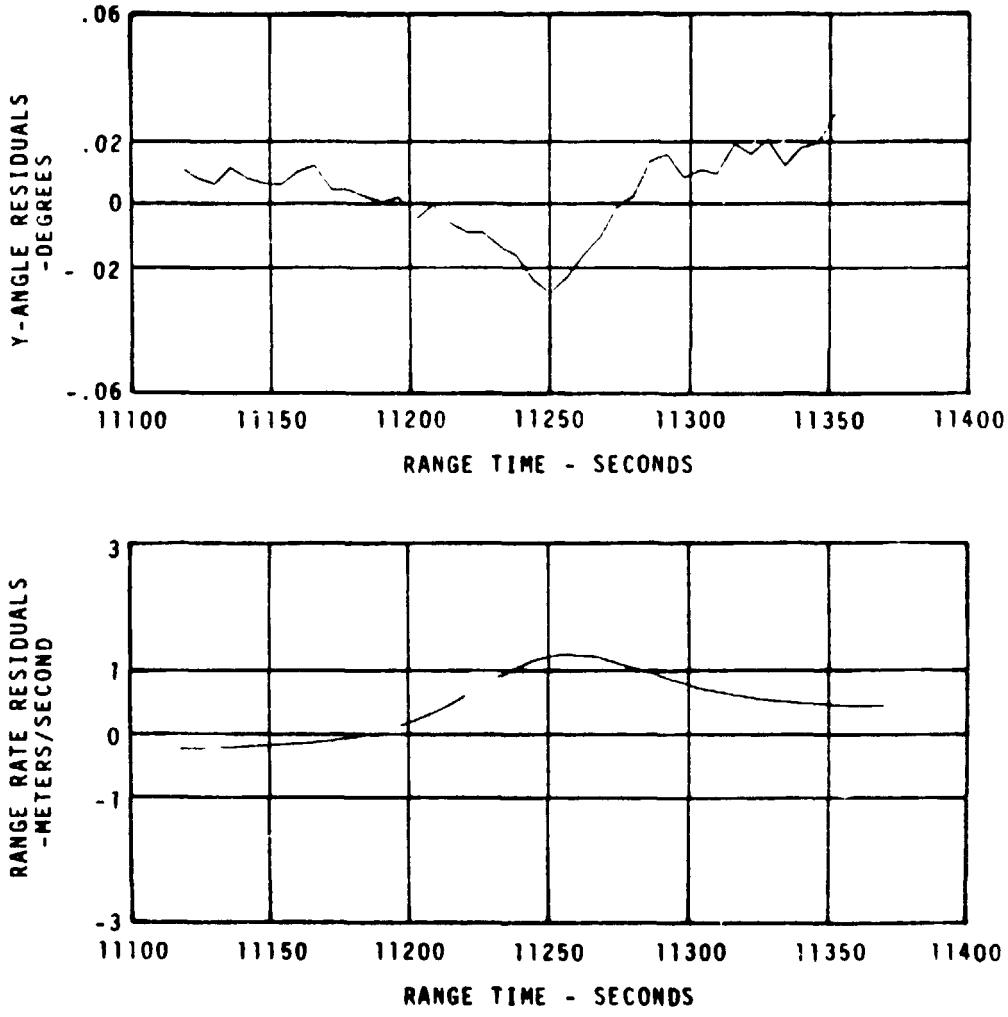

FIGURE 3-25. TEXAS S-BAND TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 2 (TEX3)

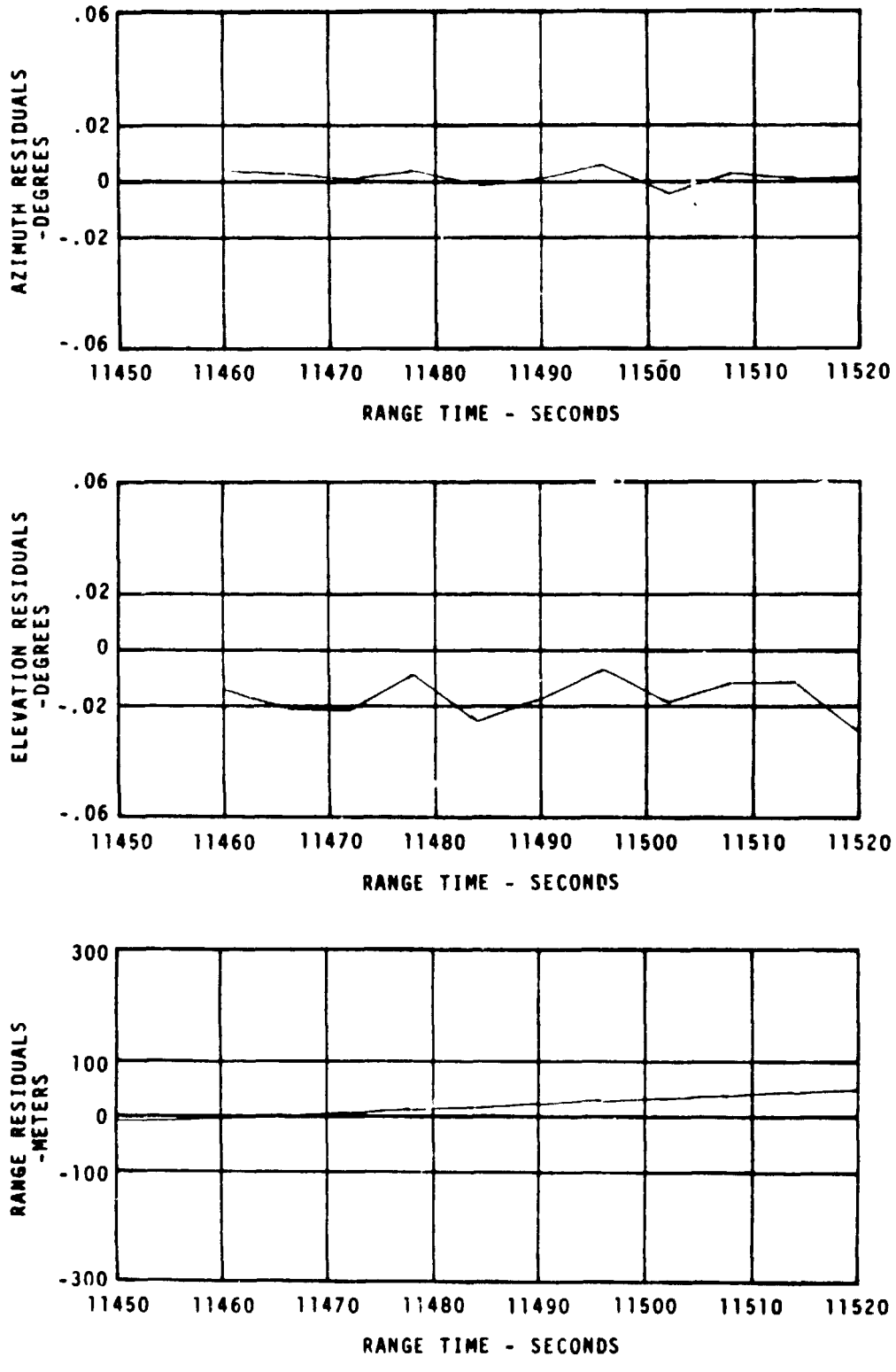

FIGURE 3-26. MERRITT ISLAND C-BAND RADAR TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 2 (MLAT)

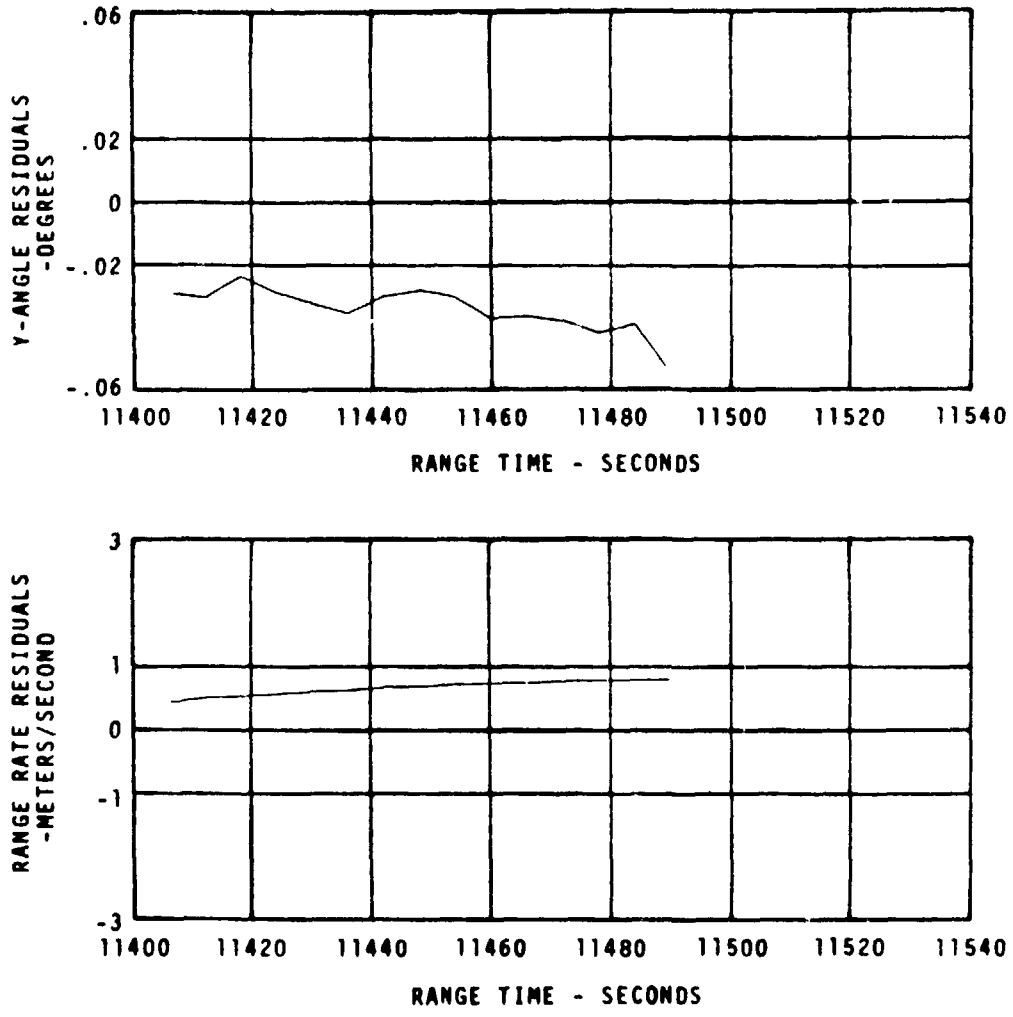

FIGURE 3-27. MERRITT ISLAND S-BAND TRACKING DEVIATIONS - PARKING ORBIT PHASE - REV. 2 (MIL3)

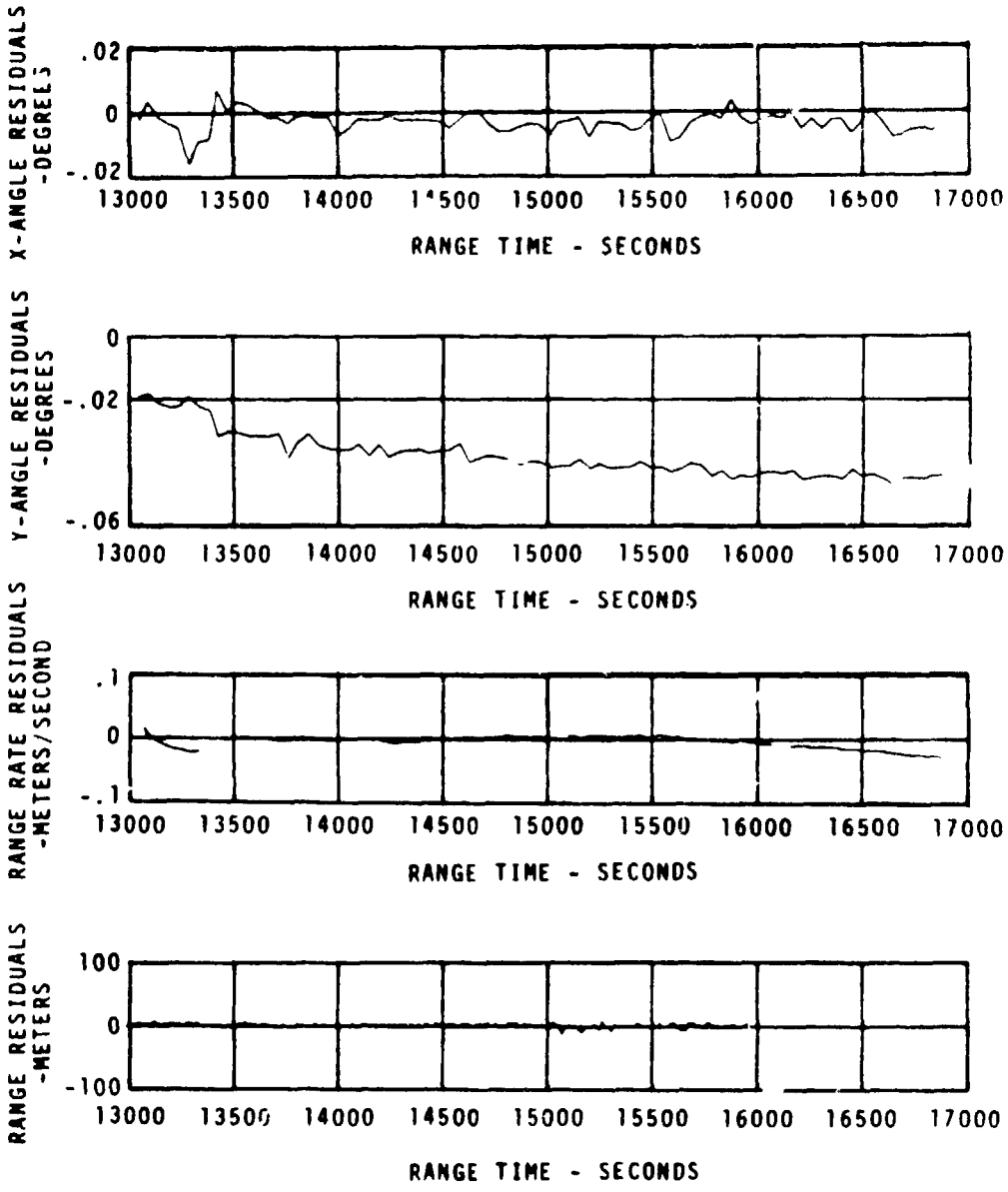

FIGURE 3-28. ASCENSION S-BAND TRACKING DEVIATIONS - TRANSLUNAR ORBIT PHASE (ACN3)

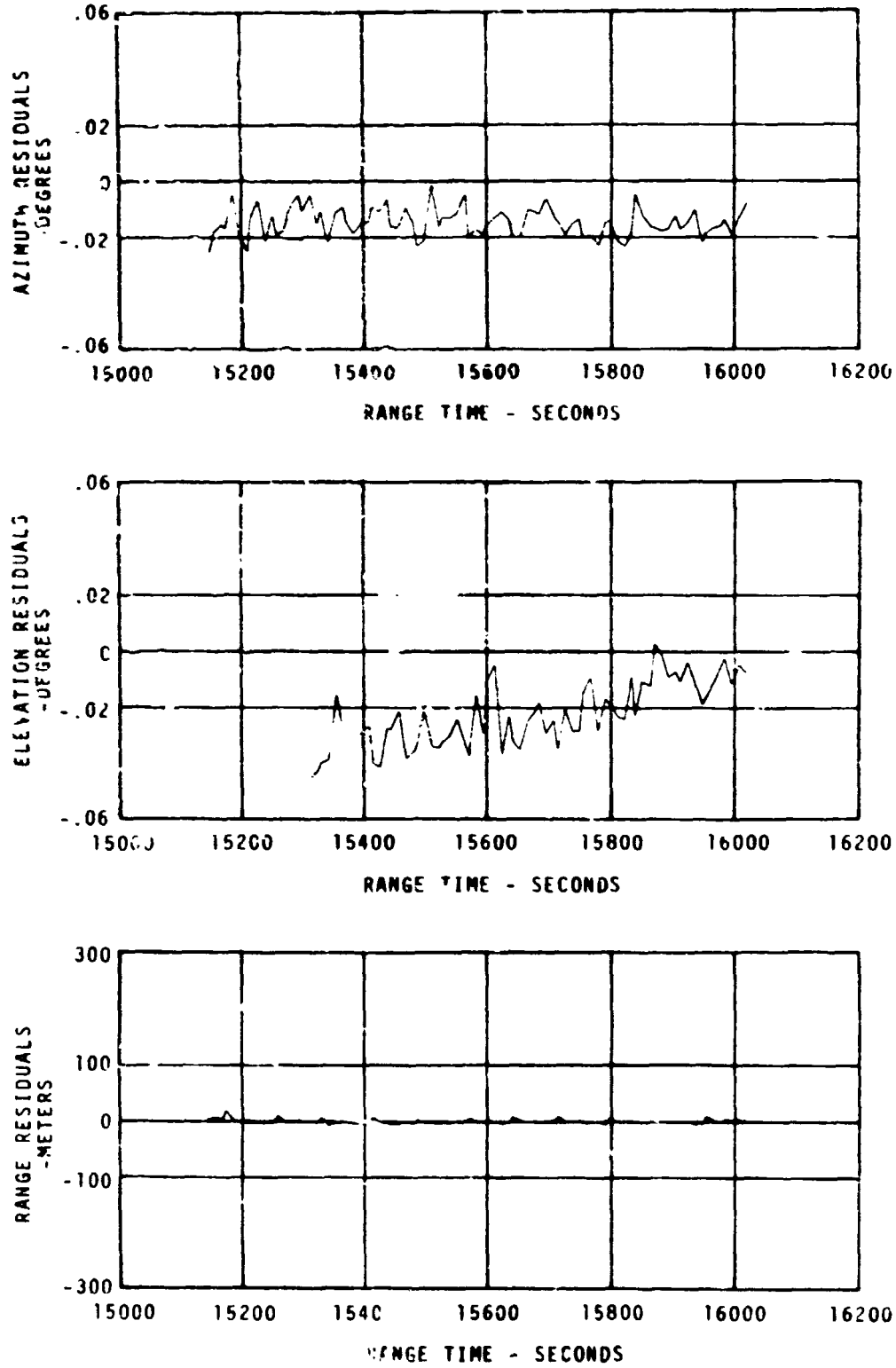

FIGURE 3-29. CARNARVON C-BAND RADAR TRACKING DEVIATIONS - TRANSLUNAR ORBIT PHASE (CRCQ)

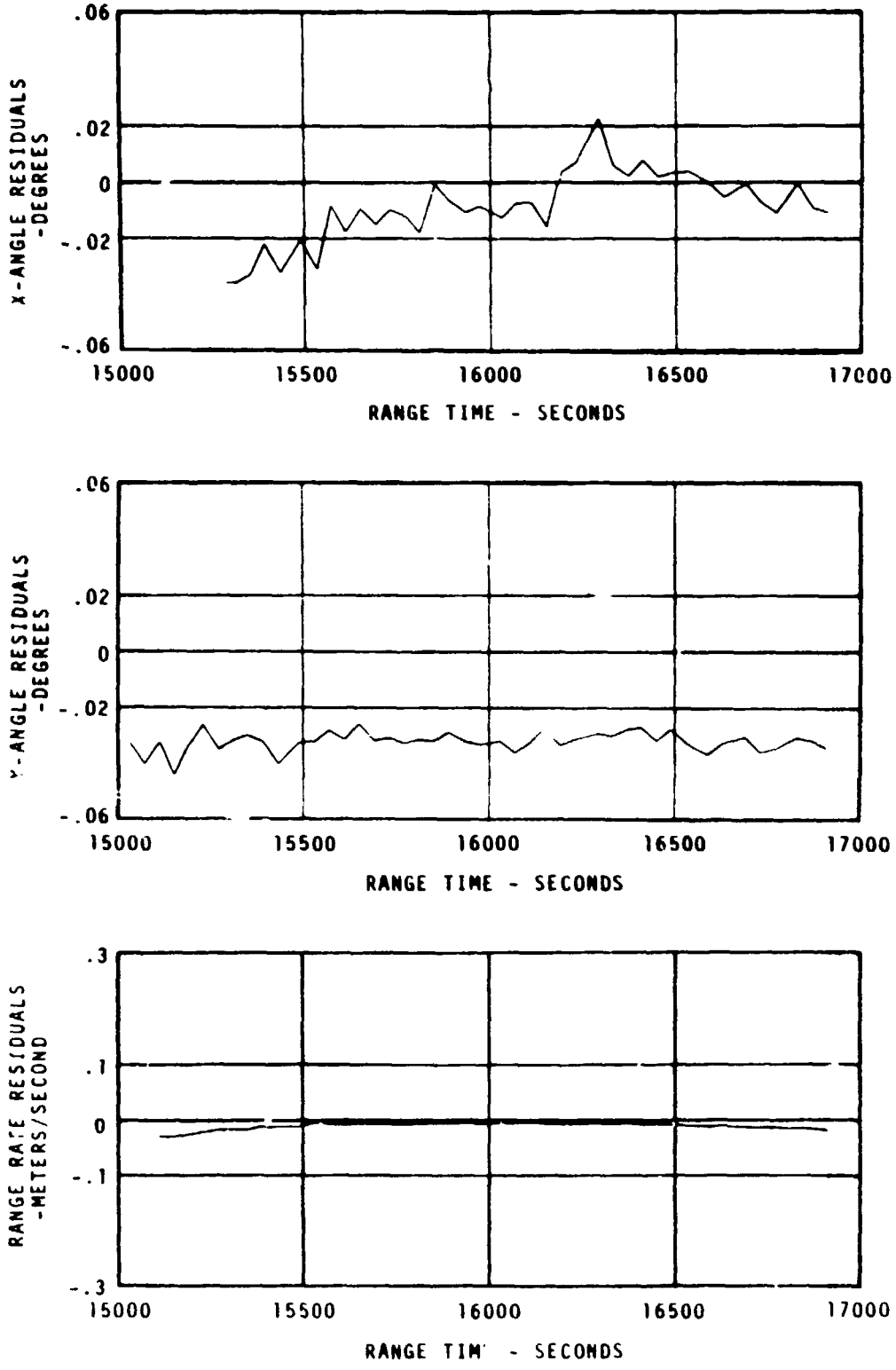

FIGURE 3-30. CARNARVON S-BAND TRACKING DEVIATIONS - TRANSLUNAR ORBIT PHASE (CR03)

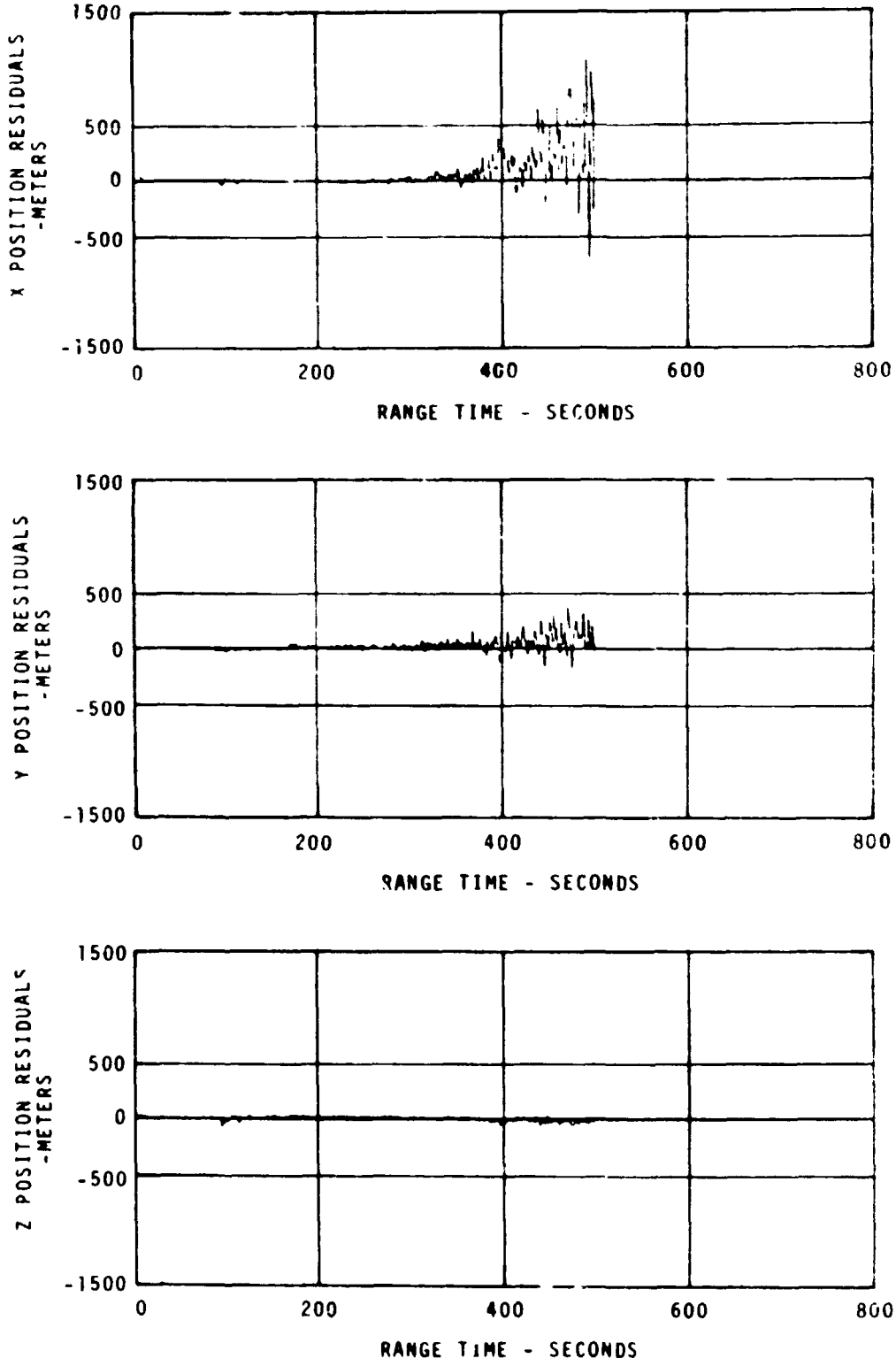

FIGURE 3-31. PACSS10 POSITION DEVIATIONS - ASCENT PHASE (MLAT)

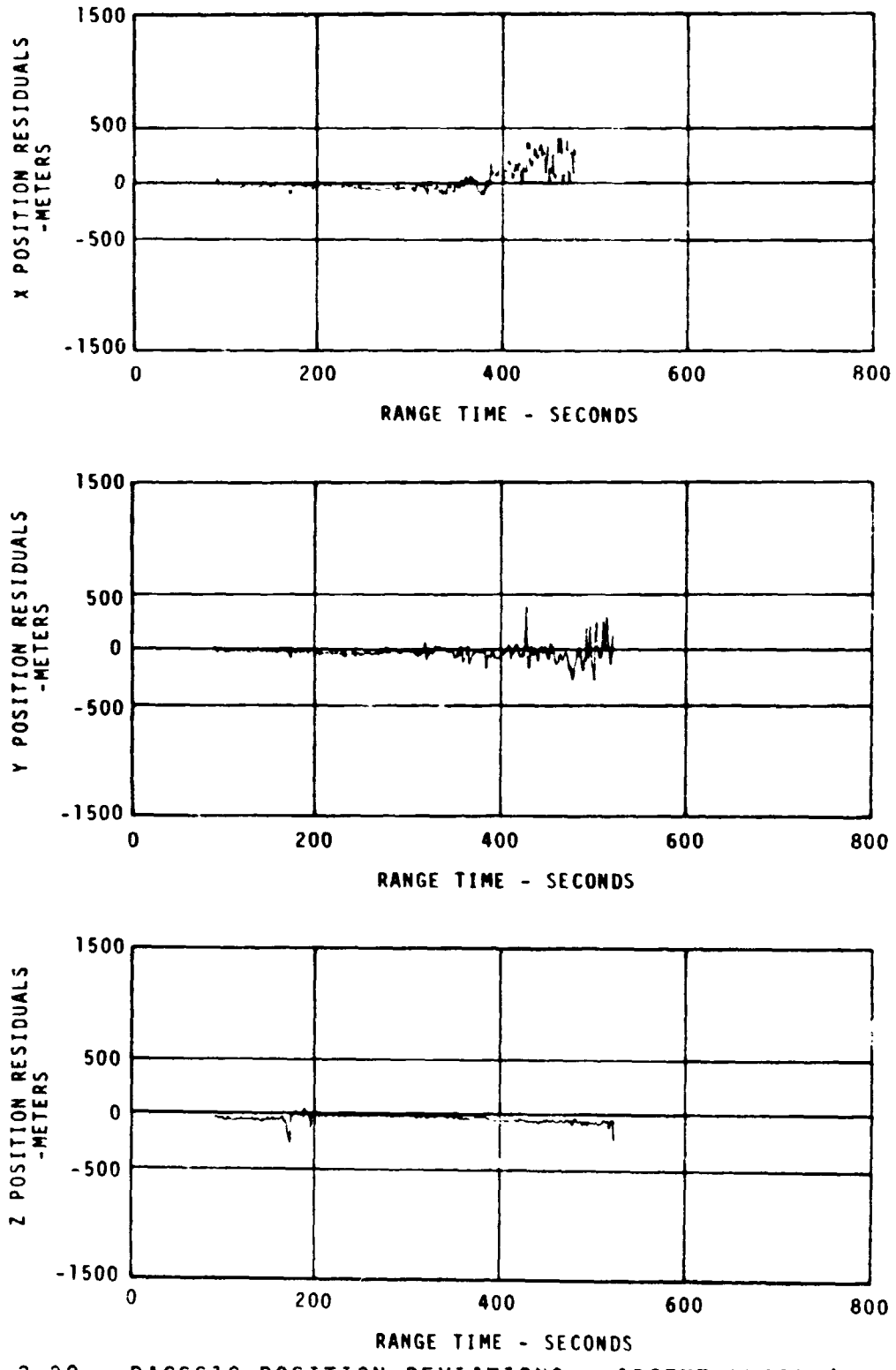

FIGURE 3-32. PACSS10 POSITION DEVIATIONS - ASCENT PHASE (PATQ)

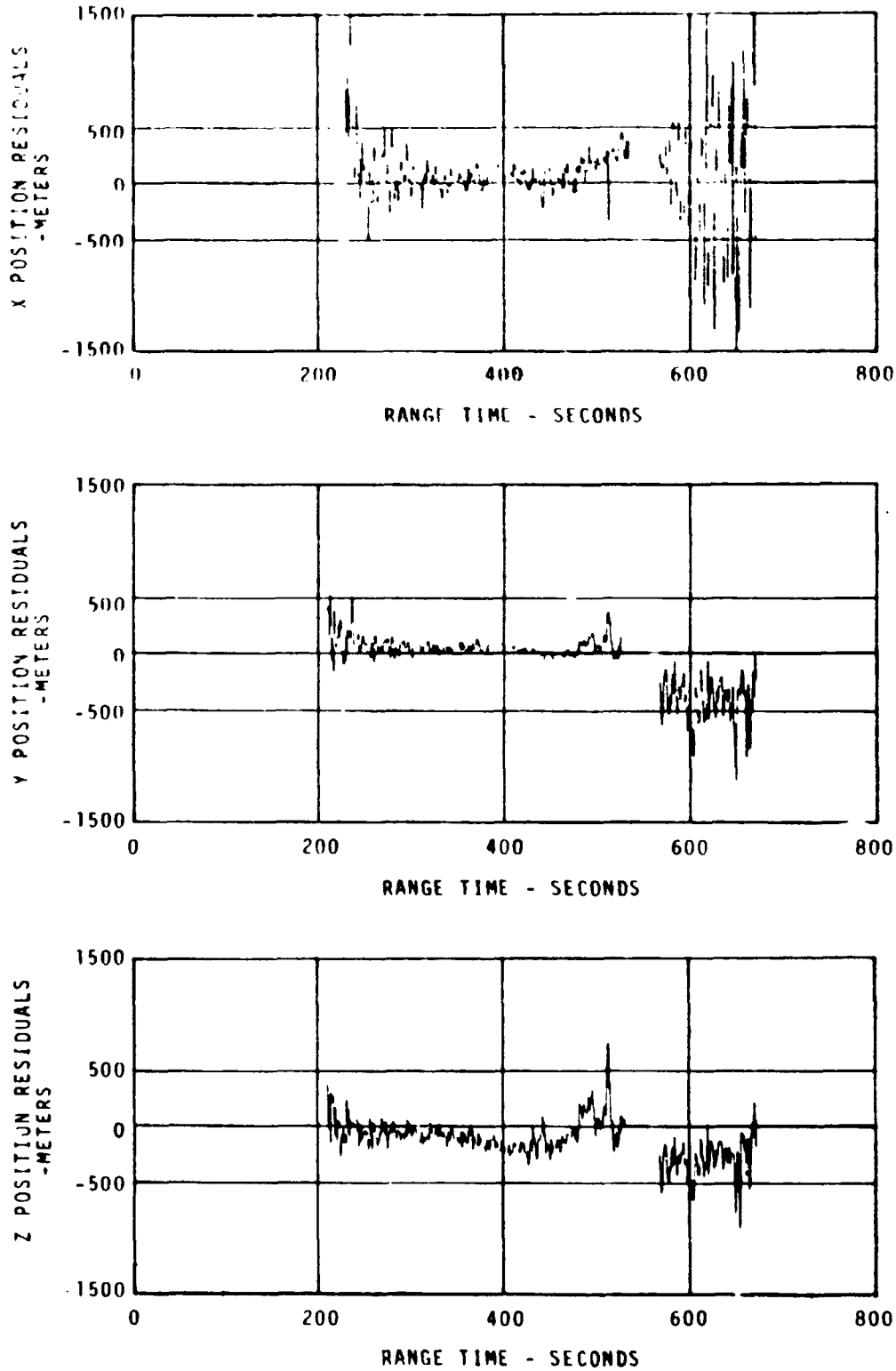

FIGURE 3-33. PACSS10 POSITION DEVIATIONS - ASCENT PHASE (GTKT)

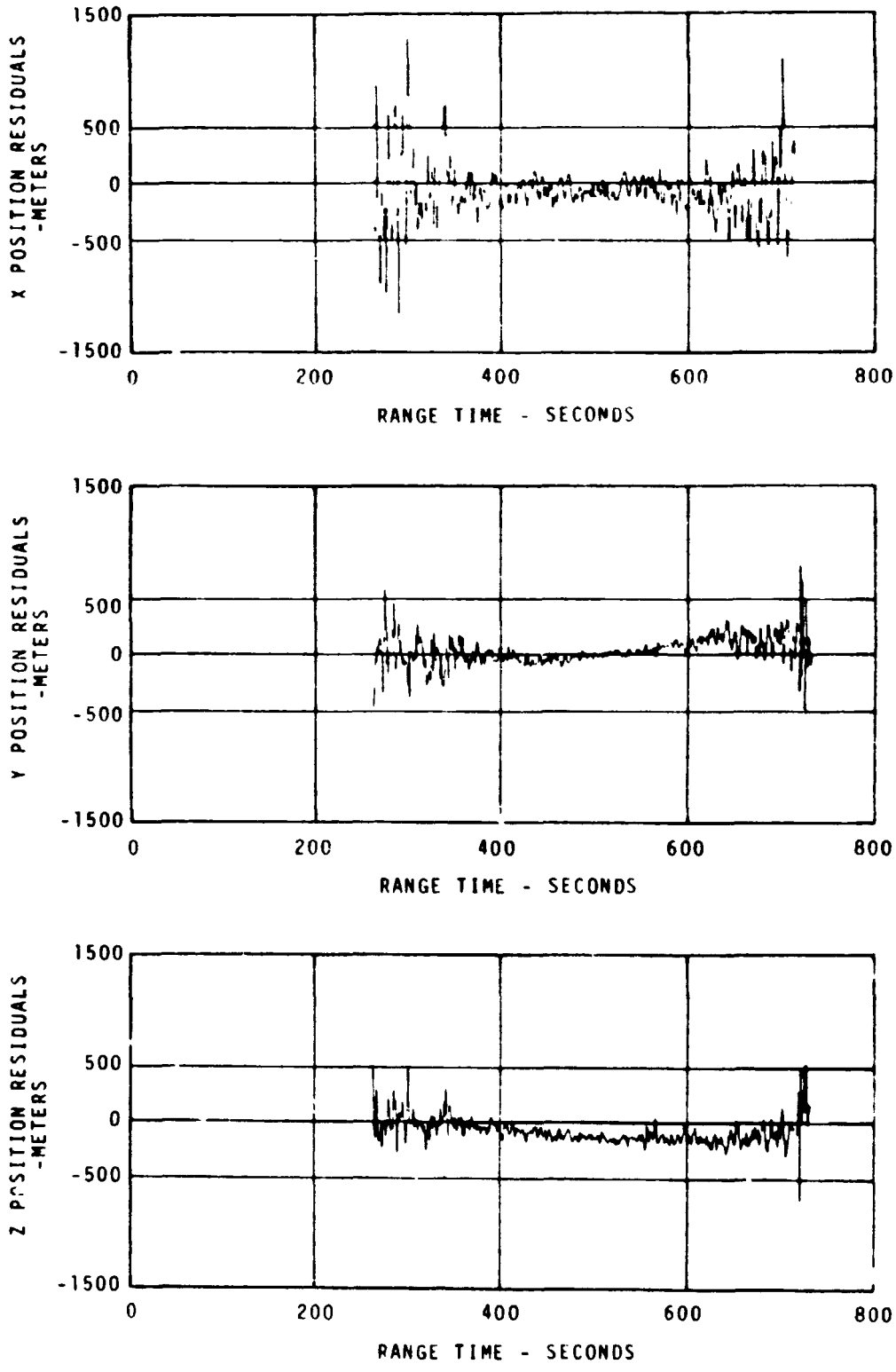

FIGURE 3-34. PACSS1O POSITION DEVIATIONS - ASCENT PHASE (BDAQ)

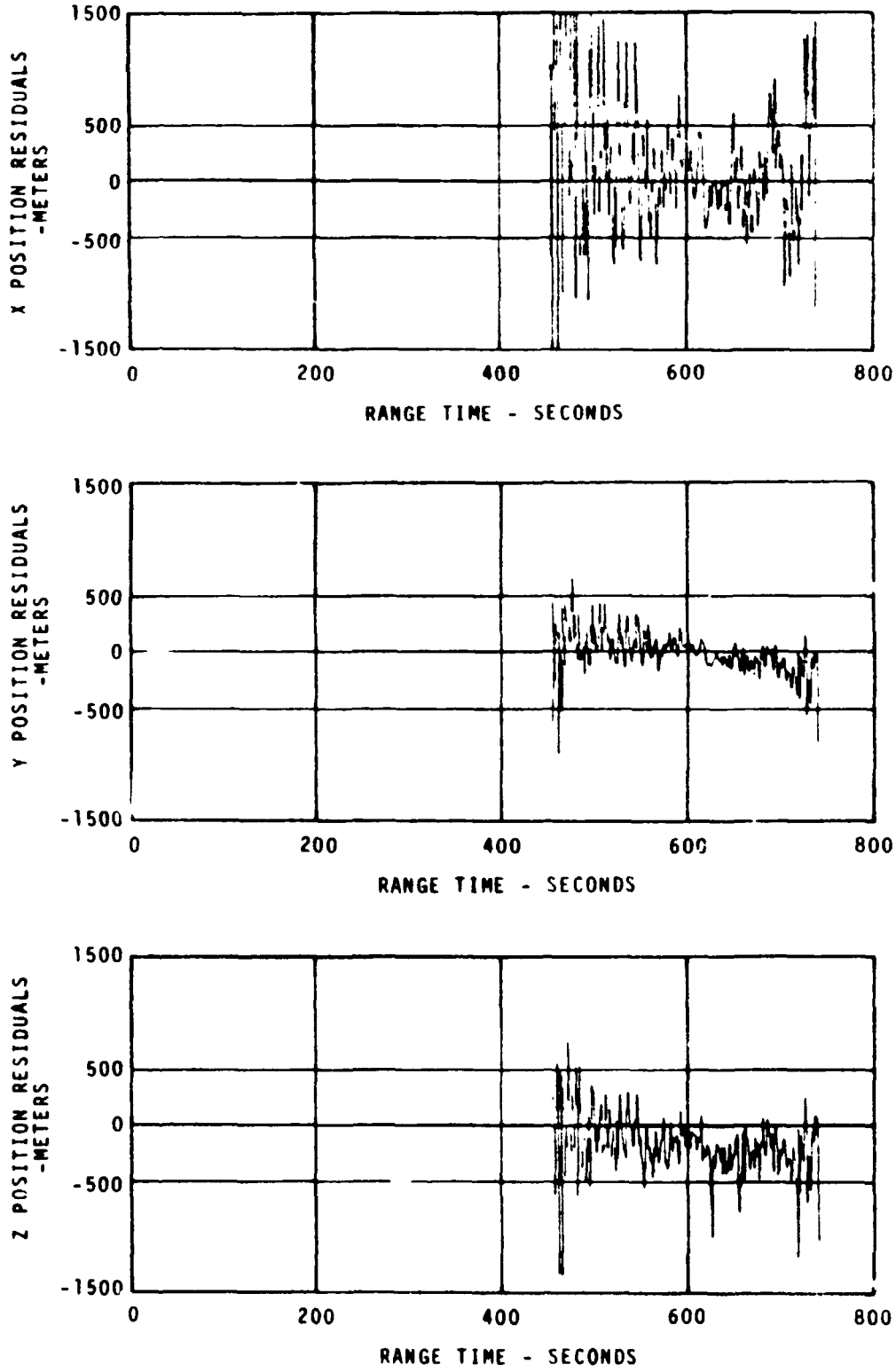

FIGURE PACSS10 POSITION DEVIATIONS - ASCENT PHASE (ANTQ)

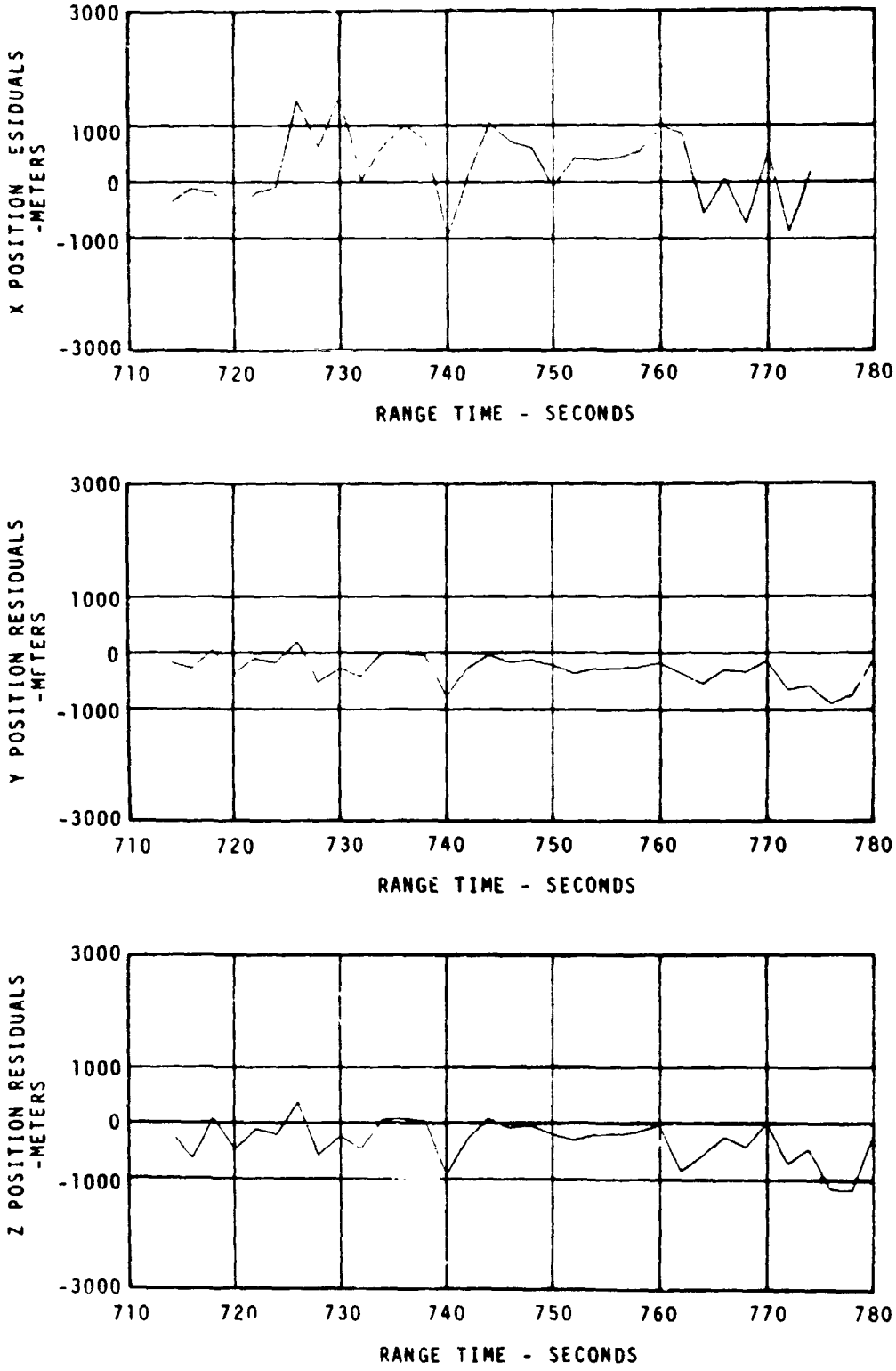

FIGURE 3-36. PACSS10 POSITION DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (ANTQ)

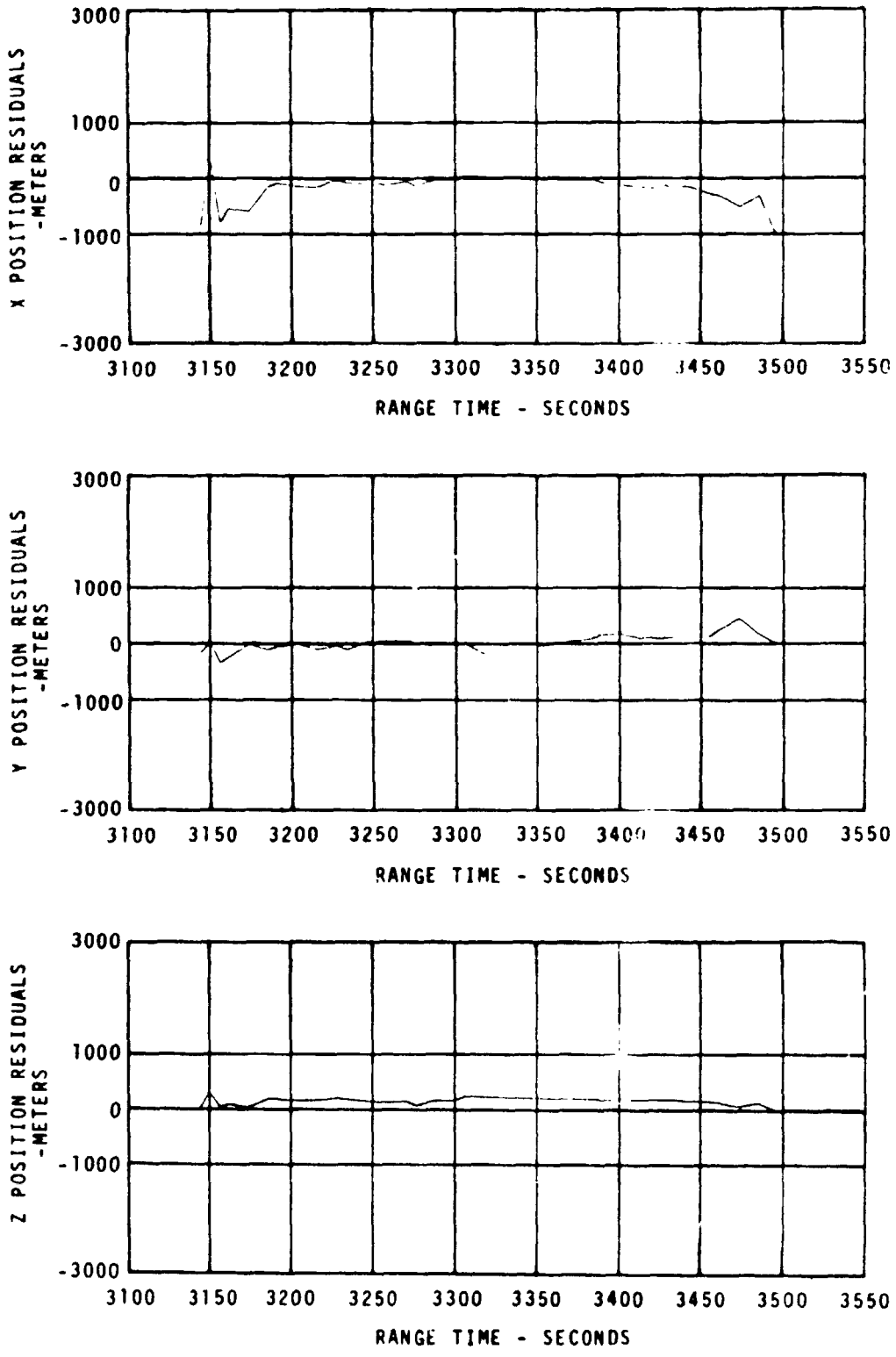

FIGURE 3-37. PACSS10 POSITION DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (CROQ)

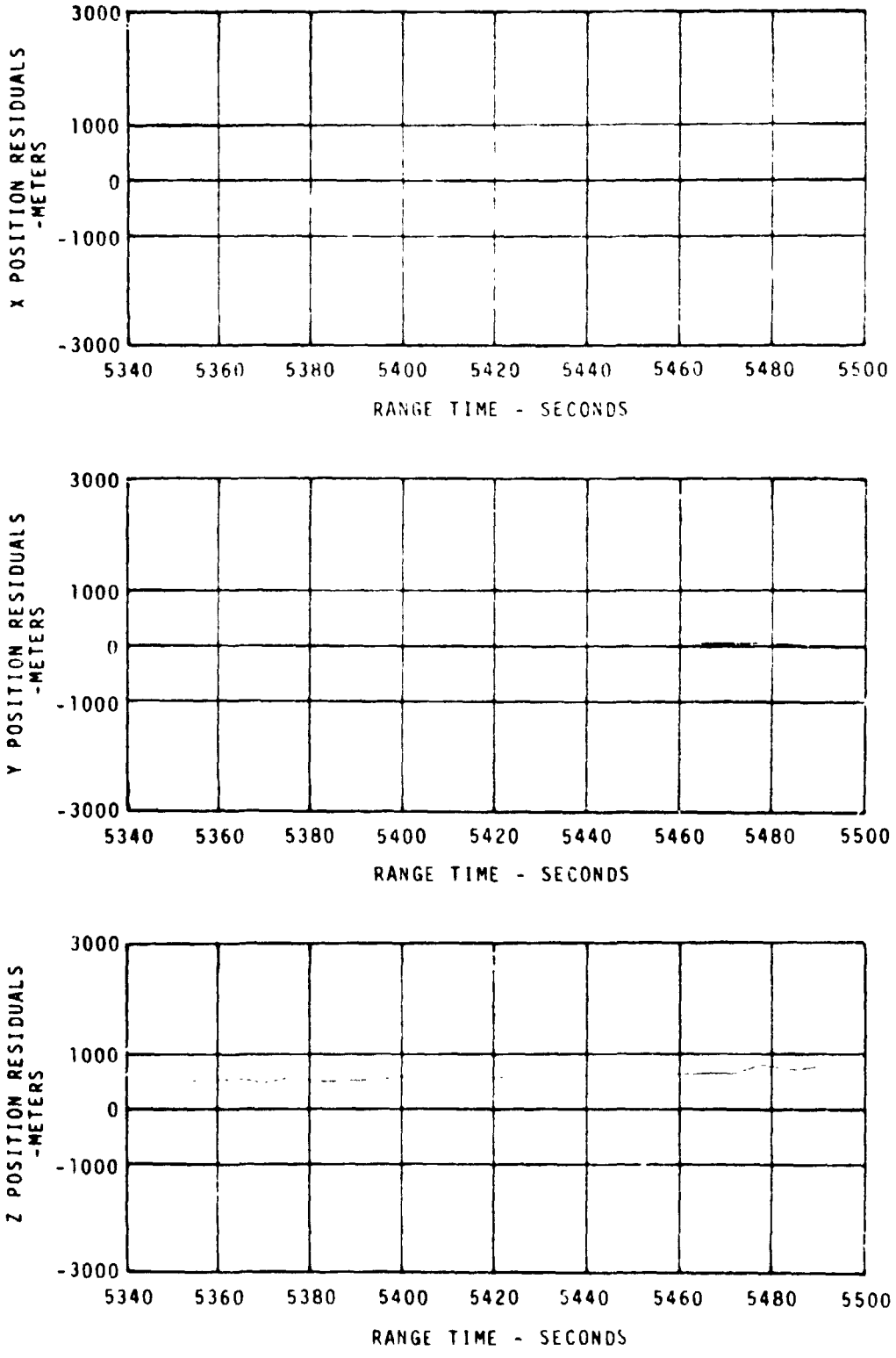

FIGURE 3-38. PACSSIO POSITION DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (GDS3)

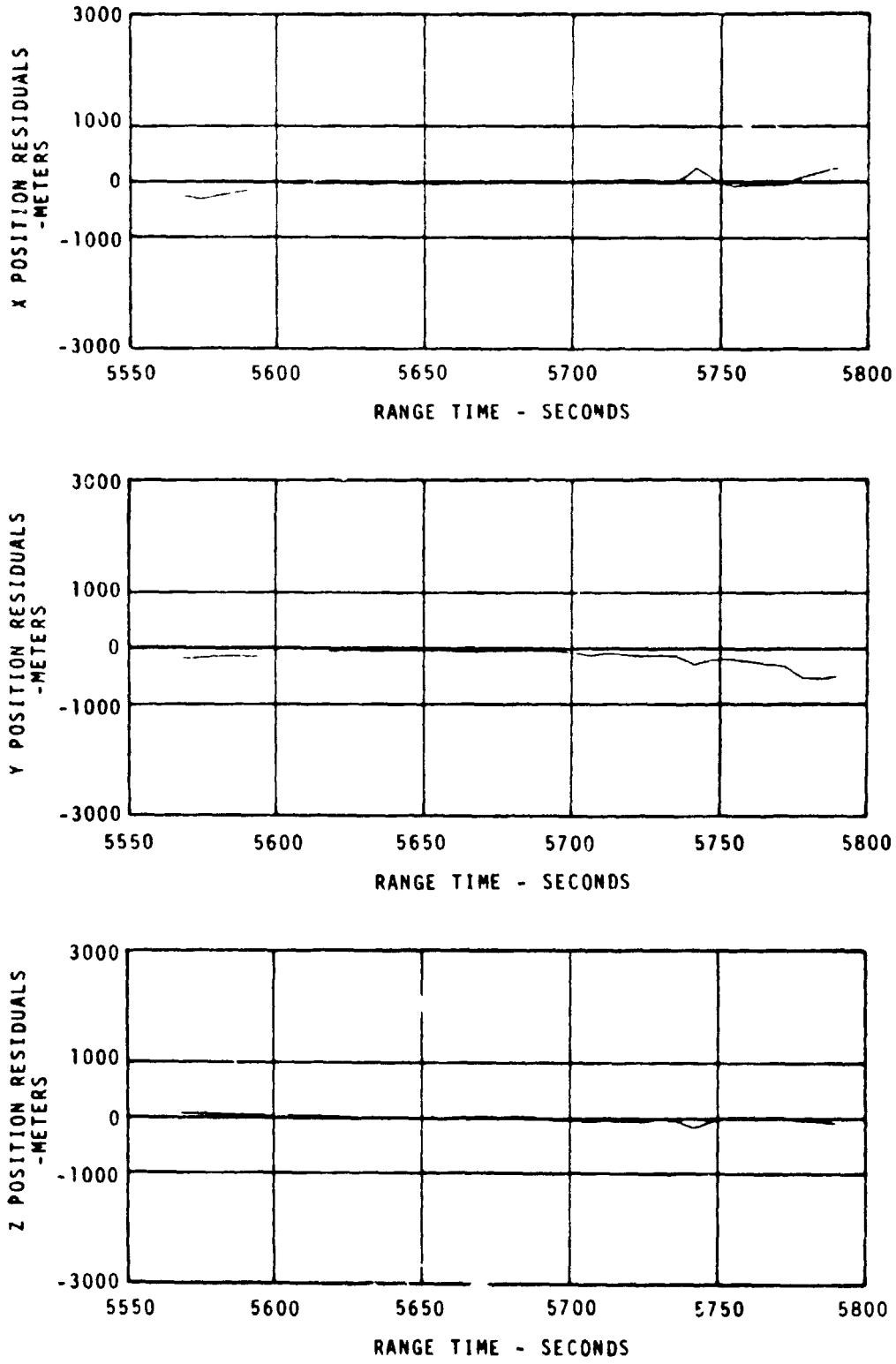

FIGURE 3-39. PACSS10 POSITION DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (TEX3)

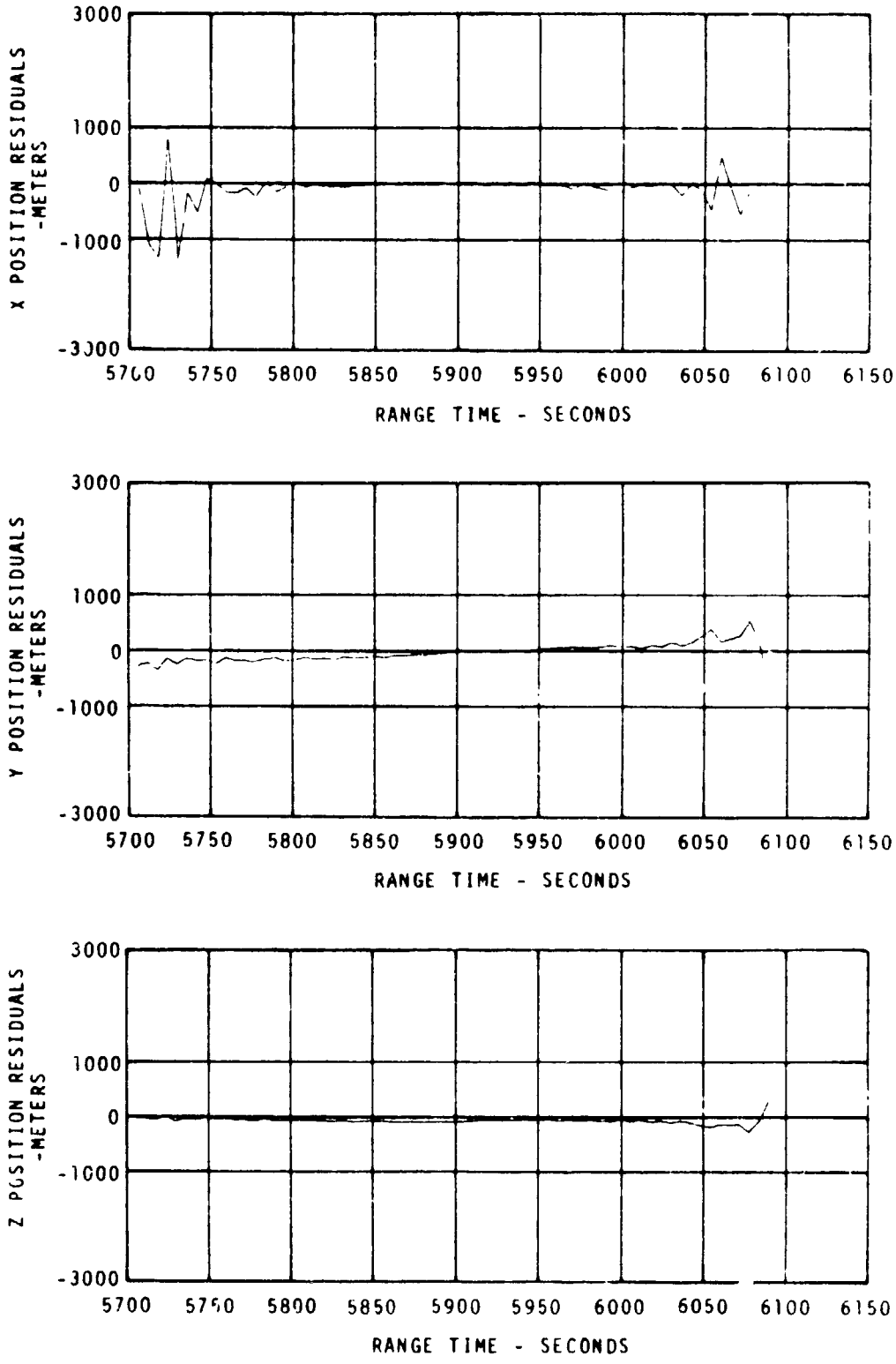

FIGURE 3-40. PACSS10 POSITION DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (MLAT)

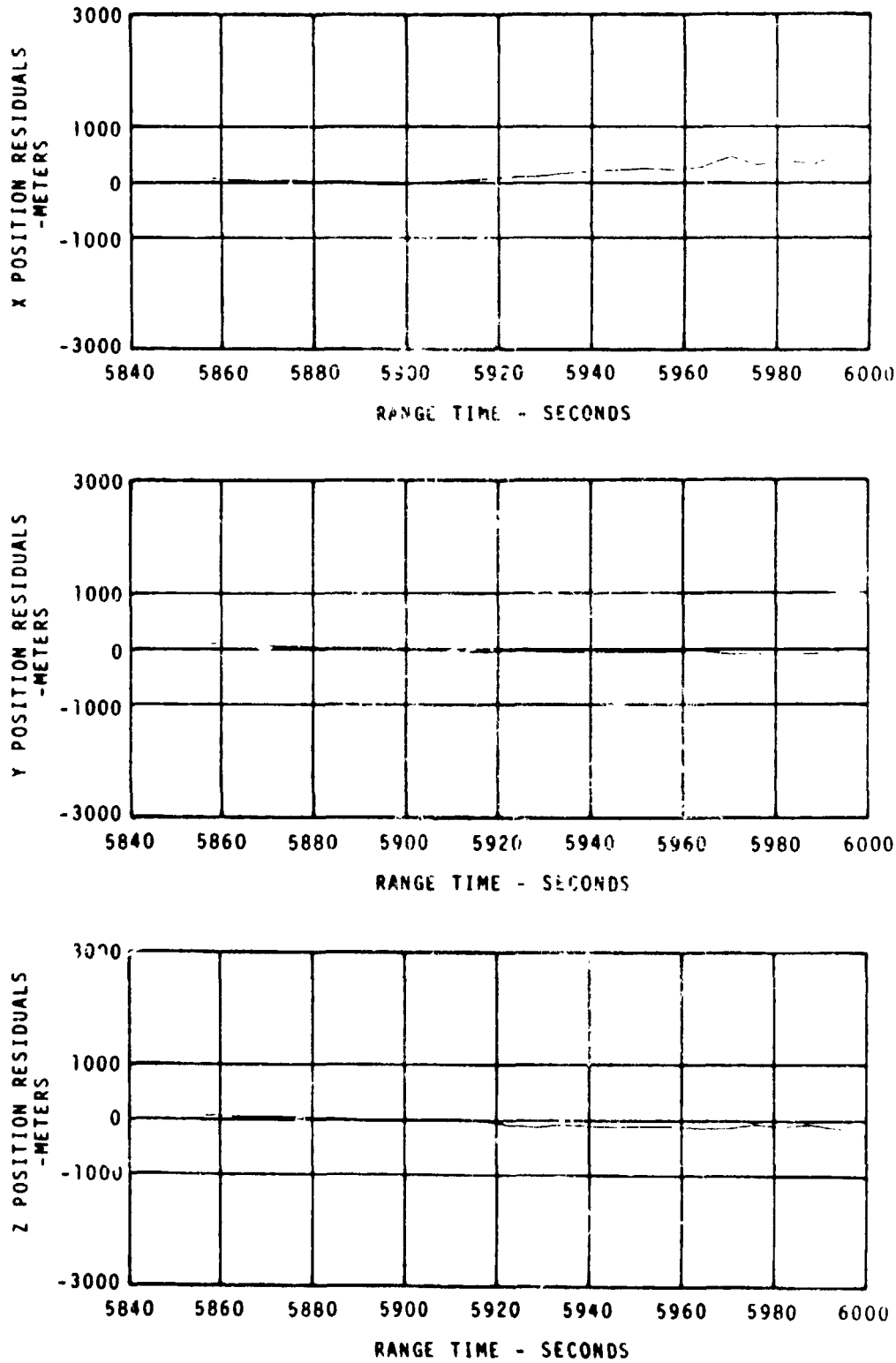

FIGURE 3-41. PACSS10 POSITION DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (MIL3)

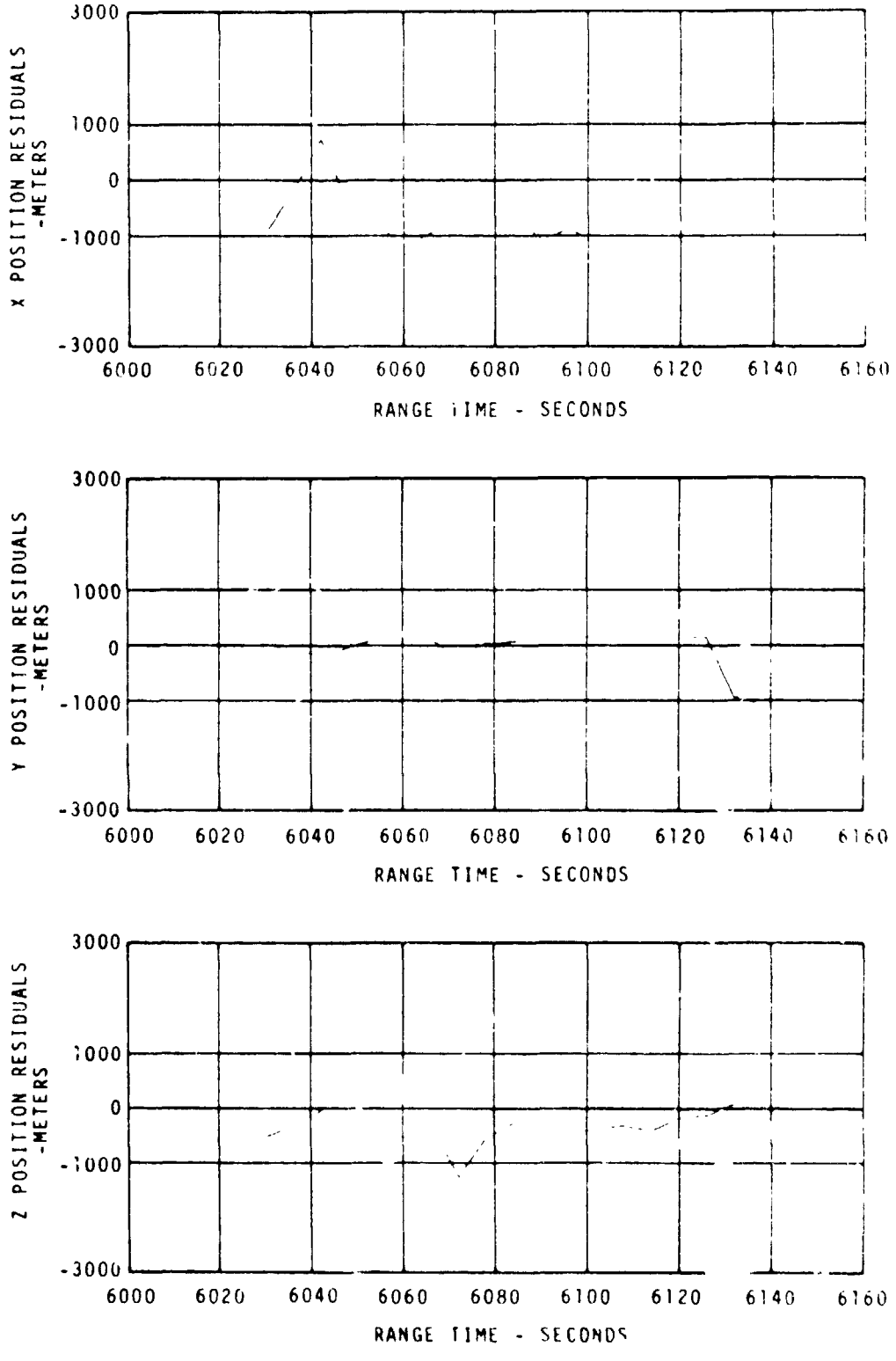

FIGURE 3-42. PACSSIO POSITION DEVIATIONS - PARKING ORBIT PHASE - REV. 1 (BDA3)

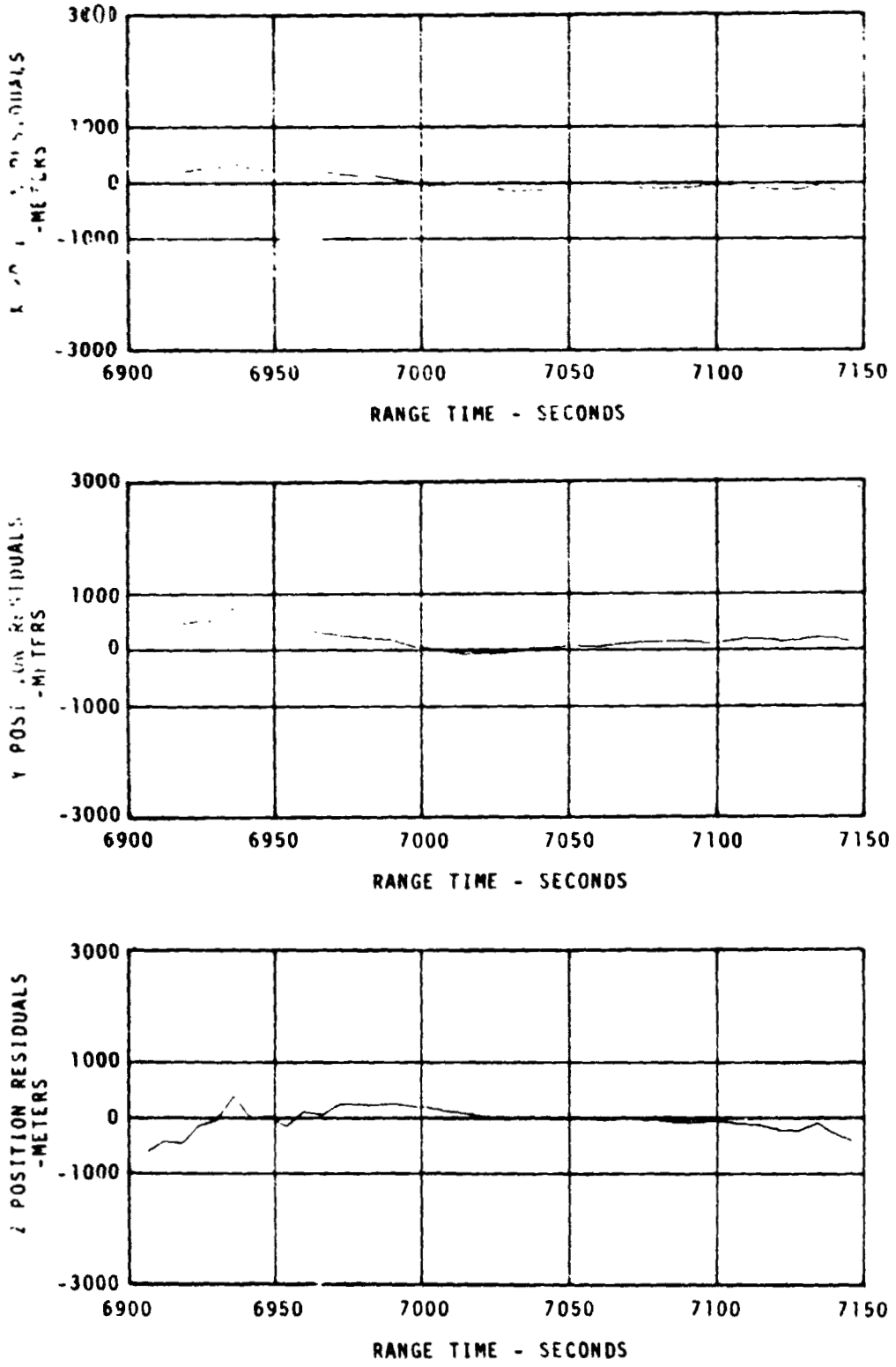

FIGURE 3-43. PACSS10 POSITION DEVIATIONS - PARKING ORBIT PHASE - REV. 2 (ACN3)

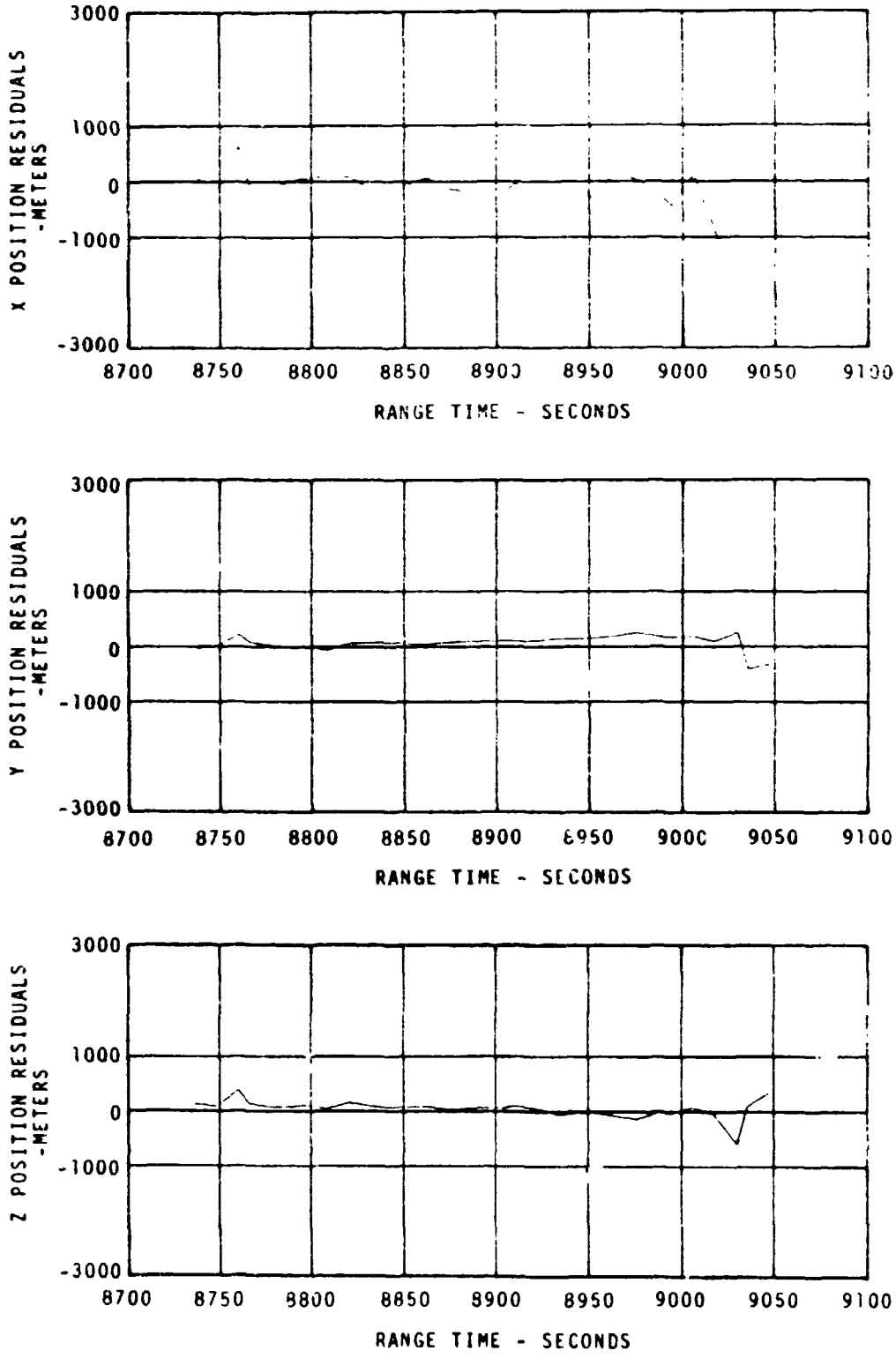

FIGURE 3-44. PACSS10 POSITION DEVIATIONS - PARKING ORBIT PHASE - REV. 2 (CROQ)

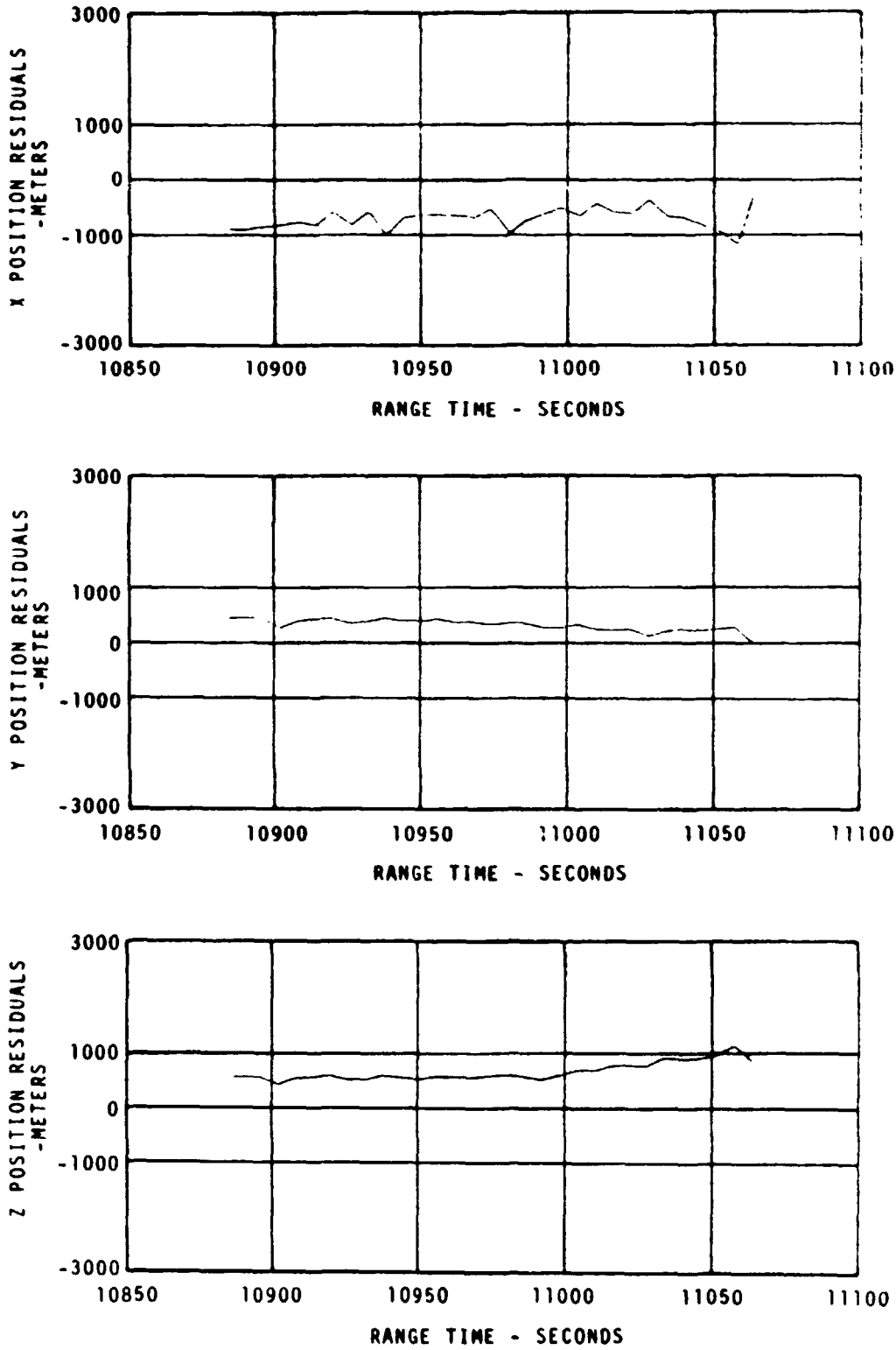

FIGURE 3-45. PACSS10 POSITION DEVIATIONS - PARKING ORBIT PHASE - REV. 2 (GDS8)

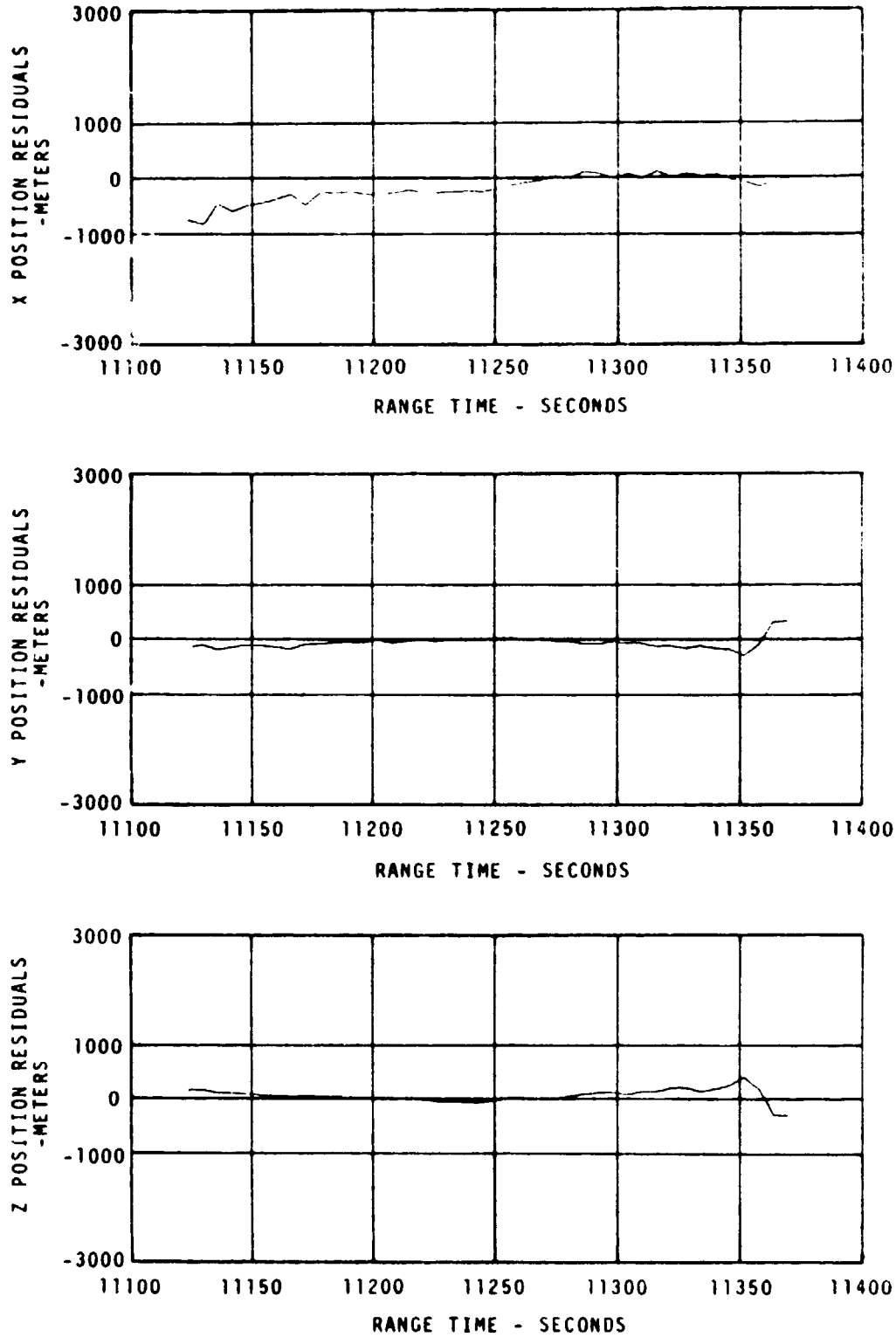

FIGURE 3-46. PACSS10 POSITION DEVIATIONS - PARKING ORBIT PHASE - REV. 2 (TEX3)

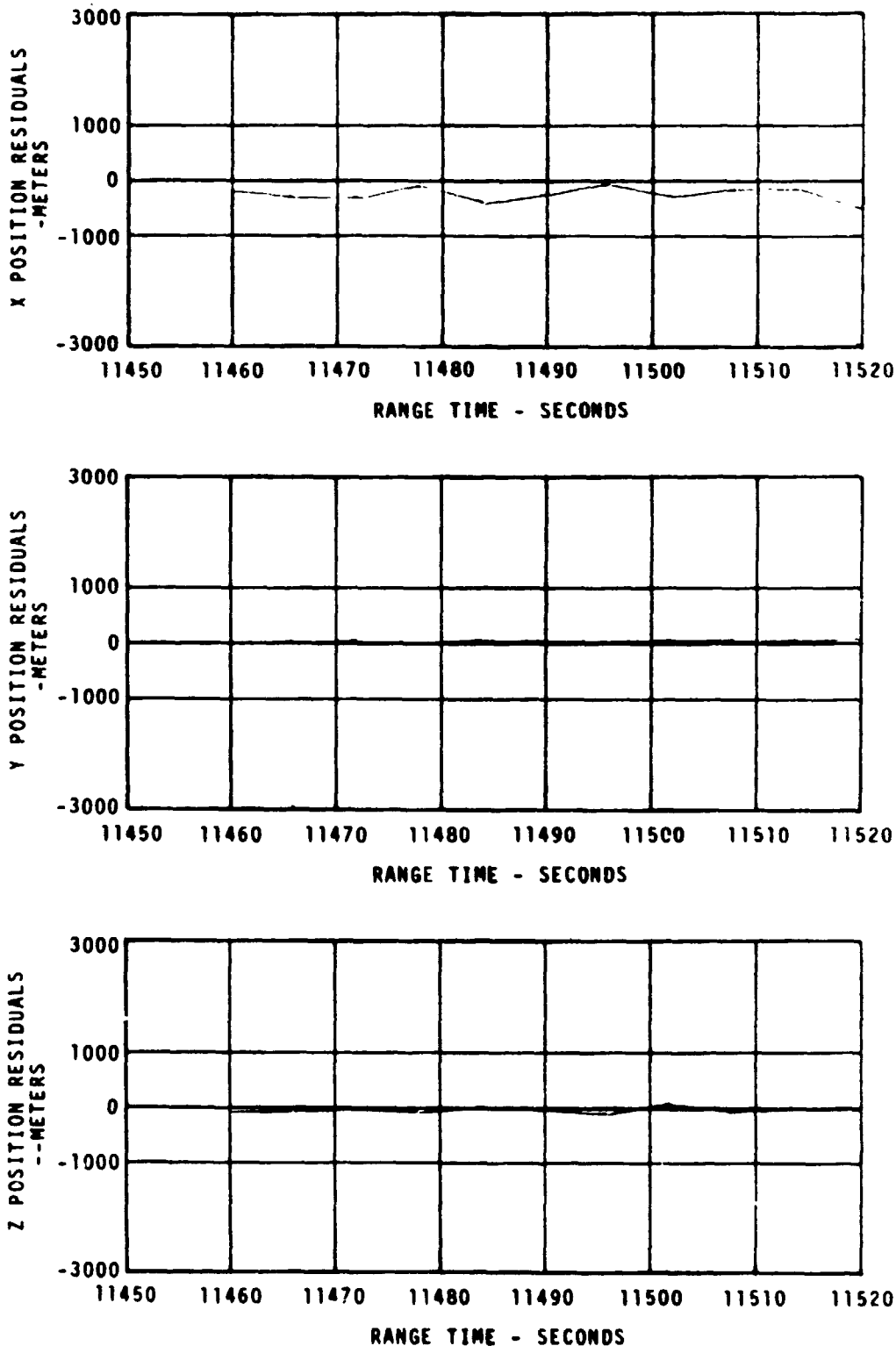

FIGURE 3-47. PACSS10 POSITION DEVIATIONS - PARKING ORBIT PHASE - REV. 2 (MLAT)

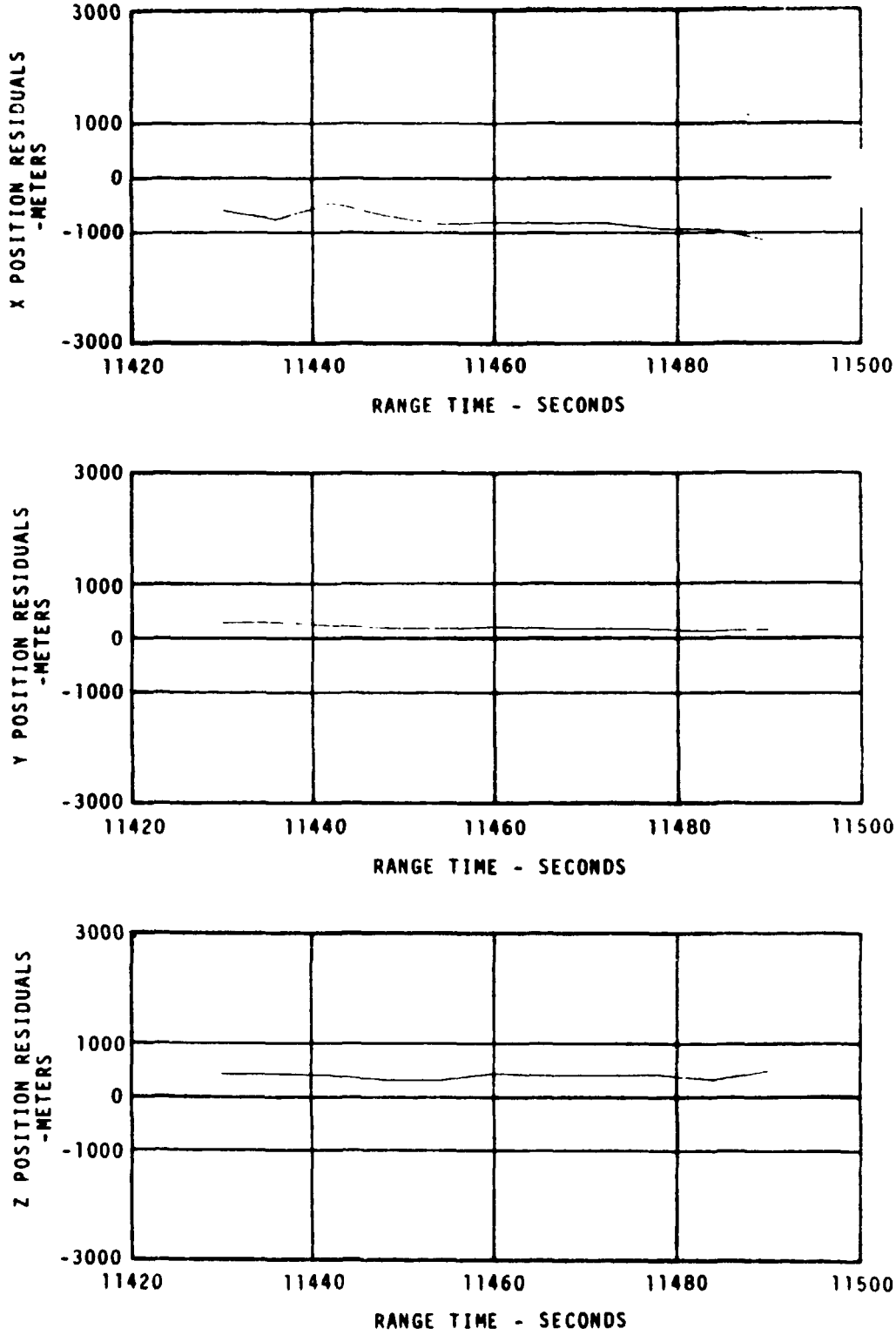

FIGURE 3-48. PACSS10 POSITION DEVIATIONS - PARKING ORBIT PHASE - REV. 2 (MIL3)

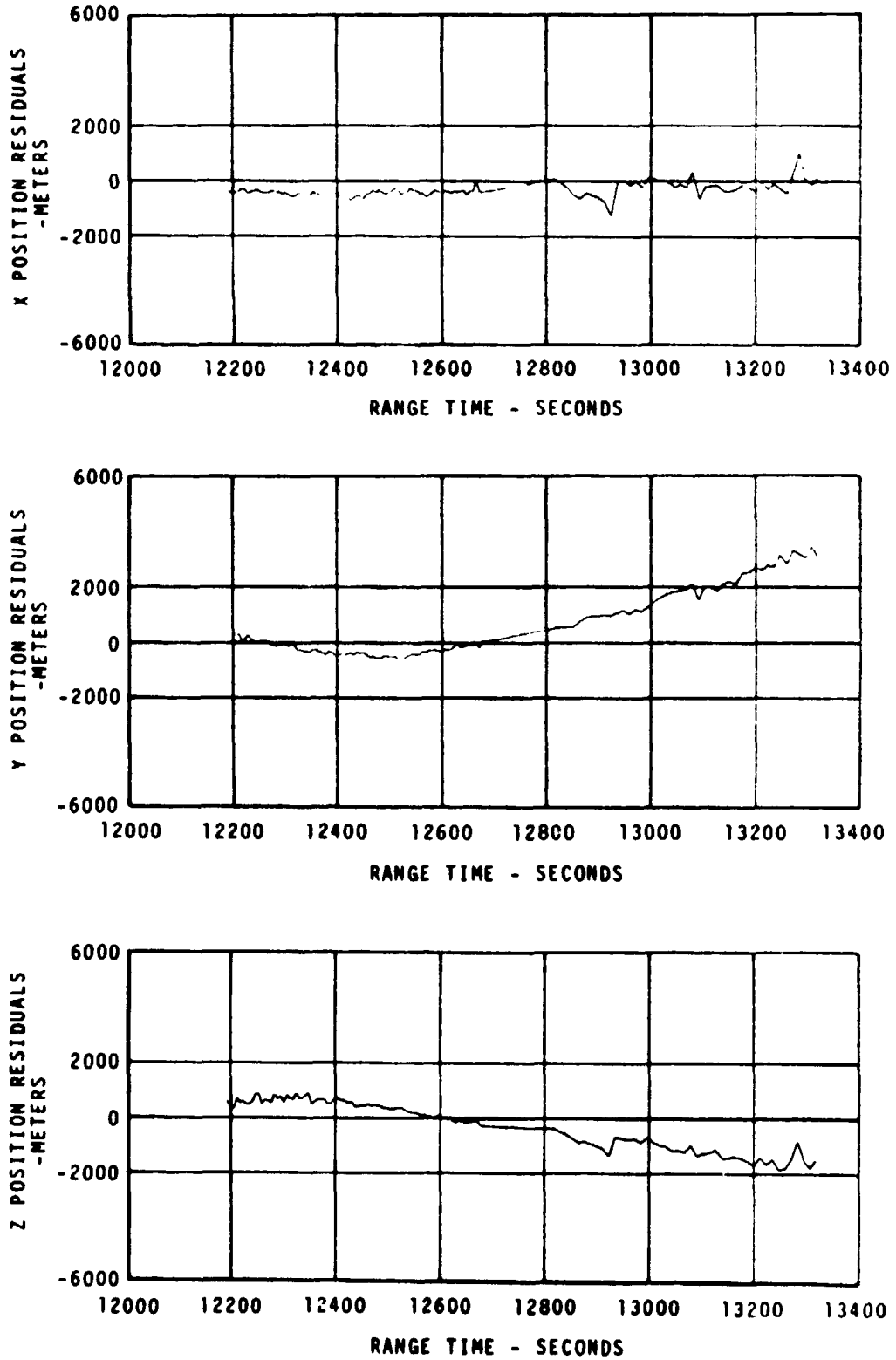

FIGURE 3-49. PACSS10 POSITION DEVIATIONS - TRANSLUNAR ORBIT PHASE (ACN3)

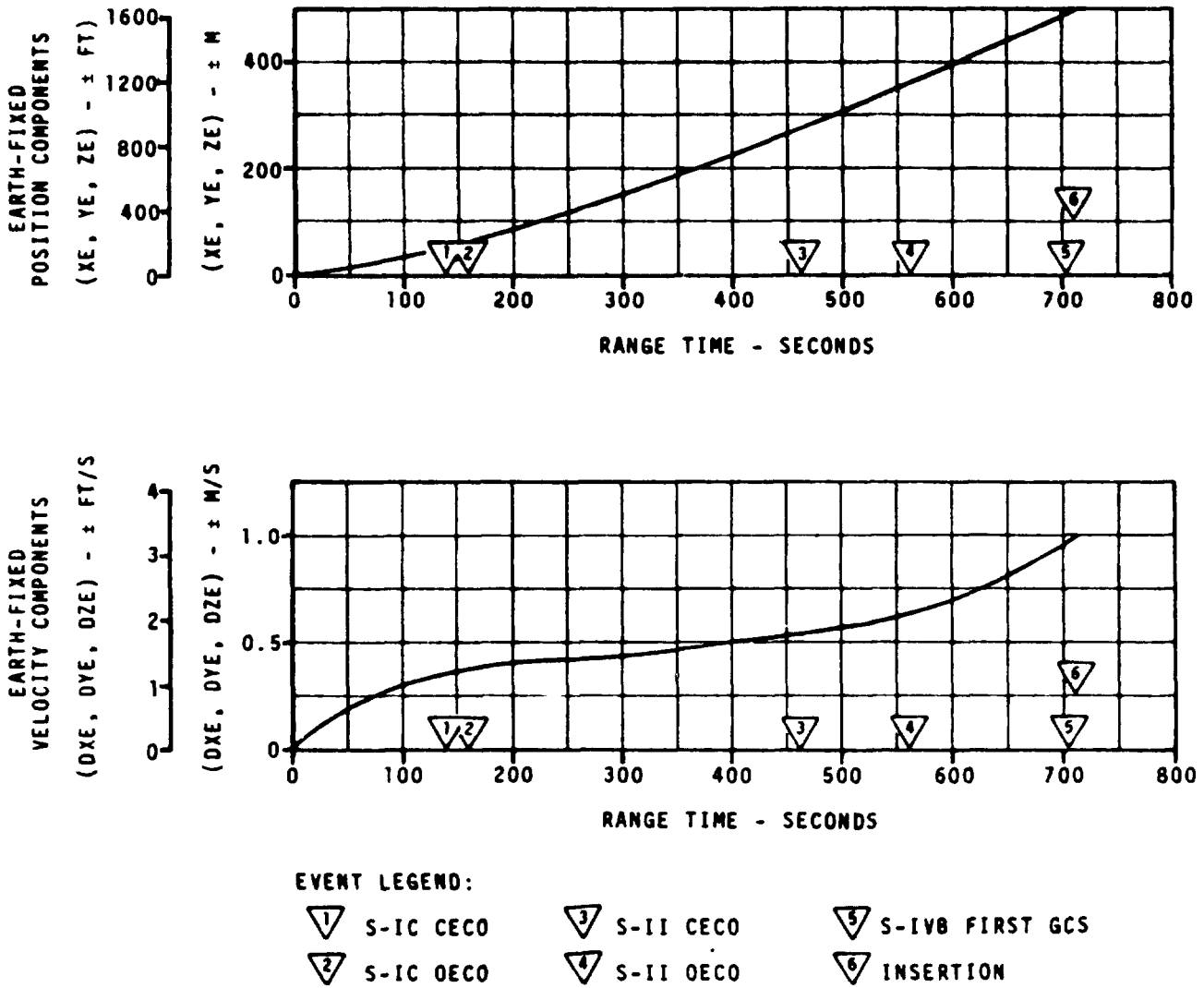

FIGURE 3-50. ESTIMATED TRAJECTORY UNCERTAINTY - ASCENT PHASE

TABLE 3-I. TRACKING STATION LOCATIONS

ABBREVIATION	NAME	LATITUDE, N	LONGITUDE, E	HEIGHT (m)
CROQ	Carnarvon C-Band	-24.89740278	113.71607778	62.0
MLAT	Merritt Island C-Band (19.18)	28.42486194	279.33559611	12.0
PATQ	Patrick AFB C-Band (0.18)	28.22655278	279.40070833	15.0
GTKT	Grand Turk C-Band (7.18)	21.46288889	288.86788611	28.0
BDAF	Bermuda C-Band (67.16)	32.34810278	295.34620000	18.0
BDAQ	Bermuda C-Band (67.18)	32.34796389	295.34625833	19.0
ANTQ	Antigua C-Band	17.14403056	298.20714167	58.0
CRO3	Carnarvon USB	-24.90664722	113.72603611	25.0
HSK8	Honeysuckle USB	-35.58349444	148.97828611	1144.0
HAW3	Hawaii USB	22.12489722	200.33501111	1150.0
GDS8	Goldstone USB	35.34159444	243.12680000	907.1
TEX3	Texas USB	27.65375000	262.62153055	10.0
MIL3	Merritt Island USB	28.50827222	279.30658333	10.0
BDA3	Bermuda USB	32.35128611	295.34181944	21.0
ACN3	Acension USB	-7.95505556	345.67242222	562.0

APPENDIX A

DEFINITIONS OF TRAJECTORY SYMBOLS AND COORDINATE SYSTEMS

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

APPENDIX A (Continued)

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

APPENDIX A (Continued)

	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 at PACSS1.
ALTITUDE	Perpendicular distance from vehicle Instrument Unit to Fischer Ellipsoid, positive above Fischer Ellipscid.
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.

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 and translunar phases of flight.

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

Table B-VII gives the geographic polar coordinates for the second burn and translunar phases of flight.

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

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
GUIDANCE REFERENCE RELEASE									
-16.960	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-16.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-15.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-14.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-13.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-12.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-11.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-10.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-9.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-8.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-7.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-6.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-5.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-4.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-3.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-2.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-1.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
ALL HOLDDOWN ARMS RELEASED									
0.200	112	0	0	0.0	0.0	0.0	0.0	0.0	0.0
LIFTOFF - START OF TIME BASE 1									
0.600	112	0	0	0.3	-0.0	-0.0	0.95	-0.01	-0.06
1.0	112	0	0	0.9	-0.0	-0.0	2.10	-0.01	-0.09
2.0	114	0	0	3.1	-0.0	-0.1	2.15	-0.01	-0.09
3.0	118	0	0	5.2	-0.0	-0.2	2.20	-0.02	-0.09
4.0	124	0	-1	7.5	-0.0	-0.3	2.26	0.00	-0.08
5.0	133	0	-1	9.9	0.1	-0.4	2.32	0.20	-0.07
6.0	144	0	-1	12.1	0.3	-0.5	2.37	0.37	-0.06
7.0	157	1	-2	14.5	0.8	-0.5	2.43	0.46	-0.04
8.0	173	2	-2	17.0	1.2	-0.5	2.49	0.44	-0.05
9.0	191	3	-3	19.5	1.6	-0.6	2.55	0.27	-0.05
10.0	212	5	-3	22.1	1.7	-0.6	2.61	0.06	-0.05
11.0	235	6	-4	24.7	1.8	-0.7	2.67	-0.04	-0.05
12.0	261	8	-5	27.4	1.7	-0.7	2.74	-0.04	-0.05
13.0	291	10	-6	30.2	1.7	-0.8	2.91	0.05	-0.05
14.0	322	12	-6	33.0	1.8	-0.8	2.97	0.13	-0.03

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

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	354	14	-7	35.9	1.9	-0.8	2.93	0.02	0.02
16.0	394	15	-8	38.9	1.8	-0.8	3.01	-0.15	0.07
17.0	434	17	-9	41.9	1.7	-0.7	3.07	-0.16	0.08
18.0	477	19	-9	45.0	1.5	-0.6	3.14	-0.17	0.11
19.0	524	20	-10	48.2	1.3	-0.5	3.20	-0.15	0.18
20.0	574	21	-10	51.4	1.2	-0.3	3.27	-0.09	0.25
21.0	627	23	-10	54.7	1.1	0.0	3.34	-0.07	0.32
22.0	683	24	-10	58.1	1.1	0.4	3.40	-0.06	0.40
23.0	743	25	-10	61.5	1.0	0.8	3.46	-0.06	0.49
24.0	806	26	-9	65.0	0.9	1.4	3.53	-0.07	0.57
25.0	873	27	-7	68.6	0.9	2.0	3.60	-0.07	0.66
26.0	944	27	-5	72.2	0.8	2.7	3.67	-0.07	0.76
27.0	1019	28	-2	75.9	0.7	3.5	3.74	-0.07	0.87
28.0	1096	29	2	79.7	0.6	4.4	3.82	-0.07	0.98
29.0	1177	29	7	83.6	0.6	5.5	3.89	-0.08	1.10
30.0	1263	30	13	87.5	0.5	6.6	3.96	-0.09	1.21
31.0	1352	30	21	91.5	0.4	7.9	4.04	-0.10	1.32
32.0	1446	31	29	95.6	0.3	9.3	4.11	-0.10	1.43
33.0	1544	31	39	99.7	0.2	10.7	4.19	-0.11	1.54
34.0	1645	31	51	104.0	0.1	12.3	4.27	-0.12	1.66
35.0	1751	31	64	108.3	-0.0	14.1	4.34	-0.12	1.78
36.0	1862	31	79	112.6	-0.2	15.9	4.42	-0.12	1.90
37.0	1977	31	96	117.1	-0.3	17.9	4.50	-0.12	2.03
38.0	2096	30	115	121.6	-0.4	20.0	4.58	-0.12	2.16
39.0	2220	30	134	126.3	-0.5	22.2	4.65	-0.11	2.30
40.0	2349	29	159	131.0	-0.6	24.6	4.73	-0.11	2.44
41.0	2482	29	185	135.7	-0.8	27.1	4.81	-0.11	2.59
42.0	2620	28	213	140.6	-0.9	29.7	4.89	-0.11	2.74
43.0	2763	27	244	145.5	-1.0	32.6	4.96	-0.11	2.91
44.0	2911	26	279	150.5	-1.1	35.6	5.04	-0.10	3.08
45.0	3064	25	316	155.6	-1.2	38.7	5.11	-0.10	3.24
46.0	3222	24	356	160.7	-1.3	42.0	5.18	-0.09	3.41
47.0	3386	22	400	165.9	-1.3	45.5	5.25	-0.06	3.58
49.0	3554	21	447	171.2	-1.4	49.2	5.32	-0.03	3.75
49.0	3728	20	498	176.6	-1.4	53.0	5.40	-0.01	3.93
50.0	3907	18	553	182.0	-1.4	57.1	5.47	0.01	4.12
51.0	4092	17	612	187.5	-1.4	61.3	5.54	0.03	4.31
52.0	4282	15	676	193.1	-1.3	65.7	5.61	0.04	4.50
53.0	4478	14	744	198.7	-1.3	70.3	5.67	0.04	4.70
54.0	4680	13	816	204.4	-1.3	75.1	5.74	0.02	4.88
55.0	4887	12	894	210.2	-1.3	80.0	5.81	0.01	5.06
56.0	5100	10	976	216.1	-1.3	85.2	5.89	-0.01	5.23
57.0	5319	9	1064	222.0	-1.3	90.5	5.97	-0.02	5.39

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

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	5544	8	1157	228.0	-1.3	95.9	6.05	-0.02	5.55
59.0	5775	6	1256	234.1	-1.3	101.6	6.12	-0.00	5.71
60.0	6013	5	1361	240.2	-1.3	107.4	6.20	0.03	5.88
61.0	6256	4	1471	246.5	-1.2	113.3	6.26	0.07	6.08
62.0	6505	3	1587	252.8	-1.1	119.5	6.31	0.11	6.29
63.0	6761	2	1710	259.1	-1.0	125.9	6.34	0.13	6.52
64.0	7024	1	1839	265.4	-0.9	132.6	6.35	0.14	6.77
65.0	7292	0	1975	271.8	-0.8	139.5	6.35	0.13	7.03
66.0	7567	-1	2119	278.1	-0.6	146.7	6.36	0.12	7.30
67.0	7849	-2	2269	284.5	-0.5	154.1	6.37	0.12	7.56
MACH 1									
67.500	7992	-2	2347	287.7	-0.5	157.9	6.38	0.11	7.69
69.0	8136	-2	2427	290.9	-0.4	161.8	6.39	0.11	7.81
69.0	8430	-2	2592	297.3	-0.3	169.7	6.43	0.11	8.03
70.0	8731	-3	2766	303.7	-0.2	177.8	6.48	0.12	8.23
71.0	9039	-3	2948	310.3	-0.0	186.1	6.55	0.14	8.40
72.0	9351	-3	3138	316.9	0.1	194.6	6.63	0.17	8.57
73.0	9672	-2	3337	323.5	0.3	203.3	6.72	0.21	8.75
74.0	9999	-2	3545	330.3	0.6	212.1	6.79	0.28	8.96
75.0	10332	-1	3762	337.1	0.9	221.2	6.87	0.38	9.19
76.0	10673	0	3989	344.0	1.4	230.6	6.93	0.49	9.46
77.0	11020	2	4223	351.0	1.9	240.2	6.98	0.61	9.76
78.0	11375	4	4469	357.9	2.6	250.1	7.02	0.71	10.06
79.0	11736	7	4723	365.0	3.3	260.3	7.05	0.78	10.37
80.0	12105	10	4989	372.1	4.1	270.8	7.09	0.81	10.67
81.0	12480	15	5265	379.2	4.9	281.6	7.14	0.79	10.96
82.0	12863	20	5552	386.4	5.6	292.7	7.19	0.74	11.26
MAXIMUM DYNAMIC PRESSURE									
82.500	13057	23	5700	390.0	6.0	298.4	7.22	0.70	11.42
83.0	13253	26	5850	393.6	6.3	304.1	7.24	0.65	11.57
84.0	13650	33	6160	400.8	6.9	315.9	7.27	0.51	11.90
85.0	14055	40	6482	408.1	7.3	328.0	7.27	0.36	12.25
86.0	14466	47	6816	415.3	7.6	340.4	7.26	0.21	12.61
87.0	14885	55	7163	422.6	7.8	353.2	7.23	0.06	12.99
88.0	15311	63	7523	429.8	7.8	366.4	7.21	-0.07	13.37
89.0	15745	71	7894	437.0	7.7	379.9	7.18	-0.17	13.75
90.0	16186	79	8283	444.2	7.4	393.8	7.15	-0.25	14.12
91.0	16633	95	8684	451.3	7.2	408.1	7.13	-0.31	14.49
92.0	17089	92	9099	458.4	6.9	422.8	7.12	-0.34	14.86

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

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	17550	99	9530	465.6	6.5	437.9	7.10	-0.37	15.23
94.0	18019	105	9975	472.6	6.1	453.3	7.08	-0.38	15.60
95.0	18495	111	10436	479.7	5.7	469.1	7.05	-0.38	15.97
96.0	18979	117	10913	486.7	5.4	485.2	7.02	-0.36	16.33
97.0	19469	122	11407	493.7	5.0	501.7	6.99	-0.32	16.70
98.0	19966	127	11917	500.7	4.7	518.6	6.96	-0.29	17.07
99.0	20470	131	12444	507.7	4.5	535.9	6.93	-0.24	17.43
100.0	20981	136	12989	514.6	4.2	553.5	6.91	-0.19	17.80
101.0	21499	140	13551	521.5	4.1	571.4	6.90	-0.15	18.15
102.0	22024	144	14132	528.4	3.9	589.9	6.90	-0.11	18.49
103.0	22556	148	14731	535.3	3.8	608.4	6.91	-0.08	18.82
104.0	23095	152	15349	542.2	3.8	627.4	6.91	-0.05	19.15
105.0	23641	155	15986	549.1	3.7	646.7	6.91	-0.03	19.48
106.0	24193	159	16642	556.0	3.7	666.4	6.92	-0.02	19.81
107.0	24753	163	17319	562.9	3.7	686.3	6.92	-0.03	20.13
108.0	25319	166	18015	569.9	3.6	706.6	6.92	-0.04	20.46
109.0	25892	170	18732	576.8	3.6	727.3	6.93	-0.06	20.79
110.0	26473	174	19470	583.7	3.5	748.2	6.94	-0.09	21.11
111.0	27060	177	20228	590.7	3.4	769.5	6.98	-0.11	21.43
112.0	27654	180	21009	597.7	3.3	791.1	7.03	-0.13	21.73
113.0	28255	184	21811	604.7	3.2	812.9	7.10	-0.14	22.03
114.0	28864	187	22635	611.9	3.0	835.1	7.18	-0.14	22.31
115.0	29479	190	23491	619.1	2.9	857.6	7.29	-0.14	22.60
116.0	30102	192	24350	626.5	2.7	880.3	7.40	-0.13	22.89
117.0	30732	195	25242	633.9	2.6	903.3	7.50	-0.11	23.19
118.0	31370	198	26157	641.5	2.5	926.7	7.59	-0.10	23.51
119.0	32015	200	27095	649.1	2.4	950.4	7.66	-0.08	23.85
120.0	32668	203	28059	656.8	2.4	974.4	7.70	-0.06	24.21
121.0	33328	205	29044	664.5	2.3	998.8	7.73	-0.05	24.59
122.0	33997	207	30055	672.2	2.3	1023.6	7.74	-0.03	24.98
123.0	34673	209	31091	679.9	2.2	1048.8	7.74	-0.03	25.38
124.0	35357	212	32153	687.7	2.2	1074.4	7.75	-0.03	25.79
125.0	36048	214	33240	695.4	2.2	1100.3	7.76	-0.04	26.20
126.0	36748	216	34354	703.2	2.1	1126.7	7.79	-0.05	26.60
127.0	37455	218	35494	711.0	2.1	1153.5	7.83	-0.06	27.01
128.0	38170	220	36661	718.9	2.0	1180.8	7.87	-0.07	27.42
129.0	38892	222	37856	726.8	1.9	1208.4	7.93	-0.07	27.84
130.0	39623	224	39079	734.7	1.9	1236.4	7.99	-0.07	28.26
131.0	40362	226	40329	742.8	1.8	1264.9	8.04	-0.06	28.68
132.0	41109	228	41609	750.9	1.7	1293.8	8.10	-0.05	29.11
133.0	41864	229	42917	759.0	1.7	1323.1	8.17	-0.01	29.54
134.0	42627	231	44254	767.2	1.7	1352.9	8.23	-0.05	29.97
135.0	43398	233	45623	775.4	1.6	1383.1	8.29	-0.07	30.40

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

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
136.0	44178	234	47021	783.7	1.6	1413.7	8.35	-0.03	30.82
137.0	44965	236	49459	792.1	1.6	1444.7	8.42	-0.03	31.25
138.0	45762	237	49911	800.6	1.5	1476.2	8.48	-0.03	31.69
139.0	46566	239	51404	809.1	1.5	1508.1	8.54	0.02	32.12
	S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
139.300	46817	239	51859	811.7	1.5	1517.7	8.56	0.03	32.25
140.0	47379	240	52929	816.3	1.6	1537.8	5.38	0.05	26.41
141.0	48198	242	54483	821.3	1.6	1564.3	4.84	0.10	26.60
142.0	49021	244	56059	826.2	1.8	1591.0	4.88	0.16	26.84
143.0	49849	246	57683	831.1	1.9	1618.0	4.92	0.17	27.11
144.0	50683	249	592	836.0	2.1	1645.2	4.96	0.24	27.43
145.0	51521	250	60956	841.0	2.4	1672.8	5.00	0.25	27.76
146.0	52365	252	62640	846.0	2.6	1700.7	5.04	0.28	28.10
147.0	53213	255	64355	851.1	2.9	1729.0	5.08	0.25	28.44
148.0	54067	258	66098	856.2	3.2	1757.6	5.13	0.26	28.79
149.0	54926	262	67870	861.4	3.4	1786.5	5.16	0.25	29.19
150.0	55790	265	69672	866.6	3.7	1815.9	5.20	0.24	29.61
151.0	56659	269	71502	871.8	3.9	1845.7	5.24	0.24	30.03
152.0	57533	273	73363	877.1	4.1	1876.0	5.29	0.24	30.46
153.0	58413	277	75254	882.4	4.4	1906.6	5.34	0.23	30.90
154.0	59298	282	77176	887.7	4.6	1937.7	5.37	0.24	31.28
155.0	60189	286	79130	893.1	4.8	1969.3	5.42	0.26	31.74
156.0	61084	291	81115	898.5	5.1	2001.2	5.47	0.22	32.20
157.0	61986	297	83133	904.0	5.3	2033.7	5.51	0.23	32.66
158.0	62893	302	85183	909.6	5.6	2066.5	5.56	0.30	33.12
159.0	63805	308	87266	915.2	5.8	2099.9	5.61	0.21	33.58
160.0	64723	314	89383	920.8	6.1	2133.7	5.66	0.27	34.04
161.0	65646	320	91533	926.5	6.3	2168.0	5.71	0.28	34.50
	S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
161.200	65832	321	91968	927.6	6.4	2174.9	5.72	0.26	34.59
162.0	66571	326	93709	924.6	6.6	2186.9	-9.25	0.19	1.03
	S-IC/S-II SEPARATION COMMAND								
162.900	67399	332	95674	916.2	6.7	2186.6	-9.28	0.14	-0.82
164.0	68402	340	98080	906.0	6.9	2185.7	-9.27	0.14	-0.82
166.0	70197	354	102451	888.0	7.2	2185.8	-8.24	0.17	2.20
168.0	71958	369	106830	873.6	7.5	2194.8	-6.77	0.17	5.45
170.0	73692	384	111231	860.3	7.9	2206.3	-6.51	0.17	6.13

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

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
172.0	75400	400	115657	847.7	8.3	2219.2	-6.22	0.21	6.65
174.0	77083	417	120109	835.2	8.7	2232.5	-6.18	0.21	6.77
176.0	78741	435	124587	822.9	9.1	2246.1	-6.16	0.21	6.80
178.0	80375	453	129093	810.6	9.5	2259.8	-6.14	0.21	6.83
180.0	81983	473	133626	798.3	9.9	2273.5	-6.11	0.21	6.87
182.0	83568	493	138187	786.1	10.4	2287.2	-6.09	0.22	6.90
184.0	85128	514	142775	774.0	10.8	2301.1	-6.07	0.22	6.93
186.0	86664	536	147391	761.9	11.2	2314.9	-6.04	0.22	6.95
188.0	88176	559	152035	749.8	11.7	2328.9	-6.02	0.22	6.97
190.0	89663	583	156707	737.8	12.1	2342.8	-6.00	0.22	7.00
192.0	91127	608	161407	725.8	12.6	2356.9	-5.98	0.22	7.04
194.0	92566	633	166135	713.9	13.0	2371.0	-5.95	0.23	7.07
196.0	93982	660	170891	702.0	13.5	2385.2	-5.93	0.23	7.10
198.0	95374	687	175675	690.2	13.9	2399.4	-5.90	0.23	7.14
200.0	96743	715	180488	678.4	14.4	2413.7	-5.88	0.23	7.18
202.0	98089	745	185330	666.7	14.8	2428.1	-5.84	0.23	7.23
204.0	99410	775	190201	655.0	15.3	2442.6	-5.80	0.24	7.25
206.0	100709	806	195101	643.5	15.8	2457.1	-5.75	0.27	7.26
208.0	101984	838	200030	632.0	16.4	2471.7	-5.69	0.31	7.27
210.0	103236	872	204987	620.7	17.1	2486.2	-5.65	0.35	7.28
212.0	104465	906	209974	609.4	17.8	2500.8	-5.63	0.36	7.31
214.0	105674	943	214991	598.2	18.5	2515.4	-5.62	0.36	7.33
216.0	106859	980	220036	586.9	19.2	2530.1	-5.62	0.36	7.37
218.0	108022	1020	225111	575.7	19.9	2544.9	-5.62	0.36	7.40
220.0	109162	1060	230216	564.4	20.7	2559.7	-5.62	0.36	7.44
222.0	110279	1102	235350	553.2	21.4	2574.6	-5.61	0.36	7.47
224.0	111375	1145	240514	542.0	22.1	2589.6	-5.61	0.36	7.51
226.0	112447	1191	245709	530.8	22.8	2604.7	-5.61	0.37	7.55
228.0	113498	1237	250933	519.6	23.6	2619.8	-5.60	0.37	7.59
230.0	114526	1285	256189	508.4	24.3	2635.0	-5.59	0.37	7.62
232.0	115531	1334	261473	497.2	25.1	2650.3	-5.59	0.37	7.65
234.0	116514	1385	266789	486.0	25.8	2665.6	-5.60	0.38	7.69
236.0	117475	1439	272136	474.8	26.6	2681.1	-5.61	0.38	7.73
238.0	118413	1491	277513	463.5	27.3	2696.6	-5.62	0.38	7.78
240.0	119329	1547	282922	452.3	28.1	2712.2	-5.62	0.38	7.82
242.0	120222	1604	288362	441.1	28.8	2727.8	-5.62	0.38	7.86
244.0	121093	1662	293833	429.8	29.6	2743.6	-5.62	0.39	7.89
246.0	121942	1722	299336	418.6	30.4	2759.4	-5.61	0.39	7.93
248.0	122769	1784	304871	407.4	31.2	2775.3	-5.60	0.39	7.96
250.0	123571	1847	310438	396.2	31.9	2791.3	-5.61	0.39	8.00
252.0	124352	1911	316036	384.9	32.7	2807.3	-5.61	0.38	8.04
254.0	125111	1978	321667	373.7	33.5	2823.4	-5.62	0.38	8.09
256.0	125847	2045	327330	362.5	34.3	2839.6	-5.62	0.38	8.13

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

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
258.0	126561	2115	333024	351.2	35.0	2855.9	-5.63	0.39	8.17
260.0	127252	2186	338754	340.0	35.8	2872.3	-5.63	0.40	8.21
262.0	127921	2258	344515	328.7	36.6	2888.8	-5.62	0.40	8.25
264.0	128567	2332	350309	317.5	37.4	2905.3	-5.62	0.40	8.28
266.0	129191	2408	356136	306.2	38.2	2921.9	-5.62	0.40	8.32
268.0	129792	2485	361997	295.0	39.0	2938.6	-5.63	0.40	8.37
270.0	130370	2564	367891	283.7	39.8	2955.4	-5.64	0.40	8.42
272.0	130927	2644	373818	272.5	40.6	2972.3	-5.63	0.40	8.46
274.0	131460	2726	379780	261.2	41.4	2989.3	-5.63	0.41	8.51
276.0	131971	2810	385776	249.9	42.2	3006.3	-5.63	0.41	8.55
278.0	132460	2895	391805	238.7	43.1	3023.5	-5.64	0.41	8.59
280.0	132926	2982	397869	227.4	43.9	3040.7	-5.64	0.40	8.64
282.0	133370	3071	403968	216.1	44.7	3058.0	-5.65	0.41	8.69
284.0	133790	3161	410102	204.8	45.5	3075.4	-5.66	0.41	8.73
286.0	134189	3253	416270	193.5	46.3	3092.9	-5.66	0.42	8.77
288.0	134564	3346	422473	182.1	47.2	3110.5	-5.66	0.42	8.82
290.0	134917	3441	428712	170.8	48.0	3128.2	-5.65	0.42	8.87
292.0	135248	3538	434986	159.5	48.9	3146.0	-5.66	0.42	8.92
294.0	135555	3637	441296	148.2	49.7	3163.9	-5.67	0.42	8.97
296.0	135840	3737	447642	136.9	50.5	3181.9	-5.68	0.42	9.01
298.0	136104	3839	454024	125.5	51.4	3199.9	-5.68	0.43	9.06
300.0	136342	3943	460442	114.1	52.2	3218.1	-5.69	0.43	9.11
302.0	136559	4048	466896	102.7	53.1	3236.4	-5.70	0.43	9.16
304.0	136753	4155	473387	91.3	54.0	3254.7	-5.70	0.43	9.21
306.0	136924	4264	479915	79.9	54.8	3273.2	-5.70	0.44	9.26
308.0	137073	4374	486480	68.5	55.7	3291.8	-5.70	0.43	9.31
310.0	137198	4487	493082	57.1	56.6	3310.4	-5.71	0.44	9.36
312.0	137301	4601	499722	45.7	57.5	3329.2	-5.72	0.44	9.41
314.0	137381	4717	506399	34.2	58.3	3348.1	-5.72	0.44	9.46
316.0	137438	4834	513114	22.8	59.2	3367.1	-5.73	0.44	9.51
318.0	137472	4953	519867	11.3	60.1	3386.1	-5.74	0.44	9.57
320.0	137483	5074	526659	-0.2	61.0	3405.3	-5.76	0.44	9.63
322.0	137472	5197	533489	-11.7	61.9	3424.7	-5.77	0.45	9.69
324.0	137437	5322	540357	-23.3	62.8	3444.1	-5.78	0.46	9.74
326.0	137378	5448	547265	-34.9	63.7	3463.6	-5.78	0.46	9.79
328.0	137297	5577	554212	-46.4	64.6	3483.2	-5.79	0.45	9.85
330.0	137193	5707	561198	-58.0	65.5	3503.0	-5.80	0.45	9.90
332.0	137065	5838	568224	-69.6	66.4	3522.9	-5.81	0.46	9.96
334.0	136914	5972	575290	-81.2	67.3	3542.8	-5.82	0.46	10.02
336.0	136740	6108	582395	-92.9	68.2	3562.9	-5.83	0.46	10.07
338.0	136543	6245	589541	-104.5	69.1	3583.1	-5.84	0.46	10.13
340.0	136322	6384	596728	-116.2	70.1	3603.5	-5.85	0.47	10.20
342.0	136078	6525	603955	-127.9	71.0	3623.9	-5.86	0.47	10.27

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

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
344.0	135810	6669	611224	-139.7	71.9	3644.5	-5.96	0.46	10.32
346.0	135519	6813	618534	-151.4	72.9	3665.2	-5.87	0.47	10.38
348.0	135205	6960	625885	-163.2	73.9	3686.1	-5.89	0.48	10.44
350.0	134867	7108	633278	-175.0	74.8	3707.0	-5.92	0.48	10.51
352.0	134505	7259	640713	-186.8	75.7	3728.1	-5.93	0.48	10.57
354.0	134119	7411	648190	-198.7	76.7	3749.3	-5.95	0.48	10.63
356.0	133710	7566	655710	-210.6	77.7	3770.6	-5.96	0.48	10.70
358.0	133277	7722	663273	-222.5	78.6	3792.1	-5.97	0.49	10.76
360.0	132820	7880	670879	-234.5	79.6	3813.7	-5.97	0.50	10.83
362.0	132339	8040	678528	-246.4	80.6	3835.4	-5.98	0.50	10.89
364.0	131834	8203	686220	-258.4	81.6	3857.2	-6.00	0.49	10.96
366.0	131305	8367	693957	-270.4	82.6	3879.2	-6.01	0.50	11.03
368.0	130753	8533	701737	-282.5	83.6	3901.4	-6.03	0.50	11.10
370.0	130176	8701	709562	-294.5	84.6	3923.7	-6.05	0.50	11.17
372.0	129574	8871	717432	-306.6	85.6	3946.1	-6.07	0.50	11.24
374.0	128949	9044	725347	-318.8	86.6	3968.6	-6.08	0.50	11.31
376.0	128299	9218	733307	-331.0	87.6	3991.3	-6.10	0.50	11.39
378.0	127625	9394	741312	-343.2	88.6	4014.2	-6.12	0.51	11.47
380.0	126926	9572	749364	-355.5	89.6	4037.2	-6.14	0.51	11.54
382.0	126203	9752	757461	-367.8	90.7	4060.3	-6.16	0.52	11.61
384.0	125455	9935	765605	-380.1	91.7	4083.6	-6.18	0.52	11.68
386.0	124683	10119	773796	-392.5	92.7	4107.1	-6.20	0.52	11.76
388.0	123885	10306	782034	-404.9	93.8	4130.7	-6.23	0.52	11.84
390.0	123063	10494	790319	-417.4	94.8	4154.4	-6.24	0.52	11.92
392.0	122216	10685	798651	-429.9	95.8	4178.4	-6.26	0.52	12.00
394.0	121344	10879	807032	-442.4	96.9	4202.4	-6.28	0.53	12.09
396.0	120445	11073	815461	-455.0	98.0	4226.7	-6.30	0.53	12.17
398.0	119524	11270	823939	-467.6	99.0	4251.1	-6.33	0.54	12.25
400.0	118576	11469	832466	-480.3	100.1	4275.7	-6.35	0.54	12.33
402.0	117602	11670	841042	-493.0	101.2	4300.5	-6.37	0.53	12.42
404.0	116603	11873	849669	-505.8	102.2	4325.4	-6.40	0.53	12.50
406.0	115579	12079	858344	-518.6	103.3	4350.5	-6.42	0.54	12.59
408.0	114529	12287	867070	-531.5	104.4	4375.7	-6.45	0.54	12.67
410.0	113453	12496	875847	-544.4	105.5	4401.2	-6.47	0.54	12.77
412.0	112351	12708	884675	-557.4	106.6	4426.8	-6.50	0.55	12.86
414.0	111223	12923	893554	-570.4	107.7	4452.6	-6.52	0.55	12.95
416.0	110070	13139	902485	-583.5	108.8	4478.6	-6.55	0.56	13.04
418.0	108890	13358	911469	-596.6	109.9	4504.8	-6.58	0.56	13.14
420.0	107683	13579	920505	-609.8	111.0	4531.2	-6.61	0.56	13.24
422.0	106450	13802	929594	-623.0	112.1	4557.8	-6.63	0.56	13.34
424.0	105191	14027	938736	-636.3	113.3	4584.6	-6.66	0.57	13.43
426.0	103905	14255	947932	-649.7	114.4	4611.5	-6.69	0.57	13.53
428.0	102592	14485	957182	-663.1	115.5	4638.7	-6.72	0.58	13.63

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

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
430.0	101253	14717	966487	-676.5	116.7	4664.0	-6.75	0.59	13.73
432.0	99886	14951	975847	-690.1	117.9	4693.6	-6.78	0.58	13.84
434.0	98492	15188	985262	-703.7	119.0	4721.4	-6.81	0.59	13.95
436.0	97071	15428	994732	-717.3	120.2	4749.4	-6.94	0.58	14.05
438.0	95623	15669	1004259	-731.0	121.4	4777.6	-6.87	0.58	14.16
440.0	94147	15913	1013843	-744.8	122.5	4806.0	-6.91	0.59	14.27
442.0	92644	16159	1023483	-758.7	123.7	4834.7	-6.95	0.59	14.38
444.0	91112	16408	1033182	-772.6	124.9	4863.5	-6.99	0.59	14.48
446.0	89553	16659	1042939	-786.6	126.0	4892.6	-7.02	0.60	14.60
448.0	87966	16912	1052752	-800.7	127.2	4921.9	-7.05	0.60	14.72
450.0	86350	17168	1062624	-814.9	128.5	4951.5	-7.09	0.61	14.85
452.0	84706	17426	1072559	-829.1	129.7	4981.3	-7.13	0.61	14.97
454.0	83034	17686	1082551	-843.4	130.9	5011.4	-7.17	0.62	15.09
456.0	81333	17949	1092604	-857.7	132.1	5041.7	-7.21	0.63	15.22
458.0	79603	18215	1102719	-872.2	133.4	5072.2	-7.25	0.62	15.35
460.0	77844	18483	1112893	-886.7	134.6	5103.1	-7.29	0.62	15.48
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
461.210	76766	18646	1119079	-895.6	135.4	5121.8	-7.31	0.60	15.55
462.0	76056	18753	1123129	-901.5	135.8	5132.0	-7.57	0.54	12.21
464.0	74233	19026	1133419	-916.7	136.9	5156.4	-7.58	0.49	12.27
466.0	72390	19301	1143755	-931.8	137.8	5181.0	-7.57	0.49	12.32
468.0	70511	19577	1154142	-946.9	138.9	5205.7	-7.54	0.52	12.37
470.0	68602	19856	1164578	-961.8	139.9	5230.5	-7.35	0.53	12.43
472.0	66664	20137	1175063	-976.2	141.0	5255.4	-7.05	0.55	12.49
474.0	64699	20420	1185599	-990.0	142.1	5280.3	-6.74	0.55	12.54
476.0	62704	20705	1196185	-1003.3	143.2	5305.5	-6.54	0.56	12.60
478.0	60685	20993	1206821	-1016.3	144.3	5330.7	-6.49	0.56	12.68
480.0	58639	21283	1217509	-1029.3	145.5	5356.2	-6.52	0.57	12.76
482.0	56567	21575	1228246	-1042.4	146.6	5381.8	-6.56	0.57	12.86
484.0	54470	21869	1239035	-1055.5	147.7	5407.6	-6.62	0.55	12.96
486.0	52345	22166	1249876	-1068.9	148.8	5433.6	-6.71	0.56	13.06
488.0	50194	22464	1260770	-1082.4	150.0	5459.8	-6.81	0.59	13.17
490.0	48015	22766	1271715	-1096.2	151.2	5485.2	-7.03	0.58	11.92
492.0	45809	23069	1282709	-1110.4	152.3	5508.0	-7.19	0.58	11.31
494.0	43573	23375	1293746	-1124.9	153.5	5530.6	-7.29	0.57	11.32
496.0	41309	23683	1304830	-1139.6	154.6	5553.3	-7.38	0.58	11.38
498.0	39015	23994	1315960	-1154.4	155.8	5576.1	-7.43	0.58	11.44
500.0	36691	24306	1327135	-1169.3	157.0	5599.1	-7.48	0.59	11.50
502.0	34338	24621	1338354	-1184.3	158.1	5622.2	-7.52	0.59	11.57
504.0	31954	24939	1349624	-1199.4	159.3	5645.4	-7.55	0.59	11.64
506.0	29540	25259	1360939	-1214.5	160.5	5668.8	-7.59	0.60	11.71

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

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
508.0	27095	25581	1372299	-1229.7	161.7	5692.2	-7.63	0.60	11.78
510.0	24621	25906	1383707	-1245.0	162.9	5715.9	-7.67	0.61	11.85
512.0	22116	26233	1395163	-1260.4	164.2	5739.6	-7.73	0.61	11.93
514.0	19579	26562	1406666	-1276.0	165.4	5763.6	-7.79	0.62	12.02
516.0	17012	26894	1418217	-1291.6	166.6	5787.7	-7.86	0.62	12.11
518.0	14413	27229	1429817	-1307.4	167.9	5812.0	-7.92	0.63	12.18
520.0	11782	27566	1441465	-1323.3	169.1	5836.4	-7.98	0.64	12.26
522.0	9119	27905	1453163	-1339.3	170.4	5861.0	-8.04	0.64	12.34
524.0	6425	28247	1464910	-1355.5	171.7	5885.8	-8.10	0.64	12.42
526.0	3698	28592	1476706	-1371.7	173.0	5910.7	-8.16	0.64	12.50
528.0	938	28939	1488553	-1388.1	174.2	5935.8	-8.21	0.63	12.58
530.0	-1855	29289	1500449	-1404.6	175.5	5961.1	-8.26	0.63	12.67
532.0	-4680	29641	1512397	-1421.1	176.8	5986.5	-8.31	0.64	12.76
534.0	-7539	29996	1524396	-1437.8	178.0	6012.1	-8.36	0.64	12.85
536.0	-10432	30353	1536445	-1454.6	179.3	6037.9	-8.41	0.64	12.93
538.0	-13358	30713	1548547	-1471.4	180.6	6063.8	-8.46	0.64	13.02
540.0	-16318	31076	1560701	-1488.4	181.9	6090.0	-8.52	0.65	13.11
542.0	-19312	31441	1572907	-1505.5	183.2	6116.3	-8.58	0.65	13.20
544.0	-22340	31809	1585166	-1522.7	184.5	6142.8	-8.63	0.65	13.30
546.0	-25403	32179	1597479	-1540.0	185.8	6169.4	-8.67	0.65	13.39
548.0	-28500	32552	1609844	-1557.4	187.1	6196.3	-8.72	0.66	13.47
550.0	-31632	32927	1622264	-1574.9	188.5	6223.3	-8.77	0.67	13.55
552.0	-34800	33306	1634737	-1592.5	189.8	6250.5	-8.82	0.68	13.63
554.0	-38002	33687	1647266	-1610.2	191.2	6277.9	-8.87	0.68	13.72
556.0	-41241	34070	1659849	-1628.0	192.5	6305.4	-8.92	0.69	13.81
558.0	-44515	34457	1672489	-1645.9	193.9	6333.1	-8.97	0.69	13.90
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
559.660	-47260	34780	1683016	-1660.7	194.9	6354.9	-8.90	0.48	10.45
560.0	-47825	34846	1685175	-1663.6	195.0	6356.4	-8.30	0.48	-1.42
	S-II/S-IVB SEPARATION COMMAND								
560.600	-48824	34963	1688983	-1668.6	195.3	6355.5	-8.25	0.48	-1.57
562.0	-51168	35237	1697877	-1680.2	196.0	6353.2	-8.25	0.42	-1.75
564.0	-54545	35630	1710580	-1696.7	196.8	6349.6	-8.26	0.39	-1.52
566.0	-57955	36024	1723278	-1713.3	197.6	6349.1	-8.44	0.42	1.67
568.0	-61398	36420	1735981	-1730.3	198.5	6354.2	-8.45	0.49	2.86
570.0	-64875	36819	1748696	-1747.1	199.4	6360.3	-8.36	0.50	3.00
572.0	-68386	37218	1761422	-1763.9	200.4	6366.3	-8.51	0.42	3.05
574.0	-71931	37619	1774161	-1781.2	201.2	6372.4	-8.73	0.40	3.05
576.0	-75511	38022	1786912	-1798.7	202.0	6378.5	-8.84	0.41	3.05

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

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
578.0	-79126	38427	1799675	-1816.4	202.8	6384.6	-8.85	0.43	3.07
580.0	-82776	38834	1812451	-1834.1	203.7	6390.8	-8.93	0.43	3.09
582.0	-86462	39242	1825239	-1851.8	204.5	6397.0	-8.84	0.43	3.10
584.0	-90183	39652	1838039	-1869.5	205.4	6403.2	-8.86	0.44	3.10
586.0	-93940	40063	1850851	-1887.2	206.3	6409.4	-8.88	0.46	3.09
588.0	-97732	40477	1863676	-1905.0	207.3	6415.5	-8.89	0.48	3.09
590.0	-101560	40893	1876513	-1922.8	208.2	6421.7	-8.92	0.48	3.09
592.0	-105423	41310	1889363	-1940.7	209.2	6427.9	-8.95	0.47	3.09
594.0	-109323	41729	1902225	-1958.6	210.1	6434.1	-8.98	0.47	3.09
596.0	-113258	42151	1915099	-1976.6	211.1	6440.2	-9.01	0.48	3.08
598.0	-117229	42574	1927985	-1994.6	212.0	6446.4	-9.01	0.49	3.07
600.0	-121236	42999	1940884	-2012.6	213.0	6452.5	-9.02	0.49	3.06
602.0	-125279	43426	1953795	-2030.7	214.0	6458.6	-9.03	0.50	3.06
604.0	-129359	43855	1966719	-2048.8	215.0	6464.8	-9.05	0.50	3.07
606.0	-133474	44286	1979654	-2066.9	216.0	6470.9	-9.05	0.50	3.06
608.0	-137626	44719	1992602	-2085.0	217.0	6477.0	-9.06	0.50	3.06
610.0	-141814	45154	2005563	-2103.1	218.0	6483.1	-9.07	0.49	3.05
612.0	-146039	45591	2018535	-2121.2	219.0	6489.2	-9.08	0.49	3.05
614.0	-150298	46030	2031519	-2139.4	220.0	6495.3	-9.09	0.49	3.04
616.0	-154596	46471	2044516	-2157.6	220.9	6501.4	-9.09	0.49	3.03
618.0	-158930	46913	2057525	-2175.8	221.9	6507.4	-9.10	0.49	3.04
620.0	-163300	47356	2070546	-2194.0	222.9	6513.5	-9.11	0.49	3.04
622.0	-167706	47805	2083579	-2212.2	223.9	6519.6	-9.11	0.49	3.04
624.0	-172148	48254	2096624	-2230.4	224.9	6525.7	-9.11	0.50	3.04
626.0	-176628	48705	2109682	-2248.7	225.9	6531.8	-9.12	0.49	3.04
628.0	-181143	49157	2122751	-2266.9	226.9	6537.8	-9.13	0.49	3.03
630.0	-185695	49612	2135833	-2285.2	227.8	6543.9	-9.15	0.49	3.02
632.0	-190284	50069	2148927	-2303.5	228.8	6549.9	-9.16	0.49	3.01
634.0	-194910	50527	2162033	-2321.9	229.8	6555.9	-9.17	0.48	3.01
636.0	-199572	50988	2175151	-2340.2	230.8	6561.9	-9.17	0.48	3.01
638.0	-204270	51450	2188281	-2358.6	231.7	6568.0	-9.17	0.48	3.00
640.0	-209006	51915	2201422	-2376.9	232.7	6574.0	-9.18	0.48	3.00
642.0	-213778	52381	2214576	-2395.3	233.6	6580.0	-9.17	0.48	3.00
644.0	-218587	52849	2227742	-2413.6	234.6	6586.0	-9.18	0.48	3.00
646.0	-223432	53320	2240920	-2432.0	235.6	6592.0	-9.18	0.48	3.01
648.0	-228315	53792	2254110	-2450.3	236.5	6598.0	-9.19	0.48	3.02
650.0	-233234	54266	2267312	-2468.7	237.5	6604.0	-9.20	0.48	3.01
652.0	-238190	54741	2280526	-2487.2	238.4	6610.0	-9.21	0.47	3.00
654.0	-243183	55219	2293752	-2505.6	239.4	6616.0	-9.22	0.47	2.99
656.0	-248212	55699	2306990	-2524.0	240.3	6622.0	-9.23	0.46	2.99
658.0	-253279	56180	2320241	-2542.5	241.2	6628.0	-9.24	0.46	2.99
660.0	-258382	56664	2333503	-2561.0	242.1	6634.0	-9.25	0.46	2.98
662.0	-263521	57149	2346776	-2579.5	243.0	6639.9	-9.25	0.46	2.97

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

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
664.0	-[illegible]8700	57636	2360062	-2598.0	243.9	6645.9	-9.25	0.46	2.97
666.0	-273915	59125	2373360	-2616.5	244.9	6651.8	-9.25	0.46	2.98
668.0	-279166	58615	2386670	-2635.0	245.8	6657.8	-9.24	0.46	2.99
670.0	-284454	59109	2399991	-2653.4	246.7	6663.8	-9.24	0.46	2.98
672.0	-289780	59602	2413325	-2672.0	247.6	6669.7	-9.27	0.45	2.97
674.0	-295142	60098	2426670	-2690.6	248.5	6675.6	-9.32	0.44	2.95
676.0	-300542	60596	2440027	-2709.2	249.4	6681.5	-9.35	0.44	2.95
678.0	-305979	61096	2453396	-2727.9	250.3	6687.5	-9.33	0.44	2.96
680.0	-311454	61598	2466777	-2746.5	251.2	6693.4	-9.30	0.44	2.97
682.0	-316965	62101	2480170	-2765.1	252.1	6699.3	-9.30	0.44	2.96
684.0	-322514	62606	2493574	-2783.7	252.9	6705.2	-9.31	0.45	2.95
686.0	-328100	63113	2506991	-2802.4	253.8	6711.1	-9.32	0.45	2.95
688.0	-333724	63621	2520419	-2821.0	254.7	6717.0	-9.31	0.45	2.96
690.0	-339394	64131	2533859	-2839.6	255.6	6723.0	-9.29	0.45	2.98
692.0	-345082	64644	2547311	-2858.2	256.5	6729.0	-9.28	0.45	3.00
694.0	-350817	65159	2560775	-2876.7	257.4	6735.0	-9.27	0.44	3.01
696.0	-356589	65673	2574251	-2895.3	258.3	6741.0	-9.26	0.44	3.00
698.0	-362398	66191	2587739	-2913.8	259.1	6747.0	-9.25	0.44	3.00
700.0	-368244	66710	2601239	-2932.3	260.0	6753.0	-9.24	0.46	3.00
702.0	-374127	67231	2614751	-2950.7	260.9	6758.9	-9.23	0.44	3.00
S-IVB FIRST GUIDANCE CUTOFF									
702.650	-376047	67400	2619145	-2956.7	261.1	6760.9	-9.23	[illegible].40	3.00
704.0	-380046	67753	2628268	-2967.5	261.7	6757.9	-7.68	0.38	-3.14
706.0	-385996	68277	2641778	-2982.8	262.4	6751.3	-7.63	0.36	-3.38
708.0	-391977	68803	2655274	-2998.0	263.1	6744.5	-7.62	0.36	-3.40
710.0	-397988	69330	2668756	-3013.3	263.8	6737.7	-7.62	0.32	-3.41
712.0	-404030	69858	2682225	-3028.5	264.5	6730.9	-7.61	0.39	-3.40
PARKING ORBIT INSERTION									
712.650	-406000	70030	2686593	-3033.4	264.8	6728.7	-7.60	0.38	-3.40

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

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
GUIDANCE REFERENCE RELEASE									
-16.960	6373.382	17.954	0.471	0.0	-10.7	408.5	-0.02	-0.01	-0.00
-16.0	6373.382	17.944	0.963	-0.0	-10.7	408.5	-0.02	-0.01	-0.00
-15.0	6373.382	17.933	1.272	-0.1	-10.7	408.5	-0.02	-0.01	-0.00
-14.0	6373.382	17.922	1.690	-0.1	-10.8	408.5	-0.02	-0.01	-0.00
-13.0	6373.382	17.911	2.089	-0.1	-10.8	408.5	-0.02	-0.01	-0.00
-12.0	6373.381	17.901	2.497	-0.1	-10.8	408.5	-0.02	-0.01	-0.00
-11.0	6373.381	17.890	2.906	-0.2	-10.8	408.5	-0.02	-0.01	-0.00
-10.0	6373.381	17.879	3.314	-0.2	-10.8	408.5	-0.02	-0.01	-0.00
-9.0	6373.381	17.868	3.723	-0.2	-10.8	408.5	-0.02	-0.01	-0.00
-8.0	6373.381	17.857	4.131	-0.2	-10.8	408.5	-0.02	-0.01	-0.00
-7.0	6373.380	17.846	4.540	-0.3	-10.9	408.5	-0.02	-0.01	-0.00
-6.0	6373.380	17.836	4.948	-0.3	-10.9	408.5	-0.02	-0.01	-0.00
-5.0	6373.380	17.825	5.357	-0.3	-10.9	408.5	-0.02	-0.01	-0.00
-4.0	6373.380	17.814	5.765	-0.3	-10.9	408.5	-0.02	-0.01	-0.00
-3.0	6373.379	17.803	6.174	-0.4	-10.9	408.5	-0.02	-0.01	-0.00
-2.0	6373.379	17.792	6.582	-0.4	-10.9	408.5	-0.02	-0.01	-0.00
-1.0	6373.379	17.781	6.991	-0.4	-10.9	408.5	-0.02	-0.01	-0.00
0.0	6373.379	17.770	7.399	-0.4	-11.0	408.5	-0.02	-0.01	-0.00
ALL HOLDDOWN ARMS RELEASED									
0.200	6373.379	17.768	7.481	-0.4	-11.0	408.5	-0.02	-0.01	-0.00
LIFTOFF - START OF TIME BASE 1									
0.600	6373.379	17.763	7.644	-0.1	-11.0	408.5	0.93	-0.02	-0.06
1.0	6373.379	17.759	7.809	0.5	-11.0	408.5	2.07	-0.02	-0.09
2.0	6373.373	17.748	9.216	2.6	-11.0	408.4	2.13	-0.02	-0.09
3.0	6373.383	17.737	8.624	4.7	-11.0	408.3	2.19	-0.03	-0.09
4.0	6373.389	17.726	9.033	6.9	-11.1	408.2	2.24	-0.01	-0.08
5.0	6373.397	17.715	9.441	9.2	-11.0	408.1	2.29	0.18	-0.06
6.0	6373.407	17.704	9.849	11.5	-10.7	408.1	2.35	0.35	-0.05
7.0	6373.420	17.694	10.257	13.9	-10.3	408.0	2.41	0.44	-0.03
8.0	6373.435	17.684	10.665	16.3	-9.9	408.0	2.47	0.43	-0.04
9.0	6373.452	17.674	11.073	18.8	-9.5	407.9	2.52	0.26	-0.05
10.0	6373.473	17.664	11.481	21.3	-9.4	407.9	2.59	0.05	-0.04
11.0	6373.495	17.655	11.889	24.0	-9.4	407.9	2.65	-0.05	-0.05
12.0	6373.520	17.646	12.297	26.6	-9.4	407.9	2.71	-0.05	-0.04
13.0	6373.548	17.636	12.704	29.4	-9.4	407.8	2.79	0.04	-0.04
14.0	6373.579	17.627	13.112	32.2	-9.3	407.7	2.95	0.12	-0.02

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

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	6373.613	17.618	13.520	35.1	-9.3	407.8	2.91	0.01	0.03
16.0	6373.649	17.608	13.929	38.0	-9.4	407.8	2.98	-0.16	0.08
17.0	6373.689	17.599	14.335	41.0	-9.5	407.9	3.05	-0.17	0.09
18.0	6373.732	17.589	14.743	44.1	-9.7	408.0	3.12	-0.18	0.12
19.0	6373.777	17.579	15.151	47.3	-9.9	408.2	3.18	-0.17	0.19
20.0	6373.826	17.569	15.560	50.5	-10.0	408.4	3.25	-0.10	0.26
21.0	6373.878	17.559	15.968	53.7	-10.1	408.7	3.32	-0.08	0.34
22.0	6373.934	17.549	16.377	57.1	-10.2	409.1	3.39	-0.08	0.42
23.0	6373.992	17.539	16.786	60.5	-10.3	409.5	3.44	-0.08	0.50
24.0	6374.055	17.529	17.196	64.0	-10.4	410.1	3.51	-0.08	0.59
25.0	6374.120	17.518	17.607	67.5	-10.5	410.7	3.59	-0.09	0.68
26.0	6374.190	17.508	18.018	71.1	-10.6	11.4	3.65	-0.09	0.78
27.0	6374.263	17.497	18.429	74.8	-10.6	412.3	3.72	-0.09	0.89
28.0	6374.339	17.486	18.842	78.5	-10.7	413.2	3.79	-0.09	1.00
29.0	6374.420	17.476	19.256	82.4	-10.8	414.3	3.86	-0.09	1.12
30.0	6374.504	17.465	19.671	86.3	-10.9	415.4	3.94	-0.10	1.23
31.0	6374.592	17.454	20.087	90.2	-11.0	416.7	4.01	-0.11	1.34
32.0	6374.685	17.443	20.504	94.3	-11.2	418.1	4.08	-0.12	1.45
33.0	6374.781	17.431	20.923	98.4	-11.3	419.6	4.16	-0.13	1.57
34.0	6374.881	17.420	21.344	102.6	-11.4	421.3	4.24	-0.13	1.68
35.0	6374.986	17.409	21.766	106.9	-11.5	423.0	4.31	-0.14	1.80
36.0	6375.095	17.397	22.190	111.2	-11.7	424.9	4.39	-0.14	1.93
37.0	6375.208	17.385	22.615	115.6	-11.8	426.9	4.47	-0.14	2.06
38.0	6375.326	17.373	23.043	120.1	-12.0	429.0	4.54	-0.14	2.19
39.0	6375.449	17.361	23.473	124.7	-12.1	431.2	4.62	-0.13	2.33
40.0	6375.576	17.349	23.906	129.4	-12.2	433.6	4.70	-0.13	2.47
41.0	6375.707	17.337	24.341	134.1	-12.4	436.2	4.78	-0.13	2.62
42.0	6375.844	17.324	24.779	138.9	-12.5	438.9	4.85	-0.13	2.78
43.0	6375.985	17.312	25.219	143.8	-12.6	441.8	4.93	-0.13	2.95
44.0	6376.132	17.299	25.662	148.7	-12.8	444.9	5.00	-0.12	3.11
45.0	6376.283	17.286	26.108	153.8	-12.9	448.0	5.07	-0.12	3.28
46.0	6376.439	17.273	26.559	158.9	-13.0	451.3	5.14	-0.11	3.45
47.0	6376.601	17.260	27.011	164.0	-13.1	454.9	5.21	-0.09	3.62
48.0	6376.767	17.247	27.469	169.3	-13.2	458.6	5.28	-0.06	3.79
49.0	6376.939	17.234	27.928	174.6	-13.2	462.5	5.35	-0.03	3.97
50.0	6377.116	17.221	28.393	180.0	-13.3	466.5	5.42	-0.01	4.16
51.0	6377.299	17.207	28.861	185.4	-13.3	470.8	5.49	0.00	4.36
52.0	6377.487	17.194	29.334	190.9	-13.3	475.3	5.56	0.01	4.55
53.0	6377.681	17.181	29.812	196.5	-13.3	479.9	5.62	0.01	4.75
54.0	6377.880	17.168	30.294	202.2	-13.3	484.7	5.68	-0.01	4.93
55.0	6378.085	17.154	30.782	207.9	-13.3	489.8	5.76	-0.03	5.11
56.0	6378.294	17.141	31.274	213.7	-13.3	495.0	5.83	-0.04	5.28
57.0	6378.513	17.128	31.772	219.6	-13.4	500.3	5.91	-0.05	5.44

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

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
59.0	6373.735	17.114	32.275	225.5	-13.4	505.8	5.99	-0.06	5.60
53.0	6379.364	17.101	32.783	231.5	-13.5	511.5	6.06	-0.04	5.77
60.0	6379.198	17.087	33.298	237.6	-13.5	517.4	6.13	-0.01	5.94
61.0	6379.433	17.074	33.81[illegible]	243.8	-13.5	523.4	6.20	0.03	6.14
62.0	6379.696	17.060	34.345	250.0	-13.4	529.7	6.24	0.07	6.35
63.0	6379.939	17.047	34.878	256.2	-13.3	536.2	6.27	0.09	6.59
64.0	6380.193	17.034	35.417	262.5	-13.3	542.9	6.29	0.10	6.84
65.0	6380.464	17.021	35.963	268.8	-13.2	549.8	6.29	0.09	7.10
66.0	6380.736	17.007	34.517	275.0	-13.1	557.1	6.28	0.08	7.37
67.0	6381.014	16.994	37.078	281.3	-13.0	564.[illegible]	6.29	0.07	7.63
MACH 1									
67.500	6381.154	16.988	37.361	284.5	-13.0	568.4	6.29	0.07	7.76
68.0	6381.293	16.981	37.646	287.6	-12.9	572.3	6.30	0.07	7.88
69.0	6381.583	16.968	38.222	293.9	-12.9	580.3	6.34	0.06	8.11
70.0	6381.887	16.956	38.807	300.3	-12.8	588.5	6.39	0.07	8.30
71.0	6382.193	16.943	39.399	306.7	-12.8	596.9	6.46	0.09	8.48
72.0	6382.500	16.930	40.001	313.2	-12.7	605.4	6.54	0.12	8.65
73.0	6382.816	16.918	40.610	319.8	-12.5	614.2	6.62	0.16	8.83
74.0	6383.140	16.905	41.229	326.4	-12.3	623.1	6.69	0.23	9.04
75.0	6383.467	16.893	41.857	333.2	-12.0	632.3	6.76	0.32	9.27
76.0	6383.806	16.881	42.494	339.9	-11.6	641.7	6.82	0.43	9.55
77.0	6384.149	16.870	43.140	346.8	-11.2	651.4	6.87	0.55	9.84
78.0	6384.499	16.859	43.797	353.6	-10.6	661.4	6.90	0.64	10.15
[illegible].0	6384.857	16.849	44.463	360.6	-9.9	671.7	6.93	0.71	10.46
[illegible]	6385.221	16.839	45.140	367.5	-9.2	682.3	6.97	0.74	10.76
.0	6385.592	16.830	45.828	374.5	-8.5	693.2	7.02	0.72	11.06
82.0	6385.970	16.822	46.527	381.6	-7.9	704.4	7.06	0.67	11.36
MAXIMUM DYNAMIC PRESSURE									
82.500	6386.161	16.818	46.880	385.1	-7.5	710.2	7.08	0.62	11.51
83.0	6386.355	16.815	47.237	388.6	-7.2	716.0	7.10	0.57	11.67
84.0	6386.747	16.808	47.959	395.7	-6.7	727.8	7.11	0.44	12.00
85.0	6387.146	16.801	48.693	402.8	-6.3	740.0	7.13	0.28	12.35
86.0	6387.553	16.795	49.439	410.0	-6.1	752.5	7.11	0.12	12.71
87.0	6387.966	16.789	50.198	417.0	-6.1	765.4	7.08	-0.03	13.09
88.0	6388.387	16.783	50.970	424.1	-6.2	778.7	7.05	-0.16	13.47
89.0	6388.814	16.776	51.755	431.1	-6.4	792.3	7.01	-0.27	13.85
90.0	6389.249	16.770	52.555	438.1	-6.7	806.4	6.98	-0.35	14.22
91.0	6389.691	16.763	53.368	445.1	-7.1	820.9	6.96	-0.40	14.60
92.0	6390.139	16.756	54.196	452.1	-7.5	835.6	6.94	-0.44	14.96

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

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	6390.595	16.748	55.039	459.0	-7.9	850.7	6.91	-0.47	15.33
94.0	6391.057	16.740	55.898	465.9	-8.4	866.2	6.89	-0.49	15.70
95.0	6391.526	16.731	56.772	472.7	-8.9	882.1	6.85	-0.49	16.07
96.0	6392.002	16.722	57.662	479.6	-9.4	898.4	6.81	-0.47	16.44
97.0	6392.485	16.712	58.569	486.3	-9.9	915.0	6.79	-0.44	16.81
98.0	6392.975	16.702	59.492	493.1	-10.3	932.0	6.74	-0.41	17.18
99.0	6393.472	16.692	60.433	499.8	-10.7	949.4	6.71	-0.36	17.55
100.0	6393.975	16.681	61.391	506.5	-11.0	967.1	6.69	-0.32	17.91
101.0	6394.485	16.670	62.367	513.2	-11.3	985.2	6.67	-0.28	18.26
102.0	6395.001	16.659	63.362	519.9	-11.6	1003.6	6.66	-0.24	18.61
103.0	6395.524	16.647	64.375	526.5	-11.8	1022.4	6.66	-0.21	18.94
104.0	6396.054	16.635	65.406	533.2	-12.0	1041.5	6.66	-0.19	19.27
105.0	6396.591	16.623	66.458	539.8	-12.2	1060.9	6.66	-0.18	19.60
106.0	6397.134	16.610	67.528	546.5	-12.4	1080.7	6.65	-0.17	19.93
107.0	6397.684	16.598	68.619	553.1	-12.6	1100.8	6.65	-0.18	20.26
108.0	6398.240	16.585	69.730	559.7	-12.8	1121.2	6.64	-0.20	20.58
109.0	6398.803	16.572	70.862	566.4	-13.0	1142.0	6.64	-0.22	20.91
110.0	6399.373	16.559	72.014	573.0	-13.2	1163.1	6.65	-0.25	21.24
111.0	6399.949	16.546	73.188	579.7	-13.5	1184.5	6.69	-0.28	21.55
112.0	6400.532	16.532	74.383	586.4	-13.8	1206.2	6.73	-0.30	21.86
113.0	6401.122	16.519	75.600	593.2	-14.1	1228.2	6.79	-0.31	22.16
114.0	6401.719	16.504	76.840	600.0	-14.4	1250.5	6.87	-0.32	22.45
115.0	6402.322	16.490	78.101	606.9	-14.7	1273.1	6.96	-0.32	22.74
116.0	6402.932	16.475	79.386	613.9	-15.0	1295.9	7.07	-0.31	23.03
117.0	6403.550	16.460	80.693	621.0	-15.3	1319.1	7.16	-0.30	23.33
118.0	6404.174	16.444	82.024	628.2	-15.6	1342.6	7.25	-0.29	23.65
119.0	6404.806	16.428	83.379	635.5	-15.9	1366.5	7.31	-0.28	23.99
120.0	6405.445	16.412	84.757	642.8	-16.2	1390.6	7.34	-0.27	24.35
121.0	6406.092	16.396	86.160	650.1	-16.4	1415.2	7.36	-0.25	24.73
122.0	6406.746	16.380	87.589	657.5	-16.7	1440.1	7.36	-0.24	25.13
123.0	6407.407	16.363	89.041	664.9	-16.9	1465.4	7.36	-0.24	25.53
124.0	6408.075	16.346	90.519	672.2	-17.2	1491.2	7.35	-0.25	25.94
125.0	6408.751	16.328	92.023	679.6	-17.4	1517.3	7.36	-0.26	26.35
126.0	6409.435	16.311	93.554	686.9	-17.7	1543.9	7.38	-0.28	26.76
127.0	6410.125	16.293	95.111	694.3	-18.0	1570.8	7.41	-0.30	27.17
128.0	6410.823	16.275	96.695	701.7	-18.3	1598.2	7.45	-0.31	27.58
129.0	6411.529	16.256	98.307	709.2	-18.6	1626.0	7.49	-0.32	28.00
130.0	6412.242	16.238	99.947	716.7	-18.9	1654.2	7.54	-0.32	28.42
131.0	6412.962	16.218	101.616	724.3	-19.3	1682.8	7.59	-0.31	28.85
132.0	6413.690	16.199	103.313	731.9	-19.6	1711.9	7.64	-0.31	29.28
133.0	6414.426	16.179	105.040	739.5	-19.9	1741.4	7.69	-0.27	29.71
134.0	6415.169	16.159	106.796	747.2	-20.2	1771.3	7.74	-0.32	30.14
135.0	6415.920	16.139	108.583	755.0	-20.5	1801.7	7.80	-0.30	30.57

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

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
136.0	6416.679	16.118	110.490	762.8	-20.8	1832.5	7.85	-0.31	31.00
137.0	6417.446	16.097	112.249	770.7	-21.1	1863.7	7.90	-0.32	31.43
138.0	6418.220	16.076	114.128	778.6	-21.4	1895.3	7.95	-0.33	31.87
139.0	6419.003	16.054	116.040	786.6	-21.7	1927.4	8.00	-0.28	32.30
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
139.330	6419.239	16.048	116.621	789.0	-21.8	1937.1	8.02	-0.27	32.43
140.0	6419.793	16.033	117.983	793.3	-22.0	1957.3	4.89	-0.22	26.56
141.0	6420.583	16.010	119.955	797.8	-22.2	1983.9	4.35	-0.17	26.75
142.0	6421.383	15.988	121.953	802.2	-22.3	2010.8	4.38	-0.11	26.99
143.0	6422.192	15.966	123.979	806.6	-22.5	2037.9	4.41	-0.11	27.26
144.0	6423.001	15.943	126.030	811.0	-22.6	2065.3	4.44	-0.04	27.58
145.0	6423.814	15.921	128.109	815.4	-22.6	2093.1	4.49	-0.04	27.91
146.0	6424.632	15.898	130.216	819.9	-22.6	2121.2	4.51	-0.01	28.25
147.0	6425.454	15.875	132.351	824.4	-22.6	2149.6	4.54	-0.05	28.60
148.0	6426.280	15.853	134.515	829.0	-22.7	2178.3	4.57	-0.05	28.94
149.0	6427.112	15.830	136.708	833.6	-22.8	2207.4	4.60	-0.06	29.35
150.0	6427.948	15.807	138.930	838.2	-22.8	2237.0	4.63	-0.07	29.77
151.0	6428.788	15.784	141.182	842.9	-22.9	2266.9	4.66	-0.08	30.19
152.0	6429.634	15.761	143.464	847.6	-23.0	2297.3	4.70	-0.09	30.63
153.0	6430.483	15.738	145.777	852.3	-23.1	2328.2	4.73	-0.10	31.06
154.0	6431.338	15.715	148.121	857.0	-23.2	2359.5	4.76	-0.10	31.45
155.0	6432.197	15.692	150.496	861.8	-23.3	2391.1	4.79	-0.09	31.91
156.0	6433.062	15.669	152.903	866.6	-23.4	2423.3	4.83	-0.13	32.37
157.0	6433.931	15.645	155.343	871.4	-23.6	2455.9	4.87	-0.13	32.83
158.0	6434.805	15.622	157.815	876.3	-23.7	2488.9	4.91	-0.06	33.29
159.0	6435.683	15.598	160.321	881.2	-23.8	2522.5	4.94	-0.16	33.75
160.0	6436.567	15.574	162.860	886.2	-23.9	2556.5	4.98	-0.11	34.21
161.0	6437.455	15.550	165.433	891.2	-24.0	2590.9	5.02	-0.10	34.68
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
161.200	6437.634	15.545	165.953	892.2	-24.0	2597.8	5.02	-0.12	34.77
162.0	6438.345	15.526	168.032	888.8	-24.1	2609.9	-9.57	0.00	1.03
S-IC/S-II SEPARATION COMMAND									
162.900	6439.140	15.504	170.373	889.1	-24.1	2609.7	-9.57	-0.02	-0.81
164.0	6440.104	15.478	173.249	869.6	-24.1	2608.8	-9.57	-0.02	-0.81
165.0	6441.025	15.430	178.467	850.9	-24.1	2608.8	-8.57	-0.01	2.21
169.0	6443.511	15.381	183.691	835.8	-24.2	2617.9	-7.14	-0.03	5.48
170.0	6445.169	15.333	188.939	921.8	-24.3	2629.4	-6.83	-0.04	6.16

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

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
172.0	6446.799	15.284	194.211	808.4	-24.3	2642.4	-6.61	-0.01	6.68
174.0	6448.403	15.236	199.509	795.1	-24.3	2655.8	-6.57	-0.00	6.79
176.3	6449.980	15.187	204.934	782.0	-24.3	2669.4	-6.55	-0.00	6.82
178.0	6451.531	15.138	210.187	768.9	-24.3	2683.1	-6.53	-0.00	6.85
180.0	6453.055	15.090	215.567	755.9	-24.4	2696.9	-6.51	-0.00	6.89
182.0	6454.554	15.041	220.975	742.8	-24.4	2710.7	-6.49	-0.00	6.92
184.0	6456.027	14.992	226.410	729.9	-24.4	2724.5	-6.47	-0.00	6.94
186.0	6457.474	14.943	231.873	716.9	-24.4	2738.4	-6.45	-0.00	6.97
188.0	6458.894	14.895	237.364	704.0	-24.4	2752.4	-6.44	-0.00	6.98
190.0	6460.290	14.846	242.882	691.2	-24.4	2766.4	-6.42	-0.00	7.01
192.0	6461.659	14.797	248.429	678.3	-24.4	2780.5	-6.40	-0.00	7.05
194.0	6463.003	14.748	254.004	665.6	-24.5	2794.6	-6.37	-0.00	7.08
196.0	6464.321	14.699	259.607	652.8	-24.5	2808.8	-6.35	-0.00	7.10
198.0	6465.614	14.650	265.239	640.1	-24.5	2823.0	-6.33	-0.00	7.14
200.0	6466.882	14.601	270.900	627.5	-24.5	2837.3	-6.31	-0.01	7.18
202.0	6468.125	14.552	276.589	614.9	-24.5	2851.7	-6.28	-0.01	7.22
204.0	6469.342	14.503	282.306	602.4	-24.5	2866.2	-6.24	0.00	7.25
206.0	6470.534	14.454	288.053	589.9	-24.5	2880.7	-6.19	0.03	7.25
208.0	6471.702	14.405	293.829	577.6	-24.4	2895.2	-6.14	0.07	7.26
210.0	6472.845	14.356	299.634	565.4	-24.2	2909.7	-6.09	0.10	7.27
212.0	6473.963	14.308	305.468	553.2	-24.0	2924.3	-6.08	0.12	7.30
214.0	6475.057	14.260	311.332	541.0	-23.8	2938.9	-6.07	0.12	7.32
216.0	6476.127	14.213	317.224	528.9	-23.6	2953.6	-6.08	0.11	7.35
218.0	6477.173	14.166	323.146	516.7	-23.3	2968.3	-6.08	0.11	7.39
220.0	6478.194	14.120	329.098	504.5	-23.1	2983.2	-6.08	0.11	7.42
222.0	6479.191	14.074	335.079	492.4	-22.9	2998.0	-6.09	0.10	7.45
224.0	6480.163	14.028	341.090	480.2	-22.7	3013.0	-6.08	0.11	7.49
226.0	6481.111	13.983	347.131	468.0	-22.5	3028.0	-6.08	0.11	7.53
228.0	6482.035	13.938	353.202	455.9	-22.3	3043.1	-6.08	0.11	7.56
230.0	6482.935	13.894	359.303	443.7	-22.1	3058.2	-6.07	0.11	7.59
232.0	6483.810	13.850	365.434	431.5	-21.9	3073.4	-6.08	0.11	7.62
234.0	6484.661	13.806	371.597	419.4	-21.6	3088.7	-6.09	0.12	7.66
236.0	6485.488	13.763	377.789	407.2	-21.4	3104.0	-6.10	0.12	7.70
238.0	6486.290	13.720	384.013	394.9	-21.2	3119.5	-6.11	0.11	7.74
240.0	6487.067	13.678	390.267	382.7	-21.0	3135.0	-6.11	0.11	7.78
242.0	6487.820	13.637	396.553	370.4	-20.8	3150.6	-6.12	0.11	7.81
244.0	6488.549	13.595	402.870	358.2	-20.6	3166.3	-6.12	0.11	7.85
246.0	6489.253	13.554	409.219	345.9	-20.4	3182.0	-6.12	0.11	7.88
248.0	6489.933	13.514	415.599	333.7	-20.1	3197.8	-6.12	0.12	7.91
250.0	6490.588	13.474	422.009	321.4	-19.9	3213.6	-6.12	0.11	7.95
252.0	6491.218	13.434	428.452	309.2	-19.7	3229.6	-6.13	0.10	7.99
254.0	6491.825	13.395	434.927	296.9	-19.5	3245.6	-6.14	0.10	8.03
256.0	6492.406	13.356	441.435	284.6	-19.3	3261.7	-6.15	0.10	8.07

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

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
258.0	6492.963	13.318	447.974	272.3	-19.1	3277.9	-6.16	0.10	8.11
260.0	6493.495	13.280	454.546	259.9	-18.9	3294.1	-6.16	0.11	8.15
262.0	6494.003	13.242	461.151	247.6	-18.7	3310.5	-6.16	0.11	8.18
264.0	6494.486	13.205	467.789	235.3	-18.5	3326.9	-6.16	0.11	8.22
266.0	6494.944	13.168	474.459	222.9	-18.3	3343.4	-6.16	0.11	8.25
268.0	6495.377	13.132	481.162	210.6	-18.1	3359.9	-6.18	0.10	8.30
270.0	6495.786	13.096	487.898	198.2	-17.9	3376.5	-6.19	0.10	8.34
272.0	6496.170	13.060	494.668	185.8	-17.7	3393.3	-6.19	0.10	8.39
274.0	6496.529	13.025	501.471	173.4	-17.5	3410.1	-6.19	0.11	8.43
276.0	6496.864	12.990	508.308	161.0	-17.3	3427.0	-6.19	0.11	8.47
278.0	6497.173	12.956	515.179	148.6	-17.1	3444.0	-6.21	0.10	8.51
280.0	6497.458	12.922	522.084	136.2	-16.9	3461.0	-6.22	0.09	8.55
282.0	6497.718	12.888	529.023	123.7	-16.7	3478.2	-6.23	0.09	8.60
284.0	6497.953	12.855	535.997	111.2	-16.5	3495.4	-6.24	0.10	8.64
286.0	6498.163	12.822	543.005	98.7	-16.3	3512.7	-6.25	0.10	8.68
288.0	6498.348	12.789	550.048	86.2	-16.1	3530.1	-6.25	0.10	8.72
290.0	6498.508	12.757	557.125	73.7	-16.0	3547.6	-6.25	0.10	8.77
292.0	6498.643	12.726	564.238	61.2	-15.8	3565.2	-6.25	0.09	8.82
294.0	6498.753	12.694	571.386	48.7	-15.6	3582.9	-6.27	0.09	8.87
296.0	6498.838	12.663	578.570	36.1	-15.4	3600.7	-6.28	0.10	8.90
298.0	6498.897	12.633	585.789	23.5	-15.2	3618.5	-6.30	0.09	8.95
300.0	6498.932	12.602	593.044	10.9	-15.0	3636.5	-6.31	0.10	9.00
302.0	6498.941	12.572	600.335	-1.7	-14.9	3654.5	-6.32	0.09	9.04
304.0	6498.925	12.543	607.662	-14.4	-14.7	3672.7	-6.33	0.10	9.09
306.0	6498.883	12.514	615.026	-27.1	-14.5	3690.9	-6.33	0.10	9.14
308.0	6498.816	12.485	622.426	-39.7	-14.3	3709.2	-6.34	0.09	9.19
310.0	6498.724	12.456	629.863	-52.4	-14.1	3727.7	-6.35	0.09	9.24
312.0	6498.607	12.428	637.336	-65.2	-14.0	3746.2	-6.36	0.09	9.29
314.0	6498.464	12.401	644.847	-77.9	-13.8	3764.8	-6.37	0.09	9.33
316.0	6498.295	12.373	652.396	-90.7	-13.6	3783.5	-6.38	0.09	9.38
318.0	6498.101	12.346	659.982	-103.5	-13.5	3802.4	-6.40	0.09	9.44
320.0	6497.881	12.319	667.605	-116.3	-13.3	3821.3	-6.42	0.09	9.49
322.0	6497.636	12.293	675.267	-129.2	-13.1	3840.3	-6.44	0.09	9.55
324.0	6497.364	12.267	682.967	-142.1	-13.0	3859.5	-6.45	0.09	9.60
326.0	6497.067	12.241	690.705	-155.0	-12.8	3878.7	-6.46	0.09	9.65
328.0	6496.744	12.216	698.482	-167.9	-12.6	3898.1	-6.47	0.08	9.70
330.0	6496.396	12.191	706.297	-180.9	-12.5	3917.6	-6.49	0.08	9.75
332.0	6496.021	12.166	714.152	-193.9	-12.3	3937.1	-6.50	0.08	9.81
334.0	6495.620	12.141	722.046	-206.9	-12.1	3956.8	-6.51	0.08	9.87
336.0	6495.193	12.117	729.979	-220.0	-12.0	3976.6	-6.53	0.08	9.92
338.0	6494.740	12.093	737.952	-233.1	-11.8	3996.5	-6.55	0.08	9.98
340.0	6494.261	12.070	745.965	-246.2	-11.7	4016.5	-6.56	0.08	10.04
342.0	6493.755	12.047	754.019	-259.4	-11.5	4036.7	-6.57	0.08	10.10

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

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
344.0	6493.223	12.024	762.112	-272.5	-11.4	4056.9	-6.58	0.07	10.16
346.0	6492.665	12.001	770.246	-285.7	-11.2	4077.3	-6.60	0.07	10.21
348.0	6492.080	11.979	778.421	-299.0	-11.1	4097.8	-6.63	0.08	10.27
350.0	6491.469	11.957	786.637	-312.3	-10.9	4118.4	-6.66	0.09	10.33
352.0	6490.831	11.935	794.895	-325.6	-10.8	4139.1	-6.68	0.08	10.39
354.0	6490.166	11.914	803.194	-339.0	-10.6	4160.0	-6.70	0.08	10.45
356.0	6489.475	11.893	811.535	-352.4	-10.5	4180.9	-6.71	0.07	10.52
358.0	6488.757	11.872	819.918	-365.9	-10.3	4202.0	-6.73	0.08	10.58
360.0	6488.012	11.851	828.343	-379.4	-10.2	4223.2	-6.74	0.08	10.64
362.0	6487.239	11.831	836.811	-392.9	-10.0	4244.6	-6.76	0.08	10.70
364.0	6486.440	11.811	845.321	-406.4	-9.9	4266.1	-6.78	0.08	10.77
366.0	6485.614	11.792	853.875	-420.0	-9.7	4287.7	-6.79	0.07	10.84
368.0	6484.760	11.772	862.472	-433.6	-9.6	4309.4	-6.81	0.07	10.90
370.0	6483.879	11.753	871.113	-447.3	-9.5	4331.3	-6.84	0.08	10.97
372.0	6482.971	11.734	879.798	-461.0	-9.3	4353.3	-6.87	0.07	11.04
374.0	6482.035	11.716	888.526	-474.8	-9.2	4375.5	-6.89	0.07	11.11
376.0	6481.072	11.698	897.300	-488.6	-9.1	4397.8	-6.91	0.07	11.18
378.0	6480.081	11.680	906.117	-502.5	-8.9	4420.2	-6.94	0.07	11.25
380.0	6479.062	11.662	914.980	-516.4	-8.8	4442.8	-6.97	0.07	11.32
382.0	6478.015	11.644	923.889	-530.4	-8.7	4465.5	-7.00	0.07	11.39
384.0	6476.940	11.627	932.842	-544.4	-8.6	4488.3	-7.02	0.07	11.46
386.0	6475.837	11.610	941.842	-558.5	-8.4	4511.3	-7.05	0.07	11.54
388.0	6474.706	11.593	950.888	-572.6	-8.3	4534.5	-7.08	0.06	11.61
390.0	6473.547	11.577	959.980	-586.8	-8.2	4557.8	-7.10	0.06	11.69
392.0	6472.359	11.560	969.119	-601.1	-8.1	4581.2	-7.12	0.06	11.77
394.0	6471.142	11.544	978.305	-615.3	-8.0	4604.9	-7.15	0.06	11.85
396.0	6469.897	11.528	987.539	-629.7	-7.9	4628.6	-7.18	0.06	11.93
398.0	6468.624	11.513	996.820	-644.1	-7.8	4652.6	-7.21	0.06	12.01
400.0	6467.321	11.497	1006.149	-658.5	-7.7	4676.7	-7.24	0.06	12.09
402.0	6465.989	11.482	1015.527	-673.1	-7.6	4700.9	-7.27	0.05	12.17
404.0	6464.627	11.467	1024.953	-687.7	-7.5	4725.3	-7.30	0.05	12.25
406.0	6463.239	11.452	1034.428	-702.3	-7.4	4749.9	-7.33	0.05	12.33
408.0	6461.819	11.437	1043.953	-717.0	-7.3	4774.7	-7.36	0.05	12.41
410.0	6460.371	11.423	1053.527	-731.8	-7.2	4799.6	-7.40	0.05	12.51
412.0	6458.892	11.408	1063.151	-746.7	-7.2	4824.7	-7.43	0.05	12.60
414.0	6457.384	11.394	1072.826	-761.6	-7.1	4850.0	-7.46	0.05	12.68
416.0	6455.846	11.380	1082.551	-776.5	-7.0	4875.4	-7.50	0.05	12.77
418.0	6454.278	11.366	1092.329	-791.6	-6.9	4901.1	-7.54	0.04	12.86
420.0	6452.679	11.352	1102.156	-806.7	-6.8	4926.9	-7.57	0.04	12.96
422.0	6451.051	11.339	1112.035	-821.9	-6.8	4952.9	-7.60	0.04	13.05
424.0	6449.392	11.325	1121.967	-837.2	-6.7	4979.1	-7.64	0.04	13.14
426.0	6447.702	11.312	1131.952	-852.5	-6.6	5005.5	-7.67	0.04	13.23
428.0	6445.982	11.299	1141.989	-867.9	-6.5	5032.1	-7.71	0.04	13.33

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

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
430.0	6444.230	11.286	1152.080	-883.4	-6.5	5058.8	-7.75	0.04	13.43
432.0	6442.448	11.273	1162.225	-898.9	-6.4	5085.9	-7.79	0.04	13.54
434.0	6440.635	11.260	1172.424	-914.6	-6.3	5113.0	-7.83	0.03	13.64
436.0	6438.790	11.248	1182.677	-930.3	-6.3	5140.4	-7.87	0.03	13.74
438.0	6436.913	11.235	1192.985	-946.1	-6.2	5167.9	-7.91	0.03	13.84
440.0	6435.005	11.223	1203.349	-962.0	-6.2	5195.8	-7.95	0.02	13.95
442.0	6433.065	11.211	1213.769	-978.0	-6.2	5223.8	-8.00	0.02	14.06
444.0	6431.093	11.198	1224.244	-994.0	-6.1	5252.0	-8.05	0.02	14.16
446.0	6429.089	11.186	1234.776	-1010.2	-6.1	5280.4	-8.09	0.02	14.27
448.0	6427.053	11.174	1245.366	-1026.4	-6.1	5309.1	-8.13	0.02	14.39
450.0	6424.983	11.162	1256.013	-1042.8	-6.0	5338.0	-8.18	0.02	14.51
452.0	6422.881	11.150	1266.719	-1059.2	-6.0	5367.1	-8.22	0.02	14.62
454.0	6420.747	11.138	1277.481	-1075.7	-6.0	5396.5	-8.27	0.02	14.74
456.0	6418.579	11.126	1288.304	-1092.3	-5.9	5426.1	-8.32	0.03	14.87
458.0	6416.377	11.114	1299.196	-1109.0	-5.9	5455.9	-8.37	0.01	14.99
460.0	6414.143	11.102	1310.128	-1125.8	-5.9	5486.0	-8.42	0.01	15.11
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
461.210	6412.774	11.095	1316.777	-1136.1	-5.9	5504.4	-8.45	-0.01	15.19
462.0	6411.874	11.091	1321.129	-1142.8	-5.9	5514.2	-8.61	-0.02	11.84
464.0	6409.571	11.079	1332.181	-1160.1	-6.0	5537.9	-8.62	-0.07	11.89
466.0	6407.234	11.067	1343.281	-1177.4	-6.1	5561.8	-8.62	-0.07	11.94
468.0	6404.862	11.054	1354.428	-1194.6	-6.3	5585.7	-8.60	-0.05	11.99
470.0	6402.456	11.042	1365.623	-1211.7	-6.4	5609.7	-8.42	-0.04	12.05
472.0	6400.016	11.029	1376.867	-1228.2	-6.4	5633.9	-8.12	-0.03	12.11
474.0	6397.543	11.016	1388.159	-1244.2	-6.5	5658.1	-7.82	-0.03	12.17
476.0	6395.039	11.003	1399.499	-1259.6	-6.6	5682.5	-7.62	-0.03	12.24
478.0	6392.505	10.990	1410.889	-1274.8	-6.6	5707.1	-7.58	-0.02	12.32
480.0	6389.940	10.976	1422.328	-1290.0	-6.7	5731.9	-7.62	-0.02	12.40
482.0	6387.345	10.963	1433.816	-1305.3	-6.7	5756.7	-7.67	-0.03	12.49
484.0	6384.718	10.950	1445.354	-1320.8	-6.8	5781.7	-7.74	-0.04	12.58
486.0	6382.061	10.936	1456.943	-1336.3	-6.9	5807.0	-7.84	-0.04	12.68
488.0	6379.373	10.922	1468.583	-1352.1	-6.9	5832.5	-7.94	-0.02	12.79
490.0	6376.653	10.908	1480.272	-1368.2	-7.0	5857.0	-8.12	-0.01	11.53
492.0	6373.902	10.894	1492.008	-1384.6	-7.0	5879.1	-8.27	0.00	10.90
494.0	6371.114	10.880	1503.789	-1401.3	-7.0	5900.9	-8.38	-0.01	10.92
496.0	6368.294	10.866	1515.612	-1418.2	-7.0	5922.8	-8.47	-0.00	10.96
498.0	6365.441	10.852	1527.479	-1435.2	-7.1	5944.7	-8.53	-0.01	11.02
500.0	6362.554	10.838	1539.391	-1452.3	-7.1	5966.8	-8.59	-0.01	11.08
502.0	6359.632	10.824	1551.347	-1469.5	-7.1	5989.1	-8.63	-0.01	11.14
504.0	6356.675	10.809	1563.347	-1486.9	-7.1	6011.5	-8.67	-0.00	11.21
506.0	6353.684	10.795	1575.393	-1504.3	-7.1	6033.9	-8.71	-0.00	11.27

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

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
508.0	6350.658	10.781	1587.483	-1521.8	-7.2	6056.5	-8.76	-0.00	11.34
510.0	6347.597	10.766	1599.619	-1539.3	-7.2	6079.3	-8.81	0.00	11.40
512.0	6344.501	10.752	1611.800	-1557.1	-7.2	6102.2	-8.87	-0.00	11.48
514.0	6341.369	10.738	1624.029	-1574.9	-7.2	6125.2	-8.95	-0.00	11.56
516.0	6338.201	10.723	1636.301	-1592.9	-7.2	6148.4	-9.02	-0.00	11.64
518.0	6334.997	10.709	1648.621	-1611.0	-7.2	6171.8	-9.09	0.00	11.71
520.0	6331.757	10.694	1660.988	-1629.3	-7.2	6195.3	-9.15	0.01	11.78
522.0	6328.480	10.680	1673.403	-1647.6	-7.2	6218.9	-9.22	0.01	11.86
524.0	6325.166	10.666	1685.864	-1666.2	-7.2	6242.7	-9.29	0.00	11.94
526.0	6321.815	10.651	1698.373	-1684.8	-7.2	6266.7	-9.35	-0.00	12.01
528.0	6318.427	10.637	1710.931	-1703.6	-7.2	6290.9	-9.41	-0.01	12.09
530.0	6315.001	10.622	1723.537	-1722.5	-7.3	6315.1	-9.47	-0.01	12.17
532.0	6311.537	10.608	1736.191	-1741.5	-7.3	6339.5	-9.53	-0.01	12.25
534.0	6308.035	10.593	1748.895	-1760.7	-7.4	6364.1	-9.59	-0.01	12.33
536.0	6304.494	10.578	1761.648	-1779.9	-7.4	6388.8	-9.64	-0.02	12.42
538.0	6300.915	10.563	1774.450	-1799.3	-7.4	6413.7	-9.70	-0.02	12.50
540.0	6297.297	10.548	1787.303	-1818.8	-7.5	6438.8	-9.77	-0.02	12.58
542.0	6293.639	10.533	1800.206	-1838.4	-7.6	6464.1	-9.83	-0.02	12.67
544.0	6289.943	10.518	1813.159	-1858.2	-7.6	6489.5	-9.89	-0.02	12.76
546.0	6286.207	10.503	1826.164	-1878.0	-7.7	6515.1	-9.95	-0.03	12.84
548.0	6282.431	10.487	1839.220	-1898.0	-7.7	6540.9	-10.00	-0.02	12.92
550.0	6278.615	10.472	1852.327	-1918.1	-7.8	6566.8	-10.06	-0.02	13.00
552.0	6274.758	10.456	1865.487	-1938.3	-7.8	6592.9	-10.12	-0.01	13.07
554.0	6270.861	10.441	1878.699	-1958.6	-7.9	6619.1	-10.17	-0.02	13.15
556.0	6266.923	10.425	1891.964	-1979.0	-7.9	6645.5	-10.23	-0.02	13.24
558.0	6262.945	10.409	1905.281	-1999.6	-8.0	6672.1	-10.29	-0.02	13.32
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
559.660	6259.611	10.396	1916.372	-2016.6	-8.2	6692.9	-10.10	-0.16	9.87
560.0	6258.925	10.393	1918.645	-2019.9	-8.2	6694.3	-9.06	0.08	-1.96
	S-II/S-IVB SEPARATION COMMAND								
560.600	6257.712	10.388	1922.656	-2025.3	-8.1	6693.0	-9.01	0.08	-2.11
562.0	6254.868	10.377	1932.022	-2037.9	-8.0	6689.9	-9.00	0.02	-2.29
564.0	6250.774	10.361	1945.398	-2055.9	-8.0	6685.3	-9.01	-0.01	-2.07
566.0	6246.644	10.345	1958.766	-2074.2	-8.1	6683.6	-9.32	-0.04	1.11
569.0	6242.477	10.328	1972.137	-2093.0	-8.2	6687.6	-9.37	0.01	2.29
570.0	6238.273	10.312	1985.517	-2111.7	-8.2	6692.5	-9.29	0.01	2.43
572.0	6234.031	10.295	1998.907	-2130.4	-8.3	6697.4	-9.44	-0.08	2.47
574.0	6229.751	10.279	2012.307	-2149.5	-8.5	6702.3	-9.66	-0.09	2.46
576.0	6225.433	10.262	2025.717	-2169.0	-8.6	6707.3	-9.77	-0.08	2.45

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

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
578.0	6221.075	10.244	2039.136	-2188.5	-8.8	6712.2	-9.78	-0.06	2.47
580.0	6216.679	10.226	2052.565	-2208.1	-9.0	6717.1	-9.76	-0.06	2.49
582.0	6212.243	10.208	2066.005	-2227.7	-9.1	6722.1	-9.77	-0.06	2.49
584.0	6207.768	10.190	2079.454	-2247.3	-9.2	6727.1	-9.80	-0.05	2.48
586.0	6203.254	10.171	2092.913	-2266.9	-9.3	6732.1	-9.82	-0.03	2.47
588.0	6198.700	10.153	2106.382	-2286.6	-9.4	6737.0	-9.83	-0.01	2.46
590.0	6194.107	10.134	2119.861	-2306.3	-9.4	6741.9	-9.86	-0.01	2.46
592.0	6189.475	10.115	2133.350	-2326.0	-9.5	6746.9	-9.89	-0.02	2.46
594.0	6184.803	10.096	2146.849	-2345.9	-9.5	6751.8	-9.92	-0.03	2.45
596.0	6180.092	10.077	2160.357	-2365.8	-9.6	6756.7	-9.95	-0.02	2.44
598.0	6175.340	10.058	2173.875	-2385.7	-9.6	6761.6	-9.95	-0.01	2.43
600.0	6170.549	10.039	2187.403	-2405.6	-9.7	6766.4	-9.96	-0.01	2.41
602.0	6165.717	10.019	2200.941	-2425.6	-9.7	6771.2	-9.98	-0.00	2.41
604.0	6160.846	10.000	2214.488	-2445.6	-9.7	6776.1	-9.99	0.01	2.41
606.0	6155.935	9.981	2228.045	-2465.6	-9.7	6780.9	-10.00	0.01	2.41
608.0	6150.984	9.961	2241.612	-2485.6	-9.7	6785.7	-10.00	-0.00	2.40
610.0	6145.992	9.942	2255.188	-2505.7	-9.7	6790.5	-10.02	-0.01	2.39
612.0	6140.961	9.922	2268.773	-2525.8	-9.7	6795.2	-10.03	-0.01	2.37
614.0	6135.889	9.903	2282.369	-2545.8	-9.8	6800.0	-10.04	-0.01	2.36
616.0	6130.778	9.883	2295.973	-2565.9	-9.8	6804.7	-10.04	-0.01	2.35
618.0	6125.626	9.864	2309.587	-2586.1	-9.8	6809.4	-10.05	-0.01	2.35
620.0	6120.433	9.844	2323.211	-2606.2	-9.9	6814.1	-10.06	-0.01	2.35
622.0	6115.201	9.824	2336.844	-2626.3	-9.9	6818.8	-10.06	-0.01	2.35
624.0	6109.928	9.804	2350.486	-2646.5	-9.9	6823.5	-10.07	-0.01	2.35
626.0	6104.615	9.785	2364.138	-2666.7	-9.9	6828.2	-10.07	-0.01	2.34
628.0	6099.261	9.765	2377.799	-2686.8	-10.0	6832.9	-10.09	-0.01	2.33
630.0	6093.867	9.745	2391.470	-2707.1	-10.0	6837.5	-10.10	-0.01	2.31
632.0	6088.4[illegible]	9.725	2405.149	-2727.3	-10.1	6842.1	-10.12	-0.02	2.30
634.0	6082.953	9.704	2418.838	-2747.6	-10.1	6846.7	-10.13	-0.02	2.29
636.0	6077.443	9.684	2432.536	-2767.9	-10.2	6851.3	-10.13	-0.02	2.29
638.0	6071.887	9.664	2446.243	-2788.2	-10.2	6855.9	-10.13	-0.03	2.28
640.0	6066.290	9.643	2459.960	-2808.4	-10.3	6860.5	-10.13	-0.02	2.27
642.0	6060.653	9.623	2473.685	-2828.7	-10.3	6865.0	-10.13	-0.02	2.27
644.0	6054.975	9.602	2487.420	-2849.0	-10.4	6869.5	-10.13	-0.02	2.27
646.0	6049.257	9.581	2501.163	-2869.3	-10.5	6874.1	-10.14	-0.03	2.28
648.0	6043.498	9.560	2514.916	-2889.7	-10.5	6878.6	-10.15	-0.03	2.27
650.0	6037.698	9.539	2528.678	-2910.0	-10.6	6883.2	-10.16	-0.03	2.26
652.0	6031.854	9.517	2542.449	-2930.4	-10.7	6887.7	-10.18	-0.03	2.25
654.0	6025.977	9.496	2556.229	-2950.8	-10.8	6892.2	-10.19	-0.04	2.24
656.0	6020.055	9.474	2570.018	-2971.2	-10.9	6896.7	-10.19	-0.04	2.23
658.0	6014.092	9.452	2583.815	-2991.6	-11.0	6901.1	-10.20	-0.05	2.23
660.0	6008.089	9.430	2597.622	-3012.0	-11.1	6905.6	-10.21	-0.05	2.22
662.0	6002.044	9.408	2611.439	-3032.5	-11.2	6910.0	-10.22	-0.05	2.20

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

TIME SEC	XS KM	YS KM	ZS KM	DXS M/S	DYS M/S	DZS M/S	DDXS M/S SQ	DDYS M/S SQ	DDZS M/S SQ
664.0	5995.959	9.396	2625.262	-3053.0	-11.3	6914.4	-10.22	-0.05	2.20
666.0	5989.832	9.363	2639.095	-3073.4	-11.4	6918.8	-10.21	-0.04	2.20
668.0	5983.665	9.340	2652.937	-3093.9	-11.5	6923.2	-10.21	-0.04	2.20
670.0	5977.457	9.317	2666.788	-3114.3	-11.6	6927.6	-10.21	-0.05	2.20
672.0	5971.207	9.293	2680.649	-3134.8	-11.8	6932.0	-10.24	-0.06	2.18
674.0	5964.917	9.270	2694.516	-3155.3	-11.9	6936.4	-10.29	-0.07	2.15
676.0	5958.586	9.246	2708.393	-3176.0	-12.0	6940.7	-10.32	-0.07	2.14
678.0	5952.213	9.221	2722.279	-3196.6	-12.2	6945.0	-10.30	-0.07	2.15
680.0	5945.800	9.197	2736.173	-3217.2	-12.4	6949.3	-10.28	-0.07	2.16
682.0	5939.344	9.172	2750.076	-3237.9	-12.5	6953.6	-10.27	-0.07	2.15
684.0	5932.848	9.147	2763.988	-3258.4	-12.7	6957.9	-10.29	-0.06	2.14
686.0	5926.311	9.121	2777.908	-3279.0	-12.8	6962.2	-10.29	-0.06	2.13
688.0	5919.732	9.096	2791.836	-3299.6	-12.9	6966.4	-10.29	-0.07	2.14
690.0	5913.112	9.070	2805.773	-3320.2	-13.1	6970.7	-10.27	-0.07	2.16
692.0	5906.451	9.043	2819.719	-3340.8	-13.2	6975.1	-10.26	-0.07	2.17
694.0	5899.749	9.017	2833.674	-3361.3	-13.4	6979.4	-10.25	-0.07	2.17
696.0	5893.006	8.990	2847.637	-3381.8	-13.6	6983.8	-10.24	-0.08	2.16
698.0	5886.222	8.962	2861.609	-3402.3	-13.8	6988.1	-10.24	-0.08	2.16
700.0	5879.397	8.935	2875.589	-3422.8	-13.9	6992.4	-10.23	-0.06	2.16
702.0	5872.530	8.907	2889.579	-3443.3	-14.1	6996.7	-10.22	-0.07	2.15
S-IVB FIRST GUIDANCE CUTOFF									
702.650	5870.290	8.897	2894.127	-3450.0	-14.2	6998.1	-10.21	-0.11	2.15
704.0	5865.625	8.878	2903.570	-3461.7	-14.2	6994.1	-8.38	0.01	-3.91
706.0	5859.685	8.850	2917.550	-3478.4	-14.2	6985.9	-8.32	0.01	-4.15
708.0	5851.711	8.821	2931.514	-3495.1	-14.2	6977.6	-8.31	0.01	-4.17
710.0	5844.705	8.793	2945.461	-3511.7	-14.2	6969.2	-8.30	-0.03	-4.19
712.0	5837.664	8.765	2959.391	-3528.4	-14.3	6960.8	-8.29	0.04	-4.18
PARKING ORBIT INSERTION									
712.650	5835.369	8.755	2963.914	-3533.8	-14.2	6958.1	-8.29	0.03	-4.18

TABLE B-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE

TIME SEC	GC DIST KM	LONG DEG E	DEL DEG N	VEL-AZ DEG	VEL-FL DEG	FF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
GUIDANCE REFERENCE RELEASE											
-16.960	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-16.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-15.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-14.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-13.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-12.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-11.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-10.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-9.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-8.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-7.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-6.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-5.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-4.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-3.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-2.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
-1.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
0.0	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
ALL HOLDDOWN ARMS RELEASED											
0.200	6373.407	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	408.6	0	112
LIFTOFF - START OF TIME BASE 1											
0.600	6373.407	-80.6041	28.4470	279.12	87.71	0.3	90.00	0.05	408.6	0	112
1.0	6373.407	-80.6041	28.4470	279.26	87.35	0.9	90.00	0.13	408.6	0	112
2.0	6373.409	-80.6041	28.4470	279.50	87.51	3.1	90.00	0.43	408.5	0	114
3.0	6373.413	-80.6041	28.4470	280.94	87.51	5.2	89.99	0.73	408.5	0	118
4.0	6373.420	-80.6041	28.4470	282.90	87.57	7.5	89.99	1.05	408.4	0	124
5.0	6373.428	-80.6041	28.4470	266.71	87.72	9.8	90.00	1.37	408.4	1	133
6.0	6373.439	-80.6041	28.4470	237.10	87.41	12.1	90.04	1.70	408.4	1	144
7.0	6373.453	-80.6042	28.4470	216.46	86.58	14.5	90.10	2.03	408.4	2	157
8.0	6373.468	-80.6042	28.4470	206.30	85.69	17.0	90.16	2.38	408.4	2	173
9.0	6373.487	-80.6042	28.4469	202.61	85.23	19.5	90.21	2.73	408.5	4	191
10.0	6373.507	-80.6042	28.4469	202.31	85.35	22.1	90.23	3.09	408.6	5	212
11.0	6373.531	-80.6042	28.4469	203.73	85.80	24.8	90.23	3.47	408.7	7	235
12.0	6373.557	-80.6042	28.4469	205.78	86.27	27.5	90.23	3.84	408.9	9	261
13.0	6373.586	-80.6042	28.4469	207.03	86.57	30.2	90.23	4.23	408.9	10	290
14.0	6373.617	-80.6042	28.4469	206.97	86.68	33.1	90.24	4.63	409.1	12	322

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

TIME SEC	GC DIST KM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-FL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
15.0	6373.652	-80.6042	28.4469	206.14	86.82	36.0	90.25	5.03	409.4	14	356
16.0	6373.689	-80.6042	28.4468	205.96	87.21	38.9	90.24	5.45	409.7	16	394
17.0	6373.729	-80.6042	28.4469	206.02	87.66	42.0	90.22	5.87	410.1	18	434
18.0	6373.773	-80.6042	28.4468	205.55	88.07	45.1	90.19	6.30	410.5	20	477
19.0	6373.820	-80.6042	28.4468	202.98	88.46	48.2	90.17	6.74	411.0	21	524
20.0	6373.869	-80.6042	28.4468	195.32	88.77	51.5	90.15	7.18	411.6	22	574
21.0	6373.922	-80.6042	28.4468	180.21	88.98	54.8	90.14	7.63	412.3	23	627
22.0	6373.979	-80.6042	28.4468	158.36	89.04	58.1	90.13	8.09	413.1	24	683
23.0	6374.039	-80.6042	28.4468	136.19	88.92	61.6	90.12	8.55	414.1	24	743
24.0	6374.102	-80.6042	28.4468	120.19	88.64	65.1	90.11	9.01	415.1	25	806
25.0	6374.169	-80.6042	28.4467	110.14	88.26	68.6	90.10	9.49	416.3	25	873
26.0	6374.239	-80.6042	28.4467	103.82	87.82	72.3	90.09	9.96	417.7	25	944
27.0	6374.313	-80.6042	28.4467	99.70	87.33	76.0	90.08	10.44	419.1	25	1018
28.0	6374.391	-80.6041	28.4467	96.91	86.81	79.9	90.07	10.92	420.7	26	1096
29.0	6374.473	-80.6041	28.4467	94.94	86.25	83.8	90.07	11.41	422.5	27	1177
30.0	6374.558	-80.6040	28.4467	93.52	85.67	87.8	90.06	11.90	424.4	29	1263
31.0	6374.648	-80.6039	28.4467	92.45	85.08	91.8	90.05	12.39	426.5	33	1352
32.0	6374.741	-80.6038	28.4467	91.63	84.47	96.0	90.04	12.88	428.8	39	1446
33.0	6374.839	-80.6037	28.4467	91.00	83.86	100.3	90.03	13.37	431.2	47	1544
34.0	6374.941	-80.6036	28.4467	90.49	83.23	104.7	90.01	13.87	433.7	57	1645
35.0	6375.047	-80.6035	28.4467	90.07	82.60	109.2	90.00	14.36	436.4	69	1751
36.0	6375.157	-80.6033	28.4467	89.74	81.96	113.8	89.99	14.86	439.3	83	1862
37.0	6375.272	-80.6032	28.4467	89.50	81.32	118.5	89.98	15.35	442.4	99	1977
38.0	6375.392	-80.6030	28.4467	89.34	80.68	123.3	89.97	15.84	445.7	117	2096
39.0	6375.516	-80.6028	28.4467	89.23	80.03	128.2	89.96	16.33	449.1	137	2220
40.0	6375.644	-80.6025	28.4467	89.16	79.38	133.2	89.95	16.81	452.7	160	2349
41.0	6375.777	-80.6023	28.4467	89.10	78.72	138.4	89.94	17.30	456.5	186	2482
42.0	6375.916	-80.6020	28.4467	89.08	78.05	143.7	89.94	17.77	460.5	214	2620
43.0	637 .059	-80.6016	28.4467	89.08	77.38	149.1	89.93	18.24	464.7	245	2763
44.0	6376.207	-80.6013	28.4467	89.09	76.70	154.6	89.93	18.71	469.2	278	2911
45.0	6376.360	-80.6009	28.4467	89.12	76.02	160.3	89.92	19.17	473.8	315	3064
46.0	6376.518	-80.6005	28.4467	89.17	75.34	166.1	89.92	19.62	478.7	356	3222
47.0	6376.681	-80.6001	28.4468	89.24	74.65	172.1	89.92	20.06	483.7	399	3386
48.0	6376.850	-80.5996	28.4468	89.34	73.97	178.2	89.93	20.50	489.0	446	3554
49.0	6377.024	-80.5991	28.4468	89.45	73.28	184.4	89.94	20.92	494.5	497	3728
50.0	6377.203	-80.5985	28.4468	89.58	72.59	190.8	89.95	21.34	500.2	552	3907
51.0	6377.388	-80.5979	28.4469	89.72	71.91	197.3	89.96	21.74	506.2	611	4092
52.0	6377.578	-80.5972	28.4468	89.86	71.22	204.0	89.98	22.14	512.4	675	4283
53.0	6377.774	-80.5965	28.4468	89.99	70.53	210.8	90.00	22.53	518.8	743	4478
54.0	6377.975	-80.5958	28.4469	90.09	69.84	217.8	90.01	22.90	525.4	815	4680
55.0	6378.183	-80.5950	28.4469	90.17	69.16	224.9	90.03	23.27	532.2	893	4887
56.0	6378.396	-80.5942	28.4469	90.24	68.49	232.2	90.04	23.62	539.3	975	5100
57.0	6378.615	-80.5933	28.4468	90.30	67.84	239.7	90.05	23.97	546.5	1063	5320

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

TIME SEC	GC DIST KM	LON DEG	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
58.0	6378.840	-80.5923	28.4469	90.35	67.19	247.4	90.07	24.31	554.0	1156	5545
59.0	6379.071	-80.5913	28.4468	90.40	66.56	255.2	90.08	24.63	561.6	1254	5776
60.0	6379.308	-80.5902	28.4467	90.46	65.93	263.1	90.10	24.96	569.5	1359	6013
61.0	6379.552	-80.5891	28.4467	90.54	65.32	271.3	90.12	25.26	577.6	1469	6256
62.0	6379.801	-80.5879	28.4467	90.62	64.70	279.6	90.14	25.56	585.9	1585	6506
63.0	6380.057	-80.5867	28.4467	90.71	64.09	288.1	90.17	25.95	594.4	1708	6762
64.0	6380.320	-80.5854	28.4467	90.80	63.47	296.7	90.20	26.11	603.1	1837	7024
65.0	6380.588	-80.5840	28.4467	90.89	62.95	305.5	90.22	25.36	612.2	1972	7293
66.0	6380.863	-80.5825	28.4467	90.95	62.22	314.4	90.25	26.59	621.4	2115	7568
67.0	6381.145	-80.5810	28.4466	91.02	61.58	323.5	90.28	26.81	630.9	2265	7849
	MACH 1										
67.500	6381.288	-80.5802	28.4466	91.06	61.26	328.2	90.29	26.91	635.8	2343	7992
68.0	6381.432	-80.5794	28.4466	91.09	60.94	332.8	90.31	27.01	640.7	2423	8137
69.0	6381.726	-80.5777	28.4466	91.14	60.31	342.3	90.33	27.20	650.6	2588	8431
70.0	6382.027	-80.5759	28.4465	91.19	59.68	352.0	90.36	27.37	660.8	2762	8731
71.0	6382.334	-80.5740	28.4465	91.23	59.07	361.8	90.39	27.54	671.2	2943	9039
72.0	6382.648	-80.5721	28.4465	91.29	58.48	371.8	90.41	27.70	681.8	3133	9352
73.0	6382.968	-80.5701	28.4464	91.35	57.89	382.1	90.45	27.86	692.6	3331	9672
74.0	6383.295	-80.5680	28.4464	91.42	57.32	392.5	90.49	28.01	703.6	3539	9999
75.0	6383.629	-80.5657	28.4463	91.51	56.76	403.2	90.53	28.15	714.8	3755	10333
76.0	6383.970	-80.5634	28.4463	91.62	56.21	414.1	90.58	28.29	726.3	3980	10674
77.0	6384.317	-80.5610	28.4462	91.74	55.66	425.3	90.64	28.41	738.1	4215	11022
78.0	6384.672	-80.5585	28.4462	91.89	55.11	436.7	90.71	28.52	750.1	4459	11376
79.0	6385.034	-80.5559	28.4461	92.03	54.55	448.3	90.79	28.62	762.4	4713	11738
80.0	6385.402	-80.5532	28.4460	92.17	54.00	460.2	90.86	28.71	775.1	4978	12107
81.0	6385.778	-80.5504	28.4459	92.31	53.45	472.3	90.94	28.79	788.0	5253	12482
82.0	6386.161	-80.5475	28.4459	92.42	52.90	484.8	91.01	28.86	801.2	5540	12865
	MAXIMUM DYNAMIC PRESSURE										
82.500	6386.355	-80.5460	28.4457	92.47	52.63	491.1	91.04	28.89	807.9	5687	13060
83.0	6386.552	-80.5445	28.4457	92.52	52.36	497.4	91.07	28.91	814.7	5837	13256
84.0	6386.949	-80.5413	28.4455	92.59	51.82	510.4	91.12	28.96	828.4	6146	13653
85.0	6387.354	-80.5380	28.4454	92.62	51.27	523.6	91.16	29.00	842.5	6467	14058
86.0	6387.766	-80.5346	28.4453	92.62	50.73	537.1	91.19	29.02	857.0	6800	14470
87.0	6388.185	-80.5311	28.4451	92.61	50.18	550.8	91.21	29.03	871.7	7145	14889
88.0	6388.612	-80.5274	28.4450	92.57	49.63	564.8	91.21	29.03	886.7	7503	15316
89.0	6389.046	-80.5236	28.4449	92.51	49.07	579.1	91.21	29.01	902.1	7875	15750
90.0	6389.487	-80.5197	28.4447	92.45	48.51	593.7	91.20	28.99	917.7	8260	16191
91.0	6389.935	-80.5156	28.4445	92.37	47.96	608.5	91.18	28.95	933.7	8660	16639
92.0	6390.391	-80.5114	28.4444	92.30	47.40	623.7	91.17	28.90	950.0	9073	17095

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

TIME SEC	GC DIST KM	LONG DEG E	DEG 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	6390.854	-80.5070	28.4442	92.23	46.84	639.1	91.15	28.84	966.7	9502	17557
94.0	6391.323	-80.5025	28.4441	92.16	46.29	654.9	91.13	28.77	983.6	9945	18027
95.0	6391.800	-80.4978	28.4439	92.09	45.74	670.9	91.11	28.69	1000.8	10404	18504
96.0	6392.284	-80.4930	28.4438	92.03	45.19	687.3	91.10	28.61	1018.4	10879	18988
97.0	6392.776	-80.4879	28.4436	91.97	44.65	703.9	91.09	28.51	1036.3	11370	19479
98.0	6393.274	-80.4827	28.4435	91.93	44.10	720.9	91.08	28.41	1054.5	11878	19977
99.0	6393.779	-80.4774	28.4433	91.89	43.57	738.2	91.07	28.30	073.0	12403	20482
100.0	6394.291	-80.4719	28.4432	91.85	43.04	755.7	91.06	28.19	1091.8	12944	20995
101.0	6394.811	-80.4661	28.4430	91.83	42.51	773.6	91.06	28.07	1110.9	13504	21514
102.0	6395.337	-80.4602	28.4428	91.81	41.99	791.8	91.07	27.95	1130.3	14081	22040
103.0	6395.870	-80.4541	28.4427	91.79	41.48	810.4	91.07	27.82	1150.1	14677	22573
104.0	6396.410	-80.4479	28.4425	91.78	40.98	829.2	91.08	27.69	1170.1	15291	23113
105.0	6396.958	-80.441·	28.4423	91.77	40.48	848.4	91.08	27.56	1190.4	15925	23661
106.0	6397.512	-80.4347	28.4421	91.77	40.00	867.9	91.09	27.43	1211.1	16577	24215
107.0	6398.073	-80.4279	28.4419	91.76	39.52	887.7	91.10	27.29	1232.0	17250	24776
108.0	6398.642	-80.4208	28.4418	91.75	39.05	907.8	91.11	27.15	1253.3	17942	25344
109.0	6399.217	-80.4135	28.4416	91.75	38.59	928.2	91.12	27.01	1274.8	18654	25920
110.0	6399.799	-80.4060	28.4414	91.74	38.14	949.0	91.12	26.87	1296.6	19387	26502
111.0	6400.389	-80.3983	28.4412	91.73	37.70	970.1	91.13	26.73	1318.8	20141	27092
112.0	6400.986	-80.3904	28.4409	91.72	37.27	991.5	91.13	26.59	1341.2	20916	27689
113.0	6401.590	-80.3823	28.4407	91.71	36.85	1013.2	91.14	26.45	1364.0	21712	28292
114.0	6402.201	-80.3739	28.4405	91.70	36.44	1035.3	91.14	26.32	1387.0	22530	28904
115.0	6402.820	-80.3653	28.4403	91.69	36.04	1057.7	91.14	26.18	1410.4	23371	29522
116.0	6403.446	-80.3565	28.4401	91.68	35.66	1080.5	91.15	26.05	1434.1	24233	30148
117.0	6404.079	-80.3474	28.4398	91.68	35.29	1103.6	91.15	25.93	1458.1	25118	30782
118.0	6404.721	-80.3382	28.4396	91.67	34.93	1127.1	91.16	25.81	1482.4	26026	31423
119.0	6405.370	-80.3287	28.4393	91.67	34.58	1150.9	91.17	25.68	1507.1	26957	32072
120.0	6406.027	-80.3189	28.4391	91.67	34.24	1175.1	91.17	25.56	1532.1	27912	32729
121.0	6406.692	-80.3089	28.4388	91.67	33.90	1199.6	91.18	25.44	1557.5	28890	33394
122.0	6407.365	-80.2986	28.4386	91.67	33.57	1224.6	91.19	25.32	1583.2	29893	34067
123.0	6408.046	-80.2882	28.4383	91.67	33.24	1249.9	91.20	25.20	1609.3	30920	34748
124.0	6408.736	-80.2774	28.4380	91.67	32.92	1275.6	91.21	25.07	1635.8	31973	35437
125.0	6409.433	-80.2664	28.4377	91.67	32.60	1301.7	91.22	24.95	1662.6	33050	36134
126.0	6410.139	-80.2551	28.4375	91.68	32.29	1328.2	91.23	24.82	1689.9	34154	36840
127.0	6410.851	-80.2436	28.4372	91.68	31.97	1355.1	91.24	24.69	1717.5	35283	37553
128.0	6411.573	-80.2318	28.4369	91.68	31.67	1382.4	91.24	24.57	1745.6	36439	38274
129.0	6412.303	-80.2197	28.4365	91.69	31.37	1410.1	91.25	24.44	1774.0	37623	39004
130.0	6413.041	-80.2073	28.4362	91.69	31.07	1438.3	91.26	24.32	1802.9	38833	39742
131.0	6413.788	-80.1946	28.4359	91.69	30.79	1466.8	91.27	24.19	1832.2	40071	40489
132.0	6414.543	-80.1817	28.4356	91.69	30.50	1495.9	91.28	24.07	1861.9	41337	41244
133.0	6415.306	-80.1685	28.4352	91.69	30.23	1525.4	91.29	23.94	1892.0	42633	42007
134.0	6416.078	-80.1549	28.4349	91.69	29.96	1555.3	91.30	23.82	1922.6	43956	42779
135.0	6416.859	-80.1411	28.4345	91.70	29.69	1585.6	91.31	23.70	1953.6	45310	43560

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

TIME SEC	GC DIST KM	LONG DEG E	LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SE VEL M/S	RANGE M	ALTITUDE M
136.0	6417.649	-80.1270	28.4341	91.70	29.43	1616.4	91.32	23.96	1985.0	46693	44350
137.0	6418.448	-80.1125	28.4338	91.71	29.17	1647.6	91.33	23.47	2016.9	48107	45148
138.0	6419.255	-80.0979	28.4334	91.72	28.92	1679.3	91.34	23.35	2049.2	49551	45956
139.0	6420.072	-80.0827	28.4330	91.72	28.68	1711.4	91.35	23.23	2081.9	51026	46777
	S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)										
139.300	6420.319	-80.0781	28.4329	91.72	28.60	1721.1	91.36	23.20	2091.8	51476	47019
140.0	6420.897	-80.0673	28.4326	91.73	28.44	1741.0	91.36	23.11	2112.1	52532	47597
141.0	6421.729	-80.0516	28.4321	91.74	28.19	1766.8	91.38	22.97	2138.5	54066	48428
142.0	6422.565	-80.0357	28.4317	91.75	27.95	1792.7	91.39	22.83	2165.0	55625	49265
143.0	6423.408	-80.0195	28.4313	91.77	27.71	1818.9	91.41	22.70	2191.8	57210	50108
144.0	6424.257	-80.0030	28.4309	91.79	27.47	1845.4	91.42	22.56	2219.0	58821	50956
145.0	6425.111	-79.9863	28.4304	91.80	27.24	1872.3	91.44	22.42	2246.4	60459	51810
146.0	6425.971	-79.9693	28.4299	91.81	27.01	1899.5	91.46	22.29	2274.2	62124	52670
147.0	6426.836	-79.9520	28.4294	91.83	26.79	1927.1	91.48	22.16	2302.4	63816	53535
148.0	6427.709	-79.9344	28.4289	91.85	26.57	1955.0	91.49	22.03	2330.9	65536	54407
149.0	6428.585	-79.9166	28.4284	91.86	26.35	1983.3	91.51	21.91	2359.7	67284	55284
150.0	6429.468	-79.8984	28.4279	91.88	26.14	2012.1	91.53	21.78	2389.0	69060	56167
151.0	6430.358	-79.8800	28.4274	91.89	25.92	2041.2	91.55	21.65	2418.7	70865	57056
152.0	6431.253	-79.8612	28.4269	91.91	25.72	2070.9	91.56	21.53	2448.8	72699	57951
153.0	6432.155	-79.8422	28.4263	91.92	25.51	2100.9	91.58	21.40	2479.4	74563	58853
154.0	6433.063	-79.8229	28.4257	91.94	25.31	2131.4	91.60	21.28	2510.4	76457	59761
155.0	6433.977	-79.8032	28.4251	91.95	25.10	2162.3	91.61	21.16	2541.8	78381	60675
156.0	6434.898	-79.7832	28.4245	91.97	24.91	2193.7	91.63	21.04	2573.7	80336	61595
157.0	6435.825	-79.7629	28.4239	91.98	24.71	2225.5	91.65	20.92	2606.0	82322	62522
158.0	6436.759	-79.7423	28.4232	92.00	24.52	2257.9	91.66	20.80	2638.8	84341	63456
159.0	6437.699	-79.7214	28.4226	92.01	24.33	2290.7	91.68	20.69	2672.1	86391	64396
160.0	6438.646	-79.7001	28.4219	92.03	24.14	2323.9	91.70	20.57	2705.8	88474	65343
161.0	6439.599	-79.6785	28.4213	92.04	23.96	2357.7	91.71	20.45	2740.0	90589	66296
	S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)										
161.200	6439.791	-79.6741	28.4211	92.05	23.92	2364.5	91.72	20.43	2746.9	91016	66488
162.0	6440.556	-79.6566	28.4206	92.06	23.76	2374.4	91.73	20.30	2757.2	92728	67252
	S-IC/S-II SEPARATION COMMAND										
162.900	6441.412	-79.6369	28.4200	92.07	23.59	2370.9	91.74	20.15	2754.2	94660	68109
164.0	6442.452	-79.6127	28.4192	92.09	23.39	2386.1	91.75	19.97	2750.0	97026	69148
166.0	6444.315	-79.5688	28.4179	92.12	23.02	2359.3	91.79	19.65	2744.2	101321	71010
168.0	6446.147	-79.5249	28.4163	92.15	22.66	2362.3	91.81	19.34	2748.2	105622	72842
170.0	6447.956	-79.4809	28.4147	92.18	22.30	2368.1	91.83	19.03	2754.9	109943	74650

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

TIME SEC	GC DIST KM	LONG DEG E	LAT DEG N	VEL-AZ DEG	VEL-FL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
172.0	6449.742	-79.4364	28.4134	92.21	21.94	2375.6	91.86	18.73	2763.4	114286	76436
174.0	6451.506	-79.3918	28.4118	92.24	21.58	2383.6	91.89	18.44	2772.4	118654	78200
176.0	6453.269	-79.3470	28.4103	92.27	21.23	2392.1	91.92	18.14	2781.7	123046	79962
178.0	6454.971	-79.3018	28.4087	92.31	20.88	2400.8	91.95	17.85	2791.2	127462	81664
180.0	6456.673	-79.2565	28.4071	92.34	20.54	2409.6	91.98	17.57	2800.9	131904	83365
182.0	6458.353	-79.2109	28.4054	92.37	20.20	2418.6	92.01	17.28	2810.7	136372	85045
184.0	6460.013	-79.1650	28.4037	92.40	19.86	2427.8	92.03	17.00	2820.7	140864	86704
186.0	6461.652	-79.1189	28.4020	92.44	19.53	2437.1	92.06	16.73	2830.8	145382	88343
188.0	6463.272	-79.0725	28.4003	92.47	19.20	2446.6	92.09	16.45	2841.1	149926	89962
190.0	6464.871	-79.0258	28.3985	92.50	18.87	2456.3	92.12	16.18	2851.5	154496	91560
192.0	6466.450	-78.9789	28.3967	92.53	18.55	2466.1	92.15	15.91	2862.1	159092	93139
194.0	6468.009	-78.9317	28.3948	92.57	18.23	2476.2	92.18	15.65	2872.8	163713	94698
196.0	6469.549	-78.8842	28.3930	92.60	17.92	2486.4	92.21	15.38	2883.7	168361	96237
198.0	6471.069	-78.8365	28.3910	92.63	17.61	2496.7	92.24	15.12	2894.8	173036	97756
200.0	6472.570	-78.7885	28.3891	92.66	17.30	2507.3	92.27	14.87	2906.0	177737	99257
202.0	6474.052	-78.7403	28.3871	92.70	17.00	2518.0	92.30	14.62	2917.4	182464	100738
204.0	6475.515	-78.6917	28.3851	92.73	16.70	2529.0	92.33	14.37	2928.9	187219	102200
206.0	6476.959	-78.6429	28.3830	92.76	16.41	2540.0	92.36	14.12	2940.6	192001	103643
208.0	6478.384	-78.5939	28.3809	92.80	16.12	2551.2	92.39	13.88	2952.4	196809	105068
210.0	6479.792	-78.5445	28.3788	92.84	15.84	2562.6	92.43	13.64	2964.3	201645	106475
212.0	6481.181	-78.4949	28.3766	92.88	15.56	2574.0	92.46	13.41	2976.3	206509	107864
214.0	6482.553	-78.4450	28.3744	92.92	15.28	2585.6	92.50	13.18	2988.4	211399	109235
216.0	6483.907	-78.3948	28.3721	92.95	15.01	2597.4	92.53	12.95	3000.7	216317	110589
218.0	6485.244	-78.3443	28.3698	92.99	14.74	2609.3	92.57	12.73	3013.1	221263	111924
220.0	6486.563	-78.2936	28.3675	93.03	14.47	2621.3	92.60	12.51	3025.6	226237	113243
222.0	6487.865	-78.2426	28.3651	93.07	14.21	2633.5	92.64	12.29	3038.3	231238	114544
224.0	6489.149	-78.1912	28.3626	93.11	13.95	2645.8	92.67	12.07	3051.1	236268	115827
226.0	6490.416	-78.1396	28.3601	93.15	13.69	2658.3	92.71	11.85	3064.0	241326	117093
228.0	6491.666	-78.0878	28.3576	93.19	13.44	2670.9	92.75	11.64	3077.1	246413	118343
230.0	6492.899	-78.0356	28.3550	93.22	13.19	2683.7	92.78	11.43	3090.3	251528	119575
232.0	6494.115	-77.9831	28.3524	93.26	12.94	2696.6	92.82	11.22	3103.6	256672	120790
234.0	6495.314	-77.9304	28.3498	93.30	12.69	2709.7	92.85	11.01	3117.1	261845	121988
236.0	6496.496	-77.8773	28.3471	93.34	12.45	2722.9	92.89	10.81	3130.7	267047	123169
238.0	6497.662	-77.8240	28.3443	93.39	12.21	2736.3	92.93	10.60	3144.5	272279	124334
240.0	6498.810	-77.7703	28.3415	93.42	11.97	2749.8	92.96	10.40	3158.3	277540	125482
242.0	6499.943	-77.7164	28.3386	93.46	11.73	2763.4	93.00	10.20	3172.4	282831	126613
244.0	6501.059	-77.6621	28.3357	93.50	11.50	2777.2	93.03	10.01	3186.5	288152	127728
246.0	6502.157	-77.6076	28.3329	93.54	11.27	2791.1	93.07	9.81	3200.8	293503	128826
248.0	6503.240	-77.5527	28.3298	93.58	11.04	2805.2	93.11	9.62	3215.2	298884	129908
250.0	6504.307	-77.4976	28.3267	93.62	10.82	2819.4	93.14	9.43	3229.7	304296	130974
252.0	6505.357	-77.4421	28.3236	93.66	10.60	2833.8	93.18	9.24	3244.4	309738	132023
254.0	6506.391	-77.3863	28.3205	93.69	10.39	2848.3	93.21	9.06	3259.2	315211	133056
256.0	6507.410	-77.3302	28.3173	93.73	10.16	2862.9	93.25	8.88	3274.1	320715	134074

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

TIME SEC	GC DIST KM	LONG DEG E	LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
258.0	6508.412	-77.2738	28.3140	93.77	9.95	2877.7	93.29	8.69	3289.2	326251	135075
260.0	6509.398	-77.2171	28.3107	93.81	9.74	2892.6	93.32	8.52	3304.4	331817	136060
262.0	6510.369	-77.1600	28.3073	93.85	9.53	2907.7	93.36	8.34	3319.8	337416	137030
264.0	6511.324	-77.1027	28.3039	93.89	9.33	2922.8	93.40	8.16	3335.2	343046	137984
266.0	6512.264	-77.0450	28.3005	93.93	9.12	2938.2	93.44	7.99	3350.8	348708	138922
268.0	6513.188	-76.9870	28.2969	93.97	8.92	2953.6	93.47	7.82	3366.5	354402	139845
270.0	6514.096	-76.9287	28.2933	94.01	8.73	2969.3	93.51	7.65	3382.4	360129	140753
272.0	6514.990	-76.8700	28.2897	94.05	8.53	2985.0	93.55	7.48	3398.4	365888	141645
274.0	6515.868	-76.8110	28.2860	94.09	8.34	3000.9	93.58	7.32	3414.5	371680	142522
276.0	6516.731	-76.7517	28.2823	94.13	8.15	3017.0	93.62	7.16	3430.8	377504	143384
278.0	6517.579	-76.6921	28.2785	94.17	7.97	3033.2	93.66	7.00	3447.2	383362	144231
280.0	6518.413	-76.6321	28.2746	94.21	7.78	3049.5	93.70	6.85	3463.7	389254	145063
282.0	6519.231	-76.5718	28.2707	94.25	7.60	3066.0	93.73	6.69	3480.4	395179	145880
284.0	6520.035	-76.5111	28.2667	94.29	7.42	3082.6	93.77	6.54	3497.2	401138	146683
286.0	6520.824	-76.4501	28.2626	94.33	7.25	3099.3	93.81	6.39	3514.1	407131	147471
288.0	6521.598	-76.3888	28.2585	94.37	7.07	3116.2	93.85	6.24	3531.2	413158	148244
290.0	6522.358	-76.3271	28.2543	94.41	6.90	3133.2	93.89	6.09	3548.4	419219	149003
292.0	6523.104	-76.2651	28.2501	94.45	6.73	3150.4	93.92	5.95	3565.8	425315	149747
294.0	6523.836	-76.2027	28.2458	94.49	6.57	3167.7	93.96	5.80	3583.3	431446	150477
296.0	6524.553	-76.1400	28.2415	94.53	6.40	3185.2	94.00	5.66	3600.9	437612	151193
298.0	6525.257	-76.0769	28.2370	94.57	6.24	3202.8	94.04	5.52	3618.6	443814	151896
300.0	6525.946	-76.0134	28.2326	94.61	6.08	3220.5	94.08	5.39	3636.5	450051	152584
302.0	6526.622	-75.9496	28.2280	94.65	5.93	3238.4	94.12	5.25	3654.5	456324	153258
304.0	6527.284	-75.8855	28.2234	94.69	5.77	3256.4	94.15	5.12	3672.7	462632	153918
306.0	6527.932	-75.8210	28.2187	94.73	5.62	3274.6	94.19	4.99	3691.0	468977	154565
308.0	6528.567	-75.7561	28.2139	94.77	5.47	3292.9	94.23	4.86	3709.5	475359	155199
310.0	6529.188	-75.6908	28.2091	94.81	5.33	3311.4	94.27	4.73	3728.1	481777	155818
312.0	6529.796	-75.6252	28.2042	94.86	5.18	3330.0	94.31	4.60	3746.8	488232	156425
314.0	6530.391	-75.5592	28.1993	94.90	5.04	3348.8	94.35	4.48	3765.6	494724	1570[illegible]
316.0	6530.973	-75.4929	28.1942	94.94	4.90	3367.6	94.39	4.36	3784.6	501254	15[illegible]
318.0	6531.542	-75.4261	28.1891	94.98	4.76	3386.7	94.43	4.24	3803.8	507822	158[illegible]6
320.0	6532.098	-75.3590	28.1840	95.02	4.63	3405.9	94.47	4.12	3823.1	514427	158721
322.0	6532.642	-75.2915	28.1787	95.06	4.50	3425.2	94.51	4.01	3842.5	521070	159262
324.0	6533.172	-75.2236	28.1734	95.10	4.36	3444.7	94.55	3.89	3862.1	527752	159791
326.0	6533.690	-75.1554	28.1680	95.14	4.24	3464.4	94.59	3.78	3881.9	534473	160308
328.0	6534.196	-75.0867	28.1625	95.19	4.11	3484.2	94.63	3.67	3901.7	541232	160811
330.0	6534.689	-75.0177	28.1570	95.23	3.99	3504.1	94.67	3.56	3921.7	548031	161303
332.0	6535.170	-74.9482	28.1514	95.27	3.86	3524.2	94.71	3.45	3941.9	554869	161782
334.0	6535.639	-74.8784	28.1457	95.31	3.74	3544.4	94.75	3.35	3962.2	561747	162249
336.0	6536.096	-74.8082	28.1399	95.35	3.63	3564.8	94.79	3.25	3982.7	568665	162704
338.0	6536.541	-74.7376	28.1340	95.40	3.51	3585.3	94.83	3.14	4003.3	575623	163148
340.0	6536.974	-74.6665	28.1281	95.44	3.40	3606.0	94.87	3.04	4024.1	582622	163579
342.0	6537.396	-74.5951	28.1221	95.48	3.29	3626.9	94.91	2.95	4045.0	589661	163999

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

TIME SEC	GC DIST KM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
344.0	6537.806	-74.5233	28.1160	95.52	3.18	3647.9	94.95	2.85	4066.1	596741	164407
346.0	6538.205	-74.4510	28.1098	95.57	3.07	3669.1	94.99	2.76	4087.3	603863	164804
348.0	6538.592	-74.3783	28.1035	95.61	2.97	3690.4	95.04	2.66	4108.7	611027	165190
350.0	6538.969	-74.3053	28.0971	95.65	2.86	3711.9	95.08	2.57	4130.2	618232	165564
352.0	6539.334	-74.2318	28.0907	95.70	2.76	3733.5	95.12	2.48	4151.9	625480	165927
354.0	6539.688	-74.1578	28.0842	95.74	2.66	3755.3	95.16	2.40	4173.8	632770	166280
356.0	6540.032	-74.0835	28.0776	95.78	2.57	3777.3	95.20	2.31	4195.8	640103	166621
358.0	6540.365	-74.0087	28.0708	95.83	2.47	3799.4	95.24	2.23	4217.9	647479	166952
360.0	6540.687	-73.9335	28.0641	95.87	2.38	3821.7	95.29	2.14	4240.3	654898	167272
362.0	6540.999	-73.8579	28.0572	95.91	2.29	3844.1	95.33	2.06	4262.8	662361	167582
364.0	6541.300	-73.7818	28.0502	95.96	2.20	3866.8	95.37	1.98	4285.4	669869	167881
366.0	6541.592	-73.7053	28.0431	96.00	2.11	3889.5	95.42	1.91	4308.2	677420	168171
368.0	6541.874	-73.6284	28.0359	96.04	2.03	3912.5	95.46	1.83	4331.2	685016	168450
370.0	6542.145	-73.5510	28.0287	96.09	1.94	3935.6	95.50	1.76	4354.4	692657	168719
372.0	6542.407	-73.4732	28.0213	96.13	1.86	3958.9	95.54	1.68	4377.7	700343	168979
374.0	6542.660	-73.3949	28.0139	96.18	1.78	3982.4	95.59	1.61	4401.2	708075	169229
376.0	6542.902	-73.3161	28.0063	96.22	1.70	4006.0	95.63	1.54	4424.8	715852	169470
378.0	6543.136	-73.2370	27.9987	96.27	1.63	4029.8	95.67	1.47	4448.7	723676	169701
380.0	6543.360	-73.1573	27.9909	96.31	1.55	4053.8	95.72	1.41	4472.7	731547	169923
382.0	6543.576	-73.0772	27.9831	96.36	1.48	4078.0	95.76	1.34	4496.9	739464	170136
384.0	6543.782	-72.9966	27.9751	96.40	1.41	4102.3	95.81	1.28	4521.2	747428	170340
386.0	6543.980	-72.9156	27.9671	96.45	1.34	4126.8	95.85	1.22	4545.8	755440	170535
388.0	6544.169	-72.8341	27.9589	96.49	1.27	4151.5	95.90	1.16	4570.5	763501	170721
390.0	6544.349	-72.7521	27.9506	96.54	1.21	4176.4	95.94	1.10	4595.4	771609	170899
392.0	6544.521	-72.6696	27.9422	96.58	1.14	4201.5	95.98	1.04	4620.5	779766	171068
394.0	6544.685	-72.5866	27.9337	96.63	1.08	4226.8	96.03	0.99	4645.8	787972	171229
396.0	6544.841	-72.5032	27.9252	96.68	1.02	4252.3	96.07	0.93	4671.3	796227	171383
398.0	6544.989	-72.4193	27.9164	96.72	0.96	4277.9	96.12	0.88	4697.0	804532	171528
400.0	6545.129	-72.3349	27.9076	96.77	0.91	4303.8	96.17	0.83	4722.8	812887	171665
402.0	6545.261	-72.2500	27.8987	96.82	0.85	4329.8	96.21	0.78	4748.9	821293	171795
404.0	6545.387	-72.1646	27.8896	96.86	0.80	4356.1	96.26	0.73	4775.1	829749	171918
406.0	6545.504	-72.0786	27.8805	96.91	0.75	4382.5	96.30	0.68	4801.6	838257	172033
408.0	6545.615	-71.9922	27.8712	96.95	0.70	4409.1	96.35	0.64	4828.2	846817	172140
410.0	6545.719	-71.9053	27.8618	97.00	0.65	4436.0	96.39	0.59	4855.1	855428	172241
412.0	6545.816	-71.8179	27.8522	97.05	0.60	4463.0	96.44	0.55	4882.1	864092	172335
414.0	6545.906	-71.7299	27.8426	97.10	0.56	4490.3	96.49	0.51	4909.4	872809	172423
416.0	6545.990	-71.6414	27.8328	97.14	0.51	4517.8	96.53	0.47	4936.9	881578	172504
418.0	6546.068	-71.5524	27.8229	97.19	0.47	4545.5	96.58	0.43	4964.6	890402	172579
420.0	6546.140	-71.4629	27.8129	97.24	0.43	4573.4	96.63	0.39	4992.5	899280	172647
422.0	6546.206	-71.3729	27.8027	97.29	0.39	4601.5	96.68	0.36	5020.7	908212	172710
424.0	6546.265	-71.2823	27.7925	97.34	0.35	4629.9	96.72	0.32	5049.0	917199	172766
426.0	6546.320	-71.1911	27.7820	97.38	0.32	4658.5	96.77	0.29	5077.6	926242	172818
428.0	6546.369	-71.0995	27.7715	97.43	0.28	4687.2	96.82	0.26	5106.4	935340	172863

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

TIME SEC	GC DIST KM	LONG DEG E	LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
430.0	6546.413	-71.0072	27.7608	97.48	0.25	4716.3	96.87	0.23	5135.4	944495	172904
432.0	6546.452	-70.9145	27.7500	97.53	0.22	4745.5	96.92	0.20	5164.6	953706	172940
434.0	6546.486	-70.8211	27.7390	97.58	0.19	4775.0	96.97	0.18	5194.1	962975	172970
436.0	6546.515	-70.7272	27.7279	97.63	0.16	4804.8	97.01	0.15	5223.9	972301	172996
438.0	6546.540	-70.6328	27.7.47	97.68	0.14	4834.7	97.06	0.13	5253.8	981685	173018
440.0	6546.561	-70.5378	27.7053	97.73	0.11	4864.9	97.11	0.10	5284.1	991128	173036
442.0	6546.578	-70.4422	27.6938	97.78	0.09	4895.4	97.16	0.08	5314.5	1000630	173049
444.0	6546.591	-70.3460	27.6821	97.83	0.07	4926.1	97.21	0.06	5345.2	1010191	173058
446.0	6546.601	-70.2492	27.6703	97.89	0.05	4957.1	97.26	0.04	5376.2	1019813	173064
448.0	6546.607	-70.1519	27.6583	97.93	0.03	4988.3	97.31	0.02	5407.4	1029495	173067
450.0	6546.610	-70.0540	27.6462	97.98	0.01	5019.8	97.36	0.01	5438.9	1039238	173066
452.0	6546.610	-69.9554	27.6340	98.03	-0.01	5051.5	97.41	-0.01	5470.6	1049042	173062
454.0	6546.607	-69.8563	27.6215	98.08	0.02	5083.5	97.46	-0.02	5502.6	1058909	173056
456.0	6546.602	-69.7566	27.6089	98.13	-0.04	5115.8	97.51	-0.03	5534.9	1068838	173047
458.0	6546.595	-69.6562	27.5962	98.18	-0.05	5148.4	97.56	-0.04	5567.5	1078831	173035
460.0	6546.586	-69.5553	27.5833	98.24	-0.06	5181.3	97.62	-0.05	5600.4	1088887	173022
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)										
461.210	6546.579	-69.4939	27.5754	98.27	-0.06	5201.3	97.65	-0.06	5620.4	1095002	173013
462.0	6546.574	-69.4537	27.5702	98.29	-0.07	5212.3	97.67	-0.07	5631.4	1099006	173007
464.0	6546.559	-69.3516	27.5570	98.34	-0.10	5239.1	97.72	-0.09	5658.2	1109181	172987
466.0	6546.539	-69.2490	27.5436	98.39	-0.12	5265.9	97.77	-0.11	5685.0	1119408	172963
468.0	6546.515	-69.1459	27.5301	98.44	-0.14	5292.9	97.82	-0.13	5712.0	1129687	172935
470.0	6546.486	-69.0423	27.5164	98.49	-0.16	5320.0	97.87	-0.15	5739.1	1140019	172903
472.0	6546.456	-68.9382	27.5026	98.55	-0.17	5347.2	97.92	-0.16	5766.2	1150404	172868
474.0	6546.424	-68.8336	27.4886	98.60	-0.17	5374.2	97.97	-0.16	5793.3	1160842	172831
476.0	6546.392	-68.7285	27.4744	98.65	-0.17	5401.4	98.03	-0.15	5820.5	1171333	172795
478.0	6546.361	-68.6229	27.4601	98.71	-0.16	5428.7	98.08	-0.15	5847.7	1181876	172760
480.0	6546.332	-68.5168	27.4457	98.76	-0.15	5456.1	98.13	-0.14	5875.2	1192474	172727
482.0	6546.306	-68.4102	27.4310	98.81	-0.13	5483.8	98.18	-0.12	5902.8	1203124	172696
484.0	6546.281	-68.3030	27.4162	98.87	-0.12	5511.6	98.24	-0.11	5930.7	1213829	172667
486.0	6546.259	-68.1954	27.4013	98.92	-0.11	5539.7	98.29	-0.10	5958.8	1224589	172640
488.0	6546.240	-68.0872	27.3862	98.98	-0.09	5568.1	98.34	-0.09	5987.1	1235403	172616
490.0	6546.222	-67.9785	27.3709	99.03	-0.09	5595.7	98.40	-0.09	6014.7	1246272	172593
492.0	6546.205	-67.8694	27.3554	99.09	-0.08	5620.9	98.45	-0.08	6039.9	1257193	172572
494.0	6546.189	-67.7598	27.3398	99.14	-0.08	5646.0	98.51	-0.08	6065.0	1268162	172551
496.0	6546.172	-67.6497	27.3240	99.20	-0.08	5671.2	98.56	-0.08	6090.2	1279181	172529
498.0	6546.155	-67.5392	27.3081	99.25	-0.08	5696.5	98.62	-0.08	6115.5	1290249	172508
500.0	6546.139	-67.4282	27.2919	99.31	-0.08	5722.0	98.67	-0.08	6141.0	1301366	172486
502.0	6546.122	-67.3167	27.2756	99.37	-0.08	5747.8	98.73	-0.08	6166.8	1312533	172464
504.0	6546.105	-67.2048	27.2592	99.42	-0.08	5773.6	98.78	-0.08	6192.6	1323750	172443
506.0	6546.089	-67.0924	27.2425	99.48	-0.08	5799.6	98.84	-0.07	6218.6	1335018	172421

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

TIME S-C	GC DIST KM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-FL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
508.0	6546.074	-66.9795	27.2257	99.54	-0.07	5825.8	98.89	-0.07	6244.8	1346337	172401
510.0	6546.059	-66.9662	27.2088	99.59	-0.07	5952.2	98.95	-0.07	6271.2	1357707	172381
512.0	6546.045	-66.7523	27.1916	99.65	-0.06	5978.7	99.00	-0.06	6297.7	1369129	172362
514.0	6546.032	-66.6381	27.1742	99.71	-0.06	5905.5	99.06	-0.05	6324.4	1380602	172344
516.0	6546.021	-66.5233	27.1567	99.77	-0.05	5932.4	99.12	-0.05	6351.4	1392128	172327
518.0	6546.011	-66.4080	27.1390	99.83	-0.05	5959.6	99.17	-0.04	6378.6	1403706	172312
520.0	6546.002	-66.2922	27.1211	99.88	-0.04	5987.0	99.23	-0.04	6405.9	1415338	172298
522.0	6545.995	-66.1760	27.1030	99.94	-0.03	6014.5	99.29	-0.03	6433.5	1427023	172285
524.0	6545.990	-66.0592	27.0849	100.00	-0.02	6042.3	99.35	-0.02	6461.3	1438762	172274
526.0	6545.986	-65.9420	27.0663	100.06	-0.01	6070.3	99.40	-0.01	6489.2	1450556	172265
528.0	6545.985	-65.8242	27.0476	100.12	-0.00	6098.4	99.46	-0.00	6517.4	1462404	172258
530.0	6545.986	-65.7060	27.0288	100.18	0.01	6126.8	99.52	0.01	6545.8	1474307	172253
532.0	6545.989	-65.5872	27.0097	100.24	0.02	6155.4	99.58	0.02	6574.3	1486266	172250
534.0	6545.995	-65.4679	26.9905	100.29	0.03	6184.2	99.63	0.03	6603.1	1498280	172250
536.0	6546.003	-65.3481	26.9710	100.35	0.05	6213.2	99.69	0.04	6632.1	1510351	172253
538.0	6546.015	-65.2278	26.9514	100.41	0.06	6242.4	99.75	0.06	6661.4	1522478	172259
540.0	6546.030	-65.1070	26.9315	100.47	0.08	6271.8	99.81	0.07	6690.8	1534663	172268
542.0	6546.048	-64.9856	26.9115	100.53	0.09	6301.5	99.87	0.09	6720.4	1546905	172280
544.0	6546.070	-64.8638	26.8912	100.59	0.11	6331.4	99.93	0.10	6750.3	1559205	172296
546.0	6546.096	-64.7413	26.8707	100.65	0.13	6361.5	99.99	0.12	6780.4	1571563	172316
548.0	6546.127	-64.6184	26.8500	100.71	0.15	6391.8	100.05	0.14	6810.7	1583980	172340
550.0	6546.161	-64.4949	26.8291	100.77	0.16	6422.3	100.11	0.15	6841.2	1596456	172368
552.0	6546.201	-64.3709	26.8080	100.83	0.19	6453.0	100.17	0.17	6871.9	1608992	172401
554.0	6546.245	-64.2463	26.7867	100.89	0.21	6483.9	100.23	0.19	6902.8	1621588	172439
556.0	6546.294	-64.1211	26.7651	100.95	0.23	6515.0	100.29	0.22	6933.9	1634244	172482
558.0	6546.349	-63.9955	26.7433	101.02	0.25	6546.3	100.35	0.24	6965.3	1646961	172530
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)										
559.660	6546.397	-63.8908	26.7251	101.07	0.27	6571.2	100.39	0.25	6990.1	1657559	172573
560.0	6546.407	-63.8693	26.7213	101.08	0.27	6573.4	100.41	0.25	6992.4	1659732	172582
	S-II/S-IVB SEPARATION COMMAND										
560.600	6546.424	-63.8314	26.7147	101.10	0.26	6573.8	100.42	0.24	6992.8	1663567	172597
562.0	6546.464	-63.7430	26.6992	101.14	0.24	6574.5	100.47	0.22	6993.4	1672526	172631
564.0	6546.515	-63.6166	26.6769	101.21	0.21	6575.4	100.53	0.19	6994.3	1685329	172676
566.0	6546.559	-63.4902	26.6544	101.27	0.18	6579.2	100.59	0.17	6998.1	1698135	172713
568.0	6546.598	-63.3638	26.6319	101.33	0.16	6588.5	100.65	0.15	7007.5	1710955	172746
570.0	6546.635	-63.2372	26.6091	101.40	0.15	6598.9	100.71	0.14	7017.8	1723794	172776
572.0	6546.669	-63.1105	26.5862	101.46	0.14	6609.2	100.77	0.13	7028.1	1736653	172803
574.0	6546.700	-62.9837	26.5631	101.52	0.13	6619.7	100.83	0.12	7038.6	1749532	172827
576.0	6546.728	-62.8567	26.5399	101.58	0.11	6630.3	100.89	0.10	7049.2	1762432	172848

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

TIME SEC	GC DIST KM	LONG DEG E	LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
578.0	6546.752	-62.7295	26.5165	101.65	0.09	6641.1	100.95	0.09	7060.0	1775353	172865
580.0	6546.772	-62.6022	26.4930	101.71	0.08	6651.9	101.01	0.07	7070.8	1788294	172878
582.0	6546.789	-62.4747	26.4693	101.77	0.06	6662.7	101.07	0.06	7081.6	1801257	172888
584.0	6546.802	-62.3471	26.4454	101.83	0.05	6673.6	101.13	0.05	7092.6	1814241	172894
586.0	6546.812	-62.2194	26.4213	101.90	0.04	6684.6	101.19	0.03	7103.5	1827246	172897
588.0	6546.819	-62.0914	26.3971	101.96	0.02	6695.6	101.25	0.02	7114.5	1840272	172896
590.0	6546.822	-61.9634	26.3728	102.02	0.01	6706.6	101.31	0.01	7125.5	1853320	172892
592.0	6546.823	-61.9351	26.3482	102.09	-0.00	6717.7	101.37	-0.00	7136.6	1866389	172886
594.0	6546.820	-61.7068	26.3235	102.15	-0.02	6728.8	101.43	-0.02	7147.7	1879481	172876
596.0	6546.814	-61.5782	26.2987	102.21	-0.03	6740.0	101.49	-0.03	7158.9	1892593	172862
598.0	6546.805	-61.4495	26.2736	102.28	-0.04	6751.2	101.55	-0.04	7170.1	1905728	172846
600.0	6546.793	-61.3207	26.2484	102.34	-0.06	6762.5	101.61	-0.05	7181.3	1918885	172827
602.0	6546.779	-61.1917	26.2230	102.40	-0.07	6773.7	101.67	-0.06	7192.6	1932063	172805
604.0	6546.761	-61.0625	26.1975	102.47	-0.08	6785.0	101.73	-0.07	7203.9	1945264	172779
606.0	6546.741	-60.9332	26.1717	102.53	-0.09	6796.4	101.79	-0.09	7215.2	1958486	172752
608.0	6546.719	-60.8037	26.1459	102.60	-0.10	6807.8	101.85	-0.09	7226.6	1971731	172721
610.0	6546.693	-60.6741	26.1198	102.66	-0.11	6819.2	101.92	-0.10	7238.0	1984998	172688
612.0	6546.666	-60.5443	26.0935	102.72	-0.12	6830.6	101.98	-0.11	7249.5	1998288	172653
614.0	6546.636	-60.4144	26.0671	102.79	-0.13	6842.1	102.04	-0.12	7260.9	2011599	172616
616.0	6546.604	-60.2843	26.0405	102.85	-0.14	6853.6	102.10	-0.13	7272.4	2024934	172576
618.0	6546.570	-60.1540	26.0137	102.91	-0.15	6865.1	102.16	-0.14	7283.9	2038290	172534
620.0	6546.534	-60.0236	25.9868	102.98	-0.15	6876.7	102.22	-0.14	7295.5	2051670	172490
622.0	6546.497	-59.8930	25.9597	103.04	-0.16	6888.4	102.28	-0.15	7307.1	2065072	172444
624.0	6546.457	-59.7623	25.9324	103.10	-0.17	6900.0	102.34	-0.16	7318.8	2078496	172397
626.0	6546.416	-59.6314	25.9049	103.17	-0.17	6911.7	102.40	-0.16	7330.5	2091944	172348
628.0	6546.374	-59.5004	25.8773	103.23	-0.18	6923.4	102.46	-0.17	7342.2	2105414	172298
630.0	6546.330	-59.3692	25.8494	103.29	-0.18	6935.2	102.52	-0.17	7353.9	2118908	172246
632.0	6546.286	-59.2378	25.8214	103.36	-0.19	6946.9	102.59	-0.18	7365.7	2132424	172193
634.0	6546.240	-59.1063	25.7932	103.42	-0.19	6958.7	102.65	-0.18	7377.5	2145964	172138
636.0	6546.192	-58.9746	25.7649	103.49	-0.20	6970.6	102.71	-0.18	7389.3	2159526	172083
638.0	6546.145	-58.8428	25.7363	103.55	-0.20	6982.5	102.77	-0.19	7401.2	2173112	172027
640.0	6546.096	-58.7108	25.7076	103.61	-0.20	6994.3	102.83	-0.19	7413.1	2186721	171970
642.0	6546.046	-58.5787	25.6787	103.67	-0.20	7006.3	102.89	-0.19	7425.0	2200354	171912
644.0	6545.997	-58.4464	25.6496	103.74	-0.20	7018.2	102.95	-0.19	7436.9	2214009	171854
646.0	6545.947	-58.3139	25.6204	103.80	-0.20	7030.2	103.01	-0.19	7448.9	2227689	171795
648.0	6545.896	-58.1813	25.5909	103.86	-0.20	7042.3	103.07	-0.19	7461.0	2241391	171736
650.0	6545.846	-58.0485	25.5613	103.93	-0.20	7054.4	103.13	-0.19	7473.1	2255118	171677
652.0	6545.796	-57.9155	25.5315	103.99	-0.20	7066.5	103.19	-0.19	7485.2	2268868	171618
654.0	6545.746	-57.7824	25.5015	104.05	-0.20	7078.6	103.25	-0.19	7497.3	2282642	171560
656.0	6545.696	-57.6491	25.4713	104.12	-0.20	7090.8	103.31	-0.19	7509.5	2296440	171501
658.0	6545.647	-57.5157	25.4409	104.18	-0.20	7103.0	103.37	-0.19	7521.7	2310261	171443
660.0	6545.598	-57.3821	25.4104	104.24	-0.20	7115.3	103.44	-0.18	7533.9	2324107	171385
662.0	6545.550	-57.2484	25.3796	104.30	-0.19	7127.5	103.50	-0.18	7546.1	2337976	171328

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

TIME SEC	GC DIST KM	LONG DEG E	LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
664.0	6545.503	-57.1145	25.3487	104.37	-0.19	7139.8	103.56	-0.18	7558.4	2351869	171272
666.0	6545.456	-56.9804	25.3176	104.43	-0.18	7152.1	103.62	-0.17	7570.7	2365787	171217
668.0	6545.411	-56.8462	25.2863	104.49	-0.18	7164.5	103.68	-0.17	7583.1	2379729	171162
670.0	6545.367	-56.7118	25.2548	104.56	-0.17	7176.9	103.74	-0.16	7595.5	2393695	171109
672.0	6545.325	-56.5773	25.2231	104.62	-0.17	7189.3	103.80	-0.16	7607.9	2407685	171058
674.0	6545.284	-56.4425	25.1913	104.68	-0.16	7201.7	103.86	-0.15	7620.3	2421699	171008
676.0	6545.245	-56.3077	25.1592	104.74	-0.15	7214.2	103.92	-0.15	7632.8	2435738	170959
678.0	6545.207	-56.1727	25.1270	104.81	-0.15	7226.8	103.98	-0.14	7645.3	2449802	170912
680.0	6545.171	-56.0375	25.0946	104.87	-0.14	7239.3	104.04	-0.13	7657.9	2463890	170867
682.0	6545.137	-55.9021	25.0620	104.93	-0.13	7251.9	104.10	-0.12	7670.5	2478002	170823
684.0	6545.105	-55.7666	25.0291	104.99	-0.12	7264.5	104.16	-0.11	7683.1	2492140	170782
686.0	6545.076	-55.6309	24.9961	105.06	-0.11	7277.2	104.22	-0.11	7695.7	2506301	170743
688.0	6545.049	-55.4951	24.9630	105.12	-0.10	7289.8	104.28	-0.10	7708.4	2520488	170707
690.0	6545.024	-55.3591	24.9296	105.18	-0.09	7302.6	104.34	-0.08	7721.1	2534699	170673
692.0	6545.003	-55.2230	24.8960	105.24	-0.09	7315.3	104.40	-0.07	7733.9	2548936	170642
694.0	6544.985	-55.0866	24.8622	105.30	-0.06	7328.2	104.46	-0.06	7746.7	2563197	170614
696.0	6544.970	-54.9502	24.8283	105.37	-0.05	7341.0	104.52	-0.05	7759.5	2577484	170590
698.0	6544.959	-54.8135	24.7941	105.43	-0.04	7353.8	104.58	-0.03	7772.3	2591795	170569
700.0	6544.952	-54.6767	24.7598	105.49	-0.02	7366.7	104.64	-0.02	7785.2	2606132	170552
702.0	6544.949	-54.5398	24.7252	105.55	-0.00	7379.6	104.70	-0.00	7798.1	2620493	170539
	S-IVB FIRST GUIDANCE CUTOFF										
702.650	6544.949	-54.4952	24.7139	105.57	0.00	7383.8	104.72	0.00	7802.3	2625166	170536
704.0	6544.949	-54.4027	24.6905	105.62	0.00	7385.4	104.76	0.00	7803.9	2634874	170529
706.0	6544.950	-54.2657	24.6556	105.69	0.00	7385.6	104.82	0.00	7804.1	2649260	170520
709.0	6544.951	-54.1288	24.6206	105.74	0.00	7385.5	104.88	0.00	7804.0	2663646	170511
710.0	6544.951	-53.9919	24.5854	105.81	0.00	7385.5	104.94	0.00	7804.0	2678032	170502
712.0	6544.952	-53.8551	24.5501	105.87	0.00	7385.6	105.00	0.00	7804.0	2692418	170493
	PARKING ORBIT INSERTION										
712.650	6544.952	-53.8107	24.5396	105.89	0.00	7385.6	105.02	0.00	7804.1	2697093	170489

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

TIME SEC	GC DIST KM	LONG DEG E	DEC DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE KM
PARKING ORBIT INSERTION								
712.650	6544.952	-53.8107	24.5386	24.6805	105.02	0.00	7804.1	170.489
750.0	6544.755	-51.2719	23.8537	23.9926	106.13	-0.00	7804.5	170.101
800.0	6544.734	-47.9190	22.8638	22.9983	107.55	-0.00	7805.0	169.810
850.0	6544.599	-44.6195	21.7956	21.9251	108.88	-0.01	7805.2	169.494
900.0	6544.648	-41.3735	20.6542	20.7782	110.14	-0.01	7805.5	169.1[illegible]
950.0	6544.583	-38.1805	19.4449	19.5629	111.31	-0.01	7805.9	168.7[illegible]
1000.0	6544.503	-35.0390	18.1729	18.2843	112.39	-0.01	7806.1	1[illegible].426
1050.0	6544.407	-31.9470	16.8435	16.9478	113.39	-0.02	7806.4	1[illegible].045
1100.0	6544.298	-28.9017	15.4619	15.5585	114.29	-0.02	7806.7	1[illegible].659
1150.0	6544.174	-25.9002	14.0333	14.1217	115.11	-0.02	7807.0	1[illegible].271
1200.0	6544.035	-22.9388	12.5626	12.6424	115.85	-0.02	7807.4	16[illegible].886
1250.0	6543.883	-20.0138	11.0549	11.1257	116.49	-0.02	7807.7	166.507
1300.0	6543.716	-17.1211	9.5151	9.5764	117.04	-0.03	7808.1	166.137
1350.0	6543.536	-14.2562	7.9473	7.9395	117.51	-0.03	7808.4	165.781
1400.0	6543.344	-11.4146	6.3582	6.3996	117.89	-0.03	7808.8	165.441
1450.0	6543.139	-8.5918	4.7506	4.7816	118.19	-0.03	7809.1	165.120
1500.0	6542.922	-5.7929	3.1296	3.1501	118.40	-0.03	7809.5	164.820
1550.0	6542.694	-2.9832	1.4998	1.5096	118.52	-0.03	7809.8	164.543
1600.0	6542.457	-0.1977	-0.1343	-0.1352	118.55	-0.04	7810.2	164.291
1650.0	6542.211	2.6085	-1.7681	-1.7797	118.50	-0.04	7810.5	164.066
1700.0	6541.958	5.4102	-3.3972	-3.4194	118.37	-0.04	7810.8	163.868
1750.0	6541.699	8.2222	-5.0170	-5.0498	118.15	-0.04	7811.2	163.698
1800.0	6541.436	11.0496	-6.6229	-6.6660	117.84	-0.04	7811.4	163.556
1850.0	6541.170	13.8963	-8.2103	-8.2635	117.44	-0.04	7811.7	163.442
1900.0	6540.902	16.7687	-9.7746	-9.8376	116.96	-0.04	7812.0	163.355
1950.0	6540.634	19.6698	-11.3110	-11.3833	116.39	-0.04	7812.2	163.295
2000.0	6540.369	22.6042	-12.8145	-12.9959	115.73	-0.04	7812.5	163.259
2050.0	6540.106	25.5763	-14.2803	-14.3703	114.98	-0.04	7812.7	163.247
2100.0	6539.849	28.5936	-15.7033	-15.9014	114.14	-0.04	7812.9	163.256
2150.0	6539.598	31.6479	-17.0784	-17.1840	113.22	-0.04	7813.1	163.285
2200.0	6539.356	34.7538	-18.4004	-18.5131	112.21	-0.03	7813.2	163.330
2250.0	6539.124	37.9101	-19.6640	-19.7832	111.11	-0.03	7813.4	163.390
2300.0	6539.903	41.1189	-20.8639	-20.9890	109.92	-0.03	7813.5	163.461
2350.0	6538.695	44.3812	-21.9947	-22.1253	108.65	-0.03	7813.6	163.541
2400.0	6538.502	47.6977	-23.0513	-23.1867	107.29	-0.03	7813.8	163.628
2450.0	6539.324	51.0680	-24.0283	-24.1681	105.86	-0.02	7813.8	163.718
2500.0	6539.164	54.4909	-24.9208	-25.0644	104.35	-0.02	7813.9	163.810
2550.0	6538.022	57.9643	-25.7238	-25.8708	102.77	-0.02	7814.0	163.901
2600.0	6537.900	61.4949	-26.4330	-26.5828	101.13	-0.02	7814.1	163.989
2650.0	6537.799	65.0487	-27.0440	-27.1962	99.42	-0.01	7814.1	164.071

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

TIME SEC	GC DIST KM	LONG DEG E	DEC DEG N	GC LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE KM
2700.0	6537.719	68.6503	-27.5532	-27.7073	97.67	-0.01	7814.2	164.146
2750.0	6537.661	72.2839	-27.9573	-28.1129	95.88	-0.01	7814.2	164.213
2800.0	6537.627	75.9425	-28.2537	-28.4104	94.05	-0.00	7814.2	164.271
2850.0	6537.615	79.6187	-28.4405	-28.5979	92.20	0.00	7814.3	164.318
2900.0	6537.628	83.3047	-28.5165	-28.6741	90.34	0.00	7814.3	164.354
2950.0	6537.664	86.9920	-28.4810	-28.6385	88.48	0.01	7814.3	164.380
3000.0	6537.725	90.6727	-28.3344	-28.4914	86.62	0.01	7814.3	164.394
3050.0	6537.809	94.3385	-28.0777	-28.2337	84.78	0.01	7814.2	164.398
3100.0	6537.917	97.9819	-27.7124	-27.8672	82.98	0.02	7814.2	164.393
3150.0	6538.048	101.5958	-27.2412	-27.3941	81.21	0.02	7814.2	164.380
3200.0	6538.203	105.1738	-26.6669	-26.8175	79.49	0.02	7814.1	164.361
3250.0	6538.379	108.7105	-25.9929	-26.1410	77.82	0.03	7814.1	164.336
3300.0	6538.576	112.2012	-25.2236	-25.3685	76.22	0.03	7814.0	164.310
3350.0	6538.795	115.6426	-24.3631	-24.5044	74.68	0.03	7813.9	164.282
3400.0	6539.032	119.0319	-23.4164	-23.5535	73.22	0.04	7813.8	164.257
3450.0	6539.288	122.3678	-22.3883	-22.5207	71.84	0.04	7813.7	164.237
3500.0	6539.561	125.6494	-21.2840	-21.4112	70.53	0.04	7813.6	164.225
3550.0	6539.850	128.8772	-20.1088	-20.2302	69.32	0.04	7813.4	164.223
3600.0	6540.154	132.0520	-18.8680	-18.9831	68.18	0.05	7813.3	164.234
3650.0	6540.471	135.1756	-17.5669	-17.6751	67.14	0.05	7813.1	164.261
3700.0	6540.799	138.2503	-16.2107	-16.3116	66.18	0.05	7812.9	164.307
3750.0	6541.138	141.2791	-14.8049	-14.8978	65.31	0.05	7812.7	164.375
3800.0	6541.486	144.2652	-13.3544	-13.4389	64.53	0.05	7812.4	164.466
3850.0	6541.841	147.2122	-11.8443	-11.9400	63.84	0.05	7812.2	164.583
3900.0	6542.202	150.1243	-10.3397	-10.4062	63.24	0.05	7811.9	164.728
3950.0	6542.567	153.0056	-8.7855	-8.8423	62.73	0.05	7811.6	164.902
4000.0	6542.936	155.8605	-7.2064	-7.2532	62.30	0.05	7811.3	165.108
4050.0	6543.306	158.6937	-5.6071	-5.6437	61.96	0.05	7811.0	165.345
4100.0	6543.676	161.5090	-3.9924	-4.0185	61.70	0.05	7810.6	165.614
4150.0	6544.046	164.3139	-2.3667	-2.3823	61.54	0.05	7810.2	165.916
4200.0	6544.413	167.1104	-0.7347	-0.7395	61.45	0.05	7809.9	166.251
4250.0	6544.777	169.9044	0.8992	0.9051	61.46	0.05	7809.5	166.616
4300.0	6545.137	172.7008	2.5304	2.5470	61.55	0.05	7809.0	167.013
4350.0	6545.491	175.5044	4.1545	4.1816	61.72	0.05	7808.6	167.438
4400.0	6545.839	178.3201	5.7668	5.8044	61.99	0.05	7808.2	167.890
4450.0	6546.180	-178.8474	7.3629	7.4107	62.34	0.05	7807.7	168.367
4500.0	6546.513	-175.9933	8.9381	8.9958	62.77	0.05	7807.2	168.866
4550.0	6546.837	-173.1132	10.4877	10.5549	63.29	0.05	7806.8	169.383
4600.0	6547.152	-170.2026	12.0069	12.0834	63.91	0.05	7806.3	169.916
4650.0	6547.458	-167.2573	13.4909	13.5762	64.60	0.04	7805.8	170.461
4700.0	6547.753	-164.2734	14.9349	15.0284	65.39	0.04	7805.4	171.014
4750.0	6548.038	-161.2472	16.3335	16.4350	66.26	0.04	7804.9	171.571
4800.0	6548.312	-158.1756	17.6820	17.7907	67.23	0.04	7804.4	172.127

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

TIME SEC	GC DIST KM	LONG DEG E	LAT DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE KM
4850.0	6548.574	-155.0557	18.9751	19.0905	68.28	0.04	7804.0	172.679
4900.0	6548.325	-151.8852	20.2074	20.3292	69.41	0.04	7803.5	173.222
4950.0	6549.065	-148.6625	21.3739	21.5013	70.64	0.03	7803.1	173.752
5000.0	6549.293	-145.3866	22.4693	22.6019	71.94	0.03	7802.7	174.263
5050.0	6549.508	-142.0574	23.4884	23.6256	73.33	0.03	7802.3	174.753
5100.0	6549.712	-138.6755	24.4261	24.5674	74.79	0.03	7802.0	175.218
5150.0	6549.904	-135.2426	25.2776	25.4225	76.32	0.03	7801.6	175.652
5200.0	6550.083	-131.7611	26.0383	26.1862	77.93	0.03	7801.3	176.054
5250.0	6550.250	-128.2348	26.7037	26.8543	79.59	0.02	7801.0	176.419
5300.0	6550.404	-124.6680	27.2701	27.4229	81.31	0.02	7800.8	176.745
5350.0	6550.546	-121.0663	27.7339	27.9894	83.07	0.02	7800.6	177.029
5400.0	6550.676	-117.4359	28.0923	28.2481	84.87	0.02	7800.4	177.270
5450.0	6550.792	-113.7837	28.3429	28.4996	86.70	0.02	7800.2	177.464
5500.0	6550.896	-110.1175	28.4841	28.6413	88.55	0.01	7800.1	177.612
5550.0	6550.986	-106.4450	28.5150	28.6723	90.41	0.01	7800.0	177.712
5600.0	6551.063	-102.7744	28.4353	28.5923	92.26	0.01	7799.9	177.764
5650.0	6551.127	-99.1138	28.2457	28.4020	94.11	0.01	7799.9	177.769
5700.0	6551.177	-95.4708	27.9473	28.1026	95.93	0.01	7799.9	177.726
5750.0	6551.213	-91.8529	27.5422	27.6960	97.71	0.00	7800.0	177.637
5800.0	6551.235	-88.2666	27.0329	27.1847	99.46	0.00	7800.1	177.504
5850.0	6551.243	-84.7181	26.4225	26.5720	101.15	0.00	7800.2	177.328
5900.0	6551.236	-81.2121	25.7149	25.8615	102.79	-0.00	7800.3	177.112
5950.0	6551.215	-77.7530	24.9140	25.0573	104.36	-0.00	7800.5	176.859
6000.0	6551.178	-74.3437	24.0243	24.1638	105.86	-0.01	7800.7	176.571
6050.0	6551.127	-70.9863	23.0506	23.1858	107.29	-0.01	7801.0	176.253
6100.0	6551.059	-67.6822	21.9980	22.1283	108.64	-0.01	7801.2	175.906
6150.0	6550.977	-64.4314	20.8714	20.9963	109.91	-0.01	7801.5	175.537
6200.0	6550.879	-61.2337	19.6761	19.7951	111.09	-0.02	7801.8	175.148
6250.0	6550.766	-58.0875	18.4173	18.5298	112.19	-0.02	7802.2	174.744
6300.0	6550.637	-54.9910	17.1002	17.2058	113.20	-0.02	7802.5	174.328
6350.0	6550.492	-51.9419	15.7301	15.8281	114.13	-0.02	7802.8	173.905
6400.0	6550.333	-48.9367	14.3121	14.4021	114.96	-0.02	7803.2	173.480
6450.0	6550.158	-45.9723	12.8512	12.9327	115.71	-0.03	7803.6	173.055
6500.0	6549.969	-43.0450	11.3525	11.4250	116.37	-0.03	7804.0	172.636
6550.0	6549.766	-40.1505	9.8207	9.8839	116.94	-0.03	7804.3	172.225
6600.0	6549.549	-37.2848	8.2607	9.3142	117.43	-0.03	7804.7	171.826
6650.0	6549.319	-34.4431	6.6773	6.7207	117.83	-0.03	7805.1	171.443
6700.0	6549.076	-31.6211	5.0751	5.1082	118.14	-0.04	7805.5	171.078
6750.0	6548.822	-28.8139	3.4595	3.4812	118.36	-0.04	7805.9	170.734
6800.0	6548.556	-26.0167	1.8324	1.8444	118.50	-0.04	7806.2	170.412
6850.0	6548.281	-23.2248	0.2010	0.2024	118.55	-0.04	7806.6	170.115
6900.0	6547.996	-20.4332	-1.4310	-1.4404	118.52	-0.04	7806.9	169.843
6950.0	6547.703	-17.6370	-3.0593	-3.0794	118.40	-0.04	7807.3	169.599

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

TIME SEC	GC DIST KM	LONG DEG E	DEC DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE KM
7000.0	6547.404	-14.8315	-4.6793	-4.7099	118.20	-0.04	7807.6	169.381
7050.0	6547.099	-12.0117	-6.2864	-6.3273	117.91	-0.05	7807.9	169.191
7100.0	6546.791	-9.1730	-7.8761	-7.9271	117.53	-0.05	7808.2	169.028
7150.0	6546.479	-6.3107	-9.4437	-9.5045	117.07	-0.05	7808.5	168.892
7200.0	6546.167	-3.4202	-10.9844	-11.0547	116.52	-0.05	7808.8	168.781
7250.0	6545.855	-0.4972	-12.4935	-12.5729	115.88	-0.05	7809.0	168.694
7300.0	6545.544	2.4623	-13.9660	-14.0541	115.15	-0.05	7809.3	168.630
7350.0	6545.238	5.4624	-15.3970	-15.4932	114.33	-0.04	7809.5	168.586
7400.0	6544.936	8.5064	-16.7813	-16.8852	113.43	-0.04	7809.7	168.561
7450.0	6544.641	11.5976	-18.1139	-18.2249	112.44	-0.04	7809.9	168.551
7500.0	6544.354	14.7396	-19.3892	-19.5069	111.36	-0.04	7810.1	168.556
7550.0	6544.078	17.9315	-20.6023	-20.7261	110.19	-0.04	7810.3	168.571
7600.0	6543.812	21.1777	-21.7477	-21.8770	108.94	-0.04	7810.5	168.595
7650.0	6543.560	24.4779	-22.8201	-22.9544	107.60	-0.04	7810.6	168.624
7700.0	6543.323	27.8320	-23.8144	-23.9532	106.19	-0.03	7810.8	168.657
7750.0	6543.101	31.2390	-24.7254	-24.8682	104.70	-0.03	7810.9	168.691
7800.0	6542.896	34.6970	-25.5484	-25.6945	103.14	-0.03	7811.0	168.724
7850.0	6542.711	38.2030	-26.2786	-26.4277	101.51	-0.03	7811.2	168.753
7900.0	6542.545	41.7531	-26.9119	-27.0635	99.82	-0.02	7811.3	168.777
7950.0	6542.400	45.3424	-27.4444	-27.5980	99.08	-0.02	7811.4	168.793
8000.0	6542.276	48.9651	-27.8727	-28.0279	96.30	-0.02	7811.5	168.802
8050.0	6542.176	52.6145	-28.1942	-28.3505	94.48	-0.01	7811.6	168.801
8100.0	6542.099	56.2833	-28.4066	-28.5638	92.64	-0.01	7811.6	168.791
8150.0	6542.045	59.9637	-28.5086	-28.6662	90.78	-0.01	7811.7	168.769
8200.0	6542.017	63.6476	-28.4996	-28.6570	88.92	-0.00	7811.8	168.738
8250.0	6542.013	67.3268	-28.3794	-28.5365	87.06	0.00	7811.8	168.696
8300.0	6542.033	70.9931	-28.1491	-28.3053	85.22	0.00	7811.9	168.645
8350.0	6542.079	74.6399	-27.8100	-27.9649	83.41	0.01	7811.9	168.585
8400.0	6542.149	78.2569	-27.3643	-27.5177	81.63	0.01	7811.9	168.518
8450.0	6542.243	81.8407	-26.8151	-26.9663	79.90	0.02	7811.9	168.446
8500.0	6542.362	85.3844	-26.1655	-26.3142	78.22	0.02	7811.9	168.370
8550.0	6542.503	88.8934	-25.4197	-25.5653	76.60	0.02	7811.9	168.293
8600.0	6542.667	92.3339	-24.5818	-24.7239	75.05	0.03	7811.8	168.216
8650.0	6542.852	95.7331	-23.6565	-23.7946	73.57	0.03	7811.8	168.144
8700.0	6543.059	99.0791	-22.6489	-22.7824	72.17	0.03	7811.7	168.077
8750.0	6543.284	102.3712	-21.5638	-21.6922	70.85	0.03	7811.6	168.019
8800.0	6543.529	105.6094	-20.4064	-20.5294	69.61	0.04	7811.5	167.974
8850.0	6543.790	108.7945	-19.1825	-19.2992	68.46	0.04	7811.4	167.943
8900.0	6544.067	111.9279	-17.8970	-18.0069	67.39	0.04	7811.3	167.930
8950.0	6544.359	115.0120	-16.5552	-16.6579	66.41	0.04	7811.1	167.937
9000.0	6544.664	118.0495	-15.1624	-15.2573	65.52	0.05	7810.9	167.964
9050.0	6544.980	121.0435	-13.7237	-13.8104	64.72	0.05	7810.7	168.024
9100.0	6545.307	123.9976	-12.2443	-12.3223	64.01	0.05	7810.5	168.107

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

TIME SEC	GC DIST KM	LONG DEG E	DEG DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE KM
9150.0	6545.643	126.9157	-10.7292	-10.7980	63.38	0.05	7810.3	168.221
9200.0	6545.985	129.8020	-9.1832	-9.2424	62.85	0.05	7810.0	168.367
9250.0	6546.334	132.6609	-7.6112	-7.6605	62.40	0.05	7809.7	168.545
9300.0	6546.687	135.4970	-6.0178	-6.0570	62.04	0.05	7809.4	168.757
9350.0	6547.043	138.3148	-4.4078	-4.4366	61.76	0.05	7809.0	169.004
9400.0	6547.401	141.1192	-2.7857	-2.8040	61.57	0.05	7808.7	169.286
9450.0	6547.760	143.9149	-1.1561	-1.1637	61.47	0.05	7808.3	169.602
9500.0	6548.118	146.7069	0.4765	0.4797	61.45	0.05	7807.9	169.953
9550.0	6548.474	149.5000	2.1077	2.1215	61.52	0.05	7807.5	170.337
9600.0	6548.827	152.2991	3.7328	3.7573	61.67	0.05	7807.1	170.752
9650.0	6549.177	155.1090	5.3475	5.3824	61.91	0.05	7806.6	171.197
9700.0	6549.522	157.9344	6.9471	6.9922	62.24	0.05	7806.2	171.670
9750.0	6549.861	160.7801	8.5270	8.5821	62.65	0.05	7805.7	172.167
9800.0	6550.194	163.6507	10.0826	10.1474	63.15	0.05	7805.2	172.686
9850.0	6550.520	166.5506	11.6097	11.6833	63.74	0.05	7804.7	173.224
9900.0	6550.839	169.4839	13.1019	13.1848	64.41	0.05	7804.2	173.776
9950.0	6551.149	172.4549	14.5558	14.6472	65.17	0.04	7803.8	174.340
10000.0	6551.450	175.4670	15.9660	16.0653	66.02	0.04	7803.3	174.910
10050.0	6551.743	178.5238	17.3273	17.4341	66.96	0.04	7802.8	175.482
10100.0	6552.026	-178.3720	18.6347	18.7483	67.99	0.04	7802.3	176.053
10150.0	6552.299	-175.2178	19.8829	20.0029	69.10	0.04	7801.8	176.617
10200.0	6552.562	-172.0119	21.0666	21.1925	70.30	0.04	7801.4	177.171
10250.0	6552.815	-168.7532	22.1808	22.3120	71.58	0.04	7800.9	177.709
10300.0	6553.057	-165.4411	23.2202	23.3561	72.94	0.03	7800.5	178.228
10350.0	6553.287	-162.0763	24.1797	24.3198	74.38	0.03	7800.1	178.724
10400.0	6553.507	-158.6600	25.0544	25.1983	75.90	0.03	7799.7	179.191
10450.0	6553.715	-155.1945	25.8396	25.9867	77.48	0.03	7799.4	179.628
10500.0	6553.912	-151.6831	26.5310	26.6808	79.13	0.03	7799.0	180.029
10550.0	6554.097	-148.1301	27.1244	27.2766	80.83	0.03	7798.7	180.393
10600.0	6554.269	-144.5406	27.6164	27.7704	82.58	0.02	7798.4	180.716
10650.0	6554.429	-140.9207	28.0038	28.1592	84.37	0.02	7798.2	180.995
10700.0	6554.576	-137.2772	28.2842	28.4406	86.19	0.02	7798.0	181.230
10750.0	6554.711	-133.6175	28.4558	28.6128	88.04	0.02	7797.8	181.418
10800.0	6554.832	-129.9494	28.5174	28.6746	89.89	0.02	7797.7	181.559
10850.0	6554.940	-126.2809	28.4687	28.6257	91.75	0.01	7797.6	181.651
10900.0	6555.034	-122.6201	28.3100	28.4665	93.59	0.01	7797.5	181.696
10950.0	6555.114	-118.9749	28.0423	28.1978	95.42	0.01	7797.5	181.692
BEGIN S-IVB RESTART PREPARATIONS - START OF TIMEBASE 6								
10978.600	6555.150	-116.8398	27.9409	27.9956	96.45	0.01	7797.5	181.666

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

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 TIMEBASE 6									
10978.600	-806055	-379496	-3442290	3726.7	2764.1	5735.9	-7.14	0.95	4.18
10980.0	-800842	-374625	-3034257	3716.7	2765.5	5741.8	-7.14	0.94	4.17
10990.0	-764033	-346924	-3376632	3645.0	2774.7	5783.2	-7.19	0.91	4.10
11000.0	-727943	-319132	-3318596	3572.9	2783.6	5823.8	-7.24	0.87	4.03
11010.0	-692577	-291254	-3260158	3500.3	2792.1	5863.7	-7.28	0.83	3.95
11020.0	-657939	-263292	-3201325	3427.3	2800.2	5902.8	-7.32	0.80	3.88
11030.0	-624033	-235251	-3142104	3353.8	2808.0	5941.3	-7.37	0.76	3.80
11040.0	-590864	-207134	-3082502	3279.9	2815.4	5978.9	-7.4	0.72	3.73
11050.0	-558436	-178944	-3022528	3205.6	2822.4	6015.9	-7.45	0.68	3.65
11060.0	-526753	-150687	-2962188	3130.9	2829.1	6052.0	-7.49	0.65	3.58
11070.0	-495819	-122364	-2901490	3055.8	2835.3	6087.4	-7.53	0.61	3.50
11080.0	-465638	-93981	-2840442	2980.3	2841.2	6122.0	-7.57	0.57	3.42
11090.0	-436214	-65541	-2779052	2904.5	2846.7	6155.9	-7.60	0.53	3.35
11100.0	-407550	-37048	-2717326	2828.2	2851.9	6189.0	-7.64	0.49	3.27
11110.0	-379650	-8506	-2655274	2751.7	2856.6	6221.3	-7.68	0.46	3.19
11120.0	-352519	20092	-2592903	2674.7	2861.0	6252.8	-7.71	0.42	3.11
11130.0	-326157	48712	-2530220	2597.5	2864.9	6283.6	-7.74	0.38	3.04
11140.0	-300570	77380	-2467234	2519.9	2868.5	6313.5	-7.78	0.34	2.96
11150.0	-275761	106081	-2403952	2441.9	2871.7	6342.7	-7.81	0.30	2.88
11160.0	-251732	134813	-2340382	2363.7	2874.5	6371.1	-7.84	0.26	2.80
11170.0	-228487	163571	-2276533	2285.2	2877.0	6398.6	-7.87	0.22	2.72
11180.0	-206029	192351	-2212412	2206.4	2879.0	6425.4	-7.90	0.18	2.64
11190.0	-184361	221149	-2148028	2127.3	2880.6	6451.4	-7.92	0.14	2.56
11200.0	-163484	249962	-2083397	2047.9	2881.9	6476.5	-7.95	0.11	2.47
11210.0	-143403	278796	-2018500	1968.3	2882.7	6500.9	-7.97	0.07	2.39
11220.0	-124119	307616	-1953373	1888.5	2883.2	6524.4	-8.00	0.03	2.31
11230.0	-105635	336449	-1888015	1808.4	2883.3	6547.1	-8.02	-0.01	2.23
11240.0	-87953	365280	-1822434	1728.0	2883.0	6569.0	-8.04	-0.05	2.15
11250.0	-71075	394107	-1756638	1647.5	2882.2	6590.1	-8.06	-0.09	2.07
11260.0	-55004	422924	-1690635	1566.7	2881.1	6610.3	-8.09	-0.13	1.98
11270.0	-39741	451727	-1624435	1485.8	2879.6	6629.7	-8.10	-0.17	1.90
11280.0	-25289	480514	-1558044	1404.6	2877.7	6648.3	-8.12	-0.21	1.82
11290.0	-11649	509280	-1491471	1323.3	2875.4	6666.1	-8.14	-0.25	1.73
11300.0	1178	538020	-1424726	1241.9	2872.7	6683.0	-8.16	-0.29	1.65
11310.0	13188	566732	-1357815	1160.2	2869.6	6699.1	-8.17	-0.33	1.57
11320.0	24382	595410	-1290747	1078.5	2866.0	6714.3	-8.18	-0.37	1.48
11330.0	34757	624051	-1223532	996.6	2861.1	6728.7	-8.20	-0.41	1.40
11340.0	44312	652652	-1156176	914.5	2857.8	6742.3	-8.21	-0.45	1.31
11350.0	53047	681207	-1088689	832.4	2853.1	6755.0	-8.22	-0.49	1.23
11360.0	60960	709713	-1021079	750.1	2848.0	6766.9	-8.23	-0.53	1.15

TABLE B-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11370.0	68049	738166	-953354	667.8	2842.5	6777.9	-8.24	-0.57	1.06
11380.0	74315	766562	-885523	585.4	2836.6	6788.1	-8.25	-0.61	0.98
11390.0	79756	794898	-[illegible]7595	502.9	2830.3	6797.4	-8.25	-0.65	0.89
11400.0	84372	823168	-749577	420.3	2823.7	6805.9	-8.26	-0.69	0.81
11410.0	88162	851369	-681479	337.7	2816.6	6813.6	-8.26	-0.73	0.72
11420.0	91126	879499	-613308	255.1	2809.1	6820.4	-8.27	-0.77	0.64
11430.0	93264	907550	-545074	172.4	2801.2	6826.3	-8.27	-0.81	0.55
11440.0	94574	935520	-476785	89.7	2792.9	6831.4	-8.27	-0.85	0.47
11450.0	95059	963407	-408449	7.0	2784.2	6835.7	-8.27	-0.89	0.38
11460.0	94714	991204	-340074	-75.7	2775.2	6839.1	-8.27	-0.93	0.30
11470.0	93544	1019908	-271670	-159.4	2765.7	6841.6	-8.27	-0.97	0.21
11480.0	91547	1046517	-203245	-241.0	2755.8	6843.3	-8.26	-1.01	0.13
11490.0	88723	1074024	-134807	-323.7	2745.6	6844.2	-8.26	-1.04	0.04
11500.0	85074	1101427	-66364	-406.2	2735.0	6844.2	-8.26	-1.08	-0.04
11510.0	80598	1128722	2075	-488.8	2723.9	6843.2	-8.26	-1.12	-0.13
11520.0	75296	1155904	70499	-571.4	2712.4	6841.4	-8.25	-1.17	-0.22
11530.0	69170	1182969	138901	-653.8	2700.6	6838.8	-8.25	-1.21	-0.30
11540.0	62220	1209914	207273	-736.2	2688.3	6835.4	-8.22	-1.25	-0.39
11550.0	54446	1236734	275606	-818.5	2675.7	6831.0	-8.23	-1.28	-0.47
	S-IVB SECOND IGNITION (STDV OPEN)								
11556.600	48865	1254366	320680	-872.7	2667.2	68[illegible].7	-8.21	-1.30	-0.53
11558.0	47635	1258099	330239	-884.4	2665.8	6828.2	-8.46	-0.62	1.40
11560.0	45849	1263431	343903	-901.8	2666.2	6835.5	-8.81	0.51	4.58
11562.0	44028	1268764	357583	-919.4	2667.3	6844.8	-8.84	0.58	4.72
11564.0	42172	1274100	371282	-937.1	2668.5	6854.3	-8.84	0.60	4.76
11566.0	40280	1279438	385001	-954.8	2669.7	6863.8	-8.87	0.56	4.77
11568.0	38353	1284779	398738	-972.7	2670.7	6873.3	-9.00	0.51	4.77
11570.0	36390	1290121	412494	-990.8	2671.7	6882.9	-9.21	0.44	4.78
11572.0	34389	1295465	426269	-1009.4	2672.5	6892.5	-9.36	0.40	4.78
11574.0	32352	1300811	440064	-1028.1	2673.3	6902.0	-9.39	0.40	4.78
11576.0	30277	1306159	453878	-1046.9	2674.1	6911.6	-9.38	0.41	4.79
11578.0	28165	1311507	467710	-1065.6	2674.9	6921.2	-9.37	0.40	4.79
11580.0	26015	1316858	481562	-1084.4	2675.7	6930.8	-9.41	0.40	4.79
11582.0	23827	1322210	495433	-1103.2	2676.5	6940.3	-9.44	0.42	4.78
11584.0	21602	1327564	509324	-1122.1	2677.4	6949.9	-9.44	0.44	4.77
11586.0	19339	1332920	523233	-1141.0	2678.3	6959.4	-9.44	0.44	4.77
11588.0	17039	1338277	537161	-1159.9	2679.1	6968.9	-9.45	0.42	4.77
11590.0	14699	1343637	551109	-1178.8	2680.0	6978.5	-9.47	0.42	4.77
11592.0	12323	1348997	565075	-1197.7	2680.8	6988.0	-9.49	0.41	4.76
11594.0	9908	1354360	579061	-1216.7	2681.6	6997.5	-9.50	0.41	4.76
11596.0	7456	1359724	593065	-1235.7	2682.5	7007.0	-9.51	0.42	4.75

TABLE B-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11598.0	4965	1365090	607089	-1254.8	2683.3	7016.5	-9.52	0.43	4.75
11600.0	2436	1370457	621131	-1273.8	2684.2	7026.0	-9.53	0.43	4.75
11602.0	-130	1375826	635193	-1292.9	2685.0	7035.5	-9.54	0.42	4.74
11604.0	-2735	1381197	649273	-1312.0	2685.8	7045.0	-9.55	0.41	4.73
11606.0	-5378	1386570	663373	-1331.1	2686.7	7054.4	-9.56	0.41	4.72
11608.0	-8060	1391944	677491	-1350.2	2687.5	7063.9	-9.57	0.41	4.72
11610.0	-10779	1397320	691629	-1369.4	2688.3	7073.3	-9.58	0.42	4.72
11612.0	-13537	1402697	705784	-1388.5	2689.2	7082.7	-9.59	0.42	4.71
11614.0	-16333	1408076	719959	-1407.7	2690.0	7092.2	-9.60	0.42	4.71
11616.0	-19168	1413457	734153	-1426.9	2690.8	7101.6	-9.60	0.41	4.71
11618.0	-22041	1418840	748366	-1446.2	2691.6	7111.0	-9.61	0.40	4.72
11620.0	-24953	1424224	762597	-1465.4	2692.4	7120.5	-9.62	0.40	4.72
11622.0	-27903	1429609	776848	-1484.6	2693.2	7129.9	-9.63	0.40	4.71
11624.0	-30891	1434997	791117	-1503.9	2694.0	7139.3	-9.64	0.40	4.70
11626.0	-33918	1440385	805405	-1523.2	2694.8	7148.7	-9.65	0.40	4.70
11628.0	-36984	1445776	819711	-1542.5	2695.6	7158.1	-9.66	0.39	4.70
11630.0	-40088	1451168	834037	-1561.8	2696.4	7167.5	-9.67	0.39	4.70
11632.0	-43231	1456561	848381	-1581.2	2697.2	7176.9	-9.68	0.38	4.69
11634.0	-46413	1461957	862745	-1600.5	2697.9	7186.3	-9.68	0.38	4.68
11636.0	-49634	1467353	877126	-1619.9	2698.7	7195.6	-9.68	0.38	4.68
11639.0	-52893	1472751	891527	-1639.3	2699.4	7205.0	-9.69	0.38	4.69
11640.0	-56191	1478151	905946	-1658.7	2700.2	7214.4	-9.70	0.38	4.69
11642.0	-59528	1483552	920385	-1678.1	2701.0	7223.7	-9.70	0.37	4.69
11644.0	-62903	1488955	934841	-1697.5	2701.7	7233.1	-9.72	0.37	4.69
11646.0	-66318	1494359	949317	-1716.9	2702.4	7242.5	-9.73	0.36	4.68
11648.0	-69771	1499764	963811	-1736.4	2703.1	7251.8	-9.75	0.35	4.68
11650.0	-73263	1505172	978325	-1755.9	2703.8	7261.3	-9.96	0.65	5.57
11652.0	-76795	1510581	992859	-1775.9	2705.1	7272.4	-9.98	0.65	5.57
11654.0	-80367	1515992	1007416	-1795.8	2706.4	7283.5	-9.99	0.65	5.57
11656.0	-83979	1521407	1021994	-1815.8	2707.7	7294.7	-10.00	0.64	5.57
11658.0	-87631	1526824	1036595	-1835.8	2709.0	7305.8	-10.01	0.64	5.57
11660.0	-91322	1532243	1051218	-1855.9	2710.3	7317.0	-10.02	0.64	5.57
11662.0	-95054	1537665	1065863	-1875.9	2 11.6	7328.1	-10.03	0.64	5.58
11664.0	-98826	1543089	1080531	-1896.0	2712.8	7339.3	-10.04	0.63	5.58
11666.0	-102638	1548516	1095221	-1916.1	2714.1	7350.5	-10.05	0.63	5.59
11668.0	-106490	1553946	1109933	-1936.2	2715.4	7361.7	-10.06	0.63	5.60
11670.0	-110383	1559378	1124668	-1956.3	2716.7	7372.9	-10.07	0.63	5.61
11672.0	-114316	1564812	1139425	-1976.5	2717.9	7384.1	-10.08	0.63	5.61
11674.0	-118289	1570250	1154204	-1996.6	2719.2	7395.4	-10.09	0.64	5.61
11676.0	-122302	1575699	1169006	-2016.8	2720.5	7406.6	-10.09	0.64	5.62
11678.0	-126356	1581131	1183830	-2037.0	2721.8	7417.8	-10.10	0.64	5.63
11680.0	-130450	1586576	1198677	-2057.2	2723.0	7429.1	-10.11	0.64	5.64
11682.0	-134585	1592024	1213547	-2077.5	2724.3	7440.4	-10.12	0.64	5.64

TABLE B-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11684.0	-138760	1597474	1228439	-2097.7	2725.6	7451.7	-10.13	0.64	5.64
11686.0	-142976	1602926	1243354	-2118.0	2726.9	7462.9	-10.13	0.64	5.65
11688.0	-147232	1608381	1258291	-2138.2	2728.2	7474.3	-10.14	0.65	5.67
11690.0	-151529	1613839	1273251	-2158.5	2729.5	7485.6	-10.15	0.65	5.68
11692.0	-155866	1619297	1288233	-2178.9	2730.8	7497.0	-10.16	0.65	5.69
11694.0	-160244	1624762	1303239	-2199.2	2732.1	7508.4	-10.17	0.64	5.69
11696.0	-164663	1630227	1318267	-2219.5	2733.4	7519.7	-10.18	0.64	5.69
11698.0	-169122	1635695	1333317	-2239.9	2734.6	7531.1	-10.19	0.65	5.71
11700.0	-173623	1641166	1348391	-2260.3	2735.9	7542.6	-10.20	0.65	5.72
11702.0	-178164	1646639	1363488	-2280.7	2737.2	7554.0	-10.21	0.65	5.73
11704.0	-182746	1652115	1378607	-2301.1	2738.5	7565.5	-10.22	0.65	5.74
11706.0	-187369	1657593	1393750	-2321.6	2739.8	7577.0	-10.23	0.65	5.74
11708.0	-192037	1663074	1408915	-2342.0	2741.1	7588.4	-10.23	0.65	5.75
11710.0	-196736	1668558	1424103	-2362.5	2742.4	7599.9	-10.24	0.65	5.76
11712.0	-201482	1674044	1439315	-2383.0	2743.7	7611.5	-10.26	0.65	5.77
11714.0	-206268	1679533	1454549	-2403.5	2745.1	7623.1	-10.26	0.66	5.79
11716.0	-211096	1685024	1469807	-2424.1	2746.4	7634.6	-10.27	0.66	5.81
11718.0	-215965	1690518	1485088	-2444.6	2747.7	7646.3	-10.28	0.66	5.81
11720.0	-220875	1696015	1500392	-2465.2	2749.0	7657.9	-10.29	0.65	5.82
11722.0	-225825	1701514	1515720	-2485.8	2750.3	7669.6	-10.30	0.66	5.84
11724.0	-230818	1707016	1531070	-2506.4	2751.7	7681.2	-10.31	0.67	5.85
11726.0	-235851	1712521	1546445	-2527.0	2753.0	7692.9	-10.32	0.67	5.85
11728.0	-240926	1718028	1561842	-2547.6	2754.3	7704.6	-10.32	0.67	5.85
11730.0	-246041	1723538	1577263	-2568.3	2755.7	7716.4	-10.33	0.67	5.87
11732.0	-251199	1729051	1592708	-2589.0	2757.0	7728.1	-10.35	0.67	5.89
11734.0	-256397	1734566	1608176	-2609.7	2758.3	7739.9	-10.35	0.67	5.90
11736.0	-261637	1740084	1623667	-2630.4	2759.7	7751.7	-10.36	0.68	5.91
11738.0	-266919	1745605	1639182	-2651.1	2761.0	7763.5	-10.37	0.68	5.92
11740.0	-272242	1751128	1654721	-2671.9	2762.4	7775.4	-10.38	0.68	5.94
11742.0	-277606	1756655	1670284	-2692.6	2763.8	7787.3	-10.39	0.68	5.96
11744.0	-283012	1762183	1685870	-2713.4	2765.1	7799.2	-10.40	0.68	5.97
11746.0	-288460	1767715	1701481	-2734.2	2766.5	7811.2	-10.40	0.69	5.98
11748.0	-293949	1773249	1717115	-2755.0	2767.9	7823.1	-10.41	0.69	5.99
11750.0	-299480	1778786	1732773	-2775.9	2769.2	7835.1	-10.43	0.69	6.01
11752.0	-305053	1784326	1748456	-2796.7	2770.6	7847.2	-10.44	0.69	6.02
11754.0	-310667	1789869	1764162	-2817.6	2772.0	7859.2	-10.45	0.70	6.04
11756.0	-316323	1795414	1779893	-2838.5	2773.4	7871.3	-10.46	0.70	6.05
11758.0	-322021	1800963	1795647	-2859.5	2774.8	7883.5	-10.47	0.70	6.07
11760.0	-327761	1806514	1811427	-2880.4	2776.2	7895.6	-10.48	0.70	6.08
11762.0	-333543	1812067	1827230	-2901.4	2777.6	7907.8	-10.49	0.70	6.09
11764.0	-339367	1817624	1843059	-2922.4	2779.0	7920.0	-10.49	0.70	6.10
11766.0	-345237	1823183	1858910	-2943.4	2780.4	7932.2	-10.51	0.71	6.12
11768.0	-351149	1828746	1874787	-2964.4	2781.9	7944.5	-10.52	0.72	6.15

TABLE B-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11770.0	-357090	1834311	1990688	-2985.4	2783.3	7956.8	-10.53	0.73	6.17
11772.0	-363082	1839879	1906614	-3006.5	2784.8	7969.2	-10.54	0.72	6.19
11774.0	-369116	1845450	1922564	-3027.6	2786.2	7981.6	-10.55	0.72	6.20
11776.0	-375192	1851024	1938540	-3048.7	2787.7	7994.0	-10.56	0.73	6.22
11778.0	-381311	1856601	1954540	-3069.9	2789.1	8006.4	-10.58	0.73	6.24
11780.0	-387472	1862180	1970566	-3091.0	2790.6	8018.9	-10.59	0.74	6.26
11782.0	-393675	1867763	1986616	-3112.2	2792.1	8031.5	-10.61	0.75	6.28
11784.0	-399921	1873349	2002692	-3133.4	2793.6	8044.0	-10.62	0.75	6.30
11786.0	-406209	1878937	2018792	-3154.7	2795.1	8056.7	-10.62	0.75	6.31
11788.0	-412539	1884529	2034919	-3175.9	2796.6	8069.3	-10.63	0.75	6.33
11790.0	-418913	1890124	2051069	-3197.2	2798.1	8082.0	-10.64	0.76	6.35
11792.0	-425328	1895722	2067246	-3218.5	2799.6	8094.7	-10.66	0.76	6.36
11794.0	-431787	1901322	2083449	-3239.9	2801.1	8107.4	-10.66	0.76	6.38
11796.0	-438288	1906926	2099676	-3261.2	2802.7	8120.2	-10.71	0.77	6.41
11798.0	-444832	1912533	2115929	-3282.7	2804.2	8133.0	-10.72	0.77	6.43
11800.0	-451418	1918143	2132209	-3304.1	2805.7	8145.9	-10.73	0.77	6.46
11802.0	-458048	1923756	2148513	-3325.6	2807.3	8158.9	-10.74	0.78	6.48
11804.0	-464721	1929372	2164844	-3347.1	2808.9	8171.9	-10.76	0.78	6.50
11806.0	-471437	1934991	2181200	-3368.6	2810.4	8184.9	-10.78	0.79	6.52
11808.0	-478195	1940614	2197583	-3390.2	2812.0	8197.9	-10.80	0.78	6.54
11810.0	-484997	1946239	2213992	-3411.8	2813.6	8211.1	-10.81	0.79	6.57
11812.0	-491843	1951868	2230427	-3433.5	2815.1	8224.2	-10.83	0.79	6.60
11814.0	-498731	1957500	2246889	-3455.1	2816.7	8237.4	-10.84	0.80	6.62
11816.0	-505663	1963135	2263377	-3476.8	2818.4	8250.7	-10.85	0.81	6.64
11818.0	-512639	1968773	2279892	-3498.5	2820.0	8264.0	-10.87	0.81	6.66
11820.0	-519658	1974415	2296433	-3520.3	2821.6	8277.3	-10.90	0.82	6.69
11822.0	-526720	1980060	2313001	-3542.1	2823.3	8290.7	-10.92	0.82	6.71
11824.0	-533826	1985708	2329596	-3564.0	2824.9	8304.2	-10.94	0.82	6.74
11826.0	-540976	1991359	2346218	-3585.9	2826.6	8317.7	-10.96	0.83	6.78
11828.0	-548170	1997014	2362867	-3607.9	2828.2	8331.3	-10.98	0.84	6.80
11830.0	-555408	2002672	2379543	-3629.8	2829.9	8344.9	-11.00	0.84	6.82
11832.0	-562689	2008334	2396246	-3651.8	2831.6	8358.5	-11.01	0.84	6.83
11834.0	-570015	2013999	2412977	-3673.9	2833.3	8372.2	-11.04	0.84	6.85
11836.0	-577385	2019667	2429735	-3696.0	2834.9	8386.0	-11.06	0.84	6.89
11838.0	-584799	2025339	2446521	-3718.1	2836.6	8399.8	-11.09	0.85	6.92
11840.0	-592258	2031014	2463334	-3740.3	2838.4	8413.6	-11.11	0.87	6.95
11842.0	-599760	2036692	2480176	-3762.6	2840.1	8427.6	-11.14	0.87	6.98
11844.0	-607308	2042374	2497045	-3784.9	2841.8	8441.6	-11.17	0.88	7.03
11846.0	-614900	2048059	2513942	-3807.3	2843.6	8455.7	-11.20	0.88	7.07
11848.0	-622537	2053748	2530868	-3829.7	2845.4	8469.8	-11.24	0.88	7.10
11850.0	-630219	2059441	2547821	-3852.2	2847.1	8484.1	-11.27	0.89	7.13
11852.0	-637946	2065137	2564804	-3874.8	2848.9	8498.3	-11.30	0.90	7.16
11854.0	-645718	2070837	2581815	-3897.4	2850.8	8512.7	-11.33	0.92	7.20

TABLE B-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11856.0	-653536	2076540	2598855	-3920.1	2852.6	8527.2	-11.36	0.92	7.23
11858.0	-661399	2082247	2615923	-3942.9	2854.4	8541.6	-11.40	0.91	7.26
11860.0	-669307	2087958	2633021	-3965.7	2856.3	8556.2	-11.43	0.91	7.30
11862.0	-677262	2093672	2650148	-3988.6	2858.1	8570.8	-11.47	0.92	7.34
11864.0	-685262	2099390	2667305	-4011.6	2859.9	8585.5	-11.51	0.93	7.38
11866.0	-693308	2105112	2684491	-4034.7	2861.8	8600.3	-11.55	0.94	7.40
11868.0	-701401	2110837	2701706	-4057.8	2863.7	8615.2	-11.59	0.94	7.43
11870.0	-709539	2116567	2718951	-4081.0	2865.6	8630.0	-11.63	0.94	7.46
11872.0	-717725	2122300	2736226	-4104.4	2867.4	8645.0	-11.68	0.93	7.50
11874.0	-725957	2128036	2753531	-4127.7	2869.3	8660.1	-11.72	0.94	7.54
11876.0	-734236	2133777	2770867	-4151.2	2871.2	8675.2	-11.76	0.94	7.59
11878.0	-742562	2139521	2788232	-4174.8	2873.1	8690.4	-11.79	0.95	7.63
11880.0	-750935	2145269	2805628	-4198.4	2875.0	8705.7	-11.88	0.93	7.64
11882.0	-759356	2151021	2823055	-4222.4	2876.8	8720.9	-12.06	0.89	7.61
11884.0	-767825	2156776	2840512	-4246.7	2878.5	8736.1	-12.26	0.84	7.58
11886.0	-776343	2162535	2857999	-4271.3	2880.2	8751.3	-12.39	0.81	7.58
11888.0	-784910	2168297	2875517	-4296.2	2881.8	8766.5	-12.42	0.81	7.63
11890.0	-793527	2174062	2893065	-4321.0	2883.4	8781.8	-12.39	0.84	7.69
11892.0	-802194	2179831	2910644	-4345.8	2885.1	8797.2	-12.40	0.86	7.75
11894.0	-810910	2185603	2928254	-4370.6	2886.9	8812.8	-12.41	0.88	7.80
11896.0	-819676	2191378	2945895	-4395.4	2888.6	8828.4	-12.43	0.88	7.86
11898.0	-828492	2197157	2963568	-4420.3	2890.4	8844.2	-12.45	0.89	7.93
11900.0	-837358	2202940	2981272	-4445.2	2892.2	8860.2	-12.46	0.91	8.00
11902.0	-846273	2208726	2999009	-4470.1	2894.0	8876.2	-12.46	0.92	8.06
11904.0	-855239	2214516	3016777	-4495.0	2895.9	8892.4	-12.46	0.94	8.11
11906.0	-864253	2220309	3034578	-4519.9	2897.8	8908.6	-12.47	0.96	8.17
	S-IVB SECOND GUIDANCE CUTOFF								
11907.640	-871682	2225062	3049199	-4540.3	2899.3	8922.0	-12.46	0.94	8.21
11908.0	-873317	2226106	3052410	-4543.9	2899.2	8923.2	-7.12	-1.71	-1.98
11910.0	-882414	2231898	3070244	-4556.7	2894.6	8916.6	-6.20	-2.39	-3.73
11912.0	-891540	2237683	3088070	-4569.1	2889.8	8909.1	-6.18	-2.39	-3.74
11914.0	-900691	2243458	3105880	-4581.5	2885.0	8901.6	-6.17	-2.40	-3.76
11916.0	-909866	2249223	3123676	-4593.8	2880.2	8894.1	-6.14	-2.40	-3.77
	TRANSLUNAR INJECTION								
11917.640	-917409	2253943	3138257	-4603.9	2876.3	8887.9	-6.12	-2.41	-3.78
11950.0	-1069530	2345749	3423849	-4796.2	2797.4	8761.7	-5.77	-2.47	-4.02
12000.0	-1316378	2492499	3856766	-5071.0	2672.0	8552.3	-5.21	-2.54	-4.34
12050.0	-1576152	2612917	4278852	-5317.1	2544.5	8329.2	-4.63	-2.56	-4.57
12100.0	-1847550	2736946	4689528	-5533.9	2416.7	8096.6	-4.04	-2.55	-4.72

TABLE B-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

TIME SEC	XF M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXF M/S SQ	DDYE M/S SQ	DDZE M/S SQ
12150.0	-2129064	2854611	5098422	-5721.9	2290.3	7858.5	-3.47	-2.51	-4.79
12200.0	-2419265	2966018	5475351	-5881.7	2166.6	7618.6	-2.93	-2.44	-4.80
12250.0	-2716790	3071333	5850301	-6015.1	2046.8	7379.8	-2.42	-2.35	-4.75
12300.0	-3020364	3170772	6213396	-6124.0	1931.6	7144.8	-1.95	-2.25	-4.65
12350.0	-3328812	3264584	6564876	-6210.4	1821.7	6915.5	-1.52	-2.14	-4.52
12400.0	-3641069	3353040	6905070	-6276.6	1717.5	6693.6	-1.14	-2.03	-4.36
12450.0	-3956177	3436427	7234374	-6324.9	1619.0	6480.1	-0.80	-1.91	-4.18
12500.0	-4273290	3515034	7553237	-6357.2	1526.3	6275.8	-0.50	-1.80	-3.99
12550.0	-4591661	3589153	7862117	-6375.5	1439.4	6081.2	-0.24	-1.68	-3.79
12600.0	-4910641	3659065	8161519	-6381.8	1358.0	5896.5	-0.02	-1.57	-3.60
12650.0	-5229665	3725045	8451930	-6377.6	1282.1	5721.6	0.18	-1.47	-3.40
12700.0	-5548249	3787357	8733845	-6364.4	1211.2	5556.6	0.34	-1.37	-3.21
12750.0	-5865974	3846249	9007745	-6343.5	1145.2	5401.0	0.49	-1.27	-3.02
12800.0	-6182489	3901957	9274097	-6316.1	1083.8	5254.6	0.61	-1.18	-2.84
12850.0	-6497494	3954705	9533351	-6283.2	1026.8	5117.0	0.71	-1.10	-2.67
12900.0	-6810737	4004703	9785937	-6245.8	973.8	4987.8	0.79	-1.02	-2.50
12950.0	-7122006	4052145	10032264	-6204.4	924.5	4866.6	0.86	-0.95	-2.35
13000.0	-7431127	4097210	10272723	-6159.9	878.7	4753.0	0.92	-0.89	-2.20
13050.0	-7737953	4140068	10507680	-6112.8	836.1	4646.5	0.97	-0.82	-2.06
13100.0	-8042367	4180873	10737483	-6063.5	796.6	4546.7	1.00	-0.76	-1.93
13150.0	-8344273	4219770	10962458	-6012.5	759.8	4453.3	1.03	-0.71	-1.81
13200.0	-8643595	4256894	11182911	-5960.2	725.6	4365.8	1.06	-0.66	-1.69
13250.0	-8940273	4292368	11399130	-5906.9	693.8	4283.9	1.08	-0.61	-1.58
13300.0	-9234262	4326310	11611386	-5852.7	664.2	4207.2	1.09	-0.57	-1.48
	CSM SEPARATION								
13307.600	-9511602	4357291	11809991	-5800.6	638.0	4138.8	1.10	-0.53	-1.39

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

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 TIMEBASE 6									
10978.600	6482.637	23.097	972.046	-1155.1	48.8	7711.3	-9.18	-0.02	-1.37
10980.0	6481.014	23.165	982.841	-1168.0	48.8	7709.4	-9.18	-0.02	-1.39
10990.0	6468.876	23.651	1059.963	-1259.7	48.6	7694.9	-9.16	-0.02	-1.50
11000.0	6455.821	24.136	1136.735	-1351.2	48.3	7679.4	-9.14	-0.02	-1.61
11010.0	6441.853	24.618	1213.447	-1442.5	48.1	7662.8	-9.12	-0.02	-1.72
11020.0	6426.972	25.098	1289.987	-1533.6	47.9	7645.1	-9.10	-0.02	-1.82
11030.0	6411.181	25.576	1366.344	-1624.5	47.6	7626.3	-9.09	-0.02	-1.93
11040.0	6394.483	26.051	1442.509	-1715.2	47.4	7606.4	-9.05	-0.03	-2.04
11050.0	6376.879	26.523	1519.469	-1805.6	47.1	7585.5	-9.03	-0.03	-2.15
11060.0	6358.372	26.993	1594.215	-1895.8	46.9	7563.5	-9.00	-0.03	-2.26
11070.0	6338.965	27.461	1669.735	-1985.7	46.6	7540.4	-8.99	-0.03	-2.36
11080.0	6318.660	27.925	1745.019	-2075.3	46.3	7516.2	-8.95	-0.03	-2.47
11090.0	6297.460	28.387	1820.055	-2164.6	46.0	749..0	-8.92	-0.03	-2.57
11100.0	6275.369	28.846	1894.835	-2253.6	45.7	7464.7	-8.89	-0.03	-2.68
11110.0	6252.388	29.301	1969.347	-2342.3	45.4	7437.4	-8.85	-0.03	-2.79
11120.0	6228.523	29.754	2043.579	-2430.7	45.1	7409.0	-8.82	-0.03	-2.89
11130.0	6203.776	30.204	2117.523	-2518.7	44.8	7379.6	-8.78	-0.03	-3.00
11140.0	6178.150	30.650	2191.168	-2606.4	44.5	7349.1	-8.75	-0.03	-3.10
11150.0	6151.649	31.094	2264.502	-2693.7	44.2	7317.6	-8.71	-0.03	-3.20
11160.0	6124.277	31.534	2337.516	-2780.6	43.8	7285.0	-8.67	-0.03	-3.31
11170.0	6096.038	31.970	2410.199	-2867.2	43.5	7251.4	-8.63	-0.03	-3.41
11180.0	6066.936	32.403	2482.541	-2953.3	43.1	7216.8	-8.59	-0.03	-3.51
11190.0	6036.974	32.833	2554.532	-3039.0	42.8	7181.2	-8.55	-0.04	-3.61
11200.0	6006.157	33.259	2626.162	-3124.3	42.4	7144.6	-8.51	-0.04	-3.72
11210.0	5974.490	33.682	2697.420	-3209.1	42.1	7106.9	-8.46	-0.04	-3.82
11220.0	5941.976	34.100	2768.296	-3293.5	41.7	7068.2	-8.42	-0.04	-3.92
11230.0	5908.621	34.515	2838.781	-3377.4	41.3	7028.6	-8.37	-0.04	-4.02
11240.0	5874.429	34.926	2909.864	-3460.9	40.9	6987.9	-8.32	-0.04	-4.12
11250.0	5839.405	35.334	2978.536	-3543.8	40.5	6946.2	-8.27	-0.04	-4.21
11260.0	5803.554	35.737	3047.786	-3626.3	40.1	6903.6	-8.22	-0.04	-4.31
11270.0	5766.881	36.136	3116.60	-3708.2	39.7	6860.0	-8.17	-0.04	-4.41
11280.0	5729.391	36.531	3184.[illegible]2	-3789.7	39.3	6815.4	-8.12	-0.04	-4.51
11290.0	5691.090	36.922	3252.709	-3870.5	38.9	6769.8	-8.06	-0.04	-4.60
11300.0	5651.982	37.309	3320.176	-3950.9	38.5	6723.3	-8.01	-0.04	-4.70
11310.0	5612.074	37.691	3387.372	-4030.7	38.0	6675.9	-7.95	-0.04	-4.79
11320.0	5571.371	38.069	3453.890	-4109.9	37.6	6627.4	-7.89	-0.04	-4.89
11330.0	5529.879	38.443	3519.918	-4188.5	37.1	6578.1	-7.83	-0.04	-4.98
11340.0	5487.603	38.812	3585.448	-4266.6	36.7	6527.8	-7.77	-0.05	-5.07
11350.0	5444.550	39.177	3650.471	-4344.0	36.2	6476.6	-7.71	-0.05	-5.17
11360.0	5400.725	39.537	3714.977	-4420.8	35.8	6424.5	-7.65	-0.05	-5.26

TABLE B-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11370.0	5356.135	39.892	3778.959	-4497.0	35.3	6371.4	-7.59	-0.05	-5.35
11380.0	5310.787	40.243	3842.403	-4572.6	34.8	6317.5	-7.52	-0.05	-5.44
11390.0	5264.686	40.599	3905.304	-4647.5	34.4	6262.7	-7.46	-0.05	-5.53
11400.0	5217.839	40.930	3967.653	-4721.8	33.9	6206.9	-7.39	-0.05	-5.62
11410.0	5170.253	41.267	4029.440	-4795.4	33.4	6150.3	-7.33	-0.05	-5.70
11420.0	5121.934	41.597	4090.656	-4868.3	32.9	6092.8	-7.26	-0.05	-5.79
11430.0	5072.890	41.924	4151.294	-4940.5	32.4	6034.5	-7.19	-0.05	-5.88
11440.0	5023.126	42.246	4211.344	-5012.0	31.9	5975.3	-7.12	-0.05	-5.96
11450.0	4972.651	42.562	4270.797	-5082.9	31.4	5915.3	-7.05	-0.05	-6.05
11460.0	4921.471	42.873	4329.646	-5153.0	30.8	5854.4	-6.99	-0.05	-6.13
11470.0	4869.594	43.179	4387.882	-5222.4	30.3	5792.7	-6.90	-0.05	-6.21
11480.0	4817.026	43.479	4445.497	-5291.0	29.8	5730.1	-6.83	-0.05	-6.29
11490.0	4763.775	43.774	4502.482	-5358.9	29.3	5666.8	-6.75	-0.05	-6.37
11500.0	4709.850	44.064	4558.830	-5426.1	28.7	5602.7	-6.69	-0.05	-6.45
11510.0	4655.255	44.349	4614.533	-5492.5	28.2	5537.6	-6.61	-0.05	-6.54
11520.0	4600.001	44.629	4669.581	-5558.1	27.6	5471.8	-6.52	-0.05	-6.62
11530.0	4544.095	44.902	4723.966	-5622.9	27.1	5405.2	-6.45	-0.06	-6.70
11540.0	4487.545	45.170	4777.682	-5686.9	26.5	5337.8	-6.36	-0.06	-6.77
11550.0	4430.359	45.432	4830.720	-5750.2	25.9	5269.6	-6.29	-0.05	-6.85
	S-IVB SECOND IGNITION (STDV OPEN)								
11556.600	4392.271	45.601	4865.350	-5791.4	25.6	5224.3	-6.23	-0.05	-6.89
11558.0	4384.156	45.637	4872.658	-5801.2	25.5	5215.5	-7.77	-0.06	-5.52
11560.0	4372.535	45.688	4883.081	-5820.2	25.4	5207.7	-10.26	-0.08	-3.23
11562.0	4360.874	45.739	4893.491	-5840.9	25.3	5201.4	-10.38	-0.06	-3.14
11564.0	4349.171	45.789	4903.887	-5861.7	25.2	5195.1	-10.42	-0.05	-3.11
11566.	4337.427	45.839	4914.272	-5882.5	25.1	5188.9	-10.43	-0.08	-3.14
11568.0	4325.641	45.889	4924.643	-5903.5	24.9	5182.5	-10.53	-0.11	-3.25
11570.0	4313.813	45.939	4935.002	-5924.6	24.6	5175.9	-10.68	-0.15	-3.41
11572.0	4301.943	45.987	4945.347	-5946.1	24.3	5169.0	-10.79	-0.16	-3.52
11574.0	4290.029	46.036	4955.677	-5967.7	24.0	5161.9	-10.81	-0.15	-3.54
11576.0	4278.072	46.083	4965.994	-5989.3	23.7	5154.8	-10.79	-0.15	-3.52
11578.0	4266.072	46.130	4976.297	-6010.9	23.3	5147.8	-10.80	-0.16	-3.53
11580.0	4254.028	46.177	4986.585	-6032.5	23.0	5140.7	-10.82	-0.15	-3.57
11582.0	4241.942	46.222	4996.859	-6054.1	22.8	5133.5	-10.83	-0.12	-3.59
11584.0	4229.812	46.268	5007.119	-6075.8	22.5	5126.3	-10.83	-0.10	-3.59
11586.0	4217.639	46.313	5017.365	-6097.4	22.3	5119.2	-10.83	-0.10	-3.60
11588.0	4205.422	46.357	5027.596	-6119.1	22.1	5111.9	-10.84	-0.11	-3.62
11590.0	4193.162	46.401	5037.813	-6140.8	21.9	5104.7	-10.85	-0.12	-3.64
11592.0	4180.859	46.445	5048.015	-6162.5	21.7	5097.4	-10.86	-0.11	-3.65
11594.0	4168.512	46.488	5058.202	-6184.2	21.5	5090.1	-10.86	-0.11	-3.67
11596.0	4156.122	46.531	5068.375	-6205.9	21.3	5082.7	-10.86	-0.10	-3.68

TABLE B-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11598.0	4143.699	46.573	5078.533	-6227.7	21.1	5075.4	-10.87	-0.09	-3.69
11600.0	4131.212	46.615	5088.676	-6249.4	20.9	5068.0	-10.89	-0.08	-3.70
11602.0	4118.691	46.656	5098.905	-6271.1	20.7	5060.5	-10.89	-0.09	-3.72
11604.0	4106.127	46.698	5108.918	-6292.9	20.6	5053.1	-10.87	-0.09	-3.74
11606.0	4093.519	46.739	5119.017	-6314.6	20.4	5045.6	-10.87	-0.08	-3.75
11608.0	4080.867	46.779	5129.101	-6336.4	20.2	5038.0	-10.88	-0.08	-3.77
11610.0	4068.174	46.820	5139.169	-6358.1	20.1	5030.5	-10.89	-0.07	-3.78
11612.0	4055.436	46.860	5149.223	-6379.9	19.9	5022.9	-10.88	-0.07	-3.80
11614.0	4042.654	46.899	5159.261	-6401.7	19.8	5015.3	-10.89	-0.06	-3.80
11616.0	4029.829	46.939	5169.284	-6423.5	19.7	5007.7	-10.89	-0.07	-3.81
11618.0	4016.960	46.978	5179.292	-6445.2	19.5	5000.1	-10.90	-0.08	-3.82
11620.0	4004.048	47.017	5189.284	-6467.0	19.4	4992.4	-10.90	-0.08	-3.83
11622.0	3991.092	47.056	5199.261	-6488.9	19.2	4984.7	-10.90	-0.07	-3.85
11624.0	3978.093	47.094	5209.223	-6510.7	19.1	4977.0	-10.91	-0.07	-3.87
11626.0	3965.050	47.132	5219.169	-6532.5	19.0	4969.3	-10.91	-0.07	-3.88
11628.0	3951.963	47.170	5229.100	-6554.3	18.8	4961.5	-10.92	-0.07	-3.89
11630.0	3938.832	47.207	5239.015	-6576.1	18.7	4953.7	-10.92	-0.07	-3.90
11632.0	3925.658	47.245	5248.915	-6598.0	18.6	4945.9	-10.92	-0.07	-3.92
11634.0	3912.441	47.281	5258.799	-6619.8	18.4	4938.1	-10.92	-0.07	-3.93
11636.0	3899.179	47.318	5268.667	-6641.6	18.3	4930.2	-10.91	-0.07	-3.94
11638.0	3885.874	47.355	5278.520	-6663.5	18.2	4922.3	-10.92	-0.06	-3.94
11640.0	3872.525	47.391	5288.357	-6685.3	18.0	4914.4	-10.93	-0.06	-3.95
11642.0	3859.133	47.427	5298.178	-6707.2	17.9	4906.5	-10.93	-0.07	-3.96
11644.0	3845.696	47.462	5307.983	-6729.0	17.8	4898.6	-10.93	-0.07	-3.98
11646.0	3832.217	47.498	5317.772	-6750.9	17.6	4890.6	-10.94	-0.07	-3.99
11648.0	3818.693	47.533	5327.545	-6772.8	17.5	4882.6	-10.95	-0.08	-4.01
11650.0	3805.125	47.568	5337.303	-6794.7	17.3	4874.6	-11.73	-0.08	-3.46
11652.0	3791.511	47.602	5347.045	-6816.2	17.2	4867.7	-11.74	-0.08	-3.48
11654.0	3777.851	47.636	5356.774	-6841.7	17.0	4860.7	-11.75	-0.08	-3.49
11656.0	3764.144	47.670	5366.489	-6965.2	16.8	4853.7	-11.76	-0.08	-3.50
11658.0	3750.390	47.704	5376.189	-6888.7	16.7	4846.7	-11.76	-0.08	-3.51
11660.0	3736.589	47.737	5385.875	-6912.3	16.5	4839.6	-11.77	-0.08	-3.52
11662.0	3722.740	47.770	5395.548	-6935.8	16.4	4832.6	-11.78	-0.08	-3.53
11664.0	3708.845	47.802	5405.206	-6959.4	16.2	4825.5	-11.79	-0.08	-3.54
11666.0	3694.903	47.835	5414.850	-6983.0	16.1	4818.5	-11.80	-0.08	-3.55
11668.0	3680.913	47.867	5424.480	-7006.6	15.9	4811.4	-11.81	-0.08	-3.56
11670.0	3666.876	47.898	5434.095	-7030.3	15.7	4804.2	-11.82	-0.08	-3.56
11672.0	3652.792	47.930	5443.697	-7053.9	15.6	4797.1	-11.83	-0.08	-3.57
11674.0	3638.661	47.961	5453.284	-7077.6	15.4	4790.0	-11.84	-0.08	-3.57
11676.0	3624.482	47.991	5462.857	-7101.3	15.3	4782.8	-11.85	-0.07	-3.58
11678.0	3610.255	48.022	5472.415	-7125.0	15.1	4775.7	-11.85	-0.07	-3.58
11680.0	3595.982	48.052	5481.959	-7148.7	15.0	4768.5	-11.87	-0.08	-3.58
11682.0	3581.661	48.082	5491.489	-7172.4	14.8	4761.3	-11.88	-0.08	-3.59

TABLE B-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11684.0	3567.292	49.111	5501.005	-7196.2	14.7	4754.1	-11.89	-0.07	-3.61
11686.0	3552.876	48.140	5510.506	-7220.0	14.5	4746.9	-11.89	-0.07	-3.61
11688.0	3538.412	48.169	5519.932	-7243.8	14.4	4739.7	-11.91	-0.07	-3.60
11690.0	3523.901	48.198	5529.464	-7267.6	14.2	4732.5	-11.92	-0.07	-3.60
11692.0	3509.342	48.226	5538.922	-7291.4	14.1	4725.3	-11.93	-0.07	-3.61
11694.0	3494.735	49.254	5548.366	-7315.3	13.9	4718.1	-11.94	-0.07	-3.62
11696.0	3480.081	48.282	5557.794	-7339.2	13.8	4710.8	-11.95	-0.08	-3.63
11698.0	3465.378	48.309	5567.209	-7363.1	13.6	4703.5	-11.96	-0.07	-3.63
11700.0	3450.628	49.337	5576.609	-7387.0	13.5	4696.3	-11.98	-0.07	-3.63
11702.0	3435.830	48.363	5585.994	-7411.0	13.4	4689.0	-11.99	-0.08	-3.64
11704.0	3420.984	48.390	5595.365	-7435.0	13.2	4681.7	-12.00	-0.08	-3.64
11706.0	3406.090	48.416	5604.721	-7459.0	13.0	4674.4	-12.01	-0.08	-3.65
11708.0	3391.14	48.442	5614.062	-7483.0	12.9	4667.2	-12.02	-0.08	-3.65
11710.0	3376 ' 3	49.468	5623.389	-7507.1	12.7	4659.8	-12.03	-0.08	-3.66
11712.0	3361.1[illegible]0	48.493	5632.702	-7531.1	12.6	4652.5	-12.05	-0.08	-3.66
11714.0	3346.034	48.518	5642.000	-7555.3	12.4	4645.2	-12.07	-0.08	-3.65
11716.0	3330.899	49.543	5651.283	-7579.4	12.3	4637.9	-12.09	-0.08	-3.65
11718.0	3315.716	49.567	5660.551	-7603.6	12.1	4630.6	-12.09	-0.08	-3.66
11720.0	3300.485	48.591	5669.805	-7627.7	12.0	4623.3	-12.10	-0.08	-3.67
11722.0	3285.205	49.615	5679.044	-7651.9	11.8	4615.9	-12.12	-0.08	-3.67
11724.0	3269.877	48.639	5688.269	-7676.2	11.6	4608.6	-12.13	-0.08	-3.67
11726.0	3254.500	48.662	5697.479	-7700.5	11.5	4601.3	-12.14	-0.07	-3.67
11728.0	3239.075	48.685	5706.674	-7724.7	11.3	4593.9	-12.14	-0.08	-3.68
11730.0	3223.601	49.707	5715.854	-7749.0	11.2	4586.6	-12.16	-0.08	-3.68
11732.0	3208.079	48.729	5725.020	-7773.4	11.0	4579.2	-12.18	-0.08	-3.68
11734.0	3192.508	48.751	5734.171	-7797.7	10.9	4571.8	-12.19	-0.08	-3.68
11736.0	3176.888	48.773	5743.308	-7822.1	10.7	4564.5	-12.20	-0.08	-3.69
11738.0	3161.219	48.794	5752.429	-7846.5	10.6	4557.1	-12.22	-0.08	-3.68
11740.0	3145.502	48.815	5761.536	-7871.0	10.4	4549.7	-12.24	-0.08	-3.68
11742.0	3129.735	48.836	5770.628	-7895.5	10.2	4542.3	-12.26	-0.08	-3.68
11744.0	3113.920	48.856	5779.705	-7920.0	10.1	4535.0	-12.27	-0.08	-3.69
11746.0	3098.055	49.876	5788.769	-7944.6	9.9	4527.6	-12.28	-0.08	-3.68
11748.0	3082.142	48.896	5797.816	-7969.1	9.7	4520.2	-12.29	-0.08	-3.69
11750.0	3066.179	48.915	5806.849	-7993.7	9.6	4512.9	-12.31	-0.08	-3.69
11752.0	3050.167	48.934	5815.867	-8018.4	9.4	4505.5	-12.33	-0.09	-3.69
11754.0	3034.105	48.952	5824.871	-8043.0	9.2	4498.1	-12.35	-0.08	-3.69
11756.0	3017.995	49.971	5833.859	-8067.7	9.1	4490.7	-12.36	-0.08	-3.69
11758.0	3001.834	48.989	5842.833	-8092.5	8.9	4483.3	-12.38	-0.08	-3.69
11760.0	2985.625	49.006	5851.793	-8117.3	8.7	4475.9	-12.40	-0.08	-3.69
11762.0	2969.365	49.024	5860.737	-8142.1	8.6	4468.5	-12.41	-0.09	-3.70
11764.0	2953.056	49.041	5869.667	-8166.9	8.4	4461.1	-12.42	-0.09	-3.70
11766.0	2936.698	49.057	5878.582	-8191.8	8.2	4453.7	-12.44	-0.08	-3.70
11768.0	2920.289	49.073	5887.482	-8216.7	8.0	4446.4	-12.47	-0.08	-3.69

TABLE B-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11770.0	2903.831	49.089	5896.367	-8241.6	7.9	4439.0	-12.49	-0.08	-3.69
11772.0	2887.323	49.105	5905.238	-8266.6	7.7	4431.6	-12.50	-0.09	-3.68
11774.0	2870.765	49.120	5914.094	-8291.6	7.5	4424.2	-12.52	-0.09	-3.69
11776.0	2854.156	49.135	5922.935	-8316.7	7.3	4416.9	-12.54	-0.09	-3.69
11778.0	2837.498	49.150	5931.761	-8341.8	7.2	4409.5	-12.56	-0.09	-3.69
11780.0	2820.789	49.164	5940.573	-8366.9	7.0	4402.1	-12.59	-0.09	-3.69
11782.0	2804.030	49.177	5949.370	-8392.1	6.8	4394.7	-12.61	-0.09	-3.68
11784.0	2787.221	49.191	5958.152	-8417.4	6.6	4387.4	-12.63	-0.09	-3.68
11786.0	2770.361	49.204	5966.919	-8442.7	6.5	4380.0	-12.64	-0.09	-3.68
11788.0	2753.450	49.217	5975.672	-8468.0	6.3	4372.6	-12.66	-0.09	-3.68
11790.0	2736.489	49.229	5984.410	-8493.3	6.1	4365.3	-12.69	-0.09	-3.68
11792.0	2719.477	49.241	5993.133	-8518.7	5.9	4357.9	-12.70	-0.09	-3.68
11794.0	2702.414	49.253	6001.841	-8544.1	5.7	4350.5	-12.73	-0.09	-3.69
11796.0	2685.300	49.264	6010.535	-8569.6	5.6	4343.2	-12.76	-0.09	-3.69
11798.0	2668.136	49.275	6019.214	-8595.1	5.4	4335.8	-12.80	-0.09	-3.69
11800.0	2650.920	49.285	6027.879	-8620.8	5.2	4328.4	-12.82	-0.10	-3.69
11802.0	2633.653	49.296	6036.527	-8646.4	5.0	4321.0	-12.84	-0.10	-3.68
11804.0	2616.334	49.305	6045.162	-8672.1	4.8	4313.7	-12.87	-0.10	-3.68
11806.0	2598.964	49.315	6053.782	-8697.9	4.6	4306.3	-12.90	-0.10	-3.69
11808.0	2581.543	49.324	6062.387	-8723.7	4.4	4298.9	-12.92	-0.10	-3.69
11810.0	2564.069	49.332	6070.979	-8749.5	4.2	4291.5	-12.95	-0.11	-3.69
11812.0	2546.544	49.341	6079.553	-8775.5	4.0	4284.2	-12.97	-0.11	-3.68
11814.0	2528.968	49.348	6088.114	-8801.4	3.8	4276.8	-13.00	-0.10	-3.67
11816.0	2511.339	49.356	6096.661	-8827.4	3.6	4269.5	-13.02	-0.10	-3.67
11818.0	2493.658	49.362	6105.192	-8853.5	3.4	4262.1	-13.05	-0.10	-3.68
11820.0	2475.925	49.369	6113.709	-8879.6	3.1	4254.8	-13.09	-0.10	-3.68
11822.0	2458.139	49.375	6122.212	-8905.8	2.9	4247.4	-13.12	-0.11	-3.69
11824.0	2440.301	49.381	6130.699	-8932.1	2.7	4240.0	-13.15	-0.11	-3.68
11826.0	2422.411	49.386	6139.172	-8958.4	2.5	4232.7	-13.19	-0.11	-3.67
11828.0	2404.468	49.391	6147.630	-8984.9	2.3	4225.4	-13.22	-0.11	-3.67
11830.0	2386.471	49.395	6156.073	-9011.3	2.1	4218.0	-13.24	-0.11	-3.67
11832.0	2368.422	49.399	6164.502	-9037.8	1.9	4210.7	-13.26	-0.11	-3.68
11834.0	2350.320	49.403	6172.916	-9064.4	1.6	4203.3	-13.29	-0.12	-3.69
11836.0	2332.165	49.406	6181.315	-9091.0	1.4	4195.9	-13.33	-0.12	-3.69
11838.0	2313.956	49.408	6189.699	-9117.7	1.2	4188.5	-13.36	-0.12	-3.68
11840.0	2295.694	49.410	6198.069	-9144.5	0.9	4181.2	-13.41	-0.11	-3.68
11842.0	2277.378	49.412	6206.424	-9171.3	0.7	4173.8	-13.46	-0.11	-3.68
11844.0	2259.009	49.413	6214.764	-9198.3	0.5	4166.4	-13.50	-0.12	-3.67
11846.0	2240.585	49.414	6223.090	-9225.3	0.3	4159.1	-13.55	-0.12	-3.67
11848.0	2222.107	49.414	6231.401	-9252.5	0.0	4151.7	-13.60	-0.12	-3.68
11850.0	2203.575	49.414	6239.697	-9279.7	-0.2	4144.4	-13.64	-0.12	-3.69
11852.0	2184.989	49.413	6247.978	-9307.1	-0.4	4137.0	-13.69	-0.12	-3.68
11854.0	2166.347	49.412	6256.245	-9334.5	-0.7	4129.6	-13.74	-0.11	-3.68

TABLE B-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11856.0	2147.650	49.411	6264.497	-9362.0	-0.9	4122.3	-13.78	-0.12	-3.69
11858.0	2128.899	49.409	6272.734	-9389.6	-1.1	4114.9	-13.82	-0.12	-3.70
11860.0	2110.092	49.406	6280.956	-9417.3	-1.4	4107.5	-13.87	-0.13	-3.70
11862.0	2091.229	49.403	6289.164	-9445.1	-1.6	4100.1	-13.93	-0.13	-3.70
11864.0	2072.311	49.400	6297.356	-9473.0	-1.9	4092.7	-13.99	-0.12	-3.71
11866.0	2053.337	49.396	6305.534	-9501.0	-2.1	4085.2	-14.03	-0.12	-3.72
11868.0	2034.307	49.391	6313.697	-9529.1	-2.4	4077.8	-14.09	-0.13	-3.74
11870.0	2015.221	49.386	6321.845	-9557.3	-2.6	4070.3	-14.13	-0.13	-3.75
11872.0	1996.079	49.380	6329.978	-9585.7	-2.9	4062.8	-14.18	-0.14	-3.76
11874.0	1976.878	49.374	6338.096	-9614.1	-3.2	4055.3	-14.24	-0.14	-3.76
11876.0	1957.621	49.368	6346.199	-9642.6	-3.5	4047.7	-14.30	-0.15	-3.77
11878.0	1938.307	49.360	6354.287	-9671.2	-3.8	4040.2	-14.35	-0.15	-3.77
11880.0	1918.936	49.353	6362.360	-9700.0	-4.1	4032.6	-14.42	-0.15	-3.82
11882.0	1899.507	49.344	6370.418	-9729.0	-4.4	4024.8	-14.53	-0.15	-3.98
11884.0	1880.020	49.335	6378.459	-9758.1	-4.7	4016.7	-14.64	-0.15	-4.16
11886.0	1860.475	49.325	6386.484	-9787.5	-5.0	4008.3	-14.74	-0.16	-4.27
11888.0	1840.870	49.315	6394.492	-9817.0	-5.3	3999.7	-14.78	-0.17	-4.25
11890.0	1821.207	49.304	6402.483	-9846.6	-5.6	3991.3	-14.81	-0.17	-4.20
11892.0	1801.484	49.293	6410.457	-9876.3	-6.0	3982.9	-14.85	-0.17	-4.16
11894.0	1781.701	49.280	6418.415	-9906.0	-6.3	3974.6	-14.90	-0.17	-4.13
11896.0	1761.860	49.267	6426.356	-9935.9	-6.6	3966.4	-14.96	-0.18	-4.11
11898.0	1741.958	49.254	6434.280	-9965.8	-7.0	3958.2	-15.01	-0.20	-4.08
11900.0	1721.996	49.239	6442.189	-9995.9	-7.4	3950.0	-15.06	-0.21	-4.05
11902.0	1701.974	49.224	6450.081	-10026.0	-7.8	3942.0	-15.11	-0.21	-4.01
11904.0	1681.892	49.208	6457.957	-10056.3	-8.2	3934.0	-15.15	-0.21	-3.97
11906.0	1661.749	49.191	6465.817	-10086.6	-8.7	3926.1	-15.19	-0.21	-3.93
S-IVB SECOND GUIDANCE CUTOFF									
11907.640	1645.188	49.177	6472.250	-10111.5	-9.0	3919.8	-15.21	-0.24	-3.92
11908.0	1641.547	49.173	6473.660	-10115.0	-9.0	3917.5	-4.11	0.09	-7.92
11910.0	1621.319	49.155	6481.476	-10120.2	-9.2	3900.5	-2.16	-0.06	-8.69
11912.0	1601.074	49.137	6489.250	-10124.5	-9.3	3883.1	-2.14	-0.06	-8.69
11914.0	1580.821	49.118	6497.008	-10128.8	-9.5	3865.7	-2.12	-0.06	-8.70
11916.0	1560.559	49.099	6504.723	-10133.0	-9.6	3848.3	-2.08	-0.06	-8.69
TRANSLUNAR INJECTION									
11917.640	1543.933	49.083	6511.022	-10136.4	-9.7	3834.1	-2.06	-0.06	-8.69
11950.0	1214.928	48.737	6630.558	-10195.4	-11.8	3553.9	-1.59	-0.07	-8.64
12000.0	703.473	48.068	6797.501	-10256.9	-15.0	3125.0	-0.68	-0.06	-8.50
12050.0	189.806	47.243	6943.210	-10284.3	-18.0	2705.3	-0.23	-0.06	-8.27
12100.0	-326.439	46.270	7068.260	-10280.5	-20.9	2299.2	0.36	-0.06	-7.96

TABLE B-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
12150.0	-837.782	45.157	7173.411	-10248.8	-23.6	1909.9	0.88	-0.05	-7.60
12200.0	-1348.918	43.914	7259.571	-10192.9	-26.1	1539.9	1.33	-0.05	-7.20
12250.0	-1856.724	42.551	7327.744	-10116.2	-28.4	1190.7	1.71	-0.05	-6.77
12300.0	-2360.253	41.078	7378.998	-10022.4	-30.5	863.1	2.02	-0.04	-6.33
12350.0	-2858.730	39.503	7414.422	-9914.6	-32.4	557.5	2.27	-0.04	-5.89
12400.0	-3351.532	37.838	7435.107	-9795.9	-34.2	273.5	2.46	-0.04	-5.47
12450.0	-3839.180	36.090	7442.120	-9668.8	-35.7	10.5	2.60	-0.03	-5.06
12500.0	-4318.314	34.268	7436.488	-9535.7	-37.1	-232.5	2.70	-0.03	-4.66
12550.0	-4791.691	32.379	7419.191	-9398.4	-38.4	-456.4	2.77	-0.03	-4.29
12600.0	-5258.117	30.432	7391.151	-9258.7	-39.5	-662.4	2.80	-0.03	-3.95
12650.0	-5717.530	28.431	7353.231	-9117.8	-40.5	-851.7	2.81	-0.02	-3.63
12700.0	-6169.891	26.384	7306.235	-8976.9	-41.4	-1025.6	2.81	-0.02	-3.33
12750.0	-6615.220	24.295	7250.906	-8836.6	-42.2	-1185.3	2.78	-0.02	-3.06
12800.0	-7053.575	22.169	7187.927	-8697.9	-42.9	-1331.8	2.75	-0.02	-2.80
12850.0	-7485.046	20.012	7117.928	-8561.3	-43.4	-1466.2	2.70	-0.01	-2.57
12900.0	-7909.746	17.833	7041.486	-8427.1	-43.8	-1589.7	2.65	-0.01	-2.36
12950.0	-8327.806	15.634	6959.131	-8295.8	-44.2	-1703.0	2.59	-0.01	-2.17
13000.0	-8739.371	13.419	6871.344	-8167.4	-44.4	-1807.0	2.53	-0.01	-1.99
13050.0	-9144.595	11.190	6778.570	-8042.1	-44.7	-1902.6	2.46	-0.01	-1.83
13100.0	-9543.639	8.950	6681.212	-7920.1	-44.9	-1990.5	2.40	-0.01	-1.68
13150.0	-9936.663	6.700	6579.638	-7801.4	-45.1	-2071.3	2.33	-0.01	-1.55
13200.0	-10323.836	4.444	6474.189	-7686.0	-45.2	-2145.7	2.26	-0.01	-1.42
13250.0	-10705.322	2.182	6365.169	-7573.9	-45.3	-2214.1	2.20	-0.01	-1.31
13300.0	-11081.283	-0.084	6252.863	-7465.1	-45.4	-2277.2	2.13	-0.01	-1.21
	CSM SEPARATION								
13347.600	11434.196	-2.246	6143.130	-7364.4	-45.4	-2332.6	2.07	-0.01	-1.12

TABLE B-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN AND TRANSLUNAR PHASES

TIME SEC	GC DIST KM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
BEGIN S-IVB RESTART PREPARATIONS - START OF TIMEBASE 6										
10978.600	6555.150	-116.8998	27.8409	96.81	0.01	7377.6	96.45	0.01	7797.5	181666
10990.0	6555.155	-116.7984	27.8301	96.87	0.01	7377.6	96.50	0.01	7797.5	181668
10990.0	6555.168	-116.0750	27.7509	97.25	0.01	7377.7	96.85	0.01	7797.5	181656
11000.0	6555.180	-115.3528	27.6674	97.62	0.01	7377.7	97.21	0.01	7797.5	181642
11010.0	6555.191	-114.6317	27.5798	98.00	0.01	7377.7	97.56	0.01	7797.5	181626
11020.0	6555.201	-113.9119	27.4880	98.37	0.01	7377.7	97.92	0.01	7797.5	181609
11030.0	6555.211	-113.1934	27.3920	98.74	0.01	7377.8	98.27	0.01	7797.5	181589
11040.0	6555.221	-112.4762	27.2920	99.11	0.01	7377.8	98.62	0.01	7797.5	181568
11050.0	6555.230	-111.7604	27.1878	99.48	0.01	7377.8	98.97	0.01	7797.5	181545
11060.0	6555.238	-111.046	27.0795	99.85	0.01	7377.9	99.31	0.01	7797.6	181520
11070.0	6555.245	-110.3333	26.9673	100.21	0.01	7377.9	99.66	0.01	7797.6	181494
11080.0	6555.252	-109.6220	26.8509	100.57	0.01	7378.0	100.00	0.00	7797.6	181466
11090.0	6555.258	-108.9122	26.7306	100.93	0.00	7378.0	100.34	0.00	7797.6	181436
11100.0	6555.264	-108.2041	26.6064	101.29	0.00	7378.1	100.67	0.00	7797.6	181404
11110.0	6555.269	-107.497	26.4782	101.64	0.00	7378.1	101.01	0.00	7797.7	181370
11120.0	6555.273	-106.7929	26.3461	102.00	0.00	7378.2	101.34	0.00	7797.7	181335
11130.0	6555.27	-106.0839	26.2101	102.35	0.00	7378.2	101.67	0.00	7797.7	181299
11140.0	6555.280	-105.3886	26.0703	102.69	0.00	7378.3	102.00	0.00	7797.7	181260
11150.0	6555.282	-104.6891	25.9267	103.04	0.00	7378.3	102.33	0.00	7797.8	181220
11160.0	6555.284	-103.9914	25.7793	103.38	0.00	7378.4	102.65	0.00	7797.8	181178
11170.0	6555.285	-103.2956	25.6282	103.72	0.00	7378.5	102.97	0.00	7797.8	181136
11180.0	6555.286	-102.6017	25.4734	104.06	0.00	7378.5	103.29	0.00	7797.8	181091
11190.0	6555.285	-101.9097	25.3149	104.39	-0.00	7378.6	103.60	-0.00	7797.9	181045
11200.0	6555.285	-101.2197	25.1528	104.73	-0.00	7378.7	103.92	-0.00	7797.9	180997
11210.0	6555.283	-100.5316	24.9870	105.05	-0.00	7378.7	104.23	-0.00	7798.0	180948
11220.0	6555.2 1	-99.8454	24.8178	105.38	-0.00	7378.8	104.53	-0.00	7798.0	180898
11230.0	6555.278	-99.1613	24.6450	105.70	-0.00	7378.9	104.84	-0.00	7798.0	180846
11240.0	6555.275	-98.4793	24.4687	106.02	-0.00	7379.0	105.14	-0.00	7798.1	180793
11250.0	6555.271	-97.7992	24.2889	106.34	-0.00	7379.0	105.44	-0.00	7798.1	180738
11260.0	6555.266	-97.1212	24.1058	106.65	-0.00	7379.1	105.73	-0.00	7798.2	180682
11270.0	6555.261	-96.4453	23.9193	106.96	-0.00	7379.2	106.03	-0.00	7798.2	180625
11280.0	6555.255	-95.7715	23.7294	107.27	-0.00	7379.3	106.32	-0.00	7798.2	180566
11290.0	6555.249	-95.0998	23.5363	107.58	-0.0	7379.4	106.60	-0.01	7798.3	180507
11300.0	6555.241	-94.4302	23.3399	107.89	-0.01	7379.5	106.89	-0.01	7798.3	180446
11310.0	6555.234	-93.7627	23.1403	108.18	-0.01	7379.6	107.17	-0.01	7798.4	180384
11320.0	6555.225	-93.0973	22.9375	108.47	-0.01	7379.6	107.45	-0.01	7798.4	180321
11330.0	6555.216	-92.4340	22.7316	108.76	-0.01	7379.7	107.72	-0.01	7798.5	180256
11340.0	6555.206	-91.7729	22.5226	109.05	-0.01	7379.8	107.99	-0.01	7798.5	180191
11350.0	6555.196	-91.1139	22.3105	109.34	-0.01	7379.9	108.26	-0.01	7798.6	180125
11360.0	6555.185	-90.4571	22.0954	109.62	-0.01	7380.0	108.52	-0.01	7798.6	180057

TABLE B-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

TIME SEC	GC DIST KM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
11370.0	6555.173	-89.8024	21.8774	109.89	-0.01	7380.1	108.79	-0.01	7798.7	179989
11380.0	6555.161	-89.1498	21.6564	110.17	-0.01	7380.2	109.04	-0.01	7798.7	179920
11390.0	6555.148	-88.4994	21.4326	110.44	-0.01	7380.3	109.30	-0.01	7798.8	179850
11400.0	6555.135	-87.8511	21.2059	110.71	-0.01	7380.4	109.55	-0.01	7798.9	179779
11410.0	6555.120	-87.2049	20.9764	110.97	-0.01	7380.5	109.80	-0.01	7798.9	179707
11420.0	6555.106	-86.56.8	20.7441	111.23	-0.01	7380.6	110.04	-0.01	7799.0	179634
11430.0	6555.090	-85.91.9	20.5091	111.49	-0.01	7380.7	110.28	-0.01	7799.0	179561
11440.0	6555.074	-85.2790	20.2715	111.74	-0.01	7380.8	110.52	-0.01	7799.1	179486
11450.0	6555.057	-84.6413	20.0312	111.99	-0.01	7380.9	110.76	-0.01	7799.2	179411
11460.0	6555.040	-84.0056	19.7883	112.24	-0.01	7381.1	110.99	-0.01	7799.2	179336
11470.0	6555.022	-83.3720	19.5428	112.48	-0.01	7381.2	111.22	-0.01	7799.3	179259
11480.0	6555.004	-82.7404	19.2949	112.72	-0.01	7381.3	111.44	-0.01	7799.4	179183
11490.0	6554.984	-82.1109	19.0444	112.96	-0.02	7381.4	111.66	-0.01	7799.5	179105
11500.0	6554.965	-81.4834	18.7916	3.19	-0.02	7381.6	111.88	-0.01	7799.6	179027
11510.0	6554.943	-80.8579	18.5363	113.42	-0.02	7381.6	112.09	-0.02	7799.6	178948
11520.0	6554.921	-80.2345	18.2787	113.64	-0.02	7381.7	112.30	-0.02	7799.6	178868
11530.0	6554.897	-79.6130	18.0188	113.86	-0.02	7381.8	112.51	-0.02	7799.6	178787
11540.0	6554.872	-78.9935	17.7567	114.08	-0.02	7381.8	112.72	-0.02	7799.6	178704
11550.0	6554.845	-78.3759	17.4923	114.29	-0.02	7381.9	112.92	-0.02	7799.6	178620
	S-IVB SECOND IGNITION (STDV OPEN)									
11556.600	6554.827	-77.9693	17.3166	114.43	-0.02	7381.9	113.05	-0.02	7799.7	178564
11558.0	6554.823	-77.8832	17.2792	114.46	-0.02	7383.3	113.07	-0.02	7801.0	178552
11560.0	6554.818	-77.7601	17.2257	114.50	-0.02	7392.3	113.11	-0.02	7810.0	178535
11562.0	554.812	-77.6369	17.1720	114.54	-0.02	7403.4	113.15	-0.02	7821.2	178519
11564.0	554.807	-77.5136	17.1182	114.58	-0.02	7414.8	113.19	-0.02	7832.6	178502
11566.0	6554.803	-77.3902	17.0642	114.62	-0.02	7426.3	113.23	-0.02	7844.0	178487
11568.0	6554.799	-77.2667	17.0100	114.66	-0.02	7437.8	113.27	-0.01	7855.6	178471
11570.0	6554.795	-77.1431	16.9557	114.70	-0.02	7449.4	113.30	-0.02	7867.1	178456
11572.0	6554.790	-77.0193	16.9012	114.73	-0.02	7461.0	113.34	-0.02	7878.8	178440
11574.0	6554.785	-76.8954	16.8466	114.77	-0.02	7472.7	113.38	-0.02	7890.4	178423
11576.0	6554.779	-76.7714	16.7917	114.81	-0.03	7484.5	113.41	-0.02	7902.2	178405
11578.0	6554.771	-76.6473	16.7368	114.84	-0.03	7496.2	113.45	-0.03	7914.0	178387
11580.0	6554.763	-76.5231	16.6816	114.88	-0.03	7508.1	113.49	-0.03	7925.8	178367
11582.0	6554.755	-76.3987	16.6263	114.92	-0.03	7519.9	113.52	-0.03	7937.6	178348
11584.0	6554.746	-76.2742	16.5708	114.95	-0.04	7531.8	113.56	-0.03	7949.5	178327
11586.0	6554.737	-76.1496	16.5152	114.99	-0.04	7543.8	113.60	-0.03	7961.5	178306
11588.0	6554.727	-76.0249	16.4594	115.03	-0.04	7555.7	113.64	-0.03	7973.5	178285
11590.0	6554.717	-75.9000	16.4034	115.07	-0.04	7567.8	113.67	-0.03	7985.5	178264
11592.0	54.708	-75.7750	16.3473	115.10	-0.04	7579.8	113.71	-0.03	7997.5	178243
11594.0	6554.698	-75.6499	16.2910	115.14	-0.04	7591.9	113.75	-0.03	8009.6	178221
11596.0	6554.689	-75.5246	16.2345	115.18	-0.03	7604.0	113.78	-0.03	8021.7	1782

TABLE B-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

TIME SEC	GC DIST KM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
11598.0	6554.679	-75.3993	16.1779	115.21	-0.03	7616.2	113.82	-0.03	8033.9	178181
11600.0	6554.671	-75.2738	16.1211	115.25	-0.03	7628.4	113.86	-0.03	8046.1	178161
11602.0	6554.663	-75.1482	16.0641	115.29	-0.03	7640.6	113.89	-0.03	8058.3	178142
11604.0	6554.655	-75.0224	16.0070	115.32	-0.03	7652.9	113.93	-0.02	8070.6	178123
11606.0	6554.649	-74.8965	15.9497	115.36	-0.02	7665.2	113.97	-0.02	8082.9	178105
11608.0	6554.643	-74.7705	15.8922	115.40	-0.02	7677.5	114.00	-0.02	8095.2	178088
11610.0	6554.639	-74.6444	15.8345	115.43	-0.01	7689.9	114.04	-0.01	8107.5	178072
11612.0	6554.636	-74.5181	15.7767	115.47	-0.01	7702.3	114.08	-0.01	8119.9	178058
11614.0	6554.634	-74.3918	15.7187	115.51	-0.00	7714.7	114.11	-0.00	8132.4	178045
11616.0	6554.634	-74.2652	15.6605	115.54	0.00	7727.2	114.15	0.00	8144.8	178033
11618.0	6554.635	-74.1386	15.6022	115.58	0.01	7739.7	114.18	0.01	8157.3	178023
11620.0	6554.638	-74.0118	15.5437	115.62	0.02	7752.3	114.22	0.01	8169.9	178015
11622.0	6554.643	-73.8849	15.4850	115.65	0.02	7764.8	114.26	0.02	8182.5	178009
11624.0	6554.651	-73.7578	15.4261	115.69	0.03	7777.5	114.29	0.03	8195.1	178005
11626.0	6554.660	-73.6307	15.3671	115.72	0.04	7790.1	114.33	0.04	8207.8	178003
11628.0	6554.672	-73.5034	15.3079	115.76	0.05	7802.8	114.36	0.05	8220.4	178003
11630.0	6554.686	-73.3759	15.2485	115.80	0.06	7815.5	114.40	0.05	8233.2	178006
11632.0	6554.703	-73.2483	15.1890	115.83	0.07	7828.3	114.43	0.06	8245.9	178012
11634.0	6554.723	-73.1206	15.1293	115.87	0.08	7841.1	114.47	0.07	8258.7	178020
11636.0	6554.746	-72.9928	15.0694	115.90	0.09	7853.9	114.51	0.08	8271.6	178032
11638.0	6554.772	-72.8648	15.0093	115.94	0.10	7866.9	114.54	0.09	8284.4	178046
11640.0	6554.801	-72.7367	14.9491	115.97	0.11	7879.7	114.58	0.11	8297.3	178064
11642.0	6554.833	-72.6085	14.9887	116.01	0.12	7892.6	114.61	0.12	8310.3	178086
11644.0	6554.869	-72.4801	14.8281	116.04	0.14	7905.6	114.65	0.13	8323.2	178111
11646.0	6554.909	-72.3516	14.7673	116.08	0.15	7918.6	114.68	0.14	8336.2	178139
11648.0	6554.953	-72.2229	14.7064	116.11	0.17	7931.6	114.72	0.16	8349.3	178172
11650.0	6555.001	-72.0941	14.6453	116.15	0.18	7944.8	114.75	0.17	8362.4	178208
11652.0	6555.053	-71.9652	14.5840	116.18	0.19	7959.9	114.78	0.18	8377.5	178249
11654.0	6555.109	-71.8360	14.5225	116.21	0.21	7975.0	114.82	0.20	8392.6	178294
11656.0	6555.170	-71.7067	14.4608	116.25	0.23	7990.1	114.85	0.21	8407.7	178343
11658.0	6555.235	-71.5773	14.3989	116.28	0.24	8005.3	114.89	0.23	8422.9	178398
11660.0	6555.305	-71.4477	14.3369	116.31	0.26	8020.5	114.92	0.25	8438.1	178457
11662.0	6555.381	-71.3179	14.2746	116.35	0.28	8035.7	114.95	0.26	8453.4	178521
11664.0	6555.461	-71.1879	14.2122	116.38	0.30	8051.0	114.99	0.28	8468.7	178590
11666.0	6555.547	-71.0577	14.1496	116.41	0.31	8066.5	115.02	0.30	8484.1	178665
11668.0	6555.638	-70.9274	14.0867	116.45	0.33	8081.9	115.05	0.32	8499.5	178745
11670.0	6555.736	-70.7969	14.0237	116.48	0.35	8097.4	115.09	0.34	8515.0	178831
11672.0	6555.839	-70.6663	13.9605	116.51	0.38	8112.9	115.12	0.36	8530.5	178923
11674.0	6555.948	-70.5354	13.8971	116.55	0.40	8128.5	115.15	0.38	8546.1	179021
11676.0	6556.064	-70.4044	13.8335	116.58	0.42	8144.1	115.19	0.40	8561.8	179126
11678.0	6556.186	-70.2732	13.7697	116.61	0.44	8159.8	115.22	0.42	8577.4	179237
11680.0	6556.315	-70.1418	13.7058	116.64	0.47	8175.5	115.25	0.44	8593.2	179356
11682.0	6556.452	-70.0103	13.6416	116.68	0.49	8191.3	115.29	0.47	8609.0	179481

TABLE B-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

TIME SEC	GC DIST KM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
11684.0	6556.595	-69.8786	13.5772	116.71	0.51	8207.1	115.32	0.49	8624.8	179613
11686.0	6556.746	-69.7467	13.5127	116.74	0.54	8223.0	115.35	0.51	8640.7	179753
11688.0	6556.904	-69.6146	13.4479	116.77	0.56	8238.9	115.38	0.54	8656.6	179900
11690.0	6557.071	-69.4823	13.3830	116.80	0.59	8254.9	115.42	0.56	8672.6	180056
11692.0	6557.245	-69.3499	13.3178	116.83	0.62	8271.0	115.45	0.59	8688.7	180219
11694.0	6557.428	-69.2173	13.2525	116.87	0.65	8287.1	115.48	0.62	8704.8	180391
11696.0	6557.619	-69.0845	13.1869	116.90	0.67	8303.3	115.51	0.64	8721.0	180571
11698.0	6557.819	-68.9515	13.1212	116.93	0.70	8319.5	115.55	0.67	8737.2	180761
11700.0	6558.028	-68.8183	13.0553	116.96	0.73	8335.7	115.58	0.70	8753.5	180959
11702.0	6558.246	-68.6850	12.9891	116.99	0.76	8352.1	115.61	0.73	8769.8	181166
11704.0	6558.474	-68.5514	12.9228	117.02	0.80	8368.5	115.64	0.76	8786.2	181382
11706.0	6558.711	-68.4177	12.8563	117.05	0.83	8384.9	115.67	0.79	8802.7	181609
11708.0	6558.958	-68.2838	12.7896	117.08	0.86	8401.4	115.70	0.82	8819.2	181845
11710.0	6559.215	-68.1497	12.7227	117.11	0.89	8417.9	115.73	0.85	8835.7	182091
11712.0	6559.482	-68.0154	12.6555	117.14	0.93	8434.6	115.77	0.88	8852.4	182348
11714.0	6559.760	-67.8810	12.5882	117.17	0.96	8451.2	115.80	0.91	8869.1	182615
11716.0	6560.049	-67.7463	12.5207	117.20	0.99	8468.0	115.83	0.95	8885.8	182893
11718.0	6560.349	-67.6115	12.4530	117.23	1.03	8484.8	115.86	0.98	8902.6	183182
11720.0	6560.659	-67.4765	12.3851	117.26	1.07	8501.6	115.89	1.02	8919.5	183482
11722.0	6560.982	-67.3413	12.3170	117.29	1.10	8518.5	115.92	1.05	8936.4	183793
11724.0	6561.316	-67.2059	12.2487	117.32	1.14	8535.5	115.95	1.09	8953.4	184117
11726.0	6561.662	-67.0703	12.1802	117.35	1.18	8552.5	115.98	1.12	8970.4	184452
11728.0	6562.020	-66.9345	12.1114	117.38	1.22	8569.6	116.01	1.16	8987.5	184800
11730.0	6562.391	-66.7985	12.0425	117.41	1.26	8586.7	116.04	1.20	9004.7	185160
11732.0	6562.774	-66.6623	11.9734	117.44	1.30	8603.9	116.07	1.24	9021.9	185533
11734.0	6563.170	-66.5260	11.9041	117.47	1.34	8621.2	116.10	1.28	9039.2	185918
11736.0	6563.580	-66.3894	11.8346	117.50	1.38	8638.5	116.13	1.32	9056.5	186317
11738.0	6564.003	-66.2527	11.7649	117.53	1.42	8655.9	116.16	1.36	9073.9	186730
11740.0	6564.439	-66.1158	11.6950	117.55	1.46	8673.3	116.19	1.40	9091.3	187156
11742.0	6564.890	-65.9786	11.6249	117.58	1.51	8690.8	116.22	1.44	9108.9	187596
11744.0	6565.354	-65.8413	11.5545	117.61	1.55	8708.4	116.25	1.48	9126.5	188050
11746.0	6565.833	-65.7038	11.4840	117.64	1.60	8726.0	116.27	1.52	9144.1	188519
11748.0	6566.327	-65.5661	11.4133	117.67	1.64	8743.7	116.30	1.57	9161.8	189003
11750.0	6566.836	-65.4282	11.3424	117.69	1.69	8761.5	116.33	1.61	9179.6	189501
11752.0	6567.360	-65.2901	11.2712	117.72	1.74	8779.3	116.36	1.66	9197.5	190015
11754.0	6567.900	-65.1517	11.1999	117.75	1.78	8797.2	116.39	1.70	9215.4	190545
11756.0	6568.455	-65.0132	11.1284	117.78	1.83	8815.2	116.42	1.75	9233.4	191090
11758.0	6569.027	-64.8745	11.0567	117.80	1.88	8833.2	116.44	1.79	9251.4	191651
11760.0	6569.614	-64.7356	10.9847	117.83	1.93	8851.3	116.47	1.84	9269.5	192229
11762.0	6570.219	-64.5965	10.9126	117.86	1.98	8869.4	116.50	1.89	9287.7	192823
11764.0	6570.840	-64.4572	10.8402	117.88	2.03	8887.6	116.53	1.94	9305.9	193434
11766.0	6571.478	-64.3177	10.7677	117.91	2.08	8905.9	116.55	1.99	9324.2	194062
11768.0	6572.134	-64.1780	10.6950	117.94	2.13	8924.2	116.58	2.04	9342.6	194708

TABLE B-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

TIME SEC	GC DIST KM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
11770.0	6572.807	-64.0381	10.6220	117.96	2.19	8942.6	116.61	2.09	9361.0	195371
11772.0	6573.498	-63.8980	10.5480	117.99	2.24	8961.1	116.64	2.14	9379.6	196052
11774.0	6574.208	-63.7577	10.4755	118.01	2.29	8979.7	116.66	2.19	9398.1	196752
11776.0	6574.936	-63.6172	10.4019	118.04	2.35	8998.3	116.69	2.24	9416.8	197470
11778.0	6575.682	-63.4765	10.3282	118.07	2.40	9017.0	116.72	2.30	9435.5	198207
11780.0	6576.448	-63.3356	10.2542	118.09	2.46	9035.8	116.74	2.35	9454.3	198963
11782.0	6577.234	-63.1944	10.1800	118.12	2.52	9054.6	116.77	2.40	9473.2	199739
11784.0	6578.038	-63.0531	10.1057	118.14	2.57	9073.5	116.79	2.46	9492.2	200534
11786.0	6578.863	-62.9116	10.0311	118.17	2.63	9092.5	116.82	2.52	9511.2	201349
11788.0	6579.708	-62.7698	9.9563	118.19	2.69	9111.6	116.85	2.57	9530.3	202185
11790.0	6580.574	-62.6279	9.8813	118.21	2.75	9130.7	116.87	2.63	9549.4	203041
11792.0	6581.460	-62.4857	9.8062	118.24	2.81	9149.9	116.90	2.69	9568.7	203918
11794.0	6582.368	-62.3434	9.7308	118.26	2.87	9169.1	116.92	2.74	9588.0	204816
11796.0	6583.297	-62.2008	9.6552	118.29	2.93	9188.5	116.95	2.80	9607.3	205735
11798.0	6584.247	-62.0580	9.5794	118.31	2.99	9207.9	116.97	2.86	9626.8	206676
11800.0	6585.220	-61.9150	9.5034	118.33	3.05	9227.4	117.00	2.92	9646.4	207639
11802.0	6586.214	-61.7718	9.4272	118.36	3.12	9247.0	117.02	2.98	9666.0	208625
11804.0	6587.232	-61.6284	9.3508	118.38	3.18	9266.7	117.05	3.04	9685.7	209633
11806.0	6588.272	-61.4848	9.2742	118.40	3.25	9286.5	117.07	3.11	9705.5	210664
11808.0	6589.335	-61.3409	9.1974	118.43	3.31	9306.3	117.09	3.17	9725.4	211718
11810.0	6590.422	-61.1969	9.1203	118.45	3.38	9326.2	117.12	3.23	9745.3	212795
11812.0	6591.532	-61.0526	9.0431	118.47	3.44	9346.2	117.14	3.29	9765.4	213897
11814.0	6592.666	-60.9082	8.9657	118.49	3.51	9366.3	117.16	3.36	9785.5	215022
11816.0	6593.825	-60.7635	8.8881	119.52	3.58	9386.4	117.19	3.42	9805.7	216172
11818.0	6595.009	-60.6186	8.8103	118.54	3.64	9406.7	117.21	3.49	9826.0	217347
11820.0	6596.217	-60.4735	8.7322	118.56	3.71	9427.0	117.23	3.56	9846.4	218547
11822.0	6597.451	-60.3281	8.6540	118.58	3.78	9447.4	117.26	3.62	9866.8	219772
11824.0	6598.710	-60.1826	8.5756	118.60	3.85	9467.9	117.28	3.69	9887.4	221022
11826.0	6599.996	-60.0368	8.4969	118.62	3.92	9488.5	117.30	3.76	9908.0	222299
11828.0	6601.307	-59.8908	8.4181	118.64	3.99	9509.2	117.32	3.82	9928.8	223602
11830.0	6602.645	-59.7446	8.3391	118.67	4.07	9530.0	117.35	3.89	9949.6	224931
11832.0	6604.010	-59.5982	8.2598	118.69	4.14	9550.9	117.37	3.96	9970.5	226287
11834.0	6605.402	-59.4516	8.1804	118.71	4.21	9571.8	117.39	4.03	9991.5	227671
11836.0	6606.821	-59.3047	8.1007	118.73	4.28	9592.8	117.41	4.10	10012.6	229082
11838.0	6608.268	-59.1577	8.0209	118.75	4.36	9613.9	117.43	4.18	10033.7	230521
11840.0	6609.744	-59.0104	7.9408	118.77	4.43	9635.1	117.45	4.25	10055.0	231988
11842.0	6611.247	-58.8629	7.8606	118.79	4.51	9656.5	117.47	4.32	10076.4	233483
11844.0	6612.780	-58.7151	7.7802	118.81	4.58	9677.9	117.49	4.39	10097.9	235008
11846.0	6614.341	-58.5672	7.6995	118.82	4.66	9699.5	117.52	4.47	10119.5	236561
11848.0	6615.932	-58.4190	7.6187	118.84	4.74	9721.2	117.54	4.54	10141.3	238144
11850.0	6617.552	-58.2706	7.5376	118.86	4.81	9742.9	117.56	4.61	10163.1	239756
11852.0	6619.203	-58.1219	7.4564	118.88	4.89	9764.9	117.58	4.69	10185.1	241399
11854.0	6620.883	-57.9731	7.3749	118.90	4.97	9786.9	117.60	4.77	10207.2	243071

TABLE B-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

TIME SEC	GC DIST KM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
11856.0	6622.595	-57.8240	7.2933	118.92	5.05	9809.0	117.61	4.84	10229.4	244775
11858.0	6624.337	-57.6747	7.2114	118.94	5.13	9831.3	117.63	4.92	10251.7	246509
11860.0	6626.110	-57.5252	7.1293	118.95	5.21	9853.6	117.65	5.00	10274.1	248275
11862.0	6627.915	-57.3754	7.0471	118.97	5.29	9876.1	117.67	5.07	10296.6	250073
1 .0	6629.752	-57.2254	6.9646	118.99	5.37	9898.7	117.69	5.15	10319.3	251902
11866.0	6631.621	-57.0752	6.8820	119.00	5.45	9921.4	117.71	5.23	10342.1	253763
11868.0	6633.522	-56.9247	6.7991	119.02	5.53	9944.2	117.73	5.31	10365.0	255657
11870.0	6635.454	-56.7740	6.7161	119.04	5.62	9967.2	117.75	5.39	10388.0	257584
11872.0	6637.423	-56.6231	6.6328	119.05	5.70	9990.2	117.76	5.47	10411.1	259544
11874.0	6639.424	-56.4720	6.5494	119.07	5.78	10013.4	117.78	5.55	10434.3	261537
11876.0	6641.458	-56.3206	6.4658	119.09	5.86	10036.7	117.80	5.63	10457.7	263565
11878.0	6643.526	-56.1689	6.3819	119.10	5.95	10060.1	117.82	5.71	10481.2	265626
11880.0	6645.629	-56.0171	6.2979	119.12	6.03	10083.7	117.83	5.79	10504.9	267721
11882.0	6647.765	-55.8650	6.2136	119.13	6.12	10107.4	117.85	5.87	10528.6	269851
11884.0	6649.936	-55.7127	6.1292	119.15	6.20	10131.1	117.87	5.95	10552.5	272015
11886.0	6652.141	-55.5601	6.0446	119.16	6.28	10155.0	117.88	6.03	10576.4	274213
11888.0	6654.379	-55.4073	5.9597	119.18	6.36	10179.0	117.90	6.11	10600.5	276445
11890.0	6656.652	-55.2542	5.8747	119.19	6.44	10203.2	117.91	6.19	10624.8	278711
11892.0	6658.959	-55.1009	5.7895	119.20	6.53	10227.5	117.93	6.27	10649.1	281012
11894.0	6661.302	-54.9474	5.7041	119.22	6.61	10251.9	117.94	6.35	10673.6	283348
11896.0	6663.680	-54.7936	5.6185	119.23	6.69	10276.4	117.96	6.43	10698.3	285720
11898.0	6666.094	-54.6396	5.5327	119.24	6.78	10301.2	117.97	6.51	10723.1	288128
11900.0	6668.545	-54.4853	5.4466	119.26	6.87	10326.0	117.99	6.60	10748.0	290572
11902.0	6671.033	-54.3308	5.3605	119.27	6.96	10351.0	118.00	6.68	10773.1	293054
11904.0	6673.559	-54.1760	5.2741	119.28	7.04	10376.2	118.02	6.77	10798.4	295574
11906.0	6676.123	-54.0210	5.1875	119.29	7.13	10401.5	118.03	6.85	10823.8	298132
S-IVB SECOND GUIDANCE CUTOFF										
11907.640	6678.254	-53.8938	5.1163	119.30	7.21	10422.3	118.04	6.93	10844.6	300259
11908.0	6678.725	-53.8658	5.1007	119.31	7.22	10424.7	118.04	6.94	10847.1	300729
11910.0	6681.364	-53.7106	5.0139	119.32	7.32	10423.4	118.06	7.03	10845.9	303362
11912.0	6684.036	-53.5555	4.9271	119.34	7.41	10421.1	118.07	7.12	10843.7	306029
11914.0	6686.742	-53.4005	4.8403	119.35	7.51	10418.8	118.08	7.21	10841.4	308729
11916.0	6689.482	-53.2458	4.7535	119.37	7.60	10416.5	118.10	7.30	10839.1	311464
TRANSLUNAR INJECTION										
11917.640	6691.753	-53.1190	4.6824	119.38	7.68	10414.5	118.11	7.38	10837.3	313730
11950.0	6741.122	-50.6423	3.2850	119.59	9.20	10372.9	118.29	8.93	10797.1	363026
12000.0	6833.974	-46.9111	1.1581	119.79	11.50	10295.5	118.44	11.04	10722.4	455817
12050.0	6945.965	-43.3020	-0.9112	119.85	13.74	10204.0	118.45	13.17	10634.2	567804
12100.0	7075.854	-39.8195	-2.9059	119.77	15.91	10100.5	118.33	15.23	10534.5	697743

TABLE B-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

TIME SEC	GC DIST KM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	ALTITUDE M
12150.0	7222.309	-36.4662	-4.8128	119.58	18.00	9987.0	118.09	17.22	10425.3	844294
12200.0	7383.961	-33.2430	-6.6227	119.28	20.01	9865.7	117.74	19.12	10308.6	1006081
12250.0	7559.436	-30.1497	-8.3296	118.90	21.94	9738.2	117.31	20.93	10186.1	1181721
12300.0	7747.393	-27.1847	-9.9308	118.44	23.79	9606.4	116.81	22.66	10059.5	1369866
12350.0	7946.543	-24.3458	-11.4259	117.92	25.56	9471.7	116.24	24.30	9930.3	1569221
12400.0	8155.674	-21.6300	-12.8167	117.36	27.25	9335.4	115.62	25.86	9799.8	1778565
12450.0	8373.653	-19.0339	-14.1063	116.75	28.87	9198.7	114.97	27.34	9668.9	1996764
12500.0	8599.440	-16.5534	-15.2990	116.11	30.41	9062.5	114.28	28.75	9538.6	2222769
12550.0	8832.080	-14.1846	-16.3997	115.45	31.88	8927.5	113.58	30.08	9409.6	2455627
12600.0	9070.712	-11.9230	-17.4138	114.77	33.29	8794.3	112.86	31.33	9282.4	2694470
12650.0	9314.557	-9.7644	-18.3470	114.08	34.64	8663.4	112.13	32.53	9157.5	2938519
12700.0	9562.914	-7.7043	-19.2047	113.39	35.93	8535.1	111.40	33.66	9035.3	3187072
12750.0	9815.160	-5.7383	-19.9926	112.70	37.16	8409.6	110.67	34.73	8915.8	3439504
12800.0	10070.735	-3.8621	-20.7159	112.00	38.35	8287.3	109.94	35.75	8799.4	3695256
12850.0	10329.144	-2.0715	-21.3797	111.32	39.49	8168.1	109.22	36.72	8686.0	3953832
12900.0	10589.944	-0.3623	-21.9888	110.64	40.57	8052.1	108.51	37.64	8575.9	4214789
12950.0	10852.746	1.2694	-22.5476	109.97	41.62	7939.4	107.81	38.51	8468.9	4477737
13000.0	11117.201	2.8275	-23.0603	109.31	42.64	7829.9	107.13	39.35	8365.0	4742329
13050.0	11383.003	4.3156	-23.5306	108.66	43.61	7723.6	106.45	40.14	8264.2	5008259
13100.0	11649.879	5.7372	-23.9621	108.03	44.56	7620.6	105.80	40.90	8166.6	5275255
13150.0	11917.590	7.0957	-24.3581	107.40	45.47	7520.6	105.15	41.62	8071.9	5543077
13200.0	12185.923	8.3943	-24.7215	106.79	46.35	7423.6	104.53	42.31	7980.0	5811512
13250.0	12454.690	9.6359	-25.0550	106.19	47.21	7329.6	103.92	42.97	7891.1	6080374
13300.0	12723.723	10.8235	-25.3612	105.61	48.04	7238.5	103.32	43.60	7804.8	6349496
	CSM SEPARATION									
13347.600	12979.942	11.9064	-25.6292	105.06	48.81	7154.3	102.77	44.18	7725.1	6605793

APPENDIX C

TIME HISTORY OF TRAJECTORY PARAMETERS - ENGLISH UNITS

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

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

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

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

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

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

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

Table C-VII gives the geographic polar coordinates for the second burn and translunar phases of flight.

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

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
GUIDANCE REFERENCE RELEASE									
-16.960	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-16.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-15.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-14.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-13.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-12.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-11.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-10.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-9.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-8.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-7.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-6.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-5.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-4.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-3.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-2.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
-1.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
ALL HOLDDOWN ARMS RELEASED									
0.200	366	0	0	0.0	0.0	0.0	0.0	0.0	0.0
LIFTOFF - START OF TIME BASE 1									
0.600	367	0	0	1.1	-0.0	-0.0	3.11	-0.02	-0.19
1.0	367	0	0	3.1	-0.0	-0.1	6.88	-0.02	-0.28
2.0	374	0	0	10.0	-0.0	-0.4	7.05	-0.03	-0.30
3.0	397	0	-1	17.2	-0.1	-0.7	7.23	-0.07	-0.30
4.0	408	0	-2	24.5	-0.1	-1.0	7.42	0.01	-0.27
5.0	436	0	-3	32.0	0.2	-1.3	7.60	0.64	-0.22
6.0	472	0	-4	39.7	1.1	-1.5	7.78	1.20	-0.18
7.0	516	2	-6	47.6	2.5	-1.6	7.97	1.49	-0.12
8.0	567	5	-8	55.6	4.0	-1.8	8.16	1.45	-0.16
9.0	627	10	-9	63.9	5.2	-1.9	8.35	0.88	-0.17
10.0	695	16	-11	72.3	5.7	-2.1	8.58	0.21	-0.15
11.0	772	21	-14	81.0	5.7	-2.2	8.78	-0.14	-0.17
12.0	857	27	-16	89.9	5.6	-2.4	8.97	-0.13	-0.16
13.0	952	33	-19	99.0	5.6	-2.6	9.21	0.17	-0.15
14.0	1056	39	-21	108.3	6.0	-2.7	9.41	0.44	-0.11

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

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	1169	44	-24	117.8	6.3	-2.7	9.62	0.08	0.07
16.0	1291	51	-26	127.6	6.0	-2.6	9.86	-0.49	0.22
17.0	1424	56	-29	137.6	5.5	-2.3	10.08	-0.52	0.27
18.0	1566	62	-31	147.7	5.0	-2.0	10.29	-0.56	0.36
19.0	1719	66	-33	158.1	4.4	-1.6	10.51	-0.51	0.59
20.0	1883	71	-34	168.8	4.0	-0.9	10.74	-0.28	0.82
21.0	2057	74	-34	179.6	3.7	0.1	10.95	-0.24	1.06
22.0	2242	78	-34	190.6	3.5	1.3	11.16	-0.21	1.32
23.0	2438	81	-32	201.9	3.2	2.7	11.36	-0.21	1.59
24.0	2646	84	-28	213.4	3.0	4.5	11.58	-0.22	1.87
25.0	2865	87	-23	225.1	2.8	6.5	11.81	-0.23	2.17
26.0	3096	90	-15	237.0	2.6	8.8	12.04	-0.23	2.50
27.0	3339	93	-5	249.2	2.4	11.5	12.28	-0.23	2.86
28.0	3595	95	8	261.6	2.1	14.5	12.52	-0.24	3.22
29.0	3862	97	24	274.2	1.9	18.0	12.76	-0.26	3.59
30.0	4143	98	44	287.1	1.6	21.7	13.00	-0.29	3.97
31.0	4437	100	68	300.2	1.3	25.9	13.24	-0.31	4.33
32.0	4744	101	96	313.6	1.0	30.4	13.48	-0.34	4.69
33.0	5064	102	129	327.2	0.6	35.2	13.74	-0.36	5.06
34.0	5398	102	166	341.1	0.2	40.5	13.99	-0.38	5.44
35.0	5746	102	210	355.2	-0.2	46.1	14.25	-0.40	5.83
36.0	6109	102	259	369.6	-0.6	52.2	14.51	-0.41	6.23
37.0	6485	101	314	384.2	-1.0	58.6	14.76	-0.40	6.65
38.0	6877	100	376	399.1	-1.3	65.5	15.01	-0.39	7.09
39.0	7284	98	445	414.2	-1.7	72.8	15.27	-0.37	7.54
40.0	7706	97	522	429.6	-2.1	80.6	15.53	-0.36	8.00
41.0	8143	94	607	445.3	-2.5	88.8	15.79	-0.36	8.49
42.0	8596	92	700	461.2	-2.8	97.6	16.04	-0.35	9.00
43.0	9066	89	802	477.4	-3.2	106.8	16.29	-0.34	9.54
44.0	9551	85	914	493.8	-3.5	116.7	16.53	-0.34	10.10
45.0	10053	82	1035	510.4	-3.8	127.0	16.76	-0.32	10.64
46.0	10572	78	1168	527.3	-4.1	137.9	16.99	-0.28	11.18
47.0	11108	73	1311	544.4	-4.4	149.4	17.23	-0.21	11.73
49.0	11661	69	1467	561.8	-4.5	161.4	17.47	-0.11	12.30
49.0	12231	64	1634	579.3	-4.6	174.0	17.70	-0.03	12.89
50.0	12823	60	1815	597.2	-4.6	187.2	17.94	0.05	13.51
51.0	13426	55	2009	615.2	-4.5	201.0	18.17	0.10	14.13
52.0	14050	51	2217	633.5	-4.4	215.5	18.40	0.13	14.77
53.0	14693	46	2440	652.0	-4.3	230.6	18.61	0.12	15.41
54.0	15354	42	2678	670.7	-4.2	246.3	18.82	0.09	16.02
55.0	16034	38	2933	689.7	-4.2	262.6	19.07	0.02	16.60
56.0	16734	34	3204	708.9	-4.2	279.4	19.32	-0.03	17.15
57.0	17452	30	3492	728.3	-4.2	296.8	19.58	-0.06	17.67

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

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	18190	25	3738	748.0	-4.3	314.7	19.84	-0.07	18.19
59.0	18948	21	4121	768.0	-4.3	333.2	20.09	-0.01	18.74
60.0	19726	17	4464	788.2	-4.2	352.2	20.33	0.09	19.31
61.0	20525	13	4826	808.7	-4.0	371.9	20.54	0.24	19.94
62.0	21344	9	5208	829.3	-3.7	392.2	20.70	0.37	20.64
63.0	22183	5	5611	850.0	-3.4	413.2	20.80	0.44	21.40
64.0	23044	2	6035	870.8	-3.0	435.0	20.93	0.45	22.22
65.0	23925	-1	6481	891.6	-2.5	457.7	20.85	0.43	23.08
66.0	24827	-3	6950	912.5	-2.1	481.2	20.96	0.40	23.95
67.0	25757	-5	7444	933.4	-1.7	505.6	20.89	0.38	24.81
MACH 1									
67.500	26219	-6	7700	943.9	-1.5	518.1	20.92	0.38	25.22
68.0	26694	-6	7962	954.3	-1.3	530.8	20.96	0.38	25.62
69.0	27659	-8	8505	975.4	-0.9	556.7	21.09	0.38	26.36
70.0	28645	-8	9075	996.5	-0.5	583.4	21.27	0.41	27.00
71.0	29652	-9	9672	1017.9	-0.2	610.6	21.50	0.47	27.57
72.0	30680	-9	10297	1039.5	0.3	638.4	21.76	0.57	28.12
73.0	31731	-8	10950	1061.4	1.0	666.9	22.03	0.70	28.72
74.0	32803	-6	11631	1083.6	1.9	696.0	22.29	0.93	29.39
75.0	33898	-4	12342	1106.0	3.0	725.8	22.53	1.23	30.15
76.0	35015	0	13083	1128.6	4.5	756.4	22.73	1.61	31.04
77.0	36155	5	13855	1151.4	6.3	788.0	22.89	2.00	32.01
78.0	37319	12	14659	1174.4	8.4	820.4	23.02	2.33	33.02
79.0	38504	22	15496	1197.4	10.8	853.9	23.13	2.56	34.02
80.0	39713	34	16367	1220.7	13.4	888.4	23.27	2.65	35.00
81.0	40946	49	17273	1244.1	16.0	923.9	23.43	2.61	35.97
82.0	42201	66	18215	1267.6	18.5	960.3	23.60	2.43	36.95
MAXIMUM DYNAMIC PRESSURE									
82.500	42838	75	18700	1279.4	19.7	978.9	23.68	2.29	37.46
83.0	43481	86	19194	1291.3	20.8	997.8	23.74	2.12	37.96
84.0	44784	107	20211	1315.0	22.6	1036.3	23.84	1.69	39.05
85.0	46111	131	21267	1338.8	24.1	1076.0	23.86	1.19	40.18
86.0	47462	155	22364	1362.7	25.0	1116.8	23.82	0.69	41.37
87.0	48836	181	23501	1386.4	25.5	1158.7	23.74	0.19	42.60
88.0	50235	206	24681	1410.2	25.5	1201.9	23.64	-0.22	43.85
89.0	51657	232	25905	1433.8	25.1	1246.4	23.54	-0.57	45.10
90.0	53102	256	27175	1457.3	24.4	1292.1	23.46	-0.82	46.33
91.0	54571	280	28490	1480.7	23.5	1339.0	23.41	-1.00	47.55
92.0	56063	303	29853	1504.1	22.4	1387.2	23.36	-1.13	48.75

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

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	57579	325	31265	1527.4	21.3	1436.5	23.30	-1.21	49.95
94.0	59118	346	32727	1550.7	20.0	1487.1	23.22	-1.25	51.17
95.0	60691	365	34239	1573.8	18.8	1538.9	23.12	-1.24	52.38
96.0	62266	383	35805	1596.9	17.6	1591.9	23.02	-1.17	53.59
97.0	63874	400	37424	1619.9	16.5	1646.1	22.92	-1.06	54.79
98.0	65506	416	39097	1642.7	15.5	1701.5	22.83	-0.94	56.00
99.0	67160	431	40827	1665.5	14.6	1758.1	22.74	-0.79	57.20
100.0	68837	446	42614	1688.2	13.9	1815.9	22.67	-0.64	58.38
101.0	70536	459	44459	1710.9	13.3	1874.8	22.64	-0.49	59.54
102.0	72259	472	46364	1733.6	12.9	1934.9	22.64	-0.36	60.66
103.0	74003	485	48329	1756.2	12.6	1996.1	22.66	-0.25	61.76
104.0	75771	498	50356	1778.9	12.4	2058.4	22.67	-0.17	62.84
105.0	77561	510	52446	1801.5	12.2	2121.8	22.68	-0.10	63.92
106.0	79374	522	54600	1824.2	12.1	2186.3	22.69	-0.08	64.99
107.0	81210	534	56819	1846.9	12.1	2251.8	22.70	-0.09	66.06
108.0	83068	546	59104	1869.6	11.9	2318.4	22.71	-0.14	67.12
109.0	84949	558	61456	1892.3	11.7	2386.1	22.73	-0.21	68.20
110.0	86852	570	63877	1915.1	11.5	2454.8	22.78	-0.29	69.26
111.0	88779	581	66366	1937.9	11.2	2524.6	22.89	-0.37	70.29
112.0	90728	592	68926	1960.9	10.8	2595.3	23.06	-0.42	71.29
113.0	92701	602	71557	1984.1	10.4	2667.1	23.29	-0.45	72.27
114.0	94697	613	74261	2007.5	9.9	2739.8	23.57	-0.46	73.21
115.0	96716	622	77037	2031.3	9.5	2813.5	23.90	-0.44	74.15
116.0	98759	632	79888	2055.4	9.0	2888.1	24.26	-0.41	75.10
117.0	100827	640	82814	2079.8	8.6	2963.7	24.60	-0.37	76.09
118.0	102919	649	85816	2104.5	8.3	3040.4	24.90	-0.33	77.12
119.0	105036	657	88895	2129.5	8.0	3118.0	25.13	-0.27	78.23
120.0	107178	665	92052	2154.7	7.7	3196.9	25.28	-0.21	79.42
121.0	109345	672	95289	2180.0	7.6	3276.9	25.36	-0.16	80.66
122.0	111538	680	98607	2205.4	7.4	3358.2	25.39	-0.11	81.95
123.0	113756	687	102006	2230.8	7.3	3440.8	25.40	-0.09	83.27
124.0	116000	695	105499	2256.2	7.2	3524.8	25.41	-0.09	84.61
125.0	118269	702	109056	2281.6	7.1	3610.0	25.46	-0.12	85.95
126.0	120563	709	112709	2307.2	6.9	3696.6	25.55	-0.16	87.28
127.0	122883	716	116450	2332.8	6.8	3784.6	25.68	-0.21	88.62
128.0	125229	722	120279	2358.6	6.6	3873.9	25.84	-0.24	89.96
129.0	127600	729	124198	2384.5	6.3	3964.5	26.01	-0.24	91.32
130.0	129998	735	128209	2410.6	6.1	4056.5	26.20	-0.23	92.71
131.0	132421	741	132317	2436.8	5.9	4149.9	26.38	-0.20	94.11
132.0	134871	747	136509	2463.3	5.7	4244.8	26.59	-0.16	95.51
133.0	137348	752	140802	2490.0	5.6	4341.0	26.80	-0.02	96.91
134.0	139851	758	145192	2516.9	5.4	4438.6	27.00	-0.17	98.32
135.0	142382	763	149680	2544.0	5.4	4537.6	27.20	-0.07	99.73

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

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
136.0	144939	769	154268	2571.3	5.2	4638.0	27.41	-0.10	101.13
137.0	147524	774	158958	2598.8	5.2	4739.9	27.61	-0.10	102.54
138.0	150137	779	163751	2626.6	5.0	4843.1	27.82	-0.11	103.96
139.0	152777	784	168648	2654.5	5.0	4947.8	28.02	0.07	105.37
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
139.300	153575	785	170141	2662.9	5.0	4979.5	28.08	0.10	105.81
140.0	155442	789	173647	2678.3	5.1	5045.2	17.64	0.16	86.64
141.0	158128	794	179740	2694.6	5.4	5132.1	15.88	0.32	87.26
142.0	160829	800	183916	2710.5	5.8	5219.8	16.01	0.53	88.05
143.0	163547	806	189182	2726.6	6.4	530?.3	16.14	0.55	88.95
144.0	166282	812	194536	2742.8	7.0	5391.7	16.27	0.79	89.99
145.0	169033	820	199979	2759.2	7.9	5488.2	16.40	0.82	91.06
146.0	171801	828	205513	2775.6	8.7	5579.8	16.54	0.93	92.19
147.0	174585	837	211139	2792.2	9.6	5672.6	16.67	0.82	93.31
148.0	177385	847	216858	2809.0	10.3	5766.4	16.82	0.85	94.44
149.0	180203	858	222672	2826.0	11.2	5861.2	16.94	0.82	95.78
150.0	183039	870	228581	2843.0	12.0	5957.7	17.06	0.80	97.13
151.0	185889	882	234588	2860.2	12.8	6055.5	17.20	0.78	98.53
152.0	188758	895	240693	2877.5	13.6	6154.7	17.36	0.77	99.94
153.0	191644	909	246897	2894.9	14.4	6255.4	17.51	0.77	101.36
154.0	194548	924	253204	2912.5	15.1	6357.4	17.61	0.77	102.63
155.0	197469	939	259613	2930.1	15.9	6460.8	17.77	0.85	104.14
156.0	200409	956	266126	2948.0	16.8	6565.7	17.93	0.72	105.64
157.0	203365	973	272745	2966.0	17.4	6672.1	18.09	0.75	107.15
158.0	206 [illegible]	991	279471	2984.2	18.3	6780.0	10.25	0.98	108.66
159.0	209334	1009	286306	3002.5	19.2	6889.4	18.41	0.71	110.17
160.0	212345	1029	293251	3021.0	19.9	7000.3	18.57	0.87	111.68
161.0	215374	1049	300305	3039.6	20.8	7112.8	18.73	0.92	113.18
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
161.200	215983	1054	301732	3043.4	21.0	7135.4	18.77	0.85	113.49
162.0	218409	1071	307442	3033.4	21.6	7174.9	-30.36	0.58	3.36
S-IC/S-II SEPARATION COMMAND									
162.900	221125	1090	313890	3006.0	22.1	7174.0	-30.45	0.46	-2.68
164.0	224417	1115	321784	2972.6	22.5	7171.1	-30.43	0.45	-2.68
166.0	230305	1161	336125	2913.3	23.5	7171.1	-27.04	0.57	7.21
168.0	236082	1209	350492	2866.1	24.6	7200.8	-22.22	0.57	17.98
170.0	241772	1259	364931	2822.6	25.8	7238.4	-21.36	0.56	20.11

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

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
172.0	247375	1312	379451	2781.2	27.1	7281.0	-20.42	0.68	21.81
174.0	252897	1368	394057	2740.1	28.4	7324.5	-20.28	0.69	22.21
176.0	258337	1426	408751	2699.7	29.8	7369.2	-20.20	0.69	22.31
178.0	263696	1487	423534	2659.4	31.2	7414.0	-20.13	0.70	22.40
180.0	268975	1551	438407	2619.2	32.6	7458.9	-20.06	0.70	22.53
182.0	274173	1617	453370	2579.2	34.0	7504.1	-19.98	0.71	22.63
184.0	279291	1687	468423	2539.3	35.4	7549.4	-19.90	0.71	22.73
186.0	284330	1759	483568	2499.6	36.9	7595.0	-19.83	0.72	22.81
188.0	289290	1834	498803	2460.0	38.3	7640.6	-19.76	0.72	22.88
190.0	294170	1912	514130	2420.5	39.8	7686.5	-19.70	0.73	22.98
192.0	298972	1993	529549	2381.2	41.2	7732.6	-19.61	0.74	23.09
194.0	303696	2077	545061	2342.1	42.7	7778.9	-19.52	0.74	23.20
196.0	308341	2164	560665	2303.1	44.2	7825.4	-19.44	0.75	23.30
198.0	312908	2254	576362	2264.3	45.7	7872.1	-19.36	0.75	23.41
200.0	317398	2347	592153	2225.7	47.2	7919.1	-19.28	0.75	23.57
202.0	321811	2443	608039	2187.2	48.7	7966.3	-19.17	0.75	23.71
204.0	326147	2542	624019	2149.0	50.2	8013.8	-19.04	0.79	23.79
206.0	330407	2644	640094	2111.1	51.9	8061.4	-18.87	0.89	23.81
208.0	334592	2749	656265	2073.6	53.9	8109.1	-18.68	1.02	23.84
210.0	338702	2859	672531	2036.3	56.0	8156.8	-18.53	1.14	23.89
212.0	342738	2974	688892	1999.3	58.3	8204.7	-18.46	1.19	23.97
214.0	346699	3093	705350	1962.5	60.7	8252.7	-18.44	1.20	24.06
216.0	350587	3216	721903	1925.6	63.1	8300.9	-18.45	1.18	24.17
218.0	354402	3345	738553	1888.7	65.4	8349.4	-18.44	1.17	24.29
220.0	358142	3478	755301	1851.8	67.8	8398.1	-18.43	1.17	24.40
222.0	361809	3616	772146	1815.0	70.1	8447.0	-18.41	1.17	24.52
224.0	365402	3759	789089	1778.2	72.5	8496.1	-18.40	1.19	24.64
226.0	368922	3906	806131	1741.4	74.9	8545.6	-18.39	1.22	24.77
228.0	372367	4058	823271	1704.6	77.3	8595.2	-18.37	1.22	24.89
230.0	375740	4215	840512	1667.9	79.8	8645.1	-18.35	1.22	24.99
232.0	379039	4377	857852	1631.2	82.2	8695.2	-18.35	1.22	25.10
234.0	382265	4544	875292	1594.4	84.7	8745.5	-18.38	1.25	25.23
236.0	385417	4716	892834	1557.6	87.2	8796.1	-18.42	1.25	25.37
238.0	388495	4893	910477	1520.8	89.7	8847.0	-18.43	1.24	25.51
240.0	391500	5075	928222	1483.9	92.2	8898.2	-18.43	1.23	25.65
242.0	394431	5262	946070	1447.0	94.6	8949.6	-18.44	1.24	25.77
244.0	397288	5453	964021	1410.2	97.1	9001.3	-18.43	1.26	25.90
246.0	400071	5650	982075	1373.3	99.6	9053.2	-18.40	1.28	26.01
248.0	402781	5852	1000233	1336.5	102.2	9105.3	-18.39	1.29	26.12
250.0	405417	6059	1018496	1299.7	104.8	9157.7	-18.40	1.29	26.25
252.0	407980	6271	1036864	1262.9	107.4	9210.3	-18.42	1.26	26.39
254.0	410469	6488	1055339	1226.1	109.9	9263.2	-18.43	1.25	26.53
256.0	412884	6711	1073917	1189.2	112.4	9316.4	-18.45	1.26	26.66

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

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
258.0	415226	6939	1092604	1152.3	114.9	9369.9	-18.46	1.28	26.80
260.0	417494	7170	1111397	1115.4	117.5	9423.6	-18.46	1.30	26.95
262.0	419687	7409	1130298	1078.4	120.1	9477.6	-18.45	1.31	27.06
264.0	421807	7651	1149303	1041.6	122.7	9531.9	-18.43	1.32	27.18
266.0	423854	7899	1168426	1004.7	125.4	9586.4	-18.43	1.32	27.31
268.0	425826	8152	1187653	967.8	128.0	9641.1	-18.46	1.30	27.46
270.0	427725	8411	1206991	930.9	130.6	9696.2	-18.49	1.30	27.62
272.0	429549	8675	1226439	893.9	133.2	9751.6	-18.49	1.32	27.77
274.0	431300	8944	1245997	856.9	135.9	9807.3	-18.47	1.35	27.91
276.0	432977	9218	1265668	820.0	138.6	9863.2	-18.47	1.35	28.05
278.0	434580	9498	1285450	783.0	141.3	9919.5	-18.49	1.34	28.19
280.0	436109	9784	1305346	746.0	144.0	9976.0	-18.51	1.33	28.34
282.0	437564	10074	1325355	709.0	146.6	10032.9	-18.55	1.33	28.50
284.0	438945	10370	1345478	671.8	149.3	10090.0	-18.58	1.36	28.65
286.0	440251	10671	1365715	634.7	152.1	10147.4	-18.58	1.38	28.77
288.0	441484	10978	1386067	597.5	154.8	10205.1	-18.56	1.38	28.92
290.0	442642	11291	1406536	560.4	157.6	10263.1	-18.54	1.37	29.10
292.0	443725	11609	1427120	523.4	160.3	10321.5	-18.56	1.37	29.28
294.0	444735	11932	1447822	486.2	163.1	10380.2	-18.59	1.38	29.42
296.0	445670	12261	1468641	449.0	165.8	10439.2	-18.62	1.39	29.55
298.0	446531	12595	1489579	411.7	168.6	10498.5	-18.65	1.40	29.71
300.0	447317	12935	1510635	374.4	171.4	10558.0	-18.67	1.41	29.87
302.0	448028	13281	1531811	337.0	174.2	10617.9	-18.69	1.41	30.04
304.0	448665	13632	1553107	299.6	177.1	10678.2	-18.70	1.42	30.21
306.0	449227	13989	1574524	262.2	179.9	10738.8	-18.70	1.43	30.38
308.0	449714	14352	1596063	224.8	182.8	10799.7	-18.71	1.42	30.55
310.0	450126	14720	1617723	187.4	185.6	10861.0	-18.74	1.43	30.71
312.0	450463	15094	1639507	149.9	188.5	10922.6	-18.76	1.44	30.88
314.0	450726	15474	1661414	112.3	191.4	10984.5	-18.78	1.45	31.04
316.0	450913	15860	1683445	74.8	194.3	11046.8	-18.80	1.44	31.21
318.0	451025	16251	1705601	37.1	197.1	11109.4	-18.84	1.43	31.40
320.0	451061	16648	1727883	-0.6	200.0	11172.4	-18.90	1.45	31.59
322.0	451022	17051	1750291	-38.4	202.9	11235.7	-18.94	1.48	31.78
324.0	450907	17460	1772826	-76.3	205.9	11299.5	-18.95	1.50	31.96
326.0	450717	17875	1795487	-114.2	208.9	11363.5	-18.96	1.49	32.12
328.0	450450	18296	1818280	-152.2	211.9	11428.0	-19.00	1.49	32.30
330.0	450108	18722	1841201	-190.2	214.8	11492.8	-19.04	1.48	32.49
332.0	449690	19155	1864257	-228.3	217.8	11557.9	-19.06	1.50	32.69
334.0	449194	19594	1887443	-266.5	220.8	11623.5	-19.09	1.51	32.87
336.0	448623	20038	1910746	-304.7	223.8	11689.4	-19.12	1.51	33.05
338.0	447976	20489	1934191	-343.0	226.9	11755.7	-19.16	1.53	33.25
340.0	447251	20945	1957769	-381.3	229.9	11822.4	-19.20	1.53	33.46
342.0	446450	21409	1981481	-419.7	233.0	11889.6	-19.21	1.53	33.68

TABLE 4-1. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - ASCENT PHASE (CONTINUED)

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
344.0	445572	21878	2005328	-458.2	236.0	11957.1	-19.23	1.52	33.87
346.0	444617	22357	2029310	-496.7	239.1	12025.0	-19.27	1.53	34.05
348.0	443585	22834	2053429	-535.3	242.2	12093.4	-19.34	1.56	34.26
350.0	442476	23312	2077684	-574.0	245.3	12162.1	-19.41	1.59	34.48
352.0	441289	23815	2102077	-6 2.9	248.5	12231.3	-19.47	1.59	34.68
354.0	440024	24315	2126609	-651.9	251.6	12300.8	-19.51	1.57	34.88
356.0	438681	24822	2151280	-691.0	254.8	12370.8	-19.55	1.57	35.10
358.0	437260	25335	2176092	-730.1	258.0	12441.2	-19.57	1.59	35.32
360.0	435761	25854	2201046	-769.3	261.2	12512.0	-19.60	1.63	35.52
362.0	434183	26379	2226141	-808.5	264.4	12583.3	-19.63	1.63	35.74
364.0	432527	26912	2251379	-847.8	267.7	12655.0	-19.68	1.62	35.97
366.0	430792	27450	2276761	-887.2	271.0	12727.2	-19.72	1.63	36.20
368.0	428978	27995	2302288	-926.7	274.2	12799.8	-19.77	1.64	36.43
370.0	427085	28547	2327961	-966.3	277.5	12872.9	-19.84	1.65	36.66
372.0	425113	29105	2353780	-1006.0	280.8	12946.4	-19.90	1.65	36.89
37	423061	29670	2379747	-1045.9	284.1	13020.5	-19.96	1.64	37.12
37	420929	30242	2405862	-1085.9	287.4	13094.9	-20.01	1.66	37.36
37	418718	30820	2432127	-1125.9	290.7	13169.9	-20.08	1.67	37.62
380.	416425	31405	2458542	-1166.2	[illegible]	13245.4	-20.16	1.68	37.86
382.0	414053	31996	2485109	-1206.6	[illegible]	13321.3	-20.22	1.69	38.09
384.0	411599	32594	2511828	-1247.1	[illegible].8	13397.8	-20.29	1.70	38.34
386.0	409064	33200	2538700	-1287.7	[illegible]4.2	13474.7	-20.36	1.71	[illegible].59
388.0	406448	33811	2565727	-1328.5	307.7	13552.1	-20.42	1.70	38.85
390.0	403750	34430	2592909	-1369.4	311.1	13630.1	-20.47	1.70	39.10
392.0	400971	35056	2620247	-1410.4	314.5	13708.5	-20.53	1.72	39.37
394.0	398109	35688	2647743	-1451.5	317.9	13787.6	-20.60	1.73	39.66
396.0	395164	36327	2675398	-1492.8	321.4	13867.1	-20.68	1.74	39.93
398.0	392137	36974	2703212	-1534.2	324.9	13947.3	-20.75	1.76	40.19
400.0	389027	37627	2731187	-1575.8	328.4	14027.9	-20.83	1.76	40.46
402.0	385834	38287	2759324	-1617.5	331.9	14109.1	-20.91	1.75	40.74
404.0	382557	38955	2787624	-1659.4	335.4	14190.9	-21.00	1.75	41.02
406.0	379196	39629	2816088	-1701.5	338.9	14273.2	-21.07	1.76	41.29
408.0	375751	40310	2844719	-1743.7	342.5	14356.1	-21.15	1.77	41.58
410.0	372221	40999	2873513	-1786.1	346.0	14439.6	-21.24	1.79	41.90
412.0	368606	41694	2902476	-1828.7	349.6	14523.7	-21.32	1.80	42.21
414.0	364906	42397	2931609	-1871.4	353.2	14608.4	-21.39	1.82	42.50
416.0	361121	43107	2960910	-1914.3	356.8	14693.7	-21.49	1.82	42.80
418.0	357249	43825	2990383	-1957.4	360.5	14779.6	-21.59	1.82	43.12
420.0	353291	44549	3020029	-2000.6	364.2	14866.1	-21.68	1.84	43.45
422.0	349247	45281	3049848	-2044.1	367.8	14953.4	-21.76	1.85	43.77
424.0	345115	46021	3079843	-2087.7	371.6	15041.2	-21.84	1.87	44.07
426.0	340896	46768	3110014	-2131.4	375.3	15129.6	-21.94	1.88	44.38
428.0	336589	47522	3140362	-2175.4	379.1	15218.7	-22.04	1.89	44.71

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

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
430.0	332194	48284	3170889	-2219.6	382.9	15308.5	-22.15	1.90	45.06
432.0	327711	49053	3201596	-2264.0	386.7	15399.0	-22.26	1.90	45.42
434.0	323139	49831	3232485	-2308.6	390.5	15490.1	-22.36	1.91	45.75
436.0	318476	50615	3263557	-2353.4	394.3	15582.0	-22.45	1.91	46.09
438.0	313726	51409	3294814	-2398.4	398.1	15674.5	-22.55	1.91	46.46
440.0	308882	522?	3326256	-2443.7	402.0	15767.8	-22.67	1.91	46.83
442.0	303949	531 6	3357885	-2489.1	405.8	15861.8	-22.79	1.92	47.18
444.0	298925	53831	3389703	-2534.9	409.6	15956.5	-22.93	1.94	47.52
446.0	293810	54654	3421712	-2580.9	413.5	16051.9	-23.	1.96	47.90
448.0	288602	55485	3453912	-2627.0	417.5	16148.1	-23.1	1.97	48.30
450.0	283301	56324	3486305	-2673.4	421.4	16245.1	-23.26	1.99	48.71
452.0	277908	57171	3518893	-2720.1	425.4	16342.9	-23.38	2.00	49.11
454.0	272421	58026	3551677	-2766.9	429.5	16441.6	-23.51	2.02	49.51
456.0	266840	58893	3584659	-2814.1	433.5	16541.0	-23.64	2.07	49.93
458.0	261165	59760	3617841	-2861.6	437.6	16641.2	-23.78	2.02	50.35
460.0	255394	60639	3651224	-2909.2	441.7	16742.3	-23.91	2.02	50.77
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
461.210	251856	61175	3671521	-2938.2	444.1	16803.9	-23.99	1.96	51.03
462.0	249528	61527	3684807	-2957.7	445.6	16837.2	-24.84	1.77	40.07
464.0	243563	62421	3718562	-3007.4	449.0	16917.4	-24.85	1.61	40.24
466.0	237499	63322	3752477	-3057.1	452.2	16998.1	-24.83	1.61	40.42
468.0	231336	64230	3786554	-3106.7	455.5	17079.1	-24.74	1.72	40.60
470.0	225073	65145	3820792	-3155.6	459.0	17160.4	-24.12	1.75	40.77
472.0	218714	66066	3855194	-3202.8	462.6	17242.1	-23.14	1.80	40.96
474.0	212263	66995	3889760	-3248.1	466.2	17323.9	-22.11	1.82	41.13
476.0	205723	67931	3924490	-3291.0	469.8	17406.4	-21.45	1.82	41.34
478.0	199097	68874	3959386	-3334.3	473.5	17489.3	-21.28	1.85	41.60
480.0	192385	69825	3994448	-3376.9	477.2	17572.8	-21.38	1.87	41.87
482.0	185589	70783	4029677	-3419.8	480.9	17656.8	-21.53	1.86	42.18
484.0	178706	71749	4065076	-3463.0	484.7	17741.5	-21.73	1.82	42.51
486.0	171736	72722	4100644	-3506.8	488.3	17826.8	-22.02	1.85	42.85
488.0	164678	73702	4136384	-3551.1	492.1	17912.9	-22.35	1.93	43.22
490.0	157531	74690	4172292	-3596.5	496.0	17998.1	-23.06	1.90	39.11
492.0	150291	75686	4208359	-3643.2	499.8	18070.9	-23.60	1.91	37.09
494.0	142958	76689	4244575	-3690.7	503.5	18145.2	-23.92	1.87	37.15
496.0	135528	77700	4280939	-3738.9	507.4	18219.6	-24.20	1.91	37.32
498.0	128002	78719	4317453	-3787.4	511.1	18294.4	-24.38	1.91	37.52
500.0	120378	79745	4354119	-3836.3	515.0	18369.6	-24.55	1.92	37.73
502.0	112657	80779	4390933	-3885.5	518.8	18445.5	-24.66	1.93	37.97
504.0	104836	81820	4427900	-3935.0	522.7	18521.7	-24.77	1.95	38.19
506.0	96917	82870	4465020	-3984.6	526.6	18598.3	-24.90	1.97	38.42

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

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
508.0	88897	83927	4502294	-4034.6	530.6	18675.4	-25.04	1.98	38.64
510.0	80778	84992	4539722	-4084.8	534.6	18752.9	-25.18	2.00	38.86
512.0	72558	86065	4577305	-4135.3	538.6	18830.9	-25.35	2.01	39.13
14.0	64237	87146	4615046	-4186.2	542.6	18909.4	-25.57	2.02	39.43
516.0	55813	88236	4652943	-4237.6	546.7	18988.6	-25.79	2.03	39.72
518.0	47286	89333	4691000	-4289.4	550.7	19068.2	-25.99	2.05	39.96
520.0	38655	90439	4729217	-4341.5	554.9	19148.4	-26.17	2.09	40.21
522.0	29920	91553	4767594	-4394.1	559.1	19229.1	-26.37	2.10	40.48
524 0	21079	92675	4806134	-4447.0	563.2	19310.4	-26.58	2.09	40. 5
526.0	12131	93806	4844836	-4500.4	567.4	19392.1	-26.76	2.09	41.02
52 .0	3077	94945	4883702	-4554.1	571.5	19474.4	-26.93	2.08	41.29
530.0	-6085	96092	4922734	-4608.1	575.8	19557.3	-27.11	2.08	41.57
532.0	-15356	97248	4961932	-4662.5	579.9	19640.7	-27.28	2.09	41.85
534.0	-2 735	98412	5001297	-4717.2	584.1	19724.7	-27.43	2.11	42.14
536.0	-34225	99584	5040831	-4772.2	588.3	19809.3	-27.5	2.11	42.43
538.0	-43825	100765	5080535	-4827.6	592.6	19894.4	-27.77	2.10	42.72
540.0	-53535	101954	5120410	-4883.3	596.8	19980.2	-27.95	2.12	43.01
542.0	-63358	103152	5160456	-4939.4	601.1	20066.5	-28.14	2.15	43.31
544.0	-73293	104359	5200676	-4995.8	605.3	20153.4	-28.30	2.15	43.62
546.0	-83342	105574	5241070	-5052.6	609.6	20240.9	-28.46	2.14	43.92
548.0	-93504	106797	5281640	-5109.6	613.9	20329.1	-28.61	2.16	44.19
550.0	-103780	108029	5322387	-5167.0	618.3	20417.7	-28.78	2.20	44.47
552.0	-114172	109270	5363311	-5224.7	622.7	20507.0	-28.93	2.23	44.71
554.0	-124680	110520	5404415	-5282.8	627.2	20596.7	-29.09	2.24	45.01
556.0	-135304	111779	5445699	-5341.1	631.7	20687.0	-29.25	2.25	45.31
558.0	-146046	113047	5487164	-5399.8	636.2	20777.8	-29.41	2.26	45.61
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
559.660	-155052	114106	5521707	-5448.6	639.4	20849.4	-29.19	1.58	34.29
560.0	-156905	114320	5528788	-5459.2	639.9	20854.5	-27.23	1.58	-4.65
	S-II/S-IVB SEPARATION COMMAND								
560.600	-160185	114709	5541283	-5474.4	640.9	20851.5	-27.07	1.58	-5.15
562.0	-167875	115606	5570462	-5512.4	643.0	20843.7	-27.08	1.37	-5.73
564.0	-178954	116895	5612140	-5566.5	645.6	20832.2	-27.09	1.28	-4.97
566.0	-190141	118189	5653799	-5621.1	648.2	20830.4	-27.70	1.38	5.49
568.0	-201438	119488	5695476	-5676.7	651.1	20847.1	-27.72	1.62	9.38
570.0	-212845	120793	5737191	-5731.8	654.3	20867.1	-27.44	1.63	9.83
572.0	-224363	122105	5778945	-5787.1	657.3	20886.9	-27.92	1.36	10.00
574.0	-235994	123422	5820733	-5843.7	660.0	20906.8	-28.43	1.33	10.01
576.0	-247738	124745	5862552	-5901.3	662.7	20926.8	-29.02	1.34	10.01

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

TIME SEC	XE FT	YE FT	ZF FT	DXF FT/S	DYE FT/S	DZF FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
578.0	-259539	126073	5904446	-5959.3	665.4	20946.9	-29.04	1.40	10.07
580.0	-271576	127407	5946360	-6017.4	668.2	20967.1	-28.96	1.42	10.15
582.0	-283669	128746	5988315	-6075.4	671.1	20987.4	-28.99	1.42	10.18
584.0	-295877	130091	6030310	-6133.4	674.0	21007.8	-29.07	1.45	10.15
586.0	-308202	131442	6072346	-6191.6	676.9	21028.1	-29.17	1.52	10.13
588.0	-320644	132799	6114422	-6249.9	680.0	21048.3	-29.18	1.58	10.12
590.0	-333202	134162	6156539	-6308.3	683.2	21068.6	-29.26	1.58	10.13
592.0	-345877	135532	6198696	-6367.0	686.3	21088.8	-29.37	1.55	10.13
594.0	-358670	136907	6240894	-6425.8	689.4	21109.1	-29.47	1.54	10.13
596.0	-371580	138289	6283132	-6484.8	692.5	21129.3	-29.55	1.56	10.12
598.0	-384609	139677	6325411	-6543.9	695.7	21149.5	-29.57	1.57	10.07
600.0	-397756	141072	6367731	-6603.1	698.9	21169.6	-29.59	1.61	10.04
602.0	-411022	142473	6410092	-6662.3	702.1	21189.7	-29.64	1.63	10.04
604.0	-424406	143880	6452489	-6721.7	705.4	21209.8	-29.68	1.65	10.06
606.0	-437908	145294	6494929	-6781.0	708.7	21229.9	-29.69	1.65	10.05
608.0	-451530	146715	6537409	-6840.5	712.0	21250.0	-29.72	1.63	10.04
610.0	-465270	148142	6579929	-6899.9	715.2	21270.1	-29.76	1.61	10.02
612.0	-479130	149576	6622490	-6959.5	718.4	21290.1	-29.79	1.61	9.99
614.0	-493108	151016	6665090	-7019.1	721.7	21310.1	-29.82	1.61	9.97
616.0	-507206	152463	6707730	-7078.7	724.9	21330.0	-29.84	1.62	9.95
618.0	-521423	153916	6750410	-7138.4	728.1	21349.9	-29.86	1.62	9.96
620.0	-535760	155375	6793129	-7198.2	731.4	21369.8	-29.88	1.62	9.98
622.0	-550216	156841	6835889	-7257.9	734.6	21389.8	-29.88	1.62	9.98
624.0	-564792	158313	6878689	-7317.7	737.9	21409.8	-29.90	1.62	9.97
626.0	-579487	159792	6921529	-7377.6	741.1	21429.7	-29.92	1.62	9.96
628.0	-594302	161279	6964407	-7437.4	744.3	21449.6	-29.97	1.61	9.94
630.0	-609237	162770	7007326	-7497.4	747.5	21469.4	-30.02	1.60	9.91
632.0	-624292	164269	7050285	-7557.5	750.7	21489.2	-30.07	1.60	9.88
634.0	-639467	165773	7093283	-7617.7	753.9	21509.0	-30.09	1.59	9.87
636.0	-654762	167284	7136321	-7677.9	757.1	21528.7	-30.10	1.57	9.87
638.0	-670178	168801	7179399	-7738.1	760.2	21548.4	-30.10	1.57	9.86
640.0	-685715	170324	7222514	-7798.3	763.4	21568.1	-30.10	1.57	9.83
642.0	-701372	171854	7265670	-7858.5	766.5	21587.8	-30.10	1.59	9.83
644.0	-717149	173390	7308866	-7918.7	769.7	21607.5	-30.10	1.58	9.86
646.0	-733046	174933	7352100	-7979.9	772.8	21627.2	-30.12	1.56	9.89
648.0	-749064	176482	7395374	-8039.2	775.9	21647.0	-30.16	1.56	9.90
650.0	-765203	178037	7438683	-8099.5	779.1	21666.8	-30.19	1.57	9.88
652.0	-781462	179598	7482042	-8160.0	782.2	21686.5	-30.23	1.56	9.84
654.0	-797843	181165	7525434	-8220.4	785.3	21706.2	-30.26	1.53	9.82
656.0	-814344	182739	7568866	-8281.0	788.3	21725.8	-30.28	1.52	9.82
658.0	-830967	184319	7612337	-8341.6	791.4	21745.4	-30.30	1.50	9.81
660.0	-847710	185904	7655848	-8402.2	794.3	21765.0	-30.34	1.49	9.79
662.0	-864576	187496	7699398	-8462.9	797.3	21784.6	-30.35	1.50	9.76

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

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
664.0	-881562	189094	7742986	-9523.6	800.4	21804.1	-30.35	1.51	9.76
666.0	-898670	190698	7786614	-9584.3	803.4	21823.6	-30.33	1.52	9.78
668.0	-915899	192307	7830281	-9644.9	806.4	21843.2	-30.31	1.52	9.80
670.0	-933253	193923	7873987	-9705.5	809.5	21862.8	-30.31	1.52	9.79
672.0	-950721	195545	7917732	-9766.3	812.5	21882.3	-30.42	1.48	9.74
674.0	-968315	197173	7961516	-9827.3	815.4	21901.7	-30.58	1.45	9.68
676.0	-986031	198807	8005339	-9888.5	818.3	21921.1	-30.67	1.44	9.67
678.0	-1003869	200446	8049200	-9949.9	821.2	21940.5	-30.61	1.44	9.71
680.0	-1021830	202092	8093101	-9010.9	824.1	21959.9	-30.52	1.44	9.73
682.0	-1039913	203743	8137040	-9072.0	827.0	21979.3	-30.51	1.46	9.72
684.0	-1058118	205399	8181018	-9133.0	829.9	21998.8	-30.55	1.47	9.69
686.0	-1076445	207062	8225035	-9194.1	832.8	22018.1	-30.57	1.47	9.69
688.0	-1094894	208731	8269091	-9255.3	835.7	22037.6	-30.54	1.46	9.73
690.0	-1113466	210405	8313185	-9316.3	838.7	22057.1	-30.49	1.46	9.79
692.0	-1132159	212085	8357319	-9377.2	841.6	22076.7	-30.45	1.46	9.84
694.0	-1150975	213771	8401492	-9438.1	844.5	22096.4	-30.41	1.44	9.86
696.0	-1169912	215463	8445705	-9498.9	847.4	22116.1	-30.39	1.43	9.83
698.0	-1188970	217161	8489957	-9559.6	850.2	22135.7	-30.36	1.43	9.83
700.0	-1208153	218864	8534249	-9620.3	853.0	22155.4	-30.33	1.50	9.84
702.0	-1227452	220573	8578579	-9680.9	855.8	22175.0	-30.29	1.45	9.85
	S-IVB FIRST GUIDANCE CUTOFF								
702.650	-1233751	221129	9592994	-9700.6	856.8	22181.4	-30.28	1.32	9.85
704.0	-1246868	222287	8622926	-9735.7	858.4	22171.7	-25.20	1.24	-10.29
706.0	-1266391	224007	8667249	-9786.0	860.8	22150.1	-25.04	1.19	-11.09
708.0	-1286013	225731	8711529	-9836.1	863.2	22127.7	-25.01	1.19	-11.14
710.0	-1305735	227459	8755761	-9886.1	865.5	22105.4	-24.99	1.06	-11.20
712.0	-1325557	229193	8799949	-9936.0	867.8	22082.9	-24.96	1.29	-11.15
	PARKING ORBIT INSERTION								
712.650	-1332022	229757	9814301	-9952.2	868.7	22075.7	-24.95	1.25	-11.16

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

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
GUIDANCE REFERENCE RELEASE									
-16.960	3441.351	9.694	0.254	0.0	-35.2	1340.2	-0.07	-0.04	-0.00
-16.0	3441.351	9.699	0.466	-0.1	-35.2	1340.2	-0.07	-0.04	-0.00
-15.0	3441.351	9.693	0.687	-0.2	-35.3	1340.2	0.07	-0.04	-0.00
-14.0	3441.351	9.677	0.907	-0.3	-35.3	1340.2	-0.07	-0.04	-0.00
-13.0	3441.351	9.671	1.129	-0.3	-35.4	1340.2	-0.07	-0.04	-0.00
-12.0	3441.351	9.666	1.349	-0.4	-35.4	1340.2	-0.07	-0.04	-0.00
-11.0	3441.351	9.660	1.569	-0.5	-35.4	1340.2	-0.07	-0.04	-0.00
-10.0	3441.350	9.654	1.790	-0.6	-35.5	1340.2	-0.07	-0.04	-0.00
-9.0	3441.350	9.648	2.010	-0.7	-35.5	1340.2	-0.07	-0.04	-0.00
-8.0	3441.350	9.642	2.231	-0.8	-35.6	1340.2	-0.07	-0.04	-0.00
-7.0	3441.350	9.636	2.451	-0.9	-35.6	1340.2	-0.07	-0.04	-0.00
-6.0	3441.350	9.630	2.672	-0.9	-35.7	1340.2	-0.07	-0.04	-0.00
-5.0	3441.350	9.625	2.892	-1.0	-35.7	1340.2	-0.07	-0.04	-0.00
-4.0	3441.350	9.619	3.113	-1.1	-35.8	1340.2	-0.07	-0.04	-0.00
-3.0	3441.349	9.613	3.334	-1.2	-35.8	1340.2	-0.07	-0.04	-0.00
-2.0	3441.349	9.607	3.554	-1.3	-35.9	1340.2	-0.07	-0.04	-0.00
-1.0	3441.349	9.601	3.775	-1.4	-35.9	1340.2	-0.07	-0.04	-0.00
0.0	3441.349	9.595	3.995	-1.5	-36.0	1340.2	-0.07	-0.04	-0.00
ALL HOLDDOWN ARMS RELEASED									
0.200	3441.349	9.594	4.039	-1.5	-36.0	1340.2	-0.07	-0.04	-0.00
LIFTOFF - START OF TIME BASE 1									
0.600	3441.349	9.592	4.128	-0.4	-36.0	1340.2	3.04	-0.06	-0.19
1.0	3441.349	9.589	4.216	1.5	-36.0	1340.1	6.80	-0.06	-0.28
2.0	3441.350	9.583	4.436	8.4	-36.1	1339.9	6.98	-0.07	-0.29
3.0	3441.351	9.577	4.657	15.5	-36.2	1339.5	7.16	-0.11	-0.29
4.0	3441.355	9.571	4.877	22.7	-36.3	1339.2	7.34	-0.03	-0.26
5.0	3441.359	9.565	5.098	30.1	-36.0	1339.0	7.53	0.60	-0.21
6.0	3441.365	9.559	5.318	37.7	-35.1	1338.8	7.71	1.16	-0.17
7.0	3441.374	9.554	5.539	45.5	-33.8	1338.6	7.90	1.45	-0.10
8.0	3441.383	9.548	5.759	53.5	-32.4	1338.5	8.09	1.41	-0.14
9.0	3441.393	9.543	5.979	61.7	-31.2	1338.4	8.29	0.84	-0.15
10.0	3441.403	9.538	6.199	70.0	-30.7	1338.3	8.51	0.17	-0.13
11.0	3441.413	9.533	6.419	78.6	-30.7	1338.1	8.70	-0.19	-0.15
12.0	3441.425	9.528	6.640	87.4	-30.9	1338.0	8.90	-0.17	-0.14
13.0	3441.441	9.523	6.860	96.4	-30.9	1337.9	9.14	0.13	-0.12
14.0	3441.457	9.518	7.080	105.7	-30.6	1337.8	9.34	0.40	-0.08

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

	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
[illegible]	3441.476	9.513	7.300	115.1	-30.4	1337.8	9.55	0.04	0.10
[illegible].0	3441.495	9.508	7.520	124.8	-30.7	1338.0	9.79	-0.53	0.25
17.0	3441.517	9.503	7.741	134.6	-31.3	1338.2	10.01	-0.56	0.31
[illegible].0	3441.540	9.497	7.961	144.7	31.9	1338.6	10.22	-0.60	0.40
[illegible].0	3441.564	9.492	8.191	155.1	-32.4	1339.1	10.44	-0.55	0.63
[illegible].0	3441.591	9.487	8.402	165.6	-32.9	1339.8	10.67	-0.33	0.87
21.0	3441.619	9.481	8.622	176.3	-33.2	1340.8	10.88	-0.28	1.11
22.0	3441.649	9.476	8.943	187.3	-33.5	1342.0	11.08	-0.25	1.37
23.0	3441.681	9.470	9.064	198.5	-33.8	1343.5	11.28	-0.25	1.64
24.0	3441.714	9.46	9.285	209.9	-34.1	1345.3	11.50	-0.26	1.92
25.0	3441.750	9.459	9.507	221.5	-34.3	1347.4	11.73	-0.28	2.23
26.0	3441.787	9.453	9.729	233.3	-34.6	1349.8	11.96	-0.28	2.56
27.0	3441.826	9.448	9.951	245.4	-34.9	1352.6	12.20	-0.28	2.92
28.0	3441.869	9.442	10.174	257.7	-35.2	1355.7	12.44	-0.29	3.29
29.0	3441.911	9.436	10.397	270.2	-35.5	1359.2	12.68	-0.31	3.66
30.0	3441.957	9.430	10.621	283.0	-35.9	1363.0	12.92	-0.34	4.04
31.0	3442.00.	9.424	10.846	296.0	-36.2	1367.2	13.15	-0.36	4.41
32.0	3442.054	9.418	11.071	309.3	-36.6	1371.9	13.39	-0.39	4.77
33.0	3442.106	9.412	11.298	322.8	-37.0	1376.8	13.64	-0.41	5.14
34.0	3442.161	9.406	11.525	336.5	-37.4	1382.1	13.90	-0.43	5.53
35.0	3442.217	9.400	11.752	350.6	-37.9	1387.8	14.15	-0.45	5.92
36.0	3442.276	9.394	11.981	364.8	-38.4	1394.0	14.41	-0.46	6.33
37.0	3442.337	9.387	12.211	379.3	-38.8	1400.5	14.66	-0.46	6.74
38.0	3442.401	9.381	12.442	394.1	-39.3	1407.4	14.91	-0.45	7.19
39.0	3442.467	9.374	12.675	409.1	-39.7	1414.9	15.16	-0.44	7.64
40.0	3442.535	9.368	12.908	424.4	-40.2	1422.7	15.42	-0.43	8.11
41.0	3442.607	9 361	13.143	440.0	-40.6	1431.1	15.67	-0.42	8.60
42.0	3442.680	9.354	13.379	455.7	-41.0	1440.0	15.92	-0.42	9.12
43.0	3442.757	9.348	13.617	471.7	-41.5	1449.4	16.16	-0.41	9.66
44.0	3442.836	9.341	13.856	488.0	-41.9	1459.3	16.40	-0.41	10.22
45.0	3442.917	9.334	14.097	504.5	-42.3	1469.8	16.63	-0.40	10.77
46.0	3443.002	9.327	14.340	521.2	-42.7	1480.8	16.86	-0.36	11.31
47.0	3443.089	9.320	14.585	538.2	-43.0	1492.4	17.09	-0.29	11.87
48.0	3443.179	9.313	14.831	555.4	-43.2	1504.6	17.33	-0.20	12.44
49.0	3443.272	9.306	15.080	572.8	-43.4	1517.3	17.56	-0.11	13.03
50.0	3443.367	9.298	15.331	590.5	-43.5	1530.7	17.79	-0.04	13.65
51.0	3443.466	9.291	15.584	608.4	-43.5	1544.6	18.01	0.01	14.29
52.0	3443.568	9.284	15.839	626.5	-43.5	1559.3	18.23	0.04	14.93
53.0	3443.672	9.277	16.097	644.8	-43.5	1574.5	18.44	0.02	15.57
54.0	3443.780	9.270	16.358	663.3	-43.5	1590.4	18.65	-0.02	16.19
55.0	3443.891	9.263	16.621	682.1	-43.6	1606.8	18.88	-0.09	16.77
56.0	3444.004	9.255	16.887	701.1	-43.7	1623.9	19.13	-0.14	17.32
57.0	3444.121	9.248	17.155	720.3	-43.8	1641.5	19.38	-0.17	17.85

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

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DYS FT/S SQ	DDZS FT/S SQ
58.0	3444.242	9.241	17.427	739.8	-44.0	1659.6	19.64	-0.18	18.38
59.0	3444.365	9.234	17.702	759.6	-44.2	1678.2	19.89	-0.12	18.93
60.0	3444.492	9.226	17.979	779.6	-44.2	1697.4	20.12	-0.03	19.50
61.0	3444.622	9.219	18.260	799.8	-44.2	1717.3	20.32	0.11	20.14
62.0	3444.755	9.212	18.545	820.1	-44.0	1737.8	20.47	0.24	20.85
63.0	3444.892	9.205	18.832	840.6	-43.8	1759.0	20.56	0.31	21.61
64.0	3445.032	9.198	19.124	861.2	-43.5	1781.1	20.59	0.32	22.43
65.0	3445.175	9.190	19.419	881.7	-43.3	1803.9	20.60	0.29	23.30
66.0	3445.322	9.183	19.717	902.3	-43.0	1827.7	20.60	0.26	24.17
67.0	3445.472	9.176	20.020	922.9	-42.7	1852.3	20.62	0.23	25.04
MACH 1									
67.500	3445.548	9.173	20.173	933.3	-42.6	1864.9	20.64	0.22	25.45
68.0	3445.626	9.169	20.327	943.6	-42.5	1877.7	20.68	0.22	25.85
69.0	3445.783	9.162	20.639	964.4	-42.3	1903.9	20.80	0.21	26.59
70.0	3445.943	9.155	20.954	985.2	-42.1	1930.8	20.97	0.24	27.24
71.0	34 [illegible]	9.148	21.274	1006.3	-41.9	1958.3	21.19	0.29	27.82
72.0	34 [illegible]	9.142	21.599	1027.6	-41.5	1986.4	21.44	0.39	28.38
73.0	3446 [illegible]	9.135	21.928	1049.1	-41.0	2015.1	21.71	0.52	28.98
74.0	3446.620	9.128	22.262	1071.0	-40.4	2044.4	21.95	0.74	29.66
75.0	3446.798	9.121	22.601	1093.0	-39.5	2074.5	22.19	1.04	30.43
76.0	3446.979	9.115	22.945	1115.3	-38.2	2105.4	22.38	1.41	31.32
77.0	3447.165	9.109	23.294	1137.7	-36.6	2137.2	22.53	1.79	32.30
78.0	3447.354	9.103	23.648	1160.2	-34.7	2170.0	22.64	2.11	33.31
79.0	3447.547	9.097	24.008	1182.9	-32.5	2203.8	22.74	2.34	34.32
80.0	3447.743	9.092	24.374	1205.8	-30.2	2238.6	22.86	2.42	35.31
81.0	3447.944	9.088	24.745	1228.7	-27.9	2274.4	23.02	2.37	36.28
82.0	3448.148	9.083	25.122	1251.8	-25.5	2311.1	23.17	2.19	37.26
MAXIMUM DYNAMIC PRESSURE									
82.500	3448.251	9.081	25.313	1263.4	-24.5	2329.9	23.24	2.05	37.77
83.0	3448.356	9.079	25.506	1275.0	-23.5	2348.9	23.30	1.87	38.28
84.0	3448.567	9.075	25.896	1298.3	-21.9	2387.8	23.38	1.43	39.37
85.0	3448.783	9.072	26.292	1321.7	-20.8	2427.7	23.39	0.92	40.51
86.0	3449.002	9.069	26.695	1345.0	-20.1	2468.9	23.34	0.40	41.70
87.0	3449.224	9.065	27.105	1368.3	-19.9	2511.2	23.23	-0.09	42.93
88.0	3449.4[illegible]	9.062	27.521	1391.4	-20.2	2554.7	23.12	-0.52	44.18
89.0	3449.664	9.059	27.946	1414.5	-20.9	2599.5	23.01	-0.87	45.43
90.0	3449.918	9.055	28.377	1437.5	-21.9	2645.6	22.91	-1.14	46.67
91.0	3450.157	9.051	28.816	1460.3	-23.1	2692.9	22.83	-1.33	47.89
92.0	3450.393	9.047	29.264	1483.1	-24.6	2741.3	22.77	-1.46	49.10

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

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
93.0	3450.645	9.043	29.719	1505.8	-26.1	2791.0	22.69	-1.55	50.30
94.0	3450.895	9.039	30.182	1528.4	-27.7	2841.9	22.59	-1.60	51.52
95.0	3451.148	9.034	30.654	1551.0	-29.2	2894.1	22.47	-1.60	52.74
96.0	3451.405	9.029	31.135	1573.3	-30.8	2947.4	22.36	-1.55	53.95
97.0	3451.666	9.024	31.625	1595.6	-32.3	3002.0	22.24	-1.45	55.16
98.0	3451.930	9.019	32.123	1617.8	-33.7	3057.8	22.12	-1.33	56.36
99.0	3452.198	9.013	32.631	1639.8	-35.0	3114.7	22.01	-1.19	57.57
100.0	3452.470	9.007	33.149	1661.8	-36.1	3172.9	21.93	-1.05	58.76
101.0	3452.745	9.001	33.676	1683.7	-37.1	3232.2	21.88	-0.92	59.92
102.0	3453.024	8.995	34.213	1705.6	-38.0	3292.7	21.86	-0.80	61.05
103.0	3453.307	8.989	34.759	1727.4	-38.8	3354.3	21.85	-0.70	62.15
104.0	3453.593	8.982	35.317	1749.2	-39.4	3417.0	21.85	-0.63	63.24
105.0	3453.883	8.976	35.884	1771.1	-40.0	3480.8	21.84	-0.58	64.32
106.0	3454.176	8.969	36.462	1792.9	-40.6	3545.6	21.83	-0.56	65.39
107.0	3454.473	8.962	37.051	1814.7	-41.2	3611.6	21.81	-0.58	66.46
108.0	3454.773	8.955	37.651	1836.4	-41.8	3678.6	21.80	-0.65	67.53
109.0	3455.077	8.948	38.262	1858.2	-42.6	3746.7	21.80	-0.73	68.61
110.0	3455.385	8.941	38.885	1880.0	-43.3	3815.0	21.83	-0.83	69.68
111.0	3455.696	8.934	39.519	1901.9	-44.2	3886.0	21.92	-0.91	70.72
112.0	3456.011	8.927	40.164	1923.9	-45.1	3957.2	22.06	-0.98	71.72
113.0	3456.329	8.919	40.821	1946.0	-46.1	4029.4	22.27	-1.02	72.70
114.0	3456.651	8.912	41.490	1968.4	-47.2	4102.6	22.53	-1.04	73.65
115.0	3456.977	8.904	42.171	1991.1	-48.2	4176.7	22.84	-1.03	74.60
116.0	3457.307	8.896	42.865	2014.1	-49.3	4251.8	23.18	-1.02	75.56
117.0	3457.640	8.888	43.571	2037.5	-50.3	4327.9	23.50	-0.99	76.55
118.0	3457.978	8.879	44.290	2061.1	-51.2	4404.9	23.77	-0.96	77.59
119.0	3458.319	8.871	45.021	2084.9	-52.2	4483.1	23.97	-0.91	78.71
120.0	3458.664	8.862	45.765	2108.9	-53.1	4562.4	24.10	-0.87	79.90
121.0	3459.013	8.853	46.523	2133.0	-53.9	4642.9	24.15	-0.83	81.15
122.0	3459.366	8.844	47.294	2157.1	-54.8	4724.8	24.16	-0.80	82.45
123.0	3459.723	8.835	48.078	2181.3	-55.6	4807.9	24.14	-0.79	83.77
124.0	3460.084	8.826	48.876	2205.4	-56.4	4892.3	24.12	-0.81	85.11
125.0	3460.449	8.817	49.689	2229.5	-57.2	4978.1	24.14	-0.86	86.46
126.0	3460.818	8.807	50.515	2253.7	-58.1	5065.2	24.20	-0.91	87.79
127.0	3461.191	8.797	51.356	2277.9	-59.1	5153.6	24.30	-0.97	89.14
128.0	3461.568	8.788	52.211	2302.3	-60.1	5243.5	24.43	-1.02	90.49
129.0	3461.948	8.778	53.082	2326.8	-61.1	5334.6	24.59	-1.04	91.85
130.0	3462.333	8.768	53.967	2351.4	-62.1	5427.2	24.73	-1.04	93.24
131.0	3462.722	8.757	54.868	2376.2	-63.2	5521.1	24.89	-1.03	94.65
132.0	3463.116	8.747	55.785	2401.2	-64.2	5616.5	25.06	-1.01	96.06
133.0	3463.513	8.736	56.717	2426.3	-65.2	5713.3	25.23	-0.88	97.47
134.0	3463.914	8.725	57.665	2451.6	-66.2	5911.5	25.41	-1.06	98.88
135.0	3464.320	8.714	58.630	2477.1	-67.2	5911.1	25.58	-0.97	100.30

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

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
136.0	3464.730	8.703	59.611	2502.7	-68.3	6012.1	25.75	-1.02	101.71
137.0	3465.144	8.692	60.609	2528.5	-69.2	6114.5	25.92	-1.04	103.12
138.0	3465.562	8.680	61.624	2554.5	-70.3	6218.3	26.09	-1.07	104.55
139.0	3465.984	8.669	62.657	2580.7	-71.3	6323.6	26.26	-0.91	105.97
S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)									
139.300	3466.112	8.665	62.970	2588.6	-71.6	6355.4	26.31	-0.88	106.41
140.0	3466.411	8.657	63.706	2602.8	-72.2	6421.6	16.04	-0.72	87.14
141.0	3466.840	8.645	64.771	2617.5	-72.8	6509.0	14.27	-0.57	87.75
142.0	3467.272	8.633	65.849	2631.8	-73.3	6597.1	14.37	-0.37	88.54
143.0	3467.706	8.621	66.943	2646.2	-73.7	6686.1	14.48	-0.38	89.44
144.0	3468.143	8.609	68.051	2660.7	-74.0	6776.0	14.58	-0.14	90.50
145.0	3468.582	8.596	69.173	2675.3	-74.1	6867.1	14.68	-0.13	91.57
146.0	3469.023	8.584	70.311	2690.0	-74.2	6959.2	14.78	-0.04	92.70
147.0	3469.467	8.572	71.464	2704.8	-74.3	7052.5	14.89	-0.17	93.83
148.0	3469.914	8.560	72.632	2719.8	-74.5	7146.8	15.01	-0.16	94.96
149.0	3470.363	8.548	73.816	2735.0	-74.7	7242.1	15.10	-0.20	96.31
150.0	3470.814	8.535	75.016	2750.1	-74.9	7339.1	15.19	-0.24	97.66
151.0	3471.268	8.523	76.232	2765.4	-75.2	7437.5	15.29	-0.27	99.06
152.0	3471.724	8.510	77.464	2780.7	-75.5	7537.2	15.41	-0.30	100.48
153.0	3472.183	8.498	78.713	2796.2	-75.8	7638.4	15.53	-0.32	101.90
154.0	3472.645	8.486	79.979	2811.8	-76.1	7741.0	15.60	-0.34	103.17
155.0	3473.109	8.473	81.261	2827.3	-76.5	7845.0	15.72	-0.28	104.69
156.0	3473.575	8.460	82.561	2843.1	-76.8	7950.4	15.85	-0.44	106.20
157.0	3474.045	8.448	83.878	2859.0	-77.3	8057.4	15.97	-0.42	107.71
158.0	3474.516	8.435	85.213	2875.0	-77.6	8165.8	16.09	-0.21	109.23
159.0	3474.991	8.422	86.566	2991.2	-78.0	8275.8	16.21	-0.51	110.74
160.0	3475.468	8.409	87.938	2907.4	-78.4	8387.3	16.34	-0.36	112.25
161.0	3475.948	8.396	89.327	2923.8	-78.8	8500.3	16.46	-0.34	113.76
S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)									
161.200	3476.044	8.394	89.607	2927.1	-78.9	8523.1	16.48	-0.41	114.07
162.0	3476.428	8.383	90.730	2915.9	-79.0	8562.8	-31.39	0.01	3.39
S-IC/S-II SEPARATION COMMAND									
162.900	3476.857	8.372	91.937	2887.6	-79.0	8561.9	-31.41	-0.06	-2.66
164.0	3477.379	8.357	93.547	2853.0	-79.1	8559.0	-31.39	-0.07	-2.67
166.0	3478.307	8.331	96.364	2791.7	-79.2	8559.1	-28.12	-0.02	7.25
168.0	3479.218	8.305	99.185	2742.1	-79.4	8588.9	-23.43	-0.10	17.97
170.0	3480.113	8.279	102.019	2696.2	-79.6	8626.6	-22.60	-0.12	20.19

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

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
172.0	3480.993	8.253	104.865	2652.3	-79.7	8669.4	-21.69	-0.02	21.90
174.0	3481.859	8.227	107.726	2608.6	-79.8	8713.2	-21.57	-0.02	22.29
176.0	3482.710	8.200	110.602	2565.6	-79.8	8758.0	-21.49	-0.01	22.38
178.0	3483.548	8.174	113.492	2522.7	-79.9	8802.9	-21.43	-0.02	22.47
180.0	3484.371	8.148	116.397	2479.8	-79.9	8848.0	-21.37	-0.02	22.59
182.0	3485.180	8.121	119.317	2437.1	-80.0	8893.3	-21.30	-0.02	22.69
184.0	3485.976	8.095	122.251	2394.6	-80.0	8938.8	-21.24	-0.02	22.78
186.0	3486.757	8.069	125.201	2352.1	-80.0	8984.4	-21.17	-0.01	22.85
188.0	3487.524	8.042	128.166	2309.8	-80.1	9030.2	-21.11	-0.01	22.91
190.0	3488.277	8.016	131.146	2267.6	-80.1	9076.1	-21.06	-0.01	23.01
192.0	3489.017	7.990	134.141	2225.5	-80.2	9122.2	-20.98	-0.01	23.12
194.0	3489.742	7.963	137.151	2183.6	-80.2	9168.6	-20.90	-0.01	23.22
196.0	3490.454	7.937	140.177	2141.9	-80.3	9215.1	-20.83	-0.01	23.31
198.0	3491.153	7.910	143.219	2100.2	-80.3	9261.8	-20.77	-0.01	23.41
200.0	3491.837	7.884	146.274	2058.7	-80.4	9308.9	-20.69	-0.02	23.56
202.0	3492.509	7.857	149.346	2017.4	-80.4	9356.1	-20.60	-0.03	23.70
204.0	3493.165	7.831	152.433	1976.3	-80.5	9403.5	-20.48	0.01	23.77
206.0	3493.809	7.805	155.536	1935.5	-80.4	9451.1	-20.32	0.10	23.79
208.0	3494.439	7.778	158.655	1895.0	-80.1	9498.7	-20.14	0.23	23.82
210.0	3495.056	7.752	161.790	1854.8	-79.5	9546.4	-20.00	0.34	23.87
212.0	3495.660	7.726	164.940	1814.9	-78.8	9594.2	-19.93	0.39	23.94
214.0	3496.251	7.700	168.106	1775.0	-78.0	9642.2	-19.93	0.39	24.01
216.0	3496.829	7.674	171.287	1735.1	-77.3	9690.3	-19.94	0.37	24.12
218.0	3497.393	7.649	174.485	1695.2	-76.6	9738.7	-19.94	0.35	24.23
220.0	3497.945	7.624	177.698	1655.2	-75.9	9787.2	-19.95	0.35	24.33
222.0	3498.483	7.599	180.928	1615.3	-75.2	9836.0	-19.94	0.34	24.45
224.0	3499.009	7.574	184.174	1575.4	-74.6	9885.0	-19.94	0.35	24.57
226.0	3499.520	7.550	187.436	1535.5	-73.9	9934.3	-19.94	0.37	24.69
228.0	3500.019	7.526	190.714	1495.6	-73.1	9983.8	-19.94	0.38	24.79
230.0	3500.505	7.502	194.008	1455.7	-72.4	10033.5	-19.93	0.36	24.89
232.0	3500.977	7.478	197.319	1415.8	-71.7	10083.4	-19.94	0.36	25.00
234.0	3501.437	7.455	200.646	1375.8	-71.0	10133.5	-19.98	0.38	25.12
236.0	3501.883	7.431	203.990	1335.8	-70.3	10183.9	-20.03	0.38	25.25
238.0	3502.316	7.408	207.350	1295.7	-69.5	10234.5	-20.05	0.37	25.38
240.0	3502.736	7.386	210.727	1255.5	-68.8	10285.4	-20.06	0.35	25.51
242.0	3503.143	7.363	214.121	1215.3	-68.2	10336.6	-20.08	0.35	25.63
244.0	3503.536	7.341	217.532	1175.2	-67.5	10388.0	-20.09	0.36	25.75
246.0	3503.916	7.319	220.960	1135.0	-66.8	10439.6	-20.07	0.38	25.85
248.0	3504.283	7.297	224.405	1094.8	-66.0	10491.4	-20.07	0.38	25.96
250.0	3504.637	7.275	227.867	1054.6	-65.3	10543.4	-20.09	0.37	26.08
252.0	3504.978	7.254	231.346	1014.4	-64.6	10595.7	-20.12	0.34	26.21
254.0	3505.305	7.233	234.842	974.0	-64.0	10648.3	-20.15	0.32	26.34
256.0	3505.619	7.212	238.356	933.7	-63.4	10701.1	-20.17	0.32	26.46

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

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
259.0	3505.919	7.191	241.887	893.3	-62.7	10754.2	-20.20	0.34	26.60
260.0	3506.207	7.170	245.435	852.8	-62.1	10807.5	-20.22	0.35	26.74
262.0	3506.481	7.150	249.002	812.4	-61.4	10861.1	-20.22	0.36	26.85
264.0	3506.742	7.130	252.585	771.9	-60.7	10914.9	-20.21	0.36	26.95
266.0	3506.989	7.110	256.187	731.4	-60.0	10968.9	-20.22	0.35	27.07
268.0	3507.223	7.091	259.806	690.9	-59.3	11023.3	-20.26	0.33	27.23
270.0	3507.444	7.071	263.444	650.3	-58.7	11077.9	-20.31	0.32	27.37
272.0	3507.651	7.052	267.099	609.6	-58.1	11132.7	-20.32	0.33	27.51
274.0	3507.845	7.033	270.773	569.0	-57.4	11187.9	-20.31	0.35	27.65
276.0	3508.026	7.014	274.464	528.3	-56.7	11243.4	-20.32	0.35	27.78
278.0	3508.193	6.996	278.174	487.6	-56.1	11299.1	-20.36	0.33	27.92
280.0	3508.347	6.977	281.903	446.8	-55.5	11355.0	-20.40	0.31	28.05
282.0	3508.487	6.959	285.650	405.9	-54.9	11411.3	-20.44	0.31	28.20
284.0	3508.614	6.941	289.415	364.9	-54.3	11467.9	-20.48	0.33	28.35
286.0	3508.727	6.923	293.199	323.9	-53.6	11524.7	-20.50	0.34	28.47
288.0	3508.827	6.906	297.002	282.9	-53.0	11581.8	-20.49	0.33	28.61
290.0	3508.914	6.888	300.824	241.9	-52.3	11639.2	-20.49	0.31	28.78
292.0	3508.986	6.871	304.664	200.8	-51.7	11696.9	-20.52	0.30	28.95
294.0	3509.046	6.854	308.524	159.7	-51.2	11754.9	-20.57	0.31	29.09
296.0	3509.092	6.838	312.403	118.5	-50.6	11813.2	-20.62	0.31	29.21
298.0	3509.124	6.821	316.301	77.2	-50.0	11871.8	-20.65	0.31	29.36
300.0	3509.142	6.805	320.218	35.8	-49.4	11930.7	-20.69	0.31	29.51
302.0	3509.147	6.789	324.155	-5.7	-48.8	11989.9	-20.73	0.31	29.67
304.0	3509.139	6.773	328.111	-47.2	-48.2	12049.4	-20.75	0.32	29.84
306.0	3509.116	6.757	332.087	-88.8	-47.5	12109.2	-20.77	0.31	30.00
308.0	3509.080	6.741	336.083	-130.4	-47.0	12169.4	-20.79	0.30	30.16
310.0	3509.030	6.726	340.099	-172.0	-46.4	12229.9	-20.84	0.30	30.31
312.0	3508.967	6.711	344.134	-213.8	-45.8	12290.7	-20.87	0.30	30.47
314.0	3508.890	6.696	348.190	-255.6	-45.2	12351.8	-20.90	0.30	30.62
316.0	3508.799	6.681	352.266	-297.5	-44.7	12413.2	-20.94	0.28	30.79
318.0	3508.694	6.666	356.362	-339.5	-44.2	12474.9	-20.99	0.26	30.97
320.0	3508.575	6.652	360.478	-381.6	-43.7	12537.1	-21.07	0.27	31.14
322.0	3508.443	6.638	364.615	-423.8	-43.1	12599.5	-21.12	0.29	31.33
324.0	3508.296	6.624	368.773	-466.1	-42.5	12662.4	-21.16	0.31	31.50
326.0	3508.136	6.610	372.951	-508.5	-42.0	12725.5	-21.18	0.30	31.66
328.0	3507.961	6.596	377.150	-551.0	-41.4	12789.0	-21.23	0.28	31.83
330.0	3507.773	6.582	381.370	-593.5	-40.9	12852.9	-21.29	0.27	32.00
332.0	3507.571	6.569	385.611	-636.2	-40.4	12917.1	-21.33	0.27	32.20
334.0	3507.354	6.556	389.874	-678.9	-39.9	12981.6	-21.37	0.27	32.37
336.0	3507.124	6.543	394.157	-721.8	-39.3	13046.6	-21.42	0.27	32.54
338.0	3506.879	6.530	398.462	-764.7	-38.8	13111.9	-21.48	0.27	32.73
340.0	3506.620	6.517	402.789	-807.8	-38.3	13177.5	-21.53	0.27	32.93
342.0	3506.347	6.505	407.137	-850.9	-37.8	13243.6	-21.56	0.26	33.14

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

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
344.0	3505.060	6.492	411.508	-894.1	-37.3	13310.1	-21.60	0.24	33.33
346.0	3505.753	6.480	415.900	-937.4	-36.9	13376.9	-21.66	0.24	33.50
348.0	3505.443	6.468	420.314	-980.9	-36.4	13444.1	-21.74	0.26	33.70
350.0	3505.113	6.456	424.750	-1024.5	-35.9	13511.8	-21.84	0.28	33.91
352.0	3504.768	6.444	429.209	-1068.3	-35.3	13579.8	-21.91	0.27	34.1[illegible]
354.0	3504.410	6.433	433.690	-1112.2	-34.8	13648.2	-21.97	0.25	34.29
356.0	3504.036	6.422	438.194	-1156.3	-34.4	13717.0	-22.02	0.24	34.50
358.0	3503.648	6.410	442.720	-1200.4	-33.9	13786.2	-22.07	0.25	34.71
360.0	3503.246	6.399	447.269	-1244.6	-33.4	13855.8	-22.11	0.27	34.91
362.0	3502.829	6.388	451.842	-1288.9	-32.9	13925.8	-22.17	0.27	35.12
364.0	3502.397	6.378	456.437	-1333.4	-32.4	13996.3	-22.23	0.25	35.34
366.0	3501.951	6.367	461.056	-1377.9	-32.0	14067.2	-22.29	0.24	35.56
368.0	3501.490	6.356	465.699	-1422.6	-31.5	14138.5	-22.36	0.24	35.78
370.0	3501.015	6.346	470.363	-1467.[illegible]	-31.0	14210.3	-22.45	0.25	36.00
372.0	3500.524	6.336	475.053	-1512.5	-30.6	14282.[illegible]5	-22.53	0.23	36.22
374.0	3500.019	6.326	479.766	-1557.[illegible]	-30.2	[illegible]4355.2	-22.60	0.22	36.43
376.0	3499.499	6.316	484.503	-1603.0	-29.8	14428.3	-22.68	0.22	36.67
378.0	3498.964	6.306	489.264	-1648.5	-29.3	14501.9	-22.77	0.22	36.92
380.0	3498.413	6.297	494.050	-1694.2	-28.9	14576.0	-22.86	0.22	37.15
382.0	3497.848	6.287	498.860	-1740.1	-28.5	14650.5	-22.95	0.22	37.37
384.0	3497.268	6.278	503.695	-1786.1	-28.1	14725.5	-23.04	0.22	37.61
386.0	3496.672	6.269	508.554	-1832.3	-27.7	14801.0	-23.13	0.22	37.85
388.0	3496.062	6.260	513.438	-1878.7	-27.3	14876.9	-23.22	0.20	38.10
390.0	3495.436	6.251	518.349	-1925.3	-26.9	14953.4	-23.23	0.19	38.34
392.0	3494.794	6.242	523.282	-1971.9	-26.6	15030.3	-23.36	0.19	38.60
394.0	3494.137	6.233	528.243	-2018.8	-26.2	15107.8	-23.46	0.19	38.88
396.0	3493.465	6.225	533.228	-2065.9	-25.9	15185.8	-23.56	0.19	39.14
398.0	3492.77[illegible]	6.[illegible]16	538.240	-2113.1	-25.5	15264.4	-23.65	0.20	39.39
400.0	3492.074	6.208	543.277	-2160.6	-25.2	15343.4	-23.75	0.18	39.65
402.0	3491.355	6.200	548.340	-2208.3	-24.9	15423.0	-23.85	0.17	39.91
404.0	3490.620	6.192	553.43[illegible]	-2256.1	-24.6	15503.1	-23.97	0.15	40.18
406.0	3489.870	6.184	558.546	-2304.2	-24.3	15583.7	-24.06	0.15	40.45
408.0	3489.103	6.176	563.689	-2352.5	-24.0	15664.9	-24.16	0.15	40.73
410.0	3488.321	6.168	568.959	-2401.0	-23.7	15746.7	-24.28	0.15	41.03
412.0	3487.523	6.160	574.056	-2449.7	-23.5	15829.1	-24.38	0.15	41.33
414.0	3486.709	6.152	579.280	-2498.6	-23.2	15912.0	-24 [illegible]8	0.15	41.61
416.0	3485.878	6.145	584.531	-2547.7	-22.9	15995.5	[illegible] 0	0.15	41.89
418.0	3485.031	6.137	589.810	-2597.1	-22.7	16079.6	-[illegible] 3	0.14	42.21
420.0	3484.168	6.130	595.116	-2646.7	-22.4	16164.4	-2[illegible] 84	0.14	42.53
422.0	3483.289	6.123	600.451	-2696.6	-22.2	16249.7	-24.94	0.14	42.83
424.0	3482.393	6.115	605.814	-2746.6	-21.9	16335.7	-25.05	0.14	43.12
426.0	3481.481	6.108	611.205	-2796.9	-21.7	16422.2	-25.18	0.14	43.42
428.0	3480.552	6.101	616.625	-2847.4	-21.4	16509.4	-25.30	0.14	43.74

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

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
430.0	3479.606	6.094	622.074	-2898.2	-21.2	16597.2	-25.44	0.13	44.07
432.0	3478.644	6.087	627.551	-2949.3	-21.0	16685.7	-25.57	0.12	44.42
434.0	3477.664	6.080	633.058	-3000.6	-20.8	16774.9	-25.70	0.11	44.74
436.0	3476.668	6.073	638.594	-3052.2	-20.6	16864.7	-25.82	0.10	45.07
438.0	3475.655	6.067	644.160	-3104.0	-20.4	16955.2	-25.95	0.09	45.42
440.0	3474.625	6.060	649.756	-3156.1	-20.3	17046.4	-26.09	0.07	45.78
442.0	3473.577	6.053	655.382	-3208.5	-20.2	17138.3	-26.25	0.07	46.12
444.0	3472.513	6.047	661.039	-3261.2	-20.1	17230.9	-26.41	0.07	46.45
446.0	3471.431	6.040	666.726	-3314.3	-20.0	17324.2	-26.56	0.07	46.81
448.0	3470.331	6.033	672.444	-3367.5	-19.9	17418.2	-26.68	0.07	47.21
450.0	3469.213	6.027	678.193	-3421.1	-19.8	17513.0	-26.83	0.07	47.60
452.0	3468.078	6.020	683.973	-3475.0	-19.7	17608.6	-26.99	0.07	47.98
454.0	3466.926	6.014	689.785	-3529.2	-19.6	17705.0	-27.14	0.07	48.37
456.0	3465.755	6.008	695.628	-3583.7	-19.5	17802.1	-27.31	0.10	48.78
458.0	3464.567	6.001	701.504	-3638.5	-19.3	17900.0	-27.47	0.03	49.18
460.0	3463.360	5.995	707.412	-3693.7	-19.3	17998.8	-27.64	0.02	49.59
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)								
461.210	3462.621	5.991	711.003	-3727.2	-19.3	18058.9	-27.74	-0.05	49.84
462.0	3462.135	5.988	713.352	-3749.5	-19.3	18091.3	-28.26	-0.06	38.85
464.0	3460.892	5.982	719.320	-3806.1	-19.6	18169.1	-28.29	-0.24	39.01
466.0	3459.630	5.976	725.314	-3862.7	-20.1	18247.3	-28.29	-0.24	39.18
468.0	3458.349	5.969	731.333	-3919.3	-20.5	18325.8	-28.22	-0.15	39.35
470.0	3457.049	5.962	737.378	-3975.3	-20.8	18404.6	-27.62	-0.12	39.53
472.0	3455.732	5.955	743.449	-4029.5	-21.1	18483.9	-26.65	-0.09	39.75
474.0	3454.397	5.948	749.546	-4081.9	-21.3	18563.3	-25.65	-0.08	39.94
476.0	3453.045	5.941	755.669	-4132.6	-21.5	18643.4	-25.02	-0.09	40.16
478.0	3451.676	5.934	761.819	-4182.6	-21.7	18724.0	-24.87	-0.08	40.42
480.0	3450.291	5.927	767.995	-4232.4	-21.9	18805.1	-24.99	-0.07	40.68
482.0	3448.890	5.920	774.199	-4282.6	-22.1	18886.7	-25.16	-0.09	40.97
484.0	3447.472	5.912	780.429	-4333.2	-22.3	18969.0	-25.39	-0.14	41.28
486.0	3446.037	5.905	786.686	-4384.3	-22.6	19051.8	-25.71	-0.13	41.60
488.0	3444.586	5.897	792.971	-4436.2	-22.8	19135.4	-26.06	-0.06	41.96
490.0	3443.117	5.890	799.283	-4489.0	-23.0	19216.0	-26.65	-0.03	37.82
492.0	3441.631	5.882	805.620	-4542.6	-23.0	19288.3	-27.14	0.01	35.77
494.0	3440.126	5.875	811.981	-4597.5	-23.1	19359.9	-27.48	-0.04	35.81
496.0	3438.604	5.867	818.365	-4652.8	-23.1	19431.6	-27.78	-0.00	35.96
498.0	3437.063	5.860	824.771	-4708.7	-23.2	19503.7	-27.98	-0.02	36.14
500.0	3435.504	5.852	831.204	-4764.8	-23.3	19576.2	-28.17	-0.02	36.34
502.0	3433.926	5.844	837.660	-4821.3	-23.3	19649.3	-28.30	-0.02	36.56
504.0	3432.330	5.837	844.140	-4878.2	-23.4	19722.6	-28.44	-0.01	36.77
506.0	3430.715	5.829	850.644	-4935.3	-23.4	19796.4	-28.59	-0.00	36.98

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

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
509.0	3429.081	5.821	857.172	-4992.6	-23.5	19870.6	-28.74	-0.00	37.19
510.0	3427.429	5.813	863.725	-5050.4	-23.5	19945.2	-28.91	0.00	37.40
512.0	3425.756	5.806	870.302	-5108.4	-23.6	20020.2	-29.1[illegible]	-0.00	37.65
514.0	3424.065	5.798	876.905	-5167.0	-23.6	20095.8	-29.3	-0.00	37.93
516.0	3422.355	5.790	883.532	-5226.0	-23.6	20172.0	-29.60	-0.00	38.20
518.0	3420.625	5.782	890.184	-5285.4	-23.7	20248.6	-29.81	0.00	38.43
520.0	3418.875	5.775	896.862	-5345.3	-23.7	20325.7	-30.02	0.03	38.66
522.0	3417.106	5.767	903.565	-5405.7	-23.7	20403.3	-30.24	0.03	38.91
524.0	3415.317	5.759	910.294	-5466.5	-23.7	20481.4	-30.47	0.01	39.17
526.0	3413.507	5.751	917.048	-5527.7	-23.7	20560.0	-30.6[illegible]	-0.01	39.42
528.0	3411.678	5.743	923.829	-5589.3	-23.8	20639.1	-30.8	-0.03	39.66
530.0	3409.828	5.735	930.635	-5651.3	-23.9	20718.7	-31.09	-0.04	39.93
532.0	3407.957	5.728	937.468	-5713.7	-24.0	20798.8	-31.27	-0.04	40.20
534.0	3406.066	5.720	944.328	-5776.5	-24.1	20879.5	-31.45	-0.04	40.47
536.0	3404.154	5.712	951.214	-5839.7	-24.3	20960.7	-31.64	-0.06	40.74
538.0	3402.222	5.704	958.126	-5903.2	-24.4	21042.4	-31.84	-0.07	41.00
540.0	3400.268	5.696	965.066	-5967.2	-24.6	21124.7	-32.05	-0.07	41.28
542.0	3398.293	5.687	972.033	-6031.6	-24.8	21207.6	-32.26	-0.06	41.56
544.0	3396.297	5.679	979.029	-6096.4	-25.0	21291.0	-32.45	-0.07	41.86
546.0	3394.280	5.671	986.049	-6161.5	-25.2	21375.0	-32.63	-0.09	42.14
548.0	3392.241	5.663	993.099	-6227.0	-25.4	21459.6	-32.81	-0.08	42.39
550.0	3390.181	5.654	1000.177	-6292.9	-25.5	21544.6	-33.00	-0.06	42.65
552.0	3388.098	5.645	1007.282	-6359.2	-25.7	21630.2	-33.19	-0.05	42.88
554.0	3385.994	5.637	1014.416	-6425.8	-25.8	21716.2	-33.38	-0.05	43.16
556.0	3383.868	5.629	1021.579	-6492.8	-26.0	21802.8	-33.56	-0.05	43.44
558.0	3381.719	5.620	1028.770	-6560.2	-26.1	21890.0	-33.75	-0.05	43.72
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)								
559.660	3379.919	5.613	1034.758	-6616.1	-26.8	21958.4	-33.12	-0.51	32.39
560.0	3379.549	5.612	1035.985	-6626.8	-26.8	21962.8	-29.72	0.27	-6.44
	S-II/S-IVB SEPARATION COMMAND								
560.600	3378.894	5.609	1038.151	-6644.6	-26.6	21958.8	-29.55	0.28	-6.94
562.0	3377.354	5.603	1043.208	-6686.0	-26.3	21948.5	-29.53	0.07	-7.53
564.0	3375.148	5.594	1050.431	-6745.2	-26.4	21933.4	-29.57	-0.03	-6.79
566.0	3372.913	5.586	1057.649	-6805.1	-26.6	21927.9	-30.57	-0.14	3.64
568.0	3370.668	5.577	1064.869	-6866.7	-26.9	21940.9	-30.73	0.02	7.52
570.0	3368.399	5.568	1072.094	-6929.0	-26.9	21957.2	-30.49	0.02	7.96
572.0	3366.107	5.559	1079.324	-6989.4	-27.2	21973.3	-30.97	-0.25	8.10
574.0	3363.797	5.550	1086.559	-7052.2	-27.4	21989.3	-31.69	-0.29	8.07
576.0	3361.465	5.541	1093.799	-7116.0	-28.4	22005.4	-32.07	-0.27	8.05

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

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
578.0	3359.112	5.531	1101.045	-7180.2	-28.9	22021.6	-32.10	-0.21	8.09
580.0	3356.738	5.522	1108.297	-7244.5	-29.4	22037.9	-32.03	-0.20	8.16
582.0	3354.343	5.512	1115.553	-7308.7	-29.8	22054.2	-32.05	-0.20	8.18
584.0	3351.926	5.502	1122.815	-7372.9	-30.2	22070.6	-32.14	-0.17	8.14
586.0	3349.493	5.492	1130.083	-7437.1	-30.5	22086.8	-32.20	-0.10	8.10
588.0	3347.030	5.482	1137.355	-7501.9	-30.7	22103.0	-32.25	-0.05	8.09
590.0	3344.550	5.472	1144.633	-7566.5	-30.9	22119.2	-32.33	-0.05	8.08
592.0	3342.049	5.462	1151.917	-7631.4	-31.0	22135.4	-32.45	-0.07	8.06
594.0	3339.527	5.452	1159.205	-7696.5	-31.2	22151.5	-32.56	-0.09	8.05
596.0	3336.982	5.441	1166.499	-7761.7	-31.4	22167.6	-32.63	-0.07	8.02
598.0	3334.417	5.431	1173.799	-7827.1	-31.6	22183.6	-32.66	-0.04	7.96
600.0	3331.833	5.420	1181.103	-7892.5	-31.7	22199.5	-32.68	-0.02	7.92
602.0	3329.221	5.410	1188.413	-7958.1	-31.7	22215.3	-32.73	-0.00	7.90
604.0	3326.591	5.400	1195.728	-8023.6	-31.8	22231.1	-32.78	0.02	7.91
606.0	3323.939	5.389	1203.048	-8089.3	-31.8	22247.0	-32.79	0.02	7.89
608.0	3321.266	5.379	1210.373	-8155.0	-31.8	22262.7	-32.82	-0.00	7.86
610.0	3318.570	5.368	1217.704	-8220.9	-31.9	22278.4	-32.86	-0.02	7.83
612.0	3315.854	5.358	1225.040	-8286.6	-32.0	22294.1	-32.90	-0.03	7.79
614.0	3313.115	5.347	1232.380	-8352.5	-32.1	22309.6	-32.92	-0.02	7.75
616.0	3310.355	5.337	1239.726	-8418.5	-32.2	22325.1	-32.95	-0.02	7.72
618.0	3307.573	5.326	1247.077	-8484.5	-32.3	22340.6	-32.98	-0.02	7.72
620.0	3304.770	5.315	1254.434	-8550.5	-32.3	22356.0	-32.99	-0.02	7.73
622.0	3301.944	5.305	1261.795	-8616.6	-32.4	22371.5	-33.00	-0.02	7.72
624.0	3299.097	5.294	1269.161	-8682.7	-32.5	22386.9	-33.03	-0.02	7.70
626.0	3296.228	5.283	1276.532	-8748.9	-32.6	22402.3	-33.05	-0.03	7.67
628.0	3293.338	5.272	1283.909	-8815.1	-32.7	22417.6	-33.09	-0.04	7.63
630.0	3290.425	5.262	1291.290	-8881.4	-32.9	22432.8	-33.15	-0.05	7.59
632.0	3287.491	5.251	1298.677	-8947.9	-33.0	22448.0	-33.20	-0.05	7.54
634.0	3284.535	5.240	1306.068	-9014.4	-33.2	22463.1	-33.23	-0.06	7.52
636.0	3281.557	5.229	1313.464	-9080.9	-33.3	22478.1	-33.23	-0.08	7.51
638.0	3278.557	5.218	1320.866	-9147.5	-33.6	22493.1	-33.23	-0.08	7.48
640.0	3275.535	5.207	1328.272	-9214.1	-33.8	22508.1	-33.24	-0.08	7.45
642.0	3272.491	5.196	1335.683	-9280.6	-34.0	22523.0	-33.24	-0.07	7.43
644.0	3269.425	5.185	1343.099	-9347.2	-34.2	22537.9	-33.25	-0.08	7.45
646.0	3266.337	5.173	1350.520	-9413.8	-34.4	22552.8	-33.27	-0.09	7.46
648.0	3263.228	5.162	1357.946	-9480.5	-34.6	22567.7	-33.31	-0.09	7.46
650.0	3260.096	5.151	1365.377	-9547.3	-34.8	22582.6	-33.35	-0.09	7.43
652.0	3256.943	5.139	1372.813	-9614.1	-35.1	22597.5	-33.38	-0.10	7.38
654.0	3253.767	5.127	1380.253	-9681.0	-35.3	22612.2	-33.42	-0.13	7.34
656.0	3250.569	5.116	1387.699	-9747.9	-35.7	22626.9	-33.44	-0.14	7.32
658.0	3247.350	5.104	1395.149	-9814.9	-36.0	22641.5	-33.47	-0.16	7.31
660.0	3244.108	5.092	1402.604	-9882.0	-36.4	22656.1	-33.51	-0.17	7.27
662.0	3240.844	5.080	1410.064	-9949.1	-36.8	22670.6	-33.52	0.16	7.23

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

TIME SEC	XS NM	YS NM	ZS NM	DXS FT/S	DYS FT/S	DZS FT/S	DDXS FT/S SQ	DDYS FT/S SQ	DDZS FT/S SQ
664.0	3237.558	5.068	1417.528	-10016.3	-37.2	22685.1	-33.52	-0.15	7.22
666.0	3234.250	5.056	1424.998	-10083.4	-37.5	22699.5	-33.51	-0.14	7.22
668.0	3230.920	5.043	1432.472	-10150.5	-37.8	22714.0	-33.49	-0.14	7.23
670.0	3227.568	5.031	1439.951	-10217.5	-38.2	22728.5	-33.49	-0.15	7.21
672.0	3224.194	5.018	1447.434	-10284.7	-38.6	22742.8	-33.60	-0.18	7.14
674.0	3220.798	5.005	1454.922	-10352.2	-39.0	22757.1	-33.77	-0.22	7.07
676.0	3217.379	4.992	1462.415	-10419.9	-39.5	22771.2	-33.85	-0.23	7.04
678.0	3213.938	4.979	1469.913	-10487.6	-40.0	22785.3	-33.80	-0.23	7.06
680.0	3210.475	4.966	1477.415	-10555.3	-40.6	22799.4	-33.71	-0.23	7.08
682.0	3206.989	4.952	1484.922	-10622.8	-41.0	22813.6	-33.71	-0.22	7.06
684.0	3203.482	4.939	1492.434	-10690.3	-41.5	22827.7	-33.75	-0.21	7.02
686.0	3199.952	4.925	1499.950	-10757.9	-42.0	22841.7	-33.77	-0.21	7.00
688.0	3196.400	4.911	1507.471	-10825.5	-42.5	22855.8	-33.75	-0.22	7.03
690.0	3192.825	4.897	1514.996	-10893.1	-42.9	22869.9	-33.70	-0.22	7.08
692.0	3189.229	4.883	1522.527	-10960.5	-43.4	22884.1	-33.66	-0.22	7.12
694.0	3185.610	4.869	1530.061	-11027.9	-44.0	22898.4	-33.63	-0.24	7.13
696.0	3181.969	4.854	1537.601	-11095.2	-44.5	22912.6	-33.61	-0.26	7.08
698.0	3178.306	4.839	1545.145	-11162.5	-45.2	22926.7	-33.58	-0.25	7.08
700.0	3174.620	4.824	1552.694	-11229.8	-45.7	22940.9	-33.55	-0.18	7.08
702.0	3170.913	4.809	1560.248	-11296.9	-46.3	22955.0	-33.52	-0.24	7.07
S-IVB FIRST GUIDANCE CUTOFF									
702.650	3169.703	4.804	1562.703	-11318.7	-46.5	22959.6	-33.51	-0.17	7.07
704.0	3167.184	4.794	1567.802	-11357.3	-46.6	22946.5	-27.51	0.05	-12.82
706.0	3163.437	4.779	1575.351	-11412.2	-46.6	22919.8	-27.30	0.02	-13.62
708.0	3159.671	4.763	1582.891	-11466.9	-46.6	22892.3	-27.27	0.02	-13.68
710.0	3155.888	4.748	1590.421	-11521.5	-46.7	22864.9	-27.24	-0.10	-13.75
712.0	3152.087	4.732	1597.943	-11576.0	-46.8	22837.4	-27.20	0.13	-13.71
PARKING ORBIT INSERTION									
712.650	3150.847	4.727	1600.386	-11593.7	-46.7	22828.5	-27.19	0.09	-13.72

TABLE C-III. GEOGRAPHIC POLAR COORDINATES - ASCENT PHASE

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
GUIDANCE REFERENCE RELEASE											
-16.960	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-16.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-15.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-14.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-13.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-12.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-11.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-10.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-9.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-8.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-7.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-6.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-5.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-4.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-3.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-2.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
-1.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
0.0	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
ALL HOLDDOWN ARMS RELEASED											
0.200	3441.364	-80.6041	28.4470	0.0	90.00	0.0	90.00	0.0	1340.7	0.0	366
LIFTOFF - START OF TIME BASE 1											
0.600	3441.365	-80.6041	28.4470	279.17	87.71	1.1	90.00	0.05	1340.6	0.000	367
1.0	3441.365	-80.6041	28.4470	279.26	87.35	3.1	90.00	0.13	1340.5	0.000	367
2.0	3441.366	-80.6041	28.4470	278.50	87.51	11.0	90.00	0.43	1340.3	0.000	374
3.0	3441.368	-80.6041	28.4470	280.84	87.51	17.2	89.99	0.73	1340.1	0.000	387
4.0	3441.371	-80.6041	28.4470	282.90	87.57	24.5	89.99	1.05	1339.9	0.000	408
5.0	3441.376	-80.6041	28.4470	266.71	87.72	32.0	90.00	1.37	1339.8	0.000	436
6.0	3441.382	-80.6041	28.4470	237.10	87.41	39.7	90.04	1.70	1339.8	0.001	472
7.0	3441.389	-80.6042	28.4470	216.46	86.58	47.7	90.10	2.03	1339.9	0.001	516
8.0	3441.398	-80.6042	28.4470	205.30	85.69	55.8	90.16	2.38	1340.0	0.001	567
9.0	3441.407	-80.6042	28.4469	202.61	85.23	64.1	90.21	2.73	1340.2	0.002	627
10.0	3441.419	-80.6042	28.4469	202.31	85.35	72.6	90.23	3.09	1340.4	0.003	695
11.0	3441.431	-80.6042	28.4469	203.73	85.80	81.3	90.23	3.47	1340.8	0.004	772
12.0	3441.445	-80.6042	28.4469	205.78	86.27	90.1	90.23	3.86	1341.2	0.005	857
13.0	3441.461	-80.6042	28.4469	207.03	86.57	99.2	90.23	4.23	1341.7	0.006	952
14.0	3441.478	-80.6042	28.4469	206.97	86.68	108.5	90.24	4.63	1342.3	0.007	1056

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

TIME SEC	GC DIST NM	LONG DEG E	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
15.0	3441.497	-80.6042	28.4469	206.14	86.82	118.0	90.25	5.03	1343.1	0.008	1169
16.0	3441.517	-80.6042	28.4468	205.96	87.21	127.7	90.24	5.45	1344.1	0.009	1291
17.0	3441.539	-80.6042	28.4468	206.02	87.66	137.7	90.22	5.87	1345.4	0.010	1424
18.0	3441.562	-80.6042	28.4468	205.55	88.07	147.8	90.19	6.30	1346.8	0.011	1566
19.0	3441.587	-80.6042	28.4468	202.98	88.46	158.2	90.17	6.74	1348.4	0.011	1719
20.0	3441.614	-80.6042	28.4468	195.32	88.77	168.8	90.15	7.18	1350.4	0.012	1883
21.0	3441.643	-80.6042	28.4468	180.21	88.98	179.6	90.14	7.63	1352.8	0.012	2057
22.0	3441.673	-80.6042	28.4468	158.36	89.04	190.7	90.13	8.09	1355.5	0.013	2242
23.0	3441.706	-80.6042	28.4468	136.18	88.92	202.0	90.12	8.55	1358.5	0.013	2438
24.0	3441.740	-80.6042	28.4468	120.19	88.64	213.5	90.11	9.01	1362.0	0.013	2646
25.0	3441.776	-80.6042	28.4467	110.14	88.26	225.2	90.10	9.49	1365.9	0.013	2865
26.0	3441.814	-80.6042	28.4467	103.82	87.82	237.2	90.09	9.96	1370.3	0.013	3096
27.0	3441.854	-80.6042	28.4467	99.70	87.33	249.5	90.08	10.44	1375.1	0.014	3339
28.0	3441.896	-80.6041	28.4467	96.91	86.81	262.0	90.07	10.92	1380.4	0.014	3595
29.0	3441.940	-80.6041	28.4467	94.94	86.25	274.8	90.07	11.41	1386.2	0.014	3863
30.0	3441.986	-80.6040	28.4467	93.52	85.67	287.9	90.06	11.90	1392.5	0.016	4143
31.0	3442.034	-80.6039	28.4467	92.45	85.08	301.3	90.05	12.39	1399.4	0.018	4437
32.0	3442.085	-80.6038	28.4467	91.63	84.47	315.0	90.04	12.88	1406.7	0.021	4744
33.0	3442.138	-80.6037	28.4467	91.00	83.86	329.1	90.03	13.37	1414.6	0.025	5064
34.0	3442.193	-80.6036	28.4467	90.49	83.23	343.5	90.01	13.87	1423.0	0.031	5398
35.0	3442.250	-80.6035	28.4467	90.07	82.60	358.2	90.00	14.36	1431.9	0.037	5746
36.0	3442.310	-80.6033	28.4467	89.74	81.96	373.2	89.99	14.86	1441.4	0.045	6109
37.0	3442.372	-80.6032	28.4467	89.50	81.32	388.6	89.98	15.35	1451.5	0.053	6485
38.0	3442.436	-80.6030	28.4467	89.34	80.68	404.4	89.97	15.84	1462.1	0.063	6877
39.0	3442.503	-80.6028	28.4467	89.23	80.03	420.6	89.96	16.33	1473.4	0.074	7284
40.0	3442.572	-80.6025	28.4467	89.16	79.38	437.1	89.95	16.81	1485.2	0.086	7706
41.0	3442.644	-80.6023	28.4467	89.10	78.72	454.1	89.94	17.30	1497.7	0.100	8143
42.0	3442.719	-80.6020	28.4467	89.09	78.05	471.4	89.94	17.77	1510.9	0.115	8596
43.0	3442.796	-80.6016	28.4467	89.08	77.38	489.2	89.93	18.24	1524.8	0.132	9066
44.0	3442.876	-80.6013	28.4467	89.09	76.70	507.4	89.93	18.71	1539.3	0.150	9551
45.0	3442.959	-80.6009	28.4467	89.12	76.02	526.0	89.92	19.17	1554.5	0.170	10053
46.0	3443.044	-80.6005	28.4467	89.17	75.34	545.0	89.92	19.62	1570.4	0.192	10572
47.0	3443.132	-80.6001	28.4468	89.24	74.65	564.5	89.92	20.06	1587.1	0.216	11108
48.0	3443.223	-80.5996	28.4468	89.34	73.97	584.5	89.93	20.50	1604.4	0.241	11661
49.0	3443.317	-80.5991	28.4469	89.45	73.29	604.9	89.94	20.92	1622.4	0.269	12232
50.0	3443.414	-80.5985	28.4469	89.58	72.59	625.8	89.95	21.34	1641.2	0.298	12820
51.0	3443.514	-80.5979	28.4468	89.72	71.91	647.2	89.96	21.74	1660.7	0.330	13426
52.0	3443.617	-80.5972	28.4469	89.86	71.22	669.2	89.98	22.14	1681.0	0.364	14050
53.0	3443.722	-80.5965	28.4468	89.98	70.53	691.6	90.00	22.53	1702.0	0.401	14693
54.0	3443.831	-80.5958	28.4468	90.08	69.84	714.5	90.01	22.90	1723.7	0.440	15354
55.0	3443.943	-80.5950	28.4469	90.17	69.16	738.0	90.03	23.27	1746.2	0.482	16035
56.0	3444.059	-80.5942	28.4468	90.24	68.49	762.0	90.04	23.62	1769.3	0.526	16734
57.0	3444.177	-80.5933	28.4469	90.30	67.84	786.5	90.05	23.97	1793.1	0.574	17453

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

TIME SEC	GC DIST NM	LONG DEG E	DEC 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
58.0	3444.298	-80.5923	28.4468	90.35	67.19	811.6	90.07	24.31	1817.5	0.624	18191
59.0	3444.423	-80.5913	28.4468	90.40	66.56	837.2	90.08	24.63	1842.6	0.677	18949
60.0	3444.551	-80.5902	28.4467	90.46	65.93	863.3	90.10	24.95	1868.4	0.734	19727
61.0	3444.682	-80.5891	28.4467	90.54	65.32	890.1	90.12	25.26	1894.9	0.793	20525
62.0	3444.817	-80.5879	28.4467	90.62	64.70	917.3	90.14	25.56	1922.1	0.856	21344
63.0	3444.955	-80.5867	28.4467	90.71	64.09	945.1	90.17	25.85	1950.1	0.922	22184
64.0	3445.097	-80.5854	28.4467	90.80	63.47	973.4	90.20	26.11	1978.8	0.992	23045
65.0	3445.242	-80.5840	28.4467	90.88	62.85	1002.2	90.22	26.36	2008.4	1.065	23926
66.0	3445.390	-80.5825	28.4467	90.95	62.22	1031.6	90.25	26.59	2038.7	1.142	24828
67.0	3445.542	-80.5810	28.4466	91.02	61.58	1061.5	90.28	26.81	2069.9	1.223	25751
	MACH 1										
67.500	3445.620	-80.5802	28.4465	91.06	61.26	1076.7	90.29	26.91	2085.8	1.265	26221
68.0	3445.698	-80.5794	28.4466	91.09	60.94	1092.0	90.31	27.01	2101.9	1.308	26695
69.0	3445.857	-80.5777	28.4466	91.14	60.31	1123.1	90.33	27.20	2134.6	1.398	27660
70.0	3446.019	-80.5759	28.4466	91.19	59.68	1154.7	90.36	27.37	2168.0	1.491	28647
71.0	3446.185	-80.5740	28.4465	91.23	59.07	1187.0	90.39	27.54	2202.1	1.589	29654
72.0	3446.354	-80.5721	28.4465	91.29	58.48	1219.9	90.41	27.70	2236.8	1.692	30683
73.0	3446.527	-80.5701	28.4464	91.35	57.89	1253.6	90.45	27.86	2272.2	1.799	31734
74.0	3446.704	-80.5680	28.4464	91.42	57.32	1287.9	90.49	28.01	2308.3	1.911	32807
75.0	3446.884	-80.5657	28.4463	91.51	56.76	1322.9	90.53	28.15	2345.2	2.027	33902
76.0	3447.068	-80.5634	28.4463	91.62	56.21	1358.7	90.58	28.29	2382.9	2.149	35020
77.0	3447.256	-80.5610	28.4462	91.74	55.66	1395.2	90.64	28.41	2421.5	2.276	36160
78.0	3447.447	-80.5585	28.4462	91.88	55.11	1432.6	90.71	28.52	2461.0	2.408	37324
79.0	3447.642	-80.5559	28.4461	92.03	54.55	1470.8	90.79	28.62	2501.4	2.545	38510
80.0	3447.841	-80.5532	28.4460	92.17	54.00	1509.8	90.86	28.71	2542.8	2.688	39720
81.0	3448.044	-80.5504	28.4459	92.31	53.45	1549.7	90.94	28.79	2585.2	2.837	40953
82.0	3448.251	-80.5475	28.4458	92.42	52.90	1590.4	91.01	28.86	2628.5	2.991	42210
	MAXIMUM DYNAMIC PRESSURE										
82.500	3448.356	-80.5460	28.4457	92.47	52.63	1611.1	91.04	28.89	2650.5	3.071	42847
83.0	3448.462	-80.5445	28.4457	92.52	52.36	1632.0	91.07	28.91	2672.8	3.152	43490
84.0	3448.677	-80.5413	28.4455	92.59	51.82	1674.4	91.12	28.96	2718.0	3.319	44794
85.0	3448.895	-80.5380	28.4454	92.67	51.27	1717.8	91.16	29.00	2764.3	3.492	46122
86.0	3449.118	-80.5346	28.4453	92.62	50.73	1762.0	91.19	29.02	2811.5	3.671	47474
87.0	3449.344	-80.5311	28.4451	92.61	50.18	1807.1	91.21	29.03	2859.8	3.858	48850
88.0	3449.574	-80.5274	28.4450	92.57	49.63	1853.1	91.21	29.03	2909.1	4.052	50249
89.0	3449.809	-80.5236	28.4448	92.51	49.07	1900.0	91.21	29.01	2959.5	4.252	51673
90.0	3450.047	-80.5197	28.4447	92.45	48.51	1947.8	91.20	28.99	3010.9	4.460	53120
91.0	3450.289	-80.5156	28.4445	92.37	47.96	1996.5	91.18	28.95	3063.4	4.676	54591
92.0	3450.535	-80.5114	28.4444	92.30	47.40	2046.2	91.17	28.90	3116.1	4.899	56085

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

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
93.0	3450.785	-80.5070	28.4442	92.23	46.84	2096.9	91.15	28.84	3171.4	5.131	57603
94.0	3451.039	-80.5025	28.4441	92.16	46.29	2148.6	91.13	28.77	3227.0	5.370	59144
95.0	3451.296	-80.4978	28.4439	92.09	45.74	2201.2	91.11	28.69	3283.6	5.618	60709
96.0	3451.557	-80.4930	28.4438	92.03	45.19	2254.9	91.10	28.61	3341.2	5.874	62297
97.0	3451.823	-80.4879	28.4436	91.97	44.65	2309.5	91.09	28.51	3399.9	6.140	63908
99.0	3452.092	-80.4827	28.4435	91.93	44.10	2365.1	91.08	28.41	3459.5	6.414	65542
99.0	3452.364	-80.4774	28.4433	91.89	43.57	2421.8	91.07	28.30	3520.2	6.697	67200
100.0	3452.641	-80.4719	28.4432	91.85	43.04	2479.5	91.06	28.19	3581.9	6.989	68880
101.0	3452.921	-80.4661	28.4430	91.83	42.51	2538.2	91.06	28.07	3644.7	7.292	70584
102.0	3453.206	-80.4602	28.4428	91.81	41.99	2597.9	91.07	27.95	3708.4	7.603	72310
103.0	3453.494	-80.4541	28.4427	91.79	41.48	2658.7	91.07	27.82	3773.2	7.925	74059
104.0	3453.785	-80.4479	28.4425	91.78	40.98	2720.6	91.08	27.69	3838.9	8.257	75832
105.0	3454.081	-80.4414	28.4423	91.77	40.48	2783.5	91.08	27.56	3905.6	8.599	77627
106.0	3454.380	-80.4347	28.4421	91.77	40.00	2847.4	91.09	27.43	3973.4	8.951	79445
107.0	3454.683	-80.4279	28.4419	91.76	39.52	2912.3	91.10	27.29	4042.0	9.314	81287
108.0	3454.990	-80.4208	28.4418	91.75	39.05	2978.3	91.11	27.15	4111.7	9.688	83151
109.0	3455.301	-80.4135	28.4416	91.75	38.59	3045.4	91.12	27.01	4182.4	10.072	85039
110.0	3455.615	-80.4060	28.4414	91.74	38.14	3113.5	91.12	26.87	4254.0	10.468	86950
111.0	3455.934	-80.3983	28.4412	91.73	37.70	3182.6	91.13	26.73	4326.7	10.875	88884
112.0	3456.256	-80.3904	28.4409	91.72	37.27	3252.8	91.13	26.59	4400.3	11.294	90842
113.0	3456.582	-80.3823	28.4407	91.71	36.85	3324.2	91.14	26.45	4475.0	11.724	92823
114.0	3456.912	-80.3739	28.4405	91.70	36.44	3396.6	91.14	26.32	4550.6	12.165	94828
115.0	3457.246	-80.3653	28.4403	91.69	36.04	3470.2	91.14	26.18	4627.3	12.619	96857
116.0	3457.584	-80.3565	28.4401	91.68	35.66	3544.8	91.15	26.05	4705.0	13.085	98911
117.0	3457.926	-80.3474	28.4398	91.68	35.29	3620.7	91.15	25.93	4783.7	13.563	100990
118.0	3458.273	-80.3382	28.4396	91.67	34.93	3697.7	91.16	25.81	4863.5	14.053	103094
119.0	3458.623	-80.3287	28.4393	91.67	34.58	3775.9	91.17	25.68	4944.5	14.556	105224
120.0	3458.978	-80.3189	28.4391	91.67	34.24	3855.2	91.17	25.56	5026.5	15.071	107380
121.0	3459.337	-80.3089	28.4388	91.67	33.90	3935.8	91.18	25.44	5109.7	15.600	109561
122.0	3459.700	-80.2986	28.4386	91.67	33.57	4017.6	91.19	25.32	5194.2	16.141	111769
123.0	3460.068	-80.2882	28.4383	91.67	33.24	4100.7	91.20	25.20	5279.8	16.696	114004
124.0	3460.440	-80.2774	28.4380	91.67	32.92	4185.0	91.21	25.07	5366.7	17.264	116264
125.0	3460.817	-80.2664	28.4377	91.67	32.60	4270.6	91.22	24.95	5454.8	17.846	118551
126.0	3461.198	-80.2551	28.4375	91.68	32.28	4357.5	91.23	24.82	5544.2	18.442	120865
127.0	3461.583	-80.2436	28.4372	91.68	31.97	4445.8	91.24	24.69	5634.9	19.051	123205
128.0	3461.972	-80.2318	28.4369	91.69	31.67	4535.4	91.24	24.57	5727.0	19.676	125572
129.0	3462.367	-80.2197	28.4365	91.69	31.37	4626.3	91.25	24.44	5820.3	20.315	127967
130.0	3462.765	-80.2073	28.4362	91.68	31.07	4718.7	91.26	24.32	5915.0	20.968	130388
131.0	3463.168	-80.1946	28.4359	91.68	30.79	4812.5	91.27	24.19	6011.1	21.637	132837
132.0	3463.576	-80.1817	28.4356	91.69	30.50	4907.8	91.28	24.07	6108.6	22.320	135314
133.0	3463.988	-80.1685	28.4352	91.69	30.23	5004.4	91.29	23.94	6207.5	23.020	137819
134.0	3464.405	-80.1549	28.4349	91.69	29.96	5102.6	91.30	23.82	6307.8	23.735	140352
135.0	3464.827	-80.1411	28.4345	91.70	29.69	5202.1	91.31	23.70	6409.4	24.465	142914

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

TIME SEC	GC DIST NM	LONG DEG E	LAT DEG N	VEL-AZ DEG	VEL-EL DEG	SF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
136.0	3465.253	-80.1270	28.4341	91.70	29.43	5303.1	91.32	23.58	6512.5	25.212	145504
137.0	3465.684	-80.1125	28.4338	91.71	29.17	5405.6	91.33	23.47	6617.0	25.975	148124
138.0	3466.121	-80.0978	28.4334	91.72	28.92	5509.5	91.34	23.35	6722.9	26.755	150773
139.0	3466.561	-80.0827	28.4330	91.72	28.68	5614.9	91.35	23.23	6830.3	27.552	153451
	S-IC CENTER ENGINE CUTOFF (ENGINE SOLENOID)										
139.300	3466.695	-80.0731	28.4329	91.72	28.60	5646.8	91.36	23.20	6862.7	27.795	154261
140.0	3467.007	-80.0673	28.4326	91.73	28.44	5712.0	91.36	23.11	6929.4	28.365	156157
141.0	3467.456	-80.0516	28.4321	91.74	28.19	5796.5	91.38	22.97	7015.9	29.193	158886
142.0	3467.908	-80.0357	28.4317	91.75	27.95	5881.6	91.39	22.83	7103.1	30.035	161631
143.0	3468.363	-80.0195	28.4313	91.77	27.71	5967.6	91.41	22.70	7191.1	30.891	164396
144.0	3468.821	-80.0030	28.4308	91.78	27.47	6054.6	91.42	22.56	7280.1	31.761	167179
145.0	3469.282	-79.9863	28.4304	91.80	27.24	6142.8	91.44	22.42	7370.2	32.645	169981
146.0	3469.747	-79.9693	28.4299	91.81	27.01	6232.1	91.46	22.29	7461.4	33.544	172802
147.0	3470.214	-79.9520	28.4294	91.83	26.79	6322.6	91.48	22.16	7553.7	34.458	175641
148.0	3470.684	-79.9344	28.4289	91.85	26.57	6414.2	91.49	22.03	7647.2	35.387	178500
149.0	3471.158	-79.9166	28.4284	91.86	26.35	6506.9	91.51	21.91	7741.7	36.330	181378
150.0	3471.635	-79.8984	28.4279	91.88	26.14	6601.3	91.53	21.78	7837.8	37.289	184275
151.0	3472.115	-79.8800	28.4274	91.89	25.92	6697.0	91.55	21.65	7935.3	38.264	187192
152.0	3472.599	-79.8612	28.4269	91.91	25.72	6794.2	91.56	21.53	8034.2	39.254	190130
153.0	3473.086	-79.8422	28.4263	91.92	25.51	6892.8	91.58	21.40	8134.5	40.261	193087
154.0	3473.576	-79.8229	28.4257	91.94	25.31	6992.8	91.60	21.28	8236.2	41.283	196065
155.0	3474.070	-79.8032	28.4251	91.95	25.10	7094.2	91.61	21.16	8339.2	42.322	199064
156.0	3474.567	-79.7832	28.4245	91.97	24.91	7197.2	91.63	21.04	8443.8	43.378	202084
157.0	3475.067	-79.7629	28.4239	91.99	24.71	7301.7	91.65	20.92	8549.9	44.451	205125
158.0	3475.572	-79.7423	28.4232	92.00	24.52	7407.7	91.66	20.80	8657.5	45.540	208188
159.0	3476.079	-79.7214	28.4226	92.01	24.33	7515.3	91.68	20.68	8766.6	46.647	211272
160.0	3476.591	-79.7001	28.4219	92.03	24.14	7624.4	91.70	20.57	8877.3	47.772	214379
161.0	3477.105	-79.6785	28.4213	92.04	23.96	7735.1	91.71	20.45	8989.4	48.914	217506
	S-IC OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)										
161.200	3477.209	-79.6741	28.4211	92.05	23.92	7757.4	91.72	20.43	9012.1	49.145	218135
162.0	3477.622	-79.6566	28.4206	92.06	23.76	7799.9	91.73	20.30	9046.0	50.069	220643
	S-IC/S-II SEPARATION COMMAND										
162.900	3478.084	-79.6369	28.4200	92.07	23.59	7778.4	91.74	20.15	9036.1	51.112	223453
164.0	3478.646	-79.6127	28.4192	92.09	23.39	7762.8	91.75	19.97	9022.3	52.390	226864
166.0	3479.652	-79.5689	28.4178	92.12	23.02	7740.3	91.78	19.65	9003.2	54.709	232974
168.0	3480.641	-79.5249	28.4163	92.15	22.66	7750.2	91.81	19.34	9016.3	57.031	238993
170.0	3481.613	-79.4808	28.4149	92.18	22.30	7769.3	91.83	19.03	9038.5	59.365	244916

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

TIME SEC	GC DIST NM	LONG DEG E	DEC 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
172.0	3482.582	-79.4364	28.4134	92.21	21.94	7794.1	91.86	18.73	9066.4	61.710	250774
174.0	3483.535	-79.3918	28.4119	92.24	21.58	7820.4	91.89	18.44	9095.6	64.068	256561
176.0	3484.476	-79.3470	28.4103	92.27	21.23	7948.2	91.92	18.14	9126.4	66.439	262278
178.0	3485.406	-79.3018	28.4087	92.31	20.88	7876.6	91.95	17.85	9157.6	68.824	267926
180.0	3486.324	-79.2565	28.4071	92.34	20.54	7905.5	91.98	17.57	9189.3	71.223	273506
182.0	3487.232	-79.2109	28.4054	92.37	20.20	7935.0	92.01	17.28	9221.5	73.635	279018
184.0	3488.128	-79.1650	28.4037	92.40	19.86	7965.1	92.03	17.00	9254.3	76.061	284462
186.0	3489.013	-79.1189	28.4020	92.44	19.53	7995.8	92.06	16.73	9287.5	78.500	289839
188.0	3489.888	-79.0725	28.4003	92.47	19.20	8027.0	92.09	16.45	9321.2	80.954	295150
190.0	3490.751	-79.0258	28.3985	92.50	18.87	8058.7	92.12	16.18	9355.4	83.421	300395
192.0	3491.604	-78.9789	28.3967	92.53	18.55	8091.0	92.15	15.91	9390.1	85.903	305574
194.0	3492.446	-78.9317	28.3948	92.57	18.23	8123.9	92.18	15.65	9425.3	88.398	310688
196.0	3493.277	-78.8842	28.3930	92.60	17.92	8157.4	92.21	15.38	9461.1	90.908	315737
198.0	3494.098	-78.8365	28.3910	92.63	17.61	8191.4	92.24	15.12	9497.3	93.432	320723
200.0	3494.908	-78.7885	28.3891	92.66	17.30	8226.0	92.27	14.87	9534.1	95.970	325645
202.0	3495.708	-78.7403	28.3871	92.70	17.00	8261.3	92.30	14.62	9571.4	98.523	330504
204.0	3496.498	-78.6917	28.3851	92.73	16.70	8297.1	92.33	14.37	9609.3	101.090	335302
206.0	3497.278	-78.6429	28.3830	92.76	16.41	8333.4	92.36	14.12	9647.6	103.672	340037
208.0	3498.048	-78.5939	28.3809	92.80	16.12	8370.2	92.39	13.88	9686.2	106.269	344712
210.0	3498.808	-78.5445	28.3788	92.84	15.84	8407.4	92.43	13.64	9725.3	108.880	349328
212.0	3499.558	-78.4949	28.3766	92.88	15.56	8445.0	92.46	13.41	9764.7	111.506	353885
214.0	3500.299	-78.4450	28.3744	92.92	15.28	8483.1	92.50	13.18	9804.5	114.146	358383
216.0	3501.030	-78.3948	28.3721	92.95	15.01	8521.6	92.53	12.95	9844.7	116.802	362823
218.0	3501.752	-78.3443	28.3698	92.99	14.74	8560.6	92.57	12.73	9885.4	119.472	367206
220.0	3502.464	-78.2936	28.3675	93.03	14.47	8600.1	92.60	12.51	9926.5	122.158	371531
222.0	3503.167	-78.2426	28.3651	93.07	14.21	8640.0	92.64	12.29	9968.1	124.859	375799
224.0	3503.860	-78.1912	28.3626	93.11	13.95	8680.5	92.67	12.07	10010.1	127.574	380010
226.0	3504.544	-78.1396	28.3601	93.15	13.69	8721.5	92.71	11.85	10052.5	130.306	384165
228.0	3505.219	-78.0878	28.3576	93.19	13.44	8762.9	92.75	11.64	10095.5	133.052	388263
230.0	3505.885	-78.0356	28.3550	93.22	13.19	8804.9	92.78	11.43	10138.8	135.814	392305
232.0	3506.541	-77.9831	28.3524	93.26	12.94	8847.2	92.82	11.22	10182.5	138.592	396292
234.0	3507.189	-77.9304	28.3498	93.30	12.69	8890.1	92.85	11.01	10226.7	141.385	400223
236.0	3507.827	-77.8773	28.3471	93.34	12.45	8933.4	92.89	10.81	10271.4	144.194	404099
238.0	3508.457	-77.8240	28.3443	93.38	12.21	8977.2	92.93	10.60	10316.5	147.019	407920
240.0	3509.077	-77.7703	28.3415	93.42	11.97	9021.5	92.96	10.40	10362.0	149.860	411686
242.0	3509.688	-77.7164	28.3386	93.46	11.73	9066.3	93.00	10.20	10408.0	152.716	415398
244.0	3510.291	-77.6621	28.3357	93.50	11.50	9111.6	93.03	10.01	10454.4	155.589	419055
246.0	3510.884	-77.6076	28.3328	93.54	11.27	9157.3	93.07	9.81	10501.3	158.479	422658
248.0	3511.469	-77.5527	28.3298	93.58	11.04	9203.4	93.11	9.62	10548.6	161.384	426207
250.0	3512.045	-77.4976	28.3267	93.62	10.82	9250.0	93.14	9.43	10596.3	164.306	429703
252.0	3512.612	-77.4421	28.3236	93.66	10.60	9297.1	93.18	9.24	10644.4	167.245	433146
254.0	3513.170	-77.3863	28.3205	93.69	10.38	9344.7	93.21	9.06	10692.9	170.200	436536
256.0	3513.720	-77.3302	28.3173	93.73	10.16	9392.7	93.25	8.88	10741.9	173.172	439874

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

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
258.0	3514.261	-77.2738	28.3140	93.77	9.95	9441.2	93.29	8.69	10791.4	176.161	443159
260.0	3514.794	-77.2171	28.3107	93.81	9.74	9490.1	93.32	8.52	10841.3	179.167	446392
262.0	3515.318	-77.1600	28.3073	93.85	9.53	9539.6	93.36	8.34	10891.6	182.190	449573
264.0	3515.834	-77.1027	28.3039	93.89	9.33	9589.4	93.40	8.16	10942.3	185.230	452703
266.0	3516.341	-77.0450	28.3005	93.93	9.12	9639.7	93.44	7.99	10993.5	188.287	455782
268.0	3516.840	-76.9870	28.2969	93.97	8.92	9690.4	93.47	7.82	11045.0	191.362	458810
270.0	3517.331	-76.9287	28.2933	94.01	8.73	9741.7	93.51	7.65	11097.1	194.454	461788
272.0	3517.813	-76.8700	28.2897	94.05	8.53	9793.4	93.55	7.49	11149.6	197.564	464715
274.0	3518.287	-76.8110	28.2860	94.09	8.34	9845.6	93.58	7.32	11202.5	200.691	467593
276.0	3518.753	-76.7517	28.2823	94.13	8.15	9898.2	93.62	7.16	11255.9	203.836	470421
278.0	3519.211	-76.6921	28.2785	94.17	7.97	9951.3	93.66	7.00	11309.7	206.999	473199
280.0	3519.661	-76.6321	28.2746	94.21	7.78	10004.9	93.70	6.85	11364.0	210.180	475929
282.0	3520.103	-76.5718	28.2707	94.25	7.60	10058.9	93.73	6.69	11418.7	213.380	478610
284.0	3520.537	-76.5111	28.2667	94.29	7.42	10113.4	93.77	6.54	11473.8	216.597	481243
286.0	3520.963	-76.4501	28.2626	94.33	7.25	10168.4	93.81	6.39	11529.4	219.833	483828
288.0	3521.381	-76.3888	28.2585	94.37	7.07	10223.8	93.85	6.24	11585.3	223.087	486364
290.0	3521.792	-76.3271	28.2543	94.41	6.90	10279.6	93.89	6.09	11641.8	226.360	488854
292.0	3522.194	-76.2651	28.2501	94.45	6.73	10336.0	93.92	5.95	11698.7	229.652	491296
294.0	3522.589	-76.2027	28.2458	94.49	6.57	10392.9	93.96	5.80	11756.1	232.962	493692
296.0	3522.977	-76.1400	28.2415	94.53	6.40	10450.2	94.00	5.66	11813.9	236.292	496041
298.0	3523.357	-76.0769	28.2370	94.57	6.24	10507.9	94.04	5.52	11872.2	239.640	498345
300.0	3523.729	-76.0134	28.2326	94.61	6.08	10566.1	94.08	5.39	11930.8	243.008	500603
302.0	3524.094	-75.9496	28.2280	94.65	5.93	10624.7	94.12	5.25	11990.0	246.395	502815
304.0	3524.451	-75.8855	28.2234	94.69	5.77	10683.9	94.15	5.12	12049.6	249.801	504982
306.0	3524.801	-75.8210	28.2187	94.73	5.62	10743.5	94.19	4.99	12109.6	253.228	507104
308.0	3525.144	-75.7561	28.2139	94.77	5.47	10803.6	94.23	4.86	12170.2	256.673	509182
310.0	3525.480	-75.6908	28.2091	94.81	5.33	10864.2	94.27	4.73	12231.2	260.139	511216
312.0	3525.808	-75.6252	28.2042	94.86	5.19	10925.2	94.31	4.60	12292.6	263.624	513206
314.0	3526.129	-75.5592	28.1993	94.90	5.04	10986.7	94.35	4.48	12354.5	267.130	515153
316.0	3526.443	-75.4929	28.1942	94.94	4.90	11049.7	94.39	4.36	12416.8	270.656	517057
318.0	3526.751	-75.4261	28.1891	94.98	4.76	11111.2	94.43	4.24	12479.6	274.202	518918
320.0	3527.051	-75.3590	28.1840	95.02	4.63	11174.2	94.47	4.12	12542.9	277.768	520737
322.0	3527.344	-75.2915	28.1787	95.06	4.50	11237.6	94.51	4.01	12606.7	281.355	522514
324.0	3527.631	-75.2236	28.1734	95.10	4.36	11301.6	94.55	3.89	12671.0	284.963	524250
326.0	3527.910	-75.1554	28.1680	95.14	4.24	11366.0	94.59	3.79	12735.8	288.592	525944
328.0	3528.183	-75.0867	28.1625	95.18	4.11	11430.9	94.63	3.67	12800.9	292.242	527597
330.0	3528.450	-75.0177	28.1570	95.23	3.99	11496.3	94.67	3.56	12866.6	295.913	529209
332.0	3528.709	-74.9482	28.1514	95.27	3.86	11562.2	94.71	3.45	12932.8	299.605	530782
334.0	3528.963	-74.8784	28.1457	95.31	3.74	11628.6	94.75	3.35	12999.4	303.319	532314
336.0	3529.209	-74.8082	29.1399	95.35	3.63	11695.5	94.79	3.25	13066.6	307.054	533807
338.0	3529.450	-74.7376	29.1340	95.40	3.51	11762.9	94.83	3.14	13134.2	310.812	535261
340.0	3529.684	-74.6665	28.1281	95.44	3.40	11830.8	94.87	3.04	13202.3	314.590	536677
342.0	3529.911	-74.5951	28.1221	95.48	3.29	11899.3	94.91	2.95	13271.0	318.391	538054

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

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
344.0	3530.133	-74.5233	28.1160	95.52	3.18	11968.2	94.95	2.85	13340.1	322.215	539393
346.0	3530.348	-74.4510	28.1098	95.57	3.07	12037.7	94.99	2.76	13409.8	326.060	540695
348.0	3530.557	-74.3783	28.1035	95.61	2.97	12107.6	95.04	2.66	13479.9	329.928	541961
350.0	3530.761	-74.3053	28.0971	95.65	2.86	12178.1	95.08	2.57	13550.6	333.919	543189
352.0	3530.958	-74.2318	28.0907	95.70	2.76	12249.1	95.12	2.48	13621.8	337.732	544381
354.0	3531.149	-74.1578	28.0842	95.74	2.66	12320.7	95.16	2.40	13693.4	341.668	545537
356.0	3531.335	-74.0835	28.0776	95.78	2.57	12392.7	95.20	2.31	13765.7	345.628	546657
358.0	3531.514	-74.0087	28.0709	95.83	2.47	12465.3	95.24	2.23	13838.4	349.611	547742
360.0	3531.688	-73.9335	28.0641	95.87	2.39	12538.4	95.29	2.14	13911.6	353.617	548793
362.0	3531.857	-73.8579	28.0573	95.91	2.29	12612.0	95.33	2.06	13985.4	357.647	549809
364.0	3532.020	-73.7818	28.0502	95.96	2.20	12686.2	95.37	1.98	14059.7	361.700	550791
366.0	3532.177	-73.7053	28.0431	95.00	2.11	12760.9	95.42	1.91	14134.6	365.777	551741
368.0	3532.329	-73.6284	28.0359	96.04	2.03	12836.2	95.46	1.83	14210.0	369.879	552657
370.0	3532.476	-73.5510	28.0287	96.09	1.94	12912.1	95.50	1.76	14285.9	374.005	553541
372.0	3532.617	-73.4732	28.0213	96.13	1.86	12988.5	95.54	1.68	14362.4	378.155	554393
374.0	3532.754	-73.3949	28.0139	96.18	1.78	13065.5	95.59	1.61	14439.5	382.330	555213
376.0	3532.885	-73.3161	28.0063	96.22	1.70	13143.0	95.63	1.54	14517.1	386.529	556003
378.0	3533.011	-73.2370	27.9987	96.27	1.63	13221.2	95.67	1.47	14595.3	390.754	556761
380.0	3533.132	-73.1573	27.9909	96.31	1.55	13299.9	95.72	1.41	14674.2	395.004	557489
382.0	3533.248	-73.0772	27.9831	96.36	1.48	13379.2	95.76	1.34	14753.5	399.279	558188
384.0	3533.360	-72.9966	27.9751	96.40	1.41	13459.0	95.81	1.28	14833.4	403.579	558857
386.0	3533.466	-72.9156	27.9671	96.45	1.34	13539.5	95.85	1.22	14914.0	407.905	559497
388.0	3533.568	-72.8341	27.9589	96.49	1.27	13620.5	95.90	1.16	14995.1	412.257	560108
390.0	3533.666	-72.7521	27.9506	96.54	1.21	13702.2	95.94	1.10	15076.8	416.635	560692
392.0	3533.759	-72.6696	27.9422	96.58	1.14	13784.5	95.98	1.04	15159.1	421.040	561248
394.0	3533.847	-72.5866	27.9337	96.63	1.08	13867.4	96.03	0.99	15242.1	425.471	561776
396.0	3533.931	-72.5032	27.9252	96.68	1.02	13951.0	96.07	0.93	15325.7	429.928	562279
398.0	3534.011	-72.4193	27.9164	96.72	0.96	14035.2	96.12	0.88	15409.9	434.413	562755
400.0	3534.087	-72.3349	27.9076	96.77	0.91	14120.0	96.17	0.93	15494.8	438.924	563206
402.0	3534.158	-72.2500	27.8987	96.82	0.85	14205.4	96.21	0.78	15580.3	443.463	563632
404.0	3534.226	-72.1646	27.8896	96.86	0.80	14291.5	96.26	0.73	15666.4	448.029	564034
406.0	3534.290	-72.0786	27.8805	96.91	0.75	14378.3	96.30	0.68	15753.2	452.623	564411
408.0	3534.349	-71.9922	27.8712	96.95	0.70	14465.6	96.35	0.64	15840.6	457.244	564765
410.0	3534.405	-71.9053	27.8618	97.00	0.65	14553.7	96.39	0.59	15928.7	461.894	565096
412.0	3534.458	-71.8179	27.8522	97.05	0.60	14642.5	96.44	0.55	16017.5	466.572	565405
414.0	3534.507	-71.7299	27.8426	97.10	0.56	14732.0	96.49	0.51	16107.0	471.279	565692
416.0	3534.552	-71.6414	27.8328	97.14	0.51	14822.1	96.53	0.47	16197.2	476.014	565958
418.0	3534.594	-71.5524	27.8229	97.19	0.47	14913.0	96.58	0.43	16288.0	480.779	566203
420.0	3534.633	-71.4629	27.8129	97.24	0.43	15004.6	96.63	0.39	16379.6	485.572	566427
422.0	3534.668	-71.3729	27.8027	97.29	0.39	15096.9	96.68	0.36	16472.0	490.395	566633
424.0	3534.701	-71.2823	27.7925	97.34	0.35	15189.9	96.72	0.32	16565.0	495.248	566819
426.0	3534.730	-71.1911	27.7820	97.38	0.32	15283.6	96.7	0.29	16658.7	500.131	566987
428.0	3534.755	-71.0995	27.7715	97.43	0.28	15378.1	96.82	0.26	16753.2	505.043	567137

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

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
430.0	3534.790	-71.0072	27.7608	97.49	0.25	15473.3	96.87	0.23	15848.4	509.986	567271
432.0	3534.801	-70.9145	27.7509	97.53	0.22	15569.3	96.92	0.20	16944.4	514.960	567387
434.0	3534.820	-70.8211	27.7390	97.58	0.19	15666.1	96.97	0.18	17041.1	519.965	567488
436.0	3534.836	-70.7272	27.7279	97.63	0.16	15763.6	97.01	0.15	17138.7	525.000	567574
438.0	3534.849	-70.6328	27.7167	97.69	0.14	15862.0	97.06	0.13	17237.0	530.068	567645
440.0	3534.860	-70.5378	27.7053	97.73	0.11	15961.1	97.11	0.10	17336.2	535.166	567702
442.0	3534.869	-70.4422	27.6938	97.78	0.09	16061.0	97.16	0.08	17436.1	540.297	567746
444.0	3534.877	-70.3460	27.6821	97.83	0.07	16161.8	97.21	0.06	17536.8	545.460	567777
446.0	3534.882	-70.2492	27.6703	97.89	0.05	16263.3	97.26	0.04	17638.4	550.655	567796
448.0	3534.885	-70.1519	27.6583	97.93	0.03	16365.7	97.31	0.02	17740.8	555.883	567804
450.0	3534.887	-70.0540	27.6462	97.98	0.01	16469.0	97.36	0.01	17844.0	561.143	567802
452.0	3534.887	-69.9554	27.6340	98.03	-0.01	16573.2	97.41	-0.01	17948.2	566.438	567790
454.0	3534.885	-69.8563	27.6215	98.08	-0.02	16678.3	97.46	-0.02	18053.3	571.765	567768
456.0	3534.882	-69.7566	27.6089	98.13	-0.04	16784.2	97.51	-0.03	18159.2	577.127	567739
458.0	3534.878	-69.6562	27.5962	98.18	-0.05	16891.1	97.56	-0.04	18266.1	582.522	567702
460.0	3534.873	-69.5553	27.5833	98.24	-0.06	16998.9	97.62	-0.05	18373.9	587.952	567658
	S-II CENTER ENGINE CUTOFF (ENGINE SOLENOID)										
461.210	3534.870	-69.4939	27.5754	98.27	-0.06	17064.6	97.65	-0.06	18439.6	591.254	567628
462.0	3534.867	-69.4537	27.5702	98.29	-0.07	17100.8	97.67	-0.07	18475.7	593.416	567607
464.0	3534.859	-69.3516	27.5570	98.34	-0.10	17188.5	97.72	-0.09	18563.5	598.910	567544
466.0	3534.848	-69.2490	27.5436	98.39	-0.12	17276.7	97.77	-0.11	18651.7	604.432	567465
468.0	3534.835	-69.1459	27.5301	98.44	-0.14	17365.3	97.82	-0.13	18740.2	609.982	567372
470.0	3534.820	-69.0423	27.5164	98.49	-0.16	17454.2	97.87	-0.15	18829.1	615.561	567265
472.0	3534.803	-68.9382	27.5026	98.55	-0.17	17543.1	97.92	-0.16	18918.0	621.169	567151
474.0	3534.786	-68.8336	27.4886	98.60	-0.17	17632.0	97.97	-0.16	19006.8	626.805	567031
476.0	3534.769	-68.7285	27.4744	98.65	-0.17	17721.1	98.03	-0.15	19096.0	632.469	566913
478.0	3534.752	-68.6229	27.4601	98.71	-0.16	17810.6	98.08	-0.15	19185.5	638.162	566798
480.0	3534.737	-68.5168	27.4457	98.76	-0.15	17900.7	98.13	-0.14	19275.5	643.884	566689
482.0	3534.722	-68.4102	27.4310	98.81	-0.13	17991.4	98.18	-0.12	19366.2	649.635	566587
484.0	3534.709	-68.3030	27.4162	98.87	-0.12	18082.8	98.24	-0.11	19457.6	655.415	566491
486.0	3534.697	-68.1954	27.4013	98.92	-0.11	18175.0	98.29	-0.10	19549.8	661.225	566404
488.0	3534.687	-68.0872	27.3862	98.98	-0.09	18268.1	98.34	-0.09	19642.9	667.064	566325
490.0	3534.677	-67.9785	27.3709	99.03	-0.09	18358.6	98.40	-0.08	19733.4	672.933	566251
492.0	3534.668	-67.8694	27.3554	99.09	-0.08	18441.3	98.45	-0.08	19816.1	678.830	566181
494.0	3534.659	-67.7598	27.3393	99.14	-0.08	18523.6	98.51	-0.08	19898.3	684.753	566112
496.0	3534.650	-67.6497	27.3240	99.20	-0.08	18606.2	98.56	-0.08	19980.9	690.702	566041
498.0	3534.641	-67.5392	27.3081	99.25	-0.08	18689.4	98.62	-0.08	20064.1	696.678	565970
500.0	3534.632	-67.4282	27.2919	99.31	-0.08	18773.0	98.67	-0.08	20147.7	702.681	565899
502.0	3534.623	-67.3167	27.2756	99.37	-0.08	18857.5	98.73	-0.08	20232.2	708.711	565827
504.0	3534.614	-67.2048	27.2592	99.42	-0.08	18942.3	98.78	-0.08	20317.0	714.768	565756
506.0	3534.605	-67.0924	27.2425	99.49	-0.09	19027.7	98.84	-0.07	20402.3	720.852	565687

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

TIME SEC	GC DIST NM	LONG DEG E	LAT DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
508.0	3534.597	-66.9795	27.2257	99.54	-0.07	19113.6	98.89	-0.07	20488.2	726.964	565619
510.0	3534.589	-66.8662	27.2088	99.59	-0.07	19200.0	98.95	-0.07	20574.7	733.103	565554
512.0	3534.582	-66.7523	27.1918	99.65	-0.06	19287.1	99.00	-0.06	20661.7	739.270	565492
514.0	3534.575	-66.6381	27.1747	99.71	-0.06	19374.9	99.06	-0.05	20749.5	745.465	565433
516.0	3534.569	-66.523	27.1576	99.77	-0.05	19463.3	99.12	-0.05	20837.9	751.689	565378
518.0	3534.563	-66.4080	27.1390	99.83	-0.05	19552.5	99.17	-0.04	20927.1	757.941	565327
520.0	3534.558	-66.2922	27.121	99.88	-0.04	19642.3	99.23	-0.04	21016.8	764.221	565281
522.0	3534.555	-66.1760	27.1036	99.94	-0.03	19732.7	99.29	-0.03	21107.2	770.531	565239
524.0	3534.552	-66.0592	27.0849	100.00	-0.02	19823.8	99.35	-0.02	21198.3	776.870	565204
526.0	3534.550	-65.9420	27.0663	100.06	-0.01	19915.6	99.40	-0.01	21290.1	783.237	565174
528.0	3534.549	-65.8242	27.0476	100.12	-0.00	20008.0	99.46	-0.00	21382.5	789.635	565150
530.0	3534.549	-65.7060	27.0289	100.18	0.01	20101.1	99.52	0.01	21475.6	796.062	565134
532.0	3534.551	-65.5872	27.0097	100.24	0.02	20194.9	99.58	0.02	21569.4	802.519	565126
534.0	3534.554	-65.4679	26.9905	100.29	0.03	20289.4	99.63	0.03	21663.8	809.007	565126
536.0	3534.559	-65.3481	26.9710	100.35	0.05	20384.5	99.69	0.04	21759.0	815.524	565135
538.0	3534.565	-65.2278	26.9514	100.41	0.06	20480.4	99.75	0.06	21854.8	822.072	565154
540.0	3534.573	-65.1070	26.9315	100.47	0.08	20576.9	99.81	0.07	21951.4	828.652	565183
542.0	3534.583	-64.9856	26.9115	100.53	0.09	20674.2	99.87	0.09	22048.6	835.262	565224
544.0	3534.595	-64.8638	26.8912	100.59	0.11	20772.2	99.93	0.10	22146.6	841.903	565276
546.0	3534.609	-64.7413	26.8707	100.65	0.13	20870.9	99.99	0.12	22245.4	848.576	565341
548.0	3534.626	-64.6184	26.8500	100.71	0.15	20970.4	100.05	0.14	22344.8	855.281	565420
550.0	3534.644	-64.4949	26.8291	100.77	0.16	21070.4	100.11	0.15	22444.9	862.017	565513
552.0	3534.665	-64.3709	26.8080	100.83	0.19	21171.2	100.17	0.17	22545.7	868.786	565621
554.0	3534.689	-64.2463	26.7867	100.89	0.21	21272.6	100.23	0.19	22647.2	875.587	565745
556.0	3534.716	-64.1211	26.7651	100.95	0.23	21374.7	100.29	0.22	22749.1	882.421	565885
558.0	3534.745	-63.9955	26.7433	101.02	0.25	21477.5	100.35	0.24	22851.9	889.288	566043
	S-II OUTBOARD ENGINE CUTOFF (ENGINE SOLENOID)										
559.660	3534.772	-63.8908	26.7251	101.07	0.27	21559.1	100.39	0.25	22933.5	895.010	566184
560.0	3534.777	-63.8693	26.7213	101.09	0.27	21565.0	100.41	0.25	22940.8	896.184	566214
	S-II/S-IVB SEPARATION COMMAND										
560.600	3534.786	-63.8314	26.7147	101.10	0.26	21567.7	100.42	0.24	22942.1	898.250	566262
562.0	3534.809	-63.7430	26.6992	101.1	0.24	21569.9	100.47	0.22	22944.3	903.092	566376
564.0	3534.835	-63.6166	26.6769	101.21	0.21	21572.7	100.53	0.19	22947.1	910.005	566521
566.0	3534.859	-63.4902	26.6544	101.27	0.18	21585.2	100.59	0.17	22959.6	916.920	566644
568.0	3534.880	-63.3638	26.6319	101.33	0.16	21616.0	100.65	0.15	22990.4	923.842	566752
570.0	3534.900	-63.2372	26.6091	101.40	0.15	21649.9	100.71	0.14	23024.2	930.774	566850
572.0	3534.918	-63.1105	26.5862	101.46	0.14	21683.7	100.77	0.13	23058.1	937.718	566939
574.0	3534.935	-62.9837	26.5631	101.52	0.13	21718.1	100.83	0.12	23092.5	944.672	567019
576.0	3534.950	-62.8567	26.5399	101.58	0.11	21753.0	100.89	0.10	23127.4	951.637	567087

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

TIME SEC	GC DIST NM	LONG DEG E	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
579.0	3534.963	-62.7295	26.5165	101.65	0.09	21788.3	100.95	0.09	23162.6	958.614	567142
580.0	3534.974	-62.6022	26.4930	101.71	0.08	21823.7	101.01	0.07	23198.1	965.602	567185
582.0	3534.983	-62.4747	26.4693	101.77	0.06	21859.4	101.07	0.06	23233.7	972.601	567216
584.0	3534.990	-62.3471	26.4454	101.83	0.05	21895.2	101.13	0.05	23269.5	979.612	567237
586.0	3534.996	-62.2194	26.4213	101.90	0.04	21931.1	101.19	0.03	23305.4	986.634	567246
588.0	3534.999	-62.0914	26.3971	101.96	0.02	21967.1	101.25	0.02	23341.5	993.667	567244
590.0	3535.001	-61.9634	26.3729	102.02	0.01	22003.3	101.31	0.01	23377.6	1000.713	567232
592.0	3535.001	-61.8351	26.3482	102.09	-0.00	22039.7	101.37	-0.00	23414.0	1007.770	567210
594.0	3535.000	-61.7068	26.3235	102.15	-0.02	22076.2	101.43	-0.02	23450.5	1014.838	567177
596.0	3534.997	-61.5782	26.2987	102.21	-0.03	22112.9	101.49	-0.03	23487.2	1021.919	567134
598.0	3534.992	-61.4495	26.2736	102.28	-0.04	22149.7	101.55	-0.04	23523.9	1029.011	567080
600.0	3534.986	-61.3207	26.2484	102.34	-0.06	22186.6	101.61	-0.05	23560.8	1036.115	567017
602.0	3534.978	-61.1917	26.2230	102.40	-0.07	22223.5	101.67	-0.06	23597.7	1043.231	566944
604.0	3534.968	-61.0625	26.1975	102.47	-0.08	22260.6	101.73	-0.07	23634.8	1050.358	566862
606.0	3534.957	-60.9332	26.1717	102.53	-0.09	22297.9	101.79	-0.08	23672.0	1057.498	566771
608.0	3534.945	-60.8037	26.1458	102.60	-0.10	22335.2	101.85	-0.09	23709.4	1064.650	566671
610.0	3534.932	-60.6741	26.1198	102.66	-0.11	22372.7	101.92	-0.10	23746.8	1071.813	566563
612.0	3534.917	-60.5443	26.0935	102.72	-0.12	22410.2	101.98	-0.11	23784.3	1078.989	566447
614.0	3534.901	-60.4144	26.0671	102.79	-0.13	22447.9	102.04	-0.12	23821.9	1086.177	566324
616.0	3534.883	-60.2843	26.0405	102.85	-0.14	22485.6	102.10	-0.13	23859.6	1093.377	566194
618.0	3534.865	-60.1540	26.0137	102.91	-0.15	22523.4	102.16	-0.14	23897.5	1100.589	566056
620.0	3534.846	-60.0236	25.9868	102.98	-0.15	22561.4	102.22	-0.14	23935.4	1107.813	565912
622.0	3534.825	-59.8930	25.9597	103.04	-0.16	22599.6	102.28	-0.15	23973.5	1115.049	565762
624.0	3534.804	-59.7623	25.9324	103.10	-0.17	22637.8	102.34	-0.16	24011.8	1122.298	565607
626.0	3534.782	-59.6314	25.9049	103.17	-0.17	22676.2	102.40	-0.16	24050.1	1129.559	565446
628.0	3534.759	-59.5004	25.8773	103.23	-0.18	22714.6	102.46	-0.17	24088.5	1136.833	565281
630.0	3534.736	-59.3692	25.8494	103.29	-0.18	22753.2	102.52	-0.17	24127.0	1144.119	565111
632.0	3534.711	-59.2378	25.8214	103.36	-0.19	22791.8	102.59	-0.18	24165.6	1151.417	564937
634.0	3534.687	-59.1063	25.7932	103.42	-0.19	22830.5	102.65	-0.18	24204.3	1158.728	564759
636.0	3534.661	-58.9746	25.7649	103.48	-0.20	22869.4	102.71	-0.18	24243.1	1166.051	564577
638.0	3534.635	-58.8428	25.7363	103.55	-0.20	22908.3	102.77	-0.19	24282.0	1173.387	564392
640.0	3534.609	-58.7108	25.7076	103.61	-0.20	22947.3	102.83	-0.19	24321.0	1180.735	564205
642.0	3534.582	-58.5787	25.6787	103.67	-0.20	22986.4	102.89	-0.19	24360.1	1188.096	564015
644.0	3534.555	-58.4464	25.6496	103.74	-0.20	23025.6	102.95	-0.19	24399.3	1195.469	563824
646.0	3534.528	-58.3139	25.6204	103.80	-0.20	23065.1	103.01	-0.19	24438.7	1202.856	563632
648.0	3534.501	-58.1813	25.5909	103.86	-0.20	23104.6	103.07	-0.19	24478.2	1210.255	563439
650.0	3534.474	-58.0485	25.5613	103.93	-0.20	23144.3	103.13	-0.19	24517.9	1217.666	563245
652.0	3534.447	-57.9155	25.5315	103.99	-0.20	23184.1	103.19	-0.19	24557.6	1225.091	563052
654.0	3534.420	-57.7824	25.5015	104.05	-0.20	23223.9	103.25	-0.19	24597.4	1232.528	562859
656.0	3534.393	-57.6491	25.4713	104.12	-0.20	23263.8	103.31	-0.19	24637.4	1239.978	562668
658.0	3534.367	-57.5157	25.4409	104.18	-0.20	23303.9	103.37	-0.19	24677.4	1247.441	562477
660.0	3534.340	-57.3821	25.4104	104.24	-0.20	23344.0	103.44	-0.18	24717.5	1254.917	562288
662.0	3534.314	-57.2484	25.3796	104.30	-0.19	23384.3	103.50	-0.18	24757.7	1262.406	562101

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

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
664.0	3534.289	-57.1145	25.3487	104.37	-0.19	23424.6	103.56	-0.18	24798.0	1269.908	561916
666.0	3534.264	-56.9804	25.3176	104.43	-0.18	23465.0	103.62	-0.17	24838.4	1277.423	561734
668.0	3534.239	-56.8462	25.2863	104.49	-0.18	23505.5	103.68	-0.17	24878.9	1284.951	561556
670.0	3534.216	-56.7118	25.2548	104.56	-0.17	23546.2	103.74	-0.16	24919.5	1292.492	561383
672.0	3534.193	-56.5773	25.2231	104.62	-0.17	23586.9	103.80	-0.16	24960.2	1300.046	561214
674.0	3534.171	-56.4425	25.1913	104.68	-0.16	23627.8	103.86	-0.15	25001.1	1307.613	561049
676.0	3534.149	-56.3077	25.1592	104.74	-0.15	23668.7	103.92	-0.15	25042.0	1315.194	560890
678.0	3534.129	-56.1727	25.1270	104.81	-0.15	23709.8	103.98	-0.14	25083.1	1322.797	560735
680.0	3534.109	-56.0375	25.0946	104.87	-0.14	23751.1	104.04	-0.13	25124.3	1330.394	560586
682.0	3534.091	-55.9021	25.0620	104.93	-0.13	23792.4	104.10	-0.12	25165.6	1338.014	560444
684.0	3534.074	-55.7666	25.0291	104.99	-0.12	23833.7	104.16	-0.11	25206.9	1345.648	560309
686.0	3534.058	-55.6309	24.9961	105.06	-0.11	23875.2	104.22	-0.11	25248.4	1353.294	560181
688.0	3534.043	-55.4951	24.9630	105.12	-0.10	23916.8	104.28	-0.10	25289.9	1360.955	560062
690.0	3534.030	-55.3591	24.9296	105.19	-0.09	23958.5	104.34	-0.08	25331.7	1368.628	559951
692.0	3534.019	-55.2230	24.8960	105.24	-0.08	24000.4	104.40	-0.07	25373.6	1376.315	559849
694.0	3534.009	-55.0866	24.8622	105.30	-0.06	24042.5	104.46	-0.06	25415.6	1384.016	559758
696.0	3534.001	-54.9502	24.8283	105.37	-0.05	24084.6	104.52	-0.05	25457.7	1391.730	559679
698.0	3533.995	-54.8135	24.7941	105.43	-0.04	24126.7	104.58	-0.03	25499.8	1399.457	559611
700.0	3533.991	-54.6767	24.7598	105.49	-0.02	24168.9	104.64	-0.02	25542.0	1407.199	559555
702.0	3533.990	-54.5398	24.7252	105.55	-0.00	24211.2	104.70	-0.00	25584.3	1414.953	559512
S-IVB FIRST GUIDANCE CUTOFF											
702.650	3533.990	-54.4952	24.7139	105.57	0.00	24225.0	104.72	0.00	25598.0	1417.476	559500
704.0	3533.990	-54.4027	24.6905	105.62	0.00	24230.3	104.76	0.00	25603.3	1422.718	559479
706.0	3533.990	-54.2657	24.6556	105.68	0.00	24230.8	104.82	0.00	25603.8	1430.486	559449
708.0	3533.991	-54.1288	24.6206	105.74	0.00	24230.7	104.88	0.00	25603.7	1438.254	559420
710.0	3533.991	-53.9919	24.5854	105.81	0.00	24230.8	104.94	0.00	25603.7	1446.021	559389
712.0	3533.991	-53.8551	24.5501	105.87	0.00	24230.8	105.00	0.00	25603.8	1453.789	559359
PARKING ORBIT INSERTION											
712.650	3533.991	-53.8107	24.5385	105.89	0.00	24230.9	105.02	0.00	25603.9	1456.314	559348

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

TIME SEC	GC DIST NM	LONG DEG E	GEC DEG N	GC LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE NM
PARKING ORBIT INSERTION								
712.650	3533.391	-53.9107	24.5386	24.6805	105.02	0.00	25603.9	92.057
750.0	3533.885	-51.2719	23.8537	23.9926	106.13	-0.00	25605.5	91.847
800.0	3533.874	-47.9190	22.8639	22.9983	107.55	-0.00	25606.8	91.690
850.0	3533.855	-44.6195	21.7956	21.9251	108.88	-0.01	25607.7	91.519
900.0	3533.827	-41.3735	20.6542	20.7782	110.14	-0.01	25608.5	91.336
950.0	3533.792	-38.1805	19.4449	19.5629	111.31	-0.01	25609.5	91.143
1000.0	3533.749	-35.0390	18.1729	18.2843	112.39	-0.01	25610.4	90.943
1050.0	3533.697	-31.9470	16.8435	16.9478	113.39	-0.02	25611.5	90.737
1100.0	3533.638	-28.9017	15.4619	15.5595	114.29	-0.02	25612.5	90.528
1150.0	3533.571	-25.9002	14.0333	14.1217	115.11	-0.02	25613.6	90.319
1200.0	3533.496	-22.9388	12.5626	12.6424	115.85	-0.02	25614.7	90.111
1250.0	3533.414	-20.0138	11.0549	11.1257	116.49	-0.02	25615.9	89.906
1300.0	3533.324	-17.1211	9.5151	9.5764	117.04	-0.03	25617.0	89.707
1350.0	3533.227	-14.2562	7.9479	7.9995	117.51	-0.03	25618.2	89.515
1400.0	3533.123	-11.4146	6.3582	6.3996	117.89	-0.03	25619.3	89.331
1450.0	3533.012	-8.5918	4.7506	4.7816	118.19	-0.03	25620.5	89.158
1500.0	3532.895	-5.7829	3.1296	3.1501	118.40	-0.03	25621.6	88.996
1550.0	3532.772	-2.9832	1.4998	1.5096	118.52	-0.03	25622.8	88.846
1600.0	3532.644	-0.1877	-0.1343	-0.1352	118.55	-0.04	25624.0	88.710
1650.0	3532.511	2.6085	-1.7681	-1.7797	118.50	-0.04	25625.1	88.588
1700.0	3532.375	5.4102	-3.3972	-3.4194	118.37	-0.04	25626.1	88.481
1750.0	3532.235	8.2222	-5.0170	-5.0498	118.15	-0.04	25627.1	88.390
1800.0	3532.093	11.0496	-6.6229	-6.6660	117.84	-0.04	25628.1	88.313
1850.0	3531.949	13.8968	-8.2103	-8.2635	117.44	-0.04	25629.0	88.252
1900.0	3531.804	16.7697	-9.7746	-9.8376	116.96	-0.04	25629.9	88.205
1950.0	3531.660	19.6698	-11.3110	-11.3833	116.39	-0.04	25630.7	88.172
2000.0	3531.516	22.6042	-12.8145	-12.8959	115.73	-0.04	25631.5	88.153
2050.0	3531.375	25.5763	-14.2803	-14.3703	114.98	-0.04	25632.2	88.146
2100.0	3531.236	28.5896	-15.7033	-15.8014	114.14	-0.04	25632.8	88.151
2150.0	3531.101	31.6478	-17.0784	-17.1840	113.22	-0.04	25633.4	88.167
2200.0	3530.970	34.7539	-18.4004	-18.5131	112.21	-0.03	25634.0	88.191
2250.0	3530.844	37.9101	-19.6640	-19.7832	111.11	-0.03	25634.5	88.223
2300.0	3530.725	41.1188	-20.8639	-20.9890	109.92	-0.03	25634.9	88.262
2350.0	3530.613	44.3812	-21.9947	-22.1253	108.65	-0.03	25635.3	88.305
2400.0	3530.508	47.6977	-23.0513	-23.1867	107.29	-0.03	25635.7	88.352
2450.0	3530.413	51.0690	-24.0283	-24.1681	105.86	-0.02	25636.0	88.401
2500.0	3530.326	54.4909	-24.9208	-25.0644	104.35	-0.02	25636.3	88.450
2550.0	3530.250	57.9643	-25.7238	-25.8708	102.77	-0.02	25636.5	88.499
2600.0	3530.184	61.4849	-26.4330	-26.5828	101.13	-0.02	25636.7	88.547
2650.0	3530.129	65.0487	-27.0440	-27.1962	99.42	-0.01	25636.9	88.591

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

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE NM
2700.0	3530.086	68.6503	-27.5532	-27.7073	97.67	-0.01	25637.1	88.632
2750.0	3530.055	72.2839	-27.9573	-28.1129	95.88	-0.01	25637.2	88.668
2800.0	3530.036	75.9425	-28.2537	-28.4104	94.05	-0.00	25637.3	88.699
2850.0	3530.030	79.6187	-28.4405	-28.5979	92.20	0.00	25637.3	88.725
2900.0	3530.037	83.3047	-28.5165	-28.6741	90.34	0.00	25637.4	88.744
2950.0	3530.056	86.9920	-28.4810	-28.6385	88.48	0.01	25637.4	88.758
3000.0	3530.089	90.6727	-28.3344	-28.4914	86.62	0.01	25637.3	88.766
3050.0	3530.134	94.3385	-28.0777	-28.2337	84.78	0.01	25637.3	88.768
3100.0	3530.193	97.9819	-27.7124	-27.8672	82.98	0.02	25637.2	88.765
3150.0	3530.264	101.5958	-27.2412	-27.3941	81.21	0.02	25637.1	88.758
3200.0	3530.347	105.1738	-26.6668	-26.8175	79.49	0.02	25636.9	88.748
3250.0	3530.442	108.7105	-25.9929	-26.1410	77.82	0.03	25636.7	88.735
3300.0	3530.549	112.2012	-25.2236	-25.3685	76.22	0.03	25636.5	88.720
3350.0	3530.667	115.6426	-24.3631	-24.5044	74.68	0.03	25636.2	88.705
3400.0	3530.795	119.0319	-23.4164	-23.5535	73.22	0.04	25635.9	88.692
3450.0	3530.933	122.3678	-22.3883	-22.5207	71.84	0.04	25635.5	88.681
3500.0	3531.081	125.6494	-21.2840	-21.4112	70.53	0.04	25635.1	88.674
3550.0	3531.237	128.8772	-20.1089	-20.2302	69.32	0.04	25634.6	88.673
3600.0	3531.401	132.0520	-18.8680	-18.9831	68.18	0.05	25634.1	88.679
3650.0	3531.572	135.1756	-17.5669	-17.6751	67.14	0.05	25633.5	88.694
3700.0	3531.749	138.2503	-16.2107	-16.3116	66.18	0.05	25632.9	88.719
3750.0	3531.932	141.2791	-14.8049	-14.8978	65.31	0.05	25632.2	88.755
3800.0	3532.120	144.2652	-13.3544	-13.4389	64.53	0.05	25631.4	88.804
3850.0	3532.311	147.2122	-11.8643	-11.9400	63.84	0.05	25630.5	88.868
3900.0	3532.506	150.1243	-10.3397	-10.4062	63.24	0.05	25629.6	88.946
3950.0	3532.704	153.0056	-8.7855	-8.8423	62.73	0.05	25628.7	89.040
4000.0	3532.903	155.8605	-7.2064	-7.2532	62.30	0.05	25627.6	89.151
4050.0	3533.102	158.6937	-5.6071	-5.6437	61.96	0.05	25626.5	89.279
4100.0	3533.302	161.5099	-3.9924	-4.0185	61.70	0.05	25625.4	89.425
4150.0	3533.502	164.3138	-2.3667	-2.3823	61.54	0.05	25624.2	89.588
4200.0	3533.700	167.1104	-0.7347	-0.7395	61.45	0.05	25622.9	89.768
4250.0	3533.897	169.9044	0.8992	0.9051	61.46	0.05	25621.6	89.966
4300.0	3534.091	172.7009	2.5304	2.5470	61.55	0.05	25620.2	90.180
4350.0	3534.282	175.5044	4.1545	4.1816	61.72	0.05	25618.8	90.409
4400.0	3534.470	178.3201	5.7668	5.8044	61.99	0.05	25617.3	90.653
4450.0	3534.654	-178.9474	7.3629	7.4107	62.34	0.05	25615.8	90.911
4500.0	3534.834	-175.9933	8.9381	8.9958	62.77	0.05	25614.3	91.180
4550.0	3535.009	-173.1132	10.4877	10.5549	63.29	0.05	25612.8	91.460
4600.0	3535.180	-170.2026	12.0069	12.0834	63.91	0.05	25611.2	91.747
4650.0	3535.344	-167.2573	13.4909	13.5762	64.60	0.04	25609.7	92.042
4700.0	3535.504	-164.2734	14.9349	15.0284	65.39	0.04	25608.1	92.340
4750.0	3535.658	-161.2472	16.3335	16.4350	66.26	0.04	25606.6	92.641
4800.0	3535.805	-158.1756	17.6820	17.7907	67.23	0.04	25605.1	92.941

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

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE NM
4850.0	3535.947	-155.0557	18.9751	19.0905	68.28	0.04	[illegible]	93.239
4900.0	3536.083	-151.8952	20.2074	20.3292	69.41	0.04	25602.2	93.532
4950.0	3536.212	-148.6625	21.3739	21.5013	70.64	0.03	[illegible]	93.818
5000.0	3536.335	-145.3986	22.4693	22.6019	71.94	0.03	25599.5	94.093
5050.0	3536.452	-142.0574	23.4884	23.6256	73.33	0.03	25598.2	94.359
5100.0	3536.563	-138.6755	24.4261	24.5674	74.79	0.03	25597.0	94.610
5150.0	3536.668	-135.2426	25.2776	25.4225	76.32	0.03	25595.9	94.845
5200.0	3536.762	-131.7611	26.0383	26.1862	77.93	0.03	25594.9	95.062
5250.0	3536.852	-128.2348	26.7037	26.8543	79.59	0.02	25593.9	95.259
5300.0	3536.935	-124.6680	27.2701	27.4229	81.31	0.02	25593.1	95.435
5350.0	3537.012	-121.0663	27.7339	27.8884	83.07	0.02	25592.4	95.588
5400.0	3537.082	-117.4359	28.0923	28.2481	84.87	0.02	25591.7	95.718
5450.0	3537.145	-113.7837	28.3429	28.4996	86.70	0.02	25591.2	95.823
5500.0	3537.201	-110.1175	28.4841	28.6413	88.55	0.01	25590.8	95.903
5550.0	3537.250	-106.4450	28.5150	28.6723	90.41	0.01	25590.5	95.957
5600.0	3537.291	-102.7744	28.4353	28.5923	92.26	0.01	25590.3	95.985
5650.0	3537.326	-99.1138	28.2457	28.4020	94.11	0.01	25590.3	95.987
5700.0	3537.353	-95.4708	27.9473	28.1026	95.93	0.01	25590.3	95.964
5750.0	3537.372	-91.8529	27.5422	27.6960	97.71	0.00	25590.5	95.916
5800.0	3537.384	-88.2666	27.0329	27.1847	99.46	0.00	25590.8	95.845
5850.0	3537.388	-84.7181	26.4225	26.5720	101.15	0.00	25591.2	95.750
5900.0	3537.385	-81.2121	25.7149	25.8615	102.79	-0.00	25591.7	95.633
5950.0	3537.373	-77.7530	24.9140	25.0573	104.36	-0.00	25592.3	95.496
6000.0	3537.353	-74.3437	24.0243	24.1638	105.86	-0.01	25593.0	95.341
6050.0	3537.325	-70.9863	23.0506	23.1858	107.29	-0.01	25593.7	95.169
6100.0	3537.289	-67.6827	21.9980	22.1283	108.64	-0.01	25594.6	94.982
6150.0	3537.245	-64.4314	20.8714	20.9963	109.91	-0.01	25595.5	94.782
6200.0	3537.192	-61.2337	19.6761	19.7951	111.09	-0.02	25596.5	94.572
6250.0	3537.130	-58.0875	18.4173	18.5298	112.19	-0.02	25597.6	94.354
6300.0	3537.061	-54.9910	17.1002	17.2058	113.20	-0.02	25598.7	94.130
6350.0	3536.983	-51.9418	15.7301	15.8281	114.13	-0.02	25599.9	93.901
6400.0	3536.897	-48.9357	14.3121	14.4021	114.96	-0.02	25601.1	93.671
6450.0	3536.802	-45.9723	12.8512	12.9327	115.71	-0.03	25602.3	93.442
6500.0	3536.700	-43.0450	11.3525	11.4250	116.37	-0.03	25603.5	93.216
6550.0	3536.591	-40.1505	9.8207	9.8839	116.94	-0.03	25604.8	92.994
6600.0	3536.473	-37.2848	8.2607	8.3142	117.43	-0.03	25606.0	92.779
6650.0	3536.349	-34.4431	6.6773	6.7207	117.83	-0.03	25607.3	92.572
6700.0	3536.218	-31.6211	5.0751	5.1042	118.14	-0.04	25608.5	92.375
6750.0	3536.081	-28.8139	3.4586	3.4812	118.36	-0.04	25609.7	92.189
6800.0	3535.937	-26.0167	1.8324	1.8444	118.50	-0.04	25610.9	92.015
6850.0	3535.788	-23.2248	0.2019	0.2024	118.55	-0.04	25612.1	91.855
6900.0	3535.635	-20.4332	-1.4319	-1.4404	118.52	-0.04	25613.2	91.708
6950.0	3535.477	-17.6370	-3.0593	-3.0794	118.40	-0.04	25614.4	91.576

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

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE NM
7000.0	3535.315	-14.8315	-4.6793	-4.7099	118.20	-0.04	25615.5	91.458
7050.0	3535.151	-12.0117	-6.2864	-6.3273	117.91	-0.05	25616.5	91.356
7100.0	3534.984	-9.1730	-7.8761	-7.9271	117.53	-0.05	25617.5	91.268
7150.0	3534.816	-6.3107	-9.4437	-9.5045	117.07	-0.05	25618.4	91.194
7200.0	3534.647	-3.4202	-10.9844	-11.0547	116.52	-0.05	25619.3	91.134
7250.0	3534.479	-0.4972	-12.4935	-12.5729	115.88	-0.05	25620.2	91.088
7300.0	3534.311	2.4623	-13.9660	-14.0541	115.15	-0.05	25621.0	91.053
7350.0	3534.146	5.4624	-15.3970	-15.4932	114.33	-0.04	25621.7	91.029
7400.0	3533.983	8.5064	-16.7813	-16.8852	113.43	-0.04	25622.5	91.015
7450.0	3533.823	11.5976	-18.1139	-18.2249	112.44	-0.04	25623.1	91.010
7500.0	3533.669	14.7396	-19.3892	-19.5069	111.36	-0.04	25623.8	91.013
7550.0	3533.519	17.9315	-20.6023	-20.7261	110.19	-0.04	25624.3	91.021
7600.0	3533.376	21.1777	-21.7477	-21.8770	108.94	-0.04	25624.9	91.034
7650.0	3533.240	24.4779	-22.8201	-22.9544	107.60	-0.04	25625.4	91.050
7700.0	3533.111	27.8320	-23.8144	-23.9532	106.19	-0.03	25625.9	91.068
7750.0	3532.992	31.2390	-24.7254	-24.8682	104.70	-0.03	25626.4	91.086
7800.0	3532.881	34.6970	-25.5484	-25.6945	103.14	-0.03	25626.8	91.104
7850.0	3532.781	38.2030	-26.2786	-26.4277	101.51	-0.03	25627.2	91.119
7900.0	3532.691	41.7531	-26.9119	-27.0635	99.82	-0.02	25627.5	91.132
7950.0	3532.613	45.3424	-27.4444	-27.5980	98.08	-0.02	25627.9	91.141
8000.0	3532.547	48.9651	-27.8727	-28.0279	96.30	-0.02	25628.2	91.146
8050.0	3532.492	52.6145	-28.1942	-28.3505	94.48	-0.01	25628.5	91.145
8100.0	3532.451	56.2933	-28.4066	-28.5638	92.64	-0.01	25628.7	91.140
8150.0	3532.422	59.9637	-28.5086	-28.6662	90.78	-0.01	25628.9	91.128
8200.0	3532.406	63.6476	-28.4996	-28.6570	88.92	-0.00	25629.1	91.111
8250.0	3532.404	67.3268	-28.3794	-28.5365	87.06	0.00	25629.3	91.089
8300.0	3532.415	70.9931	-28.1491	-28.3053	85.22	0.00	25629.4	91.061
8350.0	3532.440	74.6399	-27.8100	-27.9649	83.41	0.01	25629.5	91.029
8400.0	3532.478	78.2569	-27.3643	-27.5177	81.63	0.01	25629.6	90.993
8450.0	3532.529	81.8407	-26.8151	-26.9663	79.90	0.02	25629.6	90.954
8500.0	3532.593	85.3844	-26.1655	-26.3142	78.22	0.02	25629.6	90.913
8550.0	3532.669	88.8834	-25.4197	-25.5653	76.60	0.02	25629.5	90.871
8600.0	3532.757	92.3339	-24.5818	-24.7239	75.05	0.03	25629.4	90.830
8650.0	3532.858	95.7331	-23.6565	-23.7946	73.57	0.03	25629.3	90.790
8700.0	3532.969	99.0791	-22.6489	-22.7824	72.17	0.03	25629.0	90.754
8750.0	3533.091	102.3712	-21.5639	-21.6922	70.85	0.03	25628.8	90.723
8800.0	3533.223	105.6094	-20.4066	-20.5294	69.61	0.04	25628.4	90.699
8850.0	3533.364	108.7945	-19.1825	-19.2992	68.46	0.04	25628.0	90.682
8900.0	3533.514	111.9279	-17.8970	-18.0069	67.39	0.04	25627.6	90.675
8950.0	3533.671	115.0120	-16.5552	-16.6579	66.41	0.04	25627.0	90.679
9000.0	3533.836	118.0495	-15.1624	-15.2573	65.52	0.05	25626.4	90.695
9050.0	3534.007	121.0435	-13.7237	-13.8104	64.72	0.05	25625.8	90.725
9100.0	3534.183	123.9976	-12.2443	-12.3223	64.01	0.05	25625.0	90.771

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

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	GD LAT DEG N	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE NM
9150.0	3534.364	126.9157	-10.7292	-10.7980	63.38	0.05	25624.2	90.832
9200.0	3534.549	129.8020	-9.1832	-9.2424	62.85	0.05	25623.3	90.911
9250.0	3534.737	132.6609	-7.6112	-7.6605	62.40	0.05	25622.3	91.007
9300.0	3534.928	135.4970	-6.0178	-6.0570	62.04	0.05	25621.3	91.122
9350.0	3535.120	138.3148	-4.4078	-4.4366	61.76	0.05	25620.2	91.255
9400.0	3535.314	141.1192	-2.7857	-2.8040	61.57	0.05	25619.0	91.407
9450.0	3535.507	143.9149	-1.1561	-1.1637	61.47	0.05	25617.8	91.578
9500.0	3535.701	146.7069	0.4765	0.4797	61.45	0.05	25616.5	91.767
9550.0	3535.893	149.5000	2.1077	2.1215	61.52	0.05	25615.1	91.975
9600.0	3536.084	152.2991	3.7328	3.7573	61.67	0.05	25613.7	92.199
9650.0	3536.272	155.1090	5.3475	5.3824	61.91	0.05	25612.3	92.439
9700.0	3536.459	157.9344	6.9471	6.9922	62.24	0.05	25610.8	92.694
9750.0	3536.642	160.7801	8.5270	8.5821	62.65	0.05	25609.2	92.963
9800.0	3536.822	163.6507	10.0826	10.1474	63.15	0.05	25607.7	93.243
9850.0	3536.998	166.5506	11.6092	11.6833	63.74	0.05	25606.1	93.533
9900.0	3537.170	169.4939	13.1019	13.1848	64.41	0.05	25604.5	93.832
9950.0	3537.337	172.4549	14.5558	14.6472	65.17	0.04	25602.9	94.136
10000.0	3537.500	175.4670	15.9660	16.0653	66.02	0.04	25601.3	94.444
10050.0	3537.658	178.5238	17.3273	17.4341	66.96	0.04	25599.7	94.753
10100.0	3537.811	-178.3720	18.6347	18.7483	67.99	0.04	25598.1	95.061
10150.0	3537.958	-175.2178	19.8829	20.0029	69.10	0.04	25596.6	95.366
10200.0	3538.100	-172.0119	21.0666	21.1925	70.30	0.04	25595.1	95.665
10250.0	3538.237	-168.7532	22.1803	22.3120	71.58	0.04	25593.6	95.955
10300.0	3538.367	-165.4411	23.2202	23.3561	72.94	0.03	25592.2	96.236
10350.0	3538.492	-162.0763	24.1797	24.3198	74.38	0.03	25590.9	96.503
10400.0	3538.611	-158.6600	25.0544	25.1983	75.90	0.03	25589.6	96.756
10450.0	3538.723	-155.1945	25.8396	25.9867	77.48	0.03	25588.4	96.991
10500.0	3538.829	-151.6831	26.5310	26.6808	79.13	0.03	25587.3	97.208
10550.0	3538.929	-148.1301	27.1244	27.2766	80.83	0.03	25586.3	97.404
10600.0	3539.022	-144.5406	27.6164	27.7704	82.58	0.02	25585.4	97.579
10650.0	3539.109	-140.9207	28.0038	28.1592	84.37	0.02	25584.7	97.730
10700.0	3539.189	-137.2772	28.2842	28.4406	86.19	0.02	25584.0	97.856
10750.0	3539.261	-133.6175	28.4558	28.6128	88.04	0.02	25583.4	97.958
10800.0	3539.326	-129.9494	28.5174	28.6746	89.89	0.02	25582.9	98.034
10850.0	3539.384	-126.2909	28.4687	28.6257	91.75	0.01	25582.6	98.084
10900.0	3539.435	-122.6201	28.3100	28.4665	93.59	0.01	25582.4	98.108
10950.0	3539.478	-118.9749	28.0423	28.1978	95.42	0.01	25582.3	98.106
	BEGIN S-IVB RESTART PREPARATIONS - START OF TIMEBASE 6							
10978.600	3539.498	-116.8998	27.8409	27.9956	96.45	0.01	25582.3	98.092

TABLE C-V. EARTH-FIXED LAUNCH STATE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES

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 TIMEBASE 6									
10978.600	-2644537	-1241783	-11293601	12226.6	9068.7	19818.7	-23.41	3.11	13.72
10980.0	-2627433	-1229085	-11267247	12193.8	9073.0	18837.9	-23.44	3.09	13.69
10990.0	-2506670	-1139203	-11078189	11958.6	9103.3	18973.6	-23.59	2.97	13.45
11000.0	-2388265	-1047023	-10887783	11722.0	9132.5	19106.9	-23.74	2.85	13.21
11010.0	-2272235	-955557	-10696059	11483.9	9160.4	19237.8	-23.89	2.73	12.97
11020.0	-2158593	-863819	-10503035	11244.3	9187.1	19366.3	-24.03	2.61	12.73
11030.0	-2047354	-771820	-10308740	11003.3	9212.6	19492.3	-24.17	2.49	12.48
11040.0	-1938531	-679572	-10113196	10760.9	9236.8	19615.9	-24.31	2.37	12.24
11050.0	-1832140	-587087	-9916429	10517.1	9259.9	19737.1	-24.44	2.24	11.99
11060.0	-1728193	-494379	-9718463	10272.0	9281.7	19855.7	-24.57	2.12	11.74
11070.0	-1626704	-401458	-9519324	10025.7	9302.2	19971.8	-24.70	1.99	11.49
11080.0	-1527684	-308338	-9319035	9778.0	9321.6	20085.5	-24.83	1.87	11.24
11090.0	-1431148	-215031	-9117623	9529.1	9339.6	20196.6	-24.95	1.75	10.98
11100.0	-1337106	-121550	-8915112	9279.0	9356.5	20305.1	-25.07	1.62	10.73
11110.0	-1245571	-27906	-8711529	9027.8	9372.0	20411.1	-25.18	1.49	10.47
11120.0	-1156555	65887	-8506899	8775.3	9386.3	20514.6	-25.30	1.37	10.22
11130.0	-1070068	159817	-8301246	8521.8	9399.4	20615.4	-25.41	1.24	9.96
11140.0	-986122	253870	-8094599	8267.2	9411.2	20713.7	-25.51	1.11	9.70
11150.0	-904727	348036	-7886981	8011.6	9421.7	20809.4	-25.61	0.99	9.44
11160.0	-825893	442300	-7678419	7755.0	9430.9	20902.5	-25.71	0.86	9.18
11170.0	-749631	536650	-7468940	7497.3	9438.9	20992.9	-25.81	0.73	8.91
11180.0	-675949	631073	-7258570	7238.8	9445.5	21080.7	-25.90	0.60	8.65
11190.0	-604858	725556	-7047334	6979.3	9450.9	21165.9	-25.99	0.47	8.38
11200.0	-536367	820087	-6835260	6718.9	9455.0	21248.4	-26.08	0.35	8.12
11210.0	-470482	914652	-6622375	6457.7	9457.8	21328.3	-26.16	0.22	7.85
11220.0	-407214	1009239	-6408704	6195.7	9459.4	21405.5	-26.24	0.09	7.58
11230.0	-346571	1103835	-6194274	5932.9	9459.6	21480.0	-26.32	-0.04	7.32
11240.0	-288559	1198426	-5979113	5669.4	9458.5	21551.8	-26.39	-0.17	7.05
11250.0	-233186	1293000	-5763247	5405.1	9456.1	21620.9	-26.46	-0.30	6.78
11260.0	-180458	1387544	-5546704	5140.2	9452.5	21687.3	-26.53	-0.43	6.51
11270.0	-130384	1482045	-5329510	4874.6	9447.5	21751.0	-26.59	-0.56	6.23
11280.0	-82968	1576490	-5111692	4608.4	9441.2	21812.0	-26.65	-0.69	5.96
11290.0	-38217	1670865	-4893279	4341.7	9433.6	21870.2	-26.70	-0.82	5.69
11300.0	3863	1765158	-4674296	4074.4	9424.7	21925.8	-26.76	-0.95	5.41
11310.0	43268	1859356	-4454773	3806.5	9414.5	21978.5	-26.81	-1.08	5.14
11320.0	79993	1953445	-4234735	3538.3	9403.0	22028.5	-26.85	-1.22	4.86
11330.0	114032	2047412	-4014211	3269.5	9390.2	22075.8	-26.89	-1.35	4.59
11340.0	145382	2141245	-3793228	3000.4	9376.1	22120.3	-26.93	-1.48	4.31
11350.0	174039	2234930	-3571814	2730.9	9360.7	22162.1	-26.97	-1.61	4.04
11360.0	199998	2328455	-3349996	2461.0	9344.0	22201.0	-27.00	-1.74	3.76

TABLE C-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11370.0	223258	2421805	-3127802	2190.9	9325.9	22237.2	-27.03	-1.87	3.48
11380.0	243816	2514969	-2905260	1920.5	9306.6	22270.7	-27.05	-2.00	3.20
11390.0	261667	2607932	-2682398	1649.8	9285.9	22301.3	-27.08	-2.13	2.93
11400.0	276812	2700683	-2459243	1379.0	9264.0	22329.2	-27.09	-2.26	2.65
11410.0	289247	2793207	-2235823	1108.0	9240.7	22354.3	-27.11	-2.39	2.37
11420.0	298971	2885492	-2012167	836.8	9216.1	22376.6	-27.12	-2.52	2.09
11430.0	305983	2977525	-1788301	565.6	9190.3	22396.1	-27.13	-2.65	1.81
11440.0	310283	3069293	-1564255	294.3	9163.1	22412.8	-27.13	-2.78	1.53
11450.0	311869	3160783	-1340055	23.0	9134.6	22426.7	-27.13	-2.91	1.25
11460.0	310742	3251981	-1115729	-249.3	9104.9	22437.9	-27.13	-3.04	0.98
11470.0	306902	3342876	-891306	-519.6	9073.8	22446.2	-27.12	-3.17	0.70
11480.0	300350	3433453	-666814	-790.8	9041.5	22451.8	-27.11	-3.30	0.42
11490.0	291087	3523701	-442279	-1061.9	9007.8	22454.6	-27.10	-3.43	0.14
11500.0	279113	3613606	-217731	-1332.8	8972.9	22454.6	-27.09	-3.55	-0.14
11510.0	264428	3703156	6807	-1603.8	8936.6	22451.5	-27.09	-3.69	-0.42
11520.0	247035	3792336	231296	-1874.6	8899.0	22445.7	-27.06	-3.83	-0.73
11530.0	226936	3881133	455713	-2145.2	8860.2	22437.1	-27.06	-3.95	-1.00
11540.0	204133	3969534	680029	-2415.4	8819.9	22425.7	-26.98	-4.09	-1.27
11550.0	178629	4057527	904218	-2685.4	8778.4	22411.5	-26.99	-4.20	-1.55
	S-IVB SECOND IGNITION (STDV OPEN)								
11556.600	160318	4115373	1052099	-2863.2	8750.5	22400.5	-26.93	-4.26	-1.73
11558.0	156284	4127620	1083461	-2901.5	8746.0	22402.2	-27.74	-2.03	4.61
11560.0	150424	4145114	1128290	-2958.6	8747.4	22426.2	-28.89	1.67	15.02
11562.0	144450	4162612	1173173	-3016.5	8751.0	22456.7	-29.00	1.90	15.48
11564.0	138359	4180118	1218118	-3074.5	8754.9	22487.7	-29.01	1.97	15.63
11566.0	132153	4197632	1263125	-3132.6	8758.7	22519.0	-29.10	1.85	15.64
11568.0	125830	4215153	1308195	-3191.1	8762.3	22550.3	-29.54	1.67	15.64
11570.0	119388	4232680	1353327	-3250.7	8765.3	22581.7	-30.21	1.43	15.68
11572.0	112826	4250214	1398522	-3311.6	8768.1	22613.1	-30.70	1.31	15.68
11574.0	106142	4267752	1443779	-3373.0	8770.7	22644.5	-30.80	1.32	15.70
11576.0	99334	4285296	1489100	-3434.6	8773.3	22675.9	-30.72	1.35	15.72
11578.0	92403	4302846	1534483	-3496.1	8776.0	22707.3	-30.74	1.31	15.73
11580.0	85350	4320400	1579929	-3557.7	8778.6	22738.7	-30.86	1.31	15.70
11582.0	78172	4337960	1625439	-3619.5	8781.3	22770.1	-30.96	1.38	15.67
11584.0	70872	4355526	1671009	-3681.4	8784.1	22801.4	-30.97	1.44	15.65
11586.0	63447	4373097	1716643	-3743.4	8787.0	22832.7	-30.96	1.44	15.64
11588.0	55898	4390674	1762340	-3805.4	8789.8	22864.0	-31.01	1.39	15.64
11590.0	48225	4408256	1808099	-3867.4	8792.6	22895.3	-31.07	1.36	15.64
11592.0	40428	4425844	1853921	-3929.6	8795.3	22926.5	-31.13	1.36	15.63
11594.0	32507	4443439	1899806	-3991.9	8798.0	22957.8	-31.16	1.36	15.61
11596.0	24460	4461036	1944752	-4054.3	8800.8	22989.0	-31.20	1.38	15.58

TABLE C-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11598.0	16289	4478641	1991761	-4116.7	8803.6	23020.1	-31.24	1.40	15.58
11600.0	7994	4496251	2037833	-4179.2	8806.4	23051.3	-31.28	1.40	15.57
11602.0	-428	4513866	2083964	-4241.8	8809.1	23082.4	-31.31	1.37	15.55
11604.0	-8974	4531487	2130162	-4304.5	8811.8	23113.5	-31.33	1.34	15.52
11606.0	-17645	4549113	2176420	-4367.1	8814.5	23144.5	-31.35	1.35	15.50
11608.0	-26442	4566745	2222740	-4429.9	8817.2	23175.5	-31.39	1.36	15.49
11610.0	-35365	4584382	2269122	-4492.7	8820.0	23206.4	-31.43	1.37	15.47
11612.0	-44413	4602025	2315566	-4555.6	8822.7	23237.3	-31.46	1.37	15.45
11614.0	-53588	4619673	2362071	-4618.6	8825.4	23268.3	-31.49	1.36	15.45
11616.0	-62889	4637327	2408639	-4681.6	8828.1	23299.2	-31.51	1.35	15.47
11618.0	-72314	4654986	2455268	-4744.6	8830.8	23330.1	-31.53	1.32	15.48
11620.0	-81866	4672650	2501959	-4807.7	8833.4	23361.1	-31.56	1.31	15.47
11622.0	-91545	4690319	2548712	-4870.8	8836.1	23392.0	-31.60	1.31	15.45
11624.0	-101350	4707994	2595527	-4934.1	8838.7	23422.9	-31.63	1.30	15.43
11626.0	-111281	4725674	2642404	-4997.4	8841.3	23453.7	-31.66	1.30	15.41
11629.0	-121339	4743359	2689342	-5060.7	8843.8	23484.5	-31.69	1.29	15.42
11630.0	-131524	4761049	2736342	-5124.1	8846.4	23515.4	-31.73	1.28	15.43
11632.0	-141836	4778745	2783403	-5187.6	8849.0	23546.2	-31.75	1.26	15.40
11634.0	-152274	4796445	2830527	-5251.1	8851.5	23577.0	-31.77	1.24	15.37
11636.0	-162840	4814151	2877711	-5314.7	8853.9	23607.7	-31.77	1.24	15.36
11638.0	-173533	4831861	2924957	-5378.2	8856.4	23638.4	-31.79	1.25	15.38
11640.0	-184353	4849576	2972265	-5441.8	8858.9	23669.2	-31.81	1.25	15.39
11642.0	-195300	4867297	3019634	-5505.5	8861.4	23699.9	-31.84	1.23	15.38
11644.0	-206375	4885022	3067065	-5569.2	8863.8	23730.7	-31.88	1.20	15.38
11646.0	-217577	4902752	3114557	-5633.0	8866.2	23761.4	-31.93	1.17	15.37
11648.0	-228907	4920487	3162111	-5696.9	8868.5	23792.1	-31.98	1.15	15.36
11650.0	-240366	4938227	3209728	-5761.0	8870.9	23823.1	-32.68	2.12	18.28
11652.0	-251953	4955973	3257413	-5826.4	8875.1	23859.6	-32.73	2.12	18.28
11654.0	-263672	4973729	3305170	-5891.9	8879.4	23896.2	-32.77	2.12	18.28
11656.0	-275521	4991492	3353000	-5957.4	8883.6	23932.7	-32.81	2.11	18.28
11658.0	-287502	5009264	3400902	-6023.1	8887.8	23969.3	-32.84	2.11	18.28
11660.0	-299614	5027044	3448878	-6088.8	8892.0	24005.8	-32.87	2.10	18.28
11662.0	-311857	5044832	3496927	-6154.6	8896.2	24042.4	-32.89	2.09	18.30
11664.0	-324232	5062629	3545048	-6220.4	8900.4	24079.0	-32.94	2.08	18.31
11666.0	-336739	5080434	3593244	-6286.4	8904.6	24115.9	-32.99	2.07	18.33
11668.0	-349378	5098247	3641512	-6352.4	8908.8	24152.6	-33.01	2.09	18.37
11670.0	-362149	5116069	3689954	-6418.4	8912.9	24189.4	-33.03	2.09	18.39
11672.0	-375051	5133899	3738270	-6484.5	8917.1	24226.2	-33.06	2.09	18.41
11674.0	-388087	5151737	3786759	-6550.7	8921.3	24263.0	-33.10	2.10	18.42
11676.0	-401254	5169584	3835322	-6616.9	8925.5	24299.8	-33.12	2.11	18.43
11678.0	-414554	5187439	3883959	-6683.1	8929.7	24336.7	-33.13	2.11	18.47
11680.0	-427987	5205302	3932669	-6749.4	8933.9	24373.7	-33.16	2.10	18.49
11682.0	-441552	5223174	3981453	-6815.8	8938.1	24410.7	-33.21	2.10	18.51

TABLE C-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11684.0	-455250	5241055	4030311	-6882.2	8942.3	24447.7	-33.24	2.10	18.51
11686.0	-469081	5258944	4079244	-6948.7	8946.5	24484.7	-33.25	2.11	18.53
11688.0	-483045	5276841	4128250	-7015.2	8950.7	24521.9	-33.27	2.12	18.59
11690.0	-497142	5294746	4177331	-7081.8	8955.0	24559.1	-33.30	2.13	18.64
11692.0	-511372	5312661	4226487	-7148.5	8959.2	24596.4	-33.34	2.13	18.66
11694.0	-525736	5330583	4275717	-7215.2	8963.5	24633.7	-33.38	2.12	18.66
11696.0	-540233	5348514	4325022	-7282.0	8967.7	24671.0	-33.40	2.11	18.67
11698.0	-554864	5366454	4374401	-7348.8	8971.9	24708.4	-33.42	2.13	18.72
11700.0	-569628	5384402	4423855	-7415.7	8976.2	24745.9	-33.46	2.13	18.77
11702.0	-584527	5402359	4473385	-7482.6	8980.5	24783.5	-33.50	2.13	18.79
11704.0	-599559	5420324	4522989	-7549.7	8984.7	24821.1	-33.54	2.13	18.82
11706.0	-614725	5438298	4572669	-7616.7	8989.0	24858.8	-33.55	2.13	18.84
11708.0	-630026	5456280	4622424	-7683.9	8993.3	24896.5	-33.56	2.14	18.87
11710.0	-645461	5474271	4672255	-7751.0	8997.5	24934.2	-33.61	2.13	18.89
11712.0	-661030	5492270	4722161	-7818.3	9001.8	24972.1	-33.65	2.14	18.94
11714.0	-676734	5510278	4772143	-7885.6	9006.1	25010.0	-33.67	2.16	19.01
11716.0	-692572	5528295	4822201	-7953.0	9010.4	25048.1	-33.69	2.18	19.05
11718.0	-708546	5546320	4872336	-8020.4	9014.8	25086.2	-33.72	2.16	19.06
11720.0	-724654	5564354	4922546	-8087.8	9019.1	25124.3	-33.75	2.15	19.10
11722.0	-740897	5582396	4972833	-8155.4	9023.4	25162.6	-33.79	2.15	19.14
11724.0	-757276	5600447	5023197	-8223.0	9027.7	25200.9	-33.82	2.18	19.18
11726.0	-773789	5618507	5073637	-8290.6	9032.1	25239.3	-33.84	2.20	19.19
11728.0	-790438	5636576	5124154	-8358.4	9036.5	25277.7	-33.87	2.19	19.21
11730.0	-807223	5654653	5174747	-8426.1	9040.9	25316.1	-33.90	2.19	19.26
11732.0	-824143	5672739	5225418	-8494.0	9045.3	25354.7	-33.94	2.19	19.31
11734.0	-841198	5690834	5276166	-8561.9	9049.6	25393.3	-33.97	2.20	19.35
11736.0	-858390	5708938	5326992	-8629.8	9054.1	25432.1	-33.99	2.22	19.38
11738.0	-875718	5727050	5377895	-8697.8	9058.5	25470.9	-34.02	2.23	19.43
11740.0	-893182	5745172	5428875	-8765.9	9063.0	25509.8	-34.06	2.24	19.50
11742.0	-910782	5763302	5479934	-8834.1	9067.4	25548.9	-34.09	2.23	19.55
11744.0	-928518	5781442	5531071	-8902.3	9071.9	25588.0	-34.12	2.24	19.58
11746.0	-946391	5799590	5582286	-8970.5	9076.4	25627.2	-34.13	2.25	19.62
11748.0	-964400	5817747	5633580	-9039.8	9080.9	25666.5	-34.15	2.25	19.66
11750.0	-982546	5835914	5684952	-9107.2	9085.4	25705.8	-34.21	2.26	19.71
11752.0	-1000829	5854089	5736403	-9175.6	9089.9	25745.3	-34.26	2.26	19.77
11754.0	-1019249	5872273	5787933	-9244.2	9094.5	25784.9	-34.29	2.28	19.82
11756.0	-1037806	5890467	5839543	-9312.8	9099.1	25824.6	-34.32	2.30	19.86
11758.0	-1056500	5908670	5891232	-9381.5	9103.7	25864.4	-34.35	2.31	19.91
11760.0	-1075331	5926882	5943000	-9450.2	9108.3	25904.2	-34.38	2.31	19.96
11762.0	-1094301	5945103	5994849	-9519.0	9112.9	25944.2	-34.41	2.30	19.99
11764.0	-1113407	5963333	6046777	-9587.8	9117.5	25984.2	-34.43	2.31	20.03
11766.0	-1132652	5981573	6098785	-9656.7	9122.2	26024.3	-34.47	2.34	20.09
11768.0	-1152034	5999822	6150874	-9725.7	9126.9	26064.6	-34.52	2.37	20.18

TABLE C-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11770.0	-1191555	6013080	6203044	-9794.8	9131.6	26105.0	-34.55	2.38	20.24
11772.0	-1191214	6036348	6255294	-9863.9	9136.4	26145.6	-34.57	2.37	20.30
11774.0	-1211011	6054626	6307626	-9933.1	9141.1	26186.2	-34.61	2.38	20.34
11776.0	-1230946	6072913	6360039	-10002.4	9145.9	26226.9	-34.66	2.39	20.39
11778.0	-1251020	6091210	6412534	-10071.7	9150.7	26267.8	-34.70	2.40	20.46
11780.0	-1271233	6109516	6465110	-10141.2	9155.5	26308.8	-34.75	2.42	20.54
11782.0	-1291585	6127832	6517769	-10210.7	9160.4	26349.9	-34.79	2.45	20.61
11784.0	-1312076	6146157	6570510	-10280.3	9165.3	26391.2	-34.83	2.46	20.66
11786.0	-1332706	6164493	6623334	-10350.0	9170.2	26432.6	-34.95	2.46	20.71
11788.0	-1353476	6182838	6676241	-10419.7	9175.2	26474.1	-34.88	2.48	20.77
11790.0	-1374385	6201193	6729230	-10489.5	9180.1	26515.6	-34.92	2.49	20.82
11792.0	-1395434	6219559	6782303	-10559.4	9185.1	26557.3	-34.97	2.49	20.87
11794.0	-1416623	6237934	6835460	-10629.4	9190.1	26599.1	-35.04	2.49	20.93
11796.0	-1437952	6256319	6888700	-10699.6	9195.1	26641.1	-35.12	2.51	21.02
11798.0	-1459421	6274714	6942024	-10769.9	9200.1	26683.2	-35.18	2.53	21.11
11800.0	-1481032	6293119	6995433	-10840.3	9205.2	26725.5	-35.21	2.54	21.18
11802.0	-1502783	6311535	7048926	-10910.7	9210.3	26768.0	-35.24	2.55	21.26
11804.0	-1524675	6329961	7102505	-10981.3	9215.4	26810.5	-35.30	2.57	21.33
11806.0	-1546708	6348397	7156169	-11052.0	9220.6	26853.3	-35.38	2.58	21.40
11808.0	-1568883	6366843	7209918	-11122.8	9225.7	26896.1	-35.44	2.57	21.47
11810.0	-1591199	6385300	7263753	-11193.7	9230.9	26939.2	-35.48	2.58	21.55
11812.0	-1613657	6403766	7317675	-11264.7	9236.1	26982.3	-35.52	2.61	21.64
11814.0	-1636258	6422244	7371683	-11335.7	9241.3	27025.7	-35.55	2.64	21.71
11816.0	-1659000	6440732	7425779	-11406.9	9246.6	27069.2	-35.60	2.66	21.78
11818.0	-1681885	6459230	7479960	-11478.2	9251.9	27112.8	-35.67	2.67	21.85
11820.0	-1704913	6477739	7534229	-11549.6	9257.3	27156.6	-35.77	2.68	21.94
11822.0	-1728084	6496259	7588586	-11621.2	9262.6	27200.5	-35.84	2.68	22.02
11824.0	-1751398	6514790	7643031	-11693.0	9268.0	27244.7	-35.90	2.71	22.12
11826.0	-1774856	6533331	7697565	-11764.9	9273.5	27289.0	-35.97	2.74	22.23
11828.0	-1798458	6551884	7752187	-11836.8	9279.0	27333.6	-36.02	2.75	22.32
11830.0	-1822203	6570447	7806899	-11908.9	9284.5	27378.3	-36.07	2.76	22.37
11832.0	-1846093	6589022	7861701	-11981.1	9290.0	27423.0	-36.13	2.75	22.40
11834.0	-1870129	6607607	7916592	-12053.5	9295.5	27467.9	-36.20	2.74	22.48
11836.0	-1894307	6626204	7971572	-12126.0	9301.0	27513.0	-36.29	2.76	22.59
11838.0	-1918632	6644811	8026644	-12198.6	9306.6	27558.3	-36.38	2.80	22.71
11840.0	-1943102	6663430	8081806	-12271.5	9312.2	27603.8	-36.46	2.84	22.80
11842.0	-1967718	6682060	8137059	-12344.5	9317.9	27649.5	-36.55	2.86	22.92
11844.0	-1992480	6700702	8192404	-12417.7	9323.6	27695.5	-36.64	2.89	23.05
11846.0	-2017389	6719355	8247841	-12491.1	9329.4	27741.7	-36.75	2.89	23.18
11848.0	-2042444	6738019	8303371	-12564.7	9335.2	27788.2	-36.87	2.90	23.28
11850.0	-2067649	6756695	8358994	-12638.5	9341.0	27834.8	-36.98	2.92	23.38
11852.0	-2092999	6775383	8414710	-12712.6	9346.9	27881.7	-37.08	2.97	23.51
11854.0	-2118498	6794083	8470521	-12786.8	9352.9	27928.9	-37.18	3.01	23.64

TABLE C-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11856.0	-2144146	6912795	8526426	-12861.3	9358.9	27976.2	-37.28	3.01	23.73
11858.0	-2169943	6831519	8582426	-12936.0	9364.9	28023.8	-37.39	2.99	23.81
11860.0	-2195890	6850255	8638521	-13010.9	9370.9	28071.5	-37.50	3.00	23.94
11862.0	-2221987	6869002	8694712	-13086.0	9376.9	28119.5	-37.64	3.03	24.07
11864.0	-2248234	6887762	8750999	-13161.4	9383.0	28167.8	-37.77	3.07	24.20
11866.	-2274633	6906535	8807384	-13237.1	9389.2	28216.3	-37.91	3.07	24.29
11868.0	-2301183	6925319	8863865	-13313.0	9395.3	28264.9	-38.04	3.07	24.38
11870.0	-2327885	6944116	8920443	-13389.2	9401.5	28313.8	-38.17	3.07	24.49
11872.0	-2354740	6962925	8977120	-13465.7	9407.6	28362.9	-38.30	3.06	24.61
11874.0	-2381748	6981746	9033895	-13542.5	9413.7	28412.3	-38.44	3.07	24.75
11876.0	-2408910	7000590	9090769	-13619.5	9419.9	28461.9	-38.58	3.09	24.89
11878.0	-2436226	7019426	9147743	-13696.7	9426.1	28511.8	-38.69	3.10	25.02
11880.0	-2463697	7038294	9204817	-13774.4	9432.3	28561.9	-38.97	3.07	25.06
11882.0	-2491324	7057155	9261991	-13853.0	9438.2	28611.9	-39.56	2.93	24.97
11884.0	-2519110	7076037	9319264	-13932.7	9443.9	28661.8	-40.23	2.77	24.86
11886.0	-2547056	7094930	9376638	-14013.6	9449.4	28711.5	-40.66	2.66	24.87
11888.0	-2575165	7113834	9434110	-14095.0	9454.7	28761.4	-40.73	2.67	25.03
11890.0	-2603436	7132749	9491683	-14176.4	9460.1	28811.7	-40.66	2.74	25.24
11892.0	-2631870	7151675	9549357	-14257.8	9465.7	28862.3	-40.67	2.82	25.41
11894.0	-2660467	7170612	9607133	-14339.2	9471.3	28913.3	-40.71	2.88	25.59
11896.0	-2689227	7189560	9665011	-14420.7	9477.1	28964.7	-40.79	2.89	25.80
11898.0	-2718150	7208520	9722992	-14502.3	9482.9	29016.5	-40.84	2.91	26.02
11900.0	-2747236	7227492	9781077	-14584.0	9488.8	29068.7	-40.87	2.95	26.24
11902.0	-2776486	7246475	9839267	-14665.7	9494.7	29121.4	-40.88	3.02	26.43
11904.0	-2805899	7265471	9897563	-14747.4	9500.8	29174.4	-40.89	3.09	26.62
11906.0	-2835476	7284479	9955966	-14829.2	9507.1	29227.8	-40.91	3.16	26.81
	S-IVB SECOND GUIDANCE CUTOFF								
11907.640	-2859850	7300073	10003931	-14896.1	9512.3	29271.8	-40.89	3.07	26.93
11908.0	-2865213	7303499	10014469	-14907.8	9511.8	29275.5	-23.36	-5.61	-6.50
11910.0	-2895060	7322501	10072978	-14949.9	9496.7	29253.9	-20.33	-7.84	-12.24
11912.0	-2925001	7341479	10131462	-14990.5	9481.0	29229.3	-20.29	-7.86	-12.28
11914.0	-2955022	7360425	10189896	-15031.0	9465.3	29204.7	-20.25	-7.87	-12.33
11916.0	-2985125	7379341	10248281	-15071.4	9449.5	29180.0	-20.14	-7.89	-12.37
	TRANSLUNAR INJECTION								
11917.640	-3009869	7394827	10297119	-15104.3	9436.6	29159.7	-20.08	-7.90	-12.41
11950.0	-3508956	7696028	11233101	-15735.6	9177.7	28745.7	18.94	-8.11	-13.19
12000.0	-4318661	8144679	12653431	-16637.2	8766.5	28059.8	7.10	-8.32	-14.24
12050.0	-5171103	8572562	14038227	-17444.6	8348.2	27326.8	- 5.19	-8.40	-14.99
12100.0	-6061516	8979480	15385590	-18156.0	7928.8	26563.7	-.3.27	-8.36	-15.48

TABLE C-V. EARTH-FIXED LAUNCH SITE POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
12150.0	-6985116	9365521	16694297	-18772.4	7514.0	25782.6	-11.39	-8.22	-15.72
12200.0	-7937220	9731029	17963750	-19296.8	7108.2	24995.4	-9.60	-8.00	-15.74
12250.0	-8913353	10076553	19193900	-19734.5	6715.1	24212.0	-7.93	-7.72	-15.57
12300.0	-9909331	10402796	20385156	-20091.7	6337.4	23440.9	-6.38	-7.39	-15.25
12350.0	-10921300	10710576	21538305	-20375.4	5976.8	22688.7	-4.99	-7.03	-14.82
12400.0	-11945763	11000787	22654428	-20592.7	5634.7	21960.6	-3.73	-6.65	-14.30
12450.0	-12979583	11274366	23734823	-20750.9	5311.6	21260.1	-2.62	-6.27	-13.71
12500.0	-14019979	11532265	24780946	-20856.8	5007.5	20590.0	-1.64	-5.89	-13.09
12550.0	-15064506	11775435	25794347	-20917.1	4722.3	19951.5	-0.79	-5.52	-12.45
12600.0	-16111027	12004906	26776634	-20937.6	4455.5	19345.4	-0.05	-5.16	-11.80
12650.0	-17157694	12221277	27729430	-20923.8	4206.3	18771.8	0.59	-4.81	-11.15
12700.0	-18202913	12425712	28654347	-20880.5	3973.8	18 30.2	1.13	-4.49	-10.52
12750.0	-19245322	12618927	29552967	-20812.0	3757.4	17719.8	1.59	-4.18	-9.90
12800.0	-20283757	12801697	30426825	-20722.2	3555.9	17239.5	1.99	-3.89	-9.31
12850.0	-21317238	12974754	31277397	-20614.3	3368.7	16788.1	2.32	-3.61	-8.75
12900.0	-22344937	13138789	32106090	-20491.3	3194.8	16364.2	2.59	-3.35	-8.2
12950.0	-23366162	13294437	32914252	-20355.7	3033.1	15966.5	2.82	-3.12	-7.70
13000.0	-24380336	13442290	33703159	-20209.7	2882.9	15593.7	3.01	-2.90	-7.22
13050.0	-25386984	13582899	34474016	-20055.0	2743.2	15244.4	3.17	-2.69	-6.76
13100.0	-26385717	13716773	35227962	-19893.3	2613.4	14917.1	3.29	-2.50	-6.33
13150.0	-27376222	13844389	35966067	-19726.1	2492.7	14610.5	3.39	-2.33	-5.93
13200.0	-28358249	13966186	36689339	-19554.4	2380.5	14323.5	3.47	-2.16	-5.55
13250.0	-29331603	14082573	37398720	-19379.3	2276.2	14054.7	3.53	-2.01	-5.20
13300.0	-30296135	14193929	38095099	-19201.7	2179.2	13803.2	3.57	-1.87	-4.87
	CSM SEPARATION								
13347.600	-31206042	14295572	38746687	-19030.9	2093.2	13578.7	3.60	-1.75	-4.57

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

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 TIMEBASE 6									
10978.600	3503.344	12.471	524.463	-3789.8	160.1	25299.5	-30.11	-0.07	-4.51
10980.0	3499.469	12.508	530.691	-3832.0	160.0	25293.1	-30.11	-0.07	-4.56
10990.0	3492.914	12.771	572.280	-4132.9	159.3	25245.8	-30.05	-0.07	-4.92
11000.0	3485.985	13.032	613.788	-4433.0	158.6	25194.9	-29.99	-0.07	-5.27
11010.0	3478.322	13.293	655.209	-4732.6	157.9	25140.3	-29.93	-0.08	-5.63
11020.0	3470.297	13.552	696.537	-5031.5	157.1	25082.2	-29.86	-0.08	-5.99
11030.0	3461.761	13.810	737.767	-5329.7	156.3	25020.6	-29.78	-0.08	-6.34
11040.0	3452.744	14.066	778.892	-5627.2	155.5	24955.4	-29.71	-0.08	-6.69
11050.0	3443.239	14.322	819.908	-5923.8	154.6	24886.[illegible]	-29.62	-0.09	-7.05
11060.0	3433.246	14.575	860.807	-6219.7	153.7	24814.5	-29.54	-0.09	-7.40
11070.0	3422.767	14.828	901.585	-6514.6	152.8	24738.8	-29.45	-0.09	-7.75
11080.0	3411.803	15.078	942.235	-6809.6	151.9	24659.5	-29.35	-0.09	-8.10
11090.0	3400.356	15.328	982.751	-7101.7	151.0	24576.8	-29.26	-0.09	-8.45
11100.0	3388.428	15.575	1023.129	-7393.8	150.0	24490.6	-29.15	-0.10	-8.79
11110.0	3376.020	15.822	1063.362	-7684.8	149.1	24400.9	-29.05	-0.10	-9.14
11120.0	3363.134	16.066	1103.445	-7974.7	148.0	24307.8	-28.94	-0.10	-9.48
11130.0	3349.771	16.309	1143.371	-8263.5	147.0	24211.2	-28.82	-0.10	-9.83
11140.0	3335.934	16.550	1183.136	-8551.2	146.0	24111.2	-28.70	-0.11	-10.17
11150.0	3321.625	16.789	1222.733	-8837.6	144.9	24007.8	-28.58	-0.11	-10.51
11160.0	3306.845	17.027	1262.159	-9122.8	143.8	23901.0	-28.45	-0.11	-10.85
11170.0	3291.597	17.263	1301.403	-9406.7	142.7	23790.8	-28.32	-0.11	-11.19
11180.0	3275.883	17.496	1340.465	-9689.3	141.5	23677.3	-28.19	-0.11	-11.52
11190.0	3259.705	17.728	1379.337	-9970.5	140.4	23560.4	-28.05	-0.12	-11.86
11200.0	3243.065	17.958	1418.014	-10250.3	139.2	23440.1	-27.91	-0.12	-12.19
11210.0	3225.966	18.187	1456.490	-10529.6	138.0	23316.6	-27.76	-0.12	-12.52
11220.0	3208.411	18.413	1494.761	-10905.5	136.8	23189.7	-27.61	-0.12	-12.85
11230.0	3190.400	18.637	1532.819	-11080.8	135.5	23059.6	-27.46	-0.13	-13.18
11240.0	3171.933	18.859	1570.661	-11354.6	134.2	22926.1	-27.30	-0.13	-13.50
11250.0	3153.027	19.079	1608.281	-11626.7	132.9	22789.5	-27.13	-0.13	-13.83
11260.0	3133.669	19.296	1645.673	-11897.3	131.6	22649.6	-26.97	-0.13	-14.15
11270.0	3113.867	19.512	1682.832	-12166.1	130.3	22506.5	-26.80	-0.13	-14.47
11280.0	3093.624	19.725	1719.753	-12433.3	128.9	22360.2	-26.63	-0.14	-14.79
11290.0	3072.943	19.936	1756.430	-12698.6	127.6	22210.8	-26.45	-0.14	-15.10
11300.0	3051.826	20.145	1792.859	-12962.2	126.2	22058.1	-26.27	-0.14	-15.42
11310.0	3030.273	20.352	1829.035	-13224.0	124.8	21902.4	-26.08	-0.14	-15.73
11320.0	3008.300	20.556	1864.951	-13483.8	123.3	21743.6	-25.89	-0.14	-16.04
11330.0	2985.896	20.758	1900.604	-13741.8	121.9	21581.7	-25.70	-0.15	-16.34
11340.0	2963.063	20.957	1935.987	-13997.9	120.4	21416.7	-25.51	-0.15	-16.65
11350.0	2939.822	21.154	1971.097	-14251.9	118.9	21248.7	-25.31	-0.15	-16.95
11360.0	2916.153	21.349	2005.927	-14504.0	117.4	21077.7	-25.10	-0.15	-17.25

TABLE C-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11370.0	2892.082	21.540	2040.474	-14754.0	115.9	20903.6	-24.90	-0.15	-17.55
11380.0	2867.595	21.730	2074.732	-15001.9	114.3	20726.7	-24.69	-0.16	-17.84
11390.0	2842.703	21.916	2108.696	-15247.7	112.7	20546.8	-24.47	-0.16	-18.14
11400.0	2817.409	22.101	2142.361	-15491.3	111.1	20363.9	-24.26	-0.16	-18.43
11410.0	2791.713	22.282	2175.723	-15732.8	109.5	20178.2	-24.04	-0.16	-18.71
11420.0	2765.623	22.461	2208.778	-15972.0	107.9	19989.6	-23.81	-0.16	-19.00
11430.0	2739.141	22.637	2241.519	-16209.0	106.2	19798.2	-23.59	-0.17	-19.28
11440.0	2712.271	22.811	2273.944	-16443.7	104.6	19604.0	-23.36	-0.17	-19.56
11450.0	2685.017	22.982	2306.046	-16676.1	102.9	19407.0	-23.12	-0.17	-19.84
11460.0	2657.382	23.149	2337.822	-16906.1	101.2	19207.3	-22.89	-0.17	-20.11
11470.0	2629.370	23.315	2369.267	-17133.8	99.5	19004.8	-22.65	-0.17	-20.38
11480.0	2600.986	23.477	2400.376	-17359.0	97.7	18799.7	-22.40	-0.17	-20.65
11490.0	2572.233	23.636	2431.146	-17581.8	96.0	18591.9	-22.16	-0.18	-20.91
11500.0	2543.115	23.793	2461.571	-17802.1	94.2	18381.4	-21.91	-0.18	-21.17
11510.0	2513.636	23.946	2491.649	-18019.9	92.5	18168.1	-21.67	-0.18	-21.45
11520.0	2483.802	24.097	2521.372	-18235.2	90.7	17952.0	-21.39	-0.18	-21.73
11530.0	2453.615	24.245	2550.739	-18447.9	88.9	17733.5	-21.16	-0.18	-21.99
11540.0	2423.081	24.390	2579.742	-18657.9	86.9	17512.5	-20.86	-0.21	-22.21
11550.0	2392.202	24.531	2608.380	-18965.4	85.1	17288.8	-20.63	-0.18	-22.48
	S-IVB SECOND IGNITION (STDV OPEN)								
11556.600	2371.637	24.623	2627.079	-19000.8	84.0	17140.0	-20.43	-0.17	-22.61
11558.0	2367.255	24.642	2631.029	-19032.8	83.7	17111.2	-25.49	-0.20	-18.12
11560.0	2360.980	24.670	2636.653	-19095.2	83.4	17085.8	-33.66	-0.26	-10.61
11562.0	2354.694	24.697	2642.274	-19163.0	83.0	17064.9	-34.07	-0.19	-10.30
11564.0	2348.365	24.724	2647.987	-19231.2	82.7	17044.3	-34.18	-0.17	-10.20
11566.0	2342.023	24.751	2653.494	-19299.6	82.2	17023.9	-34.23	-0.27	-10.30
11568.0	2335.659	24.778	2659.095	-19368.3	81.6	17002.9	-34.53	-0.36	-10.67
11570.0	2329.273	24.805	2664.688	-19437.8	80.6	16981.3	-35.02	-0.49	-11.18
11572.0	2322.863	24.831	2670.274	-19508.2	79.6	16958.8	-35.36	-0.53	-11.56
11574.0	2316.430	24.857	2675.952	-19579.0	78.6	16935.4	-35.45	-0.50	-11.62
11576.0	2309.974	24.883	2681.422	-19649.8	77.6	16912.2	-35.41	-0.50	-11.56
11578.0	2303.496	24.908	2686.985	-19720.7	76.6	16889.0	-35.42	-0.52	-11.59
11580.0	2296.992	24.933	2692.541	-19791.6	75.6	16865.7	-35.49	-0.50	-11.70
11582.0	2290.465	24.958	2698.088	-19862.6	74.7	16842.3	-35.54	-0.40	-11.78
11584.0	2283.914	24.983	2703.628	-19933.7	73.9	16818.7	-35.54	-0.33	-11.79
11586.0	2277.343	25.007	2709.160	-20004.7	73.3	16795.1	-35.52	-0.33	-11.80
11588.0	2270.746	25.031	2714.685	-20075.8	72.6	16771.4	-35.55	-0.36	-11.86
11590.0	2264.126	25.055	2720.201	-20147.0	71.9	16747.7	-35.59	-0.38	-11.93
11592.0	2257.483	25.078	2725.710	-20218.1	71.1	16723.8	-35.62	-0.37	-11.98
11594.0	2250.817	25.101	2731.211	-20289.4	70.4	16699.7	-35.63	-0.35	-12.04
11596.0	2244.126	25.124	2736.704	-20360.6	69.7	16675.6	-35.63	-0.32	-12.08

TABLE C-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11598.0	2237.413	25.147	2742.188	-20431.9	69.1	16651.4	-35.66	-0.28	-12.12
11600.0	2230.676	25.170	2747.665	-20503.3	68.6	16627.1	-35.68	-0.27	-12.15
11602.0	2223.915	25.192	2753.134	-20574.6	68.0	16602.8	-35.69	-0.29	-12.22
11604.0	2217.131	25.215	2758.595	-20646.0	67.4	16578.3	-35.67	-0.30	-12.28
11606.0	2210.324	25.237	2764.048	-20717.3	66.9	16553.7	-35.67	-0.28	-12.31
11608.0	2203.493	25.259	2769.493	-20788.7	66.3	16529.0	-35.69	-0.25	-12.35
11610.0	2196.638	25.281	2774.929	-20860.0	65.9	16504.3	-35.70	-0.23	-12.40
11612.0	2189.760	25.302	2780.358	-20931.4	65.4	16479.4	-35.71	-0.22	-12.45
11614.0	2182.859	25.324	2785.778	-21002.9	65.0	16454.5	-35.73	-0.21	-12.48
11616.0	2175.934	25.345	2791.190	-21074.3	64.6	16429.5	-35.74	-0.23	-12.50
11618.0	2168.985	25.366	2796.594	-21145.8	64.1	16404.4	-35.76	-0.25	-12.53
11620.0	2162.013	25.387	2801.989	-21217.3	63.6	16379.3	-35.76	-0.25	-12.57
11622.0	2155.017	25.408	2807.376	-21288.9	63.1	16354.1	-35.77	-0.24	-12.63
11624.0	2147.998	25.429	2812.755	-21360.4	62.6	16328.8	-35.78	-0.23	-12.68
11626.0	2140.956	25.449	2818.126	-21432.0	62.2	16303.4	-35.78	-0.22	-12.72
11628.0	2133.889	25.470	2823.488	-21503.6	61.8	16277.9	-35.81	-0.22	-12.75
11630.0	2126.799	25.490	2828.842	-21575.2	61.3	16252.4	-35.84	-0.22	-12.79
11632.0	2119.686	25.510	2834.187	-21646.9	60.9	16226.7	-35.83	-0.22	-12.84
11634.0	2112.549	25.530	2839.524	-21718.5	60.4	16201.0	-35.81	-0.23	-12.90
11636.0	2105.389	25.550	2844.853	-21790.2	60.0	16175.2	-35.81	-0.22	-12.92
11638.0	2098.204	25.569	2850.173	-21861.8	59.6	16149.3	-35.83	-0.21	-12.93
11640.0	2090.996	25.589	2855.484	-21933.4	59.2	16123.4	-35.85	-0.21	-12.95
11642.0	2083.765	25.608	2860.787	-22005.1	58.7	16097.5	-35.85	-0.22	-12.96
11644.0	2076.510	25.628	2866.081	-22076.9	58.3	16071.4	-35.87	-0.23	-13.04
11646.0	2069.231	25.647	2871.367	-22148.6	57.8	16045.3	-35.90	-0.25	-13.10
11648.0	2061.929	25.666	2876.644	-22220.4	57.3	16019.0	-35.92	-0.26	-13.16
11650.0	2054.603	25.684	2881.913	-22292.5	56.8	15992.8	-38.50	-0.27	-11.36
11652.0	2047.252	25.703	2887.174	-22369.5	56.3	15970.0	-38.53	-0.26	-11.40
11654.0	2039.876	25.722	2892.427	-22446.5	55.8	15947.1	-38.55	-0.26	-11.45
11656.0	2032.475	25.740	2897.672	-22523.6	55.3	15924.2	-38.58	-0.26	-11.49
11658.0	2025.048	25.758	2902.910	-22600.9	54.8	15901.2	-38.60	-0.25	-11.53
11660.0	2017.596	25.776	2909.140	-22678.0	54.3	15878.1	-38.62	-0.25	-11.56
11662.0	2010.119	25.794	2913.363	-22755.2	53.8	15854.9	-38.64	-0.26	-11.58
11664.0	2002.616	25.811	2918.578	-22832.5	53.3	15831.7	-38.67	-0.26	-11.63
11666.0	1995.088	25.829	2923.785	-22910.2	52.7	15808.6	-38.72	-0.27	-11.66
11668.0	1987.534	25.846	2928.985	-22987.6	52.2	15785.3	-38.76	-0.27	-11.67
11670.0	1979.955	25.863	2934.177	-23065.2	51.6	15761.9	-38.79	-0.27	-11.68
11672.0	1972.350	25.880	2939.361	-23142.8	51.1	15738.5	-38.82	-0.27	-11.70
11674.0	1964.719	25.897	2944.538	-23220.4	50.6	15715.1	-38.84	-0.25	-11.73
11676.0	1957.064	25.913	2949.707	-23298.1	50.1	15691.7	-38.87	-0.24	-11.74
11678.0	1949.382	25.930	2954.869	-23375.9	49.6	15668.2	-38.89	-0.25	-11.74
11680.0	1941.675	25.946	2960.021	-23453.7	49.1	15644.7	-38.93	-0.25	-11.76
11682.0	1933.942	25.962	2965.167	-23531.4	48.6	15621.1	-38.97	-0.25	-11.79

TABLE C-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11684.0	1926.184	25.978	2970.305	-23609.5	48.1	15597.5	-38.99	-0.24	-11.83
11686.0	1918.400	25.994	2975.435	-23687.5	47.7	15573.9	-39.01	-0.24	-11.83
11688.0	1910.590	26.009	2980.557	-23765.6	47.2	15550.2	-39.06	-0.24	-11.82
11690.0	1902.754	26.025	2985.672	-23843.8	46.7	15526.6	-39.11	-0.24	-11.81
11692.0	1894.893	26.040	2990.779	-23922.0	46.2	15502.9	-39.16	-0.24	-11.85
11694.0	1887.006	26.055	2995.878	-24000.3	45.8	15479.2	-39.19	-0.24	-11.89
11696.0	1879.093	26.070	3000.969	-24078.7	45.3	15455.4	-39.20	-0.25	-11.91
11698.0	1871.155	26.085	3006.052	-24157.1	44.8	15431.6	-39.24	-0.24	-11.90
11700.0	1863.190	26.100	3011.128	-24235.7	44.3	15407.8	-39.30	-0.25	-11.91
11702.0	1855.200	26.114	3016.195	-24314.3	43.8	15383.9	-39.34	-0.25	-11.93
11704.0	1847.184	26.129	3021.255	-24393.0	43.3	15360.0	-39.38	-0.25	-11.96
11706.0	1839.142	26.143	3026.307	-24471.8	42.8	15336.1	-39.40	-0.25	-11.96
11708.0	1831.074	26.157	3031.351	-24550.6	42.3	15312.2	-39.42	-0.25	-11.97
11710.0	1822.980	26.171	3036.387	-24629.5	41.8	15288.2	-39.47	-0.26	-12.00
11712.0	1814.860	26.184	3041.416	-24708.5	41.3	15264.2	-39.53	-0.25	-12.00
11714.0	1806.714	26.198	3046.436	-24787.6	40.8	15240.2	-39.59	-0.25	-11.98
11716.0	1798.542	26.211	3051.449	-24866.8	40.3	15216.3	-39.62	-0.25	-11.98
11718.0	1790.343	26.224	3056.453	-24946.0	39.8	15192.3	-39.65	-0.26	-12.01
11720.0	1782.119	26.237	3061.450	-25025.4	39.3	15168.3	-39.69	-0.28	-12.03
11722.0	1773.869	26.250	3066.439	-25104.8	38.7	15144.2	-39.75	-0.28	-12.03
11724.0	1765.592	26.263	3071.419	-25184.4	38.2	15120.1	-39.79	-0.26	-12.03
11726.0	1757.290	26.275	3076.392	-25263.9	37.7	15096.0	-39.81	-0.24	-12.05
11728.0	1748.961	26.288	3081.357	-25343.6	37.2	15071.9	-39.84	-0.25	-12.07
11730.0	1740.606	26.300	3086.314	-25423.3	36.7	15047.8	-39.89	-0.26	-12.08
11732.0	1732.224	26.312	3091.264	-25503.2	36.2	15023.6	-39.96	-0.27	-12.08
11734.0	1723.816	26.324	3096.205	-25583.1	35.6	14999.4	-40.00	-0.26	-12.09
11736.0	1715.382	26.335	3101.138	-25663.1	35.1	14975.2	-40.03	-0.25	-12.10
11738.0	1706.922	26.347	3106.063	-25743.2	34.6	14951.1	-40.08	-0.26	-12.09
11740.0	1698.435	26.358	3110.980	-25823.5	34.1	14926.9	-40.16	-0.26	-12.08
11742.0	1689.922	26.369	3115.890	-25903.8	33.6	14902.7	-40.21	-0.25	-12.09
11744.0	1681.382	26.380	3120.791	-25984.3	33.0	14878.5	-40.25	-0.27	-12.09
11746.0	1672.816	26.391	3125.685	-26064.9	32.5	14854.4	-40.28	-0.27	-12.09
11748.0	1664.223	26.401	3130.570	-26145.4	31.9	14830.2	-40.32	-0.28	-12.09
11750.0	1655.604	26.412	3135.447	-26226.1	31.4	14806.0	-40.39	-0.28	-12.11
11752.0	1646.958	26.422	3140.317	-26307.0	30.8	14781.7	-40.46	-0.29	-12.12
11754.0	1638.286	26.432	3145.179	-26387.9	30.3	14757.5	-40.52	-0.28	-12.12
11756.0	1629.587	26.442	3150.032	-26469.0	29.7	14733.3	-40.56	-0.27	-12.11
11758.0	1620.861	26.452	3154.878	-26550.2	29.2	14709.0	-40.62	-0.27	-12.11
11760.0	1612.108	26.461	3159.715	-26631.4	28.7	14684.8	-40.67	-0.28	-12.12
11762.0	1603.329	26.471	3164.545	-26712.8	28.1	14660.6	-40.71	-0.29	-12.13
11764.0	1594.523	26.480	3169.367	-26794.3	27.5	14636.3	-40.74	-0.29	-12.14
11766.0	1585.690	26.489	3174.180	-26875.8	26.9	14612.0	-40.82	-0.28	-12.12
11768.0	1576.830	26.498	3178.986	-26957.5	26.4	14587.8	-40.91	-0.27	-12.10

TABLE C-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11770.0	1567.943	26.506	3183.784	-27039.4	25.8	14563.6	-40.97	-0.28	-12.09
11772.0	1559.030	26.515	3188.573	-27121.4	25.3	14539.4	-41.02	-0.30	-12.09
11774.0	1550.089	26.523	3193.355	-27203.5	24.7	14515.2	-41.08	-0.30	-12.10
11776.0	1541.121	26.531	3198.129	-27285.7	24.1	14491.0	-41.15	-0.29	-12.11
11778.0	1532.126	26.539	3202.895	-27368.1	23.5	14466.8	-41.22	-0.30	-12.11
11780.0	1523.104	26.546	3207.653	-27450.6	22.9	14442.6	-41.30	-0.30	-12.09
11782.0	1514.055	26.554	3212.403	-27533.3	22.3	14418.4	-41.39	-0.29	-12.08
11784.0	1504.979	26.561	3217.144	-27616.1	21.8	14394.3	-41.44	-0.29	-12.08
11786.0	1495.875	26.568	3221.878	-27699.0	21.2	14370.1	-41.49	-0.30	-12.08
11788.0	1486.744	26.575	3226.605	-27782.0	20.6	14345.9	-41.54	-0.30	-12.07
11790.0	1477.586	26.582	3231.323	-27865.1	20.0	14321.8	-41.60	-0.29	-12.08
11792.0	1468.400	26.588	3236.033	-27948.4	19.4	14297.6	-41.67	-0.30	-12.09
11794.0	1459.187	26.594	3240.735	-28031.8	18.8	14273.4	-41.76	-0.31	-12.11
11796.0	1449.946	26.600	3245.429	-28115.4	18.2	14249.2	-41.88	-0.30	-12.12
11798.0	1440.678	26.606	3250.115	-28199.3	17.6	14225.0	-41.98	-0.30	-12.11
11800.0	1431.382	26.612	3254.794	-28283.3	17.0	14200.8	-42.05	-0.31	-12.09
11802.0	1422.059	26.618	3259.464	-28367.5	16.4	14176.6	-42.11	-0.33	-12.07
11804.0	1412.707	26.623	3264.126	-28451.8	15.7	14152.4	-42.21	-0.32	-12.07
11806.0	1403.328	26.628	3268.781	-28536.3	15.1	14128.3	-42.31	-0.32	-12.10
11808.0	1393.921	26.633	3273.427	-28621.0	14.4	14104.1	-42.39	-0.34	-12.11
11810.0	1384.487	26.637	3278.066	-28705.8	13.7	14079.9	-42.47	-0.35	-12.09
11812.0	1375.024	26.642	3282.696	-28790.8	13.0	14055.7	-42.56	-0.35	-12.07
11814.0	1365.533	26.646	3287.319	-28876.0	12.3	14031.6	-42.64	-0.34	-12.05
11816.0	1356.014	26.650	3291.933	-28961.4	11.7	14007.5	-42.71	-0.33	-12.05
11818.0	1346.467	26.654	3296.540	-29046.9	11.0	13983.4	-42.82	-0.34	-12.06
11820.0	1336.892	26.657	3301.139	-29132.6	10.3	13959.2	-42.94	-0.34	-12.08
11822.0	1327.289	26.660	3305.730	-29218.6	9.6	13935.1	-43.04	-0.35	-12.09
11824.0	1317.657	26.663	3310.313	-29304.8	8.9	13910.9	-43.15	-0.35	-12.07
11826.0	1307.997	26.666	3314.888	-29391.2	8.2	13886.8	-43.29	-0.35	-12.04
11828.0	1298.309	26.669	3319.454	-29477.9	7.5	13862.7	-43.38	-0.36	-12.04
11830.0	1288.591	26.671	3324.014	-29564.7	6.8	13838.6	-43.44	-0.36	-12.05
11832.0	1278.846	26.673	3328.565	-29651.6	6.1	13814.5	-43.51	-0.36	-12.09
11834.0	1269.071	26.675	3333.108	-29738.7	5.4	13790.3	-43.60	-0.39	-12.11
11836.0	1259.268	26.677	3337.643	-29826.0	4.6	13766.1	-43.74	-0.39	-12.10
11838.0	1249.436	26.678	3342.170	-29913.6	3.8	13741.9	-43.89	-0.38	-12.09
11840.0	1239.576	26.679	3346.689	-30001.5	3.1	13717.7	-44.01	-0.36	-12.08
11842.0	1229.686	26.680	3351.201	-30089.7	2.4	13693.6	-44.15	-0.36	-12.07
11844.0	1219.767	26.681	3355.704	-30178.1	1.6	13669.4	-44.30	-0.38	-12.05
11846.0	1209.819	26.681	3360.200	-30266.8	0.9	13645.3	-44.46	-0.40	-12.05
11848.0	1199.842	26.682	3364.687	-30355.9	0.1	13621.2	-44.62	-0.40	-12.08
11850.0	1189.835	26.681	3369.167	-30445.3	-0.7	13597.0	-44.76	-0.39	-12.10
11852.0	1179.799	26.681	3373.638	-30535.0	-1.5	13572.8	-44.93	-0.38	-12.09
11854.0	1169.734	26.681	3378.102	-30625.0	-2.2	13548.7	-45.09	-0.37	-12.07

TABLE C-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
11856.0	1159.638	26.680	3382.558	-30715.3	-3.0	13524.5	-45.22	-0.38	-12.10
11858.0	1149.513	26.679	3387.005	-30805.8	-3.7	13500.2	-45.35	-0.41	-12.13
11860.0	1139.358	26.677	3391.445	-30896.7	-4.6	13476.0	-45.51	-0.42	-12.14
11862.0	1129.174	26.676	3395.877	-30987.9	-5.4	13451.7	-45.70	-0.42	-12.15
11864.0	1118.959	26.674	3400.300	-31079.4	-6.2	13427.4	-45.89	-0.41	-12.17
11866.0	1108.713	26.671	3404.716	-31171.4	-7.0	13403.0	-46.04	-0.40	-12.21
11868.0	1098.438	26.669	3409.124	-31263.6	-7.8	13378.5	-46.19	-0.41	-12.26
11870.0	1088.132	26.666	3413.523	-31356.1	-8.7	13354.0	-46.36	-0.43	-12.29
11872.0	1077.796	26.663	3417.915	-31449.0	-9.5	13329.3	-46.53	-0.46	-12.32
11874.0	1067.429	26.660	3422.298	-31542.2	-10.5	13304.7	-46.72	-0.47	-12.34
11876.0	1057.031	26.656	3426.674	-31635.9	-11.4	13280.0	-46.91	-0.49	-12.35
11878.0	1046.602	26.652	3431.041	-31729.8	-12.4	13255.3	-47.09	-0.49	-12.35
11880.0	1036.143	26.648	3435.400	-31824.2	-13.4	13230.4	-47.31	-0.50	-12.54
11882.0	1025.652	26.644	3439.750	-31919.2	-14.4	13204.8	-47.65	-0.49	-13.07
11884.0	1015.130	26.639	3444.092	-32014.8	-15.3	13178.1	-48.04	-0.48	-13.65
11886.0	1004.576	26.634	3448.426	-32111.2	-16.3	13150.4	-48.34	-0.51	-13.99
11888.0	993.990	26.628	3452.750	-32208.0	-17.4	13122.5	-48.50	-0.55	-13.96
11890.0	983.373	26.622	3457.064	-32305.1	-18.5	13094.7	-48.59	-0.56	-13.76
11892.0	972.723	26.616	3461.370	-32402.4	-19.6	13067.3	-48.72	-0.55	-13.65
11894.0	962.042	26.609	3465.667	-32500.0	-20.7	13040.1	-48.87	-0.54	-13.56
11896.0	951.328	26.602	3469.955	-32598.0	-21.8	13013.0	-49.07	-0.60	-13.49
11898.0	940.582	26.595	3474.233	-32696.2	-23.0	12986.1	-49.25	-0.65	-13.39
11900.0	929.804	26.587	3478.504	-32794.9	-24.4	12959.5	-49.42	-0.68	-13.27
11902.0	918.993	26.579	3482.765	-32893.8	-25.7	12933.1	-49.56	-0.68	-13.15
11904.0	908.149	26.570	3487.018	-32993.0	-27.1	12906.9	-49.71	-0.68	-13.03
11906.0	897.273	26.561	3491.262	-33092.5	-28.4	12880.9	-49.85	-0.68	-12.91
	S-IVB SECOND GUIDANCE CUTOFF								
11907.640	888.330	26.553	3494.735	-33174.2	-29.5	12859.9	-49.91	-0.80	-12.87
11908.0	886.365	26.551	3495.497	-33185.6	-29.6	12852.8	-13.48	0.29	-25.99
11910.0	875.442	26.542	3499.717	-33202.9	-30.3	12796.9	-7.10	-0.20	-28.51
11912.0	864.511	26.532	3503.920	-33217.0	-30.6	12739.8	-7.03	-0.20	-28.52
11914.0	853.575	26.522	3508.104	-33230.9	-31.0	12682.8	-6.96	-0.19	-28.53
11916.0	842.634	26.511	3512.269	-33244.7	-31.4	12625.7	-6.84	-0.21	-28.50
	TRANSLUNAR INJECTION								
11917.640	933.660	26.503	3515.671	-33255.8	-31.8	12579.1	-6.76	-0.21	-28.49
11950.0	656.009	26.316	3580.215	-33449.4	-38.6	11659.8	-5.22	-0.22	-28.34
12000.0	379.845	25.955	3670.357	-33651.3	-49.1	10252.5	-2.90	-0.21	-27.89
12050.0	102.487	25.509	3749.034	-33741.2	-59.1	8875.8	-0.75	-0.20	-27.13
12100.0	-175.183	24.994	3816.555	-33728.8	-68.5	7543.3	1.19	-0.19	-26.13

TABLE C-VI. LAUNCH VEHICLE NAVIGATION POSITIONS, VELOCITIES, AND ACCELERATIONS - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

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
12150.0	-452.366	24.383	3873.332	-33624.8	-77.4	6266.0	2.90	-0.18	-24.93
12200.0	-728.358	23.712	3919.855	-33441.2	-85.6	5052.0	4.38	-0.17	-23.61
12250.0	-1002.551	22.976	3956.665	-33189.7	-93.2	3906.4	5.62	-0.15	-22.21
12300.0	-1274.435	22.180	3984.340	-32881.8	-100.1	2831.8	6.63	-0.14	-20.77
12350.0	-1543.590	21.330	4003.468	-32528.2	-106.4	1829.0	7.44	-0.13	-19.34
12400.0	-1809.682	20.431	4014.637	-32138.7	-112.1	897.2	8.07	-0.12	-17.94
12450.0	-2072.451	19.487	4018.423	-31721.9	-117.2	34.3	8.54	-0.11	-16.58
12500.0	-2331.703	18.503	4015.382	-31285.1	-121.8	-762.7	8.87	-0.10	-15.30
12550.0	-2587.301	17.483	4006.042	-30834.8	-125.9	-1497.2	9.08	-0.09	-14.09
12600.0	-2839.156	16.432	3990.902	-30376.3	-129.6	-2173.1	9.20	-0.08	-12.95
12650.0	-3087.219	15.352	3970.427	-29913.9	-132.9	-2794.4	9.23	-0.08	-11.90
12700.0	-3331.475	14.246	3945.052	-29451.3	-135.8	-3364.9	9.21	-0.07	-10.93
12750.0	-3571.933	13.118	3915.176	-28991.4	-138.3	-3888.7	9.13	-0.06	-10.03
12800.0	-3808.626	11.970	3881.170	-28536.5	-140.6	-4369.4	9.01	-0.06	-9.20
12850.0	-4041.601	10.806	3843.374	-28088.2	-142.3	-4810.5	8.86	-0.05	-8.44
12900.0	-4270.921	9.629	3802.098	-27648.1	-143.7	-5215.4	8.68	-0.04	-7.75
12950.0	-4496.655	8.442	3757.630	-27217.0	-144.8	-5587.1	8.49	-0.04	-7.12
13000.0	-4718.883	7.245	3710.229	-26795.8	-145.8	-5928.5	8.29	-0.04	-6.54
13050.0	-4937.686	6.042	3660.135	-26384.9	-146.6	-6242.2	8.07	-0.04	-6.01
13100.0	-5153.152	4.832	3607.566	-25984.7	-147.3	-6530.5	7.86	-0.03	-5.52
13150.0	-5365.369	3.618	3552.720	-25595.3	-147.8	-6795.6	7.64	-0.03	-5.08
13200.0	-5574.426	2.400	3495.782	-25216.7	-148.3	-7039.6	7.42	-0.03	-4.67
13250.0	-5780.411	1.178	3436.916	-24848.8	-148.6	-7264.2	7.21	-0.03	-4.30
13300.0	-5983.414	-0.046	3376.276	-24491.7	-148.8	-7471.1	6.99	-0.03	-3.96
CSM SEPARATION									
13347.600	-6173.972	-1.213	3317.025	-24161.4	-148.9	-7653.0	6.79	-0.03	-3.67

TABLE C-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN AND TRANSLUNAR PHASES

TIME SEC	GC DIST NM	LONG DEG E	DEC 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 TIMEBASE 6										
10978.600	3539.498	-116.8998	27.8409	96.81	0.01	24204.8	96.45	0.01	25582.3	596017
10980.0	3539.501	-116.7984	27.8301	96.87	0.01	24204.8	96.50	0.01	25582.3	596023
10990.0	3539.507	-116.0750	27.7509	97.25	0.01	24204.9	96.85	0.01	25582.3	595984
11000.0	3539.514	-115.3528	27.6674	97.62	0.01	24205.0	97.21	0.01	25582.3	595938
11010.0	3539.520	-114.6317	27.5798	98.00	0.01	24205.1	97.56	0.01	25582.4	595887
11020.0	3539.526	-113.9119	27.4880	98.37	0.01	24205.2	97.92	0.01	25582.4	595829
11030.0	3539.531	-113.1934	27.3920	98.74	0.01	24205.3	98.27	0.01	25582.4	595766
11040.0	3539.536	-112.4762	27.2920	99.11	0.01	24205.4	98.62	0.01	25582.5	595696
11050.0	3539.541	-111.7604	27.1878	99.48	0.01	24205.5	98.97	0.01	25582.5	595621
11060.0	3539.545	-111.0461	27.0795	99.85	0.01	24205.6	99.31	0.01	25582.5	595540
11070.0	3539.549	-110.3333	26.9673	100.21	0.01	24205.8	99.66	0.01	25582.6	595453
11080.0	3539.553	-109.6220	26.8509	100.57	0.01	24205.9	100.00	0.00	25582.7	595360
11090.0	3539.556	-108.9122	26.7306	100.93	0.00	24206.1	100.34	0.00	25582.7	595261
11100.0	3539.559	-108.2041	26.6064	101.29	0.00	24206.2	100.67	0.00	25582.8	595157
11110.0	3539.562	-107.4977	26.4782	101.64	0.00	24206.4	101.01	0.00	25582.9	595048
11120.0	3539.564	-106.7929	26.3461	102.00	0.00	24206.6	101.34	0.00	25582.9	594932
11130.0	3539.566	-106.0899	26.2101	102.35	0.00	24206.7	101.67	0.00	25583.0	594812
11140.0	3539.568	-105.3886	26.0703	102.69	0.00	24206.9	102.00	0.00	25583.1	594686
11150.0	3539.569	-104.6891	25.9267	103.04	0.00	24207.1	102.33	0.00	25583.2	594555
11160.0	3539.570	-103.9914	25.7793	103.38	0.00	24207.3	102.65	0.00	25583.3	594419
11170.0	3539.571	-103.2956	25.6282	103.72	0.00	24207.5	102.97	0.00	25583.4	594277
11180.0	3539.571	-102.6017	25.4734	104.06	0.00	24207.8	103.29	0.00	25583.5	594131
11190.0	3539.571	-101.9097	25.3149	104.39	-0.00	24208.0	103.60	-0.00	25583.6	593980
11200.0	3539.571	-101.2197	25.1528	104.73	-0.00	24208.2	103.92	-0.00	25583.7	593823
11210.0	3539.570	-100.5316	24.9870	105.05	-0.00	24208.4	104.23	-0.00	25583.8	593662
11220.0	3539.569	-99.8454	24.8178	105.38	-0.00	24208.7	104.53	-0.00	25584.0	593497
11230.0	3539.567	-99.1613	24.6450	105.70	-0.00	24208.9	104.84	-0.00	25584.1	593326
11240.0	3539.565	-98.4793	24.4687	106.02	-0.00	24209.2	105.14	-0.00	25584.2	593152
11250.0	3539.563	-97.7992	24.2889	106.34	-0.00	24209.5	105.44	-0.00	25584.4	592973
11260.0	3539.561	-97.1212	24.1058	106.65	-0.00	24209.7	105.73	-0.00	25584.5	592789
11270.0	3539.558	-96.4453	23.9193	106.96	-0.00	24210.0	106.03	-0.00	25584.6	592601
11280.0	3539.555	-95.7715	23.7294	107.27	-0.00	24210.3	106.32	-0.00	25584.8	592410
11290.0	3539.551	-95.0998	23.5363	107.58	-0.01	24210.6	106.60	-0.01	25584.9	592214
11300.0	3539.547	-94.4302	23.3399	107.88	-0.01	24210.8	106.89	-0.01	25585.1	592014
11310.0	3539.543	-93.7627	23.1403	108.18	-0.01	24211.1	107.17	-0.01	25585.2	591811
11320.0	3539.538	-93.0973	22.9375	108.47	-0.01	24211.4	107.45	-0.01	25585.4	591603
11330.0	3539.533	-92.4340	22.7316	108.76	-0.01	24211.7	107.72	-0.01	25585.6	591393
11340.0	3539.528	-91.7729	22.5226	109.05	-0.01	24212.0	107.99	-0.01	25585.7	591178
11350.0	3539.523	-91.1139	22.3105	109.34	-0.01	24212.3	108.26	-0.01	25585.9	590961
11360.0	3539.517	-90.4571	22.0954	109.62	-0.01	24212.7	108.52	-0.01	25586.1	590740

TABLE C-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE FT
11370.0	3539.510	-89.8024	21.8774	109.89	-0.01	24213.0	108.79	-0.01	25586.2	590515
11380.0	3539.504	-89.1498	21.6564	110.17	-0.01	24213.3	109.04	-0.01	25586.4	590288
11390.0	3539.497	-88.4994	21.4326	110.44	-0.01	24213.6	109.30	-0.01	25586.6	590058
11400.0	3539.490	-87.8511	21.2059	110.71	-0.01	24213.9	109.55	-0.01	25586.9	589825
11410.0	3539.482	-87.2049	20.9764	110.97	-0.01	24214.3	109.80	-0.01	25587.0	589589
11420.0	3539.474	-86.5608	20.7441	111.23	-0.01	24214.6	110.04	-0.01	25587.2	589350
11430.0	3539.466	-85.9189	20.5091	111.49	-0.01	24215.0	110.28	-0.01	25587.4	589109
11440.0	3539.457	-85.2790	20.2715	111.74	-0.01	24215.3	110.52	-0.01	25587.6	588866
11450.0	3539.448	-84.6413	20.0312	111.99	-0.01	24215.7	110.76	-0.01	25587.8	588620
11460.0	3539.438	-84.0056	19.7883	112.24	-0.01	24216.1	110.99	-0.01	25588.0	588372
11470.0	3539.429	-83.3720	19.5428	112.48	-0.01	24216.5	111.22	-0.01	25588.3	588122
11480.0	3539.419	-82.7404	19.2949	112.72	-0.01	24216.9	111.44	-0.01	25588.5	587870
11490.0	3539.408	-82.1109	19.0444	112.96	-0.02	24217.3	111.66	-0.01	25588.9	587616
11500.0	3539.398	-81.4834	18.7916	113.19	-0.02	24217.7	111.88	-0.01	25589.1	587360
11510.0	3539.386	-80.8579	18.5363	113.42	-0.02	24217.9	112.09	-0.02	25589.1	587099
11520.0	3539.374	-80.2345	18.2787	113.64	-0.02	24218.1	112.30	-0.02	25589.2	586837
11530.0	3539.361	-79.6130	18.0188	113.86	-0.02	24218.4	112.51	-0.02	25589.3	586570
11540.0	3539.348	-78.9935	17.7567	114.08	-0.02	24218.5	112.72	-0.02	25589.3	586299
11550.0	3539.333	-78.3759	17.4923	114.29	-0.02	24218.7	112.92	-0.02	25589.3	586024
	S-IVB SECOND IGNITION (STDV OPEN)									
11556.600	3539.323	-77.9693	17.3166	114.43	-0.02	24218.9	113.05	-0.02	25589.4	585839
11558.0	3539.321	-77.8832	17.2792	114.46	-0.02	24223.4	113.07	-0.02	25593.9	585801
11560.0	3539.318	-77.7601	17.2257	114.50	-0.02	24252.9	113.11	-0.02	25623.4	585746
11562.0	3539.315	-77.6369	17.1720	114.54	-0.02	24289.5	113.15	-0.02	25660.0	585691
11564.0	3539.313	-77.5136	17.1182	114.58	-0.02	24326.9	113.19	-0.02	25697.4	585638
11566.0	3539.310	-77.3902	17.0642	114.62	-0.02	24364.6	113.23	-0.02	25735.1	585586
11568.0	3539.308	-77.2667	17.0100	114.66	-0.02	24402.4	113.27	-0.01	25772.8	585536
11570.0	3539.306	-77.1431	16.9557	114.70	-0.02	24440.4	113.30	-0.02	25810.9	585485
11572.0	3539.304	-77.0193	16.9012	114.73	-0.02	24479.5	113.34	-0.02	25849.9	585433
11574.0	3539.301	-76.8954	16.8466	114.77	-0.02	24516.8	113.38	-0.02	25887.3	585378
11576.0	3539.297	-76.7714	16.7917	114.81	-0.03	24555.3	113.41	-0.02	25925.8	585319
11578.0	3539.293	-76.6473	16.7368	114.84	-0.03	24594.0	113.45	-0.03	25964.4	585258
11580.0	3539.289	-76.5231	16.6816	114.88	-0.03	24632.7	113.49	-0.03	26003.2	585195
11582.0	3539.285	-76.3987	16.6263	114.92	-0.03	24671.7	113.52	-0.03	26042.1	585130
11584.0	3539.280	-76.2742	16.5708	114.95	-0.04	24710.7	113.56	-0.03	26081.1	585063
11586.0	3539.275	-76.1496	16.5152	114.99	-0.04	24749.9	113.60	-0.03	26120.3	584995
11588.0	3539.269	-76.0248	16.4594	115.03	-0.04	24789.2	113.64	-0.03	26159.6	584926
11590.0	3539.264	-75.9000	16.4034	115.07	-0.04	24828.6	113.67	-0.03	26199.0	584857
11592.0	3539.259	-75.7750	16.3473	115.10	-0.04	24868.2	113.71	-0.03	26238.6	584788
11594.0	3539.254	-75.6499	16.2910	115.14	-0.04	24907.8	113.75	-0.03	26278.2	584719
11596.0	3539.249	-75.5246	16.2345	115.18	-0.03	24947.6	113.78	-0.03	26318.0	584651

TABLE C-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE FT
11598.0	3539.244	-75.3993	16.1779	115.21	-0.03	24987.5	113.82	-0.03	26357.9	584593
11600.0	3539.239	-75.2738	16.1211	115.25	-0.03	25027.6	113.86	-0.03	26397.9	584518
11602.0	3539.235	-75.1482	16.0641	115.29	-0.03	25067.7	113.89	-0.03	26438.1	584454
11604.0	3539.231	-75.0224	16.0070	115.32	-0.03	25107.9	113.93	-0.02	26478.3	584392
11606.0	3539.227	-74.8965	15.9497	115.36	-0.02	25148.3	113.97	-0.02	26518.6	584334
11608.0	3539.224	-74.7705	15.8922	115.40	-0.02	25188.7	114.00	-0.02	26559.0	584278
11610.0	3539.222	-74.6444	15.8345	115.43	-0.01	25229.2	114.04	-0.01	26599.5	584227
11612.0	3539.220	-74.5181	15.7767	115.47	-0.01	25269.9	114.08	-0.01	26640.2	584179
11614.0	3539.219	-74.3918	15.7187	115.51	-0.00	25310.7	114.11	-0.00	26681.0	584136
11616.0	3539.219	-74.2652	15.6605	115.54	0.00	25351.6	114.15	0.00	26721.9	584098
11618.0	3539.220	-74.1386	15.6022	115.58	0.01	25392.7	114.18	0.01	26763.0	584065
11620.0	3539.221	-74.0118	15.5437	115.62	0.02	25433.9	114.22	0.01	26804.1	584038
11622.0	3539.224	-73.8849	15.4850	115.65	0.02	25475.2	114.26	0.02	26845.4	584018
11624.0	3539.228	-73.7578	15.4261	115.69	0.03	25516.6	114.29	0.03	26886.8	584005
11626.0	3539.233	-73.6307	15.3671	115.72	0.04	25558.1	114.33	0.04	26928.3	583998
11628.0	3539.240	-73.5034	15.3079	115.76	0.05	25599.7	114.36	0.05	26970.0	584000
11630.0	3539.247	-73.3759	15.2485	115.80	0.06	25641.5	114.40	0.05	27011.7	584010
11632.0	3539.257	-73.2483	15.1890	115.83	0.07	25683.4	114.43	0.06	27053.6	584029
11634.0	3539.267	-73.1206	15.1293	115.87	0.08	25725.4	114.47	0.07	27095.6	584056
11636.0	3539.280	-72.9928	15.0694	115.90	0.09	25767.4	114.51	0.08	27137.6	584094
11638.0	3539.293	-72.8648	15.0093	115.94	0.10	25809.6	114.54	0.09	27179.9	584142
11640.0	3539.309	-72.7367	14.9491	115.97	0.11	25852.0	114.58	0.11	27222.1	584200
11642.0	3539.327	-72.6085	14.8887	116.01	0.12	25894.4	114.61	0.12	27264.6	584270
11644.0	3539.346	-72.4801	14.8281	116.04	0.14	25937.0	114.65	0.13	27307.2	584352
11646.0	3539.368	-72.3516	14.7673	116.08	0.15	25979.7	114.68	0.14	27349.8	584446
11648.0	3539.392	-72.2229	14.7064	116.11	0.17	26022.4	114.72	0.16	27392.6	584553
11650.0	3539.417	-72.0941	14.6453	116.15	0.18	26065.7	114.75	0.17	27435.8	584673
11652.0	3539.445	-71.9652	14.5840	116.19	0.19	26115.0	114.78	0.18	27485.2	584806
11654.0	3539.476	-71.8360	14.5225	116.21	0.21	26164.5	114.82	0.20	27534.7	584954
11656.0	3539.508	-71.7067	14.4608	116.25	0.23	26214.2	114.85	0.21	27584.4	585116
11658.0	3539.544	-71.5773	14.3989	116.28	0.24	26264.0	114.89	0.23	27634.2	585294
11660.0	3539.582	-71.4477	14.3369	116.31	0.26	26313.9	114.92	0.25	27684.1	585488
11662.0	3539.622	-71.3179	14.2746	116.35	0.28	26363.9	114.95	0.26	27734.1	585699
11664.0	3539.666	-71.1879	14.2122	116.38	0.30	26414.1	114.99	0.28	27784.3	585925
11666.0	3539.712	-71.0577	14.1496	116.41	0.31	26464.3	115.02	0.30	27835.0	586170
11668.0	3539.761	-70.9274	14.0867	116.45	0.33	26515.4	115.05	0.32	27885.6	586434
11670.0	3539.814	-70.7969	14.0237	116.48	0.35	26566.2	115.09	0.34	27936.4	586716
11672.0	3539.870	-70.6663	13.9605	116.51	0.38	26617.1	115.12	0.36	27987.4	587018
11674.0	3539.929	-70.5354	13.8971	116.55	0.40	26668.2	115.15	0.38	28038.5	587341
11676.0	3539.991	-70.4044	13.8335	116.58	0.42	26719.4	115.19	0.40	28089.7	587684
11678.0	3540.057	-70.2732	13.7697	116.61	0.44	26770.9	115.22	0.42	28141.2	588049
11680.0	3540.127	-70.1418	13.7058	116.64	0.46	26822.5	115.25	0.44	28192.9	588437
11682.0	3540.201	-70.0103	13.6416	116.68	0.49	26874.3	115.29	0.47	28244.6	588847

TABLE C-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE FT
11684.0	3540.278	-69.8786	13.5772	116.71	0.51	26926.2	115.32	0.49	28296.5	589282
11686.0	3540.360	-69.7467	13.5127	116.74	0.54	26978.3	115.35	0.51	28348.6	589740
11688.0	3540.445	-69.6146	13.4479	116.77	0.56	27030.6	115.38	0.54	28401.0	590224
11690.0	3540.535	-69.4823	13.3830	116.80	0.59	27083.1	115.42	0.56	28453.5	590734
11692.0	3540.629	-69.3499	13.3178	116.83	0.62	27135.8	115.45	0.59	28506.2	591271
11694.0	3540.728	-69.2173	13.2525	116.87	0.65	27188.6	115.48	0.62	28559.1	591834
11696.0	3540.831	-69.0845	13.1869	116.90	0.67	27241.6	115.51	0.64	28612.1	592426
11698.0	3540.939	-68.9515	13.1212	116.93	0.70	27294.8	115.55	0.67	28665.4	593046
11700.0	3541.052	-68.8183	13.0553	116.96	0.73	27348.2	115.58	0.70	28718.8	593696
11702.0	3541.170	-68.6850	12.9891	116.99	0.76	27401.8	115.61	0.73	28772.4	594376
11704.0	3541.293	-68.5514	12.9228	117.02	0.80	27455.6	115.64	0.76	28826.2	595087
11706.0	3541.421	-68.4177	12.8563	117.05	0.83	27509.5	115.67	0.79	28880.2	595829
11708.0	3541.554	-68.2838	12.7896	117.08	0.86	27563.6	115.70	0.82	28934.3	596604
11710.0	3541.693	-68.1497	12.7227	117.11	0.89	27617.9	115.73	0.85	28988.6	597412
11712.0	3541.837	-68.0154	12.6555	117.14	0.93	27672.0	115.77	0.88	29043.2	598253
11714.0	3541.987	-67.8810	12.5882	117.17	0.96	27727.1	115.80	0.91	29097.9	599130
11716.0	3542.143	-67.7463	12.5207	117.20	0.99	27782.1	115.83	0.95	29152.9	600041
11718.0	3542.305	-67.6115	12.4530	117.23	1.03	27837.2	115.86	0.98	29208.1	600989
11720.0	3542.473	-67.4765	12.3851	117.26	1.07	27892.5	115.89	1.02	29263.4	601974
11722.0	3542.647	-67.3413	12.3170	117.29	1.10	27947.9	115.92	1.05	29318.9	602997
11724.0	3542.827	-67.2059	12.2487	117.32	1.14	28003.6	115.95	1.09	29374.7	604058
11726.0	3543.014	-67.0703	12.1802	117.35	1.18	28059.5	115.98	1.12	29430.6	605158
11728.0	3543.207	-66.9345	12.1114	117.38	1.22	28115.5	116.01	1.16	29486.6	606299
11730.0	3543.407	-66.7985	12.0425	117.41	1.26	28171.7	116.04	1.20	29542.9	607480
11732.0	3543.614	-66.6623	11.9734	117.44	1.30	28228.1	116.07	1.24	29599.3	608703
11734.0	3543.828	-66.5260	11.9041	117.47	1.34	28284.7	116.10	1.28	29656.0	609969
11736.0	3544.049	-66.3894	11.8346	117.50	1.38	28341.5	116.13	1.32	29712.9	611277
11738.0	3544.278	-66.2527	11.7649	117.53	1.42	28398.5	116.16	1.36	29770.0	612630
11740.0	3544.514	-66.1158	11.6950	117.55	1.46	28455.7	116.19	1.40	29827.3	614028
11742.0	3544.757	-65.9786	11.6249	117.58	1.51	28513.2	116.22	1.44	29884.8	615472
11744.0	3545.008	-65.8413	11.5545	117.61	1.55	28570.9	116.25	1.48	29942.5	616963
11746.0	3545.266	-65.7038	11.4840	117.64	1.60	28628.7	116.27	1.52	30000.4	618501
11748.0	3545.533	-65.5661	11.4133	117.67	1.64	28686.9	116.30	1.57	30058.6	620088
11750.0	3545.808	-65.4282	11.3424	117.69	1.69	28745.0	116.33	1.61	30116.9	621723
11752.0	3546.091	-65.2901	11.2712	117.72	1.74	28803.5	116.36	1.66	30175.4	623409
11754.0	3546.382	-65.1517	11.1999	117.75	1.78	28862.2	116.39	1.70	30234.2	625146
11756.0	3546.682	-65.0132	11.1284	117.78	1.83	28921.1	116.42	1.75	30293.2	626935
11758.0	3546.991	-64.8745	11.0567	117.80	1.88	28980.2	116.44	1.79	30352.4	628776
11760.0	3547.308	-64.7356	10.9847	117.83	1.93	29039.6	116.47	1.84	30411.8	630671
11762.0	3547.634	-64.5965	10.9126	117.86	1.98	29099.1	116.50	1.89	30471.4	632621
11764.0	3547.970	-64.4572	10.8402	117.88	2.03	29158.8	116.53	1.94	30531.2	634625
11766.0	3548.314	-64.3177	10.7677	117.91	2.08	29218.7	116.55	1.99	30591.2	636686
11768.0	3548.668	-64.1780	10.6950	117.94	2.13	29278.9	116.58	2.04	30651.5	638804

TABLE C-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE FT
11770.0	3549.032	-64.0381	10.6220	117.96	2.19	29339.3	116.61	2.09	30712.0	640981
11772.0	3549.405	-63.8980	10.5489	117.99	2.24	29400.0	116.64	2.14	30772.8	643216
11774.0	3549.788	-63.7577	10.4755	118.01	2.29	29460.9	116.66	2.19	30833.8	645511
11776.0	3550.181	-63.6172	10.4019	118.04	2.35	29522.0	116.69	2.24	30895.0	647868
11778.0	3550.584	-63.4765	10.3282	118.07	2.40	29583.3	116.72	2.30	30956.4	650286
11780.0	3550.998	-63.3356	10.2542	118.09	2.46	29644.9	116.74	2.35	31018.1	652766
11782.0	3551.422	-63.1944	10.1800	118.12	2.52	29706.7	116.77	2.40	31080.1	655311
11784.0	3551.857	-63.0531	10.1057	118.14	2.57	29768.8	116.79	2.46	31142.3	657920
11786.0	3552.302	-62.9116	10.0311	118.17	2.63	29831.1	116.82	2.52	31204.7	660594
11788.0	3552.758	-62.7698	9.9563	118.19	2.69	29893.7	116.85	2.57	31267.3	663335
11790.0	3553.226	-62.6279	9.8813	118.21	2.75	29956.4	116.87	2.63	31330.2	666144
11792.0	3553.704	-62.4857	9.8062	118.24	2.81	30019.3	116.90	2.69	31393.2	669021
11794.0	3554.194	-62.3434	9.7308	118.26	2.87	30082.5	116.92	2.74	31456.5	671967
11796.0	3554.696	-62.2008	9.6552	118.29	2.93	30146.0	116.95	2.80	31520.1	674984
11798.0	3555.209	-62.0580	9.5794	118.31	2.99	30209.7	116.97	2.86	31584.0	678072
11800.0	3555.734	-61.9150	9.5034	118.33	3.05	30273.8	117.00	2.92	31648.2	681232
11802.0	3556.271	-61.7718	9.4272	118.36	3.12	30338.0	117.02	2.98	31712.6	684465
11804.0	3556.820	-61.6284	9.3508	118.38	3.18	30402.6	117.05	3.04	31777.3	687772
11806.0	3557.382	-61.4848	9.2742	118.40	3.25	30467.4	117.07	3.11	31842.2	691154
11808.0	3557.956	-61.3409	9.1974	118.43	3.31	30532.5	117.09	3.17	31907.4	694612
11810.0	3558.543	-61.1969	9.1203	118.45	3.38	30597.8	117.12	3.23	31972.9	698148
11812.0	3559.143	-61.0526	9.0431	118.47	3.44	30663.4	117.14	3.29	32038.7	701761
11814.0	3559.755	-60.9082	8.9657	118.49	3.51	30729.3	117.16	3.36	32104.7	705454
11816.0	3560.381	-60.7635	8.8881	118.52	3.58	30795.4	117.19	3.42	32171.0	709226
11818.0	3561.020	-60.6186	8.8103	118.54	3.64	30861.8	117.21	3.49	32237.5	713080
11820.0	3561.672	-60.4735	8.7322	118.56	3.71	30928.5	117.23	3.56	32304.3	717016
11822.0	3562.339	-60.3281	8.6540	118.58	3.78	30995.5	117.26	3.62	32371.5	721035
11824.0	3563.019	-60.1826	8.5756	118.60	3.85	31062.7	117.28	3.69	32439.9	725138
11826.0	3563.713	-60.0368	8.4969	118.62	3.92	31130.4	117.30	3.76	32506.7	729327
11828.0	3564.421	-59.8908	8.4181	118.64	3.99	31198.3	117.32	3.82	32574.8	733601
11830.0	3565.143	-59.7446	8.3391	118.67	4.07	31266.5	117.35	3.89	32643.2	737963
11832.0	3565.880	-59.5982	8.2598	118.69	4.14	31334.9	117.37	3.96	32711.7	742413
11834.0	3566.632	-59.4516	8.1804	118.71	4.21	31403.5	117.39	4.03	32780.5	746952
11836.0	3567.398	-59.3047	8.1007	118.73	4.28	31472.4	117.41	4.10	32849.6	751581
11838.0	3568.179	-59.1577	8.0209	118.75	4.36	31541.7	117.43	4.18	32919.1	756302
11840.0	3568.976	-59.0104	7.9408	118.77	4.43	31611.3	117.45	4.25	32988.9	761115
11842.0	3569.788	-58.8629	7.8606	118.79	4.51	31681.3	117.47	4.32	33059.1	766021
11844.0	3570.615	-58.7151	7.7802	118.81	4.58	31751.7	117.49	4.39	33129.6	771022
11846.0	3571.458	-58.5672	7.6995	118.82	4.66	31822.4	117.52	4.47	33200.6	776118
11848.0	3572.317	-58.4190	7.6187	118.84	4.74	31893.6	117.54	4.54	33271.9	781311
11850.0	3573.192	-58.2706	7.5376	118.86	4.81	31965.1	117.56	4.61	33343.6	786601
11852.0	3574.084	-58.1219	7.4564	118.88	4.89	32036.9	117.58	4.69	33415.6	791990
11854.0	3574.991	-57.9731	7.3749	118.90	4.97	32109.2	117.60	4.77	33488.1	797479

TABLE C-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE FT
11856.0	3575.915	-57.8240	7.2933	118.92	5.05	32181.8	117.61	4.84	33561.0	803067
11858.0	3576.856	-57.6717	7.2114	118.94	5.13	32254.8	117.63	4.92	33634.1	808758
11860.0	3577.813	-57.5252	7.1293	118.95	5.21	32328.1	117.65	5.00	33707.7	814551
11862.0	3578.788	-57.3754	7.0471	118.97	5.29	32401.8	117.67	5.07	33781.6	820448
11864.0	3579.780	-57.2254	6.9646	118.99	5.37	32476.0	117.69	5.15	33856.0	826450
11866.0	3580.789	-57.0752	6.8820	119.00	5.45	32550.5	117.71	5.23	33930.7	832557
11868.0	3581.815	-56.9247	6.7991	119.02	5.53	32625.4	117.73	5.31	34005.8	838771
11870.0	3582.860	-56.7740	6.7161	119.04	5.62	32700.6	117.75	5.39	34081.3	845093
11872.0	3583.922	-56.6231	6.6328	119.05	5.70	32776.3	117.76	5.47	34157.1	851523
11874.0	3585.002	-56.4720	6.5494	119.07	5.78	32852.3	117.78	5.55	34233.4	858063
11876.0	3586.100	-56.3206	6.4658	119.09	5.86	32928.8	117.80	5.63	34310.1	864713
11878.0	3587.217	-56.1689	6.3819	119.10	5.95	33005.7	117.82	5.71	34387.3	871475
11880.0	3588.352	-56.0171	6.2979	119.12	6.03	33083.0	117.83	5.79	34464.8	878350
11882.0	3589.506	-55.8650	6.2136	119.13	6.12	33160.6	117.85	5.87	34542.7	885338
11884.0	3590.678	-55.7127	6.1292	119.15	6.20	33238.6	117.87	5.95	34621.0	892439
11886.0	3591.869	-55.5601	6.0446	119.16	6.28	33317.0	117.88	6.03	34699.6	899650
11888.0	3593.077	-55.4073	5.9597	119.18	6.36	33395.8	117.90	6.11	34778.7	906972
11890.0	3594.304	-55.2542	5.8747	119.19	6.44	33475.0	117.91	6.19	34858.2	914406
11892.0	3595.550	-55.1009	5.7895	119.20	6.53	33554.7	117.93	6.27	34938.1	921955
11894.0	3596.815	-54.9474	5.7041	119.22	6.61	33634.8	117.94	6.35	35018.5	929619
11896.0	3598.099	-54.7936	5.6185	119.23	6.69	33715.4	117.96	6.43	35099.4	937400
11898.0	3599.403	-54.6396	5.5327	119.24	6.78	33796.4	117.97	6.51	35180.7	945300
11900.0	3600.726	-54.4853	5.4466	119.26	6.87	33878.0	117.99	6.60	35262.6	953321
11902.0	3602.070	-54.3308	5.3605	119.27	6.96	33960.1	118.00	6.68	35345.0	961464
11904.0	3603.433	-54.1760	5.2741	119.28	7.04	34042.6	118.02	6.77	35427.8	969732
11906.0	3604.819	-54.0210	5.1875	119.29	7.13	34125.6	118.03	6.85	35511.0	978125
	S-IVB 2ND BURN ENGINE CUTOFF (ENGINE SOLENOID)									
11907.640	3605.969	-53.8938	5.1163	119.30	7.21	34193.8	118.04	6.93	35579.5	985101
11908.0	3606.223	-53.8658	5.1007	119.31	7.22	34201.9	118.04	6.94	35587.7	986645
11910.0	3607.648	-53.7106	5.0139	119.32	7.32	34197.6	118.06	7.03	35593.6	995281
11912.0	3609.091	-53.5555	4.9271	119.34	7.41	34190.0	118.07	7.12	35576.3	1004032
11914.0	3610.552	-53.4005	4.8403	119.35	7.51	34182.4	118.08	7.21	35569.9	1012892
11916.0	3612.031	-53.2458	4.7535	119.37	7.60	34174.7	118.10	7.30	35561.5	1021862
	TRANSLUNAR INJECTION									
11917.640	3613.258	-53.1190	4.6824	119.38	7.68	34168.3	118.11	7.38	35555.3	1029299
11950.0	3639.915	-50.6423	3.2850	119.59	9.20	34031.7	118.29	8.83	35423.4	1191031
12000.0	3690.051	-46.9111	1.1581	119.79	11.50	33777.8	118.44	11.04	35179.5	1495461
12050.0	3750.521	-43.3020	-0.9112	119.85	13.74	33477.7	118.45	13.17	34989.2	1862974
12100.0	3820.655	-39.9195	-2.9059	119.77	15.91	33138.1	118.33	15.23	34562.3	2289142

TABLE C-VII. GEOGRAPHIC POLAR COORDINATES - SECOND BURN AND TRANSLUNAR PHASES (CONTINUED)

TIME SEC	GC DIST NM	LONG DEG E	DEC DEG N	VEL-AZ DEG	VEL-EL DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	ALTITUDE FT
12150.0	3899.735	-36.4662	-4.9128	119.58	18.00	32765.9	118.09	17.22	34203.3	2769995
12200.0	3987.020	-33.2430	-6.6227	119.28	20.01	32367.6	117.74	19.12	33820.7	3303739
12250.0	4081.769	-30.1497	-8.3296	118.90	21.94	31949.4	117.31	20.93	33418.9	3877037
12300.0	4183.257	-27.1847	-9.9308	118.44	23.79	31516.9	116.81	22.66	33003.7	4494310
12350.0	4290.790	-24.3458	-11.4259	117.92	25.56	31075.0	116.24	24.30	32579.8	5148342
12400.0	4403.712	-21.6300	-12.8167	117.36	27.25	30628.0	115.62	25.86	32151.5	5835138
12450.0	4521.411	-19.0339	-14.1063	116.75	28.87	30179.5	114.97	27.	31722.1	6551062
12500.0	4643.326	-16.5534	-15.2990	116.11	30.41	29732.6	114.28	28.75	31294.6	7292550
12550.0	4768.942	-14.1846	-16.3997	115.45	31.88	29289.7	113.58	30.08	30871.4	8055518
12600.0	4897.793	-11.9230	-17.4138	114.77	33.29	28852.7	112.86	31.33	30454.2	8840125
12650.0	5029.458	-9.7644	-18.3470	114.08	34.64	28423.2	112.13	32.53	30044.4	9640810
12700.0	5163.561	-7.7043	-19.2047	113.39	35.93	28002.2	111.40	33.66	29643.3	10456274
12750.0	5299.762	-5.7387	-19.9926	112.70	37.16	27590.7	110.67	34.73	29251.4	11284463
12800.0	5437.762	-3.8621	-20.7159	112.00	38.35	27189.2	109.94	35.75	28869.4	12123544
12850.0	5577.291	-2.0715	-21.3797	111.32	39.48	26798.1	109.22	36.72	28497.5	12971883
12900.0	5718.112	-0.3623	-21.9888	110.64	40.57	26417.6	108.51	37.64	28136.3	13828047
12950.0	5860.014	1.2694	-22.5476	109.97	41.62	26047.8	107.81	38.51	27785.0	14690738
13000.0	6002.808	2.8275	-23.0603	109.31	42.64	25688.6	107.13	39.35	27444.2	15558823
13050.0	6146.330	4.3156	-23.5306	108.66	43.61	25340.0	106.45	40.14	27113.7	16431296
13100.0	6290.432	5.7372	-23.9621	108.03	44.56	25001.8	105.80	40.90	26793.2	17307267
13150.0	6434.984	7.0957	-24.3581	107.40	45.47	24673.8	105.15	41.62	26482.4	18185947
13200.0	6579.872	8.3943	-24.7215	106.79	46.35	24355.7	104.53	42.31	26181.3	19066641
13250.0	6724.994	9.6359	-25.0550	106.19	47.21	24047.3	103.92	42.97	25889.3	19948733
13300.0	6870.261	10.8235	-25.3612	105.61	48.04	23748.3	103.32	43.60	25606.3	20831690
	CSM SEPARATION									
13347.600	7008.608	11.9064	-25.6292	105.06	48.81	23472.0	102.77	44.18	25344.9	21672548