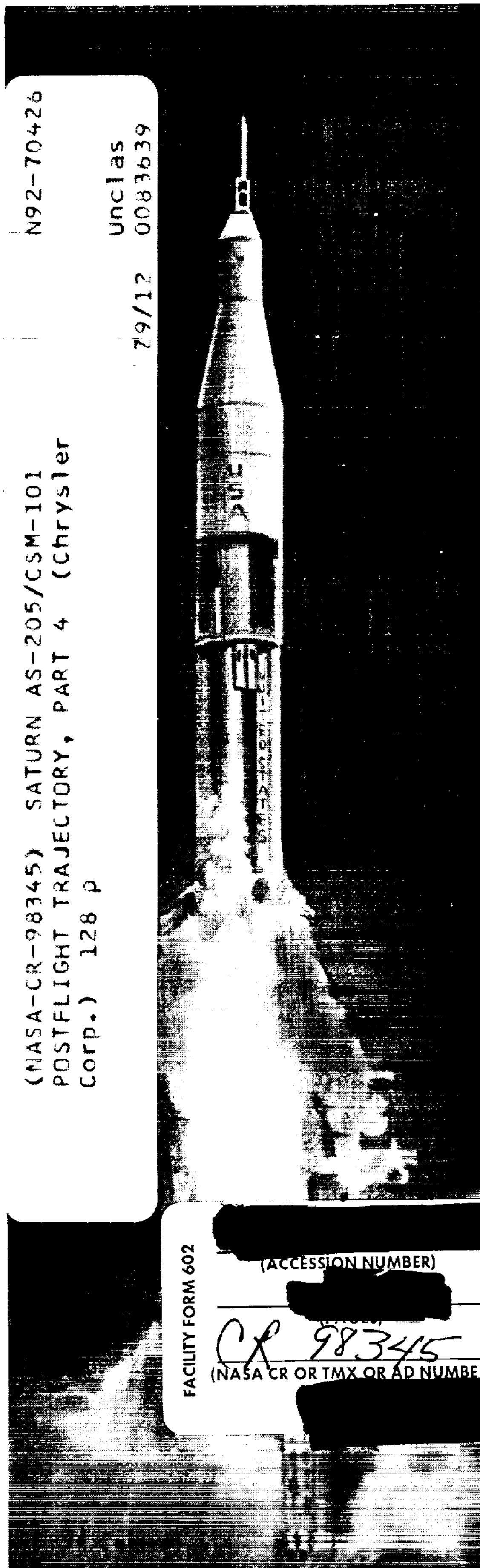

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SATURN AS-205/CSM-101 POSTFLIGHT TRAJECTORY

SPACE DIVISION CHRYSLER CORPORATION

TN-AP-68-369

SATURN AS-205/CSM-101 POSTFLIGHT TRAJECTORY

DECEMBER 1968

AEROSPACE PHYSICS BRANCH

CHRYSLER CORPORATION SPACE DIVISION

PREPARED BY:

THE TRAJECTORY RECONSTRUCTION UNIT

J. W. Nichols, Supervisor
Trajectory Reconstruction Unit

APPROVED: O. K. Jones

O. K. Jones, Managing Engineer
Postflight Evaluation Group

J. G. Swider

J. G. Swider, Manager
Flight Mechanics Section

R H Ross

R. H. Ross, Chief Engineer
Aerospace Physics Branch

FOREWORD

This report presents the postflight trajectory of the Saturn AS-205/CSM-101 vehicle from guidance reference release to S-IVB/CSM-101 separation. Included in the report is an analysis of the powered flight trajectory, orbital flight trajectory, orbital effects of the S-IVB propellant dump safing experiment, and the ballistic free flight to impact of the expended S-IB stage.

The trajectory determination and documentation were performed by the Aerospace Physics Branch of Chrysler Corporation Space Division in compliance with the work scope of contract NAS8-4016, Schedule II, Supplemented Agreement MSFC-1, Amendment 105, Paragraph 11.2, BB Item 3.1.5-4-202, Part IV.

Acknowledgements are made to the personnel of Marshall Space Flight Center, R-AERO-FFT, for their assistance and cooperation, and to the Dynamics Programming Unit of CCSD Computer Services for their invaluable assistance.

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SUMMARY

The manned Apollo Saturn Vehicle, AS-205/CSM-101, was launched from Cape Kennedy, Florida, at 10:02:45 A.M. EST, October 11, 1968. The primary mission was to flight test the manned Apollo Spacecraft. The actual flight trajectory was very close to the predicted nominal. This report presents the AS-205/CSM-101 postflight trajectory from guidance reference release to S-IVB/CSM-101 separation, and includes a discussion of the orbital effects due to the S-IVB safing experiment. The trajectory is presented in the earth-fixed plumbline, space-fixed ephemeris, and geographic coordinate systems. Time histories of trajectory parameters are given, in tabular form, at; 1.0 sec intervals from guidance reference release to S-IB/S-IVB separation, 5.0 sec intervals from S-IB/S-IVB separation to orbital insertion, and 50.0 sec intervals from insertion to S-IVB/CSM-101 separation. Also included is a tabulation at 10.0 sec intervals of the expended S-IB stage ballistic free flight trajectory to impact.

The trajectory was established from radar tracking data, telemetered guidance data from the ST-124 M guidance platform, and measured meteorological data. At S-IVB/CSM-101 separation (10502.4 sec), the vehicle space-fixed velocity was lower than predicted nominal by 7.6 m/s (24.9 ft/s). The altitude, at this point, was 6.6 km (3.6 nm) higher than nominal and the flight path angle was 0.02 deg lower than nominal.

1.0 INTRODUCTION

The manned Saturn IB vehicle, AS-205/CSM-101, was launched from KSC at 10:02:45 A.M. EST on October 11, 1968. The launch azimuth from pad 34 was 100 deg east of north. After approximately 10 sec of vertical rise, the vehicle began a roll maneuver to the flight azimuth of 72 deg east of north. Also at 10 sec, the down range pitch maneuver was started. The S-IVB stage and the Apollo 7 spacecraft with three Astronauts aboard were placed into an elliptical earth orbit for flight test of the manned Apollo configuration. A safing experiment (propellant dump) was conducted with the S-IVB stage during the first revolution and prior to S-IVB/CSM-101 separation. The S-IVB stage was separated from the manned spacecraft well into the second revolution as the vehicle approached Hawaii.

This report presents the postflight mass-point reference trajectory, and associated information, from guidance reference release (-4.972 sec) to S-IVB/CSM-101 separation (10502.4 sec). All times are referenced to the established Range Zero of 10:02:45 A.M. EST, unless otherwise specified. Comparison of this trajectory with the nominal is given for some specific parameters as indications of vehicle performance. Reference 1 provides documentation of the predicted nominal trajectory. Also presented in this report are details of available tracking data, the data utilization, an error analysis, the orbital determination, the orbital effects of the S-IVB safing experiment, and the expended S-IB stage ballistic free flight to impact. Accompaning the discussion are figures and tables of the trajectory data in both the metric and English units of measure.

2.0 COORDINATE SYSTEMS AND LAUNCH PARAMETERS

The translational motion of the vehicle's center of gravity is tabulated in three coordinate systems: earth-fixed plumbline, space-fixed ephemeris, and geographic. These coordinate systems conform to the "Project Apollo Coordinate System Standards" and are defined in Appendix A and graphically illustrated in Figure 1. The earth-fixed plumbline coordinate system has its origin located at the launch site on the reference earth model. In the earth-fixed system, the vehicle's center of gravity has an initial displacement of 34.7 m (113.8 ft) above the reference ellipsoid.

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

The geographic coordinates and gravity data for launch pad 34 at Cape Kennedy are:

Geodetic Latitude	28.521963 deg
Longitude	80.561141 deg
Acceleration of Gravity	9.818 m/sec^2 (32.21 ft/sec^2)

Elevation above the reference ellipsoid are:

Base of Launch Pedestal	5.7 m (18.7 ft)
C. G. at First Motion	34.7 m (113.8 ft)

Azimuth alignments are:

Launch Azimuth	100 deg E of N
Flight Azimuth	72 deg E of N
ST-124M Platform Azimuth	72 deg E of N

3.0 POWERED FLIGHT TRAJECTORY ANALYSIS

3.1 Data Sources

Tracking data from seven radar tracking stations and telemetered guidance data were available from first motion through insertion (S-IVB CO + 10 sec). The coverage of each tracking station is itemized in Table I and shown in Figure 2. The vehicle ground track relative to each tracking station is shown in Figure 3. The radar antenna location and the vehicle's center of gravity versus time are shown in Figure 4. The measured parameter data from each of the seven radar tracking sites are compared with the reference postflight trajectory in Figures 5 through 7.

3.1.1 PAFB Tracking Station (0.18)

Patrick Air Force Base radar produced data from 20 to 593 sec. The quality of these data were much higher than that received on the previous flight. The range data were much smoother and its maximum deviations were less than 10 m (33 ft) through the entire track. The angle data were also good with the magnitude of the maximum deviations being less than 0.03 deg.

3.1.2 Cape Tracking Station (1.16)

Cape Kennedy radar produced data from 0 to 603 sec with a 59 sec gap from 500 to 559 sec. These data matched the reference trajectory very closely with the exception of the initial 100 sec and final 44 sec of track where the largest angle and range deviations occurred. After the first 100 sec and prior to the gap, the deviations settled to an 8 m (26 ft) bias in range and the angle deviations were less than 0.01 deg. After the gap these data were rough and exhibited large deviations from the reference trajectory.

3.1.3 Merritt Island Tracking Station (19.18)

Merritt Island radar produced its usual good quality data with coverage from 11 to 606 sec. With the exception of large deviations early in the flight, the angle data agreed very well with the reference trajectory. The range was in close agreement with the reference trajectory, containing deviations of less than 10 m (33 ft) until the last 100 sec of track where the deviations tailed off to a maximum of approximately 20 m (66 ft).

3.1.4 Grand Bahama Tracking Station (3.18)

Grand Bahama radar produced a good set of tracking data from 96 to 584 sec. These data were very similar to that produced on the last flight. The azimuth and elevation were in close agreement with the reference trajectory, containing a bias of slightly less than 0.02 deg in elevation. The range data reveals excellent agreement with the reference trajectory, containing deviations of less than 15 m (49 ft) through the entire track.

3.1.5 Grand Turk Tracking Station (7.18)

Grand Turk radar produced data from 211 to 685 sec. The azimuth data received from Grand Turk were in excellent agreement with the reference trajectory, containing deviations of less than 0.01 deg throughout track. The elevation data were completely unusable and deviations were too large to be included in the measured parameter comparisons. The range data, although having large deviations from the reference trajectory at the beginning and ending of track, had deviations of less than 10 m (33 ft) for the major portion of track.

3.1.6 Bermuda Tracking Station (67.18)

Bermuda (FPQ-6) radar produced data from 0 to 689 sec although the data were not usable until 250 sec. The measured parameter deviations of this set of data exhibited the same characteristic deviations as on the previous flight. The azimuth data were in good agreement with the reference trajectory with maximum deviations being less than 0.03 deg. Deviations in elevation data were less than 0.03 deg with the exception of the first 50 sec of usable data. The range data were smooth and revealed maximum deviations of 45 m (148 ft).

3.1.7 Bermuda Tracking Station (67.16)

Bermuda (FPS-16) radar produced data from 0 to 689 sec. The angles and range measurements all exhibited very large deviations with respect to the reference trajectory. The azimuth data were the better of the three measurements. The range deviations were too large to be presented on the measured parameter comparisons with deviations up to 420 m (1378 ft). Although the parameter deviations were large they did appear to contain the characteristics of a station location error, as observed on the previous IB flight.

3.2 Trajectory Composition (Powered Flight)

Tracking data from C-band radars, covering the major portion of powered flight, were available for establishing the postflight trajectory. Telemetered guidance information and measured meteorological data were also received and utilized in the postflight trajectory determination.

The observed mass-point trajectory; often referred to as the postflight trajectory, the reference postflight trajectory, or the best estimate trajectory, was established by a composite fit of the radar tracking data.

The composite fit or best estimate trajectory is established through the utilization of a computer program called GATE. This program uses telemetered guidance velocity data as the generating parameter to compute a trajectory which will best fit the tracking data, yet retain the smoothness of the guidance data. The guidance data can vary only in accordance with an eighteen term error model and the variances assigned to each error coefficient. The error coefficients are determined using the Kalman linear filtering technique and applied to the telemetered guidance data to produce the final smooth and continuous trajectory. The GATE program also incorporates a ten term tracker error model through which the residuals between the tracking system and the reference postflight trajectory may be resolved. However, only the guidance error model was used to fit the data for this flight. See Reference 2 for further details of the GATE program.

3.3 Powered Flight Trajectory

A comparison of actual and nominal times at some significant flight events is presented in Table II. Altitude and surface range are graphically illustrated in Figures 8 and 9, respectively, for the entire powered flight. Figure 10 is an illustration of the total inertial acceleration profiles for the S-IB and S-IVB stages. The magnitude of the total earth-fixed velocity vector and the associated elevation angle, positive above the local horizontal, are shown in Figure 11. The magnitude of the space-fixed velocity vector and the angle between this vector and the local horizontal plane are shown in Figure 12. The Mach number and dynamic pressure parameters are shown during the S-IB powered flight in Figure 13.

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The meteorologically associated trajectory parameters were calculated using measured meteorological data for the day of launch. The measured data were furnished to an altitude of 90 km (49 nm). Above this altitude the U. S. Standard Reference Atmosphere was used.

Various trajectory parameters, such as altitude, surface range, and velocity, are given at some significant flight event times in Table III. The apex and impact of the discarded S-IB stage are also included in Table III. Several trajectory parameters are compared with nominal at engine cutoff events for the S-IB and S-IVB stages in Table IV. Trajectory parameters, for the purpose of performance evaluation, are compared to nominal in Table V for the S-IB/S-IVB separation event and in Table VI for the S-IVB/CSM-101 insertion and separation events. The vehicle flight evaluation report, Reference 3, provides details of vehicle subsystems performance. Tables VII through X present orbital trajectory information which is discussed in Section 4.0 below.

The actual postflight trajectory, from guidance reference release to S-IVB/CSM-101 separation is tabulated in both metric and English units of measure in Tables XI through XVI. These tables present the trajectory in the earth-fixed plumbline, space-fixed ephemeris, and geographic coordinate systems. The data are tabulated at 1.0 sec increments from guidance reference release to S-IB/S-IVB separation, continuing at 5.0 sec increments to insertion, and at 50.0 sec increments from insertion to S-IVB/CSM-101 separation.

The actual trajectory was very close to the predicted nominal, as reflected in the previously mentioned tables where comparisons are made. The velocity gain due to thrust decay between OECO and S-IB/S-IVB separation amounted to 4.1 m/s (13.5 ft/s) which was 2.0 m/s (6.7 ft/s) less than predicted. The velocity gain after S-IVB CO, due to thrust decay, amounted to 6.4 m/s (21.0 ft/s) which was 1.2 m/s (3.9 ft/s) greater than predicted.

3.4 Error Analyses

The best estimate of the reference postflight trajectory during the powered flight is the results of a composite fit of C-band radar data received from seven Eastern Test Range tracking stations. During the major portion of first stage powered flight, good coverage was provided by Merritt Island, Cape Kennedy, and Patrick Air Force Base radars. These data were the main data used in the GATE program to establish this portion of the powered flight trajectory. The remaining portion of the powered flight trajectory was established as a composite fit of all available radar tracking data.

The reference trajectory was smoothed, differentiated, and transformed from the point of track (radar antenna location) to the vehicle's center of gravity to provide a positional time history of the center of gravity rather than the point of track.

The measured parameter comparisons (Figures 5 through 7) reveal the trends of the radar data with respect to the reference trajectory. The dispersion of these data and their analyses give an indication of the quality of the reference trajectory. Most of the range and angle deviations of the radars appear to be biased or show systematic trends that could be represented by a realistic error model. The maximum range deviation shown in Figure 7, is 50 m (164 ft) which occurs in the Grand Turk data at the beginning of track. Four tracking systems; Merritt Island, Patrick Air Force Base, Cape Kennedy, and Grand Bahama, all produced range data with deviations clustered within ±20 m (±66 ft) of the reference trajectory for their entire period of track. The angle deviations showed very good agreement with the reference trajectory between 100 and 500 sec of the flight.

An estimate of the total uncertainty of the powered flight trajectory is presented in Figure 14. At S-IB outboard engines cutoff, the position uncertainty is about 30 m (98 ft) in the XE and ZE components and about 50 m (164 ft) in the YE component. The corresponding velocity uncertainty is about 0.3 m/s (1.0 ft/s) in DXE and DZE, and about 0.5 m/s (1.6 ft/s) in DYE. At S-IVB CO the uncertainties have increased to about 100 m (328 ft) in the XE and ZE components, and about 150 m (492 ft) in the YE component. The velocity uncertainties at S-IVB CO have increased to 0.5 m/s (1.6 ft/s) in the DXE and DZE components, and 1.0 m/s (3.3 ft/s) in the DYE component.

4.0 ORBITAL TRAJECTORY ANALYSIS

4.1 Orbital Trajectory

The AS-205 S-IVB/CSM-101 vehicle was inserted into orbit at 15 hrs 13 min 11.76 sec U.T. (626.76 sec Range Time). Figure 15 is a ground projection plot showing the first two orbital revolutions. The orbital insertion parameters for AS-205 were determined by a least squares differential correction procedure using C-Band radar orbital tracking data over the first two revolutions and by the insertion point established by the best estimate powered flight trajectory.

The primary objective of the AS-205 flight was to provide tests of the manned Apollo 7 spacecraft. Also, an orbital safing experiment (LOX dump) of the S-IVB stage was planned during the first revolution. The orbital safing experiment was conducted beginning at 5668.96 sec and ending at 6389.96 sec. The S-IVB/CSM-101 separation occurred over Hawaii in the second revolution at 10502.4 sec.

4.2 Orbital Data Sources

Orbital tracking of the AS-205 vehicle was conducted by the NASA Space Tracking and Data Acquisition Network (STADAN). This network provided the C-Band radar data used in determination of the AS-205 orbital trajectory. A summary of the stations furnishing data for use in determining the S-IVB orbital trajectory is presented in Table VII. These data cover portions of the first two revolutions of flight.

The two stations at Bermuda (FPS-16 and FPQ-6) and the Carnarvon tracking station furnished tracking data in the first revolution prior to the orbital safing experiment. The tracking stations at California, White Sands, Merritt

Island and Patrick furnished tracking data during the first revolution while the orbital safing experiment was being conducted. Data for the second revolution were furnished by the tracking stations at Bermuda (FPS-16 and FPQ-6), Carnarvon and Pretoria prior to S-IVB/CSM-101 separation and California, Hawaii, Merritt Island and Patrick following the separation.

4.3 Trajectory Analysis

The Orbital Correction Program (OCP) was used to provide solutions for the insertion conditions and orbital trajectory, utilizing orbital tracking data and representative orbital acceleration models. Solutions were made using various combinations of all orbital tracking data received. However, the most reasonable solutions were made using data from Bermuda (FPS-16), Carnarvon, California and Merritt Island during the first revolution and Carnarvon and California during the second revolution. From the most reasonable solution, Table VIII provides a tabulation of the number of observations and the root mean square (RMS) of the residuals associated with each measured parameter.

Telemetered guidance accelerometer data were furnished to represent the actual orbiting vehicle acceleration. These data were utilized in the orbital solutions to give a more realistic fit of the orbital tracking data.

Considering the most reasonable OCP solutions and the agreement between the orbital and powered flight solutions, the estimated uncertainty of the insertion position and velocity components are no greater than quoted at S-IVB CO in Section 3.4, above.

The orbital trajectory, from insertion to S-IVB/CSM-101 separation, was obtained from the OCP using orbital tracking data and telemetered guidance accelerations. The orbital parameters at insertion and S-IVB/CSM-101 separation were taken from the orbital trajectory and are presented in Table IX.

4.4 Orbital S-IVB Safing Experiment

The scheduled S-IVB orbital safing experiment (LOX dump) was initiated at 5668.96 sec and terminated at 6389.96 sec. Orbital tracking data from the tracking stations at California, White Sands, Merritt Island and Patrick and telemetered acceleration data were available to help construct the orbital trajectory through the period of the safing experiment. The telemetered acceleration magnitude profile, during the safing experiment, is shown in Figure 16.

In addition to the actual S-IVB/CSM-101 orbital trajectory, a theoretical trajectory was initiated at the beginning of the safing experiment and integrated through S-IVB/CSM-101 separation assuming nominal drag forces and no dump forces. The orbital parameters at the end of the safing experiment from this theoretical trajectory are compared to the parameters computed from the actual S-IVB/CSM-101 orbital trajectory. This comparison, which reveals the effect of the LOX dump on the S-IVB/CSM-101 orbit, is presented in Table X. The effects of the safing experiment on the orbiting S-IVB/CSM-101 altitude and space-fixed velocity profiles are shown in Figures 17 and 18, respectively. The solid line in these figures represent the actual S-IVB/CSM-101 orbital trajectory. The dashed line represents the theoretical trajectory which would have occurred with no propellant dumping.

5.0 EXPENDED S-IB AND S-IVB STAGE FREE FLIGHT TRAJECTORIES

Three theoretical free flight trajectories were computed for the discarded S-IB stage using initial conditions at S-IB/S-IVB separation. The trajectories were integrated from separation to impact using actual retro-rocket performance and actual outboard engine decay data. Trajectories were calculated assuming nominal drag coefficients for three types of S-IB stage free flight conditions. These three conditions for the expended S-IB stage are: (1) stabilized at zero deg angle of attack, (2) a tumbling body, and (3) stabilized at 90 deg angle of attack. This provides the following S-IB stage impact locations.

Drag Conditions	Impact Range	Impact Time
0 deg Angle of Attack	501.32 km (270.69 nm)	495.0 sec
Tumbling Body	490.78 km (265.00 nm)	560.2 sec
90 deg Angle of Attack	483.76 Km (261.21 nm)	604.3 sec

Radar tracking data were not available to confirm the results obtained. However, on previous flights the tumbling drag case was proven to be close to the actual tracking data. For this reason, the theoretical free-flight trajectory utilizing the tumbling drag coefficient data is considered the actual trajectory of the expended S-IB stage. This ballistic free flight trajectory is presented in tabular form in Table XVII (metric units) and Table XVIII (English units). The ground track and impact are also shown in Figure 3.

The S-IVB expended stage remained in earth orbit, following S-IVB/CSM-101 separation, for approximately 7 days. Due to the lack of tracking data during the final revolutions, the S-IVB free flight re-entry trajectory was not computed.

6.0 GOVERNMENT FURNISHED DATA

The Government furnished data used to establish the postflight trajectory of the AS-205 vehicle are tabulated in Table XIX.

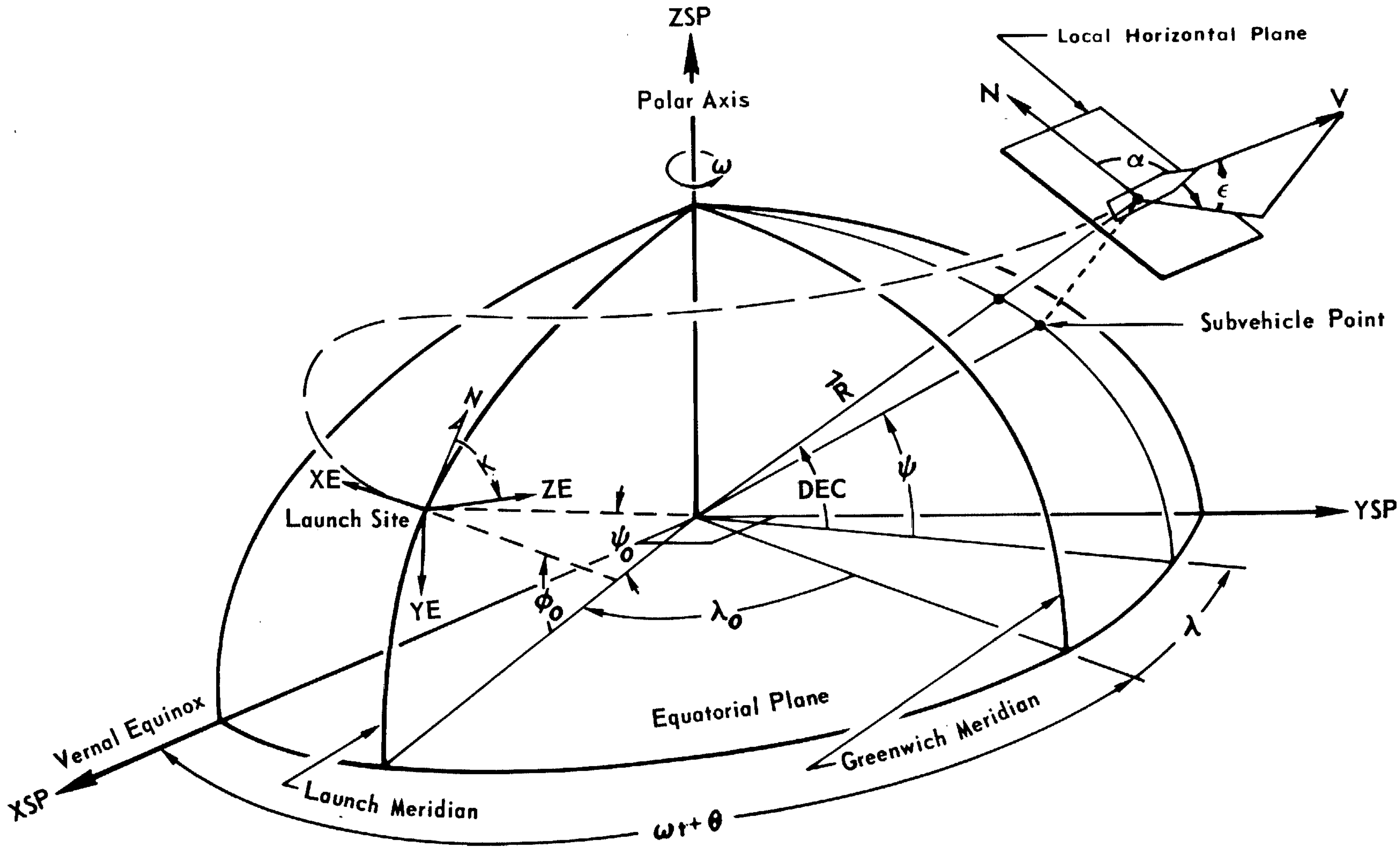

Figure 1. Trajectory Coordinate Systems

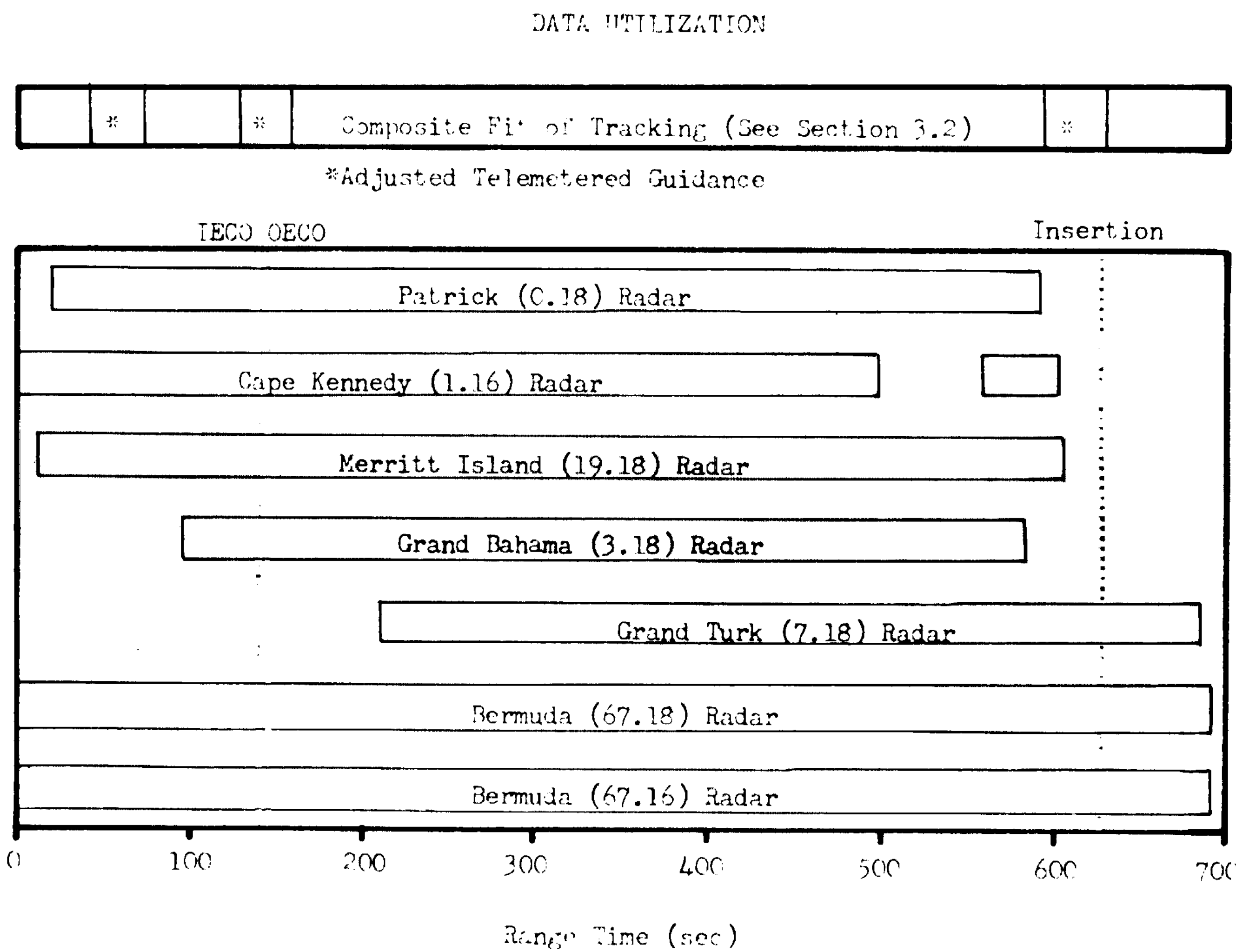

Figure 2. Available Tracking Data (Powered Flight)

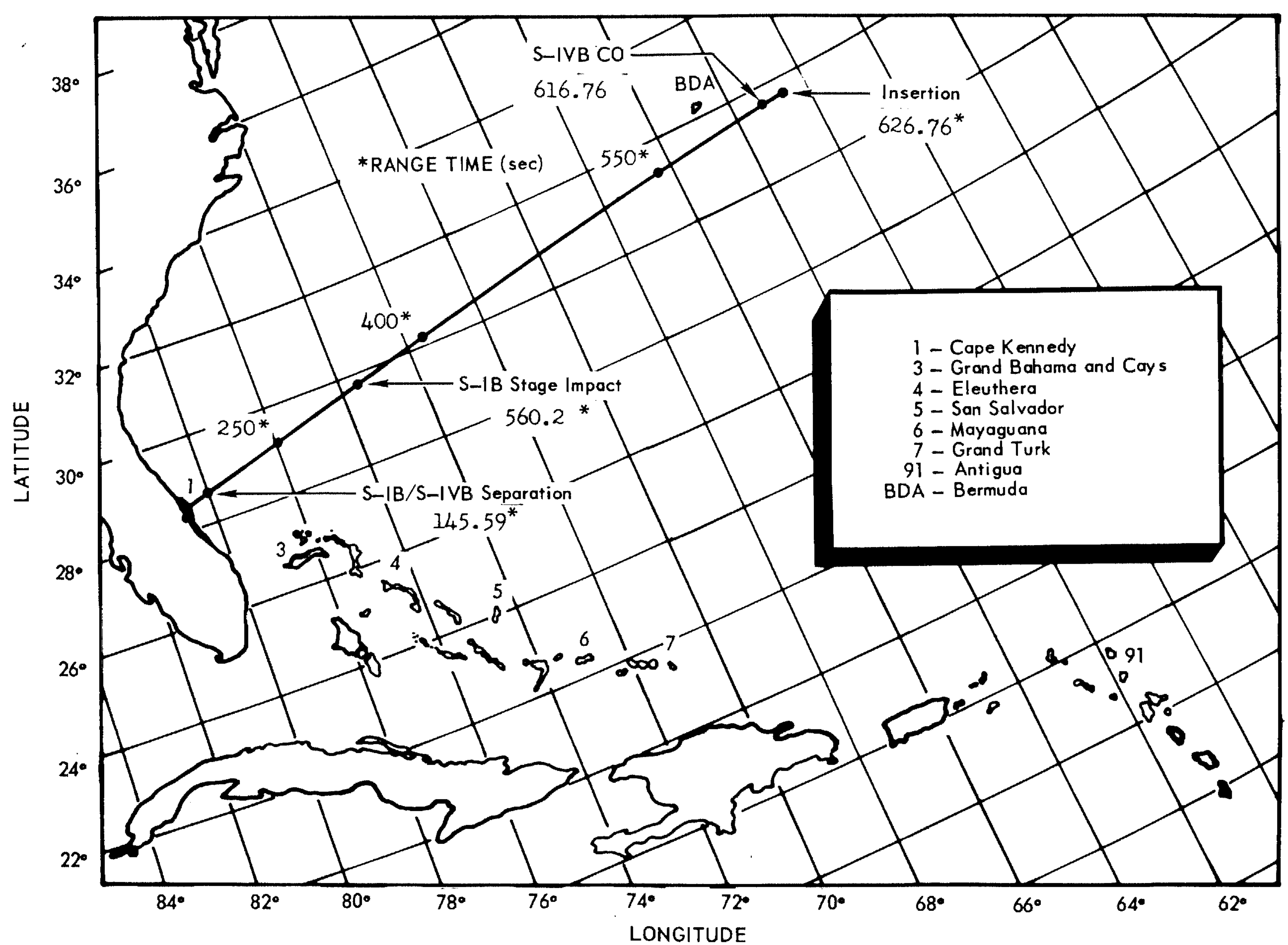

Figure 3. Vehicle Ground Track and Tracking Stations

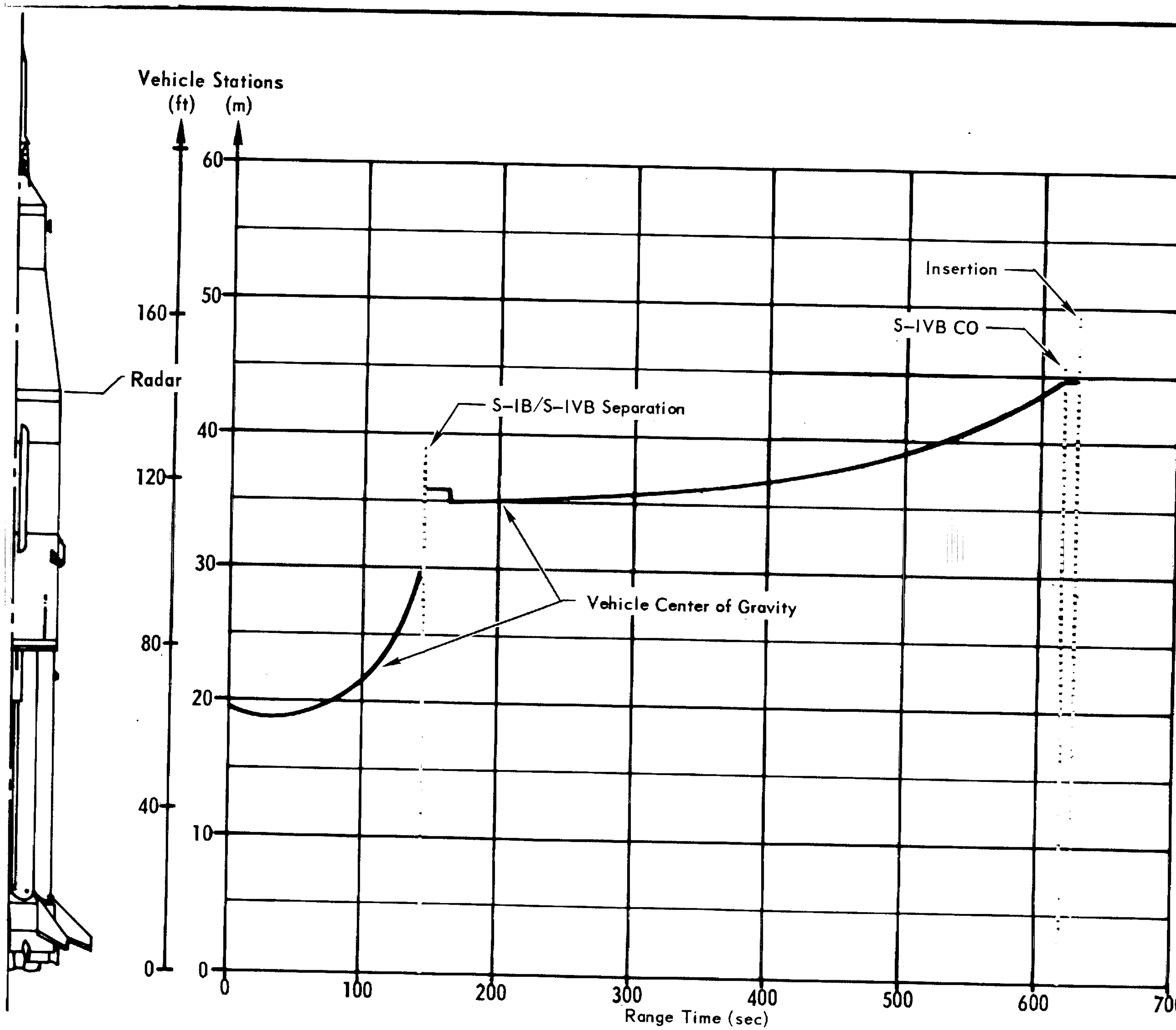

Figure 4. Antenna Location and Vehicle Center of Gravity

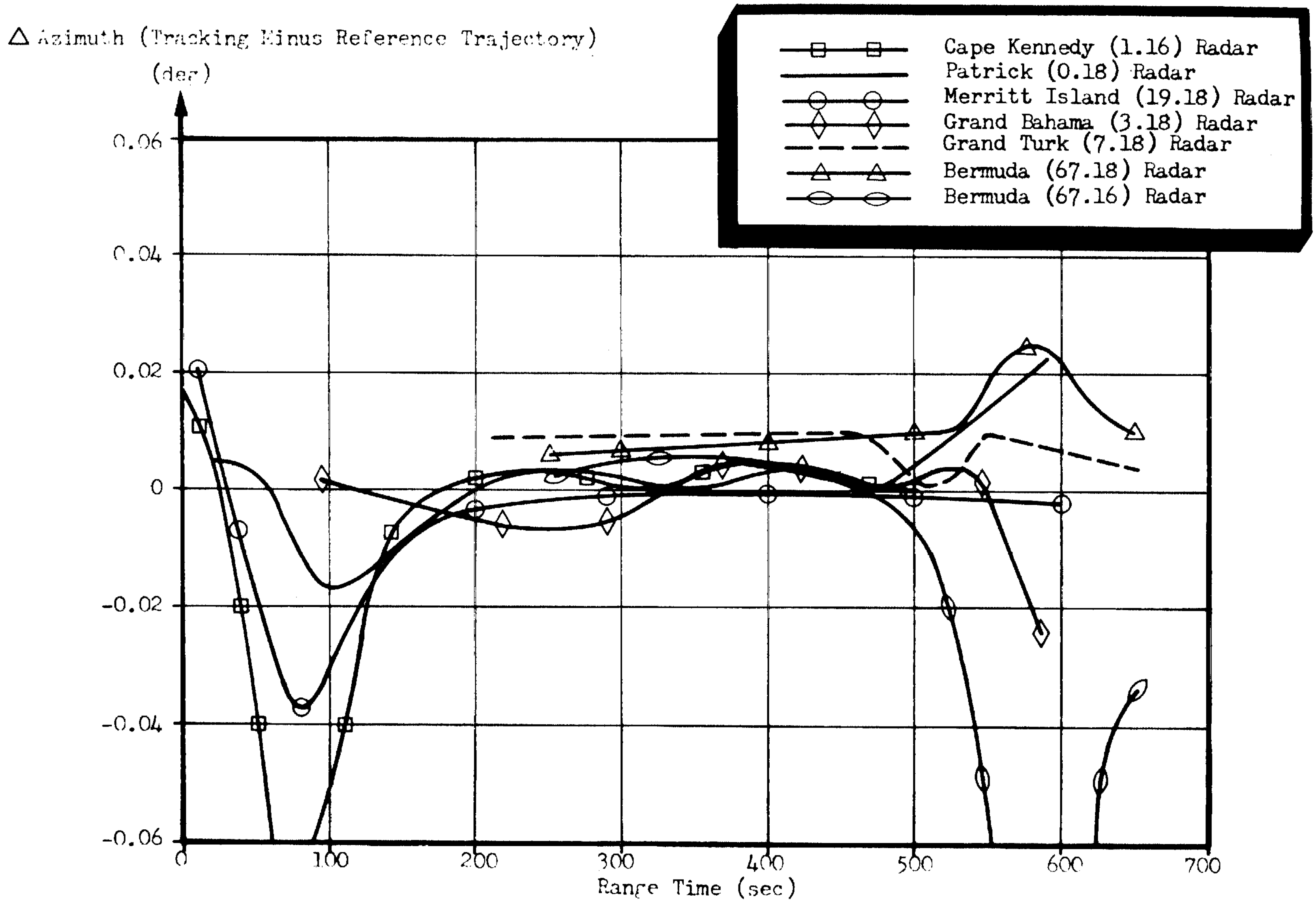

Figure 5. Measured Parameter Tracking Comparison (Azimuth)

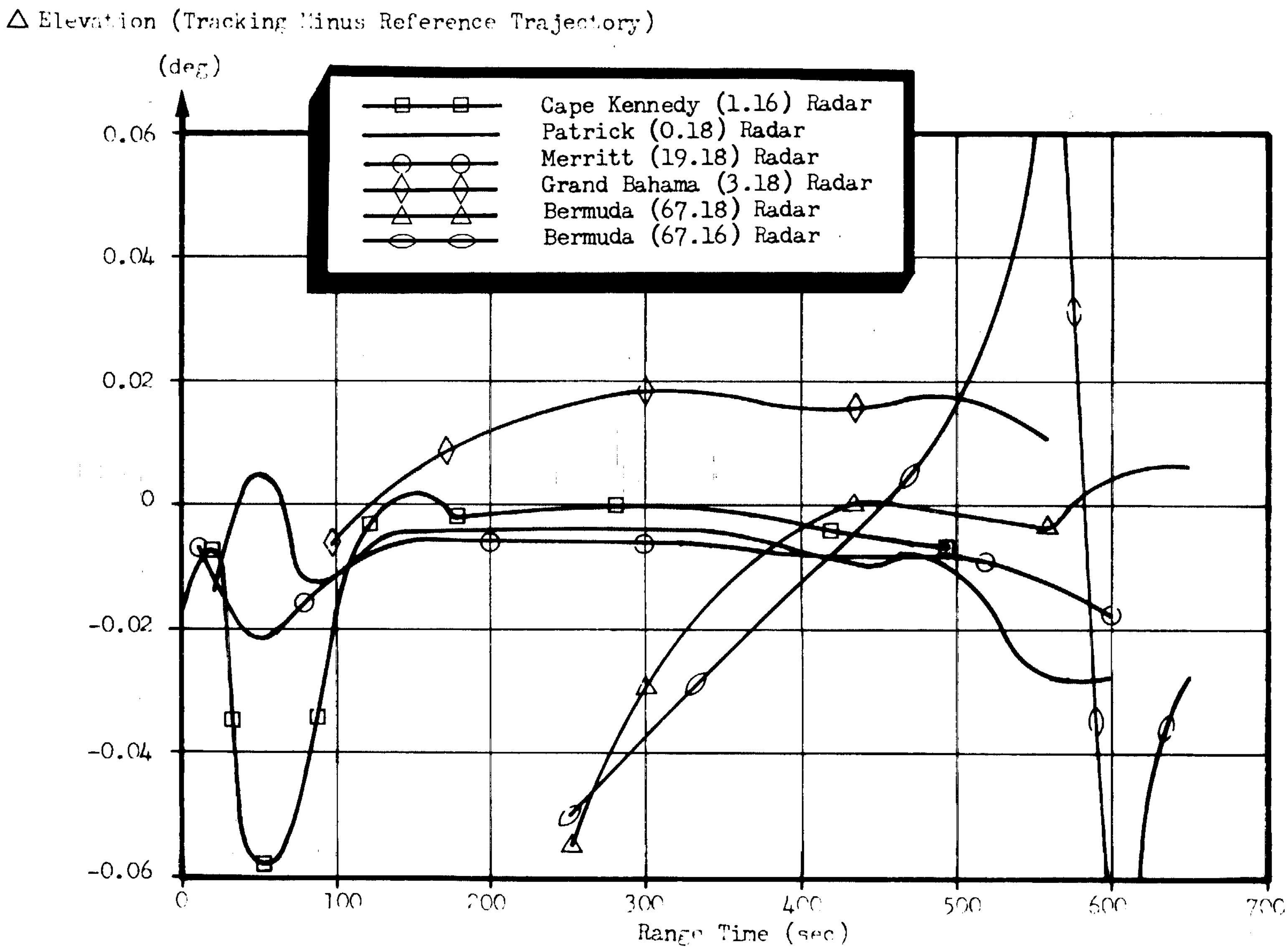

Figure 6. Measured Parameter Tracking Comparison (Elevation)

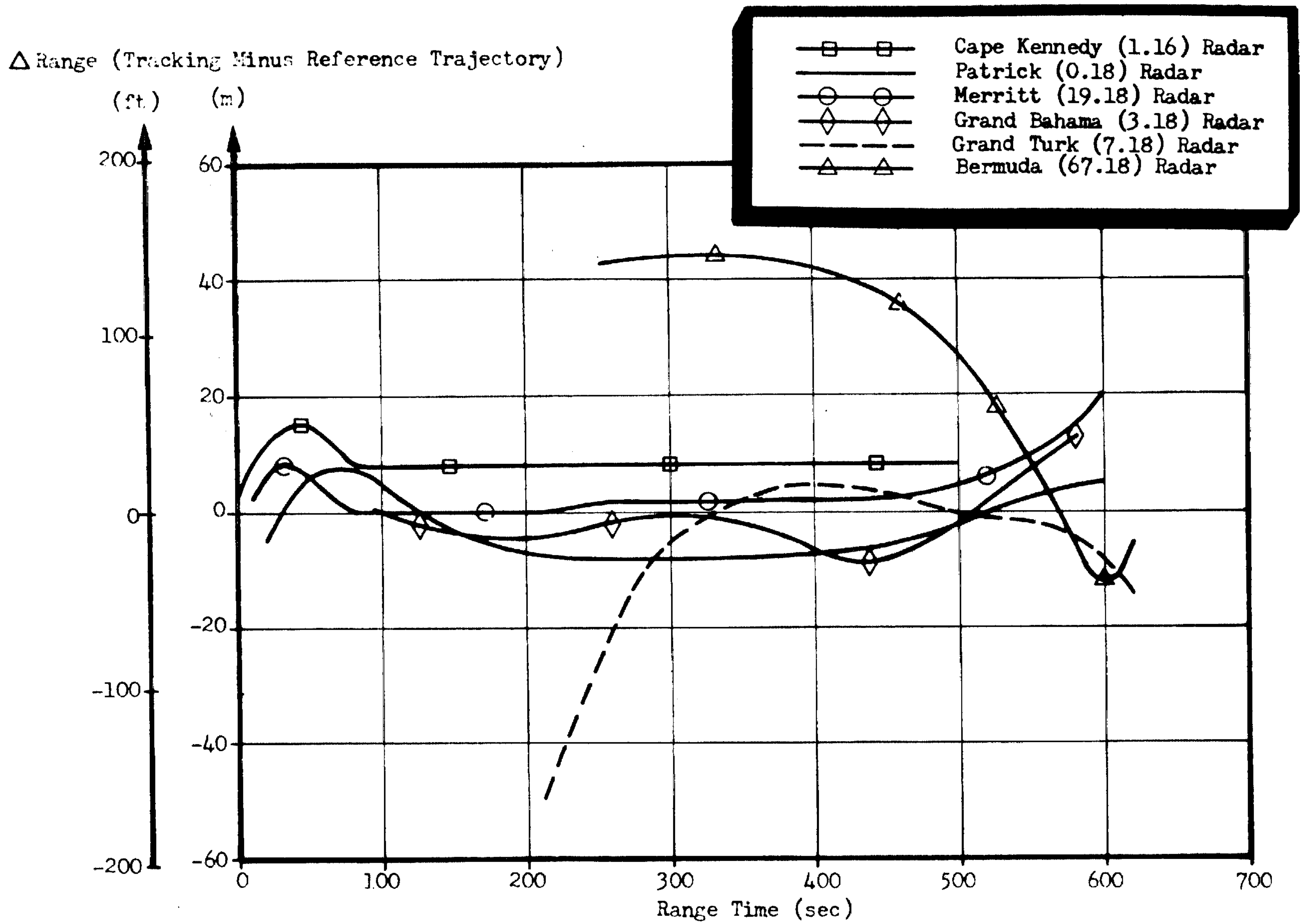

Figure 7. Measured Parameter Tracking Comparison (Range)

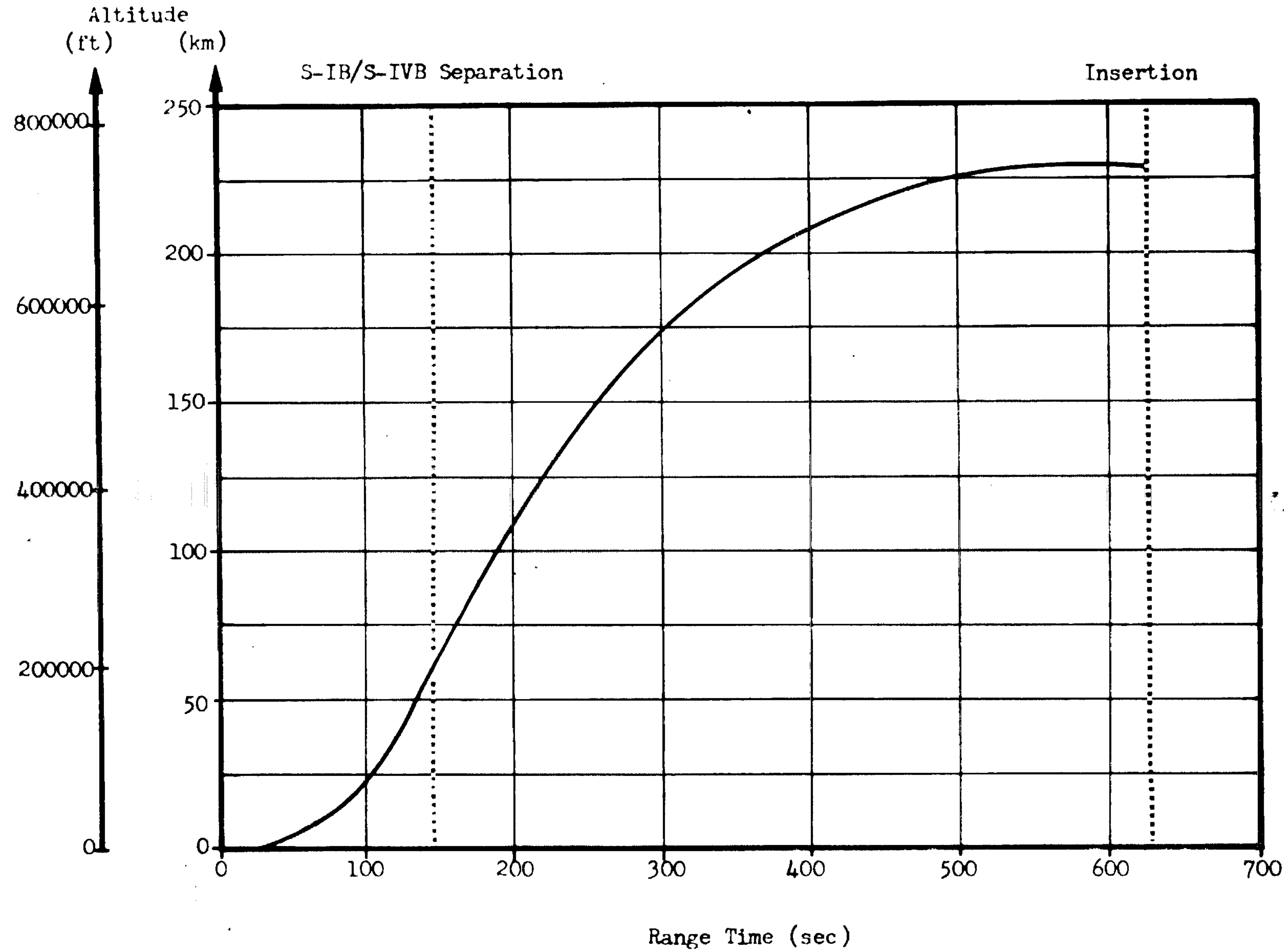

Figure 8. Altitude

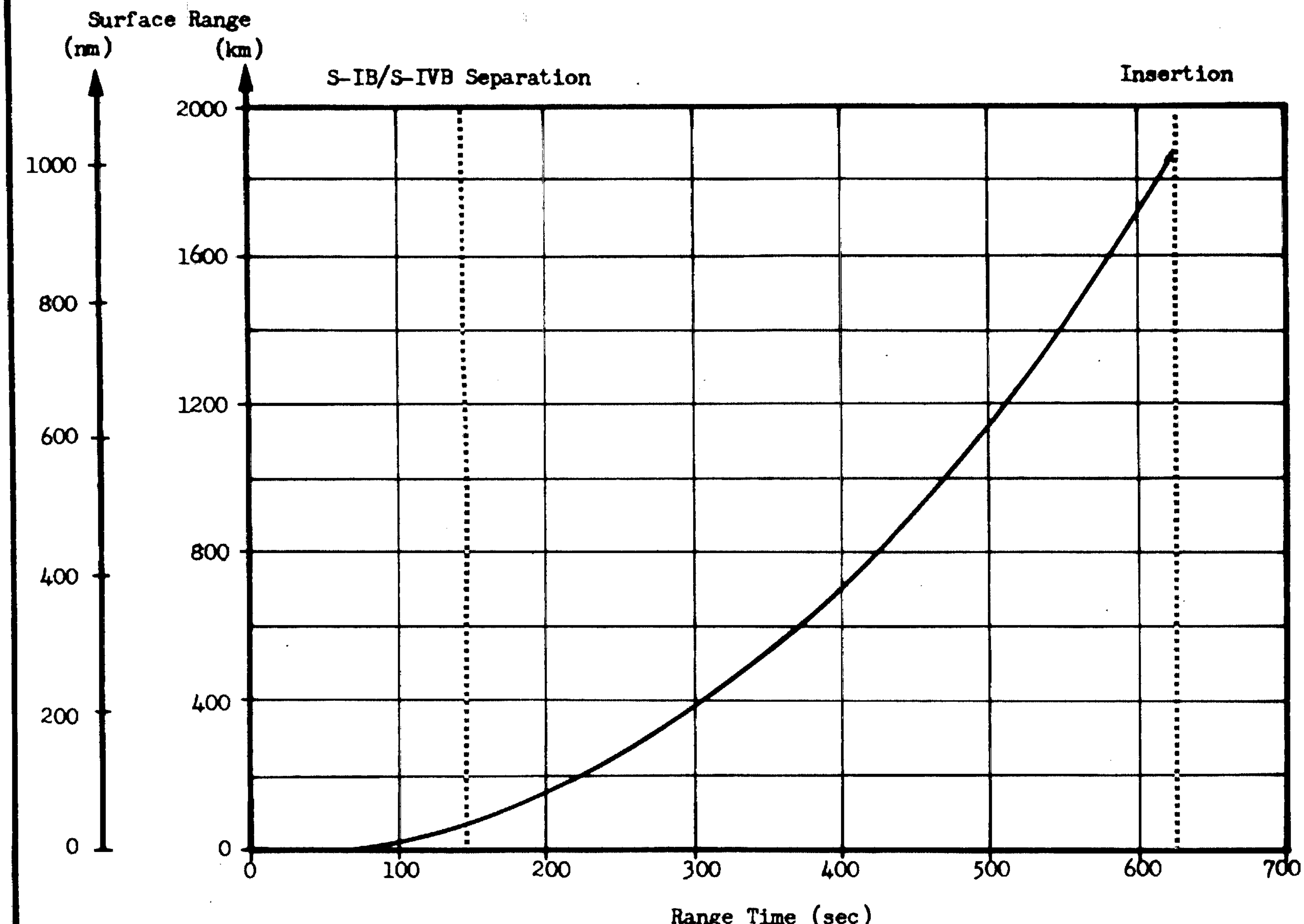

Figure 9. Surface Range

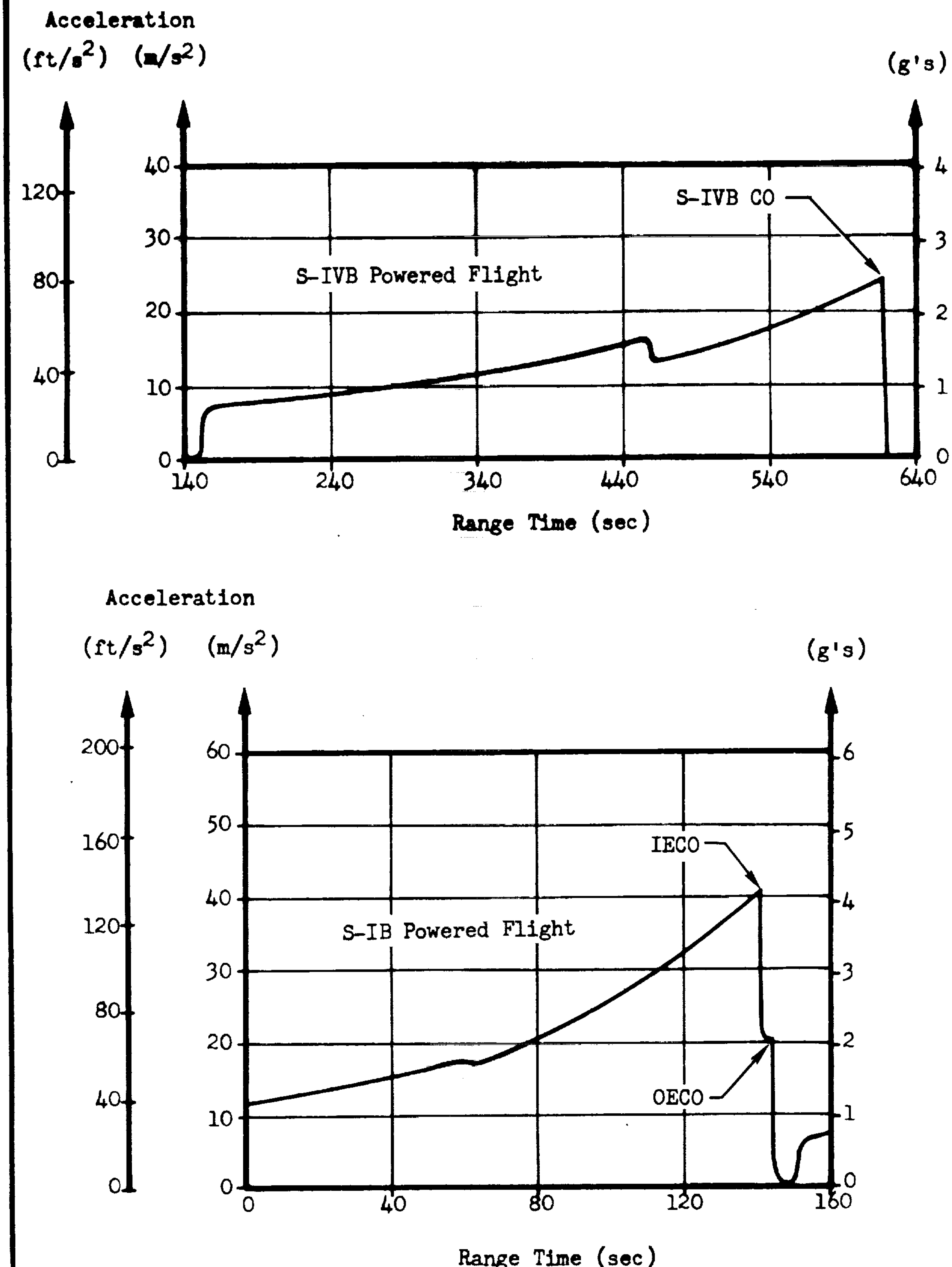

Figure 10. Total Inertial Acceleration

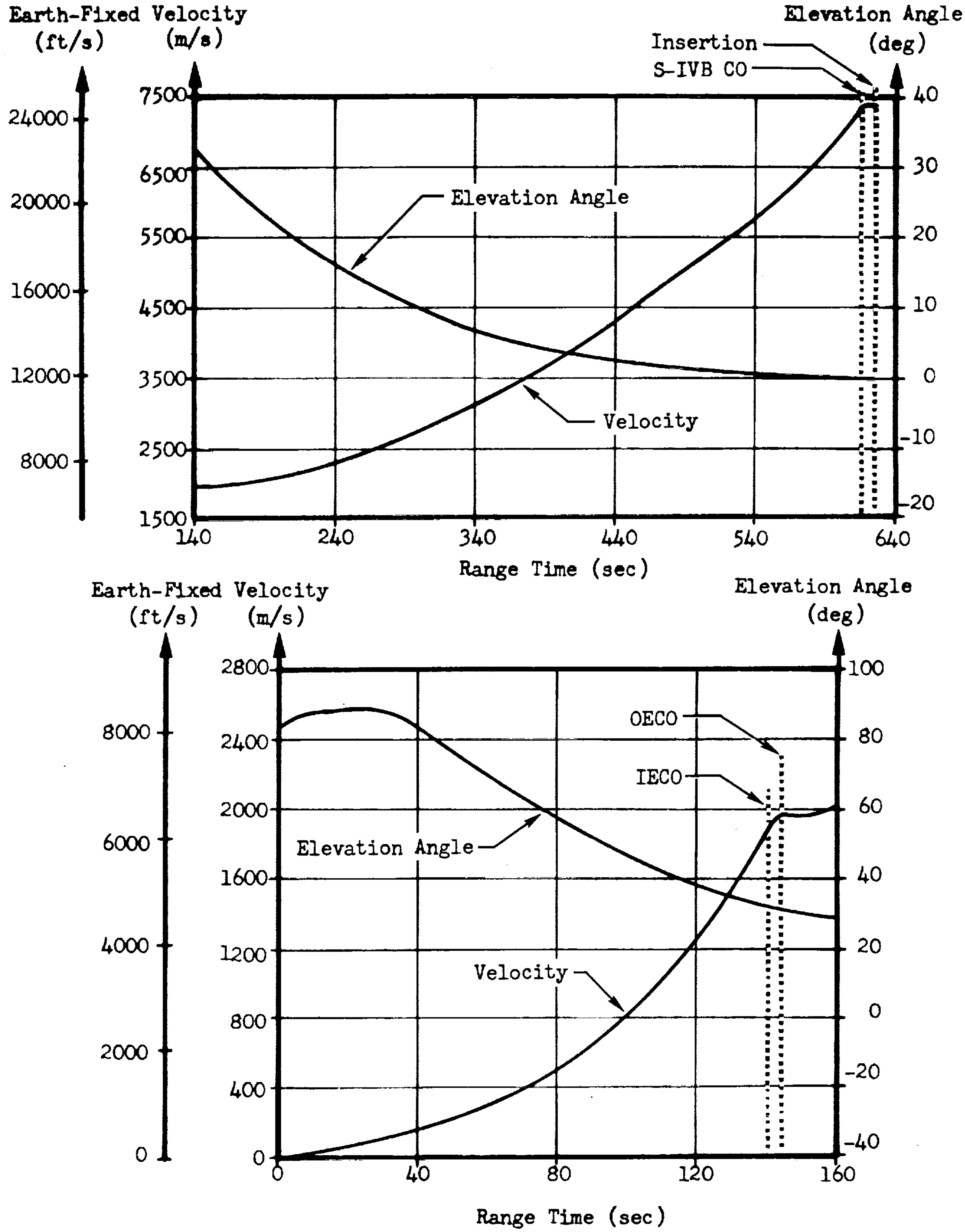

Figure 11. Earth-Fixed Velocity and Elevation Above Local Horizontal

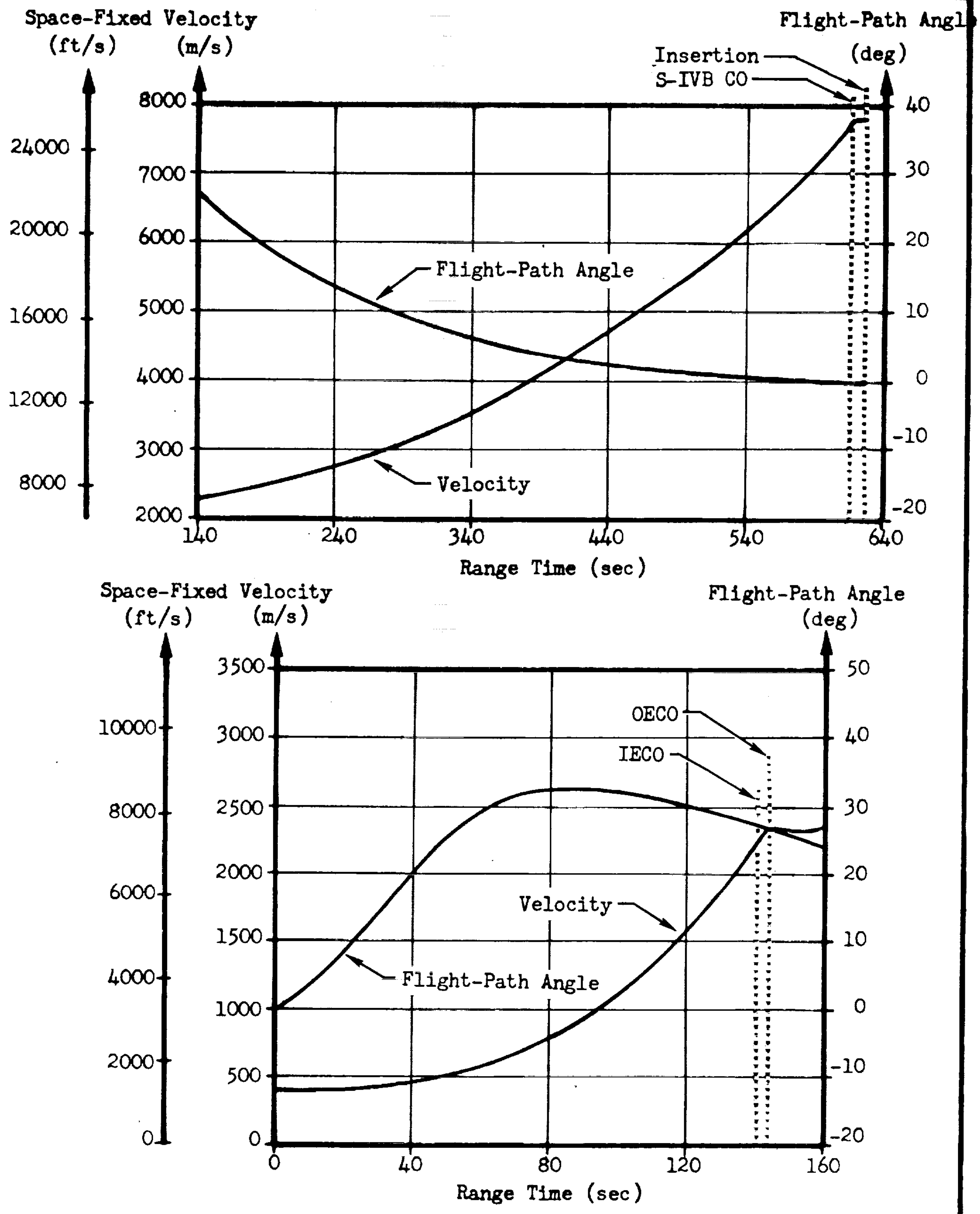

Figure 12. Space-Fixed Velocity and Flight Path Angle

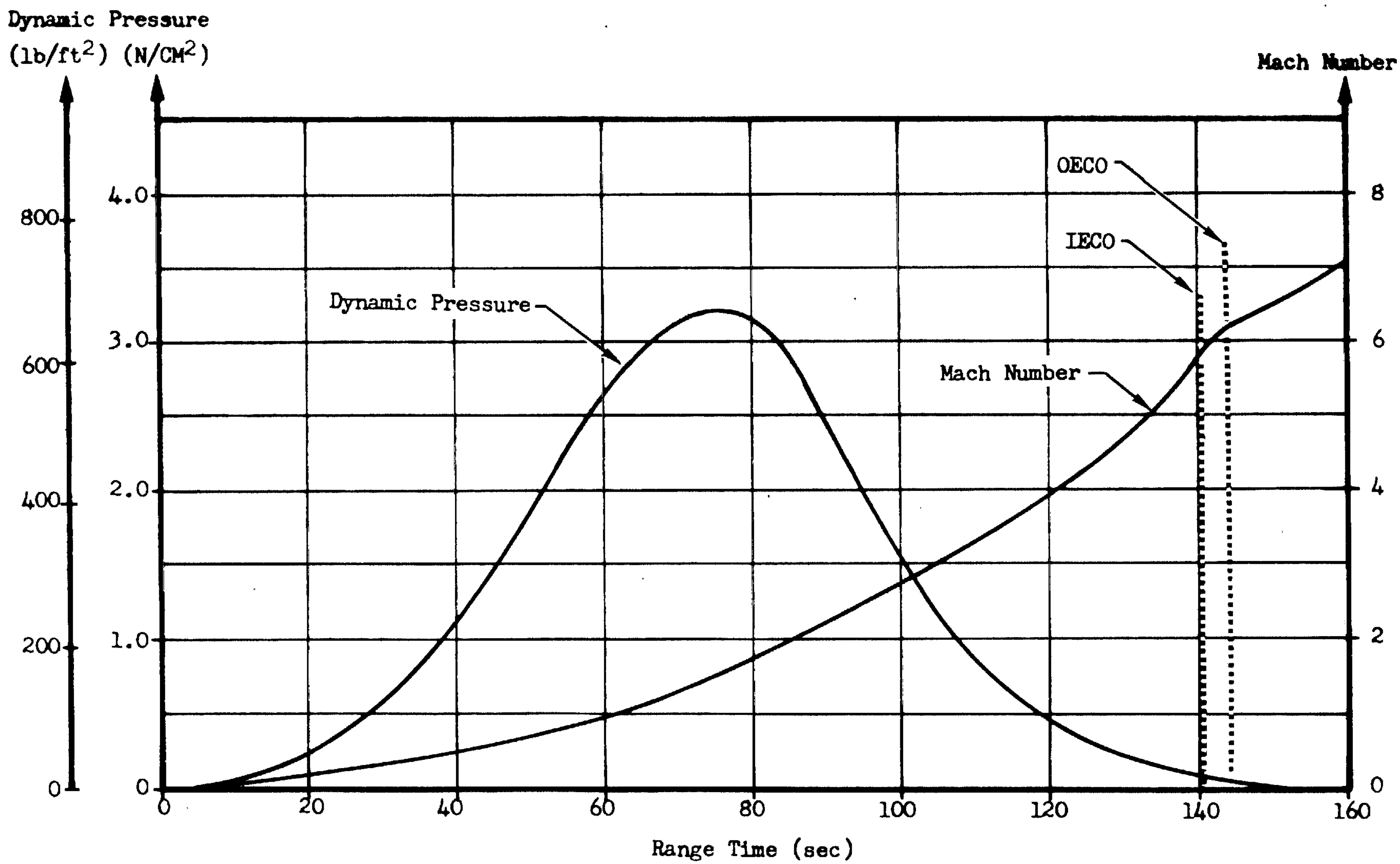

Figure 13. Mach Number and Dynamic Pressure

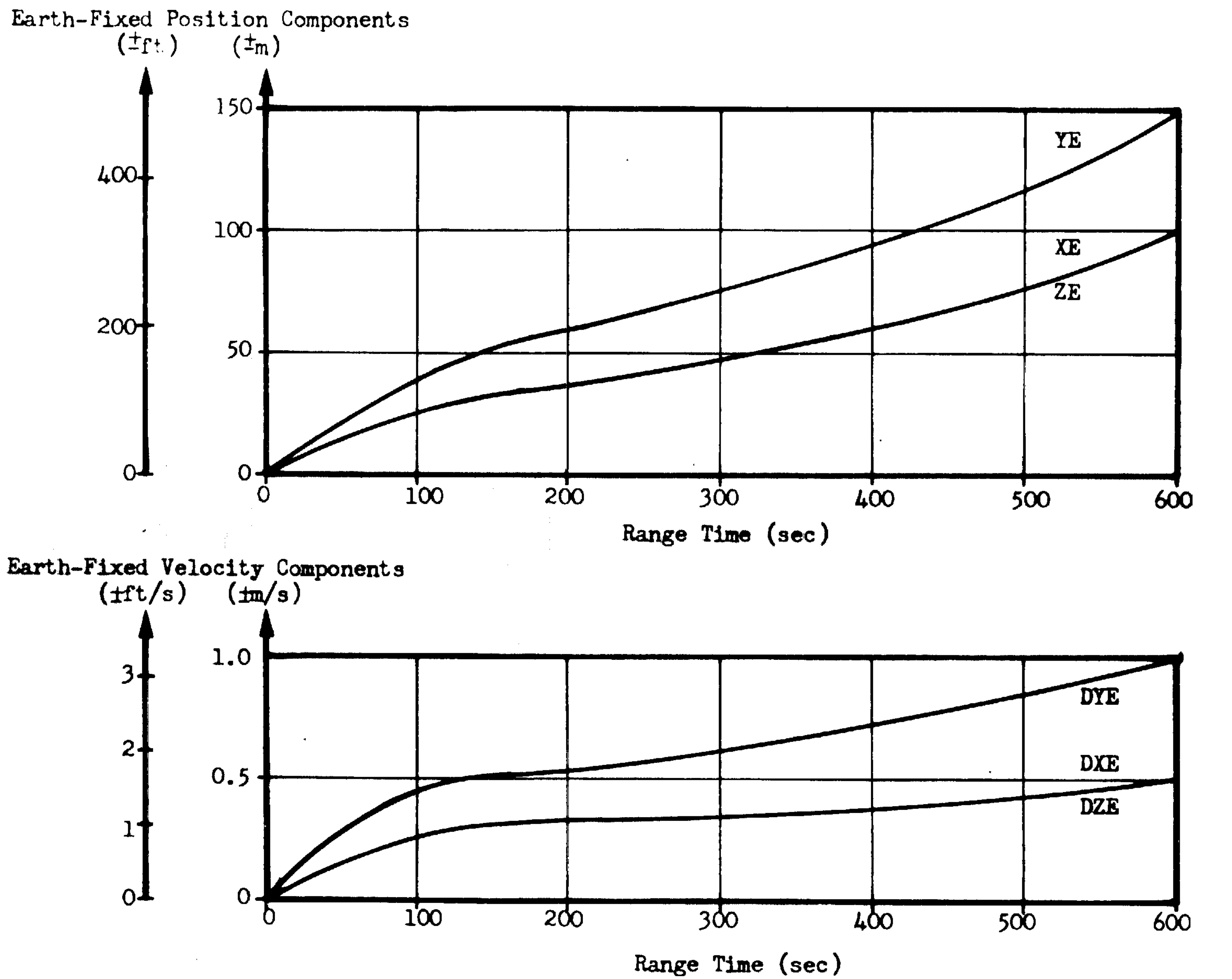

Figure 14. Estimated Uncertainty of Reference Trajectory (Powered Flight)

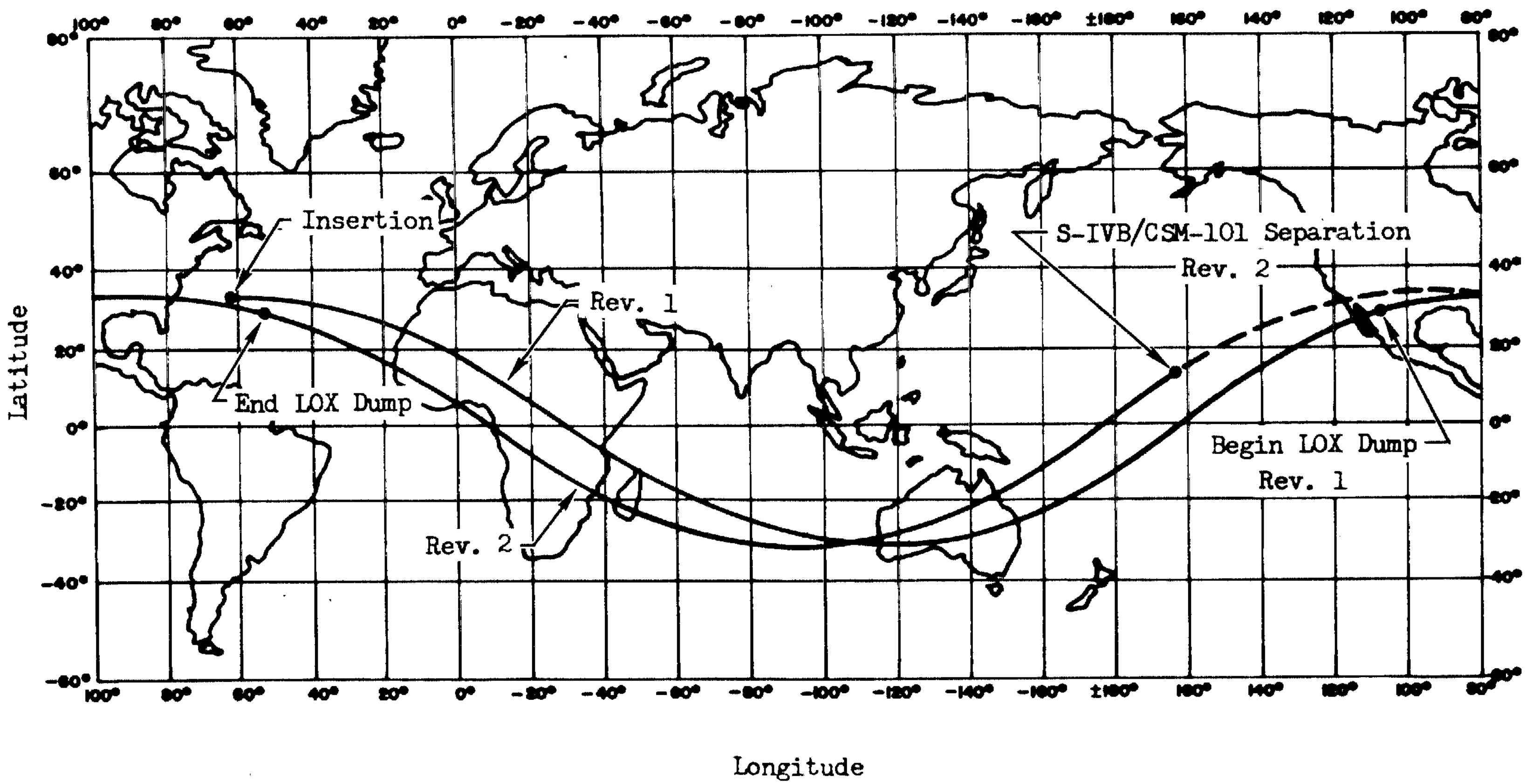

Figure 15. Orbital Ground Track (Two Revolutions)

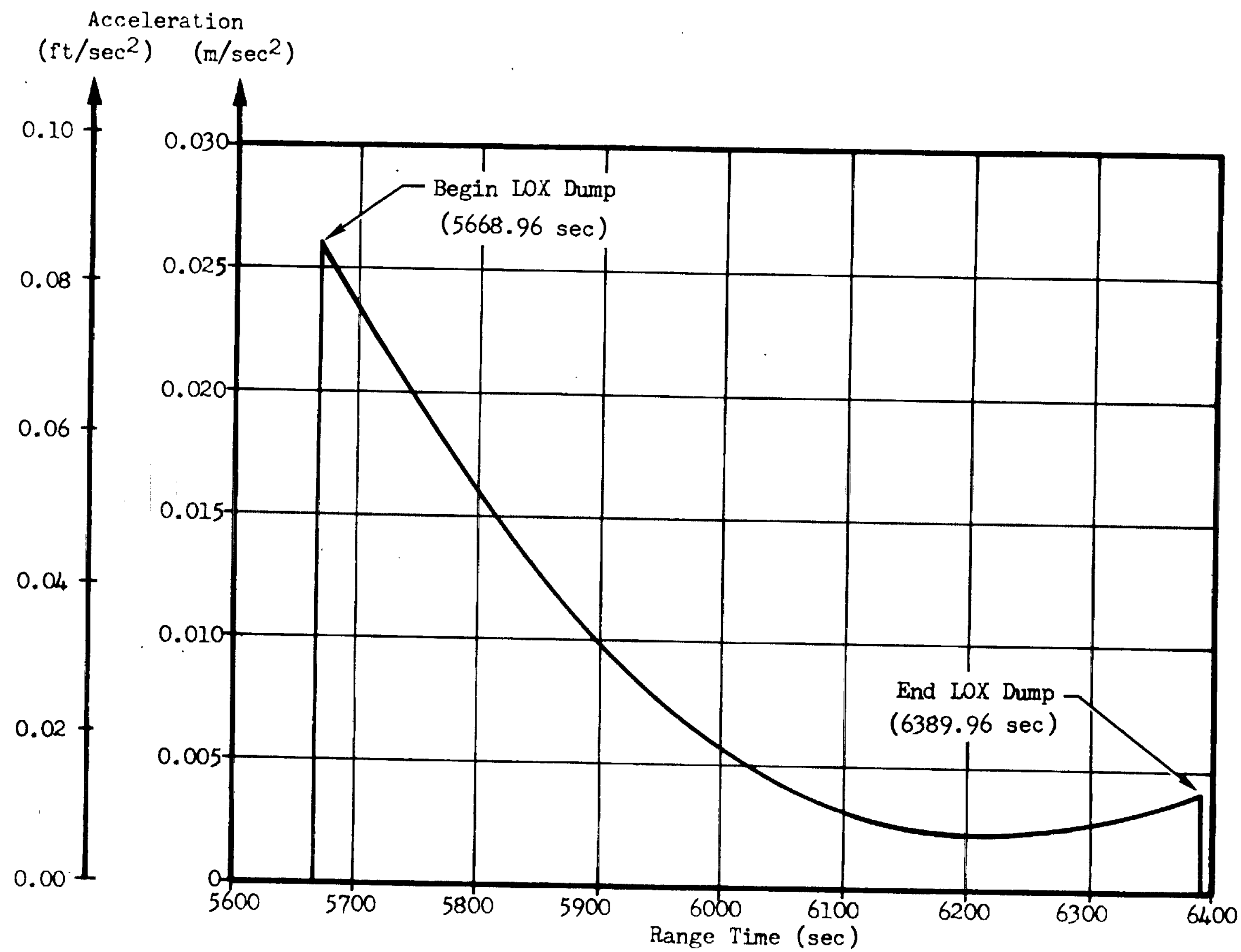

Figure 16. Acceleration Due to LOX Dump

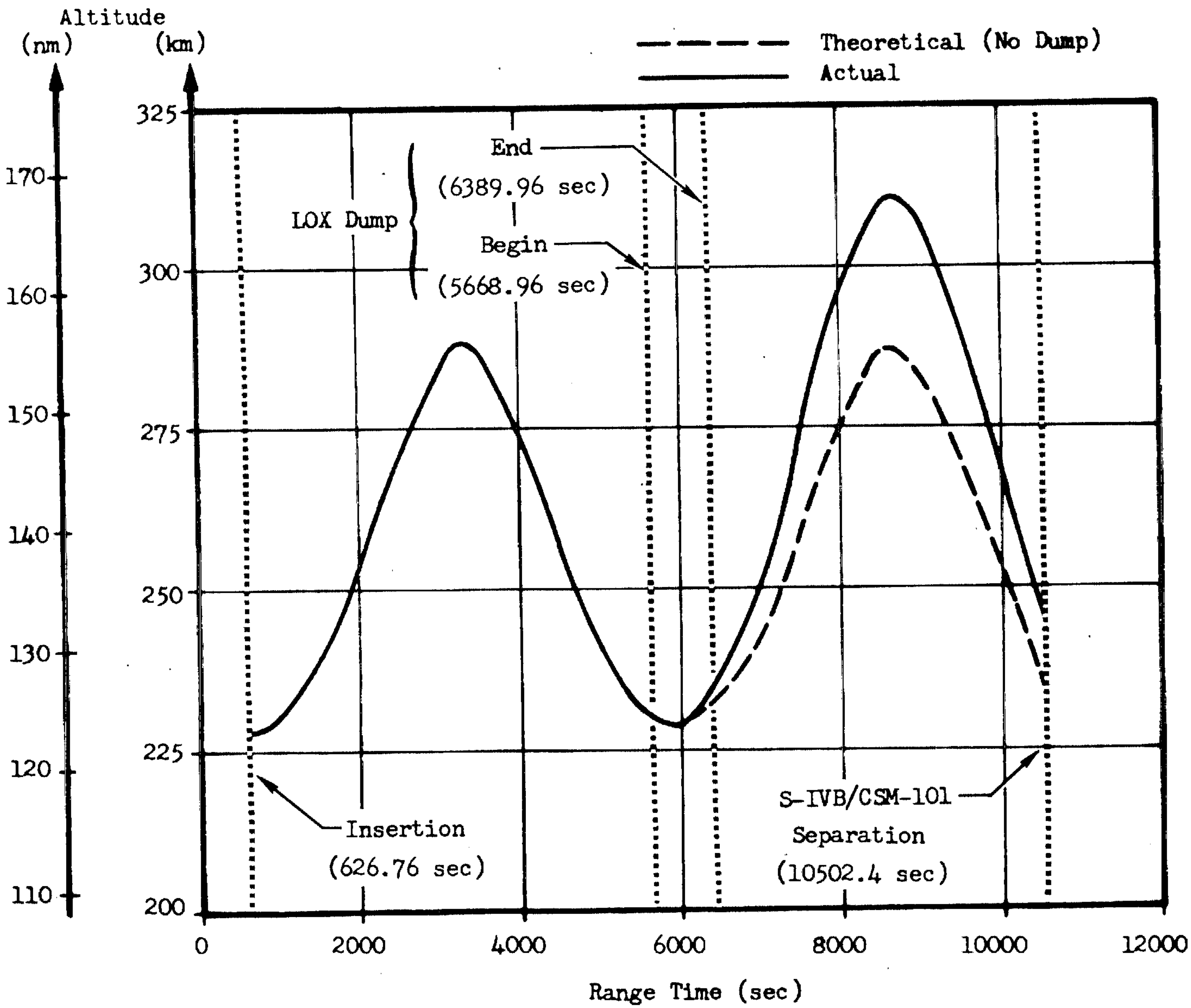

Figure 17. Orbital Altitude

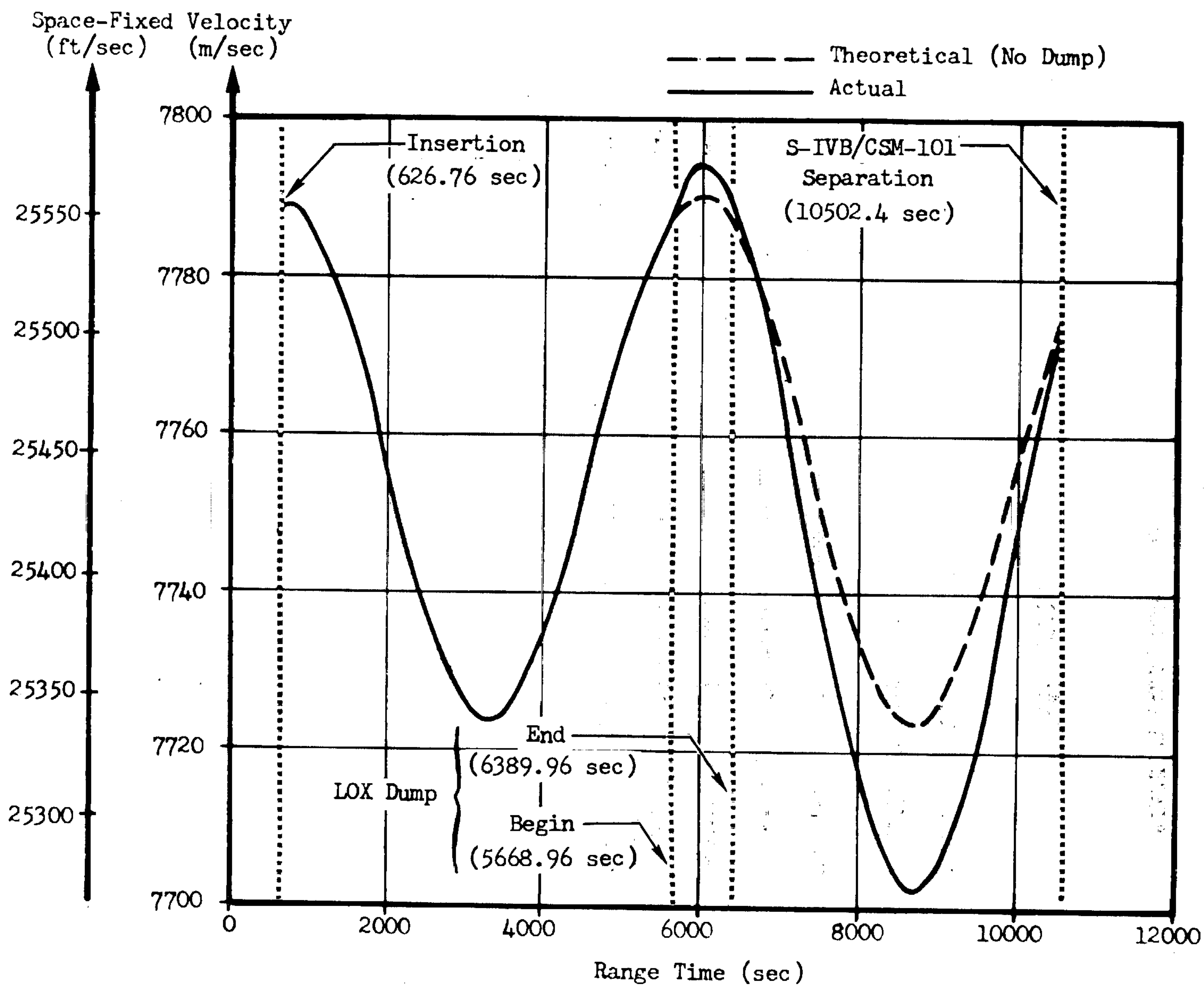

Figure 18. Orbital Space-Fixed Velocity

TABLE I

TRACKING DATA SOURCES AVAILABLE DURING POWERED FLIGHT

Data Source	Tracking Interval (Sec)
Patrick (0.18) Radar (FPQ-6)	20 - 593
Cape (1.16) Radar (FPS-16)	0 - 499 559 - 603
Merritt Island (19.18) Radar (TPQ-18)	11 - 606
Grand Bahama (3.18) Radar (TPQ-18)	96 - 584
Grand Turk (7.18) Radar (TPQ-18)	211 - 685
Bermuda (67.18) Radar (FPQ-6)	0 - 689
Bermuda (67.16) Radar (FPS-16)	0 - 689

TABLE II

TIMES OF EVENTS

Events	Range Time in sec Actual	Nominal	Act-Nom
Guidance Reference Release	- 4.972	---	---
First Motion	0.17	0.17	0.00
L. O. Signal (Umb. Disc)	0.36	0.37	- 0.01
Mach One	62.15	61.55	0.60
Maximum Dynamic Pressure	75.5	75.0	0.5
IECO	140.65	140.28	0.37
OECO	144.32	143.28	1.04
S-IB/S-IVB Separation (Signal)	145.59	144.58	1.01
Guidance Initiation (IGM)	169.76	168.42	1.34
S-IVB CO	616.76	614.80	1.96
Orbit Insertion	626.76	624.80	1.96
S-IVB/CSM-101 Separation	10502.4	10495.17	7.23

Note: Actual times are referenced to Range Zero (10:02:45 A.M. EST). Nominal times were obtained from Reference 1 and adjusted to the actual 0.17 sec first motion time.

TABLE III

SIGNIFICANT TRAJECTORY PARAMETERS

Event	Parameter	Actual Value
First Motion	Range Time	0.17 sec
	Total Inertial Acceleration	11.86 m/s^2 (38.91 ft/s^2)
Mach 1	Range Time	62.15 sec
	Altitude	7.63 km (4.12 nm)
Maximum Dynamic Pressure	Range Time	75.5 sec
	Dynamic Pressure	3.20 n/cm^2 (665.60 lb/ft^2)
	Altitude	12.16 km (6.57 nm)
Maximum Total Inertial Acceleration (S-IB Stage)	Range Time	140.10 sec
	Acceleration	41.99 m/s^2 (137.76 ft/s^2)
Maximum Earth-Fixed Velocity (S-IB Stage)	Range Time	144.6 sec
	Velocity	1978.2 m/s (6490.1 ft/s)
Apex (S-IB Stage)	Range Time	259.4 sec
	Altitude	119.3 km (64.4 nm)
	Surface Range	245.6 km (132.6 nm)
	Earth-Fixed Velocity	1628.1 m/s (5341.5 ft/s)
Impact (S-IB Stage)	Range Time	560.2 sec
	Surface Range	490.78 km (265.0 nm)
	Cross Range	5.03 km (2.72 nm)
	Geodetic Latitude	29.76 deg
	Longitude	75.72 deg
Maximum Total Inertial Acceleration (S-IVB Stage)	Range Time	616.9 sec
	Acceleration	25.06 m/s^2 (82.22 ft/s^2)
Maximum Earth-Fixed Velocity (S-IVB Stage)	Range Time	619.3 sec
	Velocity	7378.8 m/s (24208.4 ft/s)

TABLE IV

CUTOFF CONDITIONS

Parameter	Units	IECO	OECO	S-IVB CO
Range Time	sec	140.65	144.32	616.76
Altitude	km	56.72	60.52	228.1
	nm	30.63	32.68	123.2
Range	km	54.05	60.04	1821.1
	nm	29.19	32.42	983.4
Cross Range, YE	km	0.11	0.13	92.7
	nm	0.06	0.07	50.1
Cross Range Velocity, DYE	m/s	3.9	4.3	539.8
	ft/s	12.8	14.1	1771.0
Earth-Fixed Velocity	m/s	1909.5	1974.8	7370.4
	ft/s	6264.7	6478.9	24180.8
Earth-Fixed Velocity Vector Elevation	deg	32.52	31.69	0.00
Earth-Fixed Velocity Vector Azimuth	deg	72.29	72.33	85.68
Space-Fixed Velocity	m/s	2253.8	2321.6	7780.7
	ft/s	7394.3	7616.7	25526.9
Total Inertial Acceleration	m/s^2	40.53	20.36	25.05
	ft/s^2	132.97	66.80	82.18

Earth-Fixed Velocity Accurracy
OECO $\pm$0.4 m/s ($\pm$1.3 ft/s)
S-IVB CO $\pm$0.7 m/s ($\pm$2.3 ft/s)

Altitude Accurracy
OECO $\pm$30 m ($\pm$98 ft)
S-IVB CO $\pm$100 m ($\pm$328 ft)

TABLE V

S-IB/S-IVB SEPARATION CONDITIONS

Parameters	Units	Separation Signal Actual	Nominal	Act-Nom
Range Time	sec	145.59	144.58	1.01
Altitude	km	61.84	61.91	- 0.07
	nm	33.39	33.43	- 0.04
Range	km	62.15	61.82	0.33
	nm	33.56	33.38	0.18
Space-Fixed Velocity	m/s	2320.3	2326.1	- 5.8
	ft/s	7612.4	7631.5	- 19.1
Cross Range	km	0.14	- 0.03	0.17
	nm	0.08	- 0.02	0.10
Flight Path Angle	deg	26.32	26.60	- 0.28
Heading Angle	deg	72.35	72.23	0.12

TABLE VI

S-IVB/CSM-101 INSERTION AND SEPARATION CONDITIONS

Parameters	Units	Orbit Insertion Actual	Orbit Insertion Nominal	Orbit Insertion Act-Nom	S-IVB/CSM-101 Separation Actual	S-IVB/CSM-101 Separation Nominal	S-IVB/CSM-101 Separation Act-Nom
Range Time	sec	626.76	624.80	1.96	10502.40	10495.17	7.23
Altitude	km	228.1	228.0	0.1	246.8	240.2	6.6
	nm	123.2	123.1	0.1	133.3	129.7	3.6
Range	km	1892.3	1891.2	1.1	8740.9	NA	NA
	nm	1021.8	1021.2	0.6	4720.1	NA	NA
Space-Fixed Velocity	m/s	7788.6	7787.4	1.2	7772.3	7779.9	- 7.6
	ft/s	25552.8	25548.9	3.9	25499.4	25524.3	- 24.9
Cross Range	km	98.1	98.4	- 0.3	- 2923.8	NA	NA
	nm	53.0	53.1	- 0.1	- 1578.9	NA	NA
Flight Path Angle	deg	0.005	- 0.002	0.007	- 0.30	- 0.28	- 0.02
Heading Angle	deg	86.32	86.31	0.01	60.87	60.87	0.00

TABLE VII

AVAILABLE ORBITAL TRACKING DATA

Station	Type of Radar	Revolution 1	2
Bermuda	FPS-16	X	X
Bermuda	FPQ-6	X	X
California	FPS-16	X	X
Carnarvon	FPQ-6	X	X
Hawaii	FPS-16		X
Merritt Island	TPQ-18	X	X
Patrick	FPQ-6	X	X
Pretoria	MPS-25		X
White Sands	FPS-16M	X	

TABLE VIII

ORBITAL TRACKING UTILIZATION SUMMARY

Station	Time of Track (Range Time in Sec)		Data Type	Valid Observations	RMS Error of Residuals
Bermuda (FPS-16) (Rev. 1)	Begin	633	AZ	29	0.006 deg
	End	807	EL	28	0.013 deg
			RA	29	5 m (16 ft)
Carnarvon (Rev. 1)	Begin	3207	AZ	50	0.003 deg
	End	3627	EL	50	0.008 deg
			RA	52	6 m (20 ft)
California (Rev. 1)	Begin	5379	AZ	47	0.018 deg
	End	5667	EL	45	0.017 deg
			RA	47	8 m (26 ft)
Merritt Island (Rev. 1)	Begin	5842	AZ	68	0.009 deg
	End	6255	EL	67	0.014 deg
			RA	68	18 m (59 ft)
Carnarvon (Rev. 2)	Begin	8907	AZ	74	0.008 deg
	End	9357	EL	74	0.025 deg
			RA	74	21 m (69 ft)
California (Rev. 2)	Begin	11139	AZ	46	0.027 deg
	End	11421	EL	45	0.011 deg
			RA	46	45 m (148 ft)

TABLE IX

ORBITAL ELEMENTS AT SIGNIFICANT TIMES

PARAMETERS	UNITS	INSERTION	S-IVB/CSM-101 SEPARATION
Time	(Range Time in Sec.)	626.76	10502.4
Space-Fixed Velocity	(m/s) (ft/s)	7788.6 25552.8	7772.3 25499.4
Flight Path Angle	(deg)	0.005	- 0.30
Altitude	(km) (nm)	228.1 123.2	246.8 133.3
Apogee	(km) (nm)	282.13 152.34	315.23 170.21
Perigee	(km) (nm)	222.29 120.03	227.82 123.01
Period	(min)	89.55	89.94
Eccentricity	---	0.0045	0.0066
Inclination	(deg)	31.608	31.640

TABLE X

EFFECTS ON ORBIT OF S-IVB SAFING EXPERIMENT

PARAMETERS	UNITS	BEGIN DUMP	END DUMP (ACTUAL)	NO DUMP (THEORETICAL)	EFFECTS OF DUMP (DUMP MINUS NO DUMP)
Range Time	sec	5668.96	6389.96	6389.96	—
Apogee	km nm	289.2 156.1	309.2 167.0	288.0 155.5	21.2 11.5
Perigee	km nm	222.6 120.2	223.1 120.5	222.7 120.2	0.4 0.3
Space-Fixed Velocity	m/s ft/s	7788.2 25551.7	7789.9 25557.3	7786.2 25545.3	3.7 12.0
Flight Path Angle	deg	- 0.095	0.175	0.122	0.053
Inclination	deg	31.617	31.614	31.614	0.000
Eccentricity	—	0.0050	0.0065	0.0049	0.0016
Period	min	89.625	89.833	89.614	0.219

TABLE XI

EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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									
-4.972	35	0	0	0.0	0.0	0.0	0.00	0.00	0.00
-4.0	35	0	0	0.0	0.0	0.0	0.00	0.00	0.00
-3.0	35	0	0	0.0	0.0	0.0	0.00	0.00	0.00
-2.0	35	0	0	0.0	0.0	0.0	0.00	0.00	0.00
-1.0	35	0	0	0.0	0.0	0.0	0.00	0.00	0.00
RANGE ZERO AT 10 02 45 EST									
0.0	35	0	0	0.0	0.0	0.0	0.00	0.00	0.00
FIRST MOTION									
0.17	35	0	0	-0.0	-0.0	-0.0	2.07	0.16	-0.22
LIFTOFF									
0.36	35	0	0	0.4	0.0	-0.0	2.11	0.15	-0.21
1.0	35	0	0	1.8	0.1	-0.2	2.23	0.11	-0.16
2.0	38	0	0	4.1	0.2	-0.3	2.39	0.06	-0.12
3.0	44	0	-0	6.5	0.2	-0.4	2.51	0.02	-0.10
4.0	51	1	-0	9.1	0.2	-0.5	2.62	-0.00	-0.10
5.0	62	1	-1	11.8	0.2	-0.6	2.70	-0.02	-0.11
6.0	75	1	-1	14.5	0.2	-0.7	2.78	-0.03	-0.12
7.0	91	1	-2	17.3	0.2	-0.8	2.85	-0.04	-0.12
8.0	110	1	-3	20.2	0.1	-1.0	2.92	-0.04	-0.13
9.0	131	2	-4	23.2	0.1	-1.1	2.99	-0.04	-0.13
10.0	156	2	-5	26.2	0.1	-1.2	3.06	-0.04	-0.13
11.0	184	2	-7	29.3	0.0	-1.4	3.13	-0.04	-0.12
12.0	215	2	-8	32.5	-0.0	-1.5	3.20	-0.04	-0.10
13.0	249	2	-9	35.7	-0.1	-1.6	3.28	-0.03	-0.08
14.0	286	2	-11	39.0	-0.1	-1.6	3.36	-0.03	-0.06
15.0	327	1	-13	42.4	-0.1	-1.7	3.44	-0.03	-0.03
16.0	371	1	-14	45.9	-0.2	-1.7	3.53	-0.04	0.00
17.0	418	1	-16	49.5	-0.2	-1.7	3.62	-0.04	0.03
18.0	470	1	-18	53.1	-0.2	-1.6	3.70	-0.04	0.07
19.0	525	0	-19	56.9	-0.3	-1.5	3.79	-0.05	0.11
20.0	584	0	-21	60.7	-0.3	-1.4	3.88	-0.05	0.16

TABLE XI
EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
21.0	646	0	-22	64.7	-0.4	-1.2	3.97	-0.06	0.21
22.0	713	-0	-23	68.7	-0.4	-1.0	4.06	-0.06	0.27
23.0	784	-0	-24	72.8	-0.5	-0.7	4.14	-0.07	0.33
24.0	858	-1	-24	76.9	-0.6	-0.3	4.23	-0.07	0.40
25.0	937	-1	-24	81.2	-0.6	0.1	4.31	-0.07	0.48
26.0	1021	-2	-24	85.6	-0.7	0.7	4.39	-0.07	0.56
27.0	1109	-3	-23	90.0	-0.8	1.3	4.48	-0.08	0.66
28.0	1201	-4	-21	94.5	-0.9	2.0	4.53	-0.09	0.77
29.0	1298	-5	-18	99.1	-0.9	2.8	4.60	-0.07	0.86
30.0	1399	-6	-15	103.8	-1.0	3.7	4.74	-0.04	0.96
31.0	1505	-7	-11	108.6	-1.1	4.7	4.79	-0.09	1.08
32.0	1616	-8	-5	113.3	-1.1	5.9	4.83	-0.07	1.18
33.0	1732	-9	0	118.2	-1.2	7.1	4.87	-0.07	1.25
34.0	1853	-10	8	123.3	-1.3	8.4	5.12	-0.06	1.42
35.0	1978	-12	18	128.4	-1.4	9.9	5.18	-0.03	1.54
36.0	2109	-13	28	133.6	-1.4	11.4	5.27	-0.12	1.63
37.0	2246	-15	41	138.8	-1.5	13.2	5.28	-0.07	1.77
38.0	2387	-16	55	144.2	-1.6	15.0	5.38	-0.02	1.93
39.0	2534	-18	71	149.6	-1.6	17.1	5.46	-0.01	2.16
40.0	2686	-20	90	155.1	-1.6	19.3	5.58	-0.00	2.29
41.0	2844	-21	110	160.8	-1.5	21.6	5.82	0.08	2.42
42.0	3008	-23	133	166.6	-1.4	24.1	5.68	0.17	2.66
43.0	3177	-24	159	172.3	-1.2	26.9	5.77	0.24	2.74
44.0	3353	-25	187	178.1	-1.0	29.7	5.96	0.31	2.81
45.0	3533	-26	219	184.1	-0.7	32.6	5.99	0.30	3.06
46.0	3721	-27	253	190.1	-0.4	35.7	6.02	0.23	3.25
47.0	3914	-27	291	196.2	-0.1	39.0	6.11	0.15	3.52
48.0	4113	-27	332	202.4	0.0	42.6	6.24	0.13	3.76
49.0	4319	-27	376	208.7	0.2	46.3	6.27	0.09	3.87
50.0	4531	-27	425	215.0	0.3	50.2	6.31	0.05	4.02
51.0	4749	-26	477	221.4	0.3	54.3	6.45	0.03	4.22
52.0	4974	-26	534	227.9	0.3	58.6	6.52	-0.02	4.40
53.0	5205	-26	595	234.4	0.3	63.0	6.52	-0.04	4.57
54.0	5443	-25	661	241.0	0.3	67.7	6.58	0.01	4.83
55.0	5687	-25	731	247.6	0.4	72.6	6.67	0.10	5.12
56.0	5938	-25	807	254.3	0.5	77.8	6.74	0.15	5.44
57.0	6196	-24	887	261.1	0.6	83.4	6.71	-0.01	5.65
58.0	6460	-23	974	267.8	0.5	89.0	6.70	-0.10	5.76
59.0	6732	-23	1066	274.5	0.5	94.8	6.74	-0.04	5.88
60.0	7010	-22	1164	281.3	0.5	100.8	6.69	0.08	6.11
61.0	7294	-22	1268	287.9	0.6	106.9	6.57	0.02	6.25
62.0	7586	-21	1378	294.5	0.6	113.2	6.46	0.07	6.28
MACH ONE									
62.15	7630	-21	1395	295.4	0.6	114.1	6.45	0.09	6.30

TABLE XI

EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
63.0	7884	-20	1495	300.9	0.7	119.5	6.41	0.19	6.43
64.0	8188	-20	1618	307.3	1.0	126.0	6.34	0.28	6.69
65.0	8498	-18	1747	313.7	1.2	132.8	6.39	0.23	6.97
66.0	8815	-17	1884	320.1	1.4	139.9	6.41	0.13	7.29
67.0	9139	-16	2027	326.6	1.4	147.3	6.47	0.01	7.64
68.0	9469	-14	2179	333.1	1.4	155.1	6.58	-0.02	7.91
69.0	9806	-13	2338	339.8	1.4	163.1	6.71	-0.04	8.18
70.0	10149	-11	2505	346.6	1.3	171.4	6.81	-0.06	8.61
71.0	10499	-10	2682	353.5	1.2	180.3	6.91	-0.15	9.06
72.0	10856	-9	2867	360.5	1.0	189.4	6.97	-0.19	9.26
73.0	11220	-8	3061	367.5	0.8	198.6	6.94	-0.20	9.19
74.0	11592	-7	3264	374.5	0.6	207.9	6.98	-0.12	9.42
75.0	11970	-7	3477	381.6	0.5	217.5	7.21	0.03	9.87
MAX Q									
75.5	12161	-6	3587	385.2	0.5	222.4	7.37	0.10	10.00
76.0	12355	-6	3700	388.9	0.6	227.5	7.44	0.18	10.16
77.0	12748	-5	3932	396.5	0.8	237.6	7.59	0.30	10.17
78.0	13148	-4	4175	404.3	1.1	248.0	7.89	0.31	10.55
79.0	13557	-3	4429	412.1	1.5	258.6	7.89	0.34	10.77
80.0	13973	-1	4693	419.9	1.8	269.6	7.87	0.31	11.18
81.0	14397	0	4968	427.8	2.0	280.8	7.89	0.16	11.40
82.0	14829	2	5255	435.8	2.2	292.5	7.95	0.19	11.78
83.0	15269	4	5554	443.9	2.4	304.4	8.21	0.20	12.16
84.0	15717	6	5865	452.1	2.4	316.7	8.42	-0.07	12.39
85.0	16173	9	6188	460.5	2.3	329.1	8.40	-0.27	12.65
86.0	16638	11	6523	468.9	1.9	341.9	8.35	-0.43	12.98
87.0	17111	13	6872	477.2	1.7	355.2	8.36	-0.10	13.41
88.0	17593	14	7234	485.7	1.5	368.8	8.46	0.09	13.73
89.0	18083	16	7610	494.2	1.7	382.7	8.62	0.01	14.08
90.0	18582	18	8000	502.9	1.8	396.9	8.81	0.04	14.38
91.0	19089	19	8404	511.7	1.7	411.5	8.83	-0.14	14.74
92.0	19606	21	8823	520.6	1.5	426.3	8.73	-0.14	15.02
93.0	20131	22	9257	529.4	1.3	441.6	8.89	-0.22	15.45
94.0	20665	24	9707	538.3	1.2	457.2	9.11	-0.14	15.86
95.0	21208	25	10172	547.4	1.1	473.1	9.18	-0.04	16.01
96.0	21760	26	10653	556.5	1.0	489.4	9.03	-0.09	16.46
97.0	22321	27	11151	565.6	1.0	506.2	9.05	-0.04	16.95
98.0	22891	28	11666	574.7	0.9	523.2	9.13	0.01	17.14
99.0	23471	28	12198	583.9	0.9	540.5	9.35	0.04	17.62
100.0	24060	29	12747	593.2	1.0	558.3	9.38	0.04	17.97
101.0	24658	30	13315	602.7	1.0	576.5	9.36	0.01	18.17

TABLE XI
EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
102.0	25265	31	13900	612.1	1.0	594.8	9.51	0.04	18.59
103.0	25882	32	14504	621.6	1.0	613.4	9.56	-0.01	18.87
104.0	26509	33	15127	631.1	1.0	632.5	9.55	-0.02	19.09
105.0	27145	34	15770	640.7	1.0	651.9	9.56	-0.03	19.60
106.0	27791	35	16431	650.4	1.0	671.7	9.76	0.02	20.11
107.0	28446	36	17113	660.2	1.0	691.8	9.83	0.09	20.33
108.0	29112	38	17815	670.0	1.1	712.3	9.86	0.09	20.62
109.0	29787	39	18538	680.0	1.2	733.2	9.94	0.06	20.97
110.0	30472	40	19282	689.9	1.3	754.4	10.02	0.06	21.45
111.0	31167	41	20047	700.0	1.3	776.0	10.14	0.06	21.85
112.0	31872	43	20834	710.1	1.4	798.0	10.09	0.06	22.01
113.0	32588	44	21643	720.2	1.4	820.3	10.05	0.04	22.62
114.0	33313	46	22475	730.3	1.5	843.2	10.17	0.04	23.32
115.0	34049	47	23330	740.5	1.5	866.5	10.21	0.06	23.47
116.0	34794	49	24208	750.7	1.6	890.2	10.18	0.05	23.66
117.0	35550	50	25110	760.9	1.6	914.1	10.26	0.07	24.06
118.0	36317	52	26036	771.1	1.7	938.4	10.25	0.06	24.82
119.0	37093	54	26987	781.5	1.8	963.5	10.37	0.11	25.26
120.0	37880	55	27963	791.8	1.9	988.9	10.30	0.10	25.54
121.0	38677	57	28965	802.2	2.0	1014.6	10.32	0.10	25.97
122.0	39485	60	29993	812.5	2.1	1041.0	10.43	0.12	26.55
123.0	40303	62	31047	822.9	2.2	1067.7	10.31	0.08	26.93
124.0	41131	64	32128	833.2	2.3	1094.8	10.47	0.09	27.49
125.0	41970	66	33237	843.7	2.5	1122.5	10.47	0.14	27.82
126.0	42819	69	34373	854.2	2.5	1150.7	10.43	0.10	28.22
127.0	43679	71	35538	864.7	2.6	1179.2	10.51	0.04	28.93
128.0	44549	74	36732	875.3	2.7	1208.2	10.69	0.07	29.28
129.0	45430	77	37955	885.9	2.8	1237.9	10.61	0.09	29.82
130.0	46321	80	39207	896.5	2.8	1267.9	10.60	0.07	30.34
131.0	47223	82	40490	907.2	2.9	1298.4	10.65	0.06	30.82
132.0	48136	85	41804	918.0	3.0	1329.6	10.70	0.06	31.36
133.0	49059	88	43149	928.7	3.1	1361.1	10.70	0.08	31.81
134.0	49994	91	44526	939.5	3.2	1393.2	10.72	0.08	32.32
135.0	50939	95	45935	950.4	3.3	1425.8	10.80	0.08	32.94
136.0	51895	98	47377	961.3	3.4	1459.1	10.97	0.08	33.53
137.0	52862	101	48853	972.5	3.5	1492.8	11.18	0.10	33.92
138.0	53840	105	50362	983.8	3.6	1526.9	11.40	0.10	34.42
139.0	54830	109	51906	995.4	3.7	1561.3	11.76	0.10	35.11
140.0	55831	112	53485	1007.3	3.8	1596.3	11.87	0.10	35.90
IECO									
140.65	56489	115	54529	1014.2	3.9	1617.9	10.83	0.11	34.90

TABLE XI

EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
141.0	56844	116	55097	1018.7	3.9	1628.0	2.23	0.08	23.08
142.0	57864	120	56735	1020.3	4.0	1648.1	1.54	0.09	18.08
143.0	58885	124	58392	1021.9	4.1	1666.1	1.60	0.10	18.29
144.0	59908	128	60067	1023.4	4.2	1683.8	1.41	0.10	18.47
OECO									
144.32	60235	130	60606	1023.1	4.3	1689.1	0.85	0.10	17.38
145.0	60931	133	61758	1019.2	4.3	1692.2	-9.04	0.07	1.76
S-IB/S-IVB SEPARATION SIGNAL									
145.59	61531	135	62756	1013.8	4.4	1692.2	-9.43	0.07	0.15
150.0	65917	155	70216	975.2	4.6	1695.7	-7.10	0.04	3.53
155.0	70716	179	78755	945.4	4.6	1721.5	-5.51	-0.05	5.72
160.0	75375	201	87435	918.4	4.4	1751.0	-5.44	0.00	5.96
165.0	79899	223	96266	891.5	4.3	1781.2	-5.28	-0.02	6.04
GUIDANCE INITIATION									
169.76	84083	243	104815	866.7	4.1	1810.8	-5.10	-0.04	6.29
170.0	84291	244	105249	865.5	4.1	1812.4	-5.08	-0.01	6.29
175.0	88554	264	114390	840.2	4.2	1843.9	-4.84	0.25	6.26
180.0	92698	289	123686	817.8	6.0	1874.2	-4.17	0.40	5.89
185.0	96734	324	133130	797.0	7.9	1903.7	-4.15	0.39	5.90
190.0	100668	368	142722	776.3	9.8	1933.2	-4.17	0.39	6.02
195.0	104498	422	152464	755.5	11.7	1963.6	-4.14	0.41	6.13
200.0	108223	485	162359	734.7	13.8	1994.6	-4.21	0.45	6.22
205.0	111844	559	172410	713.6	15.9	2026.0	-4.17	0.44	6.35
210.0	115360	645	182620	692.7	18.2	2058.0	-4.20	0.48	6.47
215.0	118771	742	192992	671.7	20.7	2090.6	-4.18	0.53	6.62
220.0	122077	852	203528	650.7	23.3	2123.9	-4.21	0.55	6.67
225.0	125278	975	214231	629.5	26.1	2157.5	-4.21	0.59	6.80
230.0	128372	1113	225104	608.3	29.1	2191.7	-4.19	0.61	6.92
235.0	131361	1266	236149	587.1	32.2	2226.5	-4.26	0.58	7.04
240.0	134244	1435	247370	565.9	35.3	2261.9	-4.21	0.66	7.13
245.0	137021	1621	258769	544.8	38.8	2297.9	-4.21	0.39	7.22
250.0	139692	1823	270349	523.5	42.0	2334.3	-4.25	0.65	7.33
255.0	142256	2041	282113	502.1	45.5	2371.3	-4.28	0.70	7.49
260.0	144713	2278	294063	480.6	49.0	2408.8	-4.25	0.77	7.57
265.0	147063	2532	306202	459.4	52.7	2447.0	-4.25	0.77	7.69

TABLE XI
EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
270.0	149307	2805	318534	438.1	56.5	2485.8	-4.26	0.74	7.82
275.0	151444	3097	331061	416.8	60.3	2525.3	-4.27	0.76	7.97
280.0	153474	3408	343788	395.3	64.3	2565.4	-4.33	0.81	8.08
285.0	155397	3740	356717	373.6	68.3	2606.2	-4.39	0.75	8.22
290.0	157210	4092	369851	351.9	72.5	2647.5	-4.39	0.84	8.30
295.0	158915	4465	383193	330.0	76.7	2689.5	-4.34	0.87	8.43
300.0	160511	4859	396747	308.2	81.0	2732.2	-4.40	0.87	8.69
305.0	161998	5274	410516	286.4	85.3	2775.7	-4.41	0.89	8.81
310.0	163375	5712	424506	264.4	89.9	2820.1	-4.42	0.93	8.95
315.0	164642	6173	438718	242.4	94.4	2864.9	-4.43	0.91	9.11
320.0	165798	6657	453157	220.1	99.1	2910.7	-4.45	0.92	9.18
325.0	166843	7164	467826	197.6	103.8	2957.1	-4.50	0.94	9.36
330.0	167775	7695	482729	175.0	108.6	3004.3	-4.59	0.97	9.53
335.0	168593	8251	497870	152.3	113.5	3052.2	-4.52	0.99	9.64
340.0	169297	8830	513253	129.4	118.5	3101.0	-4.56	1.03	9.81
345.0	169887	9435	528881	106.3	123.5	3150.6	-4.65	1.00	10.07
350.0	170360	10066	544760	83.1	128.7	3201.2	-4.69	1.03	10.24
355.0	170718	10723	560895	59.7	134.0	3252.7	-4.68	1.06	10.46
360.0	170957	11406	577289	36.1	139.3	3305.3	-4.73	1.08	10.60
365.0	171078	12116	593949	12.1	144.7	3358.6	-4.85	1.07	10.83
370.0	171078	12853	610877	-12.1	150.3	3412.9	-4.90	1.12	10.94
375.0	170957	13619	628079	-36.6	155.9	3468.0	-4.92	1.16	11.08
380.0	170712	14412	645559	-61.5	161.6	3524.1	-4.94	1.19	11.30
385.0	170342	15235	663323	-86.5	167.4	3581.4	-5.04	1.16	11.53
390.0	169847	16087	681374	-111.8	173.4	3639.5	-5.18	1.17	11.76
395.0	169223	16969	699720	-137.6	179.3	3698.9	-5.14	1.20	11.89
400.0	168470	17881	718364	-163.7	185.6	3758.9	-5.33	1.21	12.09
405.0	167586	18824	737312	-190.2	191.9	3820.3	-5.25	1.34	12.42
410.0	166568	19800	756569	-216.9	198.2	3882.9	-5.41	1.30	12.72
415.0	165416	20807	776143	-244.1	204.7	3946.8	-5.46	1.33	12.96
420.0	164127	21847	796039	-271.7	211.4	4011.9	-5.54	1.35	13.23
425.0	162699	22921	816264	-299.7	218.2	4078.5	-5.65	1.38	13.38
430.0	161129	24029	836824	-328.4	225.1	4145.8	-5.83	1.35	13.68
435.0	159414	25172	857725	-357.7	232.1	4214.7	-5.95	1.40	13.91
440.0	157551	26351	878973	-387.5	239.3	4285.0	-6.03	1.46	14.20
445.0	155538	27566	900577	-417.8	246.7	4356.7	-6.16	1.47	14.52
450.0	153372	28818	922543	-448.8	254.1	4429.8	-6.27	1.50	14.77
455.0	151050	30107	944878	-480.2	261.8	4504.5	-6.43	1.52	15.10
460.0	148566	31435	967576	-513.7	268.9	4571.3	-6.97	1.36	11.88
465.0	145910	32796	990580	-549.1	275.7	4630.5	-7.08	1.38	11.90
470.0	143075	34192	1013882	-584.9	282.6	4690.3	-7.23	1.37	12.03
475.0	140060	35622	1037484	-621.4	289.6	4750.9	-7.33	1.42	12.31
480.0	136860	37087	1061393	-658.5	296.5	4812.6	-7.43	1.39	12.38
485.0	133474	38587	1085612	-696.2	303.5	4875.2	-7.57	1.41	12.62

TABLE XI

EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
490.0	129897	40123	1110146	-734.6	310.6	4939.0	-7.79	1.38	12.89
495.0	126127	41693	1135003	-773.4	317.7	5004.0	-7.76	1.44	13.07
500.0	122162	43299	1160188	-812.8	324.8	5070.1	-7.91	1.45	13.34
505.0	117999	44942	1185736	-853.0	332.1	5137.4	-8.14	1.47	13.61
510.0	113632	46620	1211563	-894.1	339.4	5205.7	-8.36	1.47	13.88
515.0	109056	48336	1237766	-936.4	346.9	5275.6	-8.57	1.49	14.16
520.0	104266	50089	1264320	-979.7	354.4	5346.5	-8.79	1.53	14.39
525.0	99257	51880	1291233	-1024.4	362.1	5418.9	-8.98	1.54	14.51
530.0	94021	53710	1318511	-1070.0	370.0	5492.6	-9.20	1.62	14.84
535.0	88555	55581	1346161	-1116.8	378.1	5567.7	-9.47	1.63	15.13
540.0	82851	57491	1374190	-1164.8	386.3	5644.2	-9.70	1.68	15.44
545.0	76905	59444	1402605	-1213.9	394.7	5722.3	-9.99	1.72	15.80
550.0	70710	61439	1431415	-1264.3	403.3	5802.0	-10.21	1.75	16.13
555.0	64260	63477	1460627	-1315.9	412.2	5883.3	-10.54	1.75	16.47
560.0	57549	65560	1490250	-1368.9	421.1	5966.2	-10.72	1.81	16.69
565.0	50570	67689	1520291	-1423.0	430.5	6050.9	-10.86	1.92	17.09
570.0	43317	69866	1550761	-1478.5	440.0	6137.5	-11.20	1.94	17.50
575.0	35782	72089	1581668	-1535.4	449.6	6225.9	-11.42	1.95	17.76
580.0	27960	74362	1613022	-1593.5	459.6	6316.2	-11.77	2.00	18.32
585.0	19844	76685	1644834	-1653.4	469.8	6408.9	-12.07	2.07	18.67
590.0	11424	79060	1677114	-1714.6	480.1	6503.7	-12.40	2.15	19.30
595.0	2694	81487	1709874	-1777.3	490.8	6600.6	-12.79	2.14	19.70
600.0	-6356	83969	1743123	-1843.9	501.6	6700.0	-13.53	2.13	19.96
605.0	-15744	86504	1776874	-1911.6	512.6	6801.3	-13.64	2.20	20.64
610.0	-25472	89095	1811140	-1979.9	523.8	6906.1	-13.71	2.30	21.37
615.0	-35542	91744	1845939	-2048.3	535.7	7014.2	-13.68	2.38	21.82
S-IVB GUIDANCE CUTOFF									
616.76	-39168	92690	1858317	-2072.3	539.8	7052.5	-13.63	2.41	21.95
620.0	-45929	94443	1881175	-2099.8	541.8	7052.9	-7.87	0.45	-2.38
625.0	-56526	97158	1916410	-2139.1	544.1	7040.9	-7.85	0.44	-2.42
ORBIT INSERTION									
626.76	-60303	98116	1928798	-2152.9	544.9	7036.6	-7.85	0.44	-2.44
650.0	-112449	110897	2091652	-2334.6	555.0	6977.8	-7.79	0.42	-2.61
700.0	-238935	139451	2437024	-2720.2	576.0	6835.8	-7.62	0.40	-3.07
750.0	-384402	168729	2774795	-3097.0	594.8	6671.5	-7.44	0.36	-3.49
800.0	-548471	198902	3103833	-3464.1	611.8	6486.6	-7.24	0.32	-3.90
850.0	-730628	229872	3423114	-3820.3	626.6	6281.4	-7.01	0.28	-4.30
900.0	-930303	261530	3731646	-4164.6	639.3	6056.7	-6.76	0.23	-4.68

TABLE XI

EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
950.0	-1146871	293761	4028470	-4495.8	649.6	5813.2	-6.49	0.18	-5.05
1000.0	-1379654	326445	4312665	-4813.0	657.4	5551.7	-6.20	0.13	-5.40
1050.0	-1627922	359454	4583352	-5115.1	662.5	5273.0	-5.89	0.08	-5.74
1100.0	-1890899	392653	4839694	-5401.2	665.0	4978.0	-5.56	0.02	-6.06
1150.0	-2167763	425905	5080901	-5670.5	664.6	4667.8	-5.21	-0.04	-6.35
1200.0	-2457649	459066	5306231	-5922.0	661.3	4343.1	-4.85	-0.10	-6.63
1250.0	-2759653	491990	5514994	-6155.0	655.1	4005.2	-4.47	-0.16	-6.88
1300.0	-3072831	524525	5706551	-6368.9	645.8	3655.1	-4.08	-0.22	-7.12
1350.0	-3396209	556518	5880321	-6562.9	633.4	3293.9	-3.68	-0.28	-7.33
1400.0	-3728779	587814	6035777	-6736.5	617.9	2922.8	-3.26	-0.34	-7.51
1450.0	-4069508	618257	6172452	-6889.1	599.3	2542.9	-2.84	-0.40	-7.68
1500.0	-4417336	647688	6289938	-7020.4	577.5	2155.4	-2.41	-0.47	-7.82
1550.0	-4771184	675950	6387889	-7129.9	552.5	1761.7	-1.97	-0.53	-7.93
1600.0	-5129957	702887	6466021	-7217.3	524.5	1362.8	-1.53	-0.59	-8.02
1650.0	-5492542	728344	6524110	-7282.4	493.3	960.2	-1.08	-0.65	-8.08
1700.0	-5857821	752168	6561998	-7325.0	459.1	555.0	-0.63	-0.71	-8.12
1750.0	-6224665	774209	6579591	-7345.0	422.0	148.6	-0.17	-0.77	-8.13
1800.0	-6591944	794321	6576856	-7342.4	382.0	-257.9	0.28	-0.83	-8.12
1850.0	-6958528	812363	6553825	-7317.2	339.2	-663.0	0.73	-0.88	-8.08
1900.0	-7323291	828197	6510594	-7269.6	293.7	-1065.7	1.18	-0.94	-8.02
1950.0	-7685115	841693	6447321	-7199.7	245.7	-1464.5	1.62	-0.99	-7.93
2000.0	-8042891	852726	6364226	-7107.7	195.3	-1858.3	2.06	-1.03	-7.82
2050.0	-8395527	861181	6261591	-6994.1	142.6	-2245.9	2.49	-1.08	-7.68
2100.0	-8741947	866947	6139756	-6859.2	87.7	-2626.1	2.91	-1.12	-7.52
2150.0	-9081095	869923	5999123	-6703.3	31.0	-2997.7	3.32	-1.15	-7.34
2200.0	-9411942	870019	5840149	-6527.2	-27.5	-3359.6	3.72	-1.19	-7.13
2250.0	-9733484	867150	5663347	-6331.2	-87.5	-3710.6	4.11	-1.21	-6.91
2300.0	-10044747	861245	5469284	-6116.2	-148.9	-4049.8	4.49	-1.24	-6.66
2350.0	-10344792	852242	5258579	-5882.6	-211.4	-4376.1	4.85	-1.26	-6.39
2400.0	-10632714	840090	5031902	-5631.4	-274.8	-4688.6	5.20	-1.28	-6.1[illegible]
2450.0	-10907645	824750	4789968	-5363.2	-338.9	-4986.2	5.53	-1.29	-5.80
2500.0	-11168762	806193	4533540	-5078.9	-403.4	-5268.2	5.84	-1.29	-5.48
2550.0	-11415281	784403	4263421	-4779.4	-468.2	-5533.7	6.14	-1.29	-5.14
2600.0	-11646464	759377	3980457	-4465.6	-532.8	-5781.9	6.41	-1.29	-4.79
2650.0	-11861623	731124	3685529	-4138.6	-597.2	-6012.1	6.67	-1.28	-4.42
2700.0	-12060116	699664	3379554	-3799.2	-661.0	-6223.7	6.90	-1.27	-4.04
2750.0	-12241354	665033	3063481	-3448.5	-724.0	-6416.0	7.12	-1.25	-3.65
2800.0	-12404799	627278	2738287	-3087.7	-786.0	-6588.4	7.31	-1.23	-3.25
2850.0	-12549967	586458	2404975	-2717.7	-846.6	-6740.6	7.48	-1.20	-2.84
2900.0	-12676430	542647	2064572	-2339.6	-905.6	-6872.0	7.63	-1.16	-2.42
2950.0	-12783817	495931	1718122	-1954.8	-962.7	-6982.4	7.76	-1.12	-1.99
3000.0	-12871811	446408	1366689	-1564.1	-1017.8	-7 71.3	7.86	-1.08	-1.56
3050.0	-12940155	394189	1011348	-1169.0	-1070.5	-7138.7	7.94	-1.03	-1.13
3100.0	-12988653	339399	653186	-770.4	-1120.6	-7184.2	8.00	-0.97	-0.69

TABLE XI
EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
3150.0	-13017162	282173	293296	-369.7	-1167.9	-7207.8	8.03	-0.92	-0.25
3200.0	-13025604	222658	-67225	32.1	-1212.1	-7209.4	8.04	-0.85	0.19
3250.0	-13013958	161014	-427279	433.7	-1253.1	-7189.1	8.02	-0.78	0.63
3300.0	-12982262	97411	-785771	833.9	-1290.5	-7146.9	7.98	-0.71	1.06
3350.0	-12930614	32031	-1141610	1231.5	-1324.1	-7083.0	7.92	-0.63	1.49
3400.0	-12859172	-34935	-1493716	1625.4	-1353.9	-6997.6	7.83	-0.55	1.92
3450.0	-12768151	-103288	-1841019	2014.5	-1379.5	-6891.0	7.72	-0.47	2.34
3500.0	-12657825	-172816	-2182465	2397.5	-1400.9	-6763.4	7.59	-0.38	2.76
3550.0	-12528524	-243301	-2517017	2773.3	-1417.8	-6615.3	7.44	-0.29	3.16
3600.0	-12380636	-314518	-2843661	3140.8	-1430.1	-6447.1	7.26	-0.20	3.56
3650.0	-12214602	-386231	-3161405	3498.9	-1437.7	-6259.4	7.06	-0.10	3.95
3700.0	-12030920	-458202	-3469285	3846.6	-1440.4	-6052.7	6.84	-0.00	4.32
3750.0	-11830138	-530185	-3766365	4182.7	-1438.1	-5827.5	6.60	0.10	4.68
3800.0	-11612857	-601928	-4051743	4506.4	-1430.8	-5584.7	6.34	0.20	5.03
3850.0	-11379726	-673179	-4324552	4816.5	-1418.4	-5324.9	6.06	0.30	5.36
3900.0	-11131443	-743679	-4583963	5112.3	-1400.8	-5048.9	5.76	0.40	5.68
3950.0	-10868752	-813168	-4829185	5392.7	-1377.9	-4757.5	5.45	0.51	5.98
4000.0	-10592440	-881385	-5059473	5657.0	-1349.9	-4451.7	5.12	0.61	6.26
4050.0	-10303338	-948068	-5274125	5904.2	-1316.6	-4132.2	4.77	0.72	6.52
4100.0	-10002312	-1012957	-5472485	6133.8	-1278.1	-3800.2	4.41	0.82	6.76
4150.0	-9690271	-1075791	-5653948	6344.8	-1234.4	-3456.5	4.03	0.92	6.98
4200.0	-9368152	-1136315	-5817959	6536.7	-1185.7	-3102.3	3.64	1.03	7.18
4250.0	-9036928	-1194274	-5964018	6708.9	-1131.9	-2738.6	3.24	1.13	7.36
4300.0	-8697601	-1249420	-6091676	6860.8	-1073.2	-2366.5	2.83	1.22	7.52
4350.0	-8351197	-1301509	-6200544	6991.9	-1009.6	-1987.1	2.41	1.32	7.65
4400.0	-7998766	-1350305	-6290288	7101.8	-941.5	-1601.7	1.98	1.41	7.76
4450.0	-7641378	-1395579	-6360632	7190.1	-868.8	-1211.4	1.55	1.50	7.85
4500.0	-7280120	-1437111	-6411361	7256.5	-791.8	-817.3	1.11	1.58	7.91
4550.0	-6916093	-1474690	-6442321	7300.8	-710.7	-420.8	0.66	1.66	7.95
4600.0	-6550407	-1508114	-6453418	7322.9	-625.7	-23.0	0.22	1.74	7.96
4650.0	-6184180	-1537197	-6444619	7322.5	-537.0	374.8	-0.23	1.81	7.95
4700.0	-5818533	-1561761	-6415954	7299.7	-445.0	771.4	-0.68	1.87	7.91
4750.0	-5454586	-1581643	-6367515	7254.5	-349.8	1165.6	-1.13	1.93	7.85
4800.0	-5093458	-1596694	-6299455	7187.0	-251.8	1556.1	-1.57	1.99	7.76
4850.0	-4736259	-1606781	-6211987	7097.3	-151.3	1941.7	-2.01	2.03	7.65
4900.0	-4384088	-1611784	-6105389	6985.9	-48.5	2321.2	-2.45	2.07	7.52
4950.0	-4038032	-1611603	-5979994	6852.8	56.1	2693.3	-2.87	2.11	7.36
5000.0	-3699160	-1606152	-5836198	6698.6	162.2	3057.0	-3.29	2.14	7.18
5050.0	-3368519	-1595364	-5674453	6523.6	269.5	3411.1	-3.70	2.16	6.98
5100.0	-3047132	-1579190	-5495268	6328.5	377.6	3754.4	-4.10	2.17	6.75
5150.0	-2735995	-1557599	-5299207	6113.7	486.1	4085.9	-4.49	2.17	6.51
5200.0	-2436075	-1530580	-5086888	5880.0	594.6	4404.6	-4.86	2.17	6.24
5250.0	-2148301	-1498141	-4858979	5628.0	702.8	4709.4	-5.22	2.16	5.95
5300.0	-1873568	-1460309	-4616199	5358.5	810.3	4999.3	-5.56	2.14	5.64

TABLE XI
EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
5350.0	-1612730	-1417132	-4359312	5072.3	916.6	5273.5	-5.88	2.11	5.32
5400.0	-1366600	-1368677	-4089127	4770.3	1021.3	5531.1	-6.19	2.08	4.98
5450.0	-1135944	-1315032	-3806496	4453.5	1124.1	5771.2	-6.48	2.03	4.62
5500.0	-921479	-1256302	-3512309	4122.8	1224.6	5993.2	-6.75	1.98	4.25
5550.0	-723876	-1192616	-3207493	3779.3	1322.3	6196.3	-6.99	1.92	3.87
5600.0	-543743	-1124118	-2892989	3424.4	1417.1	6381.0	-7.20	1.86	3.51
5650.0	-381618	-1050964	-2569731	3058.9	1508.5	6545.9	-7.41	1.79	3.09
5700.0	-238014	-973334	-2238754	2683.7	1596.0	6689.6	-7.59	1.71	2.66
5750.0	-113387	-891433	-1901122	2300.0	1679.3	6812.1	-7.75	1.62	2.23
5800.0	-8132	-805487	-1557904	1909.1	1757.8	6913.0	-7.88	1.52	1.80
5850.0	77421	-715736	-1210186	1512.2	1831.4	6992.1	-7.99	1.42	1.36
5900.0	143007	-622440	-859062	1110.6	1899.6	7049.2	-8.07	1.31	0.92
5950.0	188419	-525868	-505634	705.5	1962.3	7084.2	-8.13	1.20	0.48
6000.0	213413	-426390	-150973	298.5	2018.6	7096.9	-8.16	1.08	0.03
6050.0	218136	-324168	203729	-109.6	2069.3	7087.5	-8.16	0.95	-0.41
6100.0	202457	-219568	557409	-517.4	2113.6	7056.0	-8.14	0.82	-0.85
6150.0	166429	-112917	908961	-923.4	2151.3	7002.4	-8.10	0.69	-1.29
6200.0	110166	-4554	1257290	-1326.5	2182.0	6927.1	-8.02	0.54	-1.72
6250.0	33849	105168	1601314	-1725.4	2205.7	6830.3	-7.93	0.40	-2.15
6300.0	-62281	215890	1939966	-2118.8	2222.0	6712.3	-7.81	0.25	-2.57
6350.0	-177919	327244	2272199	-2505.5	2230.9	6573.6	-7.66	0.10	-2.98
6400.0	-312697	438859	2596992	-2884.2	2232.5	6414.8	-7.49	-0.04	-3.38
6450.0	-466186	550372	2913350	-3253.7	2226.8	6236.3	-7.29	-0.18	-3.76
6500.0	-637891	661430	3220309	-3612.7	2214.3	6038.9	-7.08	-0.34	-4.14
6550.0	-827275	771648	3516924	-3960.6	2193.2	5822.7	-6.84	-0.50	-4.50
6600.0	-1033749	880623	3802287	-4296.2	2164.5	5588.9	-6.58	-0.65	-4.85
6650.0	-1256666	987972	4075532	-4618.2	2128.2	5338.2	-6.30	-0.80	-5.18
6700.0	-1495327	1093316	4335837	-4925.8	2084.3	5071.4	-6.00	-0.95	-5.49
6750.0	-1748987	1196276	4582422	-5218.0	2032.9	4789.5	-5.68	-1.10	-5.78
6800.0	-2016853	1296480	4814552	-5493.9	1974.1	4493.4	-5.35	-1.25	-6.06
6850.0	-2298090	1393561	5031541	-5752.7	1908.0	4184.0	-5.00	-1.39	-6.31
6900.0	-2591825	1487160	5232750	-5993.6	1834.8	3862.4	-4.64	-1.53	-6.55
6950.0	-2897145	1576926	5417595	-6216.0	1754.7	3529.6	-4.26	-1.67	-6.76
7000.0	-3213103	1662517	5585543	-6419.1	1667.9	3186.7	-3.87	-1.80	-6.95
7050.0	-3538724	1743604	5736116	-6602.4	1574.5	2834.8	-3.46	-1.93	-7.12
7100.0	-3873001	1819869	5868892	-6765.3	1475.0	2475.0	-3.05	-2.05	-7.27
7150.0	-4214905	1891007	5983506	-6907.4	1369.5	2108.5	-2.63	-2.17	-7.39
7200.0	-4563385	1956730	6079650	-7028.3	1258.4	1736.4	-2.20	-2.28	-7.49
7250.0	-4917372	2016764	6157076	-7127.6	1142.0	1360.[illegible]	-1.77	-2.38	-7.57
7300.0	-5275782	2070852	6215593	-7205.2	1020.7	980.3	-1.33	-2.47	-7.62
7350.0	-5637521	2118756	6255071	-7260.7	894.7	598.6	-0.89	-2.56	-7.65
7400.0	-6001486	2160256	6275436	-7294.2	764.6	216.0	-0.45	-2.64	-7.65
7450.0	-6366570	2195152	6276678	-7305.5	630.6	-166.2	-0.00	-2.71	-7.63
7500.0	-6731666	2223265	6258841	-7294.7	493.3	-546.9	0.44	-2.78	-7.59

TABLE XI
EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
7550.0	-7095668	2244435	6222030	-7261.8	353.0	-925.0	0.88	-2.83	-7.53
7600.0	-7457477	2258527	6166407	-7207.0	210.2	-1299.2	1.31	-2.88	-7.44
7650.0	-7816002	2265426	6092190	-7130.4	65.4	-1668.5	1.75	-2.91	-7.33
7700.0	-8170165	2265041	5999653	-7032.5	-81.0	-2031.8	2.17	-2.94	-7.20
7750.0	-8518902	2257305	5889125	-6913.5	-228.6	-2388.0	2.59	-2.96	-7.05
7800.0	-8861171	2242173	5760988	-6773.8	-376.8	-2736.0	3.02	-2.97	-6.87
7850.0	-9195946	2219627	5615674	-6613.9	-525.1	-3074.9	3.40	-2.97	-6.68
7900.0	-9522230	2189670	5453669	-6434.2	-673.1	-3403.6	3.79	-2.95	-6.47
7950.0	-9839052	2152331	5275503	-6235.5	-820.3	-3721.1	4.16	-2.93	-6.23
8000.0	-10145469	2107663	5081755	-6018.2	-966.2	-4026.7	4.53	-2.90	-5.99
8050.0	-10440573	2055745	4873048	-5783.1	-1110.2	-4319.4	4.88	-2.86	-5.72
8100.0	-10723489	1996677	4650047	-5530.8	-1252.0	-4598.3	5.21	-2.81	-5.44
8150.0	-10993381	1930587	4413458	-5262.2	-1391.1	-4862.8	5.53	-2.75	-5.14
8200.0	-11249452	1857624	4164024	-4978.1	-1526.9	-5112.0	5.83	-2.68	-4.83
8250.0	-11490944	1777962	3902524	-4679.3	-1659.0	-5345.3	6.12	-2.60	-4.50
8300.0	-11717147	1691797	3629772	-4366.6	-1786.9	-5562.0	6.38	-2.51	-4.16
8350.0	-11927395	1599349	3346609	-4041.2	-1910.2	-5761.6	6.63	-2.42	-3.82
8400.0	-12121067	1500859	3053908	-3703.8	-2028.5	-5943.5	6.86	-2.31	-3.46
8450.0	-12297593	1396591	2752566	-3355.5	-2141.3	-6107.2	7.07	-2.20	-3.09
8500.0	-12456454	1286830	2443502	-2997.4	-2248.2	-6252.3	7.26	-2.08	-2.71
8550.0	-12597182	1171878	2127656	-2630.4	-2348.8	-6378.4	7.42	-1.95	-2.33
8600.0	-12719361	1052061	1805988	-2255.6	-2442.8	-6485.1	7.57	-1.81	-1.94
8650.0	-12822629	927720	1479469	-1874.1	-2529.7	-6572.3	7.69	-1.67	-1.55
8700.0	-12906681	799216	1149084	-1487.1	-2609.2	-6639.7	7.79	-1.52	-1.15
8750.0	-12971266	666924	815827	-1095.6	-2681.1	-6687.2	7.87	-1.36	-0.75
8800.0	-13016190	531238	480700	-700.9	-2745.0	-6714.6	7.92	-1.2[illegible]	-0.35
8850.0	-13041316	392565	144706	-303.9	-2800.6	-6721.8	7.95	-1.03	0.06
8900.0	-13046564	251324	-191148	94.0	-2847.6	-6709.0	7.96	-0.85	0.46
8950.0	-13031913	107948	-525861	491.9	-2885.9	-6676.2	7.95	-0.68	0.86
9000.0	-12997399	-37118	-858432	888.4	-2915.2	-6623.4	7.91	-0.50	1.25
9050.0	-12943116	-183422	-1187872	1282.5	-2935.4	-6550.9	7.85	-0.31	1.65
9100.0	-12869214	-330503	-1513198	1672.9	-2946.3	-6458.9	7.77	-0.12	2.03
9150.0	-12775903	-477891	-1833443	2058.6	-2947.7	-6347.7	7.66	0.07	2.41
9200.0	-12663449	-625111	-2147654	2438.5	-2939.6	-6217.6	7.53	0.26	2.79
9250.0	-12532174	-771686	-2454898	2811.3	-2921.8	-6069.1	7.38	0.45	3.15
9300.0	-12382456	-917133	-2754262	3176.0	-2894.5	-5902.5	7.21	0.64	3.51
9350.0	-12214727	-1060971	-3044856	3531.5	-2857.4	-5718.4	7.01	0.84	3.85
9400.0	-12029475	-1202716	-3325819	3876.8	-2810.8	-5517.3	6.80	1.03	4.19
9450.0	-11827239	-1341889	-3596315	4210.7	-2754.6	-5299.9	6.56	1.22	4.51
9500.0	-11608607	-1478014	-3855544	4532.4	-2688.8	-5066.7	6.30	1.41	4.82
9550.0	-11374222	-1610618	-4102734	4840.7	-2613.8	-4818.5	6.03	1.59	5.11
9600.0	-11124770	-1739236	-4337154	5134.9	-2529.4	-4556.0	5.73	1.78	5.39
9650.0	-10860987	-1863412	-4558108	5413.9	-2436.1	-4280.0	5.42	1.96	5.65
9700.0	-10583652	-1982699	-4764941	5676.8	-2333.9	-3991.3	5.09	2.13	5.89

TABLE XI

EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
9750.0	-10293585	-2096661	-4957042	5923.0	-2223.2	-3690.8	4.75	2.30	6.12
9800.0	-9991649	-2204878	-5133842	6151.5	-2104.1	-3379.4	4.39	2.46	6.33
9850.0	-9678743	-2306942	-5294820	6361.7	-1977.1	-3058.1	4.02	2.62	6.52
9900.0	-9355801	-2402461	-5439500	6552.8	-1842.4	-2727.7	3.63	2.77	6.69
9950.0	-9023790	-2491062	-5567459	6724.3	-1700.5	-2389.4	3.23	2.91	6.84
10000.0	-8683707	-2572391	-5678321	6875.6	-1551.6	-2044.1	2.82	3.04	6.97
10050.0	-8336576	-2646116	-5771766	7006.1	-1396.3	-1692.8	2.40	3.17	7.08
10100.0	-7983446	-2711925	-5847524	7115.5	-1235.1	-1336.8	1.97	3.28	7.16
10150.0	-7625384	-2769530	-5905379	7203.3	-1068.3	-976.9	1.54	3.39	7.23
10200.0	-7263477	-2818668	-5945172	7269.3	-896.5	-614.5	1.10	3.48	7.27
10250.0	-6898826	-2859102	-5966799	7313.1	-720.2	-250.4	0.65	3.57	7.29
10300.0	-6532542	-2890622	-5970210	7334.6	-540.0	114.0	0.21	3.64	7.28
10350.0	-6165745	-2913046	-5955414	7333.6	-356.4	477.7	-0.24	3.70	7.26
10400.0	-5799557	-2926221	-5922474	7310.2	-170.1	839.5	-0.68	3.75	7.21
10450.0	-5435096	-2930019	-5871509	7264.4	18.5	1198.4	-1.14	3.79	7.14
10500.0	-5073492	-2924347	-5802702	7196.0	208.6	1553.1	-1.59	3.81	7.04
S-IVB/CSM SEPARATION									
10502.4	-5056241	-2923801	-5798890	7192.0	217.7	1569.9	-1.61	3.81	7.04

TABLE XII
SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
GUIDANCE REFERENCE RELEASE									
-4.972	-4634.380	3158.560	3027.488	-230.3	-337.9	0.0	0.02	-0.02	0.00
-4.0	-4634.604	3158.232	3027.488	-230.3	-338.0	0.0	0.02	-0.02	0.00
-3.0	-4634.834	3157.894	3027.488	-230.3	-338.0	0.0	0.02	-0.02	0.00
-2.0	-4635.064	3157.556	3027.488	-230.3	-338.0	0.0	0.02	-0.02	0.00
-1.0	-4635.294	3157.218	3027.488	-230.2	-338.0	0.0	0.02	-0.02	0.00
RANGE ZERO AT 10 02 45 EST									
0.0	-4635.525	3156.880	3027.488	-230.2	-338.0	0.0	0.02	-0.02	0.00
FIRST MOTION									
0.17	-4635.564	3156.823	3027.488	-230.2	-338.0	0.0	-1.47	1.20	0.79
LIFTOFF									
0.36	-4635.608	3156.758	3027.488	-230.5	-337.8	0.2	-1.50	1.20	0.83
1.0	-4635.755	3156.542	3027.488	-231.5	-337.0	0.7	-1.59	1.23	0.93
2.0	-4635.988	3156.206	3027.489	-233.1	-335.8	1.7	-1.69	1.27	1.06
3.0	-4636.222	3155.871	3027.492	-234.8	-334.5	2.8	-1.77	1.31	1.15
4.0	-4636.457	3155.537	3027.495	-236.6	-333.1	4.0	-1.83	1.36	1.22
5.0	-4636.695	3155.205	3027.500	-238.5	-331.8	5.3	-1.89	1.41	1.28
6.0	-4636.934	3154.874	3027.506	-240.4	-330.3	6.6	-1.93	1.46	1.32
7.0	-4637.176	3154.544	3027.513	-242.4	-328.8	7.9	-1.98	1.50	1.36
8.0	-4637.419	3154.216	3027.521	-244.4	-327.3	9.3	-2.02	1.53	1.39
9.0	-4637.664	3153.889	3027.531	-246.4	-325.8	10.7	-2.07	1.57	1.43
10.0	-4637.912	3153.564	3027.543	-248.5	-324.2	12.1	-2.13	1.60	1.46
11.0	-4638.161	3153.241	3027.556	-250.7	-322.6	13.6	-2.18	1.63	1.49
12.0	-4638.413	3152.919	3027.570	-252.9	-320.9	15.1	-2.25	1.65	1.53
13.0	-4638.667	3152.599	3027.586	-255.2	-319.3	16.7	-2.31	1.67	1.57
14.0	-4638.924	3152.281	3027.603	-257.5	-317.6	18.3	-2.38	1.69	1.62
15.0	-4639.182	3151.964	3027.622	-259.9	-315.9	19.9	-2.45	1.71	1.66
16.0	-4639.443	3151.649	3027.643	-262.4	-314.2	21.6	-2.53	1.72	1.72
17.0	-4639.707	3151.335	3027.666	-265.0	-312.5	23.3	-2.60	1.73	1.77
18.0	-4639.973	3151.024	3027.690	-267.6	-310.7	25.1	-2.68	1.74	1.82
19.0	-4640.242	3150.714	3027.716	-270.3	-309.0	27.0	-2.76	1.75	1.88
20.0	-4640.514	3150.406	3027.744	-273.1	-307.2	28.9	-2.84	1.75	1.94

TABLE XII
SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
21.0	-4640.789	3150.099	3027.774	-276.0	-305.5	30.9	-2.92	1.75	2.00
22.0	-4641.066	3149.795	3027.806	-279.0	-303.7	32.9	-3.01	1.74	2.06
23.0	-4641.346	3149.492	3027.840	-282.0	-302.0	35.0	-3.09	1.73	2.12
24.0	-4641.630	3149.191	3027.876	-285.2	-300.3	37.1	-3.18	1.71	2.19
25.0	-4641.917	3148.891	3027.914	-288.4	-298.6	39.4	-3.27	1.68	2.25
26.0	-4642.207	3148.593	3027.955	-291.7	-296.9	41.6	-3.37	1.65	2.31
27.0	-4642.500	3148.297	3027.998	-295.1	-295.3	44.0	-3.47	1.61	2.38
28.0	-4642.797	3148.003	3028.043	-298.6	-293.7	46.4	-3.55	1.54	2.45
29.0	-4643.098	3147.710	3028.090	-302.2	-292.2	48.9	-3.64	1.49	2.49
30.0	-4643.402	3147.418	3028.141	-306.0	-290.7	51.4	-3.80	1.47	2.55
31.0	-4643.710	3147.128	3028.193	-309.8	-289.2	54.0	-3.86	1.39	2.66
32.0	-4644.021	3146.839	3028.249	-313.7	-287.9	56.7	-3.95	1.32	2.68
33.0	-4644.337	3146.552	3028.307	-317.7	-286.6	59.4	-4.01	1.28	2.73
34.0	-4644.657	3146.266	3028.368	-321.9	-285.3	62.2	-4.26	1.26	2.88
35.0	-4644.981	3145.981	3028.431	-326.1	-284.0	65.1	-4.36	1.18	2.92
36.0	-4645.309	3145.698	3028.498	-330.5	-282.9	68.1	-4.42	1.14	3.06
37.0	-4645.642	3145.415	3028.568	-334.9	-281.8	71.1	-4.52	1.03	3.06
38.0	-4645.979	3145.134	3028.641	-339.6	-280.8	74.2	-4.68	0.93	3.11
39.0	-4646.321	3144.853	3028.716	-344.3	-280.0	77.4	-4.84	0.77	3.20
40.0	-4646.668	3144.573	3028.796	-349.2	-279.2	80.6	-4.99	0.72	3.29
41.0	-4647.020	3144.294	3028.878	-354.3	-278.5	83.9	-5.25	0.72	3.37
42.0	-4647.377	3144.016	3028.964	-359.6	-277.9	87.3	-5.30	0.45	3.29
43.0	-4647.740	3143.738	3029.053	-365.0	-277.5	90.6	-5.44	0.42	3.30
44.0	-4648.107	3143.461	3029.145	-370.5	-277.1	93.9	-5.65	0.45	3.35
45.0	-4648.480	3143.183	3029.240	-376.2	-276.7	97.3	-5.77	0.24	3.44
46.0	-4648.860	3142.907	3029.340	-382.0	-276.5	100.8	-5.83	0.09	3.56
47.0	-4649.245	3142.630	3029.442	-387.9	-276.4	104.4	-5.96	-0.10	3.75
48.0	-4649.636	3142.353	3029.549	-394.0	-276.5	108.2	-6.14	-0.25	3.89
49.0	-4650.033	3142.076	3029.659	-400.1	-276.8	112.1	-6.19	-0.33	3.97
50.0	-4650.436	3141.799	3029.773	-406.4	-277.1	116.1	-6.26	-0.44	4.06
51.0	-4650.846	3141.522	3029.891	-412.7	-277.6	120.2	-6.43	-0.55	4.20
52.0	-4651.262	3141.244	3030.014	-419.2	-278.1	124.4	-6.53	-0.67	4.32
53.0	-4651.685	3140.965	3030.140	-425.7	-278.8	128.8	-6.58	-0.82	4.39
54.0	-4652.114	3140.686	3030.271	-432.4	-279.7	133.2	-6.76	-1.02	4.44
55.0	-4652.550	3140.405	3030.407	-439.3	-280.7	137.6	-7.00	-1.23	4.49
56.0	-4652.993	3140.124	3030.547	-446.4	-282.1	142.1	-7.20	-1.47	4.57
57.0	-4653.443	3139.841	3030.691	-453.6	-283.6	146.8	-7.18	-1.67	4.75
58.0	-4653.900	3139.556	3030.841	-460.8	-285.3	151.6	-7.17	-1.77	4.85
59.0	-4654.365	3139.270	3030.995	-468.0	-287.1	156.4	-7.28	-1.86	4.85
60.0	-4654.837	3138.982	3031.154	-475.3	-289.0	161.2	-7.40	-2.09	4.79
61.0	-4655.316	3138.692	3031.318	-482.7	-291.1	166.0	-7.34	-2.27	4.82
62.0	-4655.803	3138.399	3031.486	-490.0	-293.4	170.8	-7.30	-2.35	4.73
MACH ONE									
62.15	-4655.876	3138.355	3031.512	-491.1	-293.8	171.5	-7.31	-2.37	4.71

TABLE XII
SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
63.0	-4656.296	3138.105	3031.659	-497.4	-295.8	175.5	-7.39	-2.51	4.65
64.0	-4656.798	3137.808	3031.837	-504.8	-298.4	180.1	-7.49	-2.77	4.61
65.0	-4657.306	3137.508	3032.020	-512.4	-301.2	184.8	-7.62	-2.99	4.75
66.0	-4657.823	3137.205	3032.237	-520.0	-304.3	189.7	-7.71	-3.26	4.93
67.0	-4658.347	3136.899	3032.400	-527.8	-307.7	194.7	-7.83	-3.54	5.16
68.0	-4658.879	3136.589	3032.597	-535.7	-311.3	200.0	-8.00	-3.72	5.31
69.0	-4659.419	3136.276	3032.800	-543.8	-315.0	205.4	-8.19	-3.90	5.46
70.0	-4659.967	3135.959	3033.008	-552.1	-319.0	210.9	-8.43	-4.22	5.64
71.0	-4660.523	3135.638	3033.222	-560.6	-323.4	216.7	-8.64	-4.57	5.88
72.0	-4661.089	3135.312	3033.442	-569.4	-328.0	222.7	-8.74	-4.71	6.00
73.0	-4661.663	3134.981	3033.667	-578.1	-332.7	228.7	-8.68	-4.67	5.98
74.0	-4662.245	3134.646	3033.899	-586.8	-337.4	234.7	-8.85	-4.85	5.99
75.0	-4662.837	3134.306	3034.137	-595.8	-342.4	240.8	-9.28	-5.14	6.10
MAX Q									
75.5	-4663.136	3134.134	3034.258	-600.5	-344.9	243.9	-9.49	-5.18	6.15
76.0	-4663.437	3133.961	3034.381	-605.3	-347.5	246.9	-9.65	-5.27	6.16
77.0	-4664.048	3133.611	3034.631	-615.1	-352.7	253.1	-9.82	-5.22	6.13
78.0	-4664.668	3133.256	3034.888	-625.1	-358.0	259.4	-10.20	-5.41	6.37
79.0	-4665.298	3132.895	3035.150	-635.3	-363.5	265.8	-10.31	-5.60	6.41
80.0	-4665.939	3132.528	3035.419	-645.6	-369.3	272.2	-10.44	-5.96	6.54
81.0	-4666.590	3132.156	3035.695	-656.0	-375.3	278.8	-10.47	-6.15	6.73
82.0	-4667.251	3131.777	3035.977	-666.7	-381.7	285.7	-10.68	-6.45	6.83
83.0	-4667.924	3131.392	3036.267	-677.5	-388.2	292.6	-11.03	-6.67	7.05
84.0	-4668.607	3131.001	3036.563	-688.6	-394.9	299.9	-11.12	-6.75	7.44
85.0	-4669.301	3130.602	3036.867	-699.6	-401.7	307.3	-11.11	-7.03	7.67
86.0	-4670.007	3130.197	3037.178	-710.8	-408.9	315.1	-11.12	-7.31	7.87
87.0	-4670.723	3129.785	3037.497	-722.1	-416.4	322.9	-11.47	-7.68	7.72
88.0	-4671.451	3129.364	3037.824	-733.7	-424.2	330.8	-11.78	-7.92	7.69
89.0	-4672.191	3128.936	3038.159	-745.6	-432.2	338.5	-12.00	-8.15	7.93
90.0	-4672.943	3128.499	3038.501	-757.7	-440.5	346.4	-12.27	-8.31	8.08
91.0	-4673.707	3128.055	3038.852	-770.0	-449.0	354.6	-12.33	-8.63	8.34
92.0	-4674.484	3127.601	3039.211	-782.4	-457.7	363.1	-12.37	-8.91	8.37
93.0	-4675.272	3127.139	3039.579	-794.9	-466.8	371.6	-12.62	-9.21	8.62
94.0	-4676.074	3126.668	3039.954	-807.7	-476.1	380.2	-12.99	-9.47	8.77
95.0	-4676.888	3126.187	3040.339	-820.7	-485.7	389.0	-13.15	-9.57	8.76
96.0	-4677.716	3125.696	3040.733	-833.9	-495.4	397.8	-13.20	-10.04	8.86
97.0	-4678.556	3125.196	3041.135	-847.3	-505.7	406.7	-13.44	-10.46	8.95
98.0	-4679.410	3124.685	3041.546	-860.8	-516.2	415.7	-13.59	-10.59	9.01
99.0	-4680.278	3124.163	3041.967	-874.5	-526.9	424.8	-13.97	-10.90	9.22
100.0	-4681.160	3123.631	3042.396	-888.5	-538.1	434.1	-14.13	-11.20	9.33
101.0	-4682.056	3123.087	3042.835	-902.7	-549.4	443.5	-14.18	-11.39	9.39

TABLE XII

SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
102.0	-4682.966	3122.532	3043.283	-917.0	-560.8	452.9	-14.47	-11.68	9.56
103.0	-4683.890	3121.965	3043.741	-931.5	-572.6	462.5	-14.59	-11.90	9.70
104.0	-4684.829	3121.387	3044.209	-946.2	-584.7	472.3	-14.67	-12.10	9.76
105.0	-4685.783	3120.796	3044.686	-961.0	-597.0	482.1	-14.87	-12.54	9.91
106.0	-4686.751	3120.193	3045.173	-976.0	-609.6	492.1	-15.25	-12.89	10.11
107.0	-4687.735	3119.577	3045.670	-991.3	-622.6	502.2	-15.43	-13.06	10.14
108.0	-4688.734	3118.948	3046.178	-1006.8	-635.8	512.4	-15.57	-13.29	10.23
109.0	-4689.749	3118.305	3046.695	-1022.5	-649.2	522.7	-15.75	-13.57	10.39
110.0	-4690.780	3117.649	3047.223	-1038.4	-663.0	533.2	-15.99	-13.95	10.56
111.0	-4691.826	3116.979	3047.762	-1054.5	-677.1	543.8	-16.24	-14.25	10.72
112.0	-4692.889	3116.295	3048.311	-1070.8	-691.4	554.6	-16.27	-14.42	10.75
113.0	-4693.968	3115.596	3048.871	-1087.2	-706.2	565.4	-16.48	-14.97	10.91
114.0	-4695.064	3114.883	3049.442	-1103.7	-721.3	576.4	-16.84	-15.52	11.16
115.0	-4696.176	3114.154	3050.024	-1120.6	-736.9	587.6	-16.94	-15.64	11.20
116.0	-4697.305	3113.409	3050.618	-1137.6	-752.7	598.8	-16.99	-15.83	11.24
117.0	-4698.452	3112.649	3051.222	-1154.7	-768.7	610.1	-17.22	-16.14	11.38
118.0	-4699.615	3111.872	3051.838	-1172.0	-785.1	621.6	-17.50	-16.82	11.58
119.0	-4700.796	3111.078	3052.466	-1189.7	-802.1	633.3	-17.80	-17.14	11.72
120.0	-4701.995	3110.268	3053.105	-1207.5	-819.3	645.0	-17.85	-17.42	11.77
121.0	-4703.211	3109.440	3053.756	-1225.5	-836.9	656.8	-18.04	-17.80	11.90
122.0	-4704.446	3108.594	3054.419	-1243.7	-855.0	668.9	-18.36	-18.26	12.09
123.0	-4705.699	3107.730	3055.094	-1262.1	-873.5	681.0	-18.40	-18.65	12.17
124.0	-4706.971	3106.847	3055.781	-1280.6	-892.3	693.2	-18.75	-19.06	12.39
125.0	-4708.261	3105.946	3056.480	-1299.4	-911.5	705.6	-18.90	-19.35	12.44
126.0	-4709.570	3105.025	3057.192	-1318.5	-931.1	718.2	-19.00	-19.72	12.56
127.0	-4710.898	3104.084	3057.917	-1337.6	-951.1	730.9	-19.31	-20.31	12.84
128.0	-4712.246	3103.123	3058.654	-1357.1	-971.4	743.7	-19.60	-20.52	12.99
129.0	-4713.613	3102.141	3059.405	-1376.7	-992.3	756.8	-19.77	-21.04	13.09
130.0	-4714.999	3101.138	3060.168	-1396.6	-1013.5	769.9	-19.96	-21.51	13.24
131.0	-4716.406	3100.114	3060.945	-1416.7	-1035.2	783.3	-20.18	-21.91	13.40
132.0	-4717.833	3099.068	3061.735	-1437.1	-1057.3	796.8	-20.43	-22.36	13.57
133.0	-4719.280	3098.000	3062.539	-1457.7	-1079.8	810.4	-20.61	-22.76	13.68
134.0	-4720.748	3096.909	3063.356	-1478.4	-1102.7	824.2	-20.83	-23.20	13.83
135.0	-4722.237	3095.795	3064.187	-1499.5	-1126.1	838.2	-21.14	-23.70	14.03
136.0	-4723.747	3094.658	3065.033	-1520.9	-1150.0	852.3	-21.49	-24.14	14.28
137.0	-4725.279	3093.496	3065.892	-1542.6	-1174.3	866.7	-21.81	-24.38	14.46
138.0	-4726.833	3092.310	3066.766	-1564.6	-1198.7	881.3	-22.17	-24.72	14.71
139.0	-4728.408	3091.099	3067.655	-1586.9	-1223.3	896.1	-22.71	-25.15	15.06
140.0	-4730.007	3089.864	3068.559	-1609.7	-1248.3	911.2	-23.10	-25.79	15.33
IECO									
140.65	-4731.057	3089.047	3069.154	-1623.4	-1263.9	920.3	-21.94	-25.43	14.56

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TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
141.0	-4731.627	3088.604	3069.477	-1630.7	-1270.7	925.2	-10.85	-19.29	7.26
142.0	-4733.262	3087.324	3070.405	-1639.9	-1287.7	931.3	-8.32	-15.27	5.57
143.0	-4734.906	3086.029	3071.339	-1648.3	-1302.8	936.9	-8.46	-15.42	5.65
144.0	-4736.559	3084.719	3072.279	-1656.4	-1317.8	942.3	-8.39	-15.67	5.60
OECO									
144.32	-4737.089	3084.297	3072.580	-1658.3	-1322.6	943.6	-7.54	-14.99	5.04
145.0	-4738.217	3083.395	3073.223	-1656.6	-1327.4	942.5	6.03	-6.17	-3.90
S-IB/S-IVB SEPARATION SIGNAL									
145.59	-4739.194	3082.611	3073.778	-1652.6	-1330.2	939.9	6.97	-4.95	-4.52
150.0	-4746.417	3076.704	3077.881	-1625.1	-1353.0	922.2	3.92	-6.76	-2.47
155.0	-4754.509	3069.846	3082.472	-1612.9	-1391.1	915.0	1.93	-7.90	-1.04
160.0	-4762.551	3062.791	3087.034	-1604.0	-1431.1	910.2	1.76	-8.07	-0.98
165.0	-4770.549	3055.534	3091.574	-1595.5	-1471.6	905.7	1.62	-8.06	-0.86
GUIDANCE INITIATION									
169.76	-4778.126	3048.436	3095.876	-1588.3	-1510.6	902.1	1.41	-8.19	-0.69
170.0	-4778.507	3048.073	3096.093	-1587.9	-1512.6	901.9	1.39	-8.19	-0.71
175.0	-4786.429	3040.407	3100.593	-1581.2	-1553.6	898.3	1.09	-8.04	-0.83
180.0	-4794.323	3032.542	3105.075	-1576.9	-1592.0	894.3	0.67	-7.39	-0.73
185.0	-4802.198	3024.490	3109.538	-1573.5	-1628.9	890.9	0.66	-7.38	-0.71
190.0	-4810.058	3016.253	3113.983	-1570.2	-1665.8	887.4	0.64	-7.50	-0.68
195.0	-4817.900	3007.830	3118.412	-1567.1	-1703.6	884.2	0.57	-7.58	-0.65
200.0	-4825.729	2999.216	3122.825	-1564.2	-1741.9	880.8	0.57	-7.70	-0.70
205.0	-4833.542	2990.410	3127.221	-1561.4	-1780.6	877.5	0.51	-7.79	-0.63
210.0	-4841.343	2981.409	3131.600	-1558.9	-1819.9	874.4	0.47	-7.92	-0.65
215.0	-4849.132	2972.211	3135.964	-1556.7	-1859.6	871.1	0.37	-8.03	-0.64
220.0	-4856.911	2962.812	3140.311	-1554.7	-1899.9	867.9	0.38	-8.09	-0.66
225.0	-4864.680	2953.210	3144.642	-1552.9	-1940.7	864.6	0.31	-8.20	-0.66
230.0	-4872.440	2943.404	3148.957	-1551.3	-1982.0	861.2	0.25	-8.30	-0.64
235.0	-4880.193	2933.390	3153.255	-1549.9	-2023.7	858.0	0.28	-8.44	-0.61
240.0	-4887.940	2923.166	3157.537	-1548.9	-2066.0	854.8	0.16	-8.49	-0.63
245.0	-4895.683	2912.729	3161.802	-1548.1	-2108.8	851.6	0.28	-8.57	-0.38
250.0	-4903.421	2902.077	3166.054	-1547.4	-2152.1	848.7	0.14	-8.69	-0.58
255.0	-4911.157	2891.207	3170.289	-1546.8	-2195.9	845.6	0.08	-8.84	-0.59
260.0	-4918.889	2880.117	3174.510	-1546.3	-2240.2	842.5	0.00	-8.90	-0.62
265.0	-4926.621	2868.804	3178.715	-1546.4	-2285.0	839.7	-0.04	-9.01	-0.58

TABLE XII
SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
270.0	-4934.353	2857.266	3182.907	-1546.6	-2330.4	836.9	-0.06	-9.13	-0.53
275.0	-4942.088	2845.499	3187.085	-1547.1	-2376.4	834.2	-0.11	-9.26	-0.51
280.0	-4949.824	2833.501	3191.249	-1547.7	-2422.9	831.6	-0.13	-9.39	-0.54
285.0	-4957.565	2821.268	3195.401	-1548.4	-2470.2	828.9	-0.10	-9.54	-0.49
290.0	-4965.309	2808.798	3199.539	-1549.3	-2518.0	826.3	-0.17	-9.62	-0.54
295.0	-4973.058	2796.087	3203.664	-1550.4	-2566.4	823.7	-0.26	-9.70	-0.51
300.0	-4980.813	2783.133	3207.776	-1551.7	-2615.4	821.4	-0.31	-9.96	-0.47
305.0	-4988.576	2769.932	3211.878	-1553.4	-2665.2	819.1	-0.35	-10.07	-0.45
310.0	-4996.348	2756.479	3215.967	-1555.4	-2715.8	816.9	-0.41	-10.20	-0.46
315.0	-5004.129	2742.773	3220.046	-1557.4	-2766.8	814.7	-0.44	-10.35	-0.40
320.0	-5011.922	2728.809	3224.114	-1559.6	-2818.8	812.6	-0.45	-10.42	-0.40
325.0	-5019.726	2714.584	3228.172	-1561.9	-2871.4	810.5	-0.48	-10.60	-0.40
330.0	-5027.542	2700.094	3232.220	-1564.4	-2924.9	808.5	-0.48	-10.79	-0.42
335.0	-5035.370	2685.335	3236.257	-1567.1	-2978.9	806.6	-0.59	-10.86	-0.37
340.0	-5043.213	2670.303	3240.286	-1570.0	-3033.9	804.7	-0.63	-11.03	-0.37
345.0	-5051.070	2654.995	3244.305	-1573.1	-3089.6	803.0	-0.63	-11.30	-0.32
350.0	-5058.944	2639.406	3248.316	-1576.4	-3146.3	801.3	-0.68	-11.47	-0.32
355.0	-5066.835	2623.531	3252.318	-1579.9	-3203.9	799.7	-0.78	-11.65	-0.28
360.0	-5074.744	2607.365	3256.313	-1583.8	-3262.5	798.3	-0.78	-11.81	-0.28
365.0	-5082.673	2590.905	3260.301	-1587.6	-3322.0	796.8	-0.77	-12.07	-0.27
370.0	-5090.620	2574.144	3264.281	-1591.5	-3382.4	795.3	-0.79	-12.19	-0.31
375.0	-5098.588	2557.079	3268.254	-1595.6	-3443.7	793.9	-0.84	-12.33	-0.31
380.0	-5106.577	2539.705	3272.220	-1599.9	-3506.1	792.4	-0.92	-12.53	-0.28
385.0	-5114.588	2522.016	3276.179	-1604.4	-3569.6	791.2	-0.90	-12.78	-0.25
390.0	-5122.621	2504.008	3280.131	-1609.0	-3633.9	789.9	-0.87	-13.05	-0.26
395.0	-5130.678	2485.674	3284.078	-1613.7	-3699.7	788.8	-0.96	-13.15	-0.23
400.0	-5138.758	2467.011	3288.019	-1618.5	-3766.0	787.3	-0.89	-13.42	-0.27
405.0	-5146.863	2448.011	3291.952	-1623.6	-3833.9	786.1	-1.13	-13.67	-0.25
410.0	-5154.994	2428.670	3295.880	-1628.8	-3902.9	785.0	-1.09	-14.01	-0.21
415.0	-5163.152	2408.981	3299.803	-1634.2	-3973.3	784.0	-1.14	-14.25	-0.20
420.0	-5171.337	2388.936	3303.720	-1639.8	-4045.0	782.9	-1.19	-14.52	-0.18
425.0	-5179.550	2368.529	3307.632	-1645.6	-4118.1	781.9	-1.17	-14.71	-0.21
430.0	-5187.792	2347.754	3311.538	-1651.3	-4192.2	780.7	-1.11	-15.07	-0.20
435.0	-5196.063	2326.604	3315.439	-1657.1	-4268.1	779.6	-1.13	-15.33	-0.24
440.0	-5204.363	2305.071	3319.334	-1663.0	-4345.3	778.4	-1.20	-15.62	-0.25
445.0	-5212.694	2283.148	3323.223	-1669.1	-4424.2	777.3	-1.21	-15.97	-0.23
450.0	-5221.055	2260.827	3327.107	-1675.3	-4504.5	776.1	-1.22	-16.24	-0.24
455.0	-5229.447	2238.101	3330.985	-1681.6	-4586.5	775.0	-1.23	-16.61	-0.24
460.0	-5237.863	2214.971	3334.853	-1683.1	-4662.5	771.1	0.52	-14.02	-1.24
465.0	-5246.271	2191.484	3338.692	-1680.0	-4732.7	764.7	0.59	-14.09	-1.30
470.0	-5254.664	2167.644	3342.500	-1676.8	-4803.5	758.0	0.67	-14.27	-1.33
475.0	-5263.039	2143.447	3346.273	-1673.4	-4875.5	751.3	0.63	-14.57	-1.35
480.0	-5271.397	2118.887	3350.012	-1669.8	-4948.7	744.4	0.71	-14.67	-1.35
485.0	-5279.737	2093.959	3353.717	-1666.1	-5022.9	737.6	0.73	-14.95	-1.36

TABLE XII
SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
490.0	-5288.058	2068.656	3357.388	-1662.2	-5098.5	730.7	0.82	-15.30	-1.37
495.0	-5296.359	2042.971	3361.024	-1658.5	-5175.4	723.9	0.72	-15.44	-1.36
500.0	-5304.643	2016.900	3364.627	-1654.7	-5253.6	717.1	0.74	-15.75	-1.37
505.0	-5312.906	1990.435	3368.195	-1650.7	-5333.1	710.1	0.81	-16.10	-1.42
510.0	-5321.149	1963.568	3371.728	-1646.4	-5414.0	702.9	0.89	-16.43	-1.45
515.0	-5329.370	1936.291	3375.224	-1641.8	-5496.8	695.4	0.95	-16.78	-1.49
520.0	-5337.566	1908.598	3378.682	-1636.7	-5581.0	687.7	1.01	-17.09	-1.56
525.0	-5345.737	1880.478	3382.100	-1631.3	-5667.2	679.6	1.13	-17.29	-1.64
530.0	-5353.879	1851.923	3385.477	-1625.6	-5755.0	671.2	1.14	-17.67	-1.72
535.0	-5361.992	1822.926	3388.811	-1619.5	-5844.5	662.5	1.25	-18.06	-1.78
540.0	-5370.074	1793.476	3392.101	-1613.1	-5935.8	653.5	1.29	-18.45	-1.85
545.0	-5378.123	1763.565	3395.346	-1606.5	-6029.1	644.2	1.37	-18.89	-1.92
550.0	-5386.138	1733.182	3398.543	-1599.6	-6124.3	634.6	1.41	-19.29	-1.96
555.0	-5394.118	1702.319	3401.691	-1592.3	-6221.6	624.6	1.55	-19.74	-2.03
560.0	-5402.060	1670.963	3404.788	-1584.6	-6321.0	614.4	1.59	-20.02	-2.10
565.0	-5409.964	1639.106	3407.833	-1576.8	-6422.3	603.7	1.51	-20.44	-2.15
570.0	-5417.827	1606.737	3410.825	-1568.7	-6526.1	592.8	1.62	-20.96	-2.22
575.0	-5425.649	1573.842	3413.760	-1560.2	-6632.2	581.5	1.70	-21.29	-2.26
580.0	-5433.429	1540.412	3416.639	-1551.5	-6740.4	570.0	1.75	-21.95	-2.32
585.0	-5441.164	1506.433	3419.459	-1542.5	-6851.6	558.1	1.82	-22.40	-2.42
590.0	-5448.853	1471.893	3422.219	-1533.2	-6965.2	545.9	1.81	-23.11	-2.48
595.0	-5456.494	1436.777	3424.917	-1523.6	-7081.5	533.3	1.99	-23.64	-2.55
600.0	-5464.084	1401.071	3427.550	-1512.1	-7201.7	519.5	2.48	-24.22	-2.82
605.0	-5471.615	1364.760	3430.112	-1500.3	-7324.1	505.5	2.29	-24.87	-2.75
610.0	-5479.088	1327.827	3432.605	-1489.4	-7449.9	492.0	2.04	-25.55	-2.67
615.0	-5486.511	1290.258	3435.032	-1479.9	-7578.6	478.8	1.84	-25.93	-2.60
S-IVB GUIDANCE CUTOFF									
616.76	-5489.113	1276.880	3435.871	-1476.6	-7624.2	474.3	1.74	-26.03	-2.56
620.0	-5493.862	1252.148	3437.384	-1453.8	-7637.9	459.5	7.61	-1.74	-4.78
625.0	-5501.036	1213.936	3439.622	-1415.8	-7646.5	435.6	7.62	-1.69	-4.77
ORBIT INSERTION									
626.76	-5503.516	1200.476	3440.381	-1402.4	-7649.4	427.2	7.63	-1.67	-4.78
650.0	-5534.044	1022.278	3449.018	-1224.7	-7685.4	316.1	7.66	-1.45	-4.78
700.0	-5585.738	636.442	3458.534	-839.8	-7743.8	75.8	7.74	-0.89	-4.81
750.0	-5618.034	248.375	3456.318	-451.7	-7774.4	-164.4	7.78	-0.35	-4.80
800.0	-5630.882	-140.552	3442.100	-62.1	-7778.2	-404.1	7.80	0.19	-4.78
850.0	-5624.239	-528.994	3415.931	327.7	-7755.0	-642.4	7.79	0.73	-4.74
900.0	-5598.131	-915.605	3377.903	716.3	-7705.0	-878.3	7.75	1.26	-4.69

TABLE XII

SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
950.0	-5552.654	-1299.048	3328.150	1102.3	-7628.3	-1111.2	7.69	1.79	-4.62
1000.0	-5487.968	-1677.998	3266.849	1484.4	-7525.3	-1340.1	7.60	2.32	-4.53
1050.0	-5404.303	-2051.146	3194.214	1861.2	-7396.3	-1564.4	7.48	2.83	-4.43
1100.0	-5301.952	-2417.201	3110.501	2231.6	-7241.7	-1783.1	7.33	3.34	-4.31
1150.0	-5181.277	-2774.903	3016.004	2594.0	-7062.2	-1995.6	7.17	3.83	-4.18
1200.0	-5042.700	-3123.017	2911.054	2947.4	-6858.4	-2201.1	6.97	4.31	-4.04
1250.0	-4886.707	-3460.345	2796.019	3290.5	-6630.9	-2398.9	6.75	4.77	-3.87
1300.0	-4713.844	-3785.727	2671.300	3622.0	-6380.7	-2588.3	6.51	5.22	-3.70
1350.0	-4524.713	-4098.045	2537.335	3941.0	-6108.5	-2768.7	6.25	5.65	-3.51
1400.0	-4319.976	-4396.228	2394.590	4246.1	-5815.4	-2939.4	5.96	6.06	-3.31
1450.0	-4100.347	-4679.255	2243.565	4536.5	-5502.4	-3099.9	5.66	6.44	-3.10
1500.0	-3866.588	-4946.159	2084.784	4811.1	-5170.7	-3249.5	5.33	6.81	-2.88
1550.0	-3619.514	-5196.029	1918.801	5069.0	-4821.3	-3387.9	4.99	7.15	-2.65
1600.0	-3359.983	-5428.014	1746.193	5309.3	-4455.5	-3514.5	4.63	7.46	-2.41
1650.0	-3088.893	-5641.329	1567.559	5531.2	-4074.6	-3628.8	4.26	7.75	-2.16
1700.0	-2807.186	-5835.250	1383.519	5733.9	-3680.0	-3730.6	3.87	8.02	-1.91
1750.0	-2515.834	-6009.124	1194.711	5916.8	-3273.0	-3819.5	3.46	8.25	-1.65
1800.0	-2215.845	-6162.368	1001.788	6079.3	-2855.0	-3895.2	3.05	8.45	-1.38
1850.0	-1908.254	-6294.468	805.417	6220.8	-2427.5	-3957.4	2.63	8.63	-1.11
1900.0	-1594.120	-6404.988	606.275	6340.9	-1992.0	-4006.0	2.20	8.78	-0.83
1950.0	-1274.525	-6493.564	405.049	6439.2	-1550.0	-4040.8	1.76	8.89	-0.56
2000.0	-950.567	-6559.908	202.431	6515.4	-1103.0	-4061.6	1.31	8.98	-0.28
2050.0	-623.357	-6603.810	-0.883	6569.3	-652.6	-4068.6	0.86	9.03	0.00
2100.0	-294.016	-6625.136	-204.195	6600.6	-200.3	-4061.6	0.41	9.05	0.28
2150.0	36.329	-6623.831	-406.807	6609.4	252.4	-4040.6	-0.04	9.04	0.56
2200.0	366.550	-6599.915	-608.028	6595.7	703.9	-4005.9	-0.49	9.01	0.83
2250.0	695.520	-6553.487	-807.170	6559.4	1152.6	-3957.5	-0.94	8.94	1.10
2300.0	1022.120	-6484.722	-1003.553	6500.9	1597.1	-3895.6	-1.38	8.84	1.37
2350.0	1345.238	-6393.870	-1196.509	6420.2	2035.8	-3820.4	-1.82	8.71	1.63
2400.0	1663.778	-6281.258	-1385.382	6317.8	2467.3	-3732.3	-2.25	8.55	1.89
2450.0	1976.659	-6147.284	-1569.530	6193.9	2890.1	-3631.5	-2.67	8.36	2.14
2500.0	2282.823	-5992.418	-1748.328	6049.1	3302.8	-3518.4	-3.09	8.15	2.38
2550.0	2581.233	-5817.201	-1921.172	5883.9	3703.9	-3393.4	-3.49	7.90	2.62
2600.0	2870.883	-5622.240	-2087.478	5698.8	4092.3	-3256.9	-3.88	7.63	2.84
2650.0	3150.796	-5408.210	-2246.682	5494.5	4466.5	-3109.5	-4.26	7.34	3.06
2700.0	3420.028	-5175.847	-2398.250	5271.7	4825.3	-2951.5	-4.62	7.02	3.26
2750.0	3677.674	-4925.951	-2541.669	5031.2	5167.7	-2783.6	-4.97	6.68	3.45
2800.0	3922.868	-4659.375	-2676.458	4773.8	5492.3	-2606.4	-5.30	6.32	3.63
2850.0	4154.786	-4377.033	-2802.164	4500.4	5798.2	-2420.4	-5.61	5.93	3.80
2900.0	4372.651	-4079.884	-2918.364	4211.8	6084.4	-2226.3	-5.90	5.53	3.96
2950.0	4575.732	-3768.942	-3024.668	3909.2	6349.8	-2024.7	-6.18	5.11	4.10
3000.0	4763.349	-3445.262	-3120.720	3593.4	6593.7	-1816.3	-6.43	4.67	4.23
3050.0	4934.872	-3109.942	-3206.199	3265.6	6815.3	-1601.9	-6.66	4.21	4.35
3100.0	5089.729	-2764.118	-3280.817	2926.9	7013.8	-1382.0	-6.87	3.75	4.45

TABLE XII

SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
3150.0	5227.399	-2408.961	-3344.325	2578.4	7188.5	-1157.6	-7.05	3.27	4.53
3200.0	5347.421	-2045.671	-3396.510	2221.2	7339.0	-929.2	-7.21	2.78	4.60
3250.0	5449.394	-1675.476	-3437.197	1856.6	7464.7	-697.8	-7.35	2.28	4.66
3300.0	5532.974	-1299.625	-3466.249	1485.7	7565.1	-464.0	-7.46	1.77	4.69
3350.0	5597.880	-919.389	-3483.568	1109.8	7640.1	-228.6	-7.55	1.26	4.72
3400.0	5643.894	-536.050	-3489.097	730.2	7689.2	7.5	-7.62	0.74	4.73
3450.0	5670.858	-150.901	-3482.814	348.1	7712.4	243.7	-7.65	0.22	4.72
3500.0	5678.679	234.758	-3464.741	-35.3	7709.6	479.0	-7.67	-0.30	4.69
3550.0	5667.328	619.624	-3434.936	-418.6	7680.7	712.8	-7.65	-0.82	4.65
3600.0	5636.839	1002.398	-3393.497	-800.6	7625.9	944.3	-7.62	-1.34	4.60
3650.0	5587.308	1381.786	-3340.563	-1180.0	7545.3	1172.5	-7.55	-1.85	4.53
3700.0	5518.898	1756.505	-3276.307	-1555.6	7439.2	1397.0	-7.46	-2.36	4.44
3750.0	5431.833	2125.287	-3200.945	-1926.1	7307.9	1616.7	-7.35	-2.86	4.34
3800.0	5326.399	2486.882	-3114.727	-2290.2	7151.8	1831.1	-7.21	-3.35	4.23
3850.0	5202.944	2840.063	-3017.940	-2646.7	6971.4	2039.3	-7.05	-3.83	4.10
3900.0	5061.878	3183.631	-2910.908	-2994.4	6767.4	2240.8	-6.86	-4.30	3.96
3950.0	4903.667	3516.417	-2793.988	-3332.2	6540.3	2434.7	-6.66	-4.75	3.80
4000.0	4728.839	3837.286	-2667.572	-3659.0	6290.9	2620.5	-6.42	-5.19	3.63
4050.0	4537.975	4145.144	-2532.085	-3973.5	6019.9	2797.5	-6.17	-5.61	3.45
4100.0	4331.713	4438.937	-2387.981	-4274.7	5728.4	2965.1	-5.89	-6.01	3.25
4150.0	4110.743	4717.658	-2235.745	-4561.6	5417.2	3122.7	-5.60	-6.40	3.05
4200.0	3875.805	4980.349	-2075.891	-4833.3	5087.4	3269.7	-5.29	-6.76	2.83
4250.0	3627.688	5226.106	-1908.958	-5088.6	4740.0	3405.7	-4.95	-7.10	2.61
4300.0	3367.227	5454.079	-1735.510	-5326.9	4376.3	3530.2	-4.60	-7.41	2.37
4350.0	3095.298	5663.479	-1556.135	-5547.2	3997.3	3642.7	-4.24	-7.71	2.13
4400.0	2812.820	5853.577	-1371.441	-5748.7	3604.4	3742.9	-3.86	-7.97	1.88
4450.0	2520.749	6023.711	-1182.057	-5930.8	3198.9	3830.3	-3.46	-8.21	1.62
4500.0	2220.072	6173.283	-988.627	-6092.8	2782.2	3904.7	-3.05	-8.42	1.36
4550.0	1911.812	6301.767	-791.810	-6234.1	2355.6	3965.7	-2.63	-8.61	1.09
4600.0	1597.015	6408.707	-592.278	-6354.2	1920.7	4013.2	-2.21	-8.76	0.81
4650.0	1276.754	6493.721	-390.715	-6452.6	1478.8	4047.0	-1.77	-8.88	0.54
4700.0	952.122	6556.499	-187.811	-6529.0	1031.5	4066.9	-1.33	-8.98	0.26
4750.0	624.226	6596.811	15.737	-6583.1	580.4	4072.8	-0.88	-9.04	-0.02
4800.0	294.190	6614.500	219.231	-6614.6	126.9	4064.7	-0.43	-9.07	-0.30
4850.0	-36.856	6609.491	421.970	-6623.4	-327.3	4042.5	0.03	-9.07	-0.58
4900.0	-367.776	6581.784	623.254	-6609.5	-780.7	4006.5	0.48	-9.04	-0.86
4950.0	-697.432	6531.458	822.389	-6572.9	-1231.8	3956.6	0.93	-8.98	-1.14
5000.0	-1024.689	6458.672	1018.686	-6513.6	-1678.9	3893.0	1.39	-8.89	-1.41
5050.0	-1348.421	6363.662	1211.467	-6431.9	-2120.5	3816.0	1.83	-8.76	-1.67
5100.0	-1667.510	6246.741	1400.063	-6328.0	-2555.1	3725.7	2.27	-8.61	-1.94
5150.0	-1980.855	6108.299	1583.820	-6202.2	-2981.1	3622.5	2.71	-8.42	-2.19
5200.0	-2287.371	5948.802	1762.100	-6054.9	-3397.0	3506.7	3.13	-8.21	-2.44
5250.0	-2585.999	5768.788	1934.284	-5886.7	-3801.5	3378.7	3.54	-7.96	-2.68
5300.0	-2875.703	5568.870	2099.773	-5698.1	-4193.0	3238.9	3.95	-7.69	-2.91

TABLE XII
SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
5350.0	-3155.480	5349.727	2257.990	-5489.7	-4570.2	3087.9	4.33	-7.40	-3.13
5400.0	-3424.359	5112.107	2408.384	-5262.3	-4931.8	2926.1	4.71	-7.07	-3.34
5450.0	-3681.408	4856.827	2550.432	-5016.6	-5276.5	2754.1	5.07	-6.72	-3.54
5500.0	-3925.733	4584.760	2683.637	-4753.5	-5603.1	2572.5	5.41	-6.35	-3.72
5550.0	-4156.485	4296.842	2807.535	-4473.9	-5910.3	2382.0	5.73	-5.95	-3.90
5600.0	-4372.870	3994.049	2921.700	-4179.2	-6198.3	2183.5	6.01	-5.57	-4.05
5650.0	-4574.163	3677.370	3025.753	-3870.2	-6465.1	1977.4	6.30	-5.12	-4.20
5700.0	-4759.658	3347.914	3119.318	-3547.5	-6709.2	1764.1	6.56	-4.66	-4.33
5750.0	-4928.701	3006.837	3202.060	-3212.3	-6929.9	1544.6	6.80	-4.19	-4.45
5800.0	-5080.698	2655.330	3273.687	-2865.8	-7126.4	1319.7	7.01	-3.70	-4.55
5850.0	-5215.116	2294.614	3333.951	-2509.3	-7298.1	1090.2	7.20	-3.20	-4.63
5900.0	-5331.485	1925.940	3382.640	-2144.1	-7444.6	856.9	7.36	-2.69	-4.70
5950.0	-5429.403	1550.586	3419.587	-1771.5	-7565.2	620.6	7.50	-2.17	-4.75
6000.0	-5508.395	1169.822	3444.689	-1392.6	-7659.4	382.7	7.61	-1.65	-4.79
6050.0	-5568.454	785.044	3457.831	-1009.1	-7727.3	142.8	7.69	-1.11	-4.80
6100.0	-5609.244	397.539	3458.966	-622.1	-7768.4	-97.4	7.75	-0.58	-4.80
6150.0	-5630.625	8.649	3448.093	-233.0	-7782.6	-337.4	7.78	-0.04	-4.79
6200.0	-5632.526	-380.277	3425.252	156.9	-7769.9	-576.0	7.79	0.50	-4.75
6250.0	-5614.943	-767.892	3390.530	546.2	-7730.3	-812.5	7.76	1.03	-4.70
6300.0	-5577.938	-1152.857	3344.053	933.5	-7663.9	-1046.0	7.71	1.57	-4.64
6350.0	-5521.645	-1533.839	3285.992	1317.5	-7571.0	-1275.8	7.63	2.09	-4.55
6400.0	-5446.267	-1909.526	3216.552	1696.7	-7452.2	-1501.0	7.52	2.61	-4.46
6450.0	-5352.082	-2278.630	3135.973	2069.5	-7307.8	-1721.2	7.38	3.11	-4.35
6500.0	-5239.444	-2639.889	3044.525	2434.6	-7138.5	-1935.7	7.23	3.61	-4.22
6550.0	-5108.751	-2992.056	2942.528	2791.6	-6944.1	-2143.0	7.05	4.10	-4.07
6600.0	-4960.445	-3333.907	2830.354	3138.9	-6726.0	-2342.7	6.84	4.57	-3.91
6650.0	-4795.048	-3664.273	2708.398	3475.1	-6484.9	-2534.2	6.61	5.02	-3.74
6700.0	-4613.141	-3982.024	2577.086	3799.1	-6221.5	-2716.8	6.36	5.45	-3.56
6750.0	-4415.362	-4286.075	2436.879	4109.8	-5937.0	-2889.9	6.08	5.86	-3.36
6800.0	-4202.402	-4575.391	2288.267	4406.1	-5632.3	-3052.9	5.79	6.26	-3.16
6850.0	-3975.005	-4848.989	2131.768	4687.1	-5308.5	-3205.3	5.47	6.63	-2.94
6900.0	-3733.963	-5105.944	1967.928	4951.8	-4966.8	-3346.5	5.14	6.98	-2.71
6950.0	-3480.114	-5345.389	1797.316	5199.2	-4608.3	-3476.0	4.79	7.30	-2.47
7000.0	-3214.339	-5566.517	1620.524	5428.7	-4234.4	-3593.6	4.42	7.59	-2.23
7050.0	-2937.559	-5768.589	1438.166	5639.3	-3846.3	-3698.7	4.04	7.86	-1.97
7100.0	-2650.730	-5950.931	1250.872	5830.5	-3445.4	-3791.0	3.64	8.11	-1.72
7150.0	-2354.843	-6112.939	1059.288	6001.6	-3033.1	-3870.2	3.24	8.32	-1.45
7200.0	-2050.916	-6254.080	864.075	6152.0	-2610.9	-3936.1	2.82	8.51	-1.18
7250.0	-1739.993	-6373.892	665.904	6281.3	-2180.3	-3988.5	2.40	8.66	-0.91
7300.0	-1423.141	-6471.989	465.455	6389.1	-1742.6	-4027.2	1.97	8.79	-0.64
7350.0	-1101.445	-6548.060	263.414	6475.1	-1299.4	-4052.1	1.53	8.88	-0.36
7400.0	-776.002	-6601.868	60.474	6538.9	-852.3	-4063.2	1.08	8.95	-0.08
7450.0	-447.922	-6633.254	-142.676	6580.5	-402.8	-4060.5	0.64	8.98	0.19
7500.0	-118.322	-6642.134	-345.342	6599.8	47.6	-4043.9	0.19	8.99	0.47

TABLE XII
SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
7550.0	211.681	-6628.503	-546.837	6596.6	497.4	-4013.6	-0.25	8.96	0.74
7600.0	540.969	-6592.428	-746.477	6571.2	945.1	-3969.7	-0.70	8.90	1.01
7650.0	868.428	-6534.055	-943.587	6523.5	1389.1	-3912.4	-1.14	8.82	1.28
7700.0	1192.954	-6453.605	-1137.501	6453.9	1827.9	-3842.0	-1.58	8.70	1.54
7750.0	1513.454	-6351.371	-1327.567	6362.5	2260.2	-3758.5	-2.01	8.56	1.80
7800.0	1828.853	-6227.718	-1513.145	6249.9	2684.4	-3662.5	-2.43	8.38	2.04
7850.0	2138.091	-6083.085	-1693.613	6116.2	3099.2	-3554.2	-2.84	8.18	2.29
7900.0	2440.134	-5917.978	-1868.366	5962.1	3503.2	-3434.0	-3.25	7.95	2.52
7950.0	2733.973	-5732.970	-2036.820	5788.2	3895.0	-3302.3	-3.64	7.70	2.75
8000.0	3018.628	-5528.700	-2198.412	5594.9	4273.4	-3159.6	-4.02	7.42	2.96
8050.0	3293.150	-5305.871	-2352.605	5383.0	4637.2	-3006.4	-4.38	7.12	3.17
8100.0	3556.628	-5065.244	-2498.885	5153.2	4985.1	-2843.2	-4.73	6.79	3.36
8150.0	3808.185	-4807.640	-2636.767	4906.3	5316.1	-2670.6	-5.07	6.44	3.54
8200.0	4046.990	-4533.932	-2765.794	4643.2	5629.1	-2489.1	-5.38	6.08	3.71
8250.0	4272.249	-4245.049	-2885.538	4364.7	5923.0	-2299.4	-5.68	5.69	3.87
8300.0	4483.217	-3941.965	-2995.603	4071.7	6196.9	-2102.0	-5.96	5.28	4.02
8350.0	4679.198	-3625.702	-3095.625	3765.3	6450.0	-1897.8	-6.22	4.86	4.15
8400.0	4859.544	-3297.322	-3185.273	3446.5	6681.5	-1687.2	-6.46	4.42	4.27
8450.0	5023.659	-2957.928	-3264.253	3116.3	6890.5	-1471.1	-6.68	3.97	4.37
8500.0	5171.000	-2608.658	-3332.303	2775.8	7076.4	-1250.1	-6.87	3.50	4.46
8550.0	5301.081	-2250.680	-3389.199	2426.1	7238.7	-1025.1	-7.05	3.02	4.54
8600.0	5413.472	-1885.190	-3434.753	2068.3	7376.8	-796.6	-7.20	2.54	4.60
8650.0	5507.801	-1513.410	-3468.814	1703.8	7490.3	-565.5	-7.32	2.04	4.64
8700.0	5583.755	-1136.581	-3491.270	1333.5	7578.7	-332.5	-7.43	1.54	4.67
8750.0	5641.081	-755.960	-3502.046	958.9	7641.9	-98.4	-7.50	1.04	4.69
8800.0	5679.587	-372.816	-3501.105	581.0	7679.6	136.0	-7.56	0.53	4.69
8850.0	5699.143	11.571	-3488.450	201.1	7691.6	370.1	-7.59	0.01	4.67
8900.0	5699.680	395.920	-3464.119	-179.6	7678.0	602.9	-7.59	-0.50	4.64
8950.0	5681.191	778.947	-3428.193	-559.8	7638.8	833.8	-7.57	-1.01	4.59
9000.0	5643.734	1159.373	-3380.788	-938.2	7574.0	1061.9	-7.53	-1.52	4.53
9050.0	5587.424	1535.926	-3322.058	-1313.6	7483.9	1286.6	-7.46	-2.02	4.45
9100.0	5512.443	1907.346	-3252.196	-1684.8	7368.7	1507.1	-7.36	-2.51	4.36
9150.0	5419.032	2272.389	-3171.429	-2050.6	7228.9	1722.7	-7.24	-3.00	4.26
9200.0	5307.492	2629.829	-3080.023	-2409.8	7064.7	1932.6	-7.10	-3.48	4.14
9250.0	5178.187	2978.466	-2978.278	-2761.1	6876.8	2136.1	-6.93	-3.95	4.00
9300.0	5031.536	3317.125	-2866.529	-3103.4	6665.7	2332.6	-6.74	-4.41	3.86
9350.0	4868.020	3644.664	-2745.145	-3435.5	6432.1	2521.4	-6.53	-4.85	3.69
9400.0	4688.174	3959.976	-2614.526	-3756.4	6176.8	2701.9	-6.30	-5.28	3.52
9450.0	4492.588	4261.992	-2475.105	-4064.9	5900.4	2873.4	-6.04	-5.69	3.34
9500.0	4281.906	4549.685	-2327.343	-4360.1	5604.0	3035.4	-5.77	-6.08	3.14
9550.0	4056.823	4822.076	-2171.733	-4640.8	5288.5	3187.3	-5.47	-6.45	2.93
9600.0	3818.083	5078.232	-2008.792	-4906.2	4954.8	3328.6	-5.16	-6.80	2.72
9650.0	3566.477	5317.274	-1839.063	-5155.3	4604.1	3458.7	-4.82	-7.13	2.49
9700.0	3302.843	5538.380	-1663.115	-5387.2	4237.6	3577.3	-4.48	-7.44	2.25

TABLE XII
SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
9750.0	3028.057	5740.785	-1481.536	-5601.2	3856.3	3683.8	-4.11	-7.72	2.01
9800.0	2743.037	5923.785	-1294.937	-5796.4	3461.6	3778.0	-3.73	-7.98	1.76
9850.0	2448.737	6086.740	-1103.946	-5972.3	3054.7	3859.5	-3.34	-8.21	1.50
9900.0	2146.143	6229.078	-909.207	-6128.1	2637.1	3927.9	-2.93	-8.41	1.24
9950.0	1836.273	6350.294	-711.377	-6263.2	2210.1	3983.0	-2.52	-8.58	0.97
10000.0	1520.172	6449.953	-511.128	-6377.3	1775.1	4024.7	-2.09	-8.73	0.70
10050.0	1198.905	6527.695	-309.140	-6469.7	1333.6	4052.6	-1.66	-8.85	0.42
10100.0	873.562	6583.231	-106.099	-6540.3	887.1	4066.7	-1.22	-8.93	0.14
10150.0	545.246	6616.350	97.302	-6588.6	437.2	4067.0	-0.78	-8.99	-0.13
10200.0	215.072	6626.915	300.368	-6614.6	-14.8	4053.3	-0.33	-9.01	-0.41
10250.0	-115.834	6614.867	502.403	-6617.9	-467.1	4025.8	0.12	-9.01	-0.69
10300.0	-446.344	6580.224	702.715	-6598.7	-918.3	3984.4	0.57	-8.97	-0.97
10350.0	-775.326	6523.083	900.615	-6556.8	-1366.8	3929.3	1.02	-8.90	-1.24
10400.0	-1101.654	6443.619	1095.420	-6492.5	-1811.0	3860.7	1.46	-8.81	-1.50
10450.0	-1424.213	6342.079	1286.461	-6406.1	-2249.5	3778.7	1.91	-8.67	-1.77
10500.0	-1741.890	6218.798	1473.067	-6297.3	-2680.4	3683.4	2.35	-8.51	-2.03
S-IVB/CSM SEPARATION									
10502.4	-1756.978	6212.271	1481.883	-6291.5	-2700.8	3678.5	2.37	-8.50	-2.05

TABLE XIII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
GUIDANCE REFERENCE RELEASE											
-4.972	6373.356	-80.5611	28.3608	0.00	90.00	0.0	90.00	0.00	409.0	0	35
-4.0	6373.356	-80.5611	28.3608	0.00	90.00	0.0	90.00	0.00	409.0	0	35
-3.0	6373.356	-80.5611	28.3608	0.00	90.00	0.0	90.00	0.00	409.0	0	35
-2.0	6373.356	-80.5611	28.3608	0.00	90.00	0.0	90.00	0.00	409.0	0	35
-1.0	6373.356	-80.5611	28.3608	0.00	90.00	0.0	90.00	0.00	409.0	0	35
RANGE ZERO AT 10 02 45 EST											
0.0	6373.356	-80.5611	28.3608	0.00	90.00	0.0	90.00	0.00	409.0	0	35
FIRST MOTION											
0.17	6373.356	-80.5611	28.3608	0.00	90.00	0.0	90.00	-0.00	409.0	0	35
LIFTOFF											
0.36	6373.356	-80.5611	28.3608	216.99	82.89	0.4	90.01	0.06	408.9	0	35
1.0	6373.357	-80.5611	28.3608	217.74	83.92	1.8	90.02	0.25	408.9	0	35
2.0	6373.359	-80.5611	28.3608	219.99	85.13	4.1	90.04	0.57	408.8	0	38
3.0	6373.365	-80.5611	28.3608	223.56	85.97	6.6	90.05	0.92	408.7	1	44
4.0	6373.372	-80.5611	28.3608	228.21	86.53	9.1	90.05	1.28	408.7	1	51
5.0	6373.383	-80.5612	28.3608	233.45	86.88	11.8	90.05	1.65	408.6	2	62
6.0	6373.396	-80.5612	28.3608	238.64	87.09	14.5	90.05	2.04	408.6	3	75
7.0	6373.412	-80.5612	28.3608	243.30	87.21	17.4	90.05	2.43	408.6	3	91
8.0	6373.431	-80.5612	28.3608	247.20	87.28	20.2	90.05	2.84	408.6	4	110
9.0	6373.452	-80.5612	28.3608	250.32	87.32	23.2	90.05	3.25	408.6	5	131
10.0	6373.477	-80.5612	28.3608	252.78	87.36	26.2	90.05	3.68	408.7	6	156
11.0	6373.505	-80.5612	28.3608	254.72	87.40	29.3	90.05	4.11	408.7	8	184
12.0	6373.536	-80.5612	28.3608	256.30	87.46	32.5	90.05	4.55	408.9	9	215
13.0	6373.570	-80.5612	28.3608	257.67	87.55	35.7	90.05	5.01	409.0	11	249
14.0	6373.607	-80.5613	28.3608	258.94	87.65	39.1	90.04	5.47	409.3	12	286
15.0	6373.648	-80.5613	28.3608	260.23	87.77	42.5	90.04	5.95	409.6	14	327
16.0	6373.692	-80.5613	28.3608	261.65	87.92	45.9	90.03	6.43	409.9	15	371
17.0	6373.740	-80.5613	28.3608	263.34	88.08	49.5	90.03	6.93	410.3	17	418
18.0	6373.791	-80.5613	28.3608	265.47	88.26	53.2	90.02	7.43	410.8	18	470
19.0	6373.846	-80.5613	28.3608	268.27	88.46	56.9	90.01	7.95	411.4	20	525
20.0	6373.905	-80.5613	28.3608	272.14	88.66	60.7	89.99	8.47	412.1	21	583

TABLE XIII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
21.0	6373.967	-80.5614	28.3608	277.80	88.87	64.7	89.98	9.01	412.8	23	646
22.0	6374.034	-80.5614	28.3608	286.62	89.08	68.7	89.96	9.55	413.7	24	713
23.0	6374.105	-80.5614	28.3608	301.24	89.27	72.8	89.93	10.11	414.7	25	784
24.0	6374.179	-80.5614	28.3608	325.23	89.40	76.9	89.91	10.67	415.7	25	858
25.0	6374.258	-80.5614	28.3608	355.53	89.38	81.2	89.88	11.23	416.9	25	937
26.0	6374.342	-80.5614	28.3608	19.67	89.20	85.6	89.84	11.80	418.3	25	1021
27.0	6374.430	-80.5614	28.3608	34.48	88.92	90.0	89.80	12.38	419.8	24	1109
28.0	6374.522	-80.5614	28.3608	43.51	88.58	94.5	89.76	12.96	421.4	22	1201
29.0	6374.619	-80.5613	28.3608	49.09	88.20	99.1	89.72	13.54	423.2	20	1298
30.0	6374.720	-80.5613	28.3608	53.26	87.79	103.8	89.67	14.13	425.1	17	1399
31.0	6374.826	-80.5613	28.3609	56.14	87.35	108.7	89.61	14.72	427.3	14	1505
32.0	6374.937	-80.5612	28.3609	58.34	86.91	113.5	89.56	15.30	429.5	11	1616
33.0	6375.053	-80.5612	28.3609	60.02	86.45	118.4	89.50	15.88	431.9	10	1732
34.0	6375.174	-80.5611	28.3609	61.35	85.98	123.6	89.43	16.48	434.6	14	1852
35.0	6375.299	-80.5610	28.3610	62.33	85.50	128.8	89.36	17.07	437.3	22	1978
36.0	6375.430	-80.5609	28.3610	63.26	85.01	134.1	89.28	17.66	440.3	31	2109
37.0	6375.567	-80.5608	28.3611	64.02	84.48	139.4	89.20	18.24	443.5	43	2246
38.0	6375.708	-80.5607	28.3611	64.71	83.95	145.0	89.12	18.83	446.9	57	2387
39.0	6375.855	-80.5605	28.3612	65.39	83.40	150.6	89.03	19.40	450.5	73	2534
40.0	6376.007	-80.5603	28.3612	66.09	82.83	156.3	88.94	19.96	454.3	92	2686
41.0	6376.165	-80.5601	28.3613	66.83	82.26	162.2	88.85	20.53	458.4	112	2844
42.0	6376.329	-80.5599	28.3614	67.59	81.68	168.3	88.77	21.09	462.8	135	3008
43.0	6376.498	-80.5597	28.3615	68.40	81.07	174.4	88.69	21.63	467.4	161	3177
44.0	6376.674	-80.5594	28.3616	69.19	80.49	180.6	88.61	22.16	472.1	189	3353
45.0	6376.854	-80.5591	28.3617	69.98	79.92	187.0	88.54	22.70	477.0	220	3533
46.0	6377.041	-80.5588	28.3618	70.63	79.33	193.5	88.46	23.22	482.2	254	3721
47.0	6377.235	-80.5584	28.3619	71.03	78.72	200.0	88.37	23.72	487.6	292	3914
48.0	6377.434	-80.5580	28.3620	71.32	78.07	206.8	88.26	24.22	493.3	333	4113
49.0	6377.639	-80.5576	28.3621	71.53	77.43	213.8	88.14	24.70	499.3	377	4319
50.0	6377.851	-80.5571	28.3622	71.66	76.80	220.8	88.01	25.17	505.4	425	4531
51.0	6378.069	-80.5566	28.3624	71.72	76.17	227.9	87.88	25.63	511.7	478	4749
52.0	6378.294	-80.5560	28.3625	71.72	75.54	235.3	87.73	26.08	518.2	534	4974
53.0	6378.525	-80.5554	28.3627	71.72	74.91	242.7	87.58	26.52	524.9	595	5205
54.0	6378.763	-80.5548	28.3629	71.72	74.27	250.3	87.43	26.93	531.9	660	5443
55.0	6379.007	-80.5541	28.3631	71.78	73.62	258.0	87.28	27.33	539.2	731	5687
56.0	6379.258	-80.5534	28.3633	71.89	72.94	266.0	87.13	27.71	546.8	806	5938
57.0	6379.516	-80.5526	28.3635	71.95	72.25	274.1	86.97	28.07	554.7	887	6196
58.0	6379.781	-80.5518	28.3637	71.89	71.57	282.2	86.79	28.41	562.7	973	6460
59.0	6380.052	-80.5509	28.3640	71.85	70.91	290.4	86.61	28.74	570.8	1065	6732
60.0	6380.330	-80.5499	28.3642	71.87	70.25	298.8	86.44	29.05	579.2	1163	7010
61.0	6380.614	-80.5489	28.3645	71.90	69.59	307.2	86.28	29.33	587.7	1267	7294
62.0	6380.906	-80.5478	28.3648	71.91	68.94	315.5	86.11	29.59	596.1	1377	7586
	MACH ONE										
62.15	6380.950	-80.5477	28.3649	71.92	68.85	316.7	86.08	29.63	597.4	1394	7630

TABLE XIII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
63.0	6381.203	-80.5467	28.3651	71.97	68.31	323.8	85.95	29.84	604.7	1493	7884
64.0	6381.508	-80.5455	28.3655	72.07	67.67	332.1	85.80	30.06	613.4	1616	8188
65.0	6381.818	-80.5442	28.3658	72.17	67.02	340.7	85.66	30.26	622.4	1745	8499
66.0	6382.135	-80.5429	28.3662	72.22	66.36	349.4	85.50	30.44	631.7	1881	8816
67.0	6382.458	-80.5415	28.3666	72.23	65.69	358.3	85.32	30.61	641.2	2024	9139
68.0	6382.788	-80.5400	28.3670	72.20	65.01	367.5	85.13	30.77	651.0	2176	9469
69.0	6383.125	-80.5385	28.3674	72.18	64.33	376.9	84.95	30.92	661.2	2334	9806
70.0	6383.468	-80.5369	28.3679	72.15	63.66	386.7	84.76	31.06	671.6	2501	10149
71.0	6383.818	-80.5352	28.3683	72.10	62.96	396.8	84.55	31.18	682.6	2677	10500
72.0	6384.175	-80.5334	28.3688	72.03	62.26	407.2	84.34	31.30	693.8	2862	10857
73.0	6384.539	-80.5315	28.3694	71.96	61.59	417.7	84.13	31.40	705.1	3055	11221
74.0	6384.911	-80.5295	28.3699	71.90	60.94	428.3	83.93	31.50	716.4	3258	11592
75.0	6385.289	-80.5274	28.3705	71.88	60.30	439.2	83.74	31.60	728.2	3470	11971
	MAX Q										
75.5	6385.480	-80.5264	28.3708	71.89	59.98	444.8	83.65	31.64	734.2	3580	12162
76.0	6385.674	-80.5253	28.3711	71.91	59.66	450.5	83.56	31.68	740.4	3692	12356
77.0	6386.067	-80.5230	28.3718	71.96	59.05	462.2	83.40	31.77	752.8	3924	12749
78.0	6386.467	-80.5207	28.3724	72.03	58.46	474.3	83.24	31.87	765.7	4167	13150
79.0	6386.875	-80.5182	28.3731	72.10	57.88	486.5	83.09	31.95	778.7	4419	13558
80.0	6387.291	-80.5156	28.3738	72.17	57.29	499.0	82.94	32.01	792.0	4683	13975
81.0	6387.715	-80.5130	28.3746	72.20	56.71	511.7	82.77	32.07	805.6	4957	14399
82.0	6388.147	-80.5102	28.3754	72.22	56.13	524.9	82.61	32.12	819.6	5243	14831
83.0	6388.587	-80.5073	28.3762	72.25	55.56	538.2	82.44	32.16	833.9	5540	15271
84.0	6389.035	-80.5043	28.3770	72.24	55.00	552.0	82.27	32.20	848.5	5850	15720
85.0	6389.492	-80.5011	28.3779	72.21	54.45	566.0	82.09	32.24	863.3	6172	16176
86.0	6389.957	-80.4979	28.3788	72.15	53.91	580.3	81.89	32.26	878.4	6506	16642
87.0	6390.430	-80.4945	28.3797	72.10	53.36	594.9	81.70	32.27	893.9	6853	17115
88.0	6390.912	-80.4910	28.3807	72.07	52.80	609.9	81.52	32.27	909.8	7214	17597
89.0	6391.402	-80.4873	28.3817	72.09	52.27	625.1	81.36	32.27	925.9	7588	18088
90.0	6391.901	-80.4836	28.3828	72.10	51.74	640.6	81.20	32.26	942.4	7977	18587
91.0	6392.409	-80.4796	28.3839	72.08	51.22	656.6	81.03	32.25	959.3	8379	19095
92.0	6392.925	-80.4756	28.3850	72.05	50.71	672.9	80.85	32.23	976.4	8796	19612
93.0	6393.450	-80.4714	28.3862	72.03	50.20	689.4	80.68	32.20	993.9	9228	20137
94.0	6393.985	-80.4670	28.3875	72.01	49.69	706.3	80.52	32.17	1011.7	9675	20672
95.0	6394.528	-80.4625	28.3887	72.00	49.20	723.5	80.36	32.13	1029.9	10138	21216
96.0	6395.081	-80.4579	28.3901	71.99	48.72	741.1	80.20	32.09	1048.3	10617	21769
97.0	6395.642	-80.4531	28.3914	71.99	48.23	759.0	80.05	32.03	1067.3	11112	22331
98.0	6396.213	-80.4481	28.3928	71.99	47.74	777.2	79.90	31.97	1086.4	11624	22902
99.0	6396.793	-80.4429	28.3943	71.99	47.27	795.7	79.76	31.91	1105.8	12153	23483
100.0	6397.382	-80.4376	28.3958	72.00	46.80	814.7	79.62	31.84	1125.8	12699	24072
101.0	6397.981	-80.4321	28.3973	72.00	46.34	834.0	79.48	31.77	1146.0	13263	24672

TABLE XIII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
102.0	6398.589	-80.4265	28.3989	72.00	45.90	853.5	79.34	31.70	1166.4	13845	25280
103.0	6399.207	-80.4206	28.4006	72.01	45.46	873.3	79.21	31.62	1187.2	14446	25899
104.0	6399.835	-80.4146	28.4023	72.01	45.03	893.5	79.08	31.54	1208.3	15065	26527
105.0	6400.472	-80.4084	28.4041	72.01	44.60	914.0	78.95	31.46	1229.8	15703	27165
106.0	6401.119	-80.4020	28.4059	72.01	44.18	935.0	78.83	31.37	1251.6	16360	27812
107.0	6401.775	-80.3954	28.4077	72.02	43.76	956.3	78.71	31.28	1273.8	17037	28469
108.0	6402.442	-80.3886	28.4097	72.03	43.36	977.9	78.59	31.19	1296.3	17734	29136
109.0	6403.119	-80.3817	28.4116	72.04	42.96	999.9	78.48	31.10	1319.2	18452	29814
110.0	6403.805	-80.3745	28.4137	72.05	42.57	1022.3	78.36	31.01	1342.4	19190	30501
111.0	6404.502	-80.3671	28.4157	72.05	42.18	1045.1	78.25	30.91	1366.1	19949	31198
112.0	6405.209	-80.3595	28.4179	72.06	41.80	1068.2	78.14	30.81	1390.0	20730	31906
113.0	6405.926	-80.3517	28.4201	72.07	41.43	1091.6	78.04	30.71	1414.3	21533	32624
114.0	6406.654	-80.3436	28.4224	72.07	41.05	1115.5	77.93	30.60	1439.0	22358	33353
115.0	6407.392	-80.3354	28.4247	72.08	40.67	1139.8	77.83	30.49	1464.2	23206	34091
116.0	6408.140	-80.3269	28.4271	72.08	40.31	1164.5	77.73	30.37	1489.7	24076	34840
117.0	6408.899	-80.3182	28.4295	72.09	39.95	1189.4	77.63	30.26	1515.5	24971	35600
118.0	6409.668	-80.3093	28.4321	72.10	39.59	1214.6	77.54	30.14	1541.6	25889	36369
119.0	6410.448	-80.3001	28.4346	72.11	39.24	1240.6	77.44	30.02	1568.4	26831	37150
120.0	6411.238	-80.2907	28.4373	72.12	38.89	1266.8	77.35	29.90	1595.5	27798	37941
121.0	6412.039	-80.2810	28.4400	72.13	38.54	1293.4	77.27	29.77	1622.9	28790	38743
122.0	6412.850	-80.2711	28.4428	72.13	38.19	1320.6	77.18	29.64	1650.9	29808	39555
123.0	6413.672	-80.2609	28.4457	72.14	37.85	1348.1	77.09	29.51	1679.2	30852	40378
124.0	6414.505	-80.2505	28.4486	72.15	37.51	1375.8	77.01	29.38	1707.8	31922	41212
125.0	6415.348	-80.2398	28.4516	72.16	37.18	1404.2	76.93	29.24	1737.0	33019	42056
126.0	6416.202	-80.2289	28.4547	72.17	36.85	1433.1	76.85	29.11	1766.7	34144	42911
127.0	6417.067	-80.2177	28.4578	72.18	36.52	1462.3	76.77	28.97	1796.7	35296	43777
128.0	6417.943	-80.2062	28.4611	72.19	36.20	1492.0	76.70	28.83	1827.1	36477	44654
129.0	6418.830	-80.1944	28.4644	72.19	35.88	1522.2	76.62	28.69	1858.2	37686	45542
130.0	6419.728	-80.1823	28.4677	72.20	35.56	1552.8	76.55	28.55	1889.6	38924	46440
131.0	6420.637	-80.1700	28.4712	72.21	35.25	1584.0	76.48	28.41	1921.5	40192	47350
132.0	6421.557	-80.1573	28.4748	72.22	34.95	1615.7	76.41	28.27	1954.0	41490	48272
133.0	6422.488	-80.1444	28.4784	72.22	34.64	1647.8	76.34	28.13	1986.8	42819	49204
134.0	6423.431	-80.1311	28.4821	72.23	34.34	1680.4	76.27	27.99	2020.2	44179	50148
135.0	6424.384	-80.1175	28.4859	72.24	34.05	1713.5	76.21	27.84	2054.0	45570	51103
136.0	6425.350	-80.1037	28.4898	72.25	33.75	1747.3	76.14	27.70	2088.6	46994	52069
137.0	6426.327	-80.0895	28.4937	72.26	33.47	1781.6	76.08	27.56	2123.6	48450	53047
138.0	6427.315	-80.0750	28.4978	72.27	33.20	1816.4	76.02	27.43	2159.1	49940	54037
139.0	6428.316	-80.0601	28.5019	72.28	32.93	1851.6	75.96	27.30	2195.0	51463	55039
140.0	6429.329	-80.0449	28.5062	72.29	32.68	1887.6	75.91	27.18	2231.5	53019	56054
	IECO										
140.65	6429.994	-80.0349	28.5090	72.29	32.52	1909.5	75.87	27.09	2253.8	54049	56720

TABLE XIII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
141.0	6430.354	-80.0294	28.5105	72.30	32.48	1920.5	75.86	27.08	2264.9	54609	57080
142.0	6431.386	-80.0137	28.5149	72.31	32.22	1938.4	75.83	26.91	2283.6	56224	58114
143.0	6432.421	-79.9978	28.5193	72.32	32.00	1954.5	75.81	26.76	2300.4	57856	59150
144.0	6433.458	-79.9817	28.5238	72.33	31.78	1970.4	75.79	26.61	2316.9	59506	60188
OECO											
144.32	6433.790	-79.9765	28.5252	72.33	31.69	1974.8	75.78	26.55	2321.6	60038	60520
145.0	6434.495	-79.9654	28.5283	72.34	31.56	1975.5	75.79	26.43	2322.7	61172	61227
S-IB/S-IVB SEPARATION SIGNAL											
145.59	6435.104	-79.9558	28.5310	72.35	31.44	1972.7	75.79	26.32	2320.3	62155	61836
150.0	6439.560	-79.8842	28.5509	72.39	30.48	1956.1	75.83	25.47	2307.0	69495	66299
155.0	6444.451	-79.8023	28.5736	72.43	29.43	1964.0	75.82	24.60	2318.1	77888	71197
160.0	6449.214	-79.7191	28.5966	72.47	28.40	1977.2	75.80	23.76	2334.4	86409	75967
165.0	6453.856	-79.6345	28.6199	72.51	27.39	1991.8	75.79	22.93	2351.9	95069	80617
GUIDANCE INITIATION											
169.76	6458.165	-79.5526	28.6424	72.54	26.46	2007.6	75.78	22.17	2370.3	103442	84933
170.0	6458.380	-79.5484	28.6435	72.54	26.41	2008.4	75.78	22.13	2371.3	103868	85148
175.0	6462.790	-79.4610	28.6675	72.59	25.46	2026.3	75.77	21.36	2391.8	112812	89566
180.0	6467.096	-79.3721	28.6918	72.69	24.62	2044.8	75.81	20.68	2412.6	121900	93879
185.0	6471.312	-79.2818	28.7163	72.79	23.85	2063.8	75.86	20.05	2433.7	131124	98103
190.0	6475.440	-79.1901	28.7411	72.88	23.09	2083.3	75.90	19.44	2455.2	140483	102240
195.0	6479.483	-79.0969	28.7660	72.98	22.35	2104.0	75.95	18.83	2477.8	149980	106290
200.0	6483.440	-79.0023	28.7912	73.09	21.61	2125.6	76.00	18.24	2501.3	159619	110255
205.0	6487.310	-78.9062	28.8166	73.19	20.88	2148.1	76.05	17.64	2525.6	169401	114133
210.0	6491.096	-78.8086	28.8423	73.30	20.17	2171.6	76.10	17.07	2550.8	179331	117927
215.0	6494.797	-78.7095	28.8682	73.41	19.47	2196.0	76.16	16.50	2576.9	189410	121636
220.0	6498.414	-78.6087	28.8943	73.52	18.78	2221.4	76.22	15.94	2603.9	199643	125262
225.0	6501.949	-78.5064	28.9206	73.64	18.11	2247.6	76.28	15.39	2631.6	210032	128805
230.0	6505.400	-78.4023	28.9471	73.76	17.45	2274.7	76.35	14.85	2660.1	220579	132265
235.0	6508.769	-78.2966	28.9739	73.88	16.80	2302.8	76.42	14.33	2689.6	231287	135642
240.0	6512.058	-78.1892	29.0008	74.00	16.18	2331.9	76.49	13.82	2720.0	242160	138939
245.0	6515.266	-78.0801	29.0280	74.13	15.57	2361.9	76.56	13.32	2751.2	253200	142157
250.0	6518.396	-77.9691	29.0554	74.25	14.97	2392.6	76.63	12.83	2783.2	264411	145295
255.0	6521.447	-77.8563	29.0830	74.37	14.39	2424.3	76.71	12.35	2815.9	275795	148355
260.0	6524.420	-77.7417	29.1108	74.50	13.82	2456.8	76.78	11.88	2849.5	287355	151337
265.0	6527.316	-77.6253	29.1388	74.63	13.27	2490.3	76.86	11.43	2884.0	299094	154242

TABLE XIII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
270.0	6530.138	-77.5068	29.1671	74.75	12.74	2524.8	76.94	11.00	2919.4	311016	157073
275.0	6532.886	-77.3865	29.1955	74.88	12.23	2560.2	77.02	10.57	2955.8	323123	159830
280.0	6535.561	-77.2641	29.2242	75.01	11.73	2596.5	77.10	10.16	2992.9	335420	162514
285.0	6538.164	-77.1398	29.2530	75.14	11.24	2633.7	77.18	9.75	3030.9	347910	165126
290.0	6540.694	-77.0133	29.2821	75.27	10.76	2671.7	77.27	9.36	3069.7	360595	167666
295.0	6543.154	-76.8848	29.3114	75.40	10.31	2710.7	77.35	8.97	3109.4	373479	170135
300.0	6545.545	-76.7541	29.3409	75.53	9.86	2750.7	77.44	8.60	3150.1	386566	172535
305.0	6547.867	-76.6213	29.3705	75.66	9.44	2791.7	77.53	8.25	3191.8	399860	174867
310.0	6550.123	-76.4862	29.4004	75.79	9.03	2833.9	77.62	7.90	3234.5	413366	177133
315.0	6552.314	-76.3489	29.4305	75.92	8.63	2876.7	77.71	7.57	3277.9	427086	179333
320.0	6554.440	-76.2092	29.4608	76.05	8.24	2920.7	77.80	7.24	3322.4	441024	181468
325.0	6556.501	-76.0672	29.4913	76.18	7.87	2965.5	77.89	6.92	3367.7	455185	183540
330.0	6558.500	-75.9228	29.5220	76.32	7.51	3011.4	77.98	6.62	3414.1	469572	185549
335.0	6560.437	-75.7759	29.5529	76.45	7.16	3058.1	78.07	6.33	3461.3	484189	187496
340.0	6562.314	-75.6266	29.5840	76.58	6.83	3106.0	78.17	6.04	3509.5	499041	189382
345.0	6564.132	-75.4747	29.6153	76.71	6.51	3154.8	78.26	5.77	3558.8	514132	191210
350.0	6565.892	-75.3203	29.6468	76.85	6.20	3204.9	78.36	5.51	3609.2	529466	192980
355.0	6567.595	-75.1632	29.6785	76.98	5.91	3256.0	78.46	5.25	3660.7	545050	194694
360.0	6569.243	-75.0034	29.7104	77.12	5.62	3308.4	78.55	5.01	3713.4	560887	196352
365.0	6570.838	-74.8409	29.7424	77.25	5.35	3361.8	78.65	4.77	3767.1	576983	197957
370.0	6572.379	-74.6755	29.7747	77.39	5.09	3416.2	78.75	4.55	3821.8	593343	199509
375.0	6573.868	-74.5073	29.8071	77.53	4.84	3471.7	78.86	4.33	3877.6	609970	201008
380.0	6575.306	-74.3362	29.8397	77.66	4.59	3528.4	78.96	4.12	3934.5	626871	202457
385.0	6576.695	-74.1621	29.8725	77.80	4.37	3586.4	79.06	3.92	3992.7	644050	203857
390.0	6578.037	-73.9850	29.9055	77.94	4.15	3645.4	79.17	3.73	4052.0	661514	205209
395.0	6579.331	-73.8048	29.9386	78.08	3.94	3705.8	79.28	3.55	4112.6	679267	206514
400.0	6580.581	-73.6215	29.9719	78.22	3.74	3767.0	79.39	3.37	4174.0	697315	207775
405.0	6581.786	-73.4349	30.0053	78.36	3.55	3829.9	79.50	3.20	4237.1	715663	208991
410.0	6582.950	-73.2451	30.0390	78.51	3.37	3894.0	79.61	3.05	4301.4	734317	210165
415.0	6584.073	-73.0519	30.0727	78.65	3.20	3959.6	79.72	2.90	4367.2	753286	211299
420.0	6585.158	-72.8552	30.1066	78.79	3.03	4026.7	79.84	2.75	4434.4	772574	212395
425.0	6586.205	-72.6551	30.1406	78.94	2.88	4095.3	79.95	2.62	4503.1	792190	213453
430.0	6587.217	-72.4514	30.1748	79.09	2.74	4164.8	80.07	2.49	4572.8	812139	214476
435.0	6588.194	-72.2441	30.2091	79.24	2.60	4236.2	80.19	2.37	4644.3	832427	215464
440.0	6589.137	-72.0330	30.2435	79.39	2.47	4309.1	80.32	2.25	4717.4	853063	216419
445.0	6590.050	-71.8181	30.2780	79.54	2.35	4383.6	80.44	2.15	4792.0	874054	217343
450.0	6590.933	-71.5993	30.3126	79.69	2.23	4459.8	80.57	2.04	4868.2	895408	218237
455.0	6591.788	-71.3765	30.3472	79.85	2.13	4537.6	80.69	1.95	4946.2	917132	219104
460.0	6592.614	-71.1498	30.3820	80.00	2.00	4607.9	80.82	1.84	5016.6	939222	219941
465.0	6593.393	-70.9197	30.4167	80.16	1.85	4671.1	80.96	1.70	5079.9	961624	220731
470.0	6594.124	-70.6863	30.4513	80.31	1.71	4735.1	81.09	1.58	5144.0	984333	221474
475.0	6594.808	-70.4494	30.4858	80.47	1.58	4800.1	81.23	1.45	5209.1	1007352	222169
480.0	6595.445	-70.2091	30.5202	80.63	1.45	4866.5	81.37	1.33	5275.6	1030688	222817
485.0	6596.037	-69.9653	30.5545	80.79	1.32	4934.0	81.50	1.22	5343.1	1054346	22342[illegible]

TABLE XIII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
490.0	6596.586	-69.7179	30.5887	80.95	1.21	5003.0	81.64	1.12	5412.2	1078332	223981
495.0	6597.093	-69.4669	30.6228	81.11	1.10	5073.4	81.78	1.02	5482.6	1102654	224499
500.0	6597.563	-69.2121	30.6568	81.28	1.00	5145.1	81.92	0.93	5554.5	1127318	224980
505.0	6597.995	-68.9535	30.6905	81.44	0.91	5218.3	82.07	0.84	5627.7	1152331	225423
510.0	6598.392	-68.6910	30.7242	81.60	0.82	5292.9	82.21	0.76	5702.3	1177699	225831
515.0	6598.753	-68.4246	30.7576	81.77	0.73	5369.3	82.36	0.68	5778.7	1203431	226203
520.0	6599.079	-68.1541	30.7908	81.94	0.65	5447.1	82.51	0.60	5856.6	1229534	226540
525.0	6599.371	-67.8794	30.8239	82.11	0.57	5526.7	82.66	0.53	5936.3	1256017	226843
530.0	6599.628	-67.6006	30.8567	82.28	0.49	5608.1	82.81	0.46	6017.7	1282887	227111
535.0	6599.853	-67.3174	30.8892	82.46	0.42	5691.2	82.97	0.39	6100.8	1310154	227346
540.0	6600.045	-67.0298	30.9215	82.63	0.35	5776.1	83.12	0.33	6185.7	1337825	227549
545.0	6600.207	-66.7377	30.9535	82.81	0.29	5862.9	83.28	0.27	6272.6	1365910	227722
550.0	6600.341	-66.4409	30.9852	82.99	0.23	5951.8	83.45	0.22	6361.5	1394418	227866
555.0	6600.447	-66.1394	31.0165	83.18	0.18	6042.7	83.61	0.16	6452.5	1423361	227982
560.0	6600.527	-65.8331	31.0475	83.36	0.13	6135.7	83.78	0.12	6545.4	1452746	228073
565.0	6600.584	-65.5219	31.0780	83.56	0.08	6230.8	83.95	0.08	6640.6	1482585	228140
570.0	6600.620	-65.2055	31.1081	83.75	0.05	6328.4	84.13	0.04	6738.1	1512888	228185
575.0	6600.637	-64.8840	31.1378	83.94	0.02	6428.2	84.31	0.02	6838.0	1543668	228213
580.0	6600.639	-64.5572	31.1670	84.14	-0.01	6530.3	84.49	-0.01	6940.1	1574935	228225
585.0	6600.629	-64.2249	31.1957	84.34	-0.03	6635.4	84.67	-0.02	7045.2	1606702	228224
590.0	6600.609	-63.8871	31.2238	84.54	-0.04	6743.0	84.86	-0.04	7152.8	1638983	228214
595.0	6600.584	-63.5435	31.2513	84.75	-0.04	6853.3	85.05	-0.04	7263.1	1671789	228198
600.0	6600.554	-63.1940	31.2782	84.96	-0.06	6967.2	85.24	-0.06	7377.0	1705136	228176
605.0	6600.516	-62.8385	31.3044	85.17	-0.06	7083.4	85.43	-0.06	7493.3	1739037	228147
610.0	6600.478	-62.4768	31.3300	85.38	-0.05	7203.4	85.63	-0.05	7613.2	1773509	228118
615.0	6600.456	-62.1088	31.3547	85.60	-0.02	7326.8	85.83	-0.02	7736.6	1808569	228103
S-IVB GUIDANCE CUTOFF											
616.76	6600.454	-61.9777	31.3633	85.68	-0.00	7370.4	85.91	-0.00	7780.3	1821052	228104
620.0	6600.455	-61.7353	31.3787	85.82	0.00	7378.8	86.04	0.00	7788.6	1844123	228111
625.0	6600.458	-61.3611	31.4014	86.04	0.01	7378.8	86.25	0.00	7788.6	1879734	228121
ORBIT INSERTION											
626.76	6600.459	-61.2293	31.4091	86.11	0.01	7378.8	86.32	0.01	7788.6	1892269	228124
650.0	6600.486	-59.4873	31.4969	87.13	0.01	7378.9	87.28	0.01	7788.8	2057786	228181
700.0	6600.529	-55.7305	31.5935	89.33	0.03	7379.6	89.36	0.03	7789.6	2413913	228256
750.0	6600.767	-51.9705	31.5697	91.53	0.05	7379.3	91.45	0.04	7789.3	2770057	228487
800.0	6601.109	-48.2181	31.4231	93.72	0.06	7379.0	93.52	0.06	7788.9	3126172	228779
850.0	6601.551	-44.4837	31.1550	95.89	0.08	7378.6	95.57	0.07	7788.5	3482250	229133
900.0	6602.093	-40.7770	30.7673	98.02	0.09	7378.1	97.59	0.09	7787.9	3838281	229546

TABLE XIII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
950.0	6602.732	-37.1071	30.2629	100.11	0.11	7377.5	99.57	0.10	7787.2	4194258	230021
1000.0	6603.467	-33.4821	29.6453	102.14	0.12	7376.9	101.49	0.11	7786.5	4550170	230555
1050.0	6604.293	-29.9088	28.9188	104.10	0.14	7376.2	103.34	0.13	7785.7	4906010	231150
1100.0	6605.208	-26.3928	28.0882	105.99	0.15	7375.4	105.13	0.14	7784.7	5261769	231804
1150.0	6606.209	-22.9384	27.1586	107.79	0.16	7374.5	106.83	0.15	7783.7	5617438	232519
1200.0	6607.291	-19.5487	26.1356	109.51	0.17	7373.6	108.45	0.17	7782.6	5973007	233294
1250.0	6608.450	-16.2253	25.0251	111.14	0.19	7372.6	109.98	0.18	7781.5	6328468	234129
1300.0	6609.682	-12.9688	23.8328	112.67	0.20	7371.5	111.42	0.19	7780.2	6683810	235024
1350.0	6610.981	-9.7787	22.5648	114.10	0.21	7370.4	112.76	0.20	7778.9	7039024	235980
1400.0	6612.343	-6.6536	21.2270	115.43	0.22	7369.2	114.01	0.21	7777.5	7394101	236995
1450.0	6613.763	-3.5912	19.8253	116.66	0.22	7367.9	115.16	0.21	7776.0	7749029	238069
1500.0	6615.234	-0.5887	18.3656	117.79	0.23	7366.5	116.21	0.22	7774.4	8103801	239202
1550.0	6616.751	2.3577	16.8536	118.81	0.24	7365.1	117.17	0.23	7772.8	8458405	240393
1600.0	6618.309	5.2517	15.2946	119.73	0.25	7363.5	118.03	0.23	7771.2	8812833	241640
1650.0	6619.901	8.0979	13.6942	120.56	0.25	7362.0	118.80	0.24	7769.5	9167074	242941
1700.0	6621.522	10.9007	12.0575	121.28	0.25	7360.3	119.47	0.24	7767.7	9521120	244296
1750.0	6623.166	13.6653	10.3896	121.91	0.26	7358.6	120.05	0.24	7765.9	9874962	245701
1800.0	6624.826	16.3965	8.6953	122.43	0.26	7356.8	120.54	0.25	7764.1	10228591	247153
1850.0	6626.497	19.0996	6.9795	122.86	0.26	7355.0	120.94	0.25	7762.3	10582000	248650
1900.0	6628.172	21.7799	5.2468	123.20	0.26	7353.1	121.25	0.25	7760.4	10935181	250187
1950.0	6629.846	24.4426	3.5018	123.43	0.26	7351.2	121.47	0.25	7758.5	11288128	251761
2000.0	6631.512	27.0932	1.7488	123.58	0.26	7349.3	121.60	0.25	7756.6	11640836	253367
2050.0	6633.165	29.7370	-0.0076	123.63	0.26	7347.2	121.65	0.24	7754.6	11993298	255001
2100.0	6634.800	32.3794	-1.7632	123.58	0.25	7345.2	121.60	0.24	7752.7	12345512	256656
2150.0	6636.411	35.0258	-3.5135	123.44	0.25	7343.2	121.47	0.24	7750.8	12697474	258327
2200.0	6637.991	37.6816	-5.2542	123.20	0.24	7341.1	121.25	0.23	7748.9	13049180	260007
2250.0	6639.538	40.3519	-6.9809	122.87	0.24	7339.0	120.94	0.23	7747.0	13400630	261690
2300.0	6641.044	43.0421	-8.6892	122.45	0.23	7336.9	120.55	0.22	7745.2	13751822	263370
2350.0	6642.505	45.7574	-10.3746	121.92	0.22	7334.9	120.06	0.21	7743.4	14102755	265038
2400.0	6643.918	48.5029	-12.0324	121.31	0.22	7332.8	119.48	0.21	7741.6	14453429	266688
2450.0	6645.277	51.2834	-13.6580	120.59	0.21	7330.8	118.82	0.20	7739.9	14803841	268311
2500.0	6646.579	54.1037	-15.2467	119.78	0.20	7328.8	118.06	0.19	7738.2	15153992	269900
2550.0	6647.819	56.9684	-16.7933	118.87	0.19	7326.9	117.21	0.18	7736.6	15503876	271448
2600.0	6648.994	59.8817	-18.2930	117.86	0.18	7325.1	116.26	0.17	7735.0	15853487	272946
2650.0	6650.100	62.8474	-19.7404	116.75	0.17	7323.3	115.23	0.16	7733.6	16202813	274386
2700.0	6651.134	65.8691	-21.1303	115.54	0.16	7321.6	114.10	0.15	7732.2	16551834	275762
2750.0	6652.094	68.9495	-22.4573	114.23	0.14	7319.9	112.87	0.14	7730.9	16900514	277065
2800.0	6652.977	72.0909	-23.7158	112.83	0.13	7318.4	111.55	0.12	7729.7	17248798	278287
2850.0	6653.780	75.2948	-24.9003	111.33	0.12	7317.0	110.14	0.11	7728.6	17596585	279423
2900.0	6654.501	78.5618	-26.0053	109.74	0.11	7315.7	108.65	0.10	7727.6	17943704	280465
2950.0	6655.139	81.8915	-27.0253	108.05	0.09	7314.5	107.06	0.09	7726.6	18289831	281408
3000.0	6655.691	85.2826	-27.9549	106.29	0.08	7313.4	105.39	0.08	7725.9	18634301	282245
3050.0	6656.156	88.7323	-28.7889	104.44	0.07	7312.5	103.65	0.06	7725.2	18975565	282972
3100.0	6656.534	92.2370	-29.5225	102.52	0.05	7311.8	101.84	0.05	7724.6	19309086	283584

TABLE XIII
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TIME SEC	EC DIST KM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
3150.0	6656.823	95.7917	-30.1511	100.53	0.04	7311.1	99.96	0.04	7724.2	19615408	284076
3200.0	6657.023	99.3901	-30.6709	98.48	0.02	7310.7	98.03	0.02	7723.8	19764221	284446
3250.0	6657.134	103.0251	-31.0783	96.39	0.01	7310.4	96.05	0.01	7723.7	19561313	284690
3300.0	6657.155	106.6884	-31.3706	94.27	-0.00	7310.2	94.04	-0.00	7723.6	19245839	284808
3350.0	6657.086	110.3710	-31.5457	92.11	-0.02	7310.2	92.00	-0.02	7723.6	18909901	284797
3400.0	6656.928	114.0634	-31.6024	89.95	-0.03	7310.4	89.95	-0.03	7723.8	18567656	284658
3450.0	6656.681	117.7558	-31.5402	87.79	-0.05	7310.7	87.90	-0.04	7724.1	18222723	284391
3500.0	6656.346	121.4385	-31.3596	85.64	-0.06	7311.2	85.87	-0.06	7724.5	17876406	283996
3550.0	6655.924	125.1018	-31.0619	83.51	-0.07	7311.9	83.86	-0.07	7725.1	17529282	283475
3600.0	6655.417	128.7369	-30.6490	81.42	-0.09	7312.7	81.88	-0.08	7725.7	17181638	282832
3650.0	6654.826	132.3355	-30.1237	79.38	-0.10	7313.6	79.95	-0.09	7726.5	16833629	282069
3700.0	6654.152	135.8903	-29.4895	77.39	-0.11	7314.7	78.07	-0.11	7727.4	16485344	281191
3750.0	6653.398	139.3953	-28.7504	75.47	-0.12	7316.0	76.26	-0.12	7728.4	16136834	280202
3800.0	6652.566	142.8455	-27.9108	73.62	-0.14	7317.3	74.52	-0.13	7729.6	15788127	279107
3850.0	6651.658	146.2371	-26.9756	71.86	-0.15	7318.8	72.86	-0.14	7730.8	15439241	277912
3900.0	6650.676	149.5675	-25.9500	70.18	-0.16	7320.4	71.27	-0.15	7732.1	15090181	276624
3950.0	6649.624	152.8353	-24.8394	68.59	-0.17	7322.2	69.78	-0.16	7733.5	14740949	275250
4000.0	6648.505	156.0403	-23.6492	67.09	-0.18	7324.0	68.37	-0.17	7735.0	14391545	273797
4050.0	6647.322	159.1829	-22.3850	65.69	-0.19	7325.9	67.06	-0.18	7736.5	14041964	272273
4100.0	6646.078	162.2648	-21.0524	64.39	-0.20	7327.9	65.84	-0.19	7738.2	13692202	270686
4150.0	6644.777	165.2881	-19.6568	63.19	-0.21	7329.9	64.71	-0.20	7739.9	13342253	269044
4200.0	6643.423	168.2558	-18.2037	62.08	-0.22	7332.0	63.68	-0.20	7741.6	12992110	267355
4250.0	6642.020	171.1713	-16.6985	61.08	-0.22	7334.2	62.74	-0.21	7743.5	12641769	265629
4300.0	6640.571	174.0385	-15.1463	60.17	-0.23	7336.4	61.89	-0.22	7745.3	12291225	263874
4350.0	6639.083	176.8616	-13.5522	59.36	-0.24	7338.6	61.14	-0.22	7747.2	11940474	262098
4400.0	6637.558	179.6452	-11.9212	58.65	-0.24	7340.8	60.47	-0.23	7749.1	11589512	260311
4450.0	6636.002	-177.6059	-10.2581	58.04	-0.24	7343.0	59.90	-0.23	7751.1	11238337	258519
4500.0	6634.420	-174.8868	-8.5676	57.52	-0.25	7345.2	59.42	-0.24	7753.0	10886949	256733
4550.0	6632.817	-172.1924	-6.8544	57.10	-0.25	7347.4	59.03	-0.24	7755.0	10535347	254959
4600.0	6631.198	-169.5175	-5.1230	56.78	-0.25	7349.6	58.73	-0.24	7757.0	10183533	253204
4650.0	6629.568	-166.8568	-3.3778	56.55	-0.25	7351.7	58.52	-0.24	7758.9	9831511	251478
4700.0	6627.932	-164.2051	-1.6234	56.42	-0.25	7353.8	58.39	-0.24	7760.9	9479283	249785
4750.0	6626.297	-161.5569	0.1360	56.38	-0.25	7355.8	58.35	-0.24	7762.8	9126856	248133
4800.0	6624.668	-158.9069	1.8960	56.44	-0.25	7357.8	58.41	-0.24	7764.7	8774237	246527
4850.0	6623.050	-156.2497	3.6520	56.59	-0.25	7359.7	58.54	-0.24	7766.6	8421433	244972
4900.0	6621.449	-153.5799	5.3997	56.83	-0.25	7361.5	58.77	-0.23	7768.4	8068455	243474
4950.0	6619.870	-150.8920	7.1346	57.18	-0.24	7363.3	59.09	-0.23	7770.1	7715312	242037
5000.0	6618.320	-148.1809	8.8520	57.61	-0.24	7365.0	59.50	-0.23	7771.9	7362019	240664
5050.0	6616.803	-145.4412	10.5473	58.15	-0.23	7366.6	60.00	-0.22	7773.5	7008588	239359
5100.0	6615.326	-142.6676	12.2156	58.79	-0.23	7368.1	60.59	-0.21	7775.1	6655035	238124
5150.0	6613.894	-139.8553	13.8520	59.52	-0.22	7369.5	61.27	-0.21	7776.6	6301377	236961
5200.0	6612.512	-136.9993	15.4514	60.36	-0.21	7370.8	62.05	-0.20	7778.1	5947635	235872
5250.0	6611.185	-134.0950	17.0085	61.29	-0.20	7372.0	62.92	-0.19	7779.5	5593831	234859
5300.0	6609.918	-131.1380	18.5180	62.33	-0.19	7373.1	63.89	-0.18	7780.8	5239990	233921

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TIME SEC	EC DIST KM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
5350.0	6608.717	-128.1245	19.9742	63.47	-0.18	7374.2	64.96	-0.17	7782.0	4886143	233060
5400.0	6607.586	-125.0509	21.3715	64.71	-0.17	7375.1	66.12	-0.16	7783.1	4532326	232275
5450.0	6606.529	-121.9144	22.7040	66.05	-0.16	7375.9	67.38	-0.15	7784.2	4178585	231565
5500.0	6605.551	-118.7129	23.9657	67.49	-0.15	7376.7	68.73	-0.14	7785.1	3824978	230931
5550.0	6604.655	-115.4451	25.1508	69.04	-0.13	7377.3	70.18	-0.13	7786.0	3471582	230370
5600.0	6603.844	-112.1104	26.2533	70.67	-0.12	7379.1	71.72	-0.11	7788.0	3118487	229881
5650.0	6603.121	-108.7090	27.2676	72.40	-0.10	7381.1	73.35	-0.10	7790.1	2765790	229463
5700.0	6602.501	-105.2429	28.1876	74.22	-0.09	7382.5	75.07	-0.08	7791.7	2413755	229128
5750.0	6601.996	-101.7155	29.0077	76.12	-0.07	7383.4	76.86	-0.07	7792.8	2062804	228881
5800.0	6601.613	-98.1313	29.7228	78.09	-0.05	7384.0	78.73	-0.05	7793.6	1713675	228727
5850.0	6601.357	-94.4964	30.3282	80.13	-0.03	7384.4	80.66	-0.03	7794.1	1367823	228666
5900.0	6601.230	-90.8179	30.8197	82.23	-0.01	7384.7	82.64	-0.01	7794.4	1028605	228700
5950.0	6601.235	-87.1039	31.1938	84.37	0.01	7384.8	84.67	0.01	7794.6	705692	228829
6000.0	6601.272	-83.3638	31.4486	86.54	0.03	7384.4	86.72	0.03	7794.4	436964	228950
6050.0	6601.558	-79.6076	31.5809	88.73	0.05	7384.2	88.80	0.05	7794.2	369744	229281
6100.0	6601.977	-75.8457	31.5902	90.93	0.08	7383.9	90.88	0.07	7793.9	579043	229703
6150.0	6602.527	-72.0887	31.4765	93.13	0.10	7383.4	92.96	0.09	7793.4	886897	230215
6200.0	6603.205	-68.3472	31.2408	95.31	0.12	7382.8	95.[illegible]3	0.11	7792.8	1220848	230815
6250.0	6604.009	-64.6311	30.8849	97.45	0.13	7382.0	97.[illegible]6	0.13	7792.0	1564218	231501
6300.0	6604.935	-60.9499	30.4115	99.55	0.15	7381.2	99.04	0.14	7791.1	1911889	232272
6350.0	6605.980	-57.3117	29.8240	101.59	0.17	7380.2	100.98	0.16	7790.0	2261830	233126
6400.0	6607.142	-53.7239	29.1266	103.56	0.19	7379.2	102.85	0.18	7788.9	2613080	234064
6450.0	6608.424	-50.1924	28.3238	105.49	0.21	7378.1	104.65	0.20	7787.8	2965131	235093
6500.0	6609.836	-46.7218	27.4205	107.32	0.23	7377.2	106.38	0.22	7786.6	3317685	236225
6550.0	6611.369	-43.3156	26.4224	109.06	0.25	7375.7	108.02	0.23	7785.0	3670545	237457
6600.0	6613.007	-39.9759	25.3352	110.71	0.26	7374.1	109.58	0.25	7783.3	4023577	238775
6650.0	6614.741	-36.7035	24.1650	112.27	0.28	7372.5	111.[illegible]4	0.26	7781.5	4376690	240176
6700.0	6616.567	-33.4982	22.9177	113.72	0.29	7370.7	112.41	0.28	7779.6	4729818	241660
6750.0	6618.477	-30.3588	21.5994	115.08	0.30	7368.8	113.68	0.29	7777.5	5082910	243224
6800.0	6620.464	-27.2833	20.2160	116.34	0.31	7366.8	114.86	0.30	7775.4	5435926	244865
6850.0	6622.522	-24.2689	18.7733	117.49	0.33	7364.8	115.94	0.31	7773.2	5788833	246583
6900.0	6624.642	-21.3122	17.2771	118.54	0.33	7362.6	116.92	0.32	7771.0	6141604	248373
6950.0	6626.818	-18.4093	15.7330	119.49	0.34	7360.4	117.81	0.32	7768.6	6494215	250234
7000.0	6629.041	-15.5560	14.1464	120.35	0.35	7358.1	118.60	0.33	7766.2	6846645	252160
7050.0	6631.304	-12.7477	12.5224	121.1[illegible]	0.36	7355.7	119.30	0.34	7763.8	7198877	254150
7100.0	6633.599	-9.9796	10.8664	121.75	0.36	7353.3	119.90	0.34	7761.2	7550895	256198
7150.0	6635.918	-7.2466	9.1830	122.30	0.36	7350.7	120.42	0.34	7758.7	7902685	258300
7200.0	6638.252	-4.5437	7.4772	122.76	0.36	7348.1	120.84	0.35	7756.1	8254236	260452
7250.0	6640.595	-1.8656	5.7536	123.12	0.37	7345.5	121.17	0.35	7753.5	8605536	262646
7300.0	6642.938	0.7930	4.0168	123.39	0.37	7342.8	121.42	0.35	7750.9	8956577	264879
7350.0	6645.273	3.4373	2.2711	123.56	0.36	7340.1	121.58	0.34	7748.2	9307350	267143
7400.0	6647.594	6.0727	0.5211	123.63	0.36	7337.3	121.65	0.34	7745.6	9657851	269431
7450.0	6649.891	8.7047	-1.2291	123.62	0.36	7334.5	121.63	0.34	7742.9	10008073	271736
7500.0	6652.158	11.3383	-2.9750	123.50	0.35	7331.7	121.52	0.33	7740.3	10358013	274052

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TIME SEC	EC DIST KM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
7550.0	6654.388	13.9791	-4.7124	123.30	0.35	7328.9	121.33	0.33	7737.7	10707669	276369
7600.0	6656.574	16.6322	-6.4370	123.00	0.34	7326.1	121.05	0.32	7735.1	11057040	278680
7650.0	6658.709	19.3029	-8.1444	122.61	0.33	7323.4	120.69	0.31	7732.6	11406127	280976
7700.0	6660.786	21.9962	-9.8302	122.12	0.32	7320.6	120.23	0.30	7730.1	11754931	283248
7750.0	6662.799	24.7173	-11.4899	121.54	0.31	7317.9	119.69	0.29	7727.7	12103456	285487
7800.0	6664.742	27.4710	-13.1190	120.86	0.30	7315.2	119.06	0.28	7725.3	12451704	287685
7850.0	6666.610	30.2622	-14.7128	120.08	0.29	7312.6	118.33	0.27	7723.1	12799682	289831
7900.0	6668.396	33.0953	-16.2665	119.21	0.27	7310.1	117.52	0.26	7720.9	13147393	291918
7950.0	6670.096	35.9746	-17.7752	118.24	0.26	7307.6	116.61	0.25	7718.7	13494845	293934
8000.0	6671.706	38.9040	-19.2339	117.17	0.25	7305.2	115.61	0.23	7716.7	13842042	295873
8050.0	6673.219	41.8872	-20.6373	116.00	0.23	7303.0	114.52	0.22	7714.8	14188991	297724
8100.0	6674.633	44.9272	-21.9803	114.74	0.21	7300.8	113.34	0.20	7713.0	14535697	299478
8150.0	6675.943	48.0263	-23.2575	113.38	0.20	7298.8	112.06	0.19	7711.4	14882162	301128
8200.0	6677.146	51.1863	-24.4635	111.92	0.18	7296.9	110.69	0.17	7709.8	15228387	302666
8250.0	6678.239	54.4083	-25.5928	110.37	0.16	7295.2	109.24	0.15	7708.4	15574367	304083
8300.0	6679.219	57.6922	-26.6402	108.73	0.14	7293.6	107.69	0.14	7707.1	15920091	305372
8350.0	6680.082	61.0370	-27.6002	107.01	0.13	7292.2	106.07	0.12	7706.0	16265539	306528
8400.0	6680.828	64.4407	-28.4678	105.20	0.11	7290.9	104.37	0.10	7705.0	16610673	307543
8450.0	6681.455	67.9002	-29.2380	103.32	0.09	7289.9	102.59	0.08	7704.2	16955430	308413
8500.0	6681.959	71.4108	-29.9064	101.37	0.07	7289.0	100.75	0.07	7703.5	17299708	309132
8550.0	6682.342	74.9673	-30.4689	99.36	0.05	7288.3	98.85	0.05	7703.0	17643331	309698
8600.0	6682.601	78.5628	-30.9217	97.30	0.03	7287.8	96.91	0.03	7702.6	17985993	310105
8650.0	6682.736	82.1898	-31.2620	95.20	0.01	7287.5	94.92	0.01	7702.4	18327124	310353
8700.0	6682.747	85.8397	-31.4875	93.07	-0.01	7287.4	92.91	-0.01	7702.3	18665565	310439
8750.0	6682.634	89.5036	-31.5964	90.93	-0.03	7287.5	90.88	-0.03	7702.4	18998611	310363
8800.0	6682.398	93.1718	-31.5882	88.77	-0.05	7287.8	88.84	-0.04	7702.7	19318462	310124
8850.0	6682.039	96.8348	-31.4628	86.63	-0.07	7288.3	86.81	-0.06	7703.2	19594139	309723
8900.0	6681.559	100.4832	-31.2211	84.50	-0.08	7288.9	84.80	-0.08	7703.8	19687204	309163
8950.0	6680.958	104.1078	-30.8646	82.40	-0.10	7289.8	82.82	-0.10	7704.5	19490724	308444
9000.0	6680.240	107.7004	-30.3959	80.35	-0.12	7290.9	80.87	-0.12	7705.4	19189465	307572
9050.0	6679.405	111.2532	-29.8178	78.35	-0.14	7292.2	78.98	-0.13	7706.5	18862436	306549
9100.0	6678.456	114.7600	-29.1340	76.41	-0.16	7293.6	77.15	-0.15	7707.7	18526405	305381
9150.0	6677.396	118.2151	-28.3488	74.53	-0.18	7295.2	75.38	-0.17	7709.0	18186252	304073
9200.0	6676.228	121.6143	-27.4666	72.74	-0.19	7297.0	73.69	-0.18	7710.5	17843846	302632
9250.0	6674.954	124.9545	-26.4924	71.02	-0.21	7298.9	72.07	-0.20	7712.1	17500041	301063
9300.0	6673.580	128.2339	-25.4313	69.39	-0.22	7301.0	70.54	-0.21	7713.9	17155273	299376
9350.0	6672.108	131.4515	-24.2886	67.86	-0.24	7303.2	69.10	-0.23	7715.7	16809787	297578
9400.0	6670.542	134.6074	-23.0698	66.41	-0.25	7305.5	67.74	-0.24	7717.7	16463726	295676
9450.0	6668.888	137.7028	-21.7802	65.07	-0.27	7308.0	66.48	-0.25	7719.8	16117177	293681
9500.0	6667.149	140.7394	-20.4253	63.81	-0.28	7310.5	65.31	-0.26	7722.0	15770193	291602
9550.0	6665.332	143.7199	-19.0104	62.66	-0.29	7313.2	64.23	-0.28	7724.2	15422811	289447
9600.0	6663.440	146.6471	-17.5408	61.61	-0.30	7315.9	63.24	-0.29	7726.6	15075051	287228
9650.0	6661.480	149.5249	-16.0217	60.65	-0.31	7318.7	62.35	-0.30	7729.0	14726926	284953
9700.0	6659.458	152.3572	-14.4580	59.79	-0.32	7321.5	61.55	-0.30	7731.5	14378447	282633

TABLE XIII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
9750.0	6657.379	155.1482	-12.8548	59.03	-0.33	7324.4	60.83	-0.31	7734.0	14029617	280278
9800.0	6655.249	157.9026	-11.2168	58.37	-0.34	7327.3	60.21	-0.32	7736.6	13680442	277898
9850.0	6653.076	160.6251	-9.5487	57.80	-0.34	7330.2	59.68	-0.32	7739.2	13330923	275502
9900.0	6650.864	163.3208	-7.8551	57.32	-0.35	7333.1	59.24	-0.33	7741.8	12981064	273101
9950.0	6648.623	165.9947	-6.1405	56.95	-0.35	7336.0	58.89	-0.33	7744.5	12630866	270704
10000.0	6646.357	168.6518	-4.4094	56.66	-0.36	7338.9	58.63	-0.34	7747.2	12280333	268320
10050.0	6644.076	171.2976	-2.6661	56.47	-0.36	7341.8	58.45	-0.34	7749.8	11929469	265957
10100.0	6641.785	173.9372	-0.9151	56.38	-0.36	7344.6	58.36	-0.34	7752.5	11578278	263625
10150.0	6639.492	176.5759	0.8395	56.38	-0.36	7347.4	58.36	-0.34	7755.1	11226767	261331
10200.0	6637.204	179.2192	2.5931	56.47	-0.36	7350.1	58.45	-0.34	7757.7	10874940	259083
10250.0	6634.929	-178.1276	4.3415	56.66	-0.35	7352.7	58.62	-0.33	7760.3	10522806	256888
10300.0	6632.675	-175.4592	6.0802	56.95	-0.35	7355.3	58.88	-0.33	7762.8	10170374	254752
10350.0	6630.449	-172.7703	7.8046	57.33	-0.34	7357.8	59.23	-0.33	7765.3	9817652	252681
10400.0	6628.259	-170.0556	9.5103	57.80	-0.34	7360.2	59.68	-0.32	7767.7	9464651	250681
10450.0	6626.109	-167.3097	11.1923	58.38	-0.33	7362.7	60.21	-0.31	7770.2	9111375	248755
10500.0	6624.014	-164.5277	12.8459	59.05	-0.32	7364.6	60.84	-0.30	7772.3	8757847	246912
S-IVB/CSM SEPARATION											
10502.4	6623.840	-164.3932	12.9245	59.09	-0.32	7364.6	60.87	-0.30	7772.3	8740871	246751

TABLE XIV

EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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									
-4.972	114	0	0	0.0	0.0	0.0	0.00	0.00	0.00
-4.0	114	0	0	0.0	0.0	0.0	0.00	0.00	0.00
-3.0	114	0	0	0.0	0.0	0.0	0.00	0.00	0.00
-2.0	114	0	0	0.0	0.0	0.0	0.00	0.00	0.00
-1.0	114	0	0	0.0	0.0	0.0	0.00	0.00	0.00
RANGE ZERO AT 10 02 45 EST									
0.0	114	0	0	0.0	0.0	0.0	0.00	0.00	0.00
FIRST MOTION									
0.17	114	0	0	-0.0	-0.0	-0.0	6.78	0.53	-0.73
LIFTOFF									
0.36	114	0	0	1.3	0.1	-0.1	6.91	0.49	-0.68
1.0	116	0	0	5.9	0.4	-0.5	7.31	0.36	-0.54
2.0	126	1	-0	13.4	0.6	-1.0	7.83	0.20	-0.40
3.0	143	1	-1	21.5	0.8	-1.3	8.24	0.08	-0.34
4.0	169	2	-3	29.9	0.8	-1.7	8.58	-0.01	-0.33
5.0	203	3	-5	38.6	0.8	-2.0	8.87	-0.07	-0.35
6.0	246	4	-7	47.6	0.7	-2.4	9.12	-0.10	-0.38
7.0	298	4	-9	56.9	0.6	-2.8	9.36	-0.12	-0.41
8.0	360	5	-12	66.3	0.4	-3.2	9.58	-0.13	-0.42
9.0	431	5	-16	76.0	0.3	-3.6	9.81	-0.13	-0.42
10.0	512	5	-20	85.9	0.2	-4.0	10.03	-0.13	-0.41
11.0	603	6	-24	96.1	0.1	-4.4	10.27	-0.12	-0.38
12.0	704	6	-29	106.5	-0.1	-4.8	10.51	-0.12	-0.33
13.0	816	5	-33	117.1	-0.2	-5.1	10.77	-0.11	-0.27
14.0	938	5	-39	128.0	-0.3	-5.3	11.03	-0.11	-0.19
15.0	1072	5	-44	139.2	-0.4	-5.5	11.30	-0.11	-0.10
16.0	1216	4	-49	150.6	-0.5	-5.5	11.58	-0.12	0.00
17.0	1373	3	-55	162.3	-0.6	-5.5	11.87	-0.12	0.11
18.0	1541	3	-60	174.4	-0.8	-5.3	12.15	-0.14	0.24
19.0	1722	2	-65	186.6	-0.9	-5.0	12.44	-0.15	0.37
20.0	1914	1	-70	199.2	-1.1	-4.5	12.73	-0.17	0.52

TABLE XIV

EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
21.0	2120	-0	-74	212.1	-1.2	-3.9	13.02	-0.19	0.69
22.0	2339	-1	-77	225.3	-1.4	-3.2	13.30	-0.20	0.87
23.0	2571	-3	-80	238.7	-1.7	-2.2	13.59	-0.22	1.08
24.0	2816	-5	-81	252.4	-1.9	-1.0	13.87	-0.23	1.31
25.0	3076	-7	-81	266.4	-2.1	0.4	14.14	-0.24	1.57
26.0	3349	-9	-80	280.7	-2.4	2.2	14.42	-0.24	1.85
27.0	3637	-12	-76	295.3	-2.6	4.1	14.69	-0.25	2.17
28.0	3940	-15	-71	310.1	-2.8	6.5	14.87	-0.29	2.52
29.0	4257	-18	-62	325.0	-3.1	9.1	15.08	-0.23	2.81
30.0	4590	-21	-51	340.4	-3.3	12.1	15.54	-0.13	3.14
31.0	4938	-25	-37	356.1	-3.6	15.5	15.71	-0.29	3.56
32.0	5302	-28	-19	371.8	-3.8	19.2	15.85	-0.22	3.87
33.0	5682	-32	1	387.8	-4.0	23.2	15.99	-0.23	4.11
34.0	6078	-37	27	404.4	-4.2	27.6	16.80	-0.20	4.66
35.0	6491	-41	57	421.2	-4.4	32.3	16.98	-0.11	5.04
36.0	6920	-46	93	438.3	-4.6	37.5	17.29	-0.39	5.36
37.0	7367	-51	134	455.4	-4.9	43.2	17.33	-0.23	5.82
38.0	7831	-56	180	473.2	-5.1	49.3	17.64	-0.06	6.35
39.0	8314	-61	234	490.9	-5.2	56.0	17.91	-0.02	7.10
40.0	8814	-66	294	509.0	-5.2	63.2	18.32	-0.01	7.50
41.0	9332	-71	361	527.5	-5.0	70.9	19.09	0.25	7.94
42.0	9869	-76	437	546.5	-4.7	79.2	18.63	0.56	8.72
43.0	10425	-81	522	565.3	-4.1	88.1	18.93	0.78	8.99
44.0	11000	-84	615	584.4	-3.2	97.3	19.56	1.02	9.23
45.0	11592	-88	718	604.1	-2.2	106.8	19.65	0.98	10.04
46.0	12206	-89	831	623.9	-1.1	117.0	19.75	0.75	10.66
47.0	12841	-90	954	643.7	-0.5	127.9	20.05	0.49	11.55
48.0	13494	-90	1088	664.0	0.1	139.7	20.47	0.43	12.34
49.0	14169	-90	1235	684.6	0.6	152.1	20.57	0.30	12.70
50.0	14864	-89	1394	705.3	0.9	164.8	20.70	0.16	13.19
51.0	15580	-88	1566	726.2	1.0	178.2	21.16	0.11	13.85
52.0	16317	-87	1752	747.6	1.0	192.2	21.39	-0.07	14.44
53.0	17076	-86	1952	769.0	1.0	206.8	21.39	-0.13	14.99
54.0	17856	-85	2167	790.6	1.0	222.0	21.59	0.03	15.85
55.0	18657	-84	2398	812.3	1.2	238.2	21.88	0.33	16.80
56.0	19481	-83	2646	834.4	1.7	255.4	22.11	0.49	17.85
57.0	20327	-81	2911	856.5	2.0	273.5	22.01	-0.03	18.54
58.0	21195	-78	3195	878.6	1.8	292.1	21.98	-0.33	18.90
59.0	22085	-77	3497	900.7	1.5	311.1	22.11	-0.13	19.29
60.0	22997	-75	3818	922.9	1.7	330.6	21.95	0.26	20.05
61.0	23931	-73	4160	944.7	1.9	350.8	21.56	0.07	20.51
62.0	24887	-71	4521	966.1	2.0	371.3	21.19	0.23	20.60
MACH ONE									
62.15	25033	-71	4578	969.3	2.0	374.4	21.16	0.30	20.66

TABLE XIV

EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
63.0	25865	-69	4904	987.3	2.4	392.0	21.03	0.62	21.10
64.0	26863	-66	5307	1008.3	3.1	413.4	20.80	0.92	21.95
65.0	27882	-63	5732	1029.2	4.0	435.7	20.96	0.75	22.87
66.0	28922	-58	6180	1050.3	4.5	458.9	21.03	0.43	23.92
67.0	29983	-53	6652	1071.5	4.7	483.3	21.23	0.03	25.07
68.0	31066	-49	7148	1092.9	4.6	508.8	21.59	-0.07	25.95
69.0	32171	-44	7671	1114.9	4.6	535.0	22.01	-0.12	26.84
70.0	33297	-39	8220	1137.2	4.4	562.4	22.34	-0.22	28.25
71.0	34446	-35	8798	1159.8	4.0	591.4	22.67	-0.49	29.72
72.0	35617	-31	9405	1182.7	3.3	621.5	22.87	-0.62	30.38
73.0	36812	-28	10042	1205.6	2.6	651.7	22.77	-0.66	30.15
74.0	38030	-26	10709	1228.5	1.9	682.0	22.90	-0.39	30.91
75.0	39270	-24	11407	1251.9	1.7	713.6	23.65	0.10	32.38
MAX Q									
75.5	39900	-23	11768	1263.9	1.8	729.7	24.17	0.34	32.82
76.0	40535	-22	12138	1276.0	2.0	746.2	24.42	0.60	33.33
77.0	41824	-19	12901	1300.8	2.7	779.5	24.89	0.98	33.37
78.0	43138	-16	13698	1326.3	3.6	813.7	25.87	1.01	34.62
79.0	44477	-12	14530	1352.0	4.8	848.6	25.89	1.10	35.34
80.0	45842	-7	15397	1377.6	5.9	884.4	25.83	1.01	36.66
81.0	47233	-0	16300	1403.5	6.6	921.3	25.89	0.52	37.41
82.0	48650	6	17241	1429.8	7.1	959.7	26.08	0.63	38.64
83.0	50094	13	18221	1456.2	7.8	998.7	26.92	0.67	39.91
84.0	51564	21	19241	1483.4	7.9	1038.9	27.63	-0.24	40.64
85.0	53062	29	20300	1510.8	7.4	1079.7	27.56	-0.88	41.50
86.0	54587	36	21402	1538.3	6.4	1121.8	27.41	-1.40	42.59
87.0	56140	41	22546	1565.8	5.5	1165.2	27.42	-0.34	43.99
88.0	57720	47	23734	1593.5	5.1	1210.0	27.75	0.28	45.04
89.0	59328	52	24967	1621.4	5.5	1255.5	28.28	0.04	46.21
90.0	60964	58	26246	1649.9	5.8	1302.1	28.92	0.13	47.16
91.0	62629	63	27573	1678.8	5.5	1349.9	28.96	-0.47	48.37
92.0	64323	68	28947	1707.8	4.9	1398.8	28.66	-0.46	49.27
93.0	66046	73	30371	1736.8	4.3	1448.7	29.18	-0.72	50.68
94.0	67798	77	31846	1766.1	3.9	1500.2	29.90	-0.45	52.03
95.0	69579	81	33373	1795.9	3.5	1552.3	30.12	-0.13	52.52
96.0	71390	84	34952	1825.9	3.3	1605.6	29.64	-0.29	54.01
97.0	73232	87	36585	1855.8	3.1	1660.6	29.68	-0.12	55.61
98.0	75103	90	38274	1885.6	3.0	1716.5	29.96	0.02	56.23
99.0	77004	93	40019	1915.7	3.0	1773.2	30.67	0.13	57.81
100.0	78936	97	41822	1946.3	3.2	1831.8	30.77	0.12	58.96
101.0	80898	100	43683	1977.2	3.3	1891.3	30.69	0.04	59.62

TABLE XIV

EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
102.0	82891	103	45605	2008.2	3.3	1951.3	31.21	0.13	60.98
103.0	84916	106	47587	2039.3	3.3	2012.6	31.36	-0.04	61.91
104.0	86971	110	49631	2070.7	3.3	2075.1	31.33	-0.05	62.62
105.0	89058	113	51738	2102.2	3.2	2138.7	31.37	-0.09	64.29
106.0	91177	116	53909	2133.9	3.3	2203.6	32.04	0.06	65.97
107.0	93328	120	56146	2165.9	3.4	2269.8	32.26	0.28	66.70
108.0	95510	123	58449	2198.3	3.7	2336.9	32.36	0.31	67.64
109.0	97725	127	60820	2230.9	3.9	2405.4	32.61	0.21	68.80
110.0	99973	131	63260	2263.6	4.2	2474.9	32.87	0.20	70.38
111.0	102254	135	65771	2296.6	4.4	2545.9	33.25	0.20	71.70
112.0	104568	140	68353	2329.8	4.6	2618.0	33.10	0.19	72.22
113.0	106915	145	71007	2362.9	4.7	2691.4	32.99	0.15	74.23
114.0	109295	149	73736	2396.0	4.9	2766.3	33.37	0.12	76.51
115.0	111708	154	76541	2429.3	5.0	2842.9	33.50	0.19	76.99
116.0	114155	159	79422	2462.9	5.2	2920.6	33.41	0.18	77.63
117.0	116635	165	82382	2496.4	5.4	2999.0	33.67	0.23	78.95
118.0	119149	170	85421	2530.0	5.6	3078.9	33.61	0.19	81.45
119.0	121697	176	88540	2564.0	5.9	3161.0	34.04	0.38	82.89
120.0	124278	182	91743	2597.8	6.2	3244.4	33.80	0.34	83.80
121.0	126894	188	95029	2631.8	6.6	3328.9	33.86	0.33	85.22
122.0	129543	195	98401	2665.8	6.9	3415.4	34.20	0.40	87.12
123.0	132227	202	101860	2699.9	7.3	3503.1	33.84	0.27	88.37
124.0	134944	210	105407	2733.7	7.6	3592.0	34.35	0.31	90.19
125.0	137696	218	109044	2768.1	8.1	3682.7	34.36	0.47	91.29
126.0	140482	226	112773	2802.6	8.3	3775.2	34.20	0.32	92.58
127.0	143303	234	116594	2837.0	8.6	3868.7	34.47	0.12	94.93
128.0	146158	243	120510	2871.6	8.8	3964.0	35.08	0.25	96.05
129.0	149047	252	124523	2906.4	9.1	4061.2	34.82	0.30	97.84
130.0	151970	261	128633	2941.3	9.3	4159.6	34.78	0.23	99.54
131.0	154930	270	132842	2976.4	9.6	4260.0	34.94	0.20	101.12
132.0	157925	280	137152	3011.7	9.9	4362.0	35.10	0.20	102.89
133.0	160955	290	141565	3047.0	10.2	4465.6	35.10	0.26	104.36
134.0	164021	300	146082	3082.4	10.5	4570.8	35.17	0.26	106.04
135.0	167121	310	150705	3118.0	10.8	4677.8	35.43	0.26	108.07
136.0	170258	321	155436	3154.0	11.2	4786.9	35.99	0.26	110.01
137.0	173431	332	160278	3190.5	11.5	4897.6	36.68	0.33	111.29
138.0	176641	344	165230	3227.8	11.9	5009.4	37.40	0.33	112.93
139.0	179888	356	170295	3265.8	12.2	5122.3	38.58	0.33	115.19
140.0	183174	368	175474	3304.9	12.6	5237.2	38.94	0.33	117.78
IECO									
140.65	185330	377	178901	3327.5	12.8	5307.9	35.53	0.36	114.50

TABLE XIV
EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
141.0	186496	381	180764	3342.1	12.9	5341.3	7.32	0.26	75.72
142.0	189841	394	186139	3347.4	13.3	5407.3	5.05	0.30	59.32
143.0	193192	407	191575	3352.9	13.6	5466.2	5.25	0.33	60.01
144.0	196548	421	197070	3357.7	13.9	5524.3	4.63	0.33	60.60
OECO									
144.32	197621	426	198840	3356.8	14.0	5541.7	2.79	0.33	57.02
145.0	199904	435	202617	3344.0	14.2	5551.8	-29.66	0.23	5.77
S-IB/S-IVB SEPARATION SIGNAL									
145.59	201872	444	205892	3326.1	14.3	5552.0	-30.94	0.23	0.49
150.0	216262	509	230366	3199.4	15.3	5563.8	-23.29	0.13	11.58
155.0	232007	586	258383	3101.8	15.0	5647.9	-18.08	-0.16	18.77
160.0	247293	659	286861	3013.1	14.5	5744.6	-17.85	0.01	19.55
165.0	262136	731	315833	2924.8	14.2	5843.7	-17.31	-0.05	19.83
GUIDANCE INITIATION									
169.76	275863	797	343880	2843.6	13.4	5941.1	-16.72	-0.12	20.65
170.0	276546	800	345306	2839.6	13.4	5946.1	-16.68	-0.04	20.64
175.0	290533	866	375294	2756.6	13.9	6049.6	-15.89	0.84	20.53
180.0	304126	949	405793	2683.0	19.8	6148.8	-13.68	1.33	19.33
185.0	317370	1063	436779	2614.9	25.9	6245.6	-13.60	1.29	19.34
190.0	330275	1207	468249	2547.1	32.0	6342.5	-13.67	1.28	19.73
195.0	342840	1383	500210	2478.8	38.3	6442.3	-13.57	1.34	20.11
200.0	355063	1592	532675	2410.3	45.2	6543.8	-13.81	1.48	20.41
205.0	366942	1835	565651	2341.3	52.2	6647.0	-13.69	1.43	20.82
210.0	378477	2115	599148	2272.8	59.7	6752.1	-13.79	1.59	21.24
215.0	389668	2433	633175	2203.8	67.8	6859.0	-13.70	1.73	21.71
220.0	400515	2794	667742	2134.9	76.5	6968.0	-13.82	1.79	21.88
225.0	411016	3199	702858	2065.4	85.7	7078.4	-13.82	1.95	22.30
230.0	421169	3652	738529	1995.6	95.4	7190.6	-13.76	2.01	22.69
235.0	430974	4155	774767	1926.2	105.5	7304.7	-13.99	1.90	23.09
240.0	440432	4708	811580	1856.8	115.9	7420.8	-13.81	2.18	23.39
245.0	449543	5319	848979	1787.4	127.2	7538.9	-13.80	1.29	23.68
250.0	458306	5980	886971	1717.7	137.8	7658.4	-13.95	2.12	24.04
255.0	466718	6697	925566	1647.4	149.2	7779.8	-14.04	2.29	24.58
260.0	474780	7473	964772	1576.9	160.9	7902.9	-13.95	2.52	24.82
265.0	482490	8307	1004599	1507.2	173.0	8028.3	-13.95	2.53	25.24

TABLE XIV
EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
270.0	489852	9203	1045058	1437.3	185.3	8155.6	-13.97	2.44	25.66
275.0	496864	10161	1086160	1367.4	198.0	8285.2	-14.01	2.48	26.15
280.0	503525	11183	1127914	1296.9	210.8	8416.7	-14.20	2.64	26.52
285.0	509832	12270	1170331	1225.7	224.0	8550.4	-14.40	2.47	26.96
290.0	515782	13424	1213421	1154.4	237.8	8686.0	-14.41	2.74	27.25
295.0	521376	14648	1257195	1062.8	251.6	8823.7	-14.24	2.84	27.64
300.0	526611	15941	1301663	1011.2	265.6	8963.9	-14.43	2.86	28.52
305.0	531488	17304	1346838	939.7	280.0	9106.6	-14.45	2.91	28.92
310.0	536007	18742	1392735	867.6	294.9	9252.4	-14.51	3.04	29.37
315.0	540164	20253	1439363	795.3	309.8	9399.3	-14.53	2.99	29.89
320.0	543958	21840	1486734	722.0	325.1	9549.5	-14.59	3.03	30.13
325.0	547385	23505	1534862	648.3	340.6	9701.8	-14.77	3.10	30.71
330.0	550442	25247	1583757	574.1	356.4	9856.7	-15.07	3.18	31.26
335.0	553126	27069	1633432	499.6	372.3	10013.9	-14.82	3.26	31.64
340.0	555437	28971	1683900	424.4	388.7	10173.9	-14.97	3.38	32.19
345.0	557371	30956	1735175	348.9	405.3	10336.6	-15.26	3.28	33.04
350.0	558925	33025	1787272	272.7	422.4	10502.6	-15.38	3.38	33.60
355.0	560097	35180	1840206	195.8	439.5	10671.7	-15.34	3.49	34.30
360.0	560884	37421	1893994	118.5	457.0	10844.1	-15.53	3.54	34.77
365.0	561280	39751	1948651	39.8	474.8	11019.2	-15.92	3.51	35.53
370.0	561281	42170	2004191	-39.8	493.0	11197.1	-16.07	3.68	35.88
375.0	560882	44681	2060628	-120.1	511.4	11378.0	-16.14	3.80	36.36
380.0	560078	47285	2117977	-201.6	530.2	11562.1	-16.20	3.91	37.08
385.0	558865	49984	2176255	-283.7	549.4	11750.0	-16.54	3.82	37.83
390.0	557240	52779	2235481	-366.8	568.8	11940.8	-17.01	3.84	38.58
395.0	555194	55672	2295671	-451.6	588.2	12135.6	-16.87	3.94	39.00
400.0	552724	58664	2356839	-537.0	608.9	12332.3	-17.48	3.98	39.67
405.0	549822	61760	2419002	-623.9	629.5	12534.0	-17.23	4.39	40.75
410.0	546484	64959	2482183	-711.8	650.4	12739.2	-17.73	4.26	41.72
415.0	542704	68264	2546401	-800.8	671.7	12948.8	-17.93	4.36	42.51
420.0	538475	71677	2611677	-891.4	693.6	13162.5	-18.17	4.43	43.39
425.0	533788	75201	2678033	-983.4	715.8	13381.8	-18.52	4.52	43.91
430.0	528637	78836	2745486	-1077.5	738.5	13601.6	-19.14	4.43	44.89
435.0	523010	82586	2814058	-1173.5	761.6	13827.8	-19.53	4.60	45.64
440.0	516900	86453	2883770	-1271.2	785.2	14058.4	-19.80	4.81	46.59
445.0	510296	90440	2954648	-1370.7	809.3	14293.7	-20.21	4.83	47.64
450.0	503189	94547	3026714	-1472.3	833.7	14533.6	-20.59	4.93	48.45
455.0	495570	98778	3099992	-1575.6	858.8	14778.6	-21.09	4.99	49.54
460.0	487423	103132	3174461	-1685.5	882.3	14997.5	-22.88	4.46	38.98
465.0	478706	107598	3249934	-1801.4	904.4	15192.0	-23.22	4.53	39.05
470.0	469407	112177	3326383	-1919.0	927.2	15388.1	-23.71	4.51	39.45
475.0	459514	116870	3403819	-2038.6	950.1	15587.1	-24.05	4.66	40.38
480.0	449017	121678	3482260	-2160.6	972.9	15789.5	-24.37	4.56	40.61
485.0	437906	126599	3561718	-2284.1	995.9	15994.7	-24.83	4.62	41.40

TABLE XIV

EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
490.0	426172	131636	3642213	-2410.1	1018.9	16204.1	-25.56	4.54	42.30
495.0	413803	136789	3723764	-2537.4	1042.2	16417.3	-25.46	4.71	42.89
500.0	400795	142058	3806391	-2666.6	1065.7	16634.3	-25.97	4.75	43.75
505.0	387135	147446	3890111	-2798.4	1089.4	16855.0	-26.72	4.81	44.65
510.0	372807	152953	3974944	-2933.3	1113.5	17079.2	-27.43	4.82	45.52
515.0	357795	158582	4060911	-3072.1	1138.0	17308.3	-28.13	4.88	46.44
520.0	342081	164333	4148032	-3214.3	1162.7	17541.1	-28.83	5.01	47.23
525.0	325645	170210	4236329	-3360.7	1188.0	17778.5	-29.46	5.06	47.61
530.0	308469	176215	4325824	-3510.5	1213.9	18020.5	-30.18	5.32	48.67
535.0	290534	182351	4416539	-3664.2	1240.4	18266.7	-31.08	5.36	49.62
540.0	271822	188620	4508497	-3821.5	1267.4	18517.7	-31.84	5.52	50.66
545.0	252314	195025	4601723	-3982.6	1294.9	18773.9	-32.77	5.63	51.83
550.0	231990	201571	4696243	-4147.8	1323.2	19035.3	-33.50	5.75	52.90
555.0	210828	208259	4792084	-4317.3	1352.2	19302.1	-34.59	5.75	54.03
560.0	188809	215094	4889272	-4491.1	1381.6	19574.1	-35.17	5.95	54.76
565.0	165912	222078	4987832	-4668.6	1412.4	19851.9	-35.63	6.30	56.07
570.0	142115	229218	5087798	-4850.8	1443.4	20136.1	-36.75	6.37	57.41
575.0	117396	236514	5189201	-5037.6	1475.2	20426.3	-37.46	6.41	58.27
580.0	91733	243971	5292067	-5228.1	1507.8	20722.4	-38.61	6.58	60.09
585.0	65104	251593	5396436	-5424.5	1541.3	21026.7	-39.58	6.80	61.26
590.0	37480	259384	5502342	-5625.4	1575.2	21337.4	-40.67	7.07	63.34
595.0	8839	267347	5609821	-5831.2	1610.3	21655.5	-41.96	7.02	64.63
600.0	-20855	275488	5718909	-6049.4	1645.8	21981.7	-44.39	6.99	65.49
605.0	-51655	283806	5829639	-6271.8	1681.7	22314.0	-44.75	7.22	67.72
610.0	-83572	292307	5942060	-6495.7	1718.7	22657.8	-44.98	7.55	70.11
615.0	-116610	300996	6056229	-6720.1	1757.4	23012.5	-44.88	7.81	71.59
S-IVB GUIDANCE CUTOFF									
616.76	-128506	304101	6096840	-6798.9	1770.9	23138.1	-44.72	7.91	72.01
620.0	-150687	309852	6171835	-6889.0	1777.7	23139.5	-25.82	1.48	-7.81
625.0	-185454	318759	6287435	-7018.0	1785.0	23100.1	-25.75	1.44	-7.94
ORBIT INSERTION									
626.76	-197847	321903	6328079	-7063.3	1787.6	23086.1	-25.75	1.44	-8.01
650.0	-368931	363835	6862374	-7659.4	1820.7	22893.0	-25.57	1.39	-8.56
700.0	-783911	457517	7995487	-8924.6	1889.6	22427.0	-25.01	1.30	-10.08
750.0	-1261163	553572	9103658	-10160.7	1951.5	21888.3	-24.42	1.18	-11.46
800.0	-1799446	652567	10183179	-11365.1	2007.1	21281.4	-23.74	1.05	-12.81
850.0	-2397076	754173	11230691	-12533.9	2055.9	20608.2	-23.00	0.90	-14.11
900.0	-3052179	858038	12242934	-13663.4	2097.4	19871.0	-22.17	0.75	-15.37

TABLE XIV

EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
950.0	-3762704	963784	13216765	-14750.2	2131.1	19072.2	-21.28	0.59	-16.58
1000.0	-4526425	1071015	14149164	-15790.7	2156.7	18214.2	-20.33	0.43	-17.73
1050.0	-5340953	1179310	15037244	-16781.9	2173.7	17299.9	-19.31	0.25	-18.83
1100.0	-6203739	1288232	15878261	-17720.6	2181.7	16332.2	-18.23	0.07	-19.87
1150.0	-7112086	1397326	16669622	-18603.9	2180.5	15314.2	-17.09	-0.12	-20.84
1200.0	-8063157	1506123	17408895	-19429.1	2169.8	14249.2	-15.91	-0.31	-21.75
1250.0	-9053981	1614140	18093811	-20193.6	2149.3	13140.5	-14.67	-0.51	-22.59
1300.0	-10081470	1720882	18722281	-20895.2	2118.8	11991.9	-13.39	-0.71	-23.35
1350.0	-11142421	1825847	19292391	-21531.8	2078.1	10806.8	-12.07	-0.91	-24.04
1400.0	-12233531	1928525	19802417	-22101.3	2027.3	9589.1	-10.71	-1.12	-24.65
1450.0	-13351406	2028401	20250826	-22602.1	1966.1	8342.8	-9.32	-1.33	-25.19
1500.0	-14492574	2124960	20636280	-23032.8	1894.5	7071.6	-7.90	-1.53	-25.64
1550.0	-15653494	2217685	20957643	-23392.0	1812.7	5779.8	-6.46	-1.74	-26.02
1600.0	-16830569	2306061	21213979	-23678.8	1720.7	4471.3	-5.01	-1.94	-26.31
1650.0	-18020155	2389581	21404560	-23892.4	1618.5	3150.3	-3.53	-2.14	-26.52
1700.0	-19218575	2467744	21528866	-24032.1	1506.4	1820.9	-2.05	-2.34	-26.64
1750.0	-20422132	2540057	21586584	-24097.8	1384.5	487.4	-0.57	-2.53	-26.68
1800.0	-21627116	2606041	21577611	-24089.2	1253.3	-846.0	0.91	-2.72	-26.64
1850.0	-22829820	2665232	21502050	-24006.6	1112.9	-2175.3	2.39	-2.90	-26.52
1900.0	-24026550	2717181	21360217	-23850.3	963.7	-3496.3	3.86	-3.07	-26.31
1950.0	-25213635	2761459	21152628	-23621.0	806.1	-4804.8	5.31	-3.23	-26.02
2000.0	-26387442	2797659	20880037	-23319.3	640.6	-6096.9	6.75	-3.39	-25.65
2050.0	-27544383	2825397	20543277	-22946.5	467.7	-7368.5	8.16	-3.53	-25.20
2100.0	-28680930	2844314	20143558	-22503.8	287.9	-8615.8	9.54	-3.66	-24.68
2150.0	-29793622	2854080	19682164	-21992.6	101.7	-9834.9	10.90	-3.78	-24.08
2200.0	-30879077	2854392	19160595	-21414.6	-90.1	-11022.2	12.21	-3.89	-23.40
2250.0	-31934006	2844980	18580535	-20771.8	-287.1	-12174.0	13.49	-3.99	-22.66
2300.0	-32955211	2825607	17943846	-20066.1	-488.5	-13286.8	14.73	-4.07	-21.84
2350.0	-33939610	2796070	17252557	-19299.9	-693.6	-14357.4	15.91	-4.13	-20.97
2400.0	-34884235	2756202	16508865	-18475.6	-901.6	-15382.5	17.05	-4.19	-20.03
2450.0	-35786241	2705872	15715119	-17595.7	-1111.9	-16359.0	18.13	-4.22	-19.03
2500.0	-36642923	2644989	14873818	-16663.0	-1323.6	-17284.2	19.16	-4.24	-17.97
2550.0	-37451711	2573500	13987602	-15680.5	-1536.0	-18155.2	20.13	-4.25	-16.86
2600.0	-38210188	2491394	13059242	-14651.1	-1748.2	-18969.6	21.04	-4.24	-15.70
2650.0	-38916090	2398699	12091631	-13578.0	-1959.4	-19724.9	21.88	-4.21	-14.50
2700.0	-39567315	2295486	11087778	-12464.5	-2168.8	-20418.9	22.65	-4.16	-13.26
2750.0	-40161927	2181868	10050792	-11314.1	-2375.5	-21049.8	23.36	-4.10	-11.97
2800.0	-40698163	2057999	8983883	-10130.1	-2578.6	-21615.6	23.99	-4.02	-10.66
2850.0	-41174436	1924076	7890339	-8916.2	-2777.5	-22114.9	24.55	-3.93	-9.31
2900.0	-41589342	1780339	6773529	-7676.0	-2971.1	-22546.1	25.04	-3.81	-7.94
2950.0	-41941659	1627070	5636884	-6413.2	-3158.6	-22908.1	25.46	-3.68	-6.54
3000.0	-42230353	1464593	4483888	-5131.7	-3339.3	-23199.9	25.79	-3.54	-5.13
3050.0	-42454582	1293272	3318072	-3835.2	-3512.2	-23420.8	26.05	-3.38	-3.70
3100.0	-42613693	1113514	2142999	-2527.7	-3676.6	-23570.1	26.24	-3.20	-2.27

TABLE XIV
EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
3150.0	-42707228	925763	962256	-1212.9	-3831.8	-23647.6	26.34	-3.00	-0.83
3200.0	-42734925	730505	-220555	105.2	-3976.8	-23652.9	26.37	-2.80	0.61
3250.0	-42696716	528261	-1401836	1422.7	-4111.1	-23586.3	26.32	-2.57	2.05
3300.0	-42592726	319591	-2577990	2735.8	-4233.8	-23447.9	26.19	-2.33	3.48
3350.0	-42423278	105089	-3745442	4040.4	-4344.3	-23238.3	25.98	-2.08	4.90
3400.0	-42188889	-114618	-4900645	5332.8	-4441.9	-22958.1	25.70	-1.82	6.30
3450.0	-41890264	-338872	-6040090	6609.2	-4526.0	-22608.2	25.34	-1.54	7.69
3500.0	-41528301	-566984	-7160320	7865.7	-4596.1	-22189.7	24.91	-1.26	9.05
3550.0	-41104085	-798235	-8257934	9098.7	-4651.5	-21703.8	24.40	-0.96	10.38
3600.0	-40618888	-1031884	-9329600	10304.4	-4691.9	-21152.0	23.82	-0.65	11.68
3650.0	-40074158	-1267165	-10372067	11479.3	-4716.7	-2 536.1	23.17	-0.34	12.95
3700.0	-39471526	-1503290	-11382170	12619.9	-4725.6	-19857.8	22.45	-0.02	14.18
3750.0	-38812792	-1739453	-12356842	13722.8	-4718.2	-19119.2	21.66	0.31	15.36
3800.0	-38099927	-1974833	-13293123	14784.7	-4694.2	-18322.5	20.81	0.65	16.50
3850.0	-37335061	-2208595	-14188166	15802.3	-4653.4	-17470.1	19.89	0.99	17.59
3900.0	-36520485	-2439893	-15039251	16772.6	-4595.7	-16564.6	18.91	1.33	18.62
3950.0	-35658638	-2667875	-15843787	17692.7	-4520.8	-15608.7	17.88	1.67	19.60
4000.0	-34752104	-2891684	-16599325	18559.6	-4428.7	-14605.2	16.79	2.01	20.53
4050.0	-33803605	-3110461	-17303562	19370.9	-4319.5	-13557.1	15.65	2.36	21.39
4100.0	-32815989	-3323351	-17954349	20123.9	-4193.2	-12467.7	14.46	2.70	22.18
4150.0	-31792229	-3529501	-18549700	20816.3	-4050.0	-11340.2	13.23	3.03	22.91
4200.0	-30735409	-3728069	-19087796	21445.9	-3890.0	-10178.1	11.95	3.37	23.57
4250.0	-29648718	-3918224	-19566991	22010.8	-3713.5	-8984.8	10.64	3.69	24.15
4300.0	-28535440	-4099148	-19985818	22509.1	-3520.8	-7764.0	9.29	4.01	24.67
4350.0	-27398943	-4270045	-20342996	22939.3	-3312.4	-6519.4	7.91	4.32	25.10
4400.0	-26242674	-4430138	-20637429	23299.8	-3088.8	-5254.9	6.51	4.62	25.46
4450.0	-25070142	-4578675	-20868217	23589.6	-2850.3	-3974.3	5.08	4.91	25.75
4500.0	-23884913	-4714934	-21034652	23807.5	-2597.7	-2681.5	3.64	5.19	25.95
4550.0	-22690598	-4838223	-21136227	23952.9	-2331.6	-1380.5	2.18	5.45	26.07
4600.0	-21490841	-4947884	-21172633	24025.1	-2052.8	-75.4	0.71	5.70	26.12
4650.0	-20289308	-5043299	-21143766	24023.9	-1761.9	1229.8	-0.76	5.93	26.08
4700.0	-19089678	-5123889	-21049722	23949.1	-1459.9	2531.0	-2.23	6.15	25.96
4750.0	-17895627	-5189119	-20890801	23800.7	-1147.7	3824.2	-3.71	6.34	25.76
4800.0	-16710823	-5238500	-20667505	23579.3	-826.1	5105.3	-5.16	6.52	25.47
4850.0	-15538909	-5271593	-20380539	23285.3	-496.3	6370.3	-6.60	6.67	25.11
4900.0	-14383494	-5288009	-20030806	22919.5	-159.2	7615.3	-8.03	6.81	24.67
4950.0	-13248140	-5287414	-19619407	22483.0	184.0	8836.4	-9.43	6.92	24.16
5000.0	-12136355	-5269530	-19147635	21977.0	532.1	10029.6	-10.80	7.01	23.56
5050.0	-11051573	-5234136	-18616975	21403.0	884.2	11191.2	-12.15	7.07	22.89
5100.0	-9997154	-5181071	-18029098	20762.8	1238.8	12317.7	-13.46	7.11	22.15
5150.0	-8976365	-5110234	-17385854	20058.2	1594.8	13405.3	-14.72	7.13	21.34
5200.0	-7992373	-5021589	-16689269	19291.3	1950.9	14450.8	-15.94	7.12	20.46
5250.0	-7048233	-4915162	-15941536	18464.5	2305.9	15450.7	-17.12	7.08	19.52
5300.0	-6146878	-4791042	-15145012	17580.3	2658.4	16401.9	-18.24	7.02	18.52

TABLE XIV
EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
5350.0	-5291112	-4649386	-14302206	16641.4	3007.1	17301.5	-19.31	6.93	17.46
5400.0	-4483598	-4490413	-13415773	15650.7	3350.8	18146.5	-20.31	6.81	16.34
5450.0	-3726851	-4314411	-12488506	14611.3	3688.1	18934.4	-21.26	6.67	15.17
5500.0	-3023229	-4121730	-11523326	13526.3	4017.7	19662.7	-22.13	6.51	13.95
5550.0	-2374925	-3912785	-10523272	12399.1	4338.4	20329.0	-22.94	6.32	12.69
5600.0	-1783936	-3688054	-9491437	11234.8	4649.2	20935.0	-23.63	6.11	11.50
5650.0	-1252029	-3448046	-8430877	10035.8	4949.1	21475.9	-24.31	5.88	10.13
5700.0	-780887	-3193355	-7344998	8804.9	5236.3	21947.6	-24.91	5.61	8.74
5750.0	-372007	-2924652	-6237278	7546.0	5509.4	22349.4	-25.43	5.31	7.33
5800.0	-26681	-2642675	-5111235	6263.4	5767.1	22680.4	-25.86	4.99	5.91
5850.0	254007	-2348219	-3970430	4961.2	6008.4	22939.9	-26.21	4.66	4.47
5900.0	469181	-2042127	-2818448	3643.5	6232.3	23127.3	-26.48	4.30	3.02
5950.0	618174	-1725291	-1658907	2314.6	6438.0	23242.2	-26.66	3.92	1.57
6000.0	700172	-1398920	-495322	979.4	6622.6	23283.9	-26.77	3.53	0.11
6050.0	715669	-1063546	668402	-359.7	6789.0	23253.[illegible]	-26.78	3.12	-1.34
6100.0	664229	-720370	1828768	-1697.3	6934.5	23149.6	-26.71	2.69	-2.79
6150.0	546026	-370465	2982155	-3029.5	7058.0	22973.9	-26.56	2.25	-4.23
6200.0	361438	-14944	4124967	-4352.0	7158.9	22726.8	-26.33	1.79	-5.65
6250.0	111052	345039	5253655	-5660.7	7236.4	22409.0	-26.01	1.31	-7.05
6300.0	-204335	708300	6364717	-6951.5	7290.0	22022.0	-25.61	0.83	-8.43
6350.0	-583726	1073634	7454721	-8220.1	7319.3	21567.0	-25.13	0.34	-9.77
6400.0	-1025913	1439828	8520315	-9462.6	7324.4	21045.9	-24.56	-0.14	-11.[illegible]7
6450.0	-1529484	1805684	9558235	-10674.8	7305.9	2[illegible]46[illegible].4	-23.91	-0.60	-12.34
6500.0	-2092822	2170045	10565317	-11852.7	7264.6	19812.7	-23.22	-1.13	-13.59
6550.0	-2714159	2531654	11538466	-12994.3	7195.6	19103.4	-22.43	-1.63	-14.77
6600.0	-3391567	2889184	12474695	-14095.0	7101.4	18336.3	-21.58	-2.13	-15.91
6650.0	-4122922	3241379	13371169	-15151.5	6982.2	17513.7	-20.67	-2.63	-16.99
6700.0	-4905931	3586993	14225189	-16160.7	6838.2	16638.5	-19.69	-3.13	-18.01
6750.0	-5738148	3924789	15034194	-17119.3	6669.5	15713.6	-18.65	-3.62	-18.97
6800.0	-6616973	4253543	15795776	-18024.6	6476.6	14742.1	-17.55	-4.1[illegible]	-19.88
6850.0	-7539669	4572051	16507680	-18873.7	6259.8	13727.1	-16.40	-4.57	-20.71
6900.0	-8503366	4879135	17167815	-19664.2	6019.7	12671.9	-15.21	-5.03	-21.48
6950.0	-9505071	5173642	17774262	-20393.7	5756.9	11580.1	-13.97	-5.48	-22.18
7000.0	-10541681	5454454	18325273	-21060.0	5472.0	10455.1	-12.68	-5.91	-22.81
7050.0	-11609989	5720486	18819279	-21661.3	5165.8	9300.5	-11.36	-6.33	-23.36
7100.0	-12706699	5970698	19254895	-22195.8	4839.3	8120.1	-10.01	-6.73	-23.84
7150.0	-13828430	6204091	19630925	-22662.0	4493.3	6917.7	-8.63	-7.11	-24.24
7200.0	-14971737	6419717	19946360	-23058.6	4128.8	5697.0	-7.23	-7.47	-24.57
7250.0	-16133111	6616678	20200381	-23384.5	3746.9	4461.8	-5.81	-7.80	-24.82
7300.0	-17308998	6794133	20392366	-23639.0	3348.7	3216.2	-4.37	-8.12	-24.99
7350.0	-18495805	6951299	20521886	-23821.3	2935.5	1963.8	-2.92	-8.41	-25.09
7400.0	-19689916	7087455	20588703	-23931.1	2508.5	708.7	-1.47	-8.67	-25.1[illegible]
7450.0	-20887700	7201943	20592777	-23968.2	2069.1	-545.3	-0.01	-8.90	-25.[illegible]4
7500.0	-22085521	7294175	20534257	-23932.6	1618.5	-1794.4	1.44	-9.11	-24.91

TABLE XIV
EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
7550.0	-23279754	7363632	20413486	-23824.7	1158.3	-3034.7	2.88	-9.29	-24.69
7600.0	-24466791	7409864	20230995	-23644.9	689.8	-4262.6	4.31	-9.44	-24.41
7650.0	-25643055	7432499	19987501	-23393.9	214.6	-5474.2	5.73	-9.56	-24.05
7700.0	-26805006	7431237	19683902	-23072.6	-265.8	-6666.1	7.12	-9.65	-23.62
7750.0	-27949158	7405856	19321277	-22682.1	-749.9	-7834.7	8.49	-9.71	-23.12
7800.0	-29072085	7356212	18900879	-22223.8	-1236.1	-8976.5	9.84	-9.73	-22.55
7850.0	-30170430	7282241	18424129	-21699.1	-1722.7	-10088.2	11.15	-9.73	-21.91
7900.0	-31240916	7183956	17892615	-21109.7	-2208.3	-11166.6	12.42	-9.69	-21.21
7950.0	-32280357	7061453	17308080	-20457.6	-2691.2	-12208.5	13.66	-9.62	-20.45
8000.0	-33285663	6914906	16672425	-19744.7	-3169.8	-13211.0	14.85	-9.52	-19.64
8050.0	-34253852	6744570	15987690	-18973.3	-3642.5	-14171.1	16.00	-9.38	-18.76
8100.0	-35182055	6550779	15256060	-18145.7	-4107.7	-15786.3	17.10	-9.22	-17.84
8150.0	-36067527	6333948	14479848	-17264.5	-4563.9	-15954.0	18.14	-9.02	-16.86
8200.0	-36907653	6094567	13661495	-16332.3	-5009.4	-16771.6	19.14	-8.79	-15.84
8250.0	-37699952	5833207	12803557	-15351.9	-5442.8	-17537.0	20.07	-8.54	-14.77
8300.0	-38442088	5550514	11908700	-14326.3	-5862.5	-18248.1	20.94	-8.25	-13.66
8350.0	-39131875	5247207	10979689	-13258.5	-6267.1	-18902.8	21.76	-7.93	-12.52
8400.0	-39767282	4924078	10019384	-12151.6	-6655.1	-19499.6	22.51	-7.59	-11.34
8450.0	-40346438	4581993	9030728	-11008.9	-7025.2	-20036.6	23.19	-7.21	-10.14
8500.0	-40867636	4221882	8016738	-9833.9	-7375.9	-20512.7	23.80	-6.81	-8.90
8550.0	-41329341	3844745	6980500	-8629.8	-7706.0	-20926.4	24.35	-6.39	-7.64
8600.0	-41730189	3451644	5925157	-7400.2	-8014.3	-21276.7	24.82	-5.94	-6.37
8650.0	-42068997	3043701	4853900	-6148.7	-8299.5	-21562.8	25.22	-5.47	-5.07
8700.0	-42344757	2622099	3769960	-4879.0	-8560.5	-21783.9	25.55	-4.97	-3.77
8750.0	-42556651	2188072	2676599	-3594.6	-8796.3	-21939.6	25.81	-4.46	-2.46
8800.0	-42704039	1742908	1577100	-2299.4	-9005.8	-22029.4	25.99	-3.92	-1.14
8850.0	-42786474	1287942	474757	-997.1	-9188.2	-22053.3	26.09	-3.37	0.18
8900.0	-42803693	824554	-627128	308.6	-9342.6	-22011.2	26.12	-2.80	1.50
8950.0	-42755625	354161	-1725267	1613.7	-9468.2	-21903.4	26.07	-2.22	2.81
9000.0	-42642390	-121779	-2816381	2914.7	-9564.4	-21730.3	25.95	-1.63	4.11
9050.0	-42464294	-601781	-3897219	4207.5	-9630.6	-21492.5	25.75	-1.02	5.40
9100.0	-42221834	-1084329	-4964562	5488.6	-9666.2	-21190.7	25.48	-0.40	6.67
9150.0	-41915696	-1567885	-6015234	6754.0	-9670.8	-20825.8	25.13	0.22	7.92
9200.0	-41546751	-2050892	-7046111	8000.2	-9644.2	-20399.1	24.71	0.85	9.15
9250.0	-41116059	-2531780	-8054129	9223.4	-9586.0	-19911.7	24.21	1.48	10.34
9300.0	-40624859	-3008969	-9036294	10419.9	-9496.3	-19365.2	23.64	2.11	11.51
9350.0	-40074569	-3480877	-9989688	11586.3	-9374.8	-18761.2	23.07	2.75	12.64
9400.0	-39466786	-3945922	-10911481	12719.1	-9221.7	-18101.5	22.30	3.38	13.74
9450.0	-38803280	-4402527	-11798938	13814.7	-9037.3	-17388.0	21.52	4.00	14.79
9500.0	-38085985	-4849129	-12649424	14870.0	-8821.7	-16623.0	20.68	4.62	15.80
9550.0	-37317004	-5284181	-13460416	15881.7	-8575.3	-15808.7	19.78	5.23	16.76
9600.0	-36498594	-5706156	-14229510	16846.7	-8298.7	-14947.5	18.81	5.83	17.68
9650.0	-35633164	-6113557	-14954424	17762.0	-7992.5	-14042.0	17.79	6.42	18.54
9700.0	-34723271	-6504919	-15633012	18624.8	-7657.2	-13094.9	16.71	6.99	19.34

TABLE XIV

EARTH-FIXED PLUMBLINE POSITIONS, VELOCITIES AND ACCELERATIONS

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
9750.0	-33771609	-6878813	-16263264	19432.3	-7293.9	-12109.0	15.58	7.54	20.08
9800.0	-32781004	-7233855	-16843317	20182.0	-6903.3	-11087.4	14.40	8.08	20.77
9850.0	-31754410	-7568708	-17371459	20871.6	-6486.5	-10033.1	13.17	8.59	21.39
9900.0	-30694887	-7882091	-17846132	21498.7	-6044.7	-8949.2	11.90	9.08	21.95
9950.0	-29605612	-8172778	-18265944	22061.4	-5578.9	-7839.2	10.60	9.55	22.44
10000.0	-28489855	-8439607	-18629666	22557.7	-5090.6	-6706.2	9.25	9.98	22.86
10050.0	-27350975	-8681486	-18936243	22986.0	-4581.1	-5553.9	7.88	10.39	23.22
10100.0	-26192411	-8897394	-19184791	23344.9	-4052.0	-4385.7	6.47	10.77	23.50
10150.0	-25017667	-9086386	-19374605	23633.0	-3504.8	-3205.1	5.05	11.11	23.71
10200.0	-23830308	-9247600	-19505161	23849.3	-2941.2	-2015.9	3.60	11.43	23.85
10250.0	-22633946	-9380258	-19576114	23993.0	-2362.8	-821.7	2.14	11.70	23.91
10300.0	-21432227	-9483670	-19587307	24063.5	-1771.6	373.9	0.67	11.94	23.90
10350.0	-20228824	-9557240	-19538762	24060.4	-1169.4	1567.2	-0.80	12.14	23.82
10400.0	-19027421	-9600464	-19430691	23983.5	-558.1	2754.4	-2.24	12.31	23.67
10450.0	-17831683	-9612926	-19263484	23833.5	60.6	3931.8	-3.75	12.43	23.42
10500.0	-16645318	-9594318	-19037740	23608.8	684.3	5095.3	-5.23	12.51	23.11
S-IVB/CSM SEPARATION									
10502.4	-16588720	-9592525	-19025234	23595.9	714.4	5150.7	-5.30	12.51	23.09

TABLE XV

SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
GUIDANCE REFERENCE RELEASE									
-4.972	-2502.365	1705.486	1634.713	-755.7	-1108.7	0.0	0.08	-0.06	0.00
-4.0	-2502.486	1705.309	1634.713	-755.6	-1108.8	0.0	0.08	-0.06	0.00
-3.0	-2502.610	1705.126	1634.713	-755.5	-1108.9	0.0	0.08	-0.06	0.00
-2.0	-2502.734	1704.944	1634.713	-755.4	-1108.9	0.0	0.08	-0.06	0.00
-1.0	-2502.859	1704.761	1634.713	-755.3	-1109.0	0.0	0.08	-0.06	0.00
RANGE ZERO AT 10 02 45 EST									
0.0	-2502.983	1704.579	1634.713	-755.3	-1109.0	0.0	0.08	-0.06	0.00
FIRST MOTION									
0.17	-2503.004	1704.548	1634.713	-755.2	-1109.0	0.0	-4.83	3.93	2.60
LIFTOFF									
0.36	-2503.028	1704.513	1634.713	-756.2	-1108.3	0.5	-4.93	3.95	2.71
1.0	-2503.108	1704.397	1634.713	-759.4	-1105.7	2.3	-5.21	4.02	3.04
2.0	-2503.233	1704.215	1634.714	-764.8	-1101.6	5.6	-5.55	4.16	3.46
3.0	-2503.359	1704.034	1634.715	-770.5	-1097.4	9.2	-5.81	4.31	3.78
4.0	-2503.487	1703.854	1634.717	-776.4	-1093.0	13.1	-6.01	4.47	4.01
5.0	-2503.615	1703.674	1634.719	-782.5	-1088.4	17.2	-6.19	4.63	4.19
6.0	-2503.744	1703.495	1634.722	-788.8	-1083.7	21.5	-6.34	4.78	4.34
7.0	-2503.875	1703.317	1634.726	-795.2	-1078.9	25.9	-6.49	4.91	4.46
8.0	-2504.006	1703.140	1634.731	-801.7	-1073.9	30.4	-6.64	5.04	4.57
9.0	-2504.139	1702.964	1634.736	-808.4	-1068.8	35.1	-6.80	5.15	4.68
10.0	-2504.272	1702.789	1634.742	-815.3	-1063.6	39.8	-6.98	5.25	4.79
11.0	-2504.407	1702.614	1634.749	-822.4	-1058.3	44.6	-7.17	5.33	4.90
12.0	-2504.543	1702.440	1634.757	-829.7	-1052.9	49.6	-7.37	5.41	5.03
13.0	-2504.680	1702.267	1634.766	-837.1	-1047.5	54.7	-7.58	5.48	5.16
14.0	-2504.818	1702.095	1634.775	-844.8	-1042.0	59.9	-7.81	5.54	5.31
15.0	-2504.958	1701.924	1634.785	-852.8	-1036.4	65.3	-8.04	5.60	5.46
16.0	-2505.099	1701.754	1634.797	-860.9	-1030.8	70.8	-8.29	5.64	5.63
17.0	-2505.241	1701.585	1634.809	-869.3	-1025.1	76.6	-8.54	5.68	5.80
18.0	-2505.385	1701.417	1634.822	-878.0	-1019.4	82.5	-8.79	5.72	5.98
19.0	-2505.530	1701.249	1634.836	-886.9	-1013.7	88.5	-9.05	5.74	6.17
20.0	-2505.677	1701.083	1634.851	-896.1	-1007.9	94.8	-9.31	5.75	6.36

TABLE XV
SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
21.0	-2505.825	1700.918	1634.867	-905.5	-1002.2	101.3	-9.58	5.74	6.56
22.0	-2505.975	1700.753	1634.884	-915.2	-996.4	107.9	-9.86	5.72	6.76
23.0	-2506.127	1700.590	1634.903	-925.2	-990.7	114.8	-10.14	5.68	6.96
24.0	-2506.280	1700.427	1634.922	-935.5	-985.1	121.8	-10.44	5.62	7.17
25.0	-2506.435	1700.265	1634.943	-946.1	-979.5	129.1	-10.74	5.53	7.38
26.0	-2506.591	1700.104	1634.965	-957.0	-974.0	136.6	-11.05	5.41	7.59
27.0	-2506.750	1699.944	1634.988	-968.2	-968.7	144.3	-11.38	5.27	7.81
28.0	-2506.910	1699.785	1635.012	-979.8	-963.5	152.2	-11.63	5.05	8.03
29.0	-2507.072	1699.627	1635.038	-991.5	-958.5	160.3	-11.94	4.90	8.16
30.0	-2507.236	1699.470	1635.065	-1003.8	-953.6	168.6	-12.47	4.83	8.38
31.0	-2507.403	1699.313	1635.094	-1016.4	-948.9	177.2	-12.68	4.55	8.71
32.0	-2507.571	1699.157	1635.124	-1029.2	-944.5	185.9	-12.95	4.35	8.81
33.0	-2507.741	1699.002	1635.155	-1042.2	-940.2	194.8	-13.14	4.20	8.94
34.0	-2507.914	1698.848	1635.188	-1055.9	-935.9	204.1	-13.97	4.12	9.45
35.0	-2508.089	1698.694	1635.222	-1069.9	-931.9	213.6	-14.31	3.88	9.57
36.0	-2508.266	1698.541	1635.258	-1084.3	-928.0	223.3	-14.51	3.74	10.04
37.0	-2508.446	1698.388	1635.296	-1098.9	-924.7	233.2	-14.82	3.37	10.05
38.0	-2508.628	1698.236	1635.335	-1114.2	-921.3	243.6	-15.36	3.05	10.20
39.0	-2508.813	1698.085	1635.376	-1129.7	-918.5	254.0	-15.89	2.53	10.50
40.0	-2509.000	1697.934	1635.419	-1145.8	-916.1	264.6	-16.36	2.37	10.79
41.0	-2509.190	1697.783	1635.463	-1162.5	-913.8	275.3	-17.24	2.37	11.06
42.0	-2509.383	1697.633	1635.510	-1179.9	-911.7	286.4	-17.40	1.46	10.80
43.0	-2509.579	1697.483	1635.558	-1197.5	-910.3	297.3	-17.85	1.37	10.82
44.0	-2509.777	1697.333	1635.607	-1215.6	-909.0	308.2	-18.54	1.47	11.00
45.0	-2509.979	1697.183	1635.659	-1234.3	-907.7	319.3	-18.92	0.80	11.29
46.0	-2510.183	1697.034	1635.713	-1253.4	-907.0	330.6	-19.12	0.30	11.70
47.0	-2510.391	1696.884	1635.768	-1272.7	-906.8	342.5	-19.55	-0.33	12.30
48.0	-2510.603	1696.735	1635.825	-1292.5	-907.3	354.9	-20.15	-0.81	12.77
49.0	-2510.817	1696.586	1635.885	-1312.8	-908.1	367.7	-20.30	-1.08	13.02
50.0	-2511.035	1696.436	1635.947	-1333.2	-909.1	380.8	-20.52	-1.44	13.33
51.0	-2511.256	1696.286	1636.010	-1354.0	-910.6	394.3	-21.09	-1.79	13.77
52.0	-2511.481	1696.136	1636.077	-1375.2	-912.4	408.3	-21.41	-2.20	14.19
53.0	-2511.709	1695.986	1636.145	-1396.7	-914.7	422.5	-21.60	-2.69	14.39
54.0	-2511.941	1695.835	1636.216	-1418.6	-917.6	436.9	-22.18	-3.34	14.58
55.0	-2512.176	1695.683	1636.289	-1441.2	-921.1	451.5	-22.95	-4.03	14.74
56.0	-2512.415	1695.531	1636.364	-1464.5	-925.4	466.3	-23.64	-4.84	14.99
57.0	-2512.658	1695.379	1636.443	-1488.2	-930.5	481.6	-23.56	-5.49	15.57
58.0	-2512.905	1695.225	1636.523	-1511.7	-936.0	497.4	-23.52	-5.82	15.90
59.0	-2513.156	1695.070	1636.606	-1535.3	-941.8	513.2	-23.88	-6.11	15.91
60.0	-2513.411	1694.915	1636.692	-1559.5	-948.1	529.0	-24.29	-6.85	15.70
61.0	-2513.670	1694.758	1636.781	-1583.7	-955.2	544.8	-24.18	-7.45	15.81
62.0	-2513.932	1694.600	1636.872	-1607.7	-962.6	560.5	-23.95	-7.72	15.52
MACH ONE									
62.15	-2513.972	1694.576	1636.885	-1611.3	-963.8	562.8	-23.99	-7.78	15.47

TABLE XV
SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
63.0	-2514.199	1694.441	1636.965	-1631.8	-970.4	575.9	-24.24	-8.23	15.25
64.0	-2514.470	1694.281	1637.061	-1656.2	-978.9	591.0	-24.58	-9.10	15.12
65.0	-2514.744	1694.119	1637.160	-1681.0	-988.3	606.4	-24.99	-9.82	15.59
66.0	-2515.023	1693.955	1637.261	-1706.1	-998.4	622.3	-25.28	-10.71	16.18
67.0	-2515.306	1693.790	1637.365	-1731.5	-1009.4	638.9	-25.68	-11.62	16.91
68.0	-2515.593	1693.623	1637.471	-1757.5	-1021.2	656.1	-26.25	-12.22	17.41
69.0	-2515.885	1693.454	1637.581	-1784.1	-1033.6	673.8	-26.89	-12.78	17.90
70.0	-2516.181	1693.282	1637.693	-1811.4	-1046.7	692.0	-27.66	-13.86	18.50
71.0	-2516.481	1693.109	1637.809	-1839.4	-1061.1	711.0	-28.33	-14.99	19.31
72.0	-2516.787	1692.933	1637.927	-1868.0	-1076.2	730.7	-28.67	-15.47	19.69
73.0	-2517.096	1692.755	1638.049	-1896.5	-1091.5	750.5	-28.48	-15.32	19.61
74.0	-2517.411	1692.574	1638.175	-1925.2	-1106.9	770.2	-29.03	-15.92	19.66
75.0	-2517.730	1692.390	1638.303	-1954.9	-1123.2	790.1	-30.45	-16.85	20.00
MAX Q									
75.5	-2517.892	1692.297	1638.368	-1970.3	-1131.5	800.1	-31.13	-16.99	20.17
76.0	-2518.055	1692.204	1638.435	-1985.9	-1140.1	810.2	-31.66	-17.30	20.21
77.0	-2518.384	1692.015	1638.570	-2017.9	-1157.2	830.5	-32.23	-17.12	20.12
78.0	-2518.719	1691.823	1638.708	-2050.9	-1174.6	851.2	-33.47	-17.73	20.91
79.0	-2519.060	1691.628	1638.850	-2084.4	-1192.7	871.9	-33.83	-18.36	21.04
80.0	-2519.405	1691.430	1638.995	-2118.2	-1211.6	893.0	-34.26	-19.55	21.44
81.0	-2519.757	1691.229	1639.144	-2152.4	-1231.4	914.8	-34.34	-20.18	22.08
82.0	-2520.114	1691.025	1639.297	-2187.4	-1252.2	937.3	-35.03	-21.16	22.42
83.0	-2520.477	1690.817	1639.453	-2222.9	-1273.5	960.0	-36.19	-21.87	23.13
84.0	-2520.846	1690.605	1639.613	-2259.0	-1295.5	983.8	-36.50	-22.16	24.42
85.0	-2521.221	1690.390	1639.777	-2295.3	-1317.9	1008.3	-36.44	-22.95	25.16
86.0	-2521.602	1690.171	1639.945	-2331.9	-1341.4	1033.8	-36.48	-23.98	25.82
87.0	-2521.989	1689.948	1640.117	-2369.0	-1366.1	1059.5	-37.64	-25.20	25.32
88.0	-2522.382	1689.721	1640.294	-2407.2	-1391.8	1085.2	-38.65	-25.97	25.25
89.0	-2522.781	1689.490	1640.475	-2446.2	-1418.1	1110.5	-39.37	-26.74	26.02
90.0	-2523.188	1689.255	1640.660	-2486.0	-1445.1	1136.5	-40.26	-27.27	26.51
91.0	-2523.600	1689.014	1640.849	-2526.3	-1473.0	1163.5	-40.46	-28.31	27.36
92.0	-2524.019	1688.770	1641.043	-2566.9	-1501.6	1191.2	-40.60	-29.25	27.45
93.0	-2524.445	1688.520	1641.241	-2607.9	-1531.4	1219.0	-41.41	-30.23	28.30
94.0	-2524.878	1688.266	1641.444	-2649.9	-1562.1	1247.4	-42.62	-31.07	28.78
95.0	-2525.318	1688.006	1641.652	-2692.5	-1593.3	1276.1	-43.15	-31.40	28.75
96.0	-2525.764	1687.741	1641.864	-2735.8	-1625.5	1305.1	-43.31	-32.94	29.06
97.0	-2526.218	1687.471	1642.082	-2779.8	-1659.2	1334.4	-44.08	-34.32	29.37
98.0	-2526.679	1687.195	1642.304	-2824.1	-1693.7	1363.9	-44.60	-34.74	29.56
99.0	-2527.148	1686.913	1642.531	-2869.0	-1728.8	1393.6	-45.82	-35.77	30.24
100.0	-2527.624	1686.626	1642.763	-2915.1	-1765.3	1424.1	-46.35	-36.74	30.59
101.0	-2528.108	1686.332	1642.999	-2961.8	-1802.4	1454.9	-46.51	-37.36	30.81

TABLE XV
SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
102.0	-2528.599	1686.032	1643.242	-3008.6	-1840.0	1485.9	-47.48	-38.31	31.35
103.0	-2529.098	1685.726	1643.489	-3056.1	-1878.6	1517.5	-47.86	-38.31	31.81
104.0	-2529.605	1685.414	1643.741	-3104.2	-1918.1	1549.4	-48.12	-39.06	32.01
105.0	-2530.120	1685.095	1643.999	-3152.8	-1958.6	1581.8	-48.80	-39.7[illegible]	32.51
106.0	-2530.643	1684.769	1644.262	-3202.2	-2000.1	1614.5	-50.[illegible]4	-41.15	33.16
107.0	-2531.175	1684.437	1644.530	-3252.3	-2042.6	1647.7	-50.61	-42.30	33.28
108.0	-2531.714	1684.097	1644.804	-3303.2	-2085.8	1681.1	-51.[illegible]7	-42.84	33.56
109.0	-2532.262	1683.750	1645.084	-3354.7	-2130.0	1715.0	-51.66	-43.62	34.08
110.0	-2532.818	1683.396	1645.369	-3406.8	-2175.2	1749.3	-52.48	-44.52	34.63
111.0	-2533.384	1683.034	1645.660	-3459.6	-2221.4	1784.2	-53.29	-45.78	35.18
112.0	-2533.957	1682.665	1645.956	-3513.[illegible]	-2268.5	1819.4	-53.36	-46.76	35.26
113.0	-2534.540	1682.287	1646.259	-3566.8	-2316.9	1855.1	-54.07	-47.30	35.78
114.0	-2535.132	1681.902	1646.567	-3621.2	-2366.5	1891.1	-55.25	-49.12	36.61
115.0	-2535.732	1681.509	1646.881	-3676.5	-2417.6	1927.7	-55.57	-50.93	36.75
116.0	-2536.342	1681.107	1647.202	-3732.4	-2469.4	1964.7	-55.75	-51.31	36.88
117.0	-2536.961	1680.696	1647.528	-3788.5	-2522.0	2001.8	-56.49	-51.92	37.32
118.0	-2537.589	1680.276	1647.861	-3845.3	-2575.8	2039.3	-57.42	-52.95	38.01
119.0	-2538.227	1679.848	1648.200	-3903.3	-2631.4	2077.6	-58.41	-55.17	38.44
120.0	-2538.874	1679.410	1648.545	-3961.8	-2688.2	2116.1	-58.57	-56.24	38.61
121.0	-2539.531	1678.963	1648.896	-4020.7	-2745.8	2155.0	-59.17	-57.16	39.03
122.0	-2540.198	1678.507	1649.254	-4080.5	-2805.3	2194.5	-60.22	-58.39	39.65
123.0	-2540.874	1678.040	1649.619	-4140.8	-2865.7	2234.2	-60.38	-59.89	39.92
124.0	-2541.561	1677.563	1649.990	-4201.5	-2927.3	2274.2	-61.50	-61.17	40.63
125.0	-2542.258	1677.077	1650.367	-4263.3	-2990.3	2314.9	-62.02	-62.52	40.80
126.0	-2542.964	1676.579	1650.752	-4325.7	-3054.8	2356.3	-62.34	-63.49	41.20
127.0	-2543.682	1676.071	1651.143	-4388.6	-3120.3	2397.9	-63.36	-64.71	42.13
128.0	-2544.409	1675.552	1651.541	-4452.3	-3187.1	2440.1	-64.32	-66.64	42.63
129.0	-2545.147	1675.022	1651.946	-4516.8	-3255.6	2482.9	-64.87	-67.34	42.94
130.0	-2545.896	1674.481	1652.359	-4581.9	-3325.1	2526.1	-65.47	-69.04	43.44
131.0	-2546.655	1673.928	1652.778	-4648.0	-3396.2	2569.8	-66.19	-70.56	43.97
132.0	-2547.426	1673.363	1653.205	-4714.8	-3468.8	2614.2	-67.02	-71.87	44.53
133.0	-2548.207	1672.786	1653.639	-4782.4	-3542.6	2658.9	-67.63	-73.35	44.88
134.0	-2549.000	1672.197	1654.080	-4850.5	-3617.9	2704.1	-68.34	-74.66	45.36
135.0	-2549.804	1671.596	1654.529	-4919.6	-3694.5	2749.9	-69.34	-76.10	46.04
136.0	-2550.620	1670.981	1654.985	-4989.8	-3773.0	2796.4	-70.52	-77.76	46.83
137.0	-2551.447	1670.354	1655.449	-5061.0	-3852.5	2843.6	-71.56	-79.20	47.46
138.0	-2552.286	1669.714	1655.921	-5133.2	-3932.7	2891.4	-72.73	-80.00	48.25
139.0	-2553.136	1669.060	1656.401	-5206.4	-4013.5	294[illegible]	-74.49	-81.09	49.42
140.0	-2553.999	1668.393	1656.889	-5281.2	-4095.5	2989.5	-75.79	-82.51	50.30
IECO								-84.61	
140.65	-2554.567	1667.952	1657.210	-5326.0	-4146.7	3019.3	-71.97	-83.42	47.75

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SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
141.0	-2554.874	1667.713	1657.385	-5350.2	-4169.0	3035.3	-35.60	-63.30	23.83
142.0	-2555.757	1667.022	1657.886	-5380.4	-4224.8	3055.5	-27.31	-50.08	18.27
143.0	-2556.645	1666.322	1658.390	-5407.8	-4274.3	3073.8	-27.74	-50.60	18.52
144.0	-2557.537	1665.615	1658.898	-5434.5	-4323.4	3091.6	-27.51	-51.42	18.39
OECO									
144.32	-2557.823	1665.387	1659.061	-5440.7	-4339.4	3095.8	-24.72	-49.19	16.54
145.0	-2558.433	1664.900	1659.408	-5435.1	-4354.9	3092.3	19.78	-20.23	-12.79
S-IB/S-IVB SEPARATION SIGNAL									
145.59	-2558.960	1664.477	1659.707	-5421.9	-4364.1	3083.7	22.85	-16.24	-14.83
150.0	-2562.860	1661.287	1661.923	-5331.9	-4438.9	3025.5	12.85	-22.18	-8.09
155.0	-2567.230	1657.584	1664.402	-5291.6	-4563.9	3002.0	6.32	-25.91	-3.40
160.0	-2571.572	1653.775	1666.865	-5262.4	-4695.2	2986.4	5.77	-26.48	-3.22
165.0	-2575.890	1649.856	1669.316	-5234.5	-4828.2	2971.3	5.33	-26.46	-2.84
GUIDANCE INITIATION									
169.76	-2579.982	1646.024	1671.639	-5210.8	-4956.2	2959.7	4.63	-26.89	-2.28
170.0	-2580.187	1645.828	1671.756	-5209.7	-4962.7	2959.2	4.56	-26.86	-2.32
175.0	-2584.465	1641.689	1674.187	-5187.6	-5097.0	2947.2	3.57	-26.38	-2.71
180.0	-2588.727	1637.442	1676.606	-5173.5	-5223.0	2934.0	2.20	-24.25	-2.39
185.0	-2592.980	1633.094	1679.016	-5162.4	-5344.2	2922.7	2.18	-24.23	-2.32
190.0	-2597.223	1628.646	1681.416	-5151.4	-5465.3	2911.5	2.11	-24.60	-2.24
195.0	-2601.458	1624.098	1683.808	-5141.3	-5589.3	2900.8	1.87	-24.88	-2.14
200.0	-2605.685	1619.447	1686.190	-5131.8	-5714.8	2889.8	1.88	-25.26	-2.29
205.0	-2609.904	1614.692	1688.564	-5122.6	-5842.0	2879.1	1.68	-25.56	-2.08
210.0	-2614.116	1609.832	1690.929	-5114.6	-5970.7	2868.6	1.53	-25.97	-2.14
215.0	-2618.322	1604.865	1693.285	-5107.2	-6101.2	2858.0	1.23	-26.34	-2.09
220.0	-2622.522	1599.790	1695.633	-5100.9	-6233.4	2847.3	1.25	-26.55	-2.16
225.0	-2626.717	1594.606	1697.971	-5094.8	-6367.1	2836.5	1.02	-26.92	-2.18
230.0	-2630.907	1589.311	1700.301	-5089.4	-6502.6	2825.5	0.81	-27.23	-2.[illegible]9
235.0	-2635.093	1583.904	1702.621	-5085.0	-6639.6	2814.9	0.91	-27.69	-1.99
240.0	-2639.276	1578.383	1704.934	-5081.6	-6778.3	2804.6	0.54	-27.86	-2.06
245.0	-2643.457	1572.748	1707.237	-5079.2	-6918.8	2794.1	0.93	-28.11	-1.24
250.0	-2647.636	1566.996	1709.532	-5076.6	-7060.6	2784.4	0.47	-28.50	-1.91
255.0	-2651.812	1561.127	1711.819	-5074.7	-7204.5	2774.2	0.26	-29.02	-1.94
260.0	-2655.988	1555.139	1714.098	-5073.2	-7349.8	2764.3	0.01	-29.19	-2.03
265.0	-2660.163	1549.030	1716.369	-5073.4	-7496.8	2754.9	-0.13	-29.56	-1.92

TABLE XV

SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
270.0	-2664.338	1542.800	1718.632	-5074.1	-7645.6	2745.8	-0.20	-29.94	-1.75
275.0	-2668.514	1536.447	1720.888	-5075.7	-7796.5	2737.0	-0.36	-30.39	-1.66
280.0	-2672.691	1529.968	1723.137	-5077.6	-7949.3	2728.3	-0.42	-30.81	-1.79
285.0	-2676.871	1523.363	1725.378	-5079.9	-8104.3	2719.6	-0.32	-31.29	-1.62
290.0	-2681.052	1516.630	1727.613	-5082.9	-8261.1	2710.9	-0.54	-31.55	-1.77
295.0	-2685.236	1509.766	1729.840	-5086.5	-8419.9	2702.6	-0.84	-31.82	-1.67
300.0	-2689.424	1502.772	1732.061	-5091.0	-8580.8	2694.7	-1.02	-32.68	-1.54
305.0	-2693.615	1495.643	1734.275	-5096.6	-8744.1	2687.3	-1.15	-33.05	-1.48
310.0	-2697.812	1488.380	1736.483	-5103.0	-8910.2	2680.0	-1.33	-33.47	-1.49
315.0	-2702.014	1480.979	1738.686	-5109.5	-9077.4	2672.9	-1.45	-33.94	-1.32
320.0	-2706.221	1473.439	1740.883	-5116.8	-9248.1	2665.9	-1.49	-34.18	-1.31
325.0	-2710.435	1465.758	1743.074	-5124.3	-9420.8	2659.2	-1.59	-34.78	-1.30
330.0	-2714.655	1457.934	1745.259	-5132.6	-9596.0	2652.6	-1.58	-35.41	-1.37
335.0	-2718.883	1449.965	1747.439	-5141.3	-9773.4	2646.3	-1.92	-35.63	-1.21
340.0	-2723.117	1441.848	1749.614	-5150.8	-9953.6	2640.2	-2.05	-36.19	-1.23
345.0	-2727.360	1433.583	1751.785	-5161.[illegible]	-10136.4	2634.4	-2.08	-37.07	-1.06
350.0	-2731.611	1425.165	1753.950	-5172.0	-10322.4	2628.9	-2.23	-37.63	-1.04
355.0	-2735.872	1416.593	1756.111	-5183.5	-10511.5	2623.7	-2.54	-38.24	-0.93
360.0	-2740.143	1407.865	1758.268	-5196.1	-10703.7	2619.0	-2.57	-38.74	-0.93
365.0	-2744.424	1398.977	1760.422	-5208.6	-10898.9	2614.1	-2.52	-39.6[illegible]	-0.89
370.0	-2748.715	1389.926	1762.571	-5221.5	-11097.1	2609.2	-2.60	-39.98	-1.01
375.0	-2753.017	1380.712	1764.716	-5235.0	-11298.3	2604.6	-2.76	-40.44	-1.01
380.0	-2757.331	1371.331	1766.857	-5248.9	-11503.0	2599.9	-3.01	-41.11	-0.93
385.0	-2761.656	1361.780	1768.995	-5263.7	-11711.2	2595.7	-2.95	-41.93	-0.82
390.0	-2765.994	1352.056	1771.129	-5278.9	-11922.4	2591.6	-2.87	-42.83	-0.86
395.0	-2770.344	1342.157	1773.260	-5294.2	-12138.1	2587.8	-3.14	-43.13	-0.76
400.0	-2774.708	1332.079	1775.388	-5310.1	-12355.7	2583.2	-2.93	-44.02	-0.90
405.0	-2779.084	1321.820	1777.512	-5326.6	-12578.4	2579.2	-3.70	-44.86	-0.83
410.0	-2783.474	1311.377	1779.633	-5343.7	-12804.9	2575.5	-3.58	-45.96	-0.70
415.0	-2787.879	1300.745	1781.751	-5361.6	-13035.6	2572.1	-3.75	-46.75	-0.66
420.0	-2792.298	1289.922	1783.866	-5380.0	-13270.9	2568.6	-3.91	-47.65	-0.60
425.0	-2796.733	1278.903	1785.978	-5399.0	-13510.8	2565.3	-3.83	-48.28	-0.70
430.0	-2801.184	1267.686	1788.088	-5417.5	-13753.9	2561.4	-3.65	-49.44	-0.65
435.0	-2805.650	1256.266	1790.194	-5436.6	-14002.8	2557.7	-3.69	-50.29	-0.78
440.0	-2810.131	1244.639	1792.297	-5456.2	-14256.3	2553.9	-3.92	-51.26	-0.82
445.0	-2814.629	1232.802	1794.397	-5476.1	-14515.0	2550.1	-3.98	-52.39	-0.76
450.0	-2819.144	1220.749	1796.494	-5496.3	-14778.6	2546.4	-4.00	-53.29	-0.79
455.0	-2823.675	1208.478	1798.588	-5517.1	-15047.7	2542.6	-4.03	-54.49	-0.79
460.0	-2828.220	1195.989	1800.676	-5522.0	-15296.8	2530.0	1.70	-46.01	-4.06
465.0	-2832.760	1183.307	1802.750	-5511.9	-15527.1	2509.0	1.94	-46.23	-4.27
470.0	-2837.291	1170.434	1804.805	-5501.4	-15759.7	2487.0	2.21	-46.82	-4.38
475.0	-2841.814	1157.369	1806.843	-5490.1	-15995.7	2464.7	2.08	-47.80	-4.42
480.0	-2846.327	1144.107	1808.862	-5478.3	-16235.8	2442.4	2.34	-48.14	-4.42
485.0	-2850.830	1130.647	1810.862	-5466.1	-16479.3	2419.9	2.40	-49.06	-4.48

TABLE XV
SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
490.0	-2855.323	1116.985	1812.844	-5453.6	-16727.5	2397.4	2.69	-50.20	-4.51
495.0	-2859.805	1103.116	1814.808	-5441.3	-16979.7	2375.0	2.35	-50.67	-4.45
500.0	-2864.278	1089.039	1816.753	-5428.9	-17236.1	2352.6	2.43	-51.67	-4.49
505.0	-2868.740	1074.749	1818.680	-5415.8	-17497.0	2329.8	2.67	-52.81	-4.66
510.0	-2873.191	1060.242	1820.587	-5401.6	-17762.5	2306.1	2.92	-53.92	-4.77
515.0	-2877.630	1045.514	1822.475	-5386.4	-18034.1	2281.6	3.12	-55.05	-4.89
520.0	-2882.055	1030.560	1824.342	-5369.9	-18310.5	2256.2	3.33	-56.07	-5.13
525.0	-2886.467	1015.377	1826.188	-5352.0	-18593.1	2229.6	3.69	-56.71	-5.37
530.0	-2890.863	999.959	1828.011	-5333.3	-18881.2	2202.1	3.74	-57.99	-5.64
535.0	-2895.244	984.301	1829.812	-5313.4	-19174.8	2173.5	4.09	-59.25	-5.85
540.0	-2899.608	968.400	1831.588	-5292.5	-19474.5	2144.0	4.24	-60.52	-6.06
545.0	-2903.954	952.249	1833.340	-5270.7	-19780.5	2113.6	4.50	-61.98	-6.28
550.0	-2908.282	935.844	1835.066	-5247.9	-20092.9	2082.0	4.64	-63.27	-6.44
555.0	-2912.591	919.178	1836.766	-5224.0	-20412.2	2049.3	5.10	-64.77	-6.65
560.0	-2916.879	902.248	1838.439	-5198.8	-20738.0	2015.6	5.22	-65.69	-6.90
565.0	-2921.147	885.047	1840.083	-5173.3	-21070.7	1980.6	4.94	-67.06	-7.06
570.0	-2925.393	867.568	1841.698	-5146.6	-21411.2	1944.8	5.31	-68.78	-7.28
575.0	-2929.616	849.807	1843.283	-5118.7	-21759.2	1907.9	5.57	-69.86	-7.42
580.0	-2933.817	831.756	1844.838	-5090.3	-22114.1	1870.1	5.73	-72.00	-7.62
585.0	-2937.993	813.409	1846.360	-5060.8	-22479.1	1830.9	5.97	-73.49	-7.95
590.0	-2942.145	794.758	1847.851	-5030.1	-22851.7	1791.0	5.94	-75.83	-8.13
595.0	-2946.271	775.797	1849.307	-4998.7	-23233.2	1749.8	6.53	-77.57	-8.36
600.0	-2950.370	756.518	1850.729	-4960.9	-23627.5	1704.5	8.12	-79.45	-9.26
605.0	-2954.436	736.911	1852.112	-4922.1	-24029.2	1658.6	7.52	-81.59	-9.01
610.0	-2958.471	716.969	1853.459	-4886.6	-24441.8	1614.1	6.70	-83.82	-8.75
615.0	-2962.479	696.684	1854.769	-4855.3	-24864.3	1570.9	6.02	-85.09	-8.52
S-IVB GUIDANCE CUTOFF									
616.76	-2963.884	689.460	1855.222	-4844.5	-25013.6	1556.0	5.72	-85.39	-8.41
620.0	-2966.448	676.106	1856.039	-4769.8	-25058.8	1507.7	24.97	-5.71	-15.68
625.0	-2970.322	655.473	1857.247	-4644.9	-25086.9	1429.3	25.00	-5.53	-15.66
ORBIT INSERTION									
626.76	-2971.661	648.205	1857.657	-4600.9	-25096.5	1401.7	25.02	-5.47	-15.68
650.0	-2988.145	551.986	1862.321	-4018.0	-25214.5	1036.9	25.14	-4.77	-15.69
700.0	-3016.057	343.651	1867.459	-2755.1	-25406.1	248.8	25.38	-2.91	-15.77
750.0	-3033.496	134.112	1866.263	-1481.9	-25506.6	-539.5	25.53	-1.14	-15.76
800.0	-3040.433	-75.892	1858.586	-203.7	-25518.9	-1325.8	25.58	0.62	-15.69
850.0	-3036.846	-285.634	1844.455	1075.1	-25442.9	-2107.5	25.55	2.39	-15.57
900.0	-3022.749	-494.387	1823.922	2350.0	-25278.8	-2881.6	25.43	4.14	-15.39

TABLE XV

SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
950.0	-2998.193	-701.430	1797.057	3616.4	-25027.3	-3645.6	25.22	5.88	-15.16
1000.0	-2963.266	-906.047	1763.957	4870.0	-24689.3	-4396.8	24.92	7.60	-14.88
1050.0	-2918.090	-1107.530	1724.738	6106.5	-24266.0	-5132.5	24.53	9.29	-14.54
1100.0	-2862.825	-1305.184	1679.536	7321.4	-23759.0	-5850.2	24.06	10.95	-14.16
1150.0	-2797.666	-1498.328	1628.512	8510.6	-23170.0	-6547.4	23.51	12.57	-13.72
1200.0	-2722.840	-1686.294	1571.844	9670.0	-22501.2	-7221.6	22.87	14.14	-13.24
1250.0	-2638.611	-1868.437	1509.729	10795.6	-21754.9	-7870.5	22.16	15.66	-12.71
1300.0	-2545.272	-2044.129	1442.387	11883.4	-20933.9	-8491.9	21.37	17.13	-12.14
1350.0	-2443.150	-2212.767	1370.051	12929.7	-20041.0	-9083.7	20.50	18.53	-11.52
1400.0	-2332.601	-2373.773	1292.975	13930.9	-19079.5	-9643.7	19.57	19.87	-10.87
1450.0	-2214.010	-2526.596	1211.428	14883.6	-18052.6	-10170.2	18.57	21.14	-10.18
1500.0	-2087.791	-2670.712	1125.693	15784.5	-16964.1	-10661.2	17.50	22.34	-9.45
1550.0	-1954.381	-2805.631	1036.070	16630.5	-15817.9	-11115.1	16.38	23.46	-8.70
1600.0	-1814.245	-2930.893	942.869	17418.9	-14617.8	-11530.4	15.20	24.49	-7.91
1650.0	-1667.869	-3046.074	846.414	18146.9	-13368.3	-11905.6	13.96	25.44	-7.10
1700.0	-1515.759	-3150.783	747.041	18812.0	-12073.5	-12239.6	12.69	26.30	-6.26
1750.0	-1358.442	-3244.668	645.093	19412.1	-10738.2	-12531.2	11.37	27.06	-5.40
1800.0	-1196.460	-3327.412	540.922	19945.2	-9366.9	-12779.5	10.01	27.74	-4.53
1850.0	-1030.374	-3398.741	434.890	20409.5	-7964.4	-12983.6	8.62	28.31	-3.64
1900.0	-860.756	-3458.417	327.362	20803.5	-6535.6	-13143.0	7.20	28.79	-2.74
1950.0	-688.189	-3506.244	218.709	21126.0	-5085.4	-13257.1	5.76	29.17	-1.83
2000.0	-513.265	-3542.067	109.304	21376.0	-3618.9	-13325.6	4.31	29.45	-0.91
2050.0	-336.586	-3565.772	-0.477	21552.7	-2141.1	-13348.4	2.84	29.63	0.00
2100.0	-158.756	-3577.287	-110.256	21655.6	-657.0	-13325.3	1.36	29.70	0.92
2150.0	19.616	-3576.582	-219.658	21684.5	828.1	-13256.7	-0.12	29.67	1.83
2200.0	197.921	-3563.669	-328.309	21639.3	2309.4	-13142.7	-1.60	29.55	2.73
2250.0	375.551	-3538.600	-435.837	21520.4	3781.6	-12983.9	-3.07	29.32	3.62
2300.0	551.901	-3501.470	-541.875	21328.3	5239.9	-12780.8	-4.53	28.99	4.50
2350.0	726.371	-3452.414	-646.063	21063.7	6679.3	-12534.3	-5.97	28.57	5.36
2400.0	898.368	-3391.608	-748.046	20727.6	8094.9	-12245.1	-7.38	28.04	6.20
2450.0	1067.311	-3319.268	-847.478	20321.3	9481.9	-11914.4	-8.77	27.43	7.02
2500.0	1232.626	-3235.647	-944.022	19846.3	10835.8	-11543.3	-10.13	26.72	7.82
2550.0	1393.755	-3141.037	-1037.350	19304.2	12152.0	-11133.2	-11.46	25.93	8.58
2600.0	1550.153	-3035.767	-1127.148	18696.9	13426.1	-10685.5	-12.74	25.04	9.32
2650.0	1701.293	-2920.200	-1213.111	18026.7	14653.8	-10201.7	-13.98	24.08	10.03
2700.0	1846.667	-2794.734	-1294.951	17295.7	15831.2	-9683.5	-15.17	23.03	10.70
2750.0	1985.785	-2659.801	-1372.392	16506.6	16954.3	-9132.7	-16.30	21.91	11.33
2800.0	2118.179	-2515.861	-1445.172	15662.1	18019.4	-8551.2	-17.38	20.72	11.92
2850.0	2243.405	-2363.409	-1513.047	14764.9	19023.0	-7941.0	-18.41	19.46	12.48
2900.0	2361.043	-2202.961	-1575.790	13818.3	19961.8	-7304.1	-19.37	18.13	12.99
2950.0	2470.698	-2035.066	-1633.190	12825.3	20832.7	-6642.7	-20.26	16.75	13.46
3000.0	2572.003	-1860.293	-1685.054	11789.4	21633.0	-5959.1	-21.09	15.31	13.88
3050.0	2664.618	-1679.234	-1731.209	10714.0	22359.9	-5255.5	-21.84	13.82	14.26
3100.0	2748.234	-1492.504	-1771.499	9602.7	23011.0	-4534.2	-22.53	12.29	14.58

TABLE XV
SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
3150.0	2822.570	-1300.735	-1805.791	8459.2	23584.4	-3797.8	-23.13	10.71	14.86
3200.0	2887.376	-1104.574	-1833.969	7287.4	24078.0	-3048.7	-23.66	9.11	15.09
3250.0	2942.437	-904.685	-1855.938	6091.1	24490.3	-2289.3	-24.12	7.47	15.27
3300.0	2987.567	-701.742	-1871.625	4874.3	24820.0	-1522.2	-24.49	5.80	15.40
3350.0	3022.614	-496.430	-1880.976	3641.2	25065.8	-750.0	-24.78	4.12	15.48
3400.0	3047.459	-289.444	-1883.962	2395.6	25227.1	24.7	-24.99	2.42	15.50
3450.0	3062.018	-81.480	-1880.569	1141.9	25303.2	799.5	-25.11	0.72	15.48
3500.0	3066.242	126.759	-1870.811	-115.8	25293.9	1571.7	-25.15	-0.99	15.40
3550.0	3060.112	334.570	-1854.717	-1373.4	25199.2	2338.7	-25.11	-2.69	15.27
3600.0	3043.649	541.251	-1832.342	-2626.7	25019.4	3097.9	-24.99	-4.39	15.09
3650.0	3016.905	746.105	-1803.760	-3871.5	24755.0	3846.9	-24.78	-6.07	14.86
3700.0	2979.967	948.437	-1769.065	-5103.7	24406.9	4583.2	-24.49	-7.74	14.58
3750.0	2932.955	1147.563	-1728.372	-6319.1	23976.0	5304.1	-24.12	-9.37	14.25
3800.0	2876.026	1342.809	-1681.818	-7513.6	23463.9	6007.5	-23.66	-10.98	13.87
3850.0	2809.365	1533.511	-1629.557	-8683.3	22872.2	6690.7	-23.13	-12.56	13.45
3900.0	2733.195	1719.023	-1571.764	-9824.2	22202.7	7351.6	-22.52	-14.09	12.98
3950.0	2647.768	1898.713	-1508.633	-10932.5	21457.6	7987.9	-21.83	-15.58	12.47
4000.0	2553.369	2071.969	-1440.374	-12004.4	20639.3	8597.4	-21.07	-17.02	11.91
4050.0	2450.311	2238.199	-1367.216	-13036.3	19750.5	9178.1	-20.24	-18.40	11.31
4100.0	2338.938	2396.834	-1289.407	-14024.6	18794.0	9727.9	-19.34	-19.72	10.67
4150.0	2219.624	2547.331	-1207.206	-14966.0	17773.1	10244.9	-18.37	-20.98	10.00
4200.0	2092.767	2689.173	-1120.891	-15857.1	16691.0	10727.4	-17.34	-22.17	9.29
4250.0	1958.795	2821.871	-1030.755	-16695.0	15551.3	11173.7	-16.25	-23.29	8.55
4300.0	1818.157	2944.967	-937.100	-17476.7	14357.8	11582.1	-15.10	-24.32	7.78
4350.0	1671.327	3058.034	-840.246	-18199.4	13114.5	11951.3	-13.90	-25.28	6.98
4400.0	1518.802	3160.679	-740.519	-18860.7	11825.5	12279.9	-12.65	-26.15	6.16
4450.0	1361.095	3252.544	-638.260	-19458.1	10495.2	12566.7	-11.35	-26.94	5.31
4500.0	1198.743	3333.306	-533.816	-19989.6	9128.0	12810.7	-10.02	-27.63	4.45
4550.0	1032.296	3402.682	-427.543	-20453.1	7728.5	13011.0	-8.64	-28.23	3.56
4600.0	862.319	3460.425	-319.805	-20847.1	6301.5	13166.8	-7.24	-28.74	2.67
4650.0	689.392	3506.329	-210.969	-21170.0	4851.8	13277.5	-5.81	-29.14	1.76
4700.0	514.105	3540.226	-101.410	-21420.6	3384.3	13342.7	-4.36	-29.45	0.85
4750.0	337.055	3561.993	8.498	-21598.0	1904.2	13362.1	-2.89	-29.66	-0.07
4800.0	158.850	3571.544	118.375	-21701.5	416.4	13335.5	-1.40	-29.76	-0.99
4850.0	-19.901	3568.840	227.845	-21730.5	-1073.8	13263.0	0.09	-29.77	-1.91
4900.0	-198.583	3553.879	336.530	-21684.9	-2561.4	13144.7	1.58	-29.66	-2.82
4950.0	-376.583	3526.705	444.054	-21564.7	-4041.2	12981.0	3.07	-29.46	-3.72
5000.0	-553.288	3487.404	550.046	-21370.2	-5508.1	12772.4	4.54	-29.15	-4.62
5050.0	-728.089	3436.103	654.140	-21102.1	-6957.0	12519.6	6.01	-28.75	-5.49
5100.0	-900.383	3372.970	755.973	-20761.1	-8382.7	12223.4	7.46	-28.24	-6.35
5150.0	-1069.576	3298.218	855.194	-20348.4	-9780.4	11884.8	8.88	-27.63	-7.19
5200.0	-1235.082	3212.096	951.458	-19865.3	-11145.1	11504.8	10.27	-26.93	-8.00
5250.0	-1396.328	3114.897	1044.430	-19313.4	-12472.0	11084.9	11.63	-26.13	-8.79
5300.0	-1552.755	3006.949	1133.787	-18694.6	-13756.6	10626.4	12.94	-25.24	-9.55

TABLE XV
SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
5350.0	-1703.823	2888.621	1219.217	-18011.0	-14994.2	10130.9	14.22	-24.26	-10.27
5400.0	-1849.006	2760.317	1300.423	-17264.8	-16180.5	9600.1	15.45	-23.20	-10.96
5450.0	-1987.801	2622.477	1377.123	-16458.8	-17311.3	9035.9	16.62	-22.05	-11.61
5500.0	-2119.726	2475.572	1449.048	-15595.5	-18382.7	8440.1	17.73	-20.83	-12.22
5550.0	-2244.322	2320.109	1515.948	-14678.1	-19390.9	7814.8	18.79	-19.54	-12.79
5600.0	-2361.161	2156.614	1577.592	-13711.3	-20335.7	7163.7	19.73	-18.27	-13.27
5650.0	-2469.851	1985.621	1633.776	-12697.4	-21211.1	6487.4	20.66	-16.81	-13.77
5700.0	-2570.010	1807.729	1684.297	-11638.7	-22011.9	5787.7	21.52	-15.30	-14.21
5750.0	-2661.286	1623.562	1728.974	-10539.0	-22735.8	5067.6	22.31	-13.74	-14.59
5800.0	-2743.358	1433.763	1767.650	-9402.3	-23380.5	4329.6	23.01	-12.14	-14.92
5850.0	-2815.937	1238.993	1800.189	-8232.7	-23944.0	3576.7	23.63	-10.50	-15.19
5900.0	-2878.772	1039.924	1826.480	-7034.5	-24424.5	2811.2	24.16	-8.83	-15.42
5950.0	-2931.643	837.250	1846.429	-5811.9	-24820.3	2036.0	24.61	-7.13	-15.58
6000.0	-2974.296	631.653	1859.983	-4569.0	-25129.2	1255.5	24.97	-5.40	-15.70
6050.0	-3006.725	423.890	1867.879	-3310.6	-25352.0	468.7	25.25	-3.65	-15.76
6100.0	-3028.750	214.654	1867.692	-2040.9	-25487.0	-319.7	25.43	-1.89	-15.76
6150.0	-3040.294	4.670	1861.821	-764.3	-25533.6	-1106.8	25.53	-0.13	-15.71
6200.0	-3041.321	-205.333	1849.488	514.8	-25491.8	-1889.7	25.54	1.64	-15.60
6250.0	-3031.827	-414.629	1830.740	1792.0	-25361.7	-2665.6	25.46	3.40	-15.43
6300.0	-3011.846	-622.493	1805.644	3062.8	-25143.9	-3431.8	25.30	5.14	-15.21
6350.0	-2981.450	-828.207	1774.294	4322.5	-24839.4	-4185.6	25.03	6.86	-14.94
6400.0	-2940.749	-1031.062	1736.799	5566.5	-24449.4	-4924.7	24.68	8.55	-14.62
6450.0	-2889.893	-1230.362	1693.290	6789.8	-23975.6	-5647.0	24.22	10.20	-14.27
6500.0	-2829.074	-1425.426	1643.912	7987.4	-23420.2	-6350.8	23.72	11.86	-13.83
6550.0	-2758.505	-1615.581	1588.838	9158.9	-22782.6	-7030.7	23.12	13.44	-13.36
6600.0	-2678.426	-1800.166	1528.269	10298.1	-22067.0	-7685.9	22.44	14.98	-12.84
6650.0	-2589.119	-1978.549	1462.418	11401.1	-21275.8	-8314.2	21.69	16.46	-12.28
6700.0	-2490.897	-2150.121	1391.515	12464.2	-20411.9	-8913.3	20.86	17.88	-11.68
6750.0	-2384.105	-2314.295	1315.810	13483.5	-19478.5	-9481.2	19.95	19.24	-11.03
6800.0	-2269.116	-2470.513	1235.565	14455.8	-18478.8	-10016.0	18.98	20.53	-10.35
6850.0	-2146.331	-2618.245	1151.063	15377.7	-17416.4	-10515.9	17.95	21.75	-9.64
6900.0	-2016.179	-2756.989	1062.596	16246.0	-16295.2	-10979.2	16.86	22.89	-8.89
6950.0	-1879.111	-2886.279	970.473	17057.9	-15119.1	-11404.4	15.71	23.94	-8.11
7000.0	-1735.604	-3005.679	875.013	17810.6	-13892.3	-11789.9	14.50	24.92	-7.31
7050.0	-1586.155	-3114.789	776.548	18501.7	-12619.0	-12134.7	13.25	25.80	-6.48
7100.0	-1431.280	-3213.246	675.417	19129.0	-11303.8	-12437.5	11.96	26.60	-5.63
7150.0	-1271.514	-3300.723	571.970	19690.2	-9951.3	-12697.5	10.63	27.30	-4.76
7200.0	-1107.406	-3376.933	466.563	20183.8	-8566.1	-12913.7	9.26	27.91	-3.88
7250.0	-939.521	-3441.626	359.559	20608.0	-7153.1	-13085.6	7.87	28.42	-2.99
7300.0	-768.435	-3494.595	251.325	20961.7	-5717.2	-13212.6	6.45	28.83	-2.09
7350.0	-594.733	-3535.670	142.232	21243.7	-4263.3	-13294.3	5.01	29.14	-1.18
7400.0	-419.008	-3564.724	32.653	21453.2	-2796.4	-13330.7	3.56	29.36	-0.27
7450.0	-241.859	-3581.671	-77.039	21589.7	-1321.6	-13321.7	2.10	29.47	0.63
7500.0	-63.889	-3586.466	-186.470	21652.8	156.2	-13267.4	0.63	29.48	1.54

TABLE XV

SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
7550.0	114.299	-3579.105	-295.268	21642.5	1632.0	-13168.0	-0.83	29.40	2.43
7600.0	292.100	-3559.626	-403.065	21558.9	3100.7	-13024.1	-2.29	29.21	3.32
7650.0	468.914	-3528.108	-509.496	21402.6	4557.4	-12836.1	-3.74	28.93	4.19
7700.0	644.144	-3484.668	-614.202	21174.2	5997.2	-12604.9	-5.17	28.55	5.05
7750.0	817.200	-3429.466	-716.829	20874.5	7415.4	-12331.2	-6.58	28.07	5.89
7800.0	987.501	-3362.699	-817.033	20504.8	8807.2	-12016.1	-7.97	27.50	6.71
7850.0	1154.477	-3284.603	-914.478	20066.4	10168.0	-11660.7	-9.32	26.84	7.50
7900.0	1317.567	-3195.452	-1008.837	19560.8	11493.4	-11266.3	-10.65	26.10	8.27
7950.0	1476.227	-3095.556	-1099.795	18990.0	12778.9	-10834.3	-11.93	25.26	9.01
8000.0	1629.929	-2985.259	-1187.048	18355.9	14020.4	-10366.2	-13.18	24.35	9.71
8050.0	1778.159	-2864.941	-1270.305	17660.7	15213.9	-9863.5	-14.37	23.36	10.39
8100.0	1920.425	-2735.013	-1349.290	16906.8	16355.4	-9328.1	-15.52	22.29	11.02
8150.0	2056.256	-2595.918	-1423.740	16096.9	17441.3	-8761.7	-16.62	21.14	11.62
8200.0	2185.200	-2448.127	-1493.409	15233.6	18468.1	-8166.3	-17.66	19.93	12.19
8250.0	2306.830	-2292.143	-1558.066	14319.8	19432.4	-7543.8	-18.64	18.66	12.71
8300.0	2420.744	-2128.491	-1617.496	13358.7	20331.2	-6896.4	-19.56	17.33	13.18
8350.0	2526.565	-1957.722	-1671.504	12353.5	21161.5	-6226.2	-20.41	15.94	13.62
8400.0	2623.944	-1780.411	-1719.919	11307.4	21920.8	-5535.5	-21.19	14.50	14.01
8450.0	2712.559	-1597.154	-1762.556	10224.0	22606.6	-4826.5	-21.91	13.01	14.35
8500.0	2792.116	-1408.563	-1799.300	9106.8	23216.6	-4101.5	-22.55	11.48	14.64
8550.0	2862.355	-1215.270	-1830.021	7959.5	23749.1	-3363.1	-23.12	9.92	14.89
8600.0	2923.041	-1017.921	-1854.618	6785.9	24202.1	-2613.5	-23.61	8.32	15.09
8650.0	2973.975	-817.176	-1873.010	5589.8	24574.3	-1855.3	-24.02	6.70	15.23
8700.0	3014.987	-613.705	-1885.135	4375.1	24864.6	-1090.9	-24.36	5.06	15.33
8750.0	3045.940	-408.186	-1890.954	3145.9	25071.8	-322.9	-24.62	3.40	15.38
8800.0	3066.732	-201.305	-1890.446	1906.0	25195.5	446.3	-24.79	1.72	15.38
8850.0	3077.291	6.248	-1883.612	659.6	25235.0	1214.1	-24.89	0.05	15.33
8900.0	3077.581	213.780	-1870.475	-589.2	25190.4	1978.0	-24.90	-1.63	15.22
8950.0	3067.598	420.598	-1851.076	-1836.5	25061.6	2735.5	-24.84	-3.31	15.07
9000.0	3047.372	626.011	-1825.480	-3078.0	24849.1	3484.0	-24.69	-4.97	14.87
9050.0	3016.968	829.334	-1793.768	-4309.7	24553.5	4221.2	-24.46	-6.62	14.61
9100.0	2976.481	1029.885	-1756.045	-5527.7	24175.7	4944.6	-24.15	-8.25	14.31
9150.0	2926.043	1226.992	-1712.435	-6727.7	23716.8	5651.8	-23.76	-9.85	13.97
9200.0	2865.816	1419.994	-1663.079	-7906.0	23178.3	6340.4	-23.29	-11.43	13.57
9250.0	2795.997	1608.243	-1608.142	-9058.6	22561.8	7008.2	-22.75	-12.97	13.13
9300.0	2716.812	1791.104	-1547.802	-10181.6	21869.2	7652.9	-22.12	-14.46	12.65
9350.0	2628.521	1967.961	-1482.260	-11271.3	21102.8	8272.4	-21.43	-15.91	12.12
9400.0	2531.411	2138.216	-1411.731	-12324.1	20265.0	8864.5	-20.66	-17.31	11.55
9450.0	2425.803	2301.292	-1336.450	-13336.3	19358.4	9427.2	-19.82	-18.66	10.95
9500.0	2312.044	2456.634	-1256.665	-14304.6	18385.9	9958.7	-18.92	-19.95	10.30
9550.0	2190.509	2603.713	-1172.642	-15225.7	17350.7	10457.0	-17.95	-21.17	9.62
9600.0	2061.600	2742.026	-1084.661	-16096.3	16256.0	10920.4	-16.92	-22.32	8.91
9650.0	1925.744	2871.098	-993.015	-16913.6	15105.4	11347.4	-15.83	-23.40	8.16
9700.0	1783.393	2990.486	-898.010	-17674.5	13902.7	11736.4	-14.68	-24.41	7.39

TABLE XV

SPACE-FIXED EPHEMERIS POSITIONS, VELOCITIES AND ACCELERATIONS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
9750.0	1635.020	3099.776	-799.966	-18376.6	12651.8	12086.1	-13.49	-25.33	6.59
9800.0	1481.121	3198.588	-699.210	-19017.2	11356.9	12395.1	-12.24	-26.17	5.77
9850.0	1322.212	3286.577	-596.083	-19594.1	10022.1	12662.3	-10.95	-26.93	4.92
9900.0	1158.824	3363.433	-490.932	-20105.2	8651.9	12886.8	-9.63	-27.59	4.06
9950.0	991.508	3428.884	-384.113	-20548.7	7250.9	13067.7	-8.26	-28.16	3.18
10000.0	820.827	3482.696	-275.987	-20922.8	5823.8	13204.3	-6.87	-28.64	2.28
10050.0	647.357	3524.673	-166.922	-21226.2	4375.4	13295.9	-5.45	-29.02	1.38
10100.0	471.686	3554.661	-57.289	-21457.7	2910.5	13342.3	-4.00	-29.30	0.47
10150.0	294.409	3572.543	52.539	-21616.3	1434.3	13343.1	-2.54	-29.49	-0.44
10200.0	116.130	3578.248	162.186	-21701.3	-48.4	13298.3	-1.07	-29.57	-1.35
10250.0	-62.546	3571.742	271.276	-21712.4	-1532.5	13207.9	0.40	-29.55	-2.26
10300.0	-241.007	3553.037	379.436	-21649.2	-3012.7	13072.2	1.88	-29.43	-3.17
10350.0	-418.643	3522.183	486.293	-21512.0	-4484.1	12891.4	3.36	-29.21	-4.06
10400.0	-594.845	3479.276	591.480	-21301.0	-5941.6	12666.3	4.80	-28.90	-4.93
10450.0	-769.014	3424.449	694.633	-21017.3	-7380.2	12397.3	6.28	-28.45	-5.82
10500.0	-940.545	3357.882	795.393	-20660.4	-8793.9	12084.7	7.72	-27.92	-6.68
S-IVB/CSM SEPARATION									
10502.4	-948.692	3354.358	800.153	-20641.3	-8861.0	12068.5	7.79	-27.89	-6.72

TABLE XVI
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
GUIDANCE REFERENCE RELEASE											
-4.972	3441.337	-80.5611	28.3608	0.00	90.00	0.0	90.00	0.00	1341.8	0.000	114
-4.0	3441.337	-80.5611	28.3608	0.00	90.00	0.0	90.00	0.00	1341.8	0.000	114
-3.0	3441.337	-80.5611	28.3608	0.00	90.00	0.0	90.00	0.00	1341.8	0.000	114
-2.0	3441.337	-80.5611	28.3608	0.00	90.00	0.0	90.00	0.00	1341.8	0.000	114
-1.0	3441.337	-80.5611	28.3608	0.00	90.00	0.0	90.00	0.00	1341.8	0.000	114
RANGE ZERO AT 10 02 45 EST											
0.0	3441.337	-80.5611	28.3608	0.00	90.00	0.0	90.00	0.00	1341.8	0.000	114
FIRST MOTION											
0.17	3441.337	-80.5611	28.3608	0.00	90.00	0.0	90.00	-0.00	1341.8	0.000	114
LIFTOFF											
0.36	3441.337	-80.5611	28.3608	216.99	82.89	1.3	90.01	0.06	1341.7	0.000	114
1.0	3441.337	-80.5611	28.3608	217.74	83.92	5.9	90.02	0.25	1341.4	0.000	116
2.0	3441.339	-80.5611	28.3608	219.99	85.13	13.5	90.04	0.57	1341.1	0.000	126
3.0	3441.342	-80.5611	28.3608	223.56	85.97	21.5	90.05	0.92	1340.9	0.000	143
4.0	3441.346	-80.5611	28.3608	228.21	86.53	29.9	90.05	1.28	1340.8	0.001	169
5.0	3441.352	-80.5612	28.3608	233.45	86.88	38.7	90.05	1.65	1340.6	0.001	213
6.0	3441.359	-80.5612	28.3608	238.64	87.09	47.7	90.05	2.04	1340.6	0.001	246
7.0	3441.367	-80.5612	28.3608	243.30	87.21	56.9	90.05	2.43	1340.5	0.002	298
8.0	3441.377	-80.5612	28.3608	247.20	87.28	66.4	90.05	2.84	1340.5	0.002	359
9.0	3441.389	-80.5612	28.3608	250.32	87.32	76.1	90.05	3.25	1340.6	0.003	43[illegible]
10.0	3441.402	-80.5612	28.3608	252.78	87.36	86.0	90.05	3.68	1340.8	0.003	511
11.0	3441.417	-80.5612	28.3608	254.72	87.40	96.2	90.05	4.11	1341.0	0.004	622
12.0	3441.434	-80.5612	28.3608	256.30	87.46	106.6	90.05	4.55	1341.5	0.005	724
13.0	3441.452	-80.5612	28.3608	257.67	87.55	117.2	90.05	5.01	1342.0	0.006	816
14.0	3441.473	-80.5613	28.3608	258.94	87.65	128.1	90.04	5.47	1342.8	0.007	938
15.0	3441.494	-80.5613	28.3608	260.23	87.77	139.3	90.04	5.95	1343.7	0.007	1071
16.0	3441.518	-80.5613	28.3608	261.65	87.92	150.7	90.03	6.43	1344.9	0.008	1216
17.0	3441.544	-80.5613	28.3608	263.34	88.08	162.4	90.03	6.93	1346.3	0.009	1372
18.0	3441.572	-80.5613	28.3608	265.47	88.26	174.4	90.02	7.43	1347.9	0.010	1541
19.0	3441.602	-80.5613	28.3608	268.27	88.46	186.7	90.01	7.95	1349.8	0.011	1722
20.0	3441.633	-80.5613	28.3608	272.14	88.66	199.3	89.99	8.47	1352.0	0.012	1914

TABLE XVI
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
21.0	3441.667	-80.5614	28.3608	277.80	88.87	212.1	89.98	9.01	1354.5	0.012	2120
22.0	3441.703	-80.5614	28.3608	286.62	89.08	225.3	89.96	9.55	1357.3	0.013	2338
23.0	3441.741	-80.5614	28.3608	301.24	89.27	238.7	89.93	10.11	1360.4	0.013	2571
24.0	3441.782	-80.5614	28.3608	325.23	89.40	252.5	89.91	10.67	1364.[illegible]	0.013	2816
25.0	3441.824	-80.5614	28.3608	355.53	89.38	266.5	89.88	11.23	1367.9	0.014	3075
26.0	3441.869	-80.5614	28.3608	19.67	89.20	280.7	89.84	11.80	1372.3	0.013	3349
27.0	3441.917	-80.5614	28.3608	34.48	88.92	295.3	89.80	12.38	1377.2	0.013	3637
28.0	3441.967	-80.5614	28.3608	43.51	88.58	31[illegible].2	89.76	12.96	1382.5	0.012	3940
29.0	3442.019	-80.5613	28.3608	49.[illegible]9	88.20	325.2	89.72	13.54	1388.4	0.011	4257
30.0	3442.074	-80.5613	28.3608	53.26	87.79	340.7	89.67	14.13	1394.8	0.009	4590
31.0	3442.131	-80.5613	28.3609	56.14	87.35	356.5	89.61	14.72	1401.8	0.007	4938
32.0	3442.191	-80.5612	28.3609	58.34	86.91	372.4	89.56	15.30	1409.2	0.006	53[illegible]2
33.0	3442.253	-80.5612	28.3609	60.02	86.45	388.5	89.50	15.88	1417.1	0.005	5682
34.0	3442.318	-80.5611	28.3609	61.35	85.98	405.3	89.43	16.48	1425.7	0.008	6077
35.0	3442.386	-80.5610	28.3610	62.33	85.50	422.5	89.36	17.07	1434.8	0.012	6490
36.0	3442.457	-80.5609	28.3610	63.26	85.01	439.9	89.28	17.66	1444.6	0.017	692[illegible]
37.0	3442.531	-80.5608	28.3611	64.02	84.48	457.4	89.20	18.24	1455.0	0.023	7367
38.0	3442.607	-80.5607	28.3611	64.71	83.95	475.8	89.12	18.83	1466.2	0.031	7831
39.0	3442.686	-80.5605	28.3612	65.39	83.40	494.1	89.03	19.40	1478.0	0.040	8313
40.0	3442.769	-80.5603	28.3612	66.09	82.83	512.9	88.94	19.96	1490.6	0.050	8813
41.0	3442.854	-80.5601	28.3613	66.83	82.26	532.3	88.85	20.53	1504.0	0.061	9332
42.0	3442.942	-80.5599	28.3614	67.59	81.68	552.3	88.77	21.09	1518.3	0.073	9869
43.0	3443.034	-80.5597	28.3615	68.40	81.07	572.2	88.69	21.63	1533.3	0.087	10424
44.0	3443.128	-80.5594	28.3616	69.19	80.49	592.5	88.61	22.16	1548.8	0.102	10999
45.0	3443.226	-80.5591	28.3617	69.98	79.92	613.5	88.54	22.70	1565.1	0.119	11592
46.0	3443.327	-80.5588	28.3618	70.63	79.33	634.7	88.46	23.22	1582.1	0.137	12206
47.0	3443.431	-80.5584	28.3619	71.03	78.72	656.3	88.37	23.72	1599.8	0.158	12841
48.0	3443.539	-80.5580	28.3620	71.32	78.07	678.6	88.26	24.22	1618.6	0.18[illegible]	13495
49.0	3443.650	-80.5576	28.3621	71.53	77.43	701.3	88.14	24.70	1638.1	0.204	14169
50.0	3443.764	-80.5571	28.3622	71.66	76.80	724.3	88.01	25.17	1658.0	0.230	14864
51.0	3443.882	-80.5566	28.3624	71.72	76.17	747.8	87.88	25.63	1678.7	0.258	15580
52.0	3444.003	-80.5560	28.3625	71.72	75.54	771.9	87.73	26.08	1700.1	0.288	16318
53.0	3444.128	-80.5554	28.3627	71.72	74.91	796.3	87.58	26.52	1722.2	0.321	17076
54.0	3444.257	-80.5548	28.3629	71.72	74.27	821.1	87.43	26.93	1745.1	0.357	17856
55.0	3444.388	-80.5541	28.3631	71.78	73.62	846.5	87.28	27.33	1769.0	0.395	18657
56.0	3444.524	-80.5534	28.3633	71.89	72.94	872.6	87.13	27.71	1794.0	0.435	19481
57.0	3444.663	-80.5526	28.3635	71.95	72.25	899.1	86.97	28.07	1820.0	0.479	20327
58.0	3444.806	-80.5518	28.3637	71.89	71.57	925.9	86.79	28.41	1846.2	0.525	21195
59.0	3444.952	-80.5509	28.3640	71.85	70.91	952.9	86.61	28.74	1872.9	0.575	22[illegible]86
60.0	3445.102	-80.5499	28.3642	71.87	70.25	98[illegible].3	86.44	29.[illegible]5	1900.2	0.628	22997
61.0	3445.256	-80.5489	28.3645	71.90	69.59	1007.7	86.28	29.33	1928.0	0.684	23932
62.0	3445.413	-80.5478	28.3648	71.91	68.94	1035.0	86.11	29.59	1955.9	0.743	24888
MACH ONE											
62.15	3445.438	-80.5477	28.3649	71.92	68.85	1039.1	86.08	29.63	1960.1	0.753	25[illegible]34

TABLE XVI
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
63.0	3445.574	-80.5467	28.3651	71.97	68.31	1062.3	85.95	29.84	1983.9	0.806	25865
64.0	3445.738	-80.5455	28.3655	72.07	67.67	1089.7	85.80	30.06	2012.6	0.872	26863
65.0	3445.906	-80.5442	28.3658	72.17	67.02	1117.6	85.66	30.26	2042.1	0.942	27882
66.0	3446.077	-80.5429	28.3662	72.22	66.36	1146.2	85.50	30.44	2072.4	1.016	28923
67.0	3446.252	-80.5415	28.3666	72.23	65.69	1175.5	85.32	30.61	2103.7	1.093	29984
68.0	3446.430	-80.5400	28.3670	72.20	65.01	1205.6	85.13	30.77	2135.9	1.175	31067
69.0	3446.612	-80.5385	28.3674	72.18	64.33	1236.6	84.95	30.92	2169.1	1.260	32172
70.0	3446.797	-80.5369	28.3679	72.15	63.66	1268.7	84.76	31.06	2203.5	1.351	33299
71.0	3446.986	-80.5352	28.3683	72.10	62.96	1301.9	84.55	31.18	2239.4	1.445	34447
72.0	3447.179	-80.5334	28.3688	72.03	62.26	1336.0	84.34	31.30	2276.3	1.545	35622
73.0	3447.376	-80.5315	28.3694	71.96	61.59	1370.5	84.13	31.40	2313.3	1.650	36815
74.0	3447.576	-80.5295	28.3699	71.93	60.94	1405.1	83.93	31.50	2350.5	1.759	38033
75.0	3447.780	-80.5274	28.3705	71.88	60.30	1441.0	83.74	31.60	2389.0	1.874	39274
	MAX Q										
75.5	3447.884	-80.5264	28.3708	71.89	59.98	1459.4	83.65	31.64	2408.8	1.933	39903
76.0	3447.988	-80.5253	28.3711	71.91	59.66	1478.2	83.56	31.68	2429.0	1.994	40538
77.0	3448.200	-80.5230	28.3718	71.96	59.05	1516.5	83.41	31.77	2469.9	2.119	41828
78.0	3448.416	-80.5207	28.3724	72.03	58.46	1556.0	83.24	31.87	2512.0	2.250	43142
79.0	3448.637	-80.5182	28.3731	72.10	57.88	1596.2	83.09	31.95	2554.9	2.386	44482
80.0	3448.862	-80.5156	28.3738	72.17	57.29	1637.1	82.94	32.01	2598.5	2.528	45848
81.0	3449.090	-80.5130	28.3746	72.20	56.71	1678.9	82.77	32.07	2643.1	2.677	47239
82.0	3449.324	-80.5102	28.3754	72.22	56.13	1722.0	82.61	32.12	2689.1	2.831	48658
83.0	3449.561	-80.5073	28.3762	72.25	55.56	1765.8	82.44	32.16	2735.9	2.992	50102
84.0	3449.803	-80.5043	28.3770	72.24	55.00	1811.0	82.27	32.20	2783.8	3.159	51573
85.0	3450.050	-80.5011	28.3779	72.21	54.45	1856.9	82.09	32.24	2832.3	3.332	53072
86.0	3450.301	-80.4979	28.3788	72.15	53.91	1903.9	81.89	32.26	2882.0	3.513	54598
87.0	3450.556	-80.4945	28.3797	72.10	53.36	1951.8	81.70	32.27	2932.7	3.701	56152
88.0	3450.816	-80.4910	28.3807	72.07	52.80	2000.9	81.52	32.27	2984.9	3.895	57733
89.0	3451.081	-80.4873	28.3817	72.09	52.27	2050.7	81.36	32.27	3037.8	4.097	59343
90.0	3451.350	-80.4836	28.3828	72.10	51.74	2101.8	81.20	32.26	3091.9	4.307	60981
91.0	3451.625	-80.4796	28.3839	72.08	51.22	2154.3	81.03	32.25	3147.3	4.524	62647
92.0	3451.903	-80.4756	28.3850	72.05	50.71	2207.6	80.85	32.23	3203.5	4.749	64343
93.0	3452.187	-80.4714	28.3862	72.03	50.20	2261.7	80.68	32.20	3260.7	4.983	66068
94.0	3452.476	-80.4670	28.3875	72.01	49.69	2317.3	80.52	32.17	3319.4	5.224	67822
95.0	3452.769	-80.4625	28.3887	72.00	49.20	2373.8	80.36	32.13	3378.9	5.474	69606
96.0	3453.067	-80.4579	28.3901	71.99	48.72	2431.4	80.20	32.09	3439.5	5.733	71420
97.0	3453.371	-80.4531	28.3914	71.99	48.23	2490.3	80.05	32.03	3501.6	6.000	73264
98.0	3453.679	-80.4481	28.3928	71.99	47.74	2549.9	79.90	31.97	3564.3	6.276	75138
99.0	3453.992	-80.4429	28.3943	71.99	47.27	2610.4	79.76	31.91	3628.0	6.562	77042
100.0	3454.310	-80.4376	28.3958	72.00	46.80	2672.7	79.62	31.84	3693.5	6.857	78977
101.0	3454.634	-80.4321	28.3973	72.00	46.34	2736.2	79.48	31.77	3760.0	7.162	80944

TABLE XVI
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
102.0	3454.962	-80.4265	28.3989	72.00	45.90	2800.1	79.34	31.70	3826.9	7.476	82941
103.0	3455.296	-80.4206	28.4006	72.01	45.46	2865.2	79.21	31.62	3895.0	7.800	84970
104.0	3455.634	-80.4146	28.4023	72.01	45.33	2931.5	79.08	31.54	3964.3	8.134	87030
105.0	3455.978	-80.4084	28.4041	72.01	44.60	2998.8	78.95	31.46	4034.6	8.479	89122
106.0	3456.328	-80.4020	28.4059	72.01	44.18	3067.5	78.83	31.37	4106.3	8.834	91246
107.0	3456.682	-80.3954	28.4077	72.02	43.76	3137.4	78.71	31.28	4179.1	9.199	93433
108.0	3457.042	-80.3886	28.4097	72.03	43.36	3208.4	78.59	31.19	4253.0	9.576	95592
109.0	3457.407	-80.3817	28.4116	72.04	42.96	3280.6	78.48	31.10	4328.1	9.963	97813
110.0	3457.778	-80.3745	28.4137	72.05	42.57	3354.0	78.36	31.01	4404.3	10.362	100068
111.0	3458.155	-80.3671	28.4157	72.05	42.18	3428.7	78.25	30.91	4481.8	10.772	102357
112.0	3458.536	-80.3595	28.4179	72.06	41.80	3504.5	78.14	30.81	4560.4	11.193	104679
113.0	3458.924	-80.3517	28.4201	72.07	41.43	3581.5	78.04	30.71	4640.2	11.627	107035
114.0	3459.317	-80.3436	28.4224	72.07	41.05	3659.6	77.93	30.60	4721.2	12.072	109424
115.0	3459.715	-80.3354	28.4247	72.08	40.67	3739.5	77.83	30.49	4803.9	12.533	111848
116.0	3460.119	-80.3269	28.4271	72.08	40.31	3820.4	77.73	30.37	4887.6	13.000	114305
117.0	3460.529	-80.3182	28.4295	72.09	39.95	3902.1	77.63	30.26	4972.0	13.483	116797
118.0	3460.944	-80.3093	28.4321	72.10	39.59	3985.0	77.54	30.14	5057.6	13.979	119322
119.0	3461.365	-80.3001	28.4346	72.11	39.24	4070.1	77.44	30.02	5145.5	14.488	121883
120.0	3461.792	-80.2907	28.4373	72.12	38.89	4156.3	77.35	29.90	5234.5	15.010	124479
121.0	3462.224	-80.2810	28.4400	72.13	38.54	4243.6	77.27	29.77	5324.4	15.545	127109
122.0	3462.662	-80.2711	28.4428	72.13	38.19	4332.6	77.18	29.64	5416.2	16.095	129774
123.0	3463.106	-80.2609	28.4457	72.14	37.85	4422.8	77.09	29.51	5509.1	16.659	132473
124.0	3463.556	-80.2505	28.4486	72.15	37.51	4513.9	77.01	29.38	5603.0	17.236	135208
125.0	3464.011	-80.2398	28.4516	72.16	37.18	4607.0	76.93	29.24	5698.8	17.829	137978
126.0	3464.472	-80.2289	28.4547	72.17	36.85	4701.7	76.85	29.11	5796.2	18.436	140784
127.0	3464.939	-80.2177	28.4578	72.18	36.52	4797.5	76.77	28.97	5894.5	19.058	143625
128.0	3465.412	-80.2062	28.4611	72.19	36.20	4894.9	76.70	28.83	5994.6	19.696	146502
129.0	3465.891	-80.1944	28.4644	72.19	35.88	4994.1	76.62	28.69	6096.3	20.349	149415
130.0	3466.376	-80.1823	28.4677	72.20	35.56	5094.5	76.55	28.55	6199.3	21.017	152363
131.0	3466.866	-80.1700	28.4712	72.21	35.25	5196.8	76.48	28.41	6304.1	21.702	155349
132.0	3467.363	-80.1573	28.4748	72.22	34.95	5300.7	76.41	28.27	6410.6	22.403	158372
133.0	3467.866	-80.1444	28.4784	72.22	34.64	5406.1	76.34	28.13	6518.5	23.120	161431
134.0	3468.375	-80.1311	28.4821	72.23	34.34	5513.0	76.27	27.99	6627.9	23.855	164527
135.0	3468.890	-80.1175	28.4859	72.24	34.05	5621.7	76.21	27.84	6739.0	24.606	167660
136.0	3469.411	-80.1037	28.4898	72.25	33.75	5732.6	76.14	27.70	6852.3	25.375	170831
137.0	3469.939	-80.0895	28.4937	72.26	33.47	5845.1	76.08	27.56	6967.2	26.161	174040
138.0	3470.473	-80.0750	28.4978	72.27	33.20	5959.2	76.02	27.43	7083.5	26.965	177288
139.0	3471.013	-80.0601	28.5019	72.28	32.93	6074.9	75.96	27.30	7201.3	27.788	180575
140.0	3471.560	-80.0449	28.5062	72.29	32.68	6192.8	75.91	27.18	7321.3	28.628	183903
IECO											
140.65	3471.919	-80.0349	28.5090	72.29	32.52	6264.7	75.87	27.09	7394.5	29.184	186088

TABLE XVI
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
141.0	3472.113	-80.0294	28.5105	72.30	32.48	6301.8	75.86	27.08	7430.9	29.487	187273
142.0	3472.671	-80.0137	28.5149	72.31	32.22	6359.6	75.83	26.91	7492.2	30.358	190662
143.0	3473.229	-79.9978	28.5193	72.32	32.00	6412.6	75.81	26.76	7547.3	31.240	194061
144.0	3473.789	-79.9817	28.5238	72.33	31.78	6464.7	75.79	26.61	7601.5	32.131	197467
OECO											
144.32	3473.968	-79.9765	28.5252	72.33	31.69	6479.1	75.78	26.55	7616.8	32.418	198558
145.0	3474.349	-79.9654	28.5283	72.34	31.56	6481.1	75.79	26.43	7620.2	33.030	200876
S-IB/S-IVB SEPARATION SIGNAL											
145.59	3474.678	-79.9558	28.5310	72.35	31.44	6472.1	75.79	26.32	7612.6	33.561	202875
150.0	3477.085	-79.8842	28.5509	72.39	30.48	6417.7	75.83	25.47	7568.8	37.524	217518
155.0	3479.725	-79.8023	28.5736	72.43	29.43	6443.6	75.82	24.60	7605.4	42.056	233585
160.0	3482.297	-79.7191	28.5966	72.47	28.40	6486.9	75.80	23.76	7658.7	46.657	249236
165.0	3484.803	-79.6345	28.6199	72.51	27.39	6534.8	75.79	22.93	7716.2	51.333	264490
GUIDANCE INITIATION											
169.76	3487.130	-79.5526	28.6424	72.54	26.46	6586.6	75.78	22.17	7776.6	55.854	278652
170.0	3487.246	-79.5484	28.6435	72.54	26.41	6589.4	75.78	22.13	7779.8	56.[illegible]84	279358
175.0	3489.628	-79.4610	28.6675	72.59	25.46	6648.1	75.77	21.36	7847.1	60.914	293851
180.0	3491.952	-79.3721	28.6918	72.69	24.62	6708.7	75.81	20.68	7915.4	65.821	308003
185.0	3494.229	-79.2818	28.7163	72.79	23.85	6771.0	75.86	20.05	7984.6	70.801	321860
190.0	3496.458	-79.1901	28.7411	72.88	23.09	6834.9	75.90	19.44	8055.0	75.855	335432
195.0	3498.641	-79.0969	28.7660	72.98	22.35	6902.8	75.95	18.83	8129.4	80.983	348721
200.0	3500.777	-79.0023	28.7912	73.09	21.61	6973.7	76.00	18.24	8206.4	86.187	361728
205.0	3502.867	-78.9062	28.8166	73.19	20.88	7047.5	76.05	17.64	8286.1	91.469	374453
210.0	3504.911	-78.8086	28.8423	73.30	20.17	7124.6	76.10	17.07	8368.8	96.831	386899
215.0	3506.910	-78.7095	28.8682	73.41	19.47	7204.7	76.16	16.50	8454.3	102.273	399069
220.0	3508.863	-78.6087	28.8943	73.52	18.78	7288.1	76.22	15.94	8542.9	107.799	410965
225.0	3510.771	-78.5064	28.9206	73.64	18.11	7374.1	76.28	15.39	8633.9	113.408	422587
230.0	3512.635	-78.4023	28.9471	73.76	17.45	7463.[illegible]	76.35	14.85	8727.5	119.103	433939
235.0	3514.454	-78.2966	28.9739	73.88	16.80	7555.1	76.42	14.33	8824.1	124.885	445021
240.0	3516.230	-78.1892	29.0008	74.00	16.18	7650.5	76.49	13.82	8923.8	130.756	455837
245.0	3517.962	-78.0801	29.0280	74.13	15.57	7748.9	76.56	13.32	9026.3	136.717	466393
250.0	3519.652	-77.9691	29.0554	74.25	14.97	7849.9	76.63	12.83	9131.1	142.771	47669[illegible]
255.0	3521.300	-77.8563	29.0830	74.37	14.39	7953.7	76.71	12.35	9238.7	148.917	486728
260.0	3522.905	-77.7417	29.1108	74.50	13.82	8060.3	76.78	11.88	9348.7	155.159	496512
265.0	3524.469	-77.6253	29.1388	74.63	13.27	8170.4	76.86	11.43	9462.1	161.498	506044

TABLE XVI
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
270.0	3525.993	-77.5068	29.1671	74.75	12.74	8283.3	76.94	11.00	9578.2	167.935	515331
275.0	3527.476	-77.3865	29.1955	74.88	12.23	8399.6	77.02	10.57	9697.4	174.473	524376
280.0	3528.921	-77.2641	29.2242	75.01	11.73	8518.7	77.10	10.16	9819.2	181.112	533183
285.0	3530.326	-77.1398	29.2530	75.14	11.24	8640.7	77.18	9.75	9943.9	187.856	541751
290.0	3531.692	-77.0133	29.2821	75.27	10.76	8765.6	77.27	9.36	10071.3	194.706	550085
295.0	3533.021	-76.8848	29.3114	75.40	10.31	8893.5	77.35	8.97	10201.6	201.663	558186
300.0	3534.311	-76.7541	29.3409	75.53	9.86	9024.6	77.44	8.60	10334.9	208.729	56606[illegible]
305.0	3535.566	-76.6213	29.3705	75.66	9.44	9159.3	77.53	8.25	1[illegible]471.6	215.907	573710
310.0	3536.784	-76.4862	29.4004	75.79	9.03	9297.6	77.62	7.90	10612.0	223.200	581144
315.0	3537.966	-76.3489	29.4305	75.92	8.63	9437.9	77.71	7.57	10754.1	230.608	588361
320.0	3539.114	-76.2092	29.4608	76.05	8.24	9582.3	77.80	7.24	10900.3	238.134	595368
325.0	3540.228	-76.0672	29.4913	76.18	7.87	9729.4	77.89	6.92	11049.[illegible]	245.780	602165
330.0	3541.307	-75.9228	29.5220	76.32	7.51	9879.8	77.98	6.62	11201.0	253.548	608755
335.0	3542.353	-75.7759	29.5529	76.45	7.16	10033.2	78.07	6.33	11355.9	261.441	615143
340.0	3543.366	-75.6266	29.5840	76.58	6.83	10190.2	78.17	6.04	11514.2	269.461	621334
345.0	3544.348	-75.4747	29.6153	76.71	6.51	1035[illegible].4	78.26	5.77	11675.7	277.609	627329
350.0	3545.298	-75.3203	29.6468	76.85	6.20	10514.6	78.36	5.51	11841.1	285.889	633137
355.0	3546.218	-75.1632	29.6785	76.98	5.91	10682.5	78.46	5.25	12010.1	294.303	638759
360.0	3547.108	-75.0034	29.7104	77.12	5.62	10854.4	78.55	5.01	12183.1	302.855	6442[illegible]1
365.0	3547.969	-74.8409	29.7424	77.25	5.35	11029.5	78.65	4.77	12359.2	311.546	649466
370.0	3548.801	-74.6755	29.7747	77.39	5.09	11208.0	78.75	4.55	12538.6	320.380	654556
375.0	3549.605	-74.5073	29.8071	77.53	4.84	11390.1	78.86	4.33	12721.7	329.356	659475
380.0	3550.381	-74.3362	29.8397	77.66	4.59	11576.0	78.96	4.12	12908.5	338.483	664229
385.0	3551.131	-74.1621	29.8725	77.80	4.37	11766.3	79. 6	3.92	13099.4	347.759	668821
390.0	3551.856	-73.9850	29.9055	77.94	4.15	11959.9	79.17	3.73	13293.9	357.189	673257
395.0	3552.555	-73.8048	29.9386	78.08	3.94	12158.3	79.28	3.55	13492.9	366.775	677539
400.0	3553.229	-73.6215	29.9719	78.22	3.74	12359.0	79.39	3.37	13694.3	376.52[illegible]	681675
405.0	3553.880	-73.4349	30.0053	78.36	3.55	12565.2	79.50	3.20	13901.2	386.427	685665
410.0	3554.509	-73.2451	30.0390	78.51	3.37	12775.7	79.61	3.05	14112.2	396.500	689518
415.0	3555.115	-73.0519	30.0727	78.65	3.20	12990.9	79.72	2.90	14328.0	406.742	693239
420.0	3555.701	-72.8552	30.1066	78.79	3.03	13210.9	79.84	2.75	14548.5	417.157	696834
425.0	3556.266	-72.6551	30.1406	78.94	2.88	13436.0	79.95	2.62	14774.0	427.748	700306
430.0	3556.813	-72.4514	30.1748	79.09	2.74	13664.2	80.07	2.49	15002.7	438.520	703662
435.0	3557.340	-72.2441	30.2091	79.24	2.60	13898.4	80.19	2.37	15237.3	449.475	706904
440.0	3557.850	-72.0330	30.2435	79.39	2.47	14137.6	80.32	2.25	15476.9	46[illegible].617	710037
445.0	3558.342	-71.8181	30.2780	79.54	2.35	14382.1	80.44	2.15	15721.8	471.952	713067
450.0	3558.819	-71.5993	30.3126	79.69	2.23	14631.8	80.57	2.04	15971.9	483.482	716001
455.0	3559.281	-71.3765	30.3472	79.85	2.13	14887.2	80.69	1.95	16227.6	495.212	718844
460.0	3559.727	-71.1498	30.3820	80.00	2.00	15117.7	80.82	1.84	16458.6	5[illegible]7.139	721590
465.0	3560.147	-70.9197	30.4167	80.16	1.85	15325.2	80.96	1.70	16666.4	519.236	724184
470.0	3560.542	-70.6863	30.4513	80.31	1.71	15535.0	81.09	1.58	16876.5	531.497	726620
475.0	3560.911	-70.4494	30.4858	80.47	1.58	15748.5	81.23	1.45	17090.3	543.927	728900
480.0	3561.255	-70.2091	30.5202	80.63	1.45	15966.3	81.37	1.33	17308.4	556.527	731026
485.0	3561.575	-69.9653	30.5545	80.79	1.32	16187.6	81.50	1.22	17530.0	569.3[illegible]1	733007

TABLE XVI
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
490.0	3561.871	-69.7179	30.5887	80.95	1.21	16414.0	81.64	1.12	17756.6	582.253	734844
495.0	3562.146	-69.4669	30.6228	81.11	1.10	16644.9	81.78	1.02	17987.7	595.386	736546
500.0	3562.399	-69.2121	30.6568	81.28	1.00	16880.4	81.92	0.93	18223.4	608.703	738122
505.0	3562.632	-68.9535	30.6905	81.44	0.91	17120.4	82.07	0.84	18463.6	622.209	739578
510.0	3562.847	-68.6910	30.7242	81.60	0.82	17365.0	82.21	0.76	18708.4	635.907	740916
515.0	3563.042	-68.4246	30.7576	81.77	0.73	17615.7	82.36	0.68	18959.1	649.801	742137
520.0	3563.218	-68.1541	30.7908	81.94	0.65	17871.0	82.51	0.60	19214.6	663.895	743243
525.0	3563.375	-67.8794	30.8239	82.11	0.57	18132.3	82.66	0.53	19476.1	678.195	744235
530.0	3563.514	-67.6006	30.8567	82.28	0.49	18399.3	82.81	0.46	19743.2	692.704	745115
535.0	3563.635	-67.3174	30.8892	82.46	0.42	18671.8	82.97	0.39	20015.7	707.426	745887
540.0	3563.739	-67.0298	30.9215	82.63	0.35	18950.3	83.12	0.33	20294.4	722.368	746553
545.0	3563.827	-66.7377	30.9535	82.81	0.29	19235.3	83.28	0.27	20579.5	737.532	747120
550.0	3563.899	-66.4409	30.9852	82.99	0.23	19526.8	83.45	0.22	20871.0	752.926	747592
555.0	3563.956	-66.1394	31.0165	83.18	0.18	19825.2	83.61	0.16	21169.5	768.553	747973
560.0	3564.000	-65.8331	31.0475	83.36	0.13	20130.2	83.78	0.12	21474.5	784.420	748270
565.0	3564.030	-65.5219	31.0780	83.56	0.08	20442.3	83.95	0.08	21786.7	800.532	748489
570.0	3564.050	-65.2055	31.1081	83.75	0.05	20762.4	84.13	0.04	22106.8	816.894	748640
575.0	3564.059	-64.8840	31.1378	83.94	0.02	21090.0	84.31	0.02	22434.4	833.514	748729
580.0	3564.060	-64.5572	31.1670	84.14	-0.01	21424.9	84.49	-0.01	22769.4	850.397	748768
585.0	3564.055	-64.2249	31.1957	84.34	-0.03	21769.8	84.67	-0.02	23114.3	867.550	748766
590.0	3564.044	-63.8871	31.2238	84.54	-0.04	22122.7	84.86	-0.04	23467.2	884.980	748732
595.0	3564.031	-63.5435	31.2513	84.75	-0.04	22484.6	85.05	-0.04	23829.2	902.694	748680
600.0	3564.014	-63.1940	31.2782	84.96	-0.06	22858.2	85.24	-0.06	24202.8	920.700	748610
605.0	3563.993	-62.8385	31.3044	85.17	-0.06	23239.6	85.43	-0.06	24584.2	939.005	748512
610.0	3563.973	-62.4768	31.3300	85.38	-0.05	23633.1	85.63	-0.05	24977.7	957.618	748418
615.0	3563.961	-62.1088	31.3547	85.60	-0.02	24037.9	85.83	-0.02	25382.6	976.549	748371
S-IVB GUIDANCE CUTOFF											
616.76	3563.960	-61.9777	31.3633	85.68	-0.00	24181.2	85.91	-0.00	25525.9	983.290	748374
620.0	3563.961	-61.7353	31.3787	85.82	0.00	24208.6	86.04	0.00	25553.3	995.747	748394
625.0	3563.962	-61.3611	31.4014	86.04	0.01	24208.6	86.25	0.00	25553.3	1014.975	748428
ORBIT INSERTION											
626.76	3563.963	-61.2293	31.4091	86.11	0.01	24208.5	86.32	0.01	25553.2	1021.743	748439
650.0	3563.978	-59.4873	31.4969	87.13	0.01	24208.9	87.28	0.01	25553.7	1111.116	748627
700.0	3564.001	-55.7305	31.5935	89.33	0.03	24211.4	89.36	0.03	25556.3	1303.409	748872
750.0	3564.129	-51.9705	31.5697	91.53	0.05	24210.4	91.45	0.04	25555.4	1495.711	749628
800.0	3564.314	-48.2181	31.4231	93.72	0.06	24209.3	93.52	0.06	25554.2	1687.996	751588
850.0	3564.553	-44.4837	31.1550	95.89	0.08	24207.9	95.57	0.07	25552.7	1880.265	751747
900.0	3564.845	-40.7770	30.7673	98.02	0.09	24206.3	97.59	0.09	25550.8	2072.506	753105

TABLE XVI
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
950.0	3565.190	-37.1071	30.2629	100.11	0.11	24204.5	99.57	0.10	25548.7	2264.718	754661
1000.0	3565.587	-33.4821	29.6453	102.14	0.12	24202.4	101.49	0.11	25546.3	2456.895	756414
1050.0	3566.033	-29.9088	28.9188	104.10	0.14	24200.0	103.34	0.13	25543.5	2649.034	758365
1100.0	3566.527	-26.3928	28.0882	105.99	0.15	24197.5	105.13	0.14	25540.5	2841.128	760512
1150.0	3567.068	-22.9384	27.1586	107.79	0.16	24194.7	1[illegible]6.83	0.15	25537.2	3033.174	762857
1200.0	3567.652	-19.5487	26.1356	109.51	0.17	24191.6	108.45	0.17	25533.6	3225.166	765399
1250.0	3568.278	-16.2253	25.0251	111.14	0.19	24188.3	109.98	0.18	25529.7	3417.099	768139
1300.0	3568.943	-12.9688	23.8328	112.67	0.20	24184.8	111.42	0.19	25525.6	3608.969	771077
1350.0	3569.644	-9.7787	22.5648	114.10	0.21	24181.0	112.76	0.20	25521.2	3800.769	774212
1400.0	3570.380	-6.6536	21.2270	115.43	0.22	24177.0	114.01	0.21	25516.6	3992.495	777542
1450.0	3571.146	-3.5912	19.8253	116.66	0.22	24172.8	115.16	0.21	25511.8	4184.141	781067
1500.0	3571.940	-0.5887	18.3656	117.79	0.23	24168.3	116.21	0.22	25506.7	4375.702	784784
1550.0	3572.760	2.3577	16.8536	118.81	0.24	24163.6	117.17	0.23	25501.5	4567.174	788691
1600.0	3573.601	5.2517	15.2946	119.73	0.25	24158.6	118.03	0.23	25496.0	4758.549	792781
1650.0	3574.461	8.0979	13.6942	120.56	0.25	24153.4	118.80	0.24	25490.4	4949.824	797051
1700.0	3575.336	10.9007	12.0575	121.28	0.25	24148.0	119.47	0.24	25484.7	5140.994	801495
1750.0	3576.224	13.6653	10.3896	121.91	0.26	24142.4	120. 5	0.24	25478.8	5332.[illegible]53	8[illegible]6104
1800.0	3577.120	16.3965	8.6953	122.43	0.26	24136.6	120.54	0.25	25472.8	5522.997	810869
1850.0	3578.022	19.0996	6.9795	122.86	0.26	24130.6	120.94	0.25	25466.7	5713.823	815779
1900.0	3578.927	21.7799	5.2468	123.20	0.26	24124.5	121.25	0.25	25460.5	5904.525	820824
1950.0	3579.830	24.4426	3.5018	123.43	0.26	24118.2	121.47	0.25	25454.3	6095.1[illegible]2	825988
2000.0	3580.730	27.0932	1.7488	123.58	0.26	24111.7	121.60	0.25	25448.0	6285.548	831258
2050.0	3581.623	29.7370	-0.0076	123.63	0.26	24105.1	121.65	0.24	25441.7	6475.863	836617
2100.0	3582.506	32.3794	-1.7632	123.58	0.25	24098.5	121.60	0.24	25435.4	6666.043	842047
2150.0	3583.375	35.0258	-3.5135	123.44	0.25	24091.7	121.47	0.24	25429.1	6856.087	847528
2200.0	3584.229	37.6816	-5.2542	123.20	0.24	24084.9	121.25	0.23	25422.9	7045.993	853041
2250.0	3585.064	40.3519	-6.9809	122.87	0.24	24078.1	120.94	0.23	25416.8	7235.761	858564
2300.0	3585.877	43.0421	-8.6892	122.45	0.23	24071.3	120.55	0.22	25410.7	7425.390	864074
2350.0	3586.666	45.7574	-10.3746	121.92	0.22	24064.5	120. 6	0.21	25404.7	7614.878	869547
2400.0	3587.429	48.5029	-12.0324	121.31	0.22	24057.8	119.48	0.21	25398.9	7804.227	874959
2450.0	3588.163	51.2834	-13.6580	120.59	0.21	24051.2	118.82	0.20	25393.2	7993.435	880286
2500.0	3588.866	54.1037	-15.2467	119.78	0.20	24044.8	118.[illegible]6	0.19	25387.8	8182.501	8855[illegible]
2550.0	3589.535	56.9684	-16.7933	118.87	0.19	24038.5	117.21	0.18	25382.5	8371.423	890577
2600.0	3590.169	59.8817	-18.2930	117.86	0.18	24032.3	116.26	0.17	25377.4	8560.198	895492
2650.0	3590.767	62.8474	-19.7404	116.75	0.17	24026.5	115.23	0.16	25372.6	8748.819	900218
2700.0	3591.325	65.8691	-21.1303	115.54	0.16	24020.8	114.10	0.15	25368.1	8937.275	90473[illegible]
2750.0	3591.844	68.9495	-22.4573	114.23	0.14	24015.5	112.87	0.14	25363.8	9125.548	909004
2800.0	3592.320	72.0909	-23.7158	112.83	0.13	24010.5	111.55	0.12	25359.8	9313.606	913016
2850.0	3592.754	75.2948	-24.9003	111.33	0.12	24005.8	110.14	0.11	25356.2	9501.396	916742
2900.0	3593.143	78.5618	-26.0053	109.74	0.11	24001.5	108.65	0.10	25352.9	9688.825	920162
2950.0	3593.487	81.8915	-27.0253	108.05	0.09	23997.7	107. 6	0.09	25349.9	9875.719	923255
3000.0	3593.785	85.2826	-27.9549	106.29	0.08	23994.2	105.39	0.08	25347.3	10061.718	926001
3050.0	3594.037	88.7323	-28.7889	104.44	0.07	23991.2	103.65	0.06	25345.1	10245.985	928385
3100.0	3594.241	92.2370	-29.5225	102.52	0.05	23988.7	101.84	0.05	25343.2	1[illegible]426.[illegible]72	93[illegible]392

TABLE XVI
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
3150.0	3594.397	95.7917	-30.1511	100.53	0.04	23986.7	99.96	0.04	25341.8	10591.473	932007
3200.0	3594.505	99.3901	-30.6709	98.48	0.02	23985.1	98.03	0.02	25340.7	10671.826	933221
3250.0	3594.565	103.0251	-31.0783	96.39	0.01	23984.1	96.[illegible]5	0.01	25340.1	10562.264	934024
3300.0	3594.576	106.6884	-31.3706	94.27	-0.00	23983.6	94.[illegible]4	-0.00	25339.8	10391.922	934409
3350.0	3594.539	110.3710	-31.5457	92.11	-0.02	23983.7	92.00	-0.02	25340.0	10210.529	934375
3400.0	3594.453	114.0634	-31.6024	89.95	-0.03	23984.2	89.95	-0.03	25340.6	10025.732	933918
3450.0	3594.320	117.7558	-31.5402	87.79	-0.05	23985.3	87.90	-0.04	25341.6	9839.483	933040
3500.0	3594.139	121.4385	-31.3596	85.64	-0.06	23987.0	85.87	-0.06	25343.0	9652.487	931744
3550.0	3593.912	125.1018	-31.0619	83.51	-0.07	23989.1	83.86	-0.07	25344.8	9465.055	930037
3600.0	3593.638	128.7369	-30.6490	81.42	-0.09	23991.7	81.88	-0.08	25346.9	9277.342	927926
3650.0	3593.318	132.3355	-30.1237	79.38	-0.10	23994.9	79.95	-0.09	25349.5	9089.433	925424
3700.0	3592.955	135.8903	-29.4895	77.39	-0.11	23998.5	78.07	-0.11	25352.5	8901.374	922542
3750.0	3592.548	139.3953	-28.7504	75.47	-0.12	24002.5	76.26	-0.12	25355.8	8713.193	919296
3800.0	3592.098	142.8455	-27.9108	73.62	-0.14	24007.0	74.52	-0.13	25359.4	8524.907	915705
3850.0	3591.608	146.2371	-26.9756	71.86	-0.15	24011.9	72.86	-0.14	25363.4	8336.523	911785
3900.0	3591.078	149.5675	-25.9500	70.18	-0.16	24017.2	71.27	-0.15	25367.7	8148.046	907561
3950.0	3590.510	152.8353	-24.8394	68.59	-0.17	24022.9	69.78	-0.16	25372.3	7959.476	903052
4000.0	3589.906	156.0403	-23.6492	67.09	-0.18	24028.8	68.37	-0.17	25377.2	7770.813	898285
4050.0	3589.267	159.1829	-22.3850	65.69	-0.19	24035.1	67.06	-0.18	25382.3	7582.054	893285
4100.0	3588.595	162.2648	-21.0524	64.39	-0.20	24041.6	65.84	-0.19	25387.7	7393.198	888077
4150.0	3587.893	165.2881	-19.6568	63.19	-0.21	24048.3	64.71	-0.20	25393.3	7204.240	882690
4200.0	3587.161	168.2558	-18.2037	62.08	-0.22	24055.2	63.68	-0.20	25399.1	7015.178	877150
4250.0	3586.404	171.1713	-16.6985	61.08	-0.22	24062.2	62.74	-0.21	25405.1	6826.009	871487
4300.0	3585.622	174.0385	-15.1463	60.17	-0.23	24069.4	61.89	-0.22	25411.2	6636.731	865728
4350.0	3584.818	176.8616	-13.5522	59.36	-0.24	24076.7	61.14	-0.22	25417.4	6447.340	859902
4400.0	3583.995	179.6452	-11.9212	58.65	-0.24	24083.9	60.47	-0.23	25423.7	6257.836	854037
4450.0	3583.155	-177.6059	-10.2581	58.04	-0.24	24091.2	59.90	-0.23	25430.1	6068.216	848160
4500.0	3582.300	-174.8868	-8.5676	57.52	-0.25	24098.5	59.42	-0.24	25436.5	5878.482	842299
4550.0	3581.435	-172.1924	-6.8544	57.10	-0.25	24105.7	59.03	-0.24	25443.0	5688.632	836478
4600.0	3580.560	-169.5175	-5.1230	56.78	-0.25	24112.8	58.73	-0.24	25449.4	5498.668	830723
4650.0	3579.680	-166.8568	-3.3778	56.55	-0.25	24119.8	58.52	-0.24	25455.8	5308.591	825058
4700.0	3578.797	-164.2051	-1.6234	56.42	-0.25	24126.6	58.39	-0.24	25462.2	5118.403	819505
4750.0	3577.914	-161.5569	0.1360	56.38	-0.25	24133.3	58.35	-0.24	25468.5	4928.108	814084
4800.0	3577.035	-158.9069	1.8960	56.44	-0.25	24139.8	58.41	-0.24	25474.7	4737.709	808814
4850.0	3576.161	-156.2497	3.6520	56.59	-0.25	24146.0	58.54	-0.24	25480.8	4547.210	803715
4900.0	3575.296	-153.5799	5.3997	56.83	-0.25	24152.0	58.77	-0.23	25486.8	4356.617	798801
4950.0	3574.444	-150.8920	7.1346	57.18	-0.24	24157.8	59.09	-0.23	25492.6	4165.935	794085
5000.0	3573.607	-148.1809	8.8520	57.61	-0.24	24163.3	59.50	-0.23	25498.2	3975.172	789580
5050.0	3572.788	-145.4412	10.5473	58.15	-0.23	24168.5	60.00	-0.22	25503.7	3784.335	785298
5100.0	3571.990	-142.6676	12.2156	58.79	-0.23	24173.4	60.59	-0.21	25508.9	3593.431	781246
5150.0	3571.217	-139.8553	13.8520	59.52	-0.22	24178.0	61.27	-0.21	25513.9	3402.472	777431
5200.0	3570.471	-136.9993	15.4514	60.36	-0.21	24182.3	62.05	-0.20	25518.7	3211.466	773860
5250.0	3569.754	-134.0950	17.0085	61.29	-0.20	24186.3	62.92	-0.19	25523.2	3020.427	770534
5300.0	3569.070	-131.1380	18.5180	62.33	-0.19	24190.0	63.89	-0.18	25527.5	2829.368	767458

TABLE XVI
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
5350.0	3568.422	-128.1245	19.9742	63.47	-0.18	24193.4	64.96	-0.17	25531.5	2638.306	764632
5400.0	3567.811	-125.0509	21.3715	64.71	-0.17	24196.5	66.12	-0.16	25535.2	2447.260	762056
5450.0	3567.241	-121.9144	22.7040	66.35	-0.16	24199.3	67.38	-0.15	25538.6	2256.255	759728
5500.0	3566.712	-118.7129	23.9657	67.49	-0.15	24201.7	68.73	-0.14	25541.7	2065.323	757646
5550.0	3566.229	-115.4451	25.1508	69.04	-0.13	24203.9	70.18	-0.13	25544.6	1874.504	755808
5600.0	3565.790	-112.1104	26.2533	70.67	-0.12	24209.7	71.72	-0.11	25551.1	1683.848	7542[illegible]4
5650.0	3565.400	-108.7090	27.2676	72.40	-0.10	24216.2	73.35	-0.10	25558.2	1493.407	752833
5700.0	3565.065	-105.2429	28.1876	74.22	-0.09	24220.7	75.07	-0.08	25563.3	1303.323	751731
5750.0	3564.793	-101.7155	29.0077	76.12	-0.07	24223.8	76.86	-0.07	25566.9	1113.825	750921
5800.0	3564.586	-98.1313	29.7228	78.09	-0.05	24225.8	78.73	-0.05	25569.4	925.311	750415
5850.0	3564.448	-94.4964	30.3282	80.13	-0.03	24227.1	80.66	-0.03	25571.1	738.565	750218
5900.0	3564.379	-90.8179	30.8197	82.23	-0.01	24227.9	82.64	-0.01	25572.3	555.402	750329
5950.0	3564.382	-87.1039	31.1938	84.37	0.01	24228.2	84.67	0.01	25572.9	381.043	750752
6000.0	3564.402	-83.3638	31.4486	86.54	0.03	24227.2	86.72	0.03	25572.1	235.942	751150
6050.0	3564.556	-79.6076	31.5809	88.73	0.05	24226.5	88.80	0.05	25571.6	199.646	752236
6100.0	3564.783	-75.8457	31.5902	90.93	0.08	24225.4	90.88	0.07	25570.6	312.658	753620
6150.0	3565.079	-72.0887	31.4765	93.13	0.10	24223.8	92.96	0.09	25569.0	478.886	755298
6200.0	3565.446	-68.3472	31.2408	95.31	0.12	24221.8	95.[illegible]3	0.11	25566.9	659.2[illegible]5	757267
6250.0	3565.880	-64.6311	30.8849	97.45	0.13	24219.3	97.06	0.13	25564.3	844.610	759518
6300.0	3566.380	-60.9499	30.4115	99.55	0.15	24216.4	99.04	0.14	25561.2	1032.338	762046
6350.0	3566.944	-57.3117	29.8240	101.59	0.17	24213.2	100.98	0.16	25557.7	1221.290	764848
6400.0	3567.571	-53.7239	29.1266	103.58	0.19	24209.8	102.85	0.18	25554.1	1410.950	767926
6450.0	3568.263	-50.1924	28.3238	105.49	0.21	24206.5	104.65	0.20	25550.4	1601.043	771302
6500.0	3569.026	-46.7218	27.4205	107.32	0.23	24203.4	106.38	0.22	25546.7	1791.437	775017
6550.0	3569.854	-43.3156	26.4224	109.06	0.25	24198.5	108.02	0.23	25541.4	1981.936	779059
6600.0	3570.738	-39.9759	25.3352	110.71	0.26	24193.3	109.58	0.25	25535.8	2172.558	783382
6650.0	3571.675	-36.7035	24.1650	112.27	0.28	24187.8	111.04	0.26	25529.8	2363.223	787979
6700.0	3572.660	-33.4982	22.9177	113.72	0.29	24182.0	112.41	0.28	25523.5	2553.897	792847
6750.0	3573.692	-30.3588	21.5994	115.08	0.30	24175.9	113.68	0.29	25516.8	2744.552	797978
6800.0	3574.765	-27.2833	20.2160	116.34	0.31	24169.4	114.86	0.30	25509.9	2935.165	803364
6850.0	3575.876	-24.2689	18.7733	117.49	0.33	24162.7	115.94	0.31	25502.7	3125.720	808999
6900.0	3577.021	-21.3122	17.2771	118.54	0.33	24155.6	116.92	0.32	25495.3	3316.201	814873
6950.0	3578.196	-18.4093	15.7330	119.49	0.34	24148.3	117.81	0.32	25487.6	3506.595	820976
7000.0	3579.396	-15.5560	14.1464	120.35	0.35	24140.8	118.6[illegible]	0.33	25479.7	3696.892	827298
7050.0	3580.618	-12.7477	12.5224	121.10	0.36	24132.9	119.3[illegible]	0.34	25471.6	3887.082	833826
7100.0	3581.857	-9.9796	10.8664	121.75	0.36	24124.9	119.90	0.34	25463.4	4077.157	840546
7150.0	3583.109	-7.2466	9.1830	122.30	0.36	24116.6	120.42	0.34	25455.0	4267.109	847442
7200.0	3584.370	-4.5437	7.4772	122.76	0.36	24108.1	120.84	0.35	25446.5	4456.931	8545[illegible]
7250.0	3585.634	-1.8656	5.7536	123.12	0.37	24099.4	121.17	0.35	25438.0	4646.618	861701
7300.0	3586.900	0.7930	4.0168	123.39	0.37	24090.6	121.42	0.35	25429.3	4836.165	869025
7350.0	3588.161	3.4373	2.2711	123.56	0.36	24081.7	121.58	0.34	25420.7	5025.567	876452
7400.0	3589.413	6.0727	0.5211	123.63	0.36	24072.6	121.65	0.34	25412.0	5214.822	883959
7450.0	3590.654	8.7047	-1.2291	123.62	0.36	24063.5	121.63	0.34	25403.3	5403.927	891524
7500.0	3591.878	11.3383	-2.9750	123.50	0.35	24054.3	121.52	0.33	25394.7	5592.879	899120

TABLE XVI
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
7550.0	3593.082	13.9791	-4.7124	123.30	0.35	24045.1	121.33	0.33	25386.1	5781.679	906721
7600.0	3594.263	16.6322	-6.4370	123.00	0.34	24035.9	121.[illegible]5	0.32	25377.7	5970.324	914303
7650.0	3595.415	19.3029	-8.1444	122.61	0.33	24026.8	120.69	0.31	25369.4	6158.816	921836
7700.0	3596.537	21.9962	-9.8302	122.12	0.32	24017.7	120.23	0.30	25361.3	6347.155	929290
7750.0	3597.624	24.7173	-11.4899	121.54	0.31	24008.8	119.69	0.29	25353.3	6535.343	936637
7800.0	3598.673	27.4710	-13.1190	120.86	0.30	24000.0	119.[illegible]6	0.28	25345.6	6723.382	943847
7850.0	3599.681	30.2622	-14.7128	120.08	0.29	23991.5	118.33	0.27	25338.1	6911.275	950890
7900.0	3600.646	33.0953	-16.2665	119.21	0.27	23983.1	117.52	0.26	25330.9	7099.024	957735
7950.0	3601.564	35.9746	-17.7752	118.24	0.26	23975.0	116.61	0.25	25324.0	7286.633	964352
8000.0	3602.433	38.9040	-19.2339	117.17	0.25	23967.3	115.61	0.23	25317.4	7474.105	970712
8050.0	3603.250	41.8872	-20.6373	116.00	0.23	23959.9	114.52	0.22	25311.1	7661.442	976783
8100.0	3604.013	44.9272	-21.9803	114.74	0.21	23952.8	113.34	0.20	25305.2	7848.648	982540
8150.0	3604.721	48.0263	-23.2575	113.38	0.20	23946.2	112.[illegible]6	0.19	25299.7	8[illegible]35.724	987954
8200.0	3605.371	51.1863	-24.4635	111.92	0.18	23940.0	110.69	0.17	25294.7	8222.671	992997
8250.0	3605.961	54.4083	-25.5928	110.37	0.16	23934.3	109.24	0.15	25290.0	8409.485	997646
8300.0	3606.490	57.6922	-26.6402	108.73	0.14	23929.1	107.69	0.14	25285.8	8596.162	1001878
8350.0	3606.956	61.0370	-27.6002	107.01	0.13	23924.5	106.[illegible]7	0.12	25282.1	8782.688	1005668
8400.0	3607.359	64.4407	-28.4678	105.20	0.11	23920.4	104.37	0.10	25278.9	8969.046	1008999
8450.0	3607.697	67.9002	-29.2380	103.32	0.09	23916.9	102.59	0.08	25276.1	9155.200	1011854
8500.0	3607.969	71.4108	-29.9064	101.37	0.07	23914.0	100.75	0.07	25273.9	9341.095	1014213
8550.0	3608.176	74.9673	-30.4689	99.36	0.05	23911.7	98.85	0.05	25272.1	9526.637	1016068
8600.0	3608.316	78.5628	-30.9217	97.30	0.03	23910.0	96.91	0.03	25270.9	9711.659	1017406
8650.0	3608.389	82.1898	-31.2620	95.20	0.01	23909.0	94.92	0.01	25270.3	9895.855	1018219
8700.0	3608.395	85.8397	-31.4875	93.07	-0.01	23908.7	92.91	-0.01	25270.1	10078.599	10185[illegible]2
8750.0	3608.334	89.5036	-31.5964	90.93	-0.03	23909.0	90.88	-0.03	25270.5	10258.429	1018252
8800.0	3608.206	93.1718	-31.5882	88.77	-0.05	23910.0	88.84	-0.04	25271.4	10431.135	1017468
8850.0	3608.013	96.8348	-31.4628	86.63	-0.07	23911.6	86.81	-0.06	25272.8	10579.989	1016153
8900.0	3607.753	100.4832	-31.2211	84.50	-0.08	23913.9	84.80	-0.08	25274.8	10630.240	1014313
8950.0	3607.429	104.1078	-30.8646	82.4[illegible]	-0.10	23916.8	82.82	-0.10	25277.3	1[illegible]524.149	1011956
9000.0	3607.041	107.7004	-30.3959	80.35	-0.12	23920.3	80.87	-0.12	25280.3	10361.482	1009095
9050.0	3606.590	111.2532	-29.8178	78.35	-0.14	23924.4	78.98	-0.13	25283.7	10184.901	1005740
9100.0	3606.078	114.7600	-29.1340	76.41	-0.16	23929.1	77.15	-0.15	25287.7	10003.458	10019[illegible]7
9150.0	3605.505	118.2151	-28.3488	74.53	-0.18	23934.4	75.38	-0.17	25292.1	9819.791	997616
9200.0	3604.875	121.6143	-27.4666	72.74	-0.19	23940.2	73.69	-0.18	25297.0	9634.906	992886
9250.0	3604.187	124.9545	-26.4924	71.02	-0.21	23946.6	72.[illegible]7	-0.20	25302.3	9449.266	987741
9300.0	3603.445	128.2339	-25.4313	69.39	-0.22	23953.4	70.54	-0.21	25308.0	9263.106	9822[illegible]6
9350.0	3602.650	131.4515	-24.2886	67.86	-0.24	23960.6	69.10	-0.23	25314.1	9076.559	976304
9400.0	3601.805	134.6074	-23.0698	66.41	-0.25	23968.3	67.74	-0.24	25320.6	8889.701	970067
9450.0	3600.911	137.7028	-21.7802	65.07	-0.27	23976.3	66.48	-0.25	25327.4	8702.579	963521
9500.0	3599.973	140.7394	-20.4253	63.81	-0.28	23984.6	65.31	-0.26	25334.5	8515.223	956698
9550.0	3598.991	143.7199	-19.0104	62.66	-0.29	23993.3	64.23	-0.28	25342.0	8327.652	949630
9600.0	3597.970	146.6471	-17.5408	61.61	-0.30	24002.2	63.24	-0.29	25349.7	8139.876	942348
9650.0	3596.912	149.5249	-16.0217	60.65	-0.31	24011.3	62.35	-0.30	25357.6	7951.904	934885
9700.0	3595.820	152.3572	-14.4580	59.79	-0.32	24020.6	61.55	-0.30	25365.7	7763.74[illegible]	927274

TABLE XVI
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LONG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
9750.0	3594.697	155.1482	-12.8548	59.03	-0.33	24030.0	60.83	-0.31	25374.0	7575.387	919548
9800.0	3593.547	157.9026	-11.2168	58.37	-0.34	24039.6	60.21	-0.32	25382.5	7386.847	911738
9850.0	3592.373	160.6251	-9.5487	57.80	-0.34	24049.1	59.68	-0.32	25391.1	7198.123	903879
9900.0	3591.180	163.3208	-7.8551	57.32	-0.35	24058.7	59.24	-0.33	25399.7	7009.214	896002
9950.0	3589.969	165.9947	-6.1405	56.95	-0.35	24068.3	58.89	-0.33	25408.4	6820.122	888137
10000.0	3588.746	168.6518	-4.4094	56.66	-0.36	24077.7	58.63	-0.34	25417.2	6630.849	880314
10050.0	3587.514	171.2976	-2.6661	56.47	-0.36	24087.1	58.45	-0.34	25425.9	6441.398	872564
10100.0	3586.277	173.9372	-0.9151	56.38	-0.36	24096.4	58.36	-0.34	25434.6	6251.770	864913
10150.0	3585.039	176.5759	0.8395	56.38	-0.36	24105.5	58.36	-0.34	25443.3	6061.969	857387
10200.0	3583.803	179.2192	2.5931	56.47	-0.36	24114.4	58.45	-0.34	25451.8	5871.998	850011
10250.0	3582.575	-178.1276	4.3415	56.66	-0.35	24123.1	58.62	-0.33	25460.3	5681.861	842808
10300.0	3581.358	-175.4592	6.0802	56.95	-0.35	24131.5	58.88	-0.33	25468.6	5491.562	835800
10350.0	3580.156	-172.7703	7.8046	57.33	-0.34	24139.7	59.23	-0.33	25476.7	5301.108	829006
10400.0	3578.973	-170.0556	9.5103	57.80	-0.34	24147.6	59.68	-0.32	25484.6	5110.503	822444
10450.0	3577.813	-167.3097	11.1923	58.38	-0.33	24155.7	60.21	-0.31	25492.9	4919.749	816124
10500.0	3576.681	-164.5277	12.8459	59.05	-0.32	24162.1	60.84	-0.30	25499.5	4728.859	810078
S-IVB/CSM SEPARATION											
10502.4	3576.588	-164.3932	12.9245	59.09	-0.32	24162.1	60.87	-0.30	25499.5	4719.693	809551

TABLE XVII
S-1B STAGE FREE FLIGHT TRAJECTORY

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	ALTITUDE M	RANGE M	LONG DEG	LAT DEG
	EARTH-FIXED PLUMBLINE POSITIONS			EARTH-FIXED PLUMBLINE VELOCITIES						
150.0	65855	155	70125	956.2	4.6	1664.1	66237	69507	-79.8851	28.7141
160.0	74935	205	86729	860.2	5.4	1657.6	75518	85837	-79.7258	28.7585
170.0	83066	264	103287	766.2	6.3	1654.2	83892	102[illegible]88	-79.5671	28.8024
180.0	90261	330	119815	672.9	7.1	1651.4	91371	118283	-79.4088	28.8459
190.0	96524	406	136315	579.8	8.0	1648.7	97959	134432	-79.2508	28.8890
200.0	101857	491	152788	486.9	9.0	1645.9	103658	150542	-79.0930	28.9317
210.0	106263	586	169232	394.2	9.9	1643.0	108471	166619	-78.9354	28.974[illegible]
220.0	109743	690	185646	301.7	11.0	1639.9	112398	182669	-78.7778	29.0159
230.0	112297	805	202030	209.2	12.0	1636.8	115441	198695	-78.6204	29.0575
240.0	113928	930	218382	116.9	13.1	1633.5	117599	214706	-78.4629	29.0988
250.0	114635	1066	234700	24.5	14.2	1630.1	118874	230705	-78.3054	29.1397
260.0	114418	1214	250984	-67.8	15.3	1626.6	119267	246698	-78.1477	29.1803
270.0	113279	1373	267232	-160.0	16.5	1623.0	118776	262690	-77.9899	29.22[illegible]6
280.0	111217	1544	283443	-252.4	17.7	1619.2	117403	278688	-77.8319	29.2607
290.0	108232	1727	299616	-344.7	18.9	1615.3	115147	294696	-77.6737	29.30[illegible]4
300.0	104323	1922	315749	-437.1	20.2	1611.3	112006	310719	-77.5151	29.3398
310.0	99489	2130	331842	-529.7	21.5	1607.2	107981	326764	-77.3561	29.3790
320.0	93729	2352	347892	-622.3	22.8	1602.9	103070	342836	-77.1967	29.4179
330.0	87042	2587	363899	-715.1	24.2	1598.4	97272	358940	-77.0368	29.4566
340.0	79426	2835	379860	-808.1	25.5	1593.8	90586	375081	-76.8764	29.4950
350.0	70880	3098	395773	-901.1	27.0	1588.8	83010	391264	-76.7154	29.5332
360.0	61405	3374	411633	-993.8	28.4	1582.8	74545	407490	-76.5538	29.5712
370.0	51011	3665	427418	-1084.4	29.8	1573.3	65200	423745	-76.3917	29.6088
380.0	39745	3969	443059	-1166.3	30.9	1551.4	55016	439964	-76.2299	29.6461
390.0	27793	4281	458313	-1213.7	31.2	1486.8	44163	455898	-76.0707	29.6823
400.0	15928	4581	472272	-1117.6	27.8	1258.9	33341	470594	-75.9238	29.7154
410.0	6529	4810	482381	-723.3	17.0	730.1	24721	481329	-75.8163	29.7394
420.0	1272	4926	487291	-368.4	7.4	302.9	19851	486605	-75.7635	29.7511
430.0	-1585	4977	489304	-231.4	3.4	129.7	17155	488824	-75.7412	29.7560
440.0	-3686	5003	490230	-195.6	1.9	63.7	15131	489904	-75.7304	29.7583
450.0	-5550	5017	490677	-177.7	1.0	28.9	133[illegible]7	490491	-75.7245	29.7596
460.0	-7249	5025	490859	-162.4	0.5	9.6	11628	490802	-75.7214	29.7602
470.0	-8804	5029	490899	-149.2	0.3	-0.5	10079	490960	-75.7198	29.7605
480.0	-10236	5031	490867	-137.4	0.1	-5.3	8649	491036	-75.7190	29.7606
490.0	-11559	5032	490802	-127.4	0.0	-7.4	7325	491[illegible]72	-75.7186	29.7607
500.0	-12790	5032	490724	-119.0	0.0	-8.0	6092	491088	-75.7185	29.7607
510.0	-13943	5032	490643	-111.9	-0.0	-8.1	4936	491095	-75.7184	29.7607
520.0	-15030	5031	490563	-105.7	-0.0	-7.8	3846	491098	-75.7183	29.7606
530.0	-16059	5031	490486	-100.2	-0.0	-7.5	2814	491100	-75.7183	29.7606
540.0	-17035	5031	490412	-95.2	-0.0	-7.2	1835	491101	-75.7183	29.7606
550.0	-17964	5030	490342	-90.7	-0.0	-6.9	904	491101	-75.7183	29.7606
560.0	-18851	5030	490275	-86.8	-0.0	-6.6	14	491101	-75.7183	29.76[illegible]5
	IMPACT									
560.2	-18865	5030	490274	-86.8	-0.0	-6.6	0	491101	-75.7183	29.76[illegible]5

TABLE XVIII
S-1B STAGE FREE FLIGHT TRAJECTORY

TIME SEC	EARTH-FIXED PLUMBLINE POSITIONS XE FT	YE FT	ZE FT	EARTH-FIXED PLUMBLINE VELOCITIES DXE FT/S	DYE FT/S	DZE FT/S	ALTITUDE FT	RANGE NM	LONG DEG	LAT DEG
150.0	216061	508	230070	3137.3	15.2	5459.6	217314	37.587	-79.8851	28.7141
160.0	245849	673	284545	2822.2	17.8	5438.4	247762	46.318	-79.7258	28.7585
170.0	272526	865	338869	2513.8	20.5	5427.0	275235	55.087	-79.5671	28.8024
180.0	296131	1084	393093	2207.5	23.4	5417.9	299772	63.826	-79.4088	28.8459
190.0	316679	1333	447228	1902.2	26.4	5409.0	321387	72.541	-79.2508	28.8890
200.0	334178	1612	501272	1597.6	29.4	5399.8	340087	81.234	-79.0930	28.9317
210.0	348633	1922	555223	1293.5	32.6	5390.3	355876	89.909	-78.9354	28.9740
220.0	360048	2265	609076	989.8	35.9	5380.4	368760	98.569	-78.7778	29.0159
230.0	368429	2641	662829	686.4	39.3	5370.0	378742	107.218	-78.6204	29.0575
240.0	373778	3052	716476	383.4	42.9	5359.3	385824	115.857	-78.4629	29.0988
250.0	376097	3499	770014	80.5	46.5	5348.2	390008	124.490	-78.3054	29.1397
260.0	375388	3982	823438	-222.3	50.2	5336.7	391295	133.120	-78.1477	29.1803
270.0	371651	4504	876746	-525.1	54.1	5324.8	389686	141.750	-77.9899	29.2206
280.0	364886	5064	929932	-828.0	58.0	5312.4	385181	150.382	-77.8319	29.2607
290.0	355091	5664	982993	-1131.0	62.1	5299.6	377778	159.020	-77.6737	29.3004
300.0	342266	6306	1035923	-1434.2	66.2	5286.5	367474	167.666	-77.5151	29.3398
310.0	326406	6989	1088720	-1737.8	70.5	5272.8	354269	176.324	-77.3561	29.3790
320.0	307509	7716	1141378	-2041.7	74.8	5258.8	338157	184.997	-77.1967	29.4179
330.0	285570	8486	1193893	-2346.2	79.3	5244.2	319135	193.687	-77.0368	29.4566
340.0	260584	9302	1246260	-2651.1	83.8	5229.0	297198	202.396	-76.8764	29.4950
350.0	232547	10163	1298469	-2956.3	88.5	5212.7	272343	211.129	-76.7154	29.5332
360.0	201461	11071	1350502	-3260.4	93.1	5192.9	244570	219.885	-76.5538	29.5712
370.0	167360	12025	1402291	-3557.8	97.7	5161.6	213910	228.656	-76.3917	29.6088
380.0	130397	13022	1453606	-3826.3	101.5	5090.0	180499	237.407	-76.2299	29.6461
390.0	91185	14046	1503651	-3982.0	102.4	4878.1	144892	246.076	-76.0707	29.6823
400.0	52257	15031	1549447	-3666.7	91.1	4130.2	109386	253.936	-75.9238	29.7154
410.0	21420	15780	1582615	-2372.9	55.6	2395.5	81155	259.729	-75.8163	29.7394
420.0	4174	16163	1598724	-1208.7	24.4	993.7	65129	262.576	-75.7635	29.7511
430.0	-5201	16330	1605329	-759.1	11.3	425.7	56284	263.773	-75.7412	29.7560
440.0	-12095	16414	1608366	-641.7	6.2	208.9	49643	264.356	-75.7304	29.7583
450.0	-18210	16461	1609831	-583.1	3.4	94.9	43659	264.672	-75.7245	29.7596
460.0	-23783	16487	1610431	-532.7	1.8	31.5	38148	264.840	-75.7214	29.7602
470.0	-28888	16499	1610562	-489.5	0.9	-1.6	33068	264.925	-75.7198	29.7605
480.0	-33586	16505	1610456	-450.9	0.4	-17.5	28376	264.967	-75.7190	29.7606
490.0	-37925	16508	1610242	-417.9	0.1	-24.2	24033	264.986	-75.7186	29.7607
500.0	-41963	16508	1609986	-390.4	0.0	-26.4	19988	264.995	-75.7185	29.7607
510.0	-45747	16508	1609721	-367.1	-0.1	-26.5	16194	264.998	-75.7184	29.7607
520.0	-49314	16507	1609459	-346.7	-0.1	-25.7	12618	265.000	-75.7183	29.7606
530.0	-52689	16507	1609207	-328.6	-0.1	-24.7	9234	265.001	-75.7183	29.7606
540.0	-55892	16505	1608965	-312.2	-0.1	-23.6	6022	265.001	-75.7183	29.7606
550.0	-58939	16504	1608734	-297.6	-0.1	-22.6	2965	265.002	-75.7183	29.7606
560.0	-61850	16503	1608513	-284.9	-0.1	-21.6	46	265.002	-75.7183	29.7605
	IMPACT									
560.2	-61896	16504	1608509	-284.7	-0.1	-21.6	0	265.002	-75.7183	29.7605

APPENDIX A

DEFINITIONS OF SYMBOLS

Symbol	Definitions
XE, YE, ZE DXE, DYE, DZE DDXE, DDYE, DDZE	Position, velocity and acceleration components in the Earth-Fixed Cartesian Coordinate System. The origin of this system is the projection of the center of gravity of the complete vehicle at first motion onto the Fischer Ellipsoid of 1960. The Y-Z plane is tangent to the reference ellipsoid at the origin of the coordinate system. The positive Z-axis is oriented in the flight azimuth direction, 72 deg E of N. The X-axis is normal to the Y-Z plane and is positive above the origin. The Y-axis is normal to the X-Z plane and is in a right hand relation to the X-Z axes with the positive direction 162 deg E of N. The origin of this earth-fixed system rotates with an angular velocity identical to that of the earth. The earth-fixed coordinate system is shown in Figure 1.
XSP, YSP, ZSP DXSP, DYSP, DZSP DDXSP, DDYSP, DDZSP	Position, velocity and acceleration components in the Space-Fixed Ephemeris Coordinate System. The origin of this system is located at the geocentric center of the earth. The Z-axis points north along the earth's axis of rotation (through the north pole). The X-Y plane is coincident with the equatorial plane. The X-axis points through the vernal equinox. The reference equinox and equator are the mean equinox and equator of date for the epoch of midnight or zero hours on the day of launch. The Y-axis is normal to the X-Z plane and in a right hand relation to the X-, Z-axes. The direction of the coordinate axes remain fixed in space although the origin continues to move with the center of the earth. The space-fixed ephemeris coordinate system is shown in Figure 1.
E. C. DIST LONG G.C. LAT	Position of vehicle in the Geographic Coordinate System. Position in this system is defined by the radius vector from the vehicle to the geocentric center of the earth (E.C.DIST), geocentric latitude (G.C. LAT) and longitude (LONG). Geocentric latitude is the angle between the radius vector of the sub-vehicle point and the equatorial plane, positive north of the equator. Longitude is the angle between the projection of the radius vector into the equatorial plane and the Greenwich meridian, measured positive east of the Greenwich meridian.

DEFINITIONS OF SYMBOLS (CONT'D)

Symbols	Definitions
E.F. VEL VEL-AZ VEL-ELEV	Earth-fixed velocity of the vehicle in the Geographic Coordinate System. Velocity in this system is given in terms of azimuth (VEL-AZ), elevation (VEL-ELEV), and magnitude of the velocity vector (E.F.VEL). Azimuth is the angle between the projection of the velocity vector into the local horizontal plane and the north direction in this plane. Elevation is the angle between the velocity vector and the local horizontal plane. The local horizontal plane is defined as the plane perpendicular to the radius vector from the vehicle to the geocentric center of the earth. The geographic coordinate system is shown in Figure 1.
S.F. VEL FLT-PATH HEAD	Space-fixed velocity of vehicle in the Geographic Coordinate System. Velocity is given in terms of flight-path angle (FLT-PATH), heading angle (HEAD), and magnitude of the velocity vector (S.F.VEL). The flight-path angle is the angle between the space fixed velocity vector and the plane normal to the radius vector from the vehicle to the geocentric center of the earth, measured positive upward from this plane. The heading angle is measured positive clockwise from north to the projection of the space-fixed velocity vector in the plane normal to the radius vector.
LAT	Geodetic latitude of vehicle.
MACH	Mach number.
DYN PRES	Dynamic Pressure.
ALTITUDE	Distance from the reference ellipsoid to the center of gravity of the vehicle measured along the radius vector from the vehicle to the geocentric center of the earth.
RANGE	Surface range measured along a spherical earth from the launch site to the subvehicle point. The subvehicle point is defined as the intersection of the reference ellipsoid and the reference ellipsoid normal passing through the vehicle.
DEC	The Declination angle is the angle between the radius vector from the center of the earth to the vehicle and the equatorial plane, positive north of the equator.

TABLE XIX

GOVERNMENT FURNISHED DOCUMENTATION
DELIVERABLE ITEM NO. BB-3.1.5-4-202

GFDA NO.	DATE MSFC APPROVAL	DESCRIPTION OF GFD REQUIRED	IDENTIFICATION OF GFD
05A00109	9/17/68	AS-205 Final Predicted Mass Characteristics, Depletion Cutoff	R-P&VE-VAW-68-36
05A00109	9/17/68	SA-204/SA-205 Vehicle Antenna Locations	BB-3.16.10-1
05A00109	9/17/68	Tracking and Telemetry Station Locations (Updated Co-ordinates for Tananarive)	OD Item 9.2.1.3-11
05A00109	9/17/68	AS-205/CSM-101 Launch Vehicle Operational Trajectory	R-AERO-FMR-170-68
05A00109	10/10/68	Tracking Tape Format	Report #4200, Section 2600
05A00109	10/10/68	AS-205 Processed Data Requirement Document	MSFC PDRD (AS-205)
05A00146	11/12/68	Preliminary Guidance Velocities (IBM Cards on Tape)	Preliminary guidance velocities (IBM cards)
05A00146	11/12/68	Preliminary Tracking Data (Radars)	IP sort quick look radars, Tape No. 3858
05A00146	11/12/68	Orbital Radar Tracking and Insertion State Vector	Orbital radar tracking and insertion state vector
05A00146	11/12/68	Preliminary T-0 meteorological magnetic tape	Preliminary T-0 meteorol-ogical data tape No. 6928
05A00146	11/12/68	Preliminary Postflight Trajectory	Preliminary Postflight Tra-jectory, tape No. 9255
05A00147	11/12/68	Final T-0 meteorological magnetic tape	Final T-0 meteorological data, tape No 9933
05A00148	11/12/68	Updated guidance velocities	Use preliminary guidance velocities for final tra-jectory (update not required)
05A00148	11/12/68	Corrected measured parameters (radars)	Corrected measured parameters (radars) tape No. 1641
05A00149	11/12/68	Orbital venting accelerations	Orbital venting acceleration polynominals

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1. Solmon, Gordon W., Operational Trajectory Data Report, "AS-205/CSM-101 Launch Vehicle Operational Trajectory, Revision I", dated September 10, 1968, NASA George C. Marshall Space Flight Center, Huntsville, Alabama.

2. Hill, R.E. and Rich, N.E., "Manual For The GATE Program", TM 54/30-150, LMSC/HREC A784527, dated September 1967.

3. Saturn Flight Evaluation Working Group, "Results of the Fifth Saturn IB Launch Vehicle Test Flight AS-205", to be published by the Saturn IB Flight Evaluation Working Group.

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