

DOCUMENT NO. D5-15551(I)-7

TITLE SATURN V AS-507 "G" MISSION LAUNCH VEHICLE OPERATIONAL FLIGHT TRAJECTORY - SEPTEMBER LAUNCH MONTH

MODEL NO. SATURN V CONTRACT NO. NAS8-5608, Schedule II,
Part IIA, Task 8.1.4,
DRL-049, Item 172

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June 13, 1969

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ABSTRACT AND LIST OF KEY WORDS

This document provides launch vehicle operational trajectory data for the Apollo 12 AS-507 G Mission. Trajectory and flight sequence data are presented for all powered flight phases and for parking orbit and preseparation translunar coast. Trajectory data for the spent S-IC, S-II, and S-IVB stages are also presented. Recommended launch vehicle guidance presettings and targeting presettings for the launch vehicle flight program are included, as is identification of trajectory data contained on magnetic computer tapes delivered by The Boeing Company to MSFC prior to release of this report.

Primary emphasis of this report is for the September 13, 1969, launch day. Trajectory printout is provided for a launch azimuth of 78.051 degrees. Representative mission and trajectory data are presented for other launch days in the September launch window.

Apollo 12
Saturn V
AS-507
"G" Mission
Operational Trajectory
Launch Vehicle Trajectory

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27. Meeting between Boeing, MSFC/S&E-AERO-FMT, MSFC/S&E-CSE, and IBM technical personnel at MSFC on 6-5-69 to discuss AS-507 guidance and targeting presettings and values.

ACKNOWLEDGEMENT

The analyses presented in this document were prepared by the following personnel:

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INTRODUCTION

The Apollo 12 AS-507 flight is the seventh mission of the Saturn V vehicle and the fifth manned Saturn V mission. Targeting objectives for the September launch window are for a G-type mission. The launch days considered in this analysis are September 13, 15, and 18, 1969. The launch vehicle trajectory is designed to inject the Apollo 12 spacecraft onto a circum-lunar trajectory. The boost to translunar orbit consists of complete burns of the S-IC and S-II stages, and two partial burns of the S-IVB stage. Spacecraft separation from the launch vehicle occurs prior to 2 hours after translunar injection. Post-separation spacecraft operations include an evasive maneuver away from the S-IVB/IU, deboost into a lunar orbit, manned lunar landing, ascent from the lunar surface and docking, transearth injection by the CSM, and atmospheric reentry and splash. Post-separation launch vehicle operations include maneuver to a slingshot attitude, propellant venting, dump, and APS engine burns to achieve a slingshot orbit, and coast past the trailing side of the moon into solar orbit.

This report presents trajectory and mission-related groundrules and constraints, a mission description, a launch vehicle trajectory description and data summary, an operational sequence of events, vehicle configuration data including weight and performance data, propellant-reserve and flight-profile envelopes, launch vehicle guidance and targeting presettings including the primary tilt program, and representative trajectory data for all launch vehicle boost and coast phases of flight.

SUMMARY

The data of this analysis substantiate that the AS-507 launch vehicle, as defined by vehicle descriptive data provided for this analysis, is capable of achieving all mission and launch vehicle objectives and constraints. Launch vehicle performance reserves are adequate to meet all mission objectives in the presence of three-sigma dispersions. Launch vehicle response to the guidance and targeting presettings is adequate to inject the Apollo 12 spacecraft onto the desired translunar trajectory. Although detailed S-IVB lunar slingshot analyses are not included in the scope of this analysis, all nominal trajectories verified achieve lunar slingshot and earth escape.

SECTION 1

MISSION DESCRIPTION

1.0 APOLLO 12 MISSION SUMMARY

The Apollo 12/AS-507 G mission is a manned Lunar Landing Mission (LLM). This document provides mission and trajectory data for the September 1969 launch month. Launch days considered are September 13, 15, and 18. The primary launch day considered is September 13. Targeting objectives for these days are for high-periselenium free-return trajectories consistent with the "hybrid" lunar landing mission profile. The hybrid mission profile is presented in Figure 1-1. Periselenium altitudes for these 3 days are approximately 100, 200, and 1100 nautical miles, respectively.

The earth-centered ephemeral coordinate system is used to summarize the sun/earth/moon/trajectory relationship. The ephemeral X-Y plane is the mean equatorial plane of the earth, and the X-axis points toward the vernal equinox (approximately toward the first point of Aries). The ephemeral Z-axis is normal to the X-Y plane and is positive in the direction of the North Pole. Right ascension of the moon at the time of lunar arrival, as summarized in Figure 1-2, is the geocentric angle between the X-Y plane projection of the moon position at arrival and the X-axis. Lunar declination at arrival, summarized in Figure 1-3, is the geocentric angle between the moon position at arrival and the X-Y plane.

The earth-moon distance at spacecraft (SC) periselenium for September 1969 is summarized in Figure 1-4. The composite Apollo 12/AS-507 G lunar ephemeris and trajectory projection in the geocentric ephemeral X-Y and X-Z planes are presented in Figures 1-5 and 1-6, respectively.

1.1 LAUNCH VEHICLE MISSION DESCRIPTION

The launch vehicle (LV) operational mission consists of the following flight phases:

- a. Launch and boost to earth parking orbit (EPO). This phase consists of complete burns of the S-IC and S-II stages, and a partial burn of the S-IVB stage.
- b. Coast in a circular parking orbit. Approximately two or three revolutions are made while subsystem checkout is performed.
- c. S-IVB stage reignition and boost to translunar orbit injection (TLI) during one of two injection opportunities from parking orbit.

1.1 (Continued)

- d. Command and Service Modules (CSM) separation, transposition, and docking with the Lunar Module (LM)/S-IVB, and CSM/LM separation from the S-IVB/Instrument Unit (IU) during post-TLI coast.
- e. S-IVB dumping and safing operations after CSM/LM separation to cause the expended S-IVB/IU to pass behind the moon's trailing side and into a solar orbit.

The simulated Apollo 12 AS-507G vehicle is launched from Pad 39B of the Kennedy Space Center. The range of launch azimuths is 72 degrees to 108 degrees east of north. The actual flight azimuth is determined just prior to launch from a launch-day-dependent polynomial of launch azimuth as a function of launch time. The variations of launch azimuth with launch time for the September 1969 launch window are presented in Figure 1-7. The prime launch time for September 13 is 10:37 GMT (5:37 AM E.S.T.) and the corresponding flight azimuth is 78.051 degrees. This launch time is chosen to provide natural lighting at Cape Kennedy for the launch.

For launch in accordance with these September daily launch windows, TLI occurs over the North Pacific Ocean. The operational trajectory groundtrack through TLI+7 hours is presented in Figure 1-8 for launch on September 13, 1969, along a 78.051-degree launch azimuth with first-opportunity injection. The envelope of groundtracks for the boost to earth parking orbit is presented in Figure 1-9 for the full 36-degree launch azimuth range. The envelopes of TLI-boost groundtracks for September 13, 15, and 18 are presented in Figures 1-10, 1-11, and 1-12, respectively.

Significant trajectory events and event times are presented in the critical event sequence of Table 1-I. Flight times shown in this table are for launch along a 78.051-degree azimuth on September 13, 1969. However, events referenced to a timebase in this table are applicable with respect to that timebase for all launch days and azimuths. Flight times for azimuth-dependent critical events for a September 13 launch are summarized in Table 1-II. A summary of trajectory parameters at key events is presented in Tables 1-III through 1-VIII for launch on September 13.

1.2 APOLLO 12 MISSION OBJECTIVES

The Apollo 12 G mission is a lunar landing mission. Achievement of the primary G mission launch vehicle objectives requires that the launch vehicle inject a manned Apollo CSM and LM onto a translunar orbit. The primary Manned Space Flight (MSF) objective for the G mission is to perform a manned lunar landing and return (Reference 1).

1.2 (Continued)

MSF Detailed Test Objectives (DTO's) support the primary objective and are as follows:

- a. Perform selenological inspection and sampling.
- b. Obtain data to assess the capability and limitations of the astronaut and his equipment in the lunar surface environment.

Marshall Space Flight Center DTO's have not been assigned but may be assigned later to investigate anomalies that occur on AS-505 and AS-506 flights.

1.3 APOLLO 12/AS-507 CONSTRAINTS

Apollo 12 mission constraints are derived from the data of References 1, 2, and 3 and reflect current design criteria. Trajectory profile constraints are as follows:

- a. Launch shall occur along an azimuth of not less than 72 degrees and not greater than 108 degrees east of north.
- b. TLI will be performed during the second revolution of Earth Parking Orbit (EPO). If system status precludes nominal injection during the second revolution, injection during the third revolution of EPO will be possible.
- c. TLI targeting will place the SC on a free-return circum-lunar trajectory and, when a hybrid trajectory is required, will be constrained to provide a maximum perilune altitude of 1500 nautical miles.

Launch vehicle constraints are as follows:

- a. The crew-commanded S-IVB attitude rate limits are 0.3 degree/second in pitch and yaw, and 0.5 degree/second in roll. These rate limits are the same for EPO coast and for post-TLI coast modes.
- b. Nominal acceleration during S-IC boost shall not exceed 4.0 g's.
- c. The PU system (S-II and S-IVB stages) will be open loop.
- d. The S-IVB will be maintained in a safe condition.

1.3 (Continued)

Spacecraft-imposed LV operational constraints are as follows:

- a. Continuous MSF Network (MSFN) coverage is desired from the initiation of the preignition sequence until 3 minutes after S-IVB cutoff.
- b. MSFN coverage is desired from 1 minute before until 3 minutes after initiation of the dumping and safing sequence.
- c. MSFN coverage is desired from 1 minute before until 3 minutes after termination of the dumping and safing sequence.

Lunar surface visibility and lighting constraints are as follows:

- a. The lunar surface at the landing site will be in the astronauts' field of view for at least 120 seconds prior to touchdown.
- b. At the time of landing, the sun elevation referenced to the local horizontal at the landing site will be between 5 and 13 degrees.

1.4 AS-507 LAUNCH VEHICLE TRAJECTORY DESIGN GROUNDRULES

Launch vehicle trajectory design groundrules used to define the AS-507 operational trajectory are presented in References 4, 5, 6, and 7 and are consistent with the mission constraints in Paragraph 1.3. Critical groundrules are summarized in Enumerations a through u.

- a. The S-IC outboard engines are canted radially outward as specified in Engineering Change Request ABUE-686. The cant is initialized 20.0 seconds from timebase 1 (TBI). There are no nominal engine misalignments.
- b. Extrusion-rod soft-release-mechanism forces defined in Reference 8 are implemented in the boost-to-EPO trajectory. Forces for 8 rods are simulated.
- c. Buoyancy and trapped air effects are simulated. The volume of trapped air is 760 meters³, and the buoyant volume is 6831 meters³.
- d. Prior to the S-II mixture-ratio shift (MRS), the S-II outboard engines are canted radially outward 0.35 degree. After S-II MRS, the engines are canted outward 0.65 degree as specified in Reference 9.

1.4 (Continued)

- e. The orbit insertion and injection times occur 10 seconds after S-IVB guidance cutoff commands.
- f. Timebase 5 is set 0.210 seconds after S-IVB first guidance cutoff signal (GCS1).
- g. Timebase 7 is set 0.210 seconds after S-IVB second guidance cutoff signal (GCS2).
- h. Orbital guidance is initiated 20.210 seconds after the S-IVB guidance cutoff signal for parking orbit insertion and trans-lunar injection.
- i. A constant roll torque of a positive (clockwise as viewed from the rear) 10 newton-meters due to engine turbine is simulated during S-IVB powered flight.
- j. The nominal AS-507 S-IC tilt program is generated for mean September through November winds.
- k. An average September/October 50-percentile wind is used in nominal trajectory simulations.
- m. The Aerodynamic Heating Indicator (AHI) maximum design limit for the S-IC tilt polynomial is 676.7×10^6 newtons/meter-radian at S-IC/S-II separation.
- n. Thrust buildup for all stages and thrust decay for the S-IC and S-II stages are as specified on the propulsion tapes. S-IVB thrust decay is as specified in Reference 10.
- p. The simulated S-IVB axial-force coefficient is 2.0 during boost and coast phases of flight. The simulated S-IVB normal-force coefficient is 0.0. The aerodynamic reference area is 370.0 square feet.
- q. Post-injection vent-thrust, and mass-flowrate simulations are based upon the data of Reference 11.
- r. The variation of launch azimuth with launch time for the September 15 launch window cannot be fitted by a 3-segment polynomial to a fit tolerance of 0.02 degree. The procedure used for fitting this function is that defined in Groundrule 9 of Reference 12.
- s. The simulated slingshot ΔV for September 13 is 35.0 meters/second. The slingshot attitude is 210, 0, 180 degrees pitch, yaw, and roll relative to the local horizontal coordinates. The time of slingshot ΔV application is 9058 seconds after GCS2.

1.4 (Continued)

- t. S-II expanded IGM logic is simulated as specified in AS-507 FPCR 507-4 (unapproved).
- u. Simulated body attitude rate limits during the TD&E maneuver are 0.7 degree/second pitch, yaw, and roll consistent with FPCR 507-6 (unapproved). All other simulated orbital rate limits are 0.3, 0.3, and 0.5 degree/second pitch, yaw, and roll.

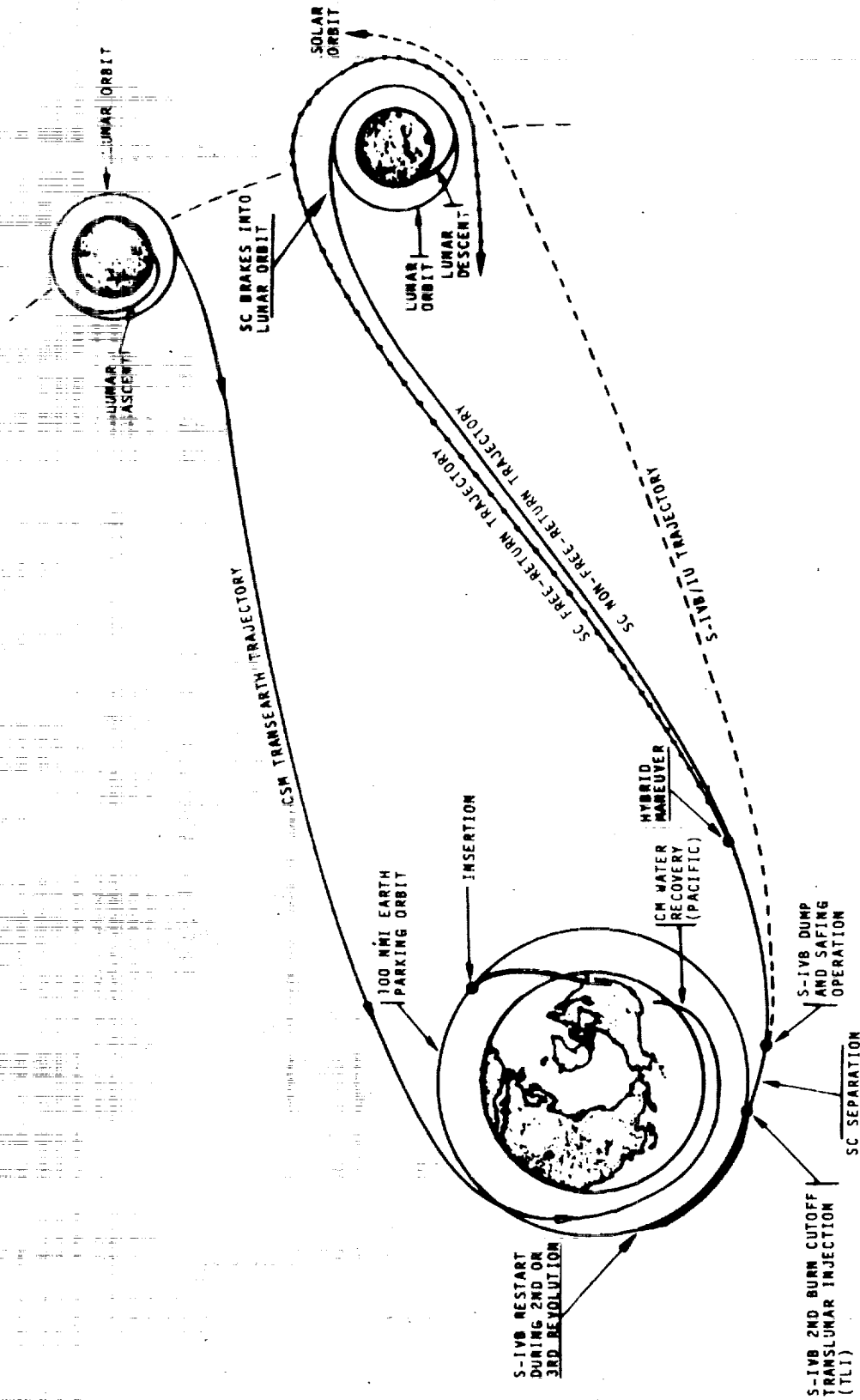
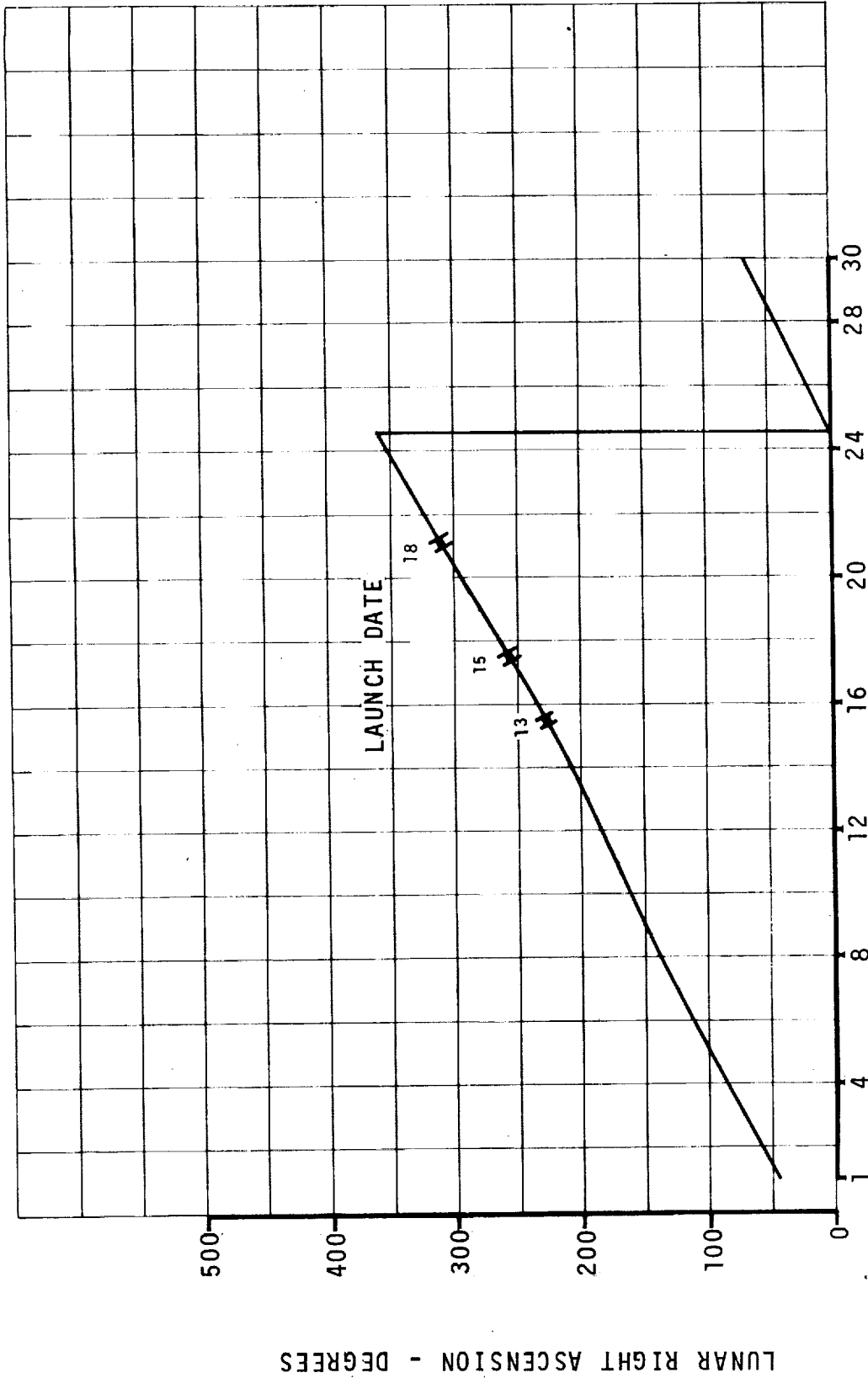


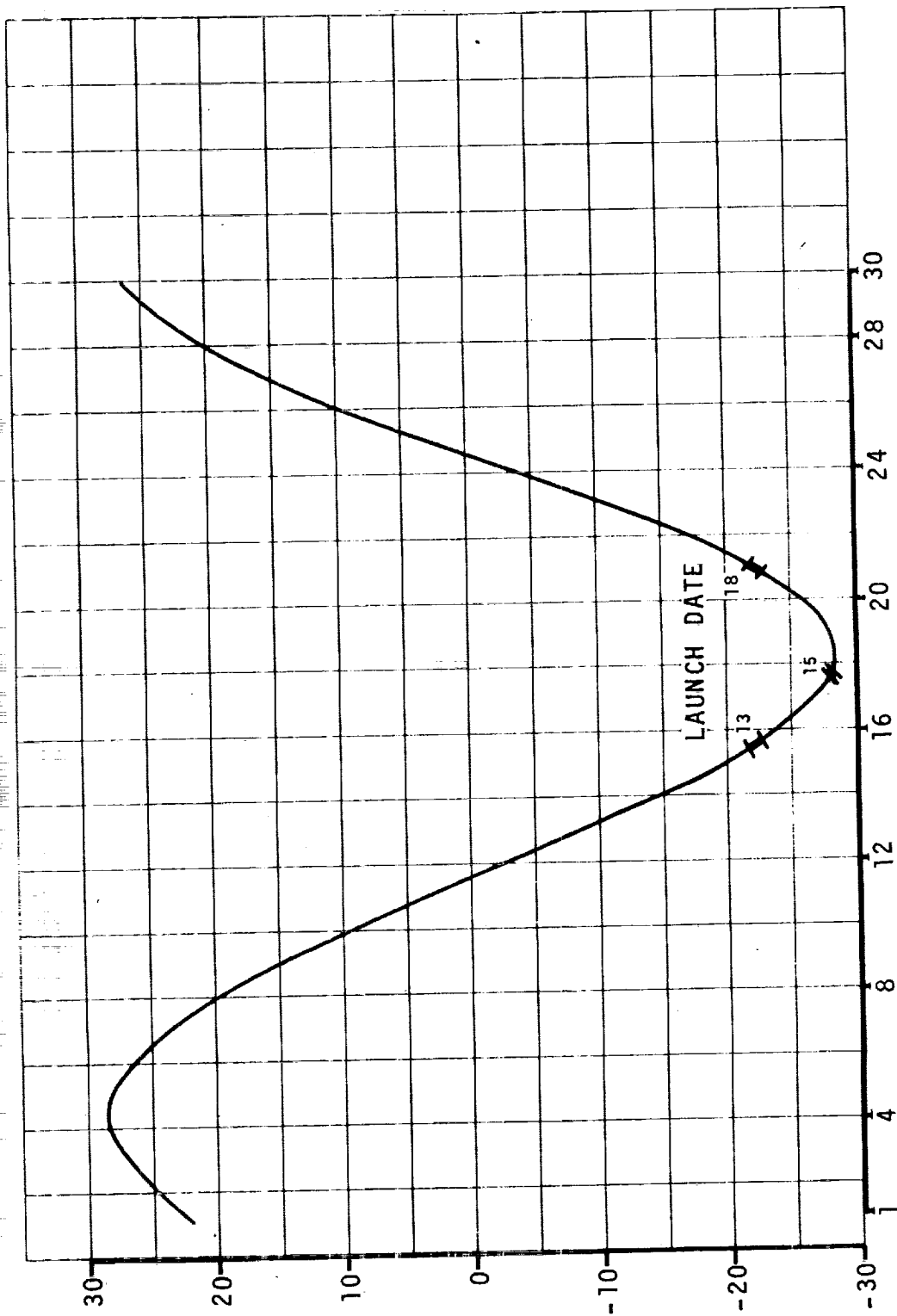
FIGURE 1-1 AS-5076/APOLLO 12 MISSION PROFILE



DATE OF ARRIVAL AT MOON - SEPTEMBER 1969

FIGURE 1-2 RIGHT ASCENSION OF MOON AT LUNAR ARRIVAL

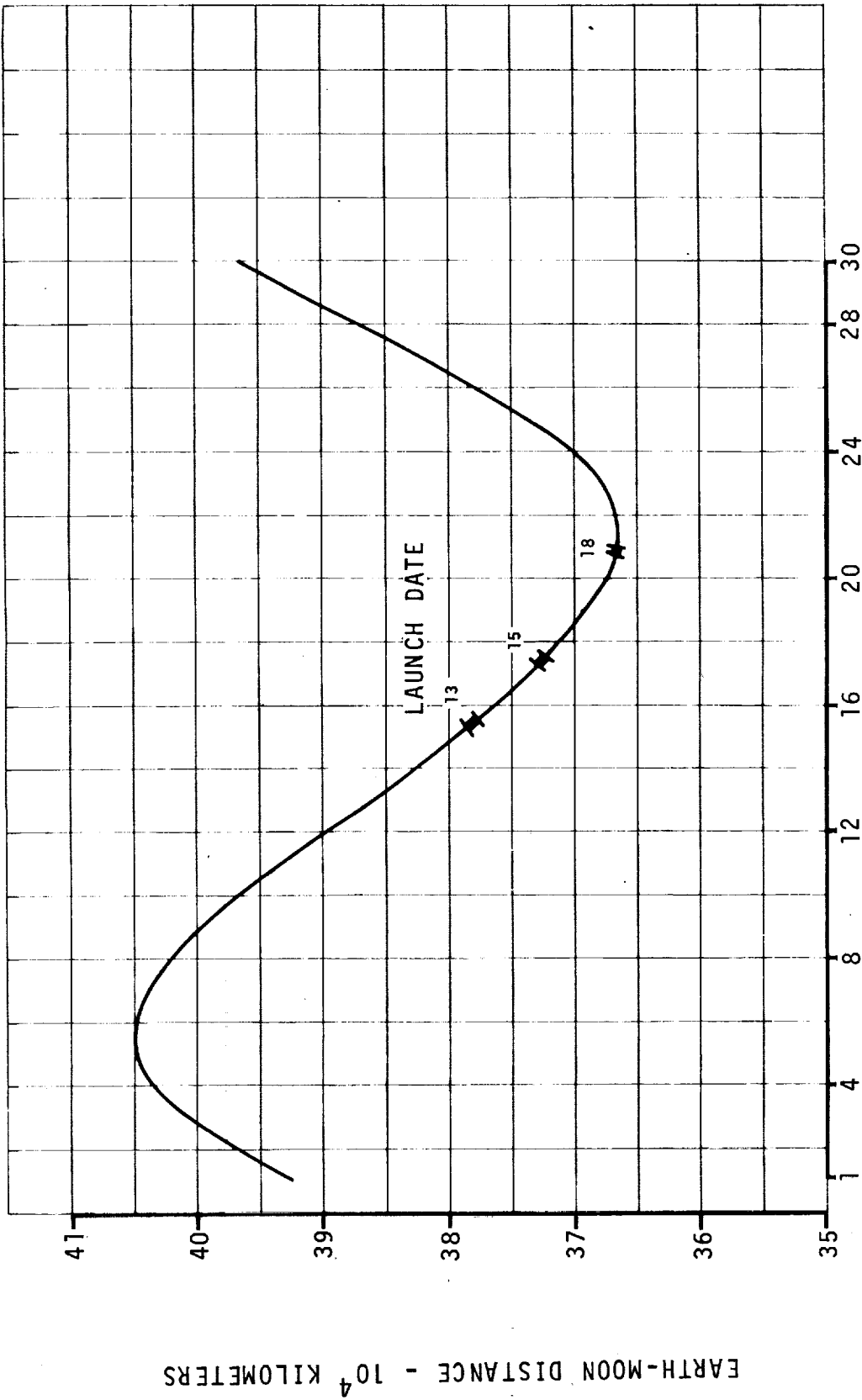
LUNAR RIGHT ASCENSION - DEGREES



LUNAR DECLINATION - DEGREES

DATE OF ARRIVAL AT MOON - SEPTEMBER 1969

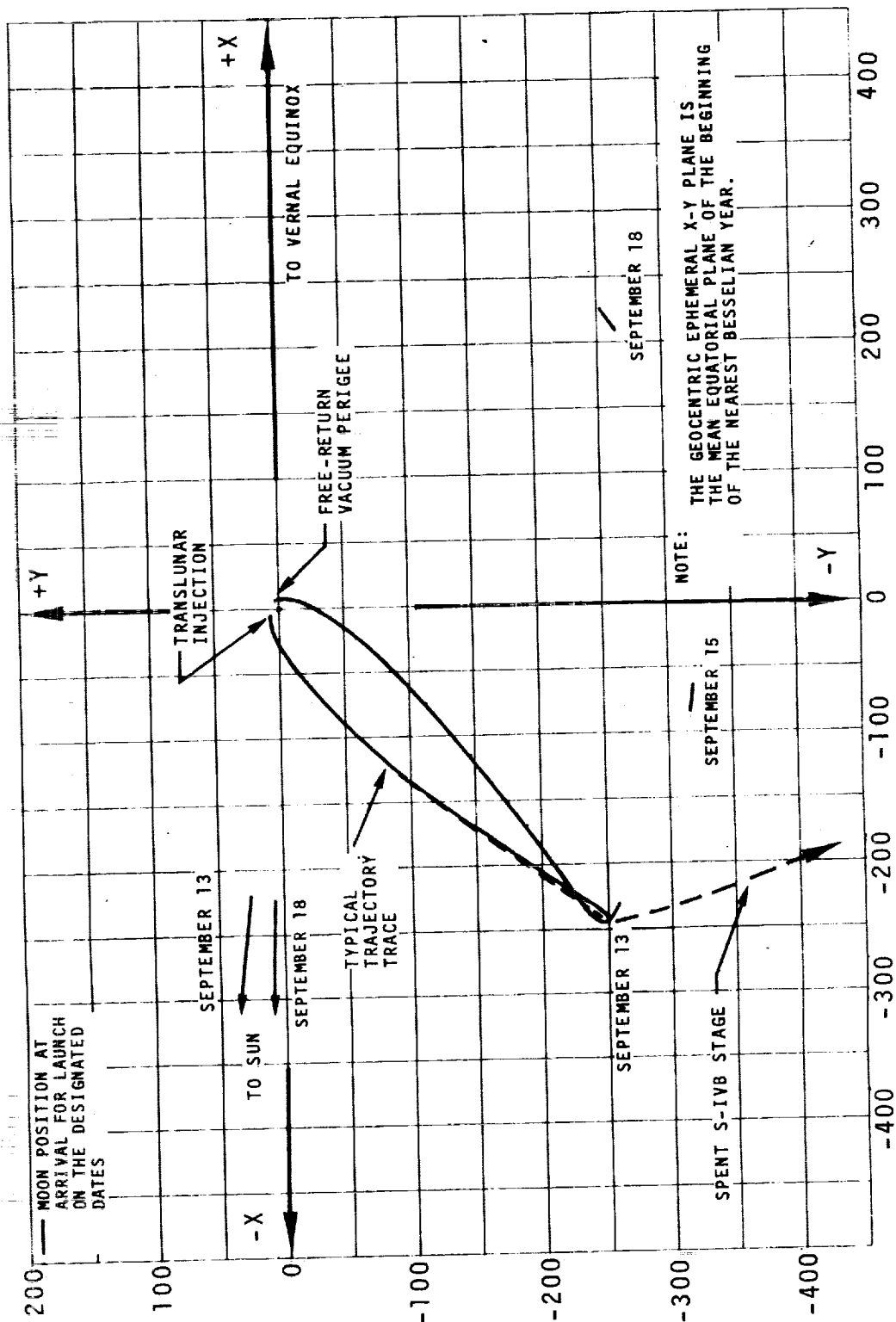
FIGURE 1-3 DECLINATION OF MOON AT LUNAR ARRIVAL



DATE OF ARRIVAL AT MOON - SEPTEMBER 1969

FIGURE 1-4 EARTH-MOON DISTANCE AT PERISELENUM

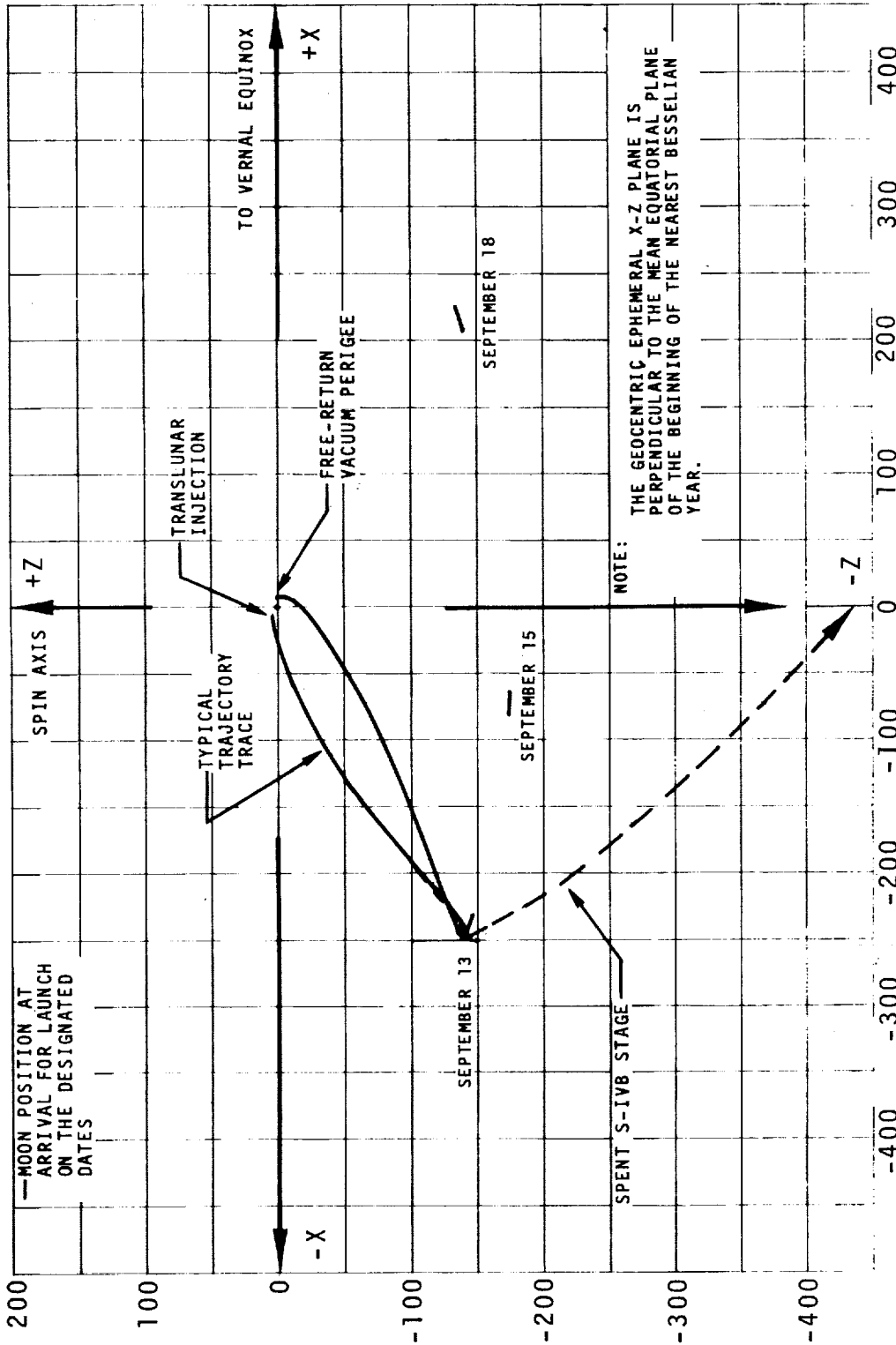
EARTH-MOON DISTANCE - 10^4 KILOMETERS



Y GEOCENTRIC EPHEMERAL POSITION COORDINATE - 1000 KILOMETERS

X GEOCENTRIC EPHEMERAL POSITION COORDINATE - 1000 KILOMETERS

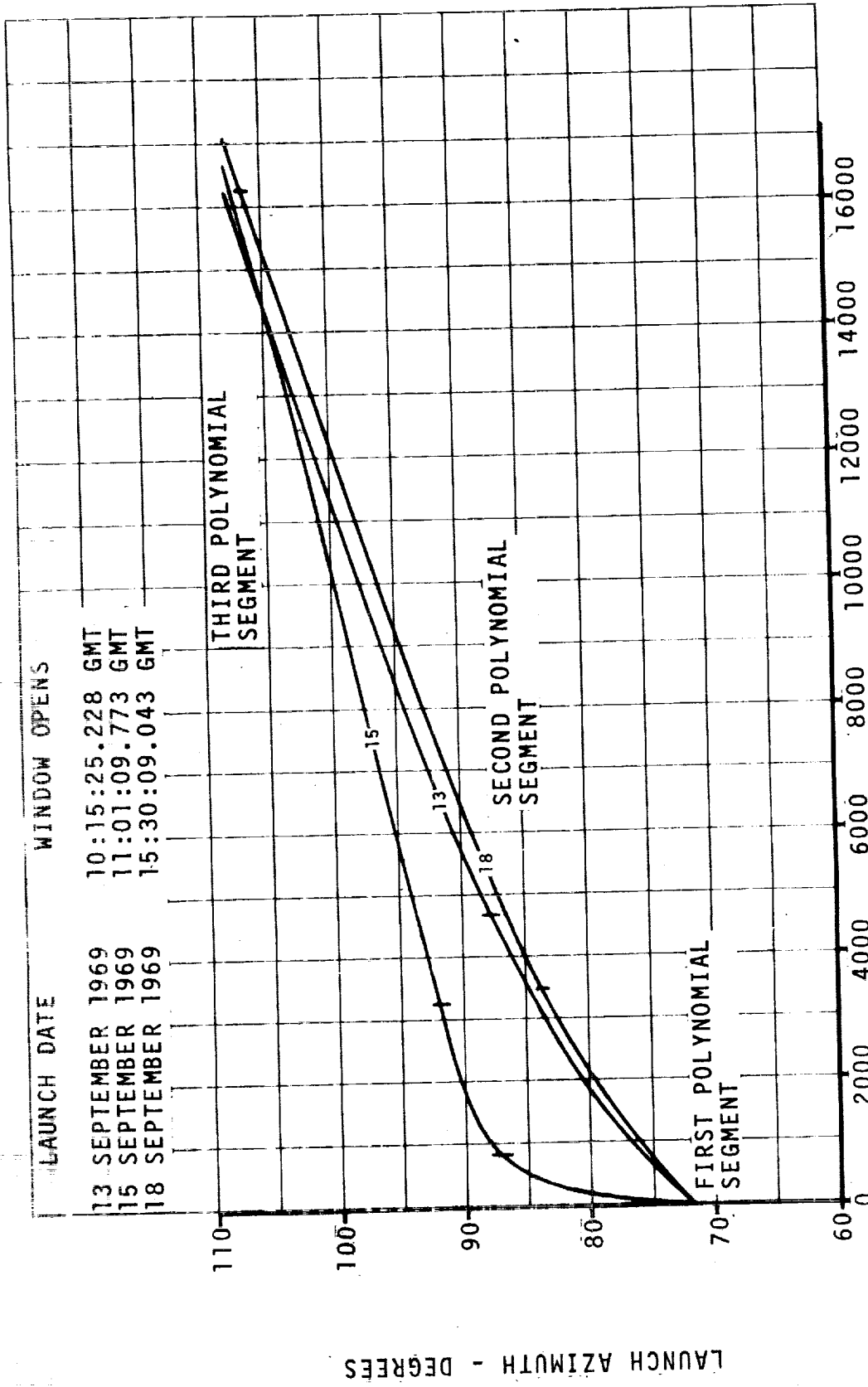
FIGURE 1-5 COMPOSITE AS-507 LUNAR EPHEMERIS AND TRAJECTORY PROJECTION IN THE GEOCENTRIC EPHEMERAL X-Y PLANE



Z GEOCENTRIC EPHEMERAL POSITION COORDINATE - 1000 KILOMETERS

X GEOCENTRIC EPHEMERAL POSITION COORDINATE - 1000 KILOMETERS

FIGURE 1-6 COMPOSITE AS-507 LUNAR EPHEMERIS AND TRAJECTORY PROJECTION IN THE GEOCENTRIC EPHEMERAL X-Z PLANE



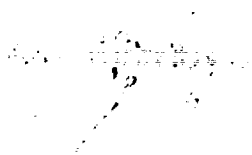
LAUNCH AZIMUTH - DEGREES

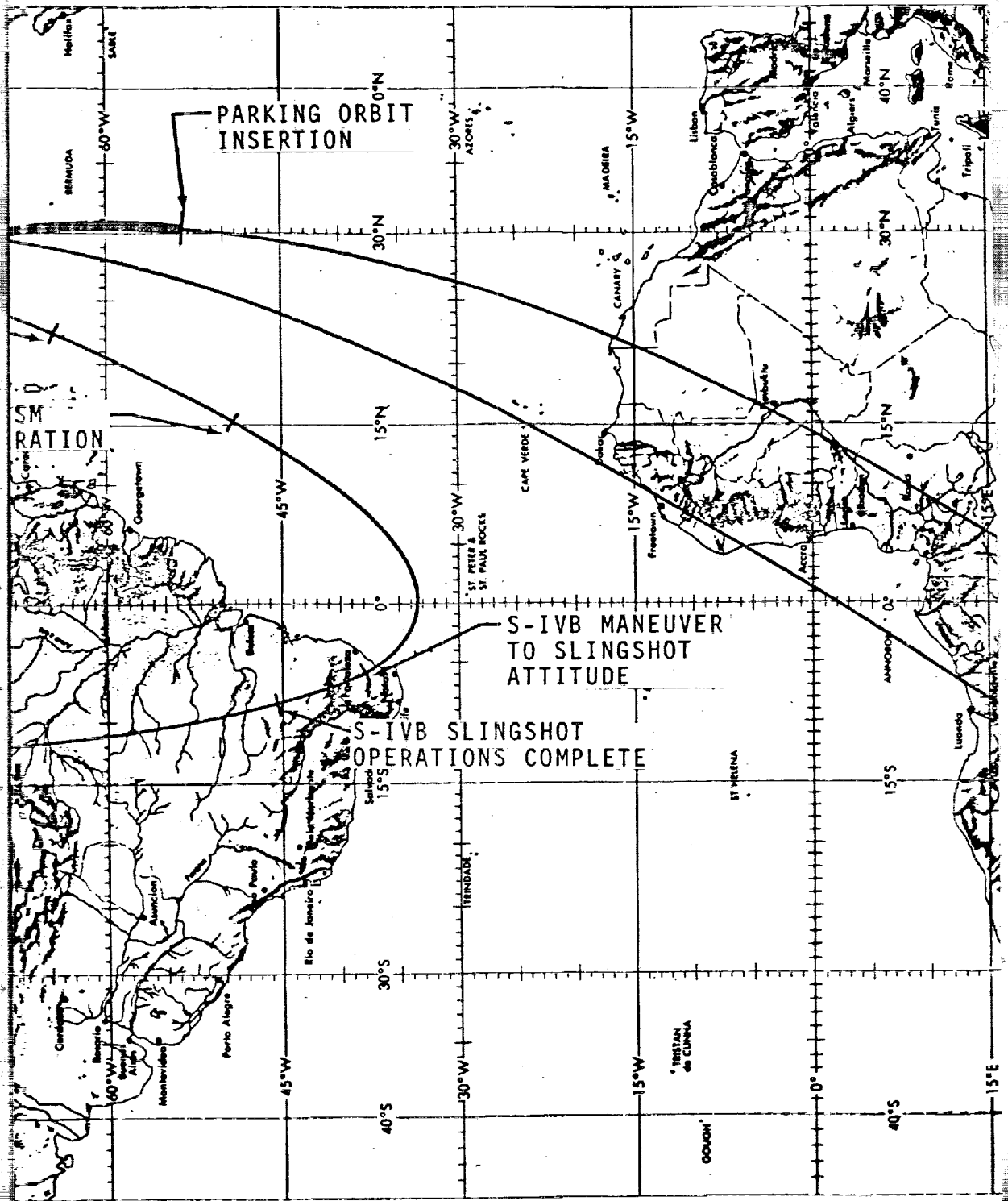
TIME OF GUIDANCE REFERENCE RELEASE (GRR) AFTER THE OPENING OF THE LAUNCH WINDOW - SECONDS

FIGURE 1-7 LAUNCH AZIMUTH VERSUS LAUNCH TIME FOR THE SEPTEMBER 1969 LAUNCH WINDOW

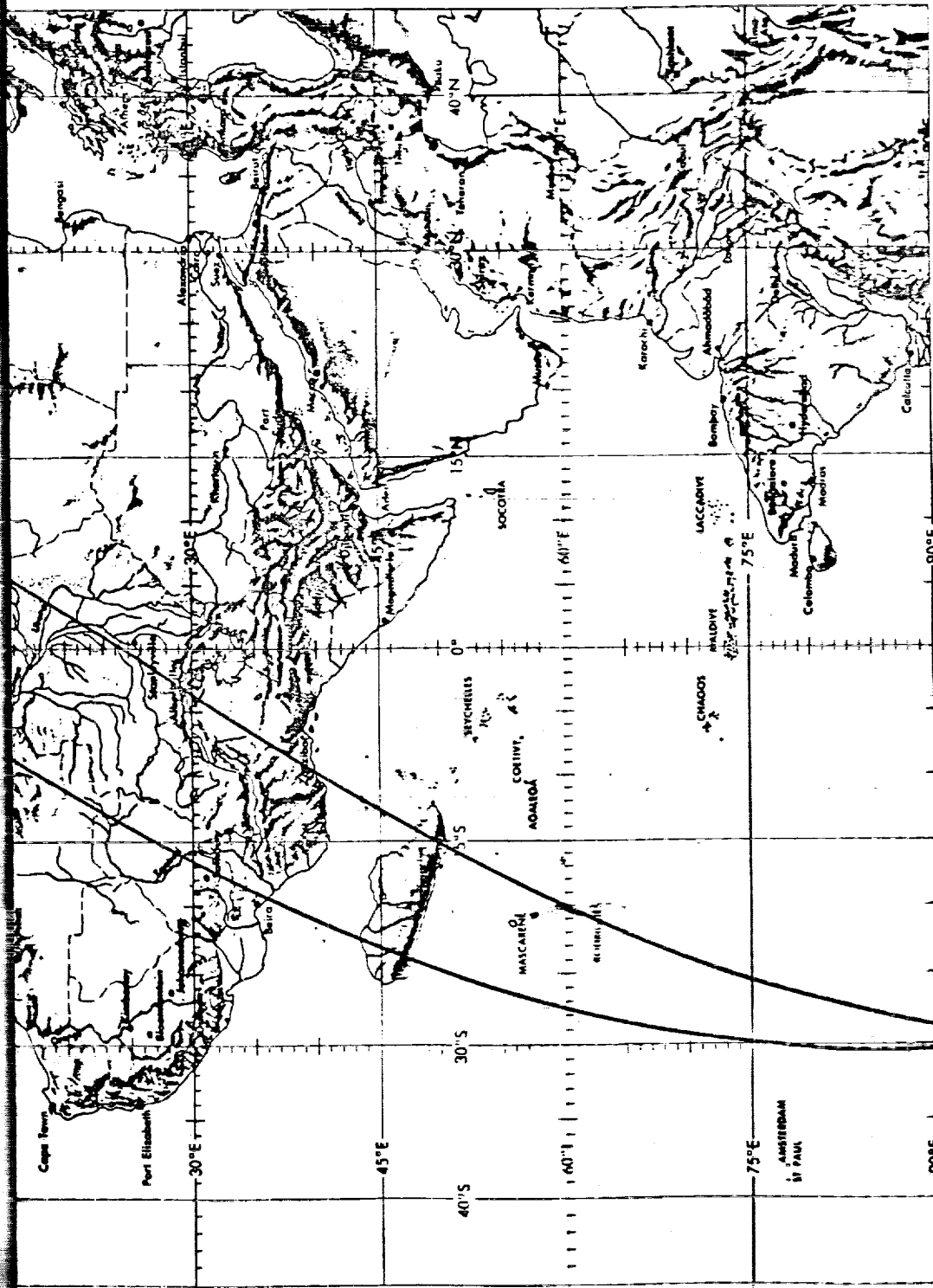
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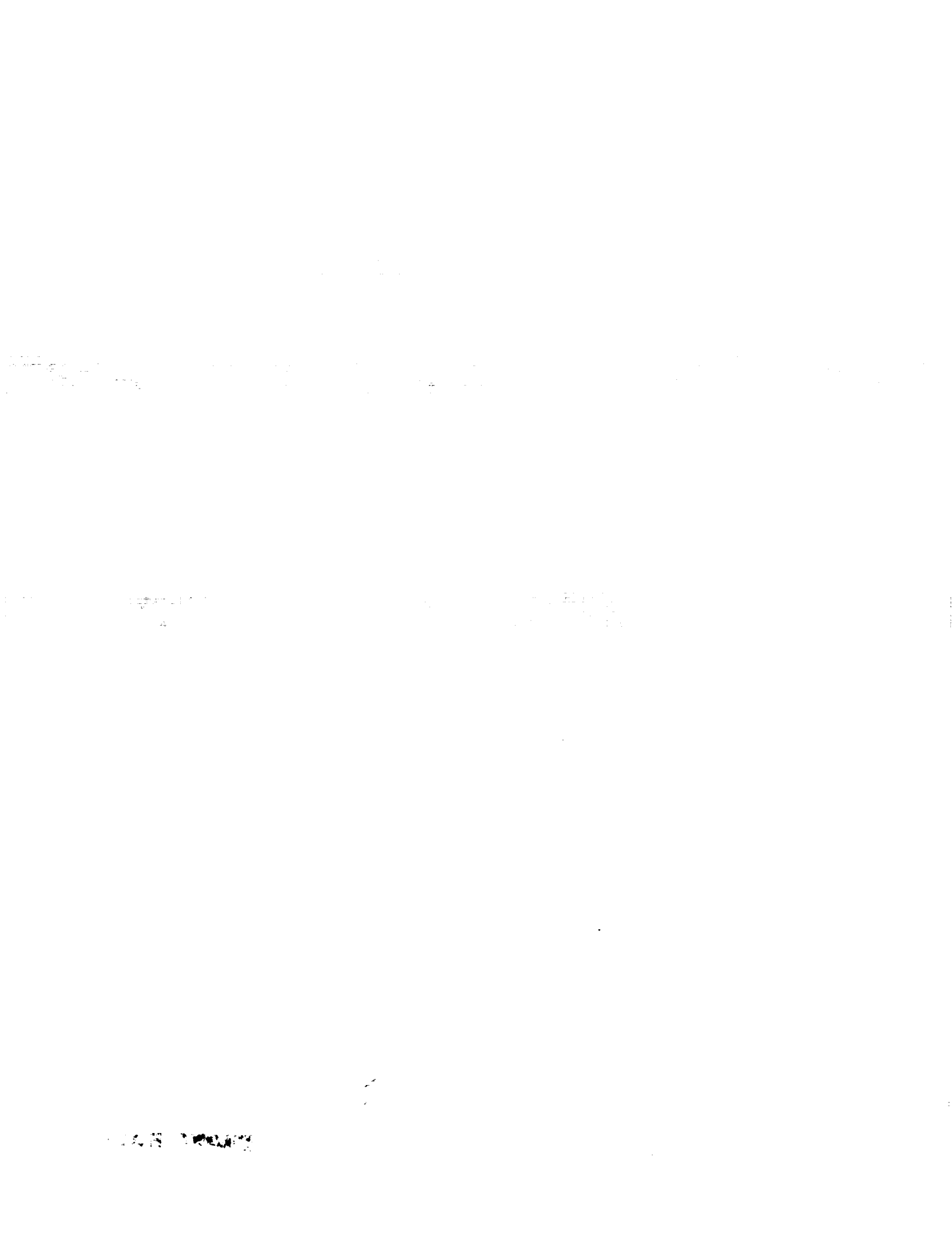








EOLDOUT FRAME 3



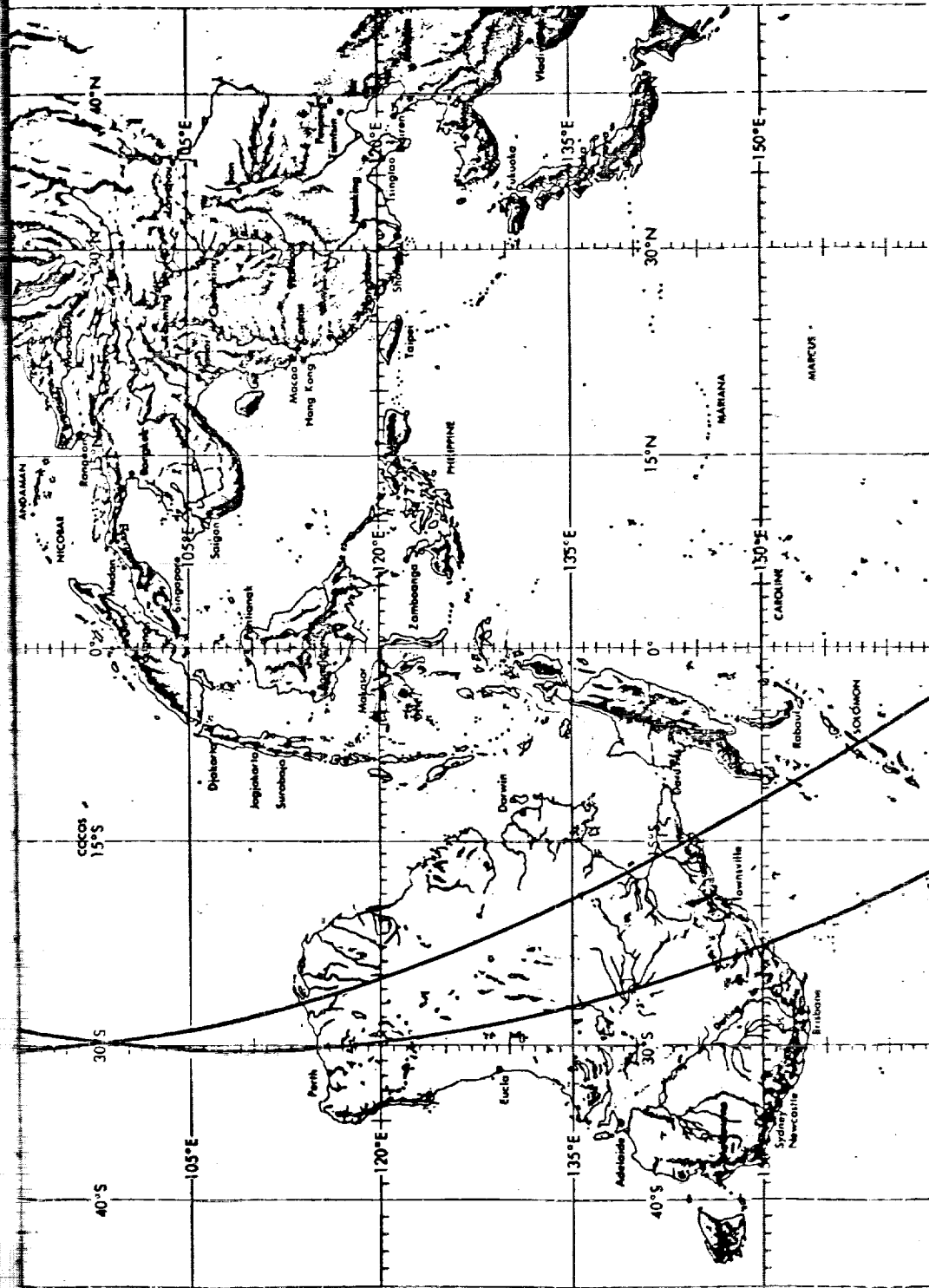
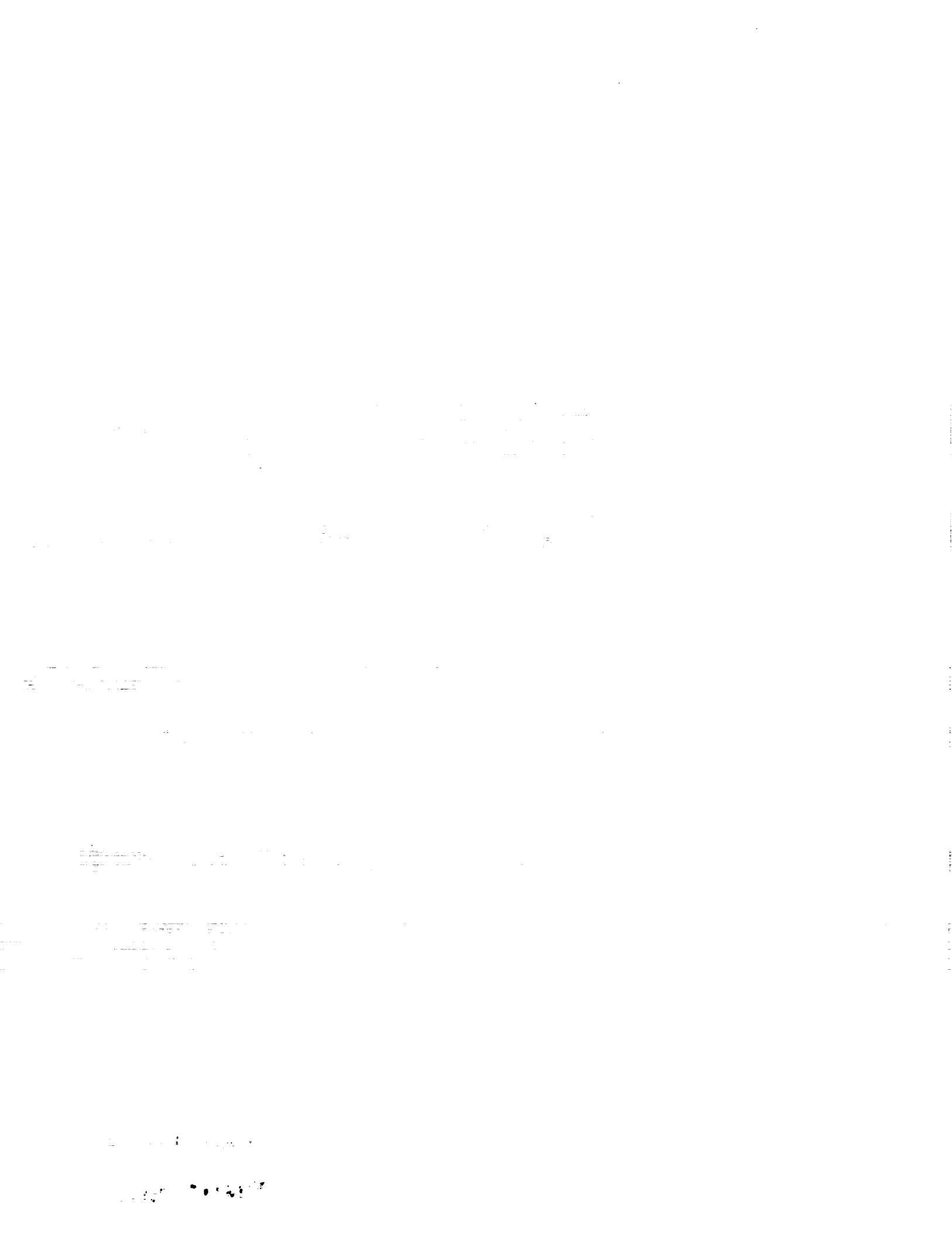
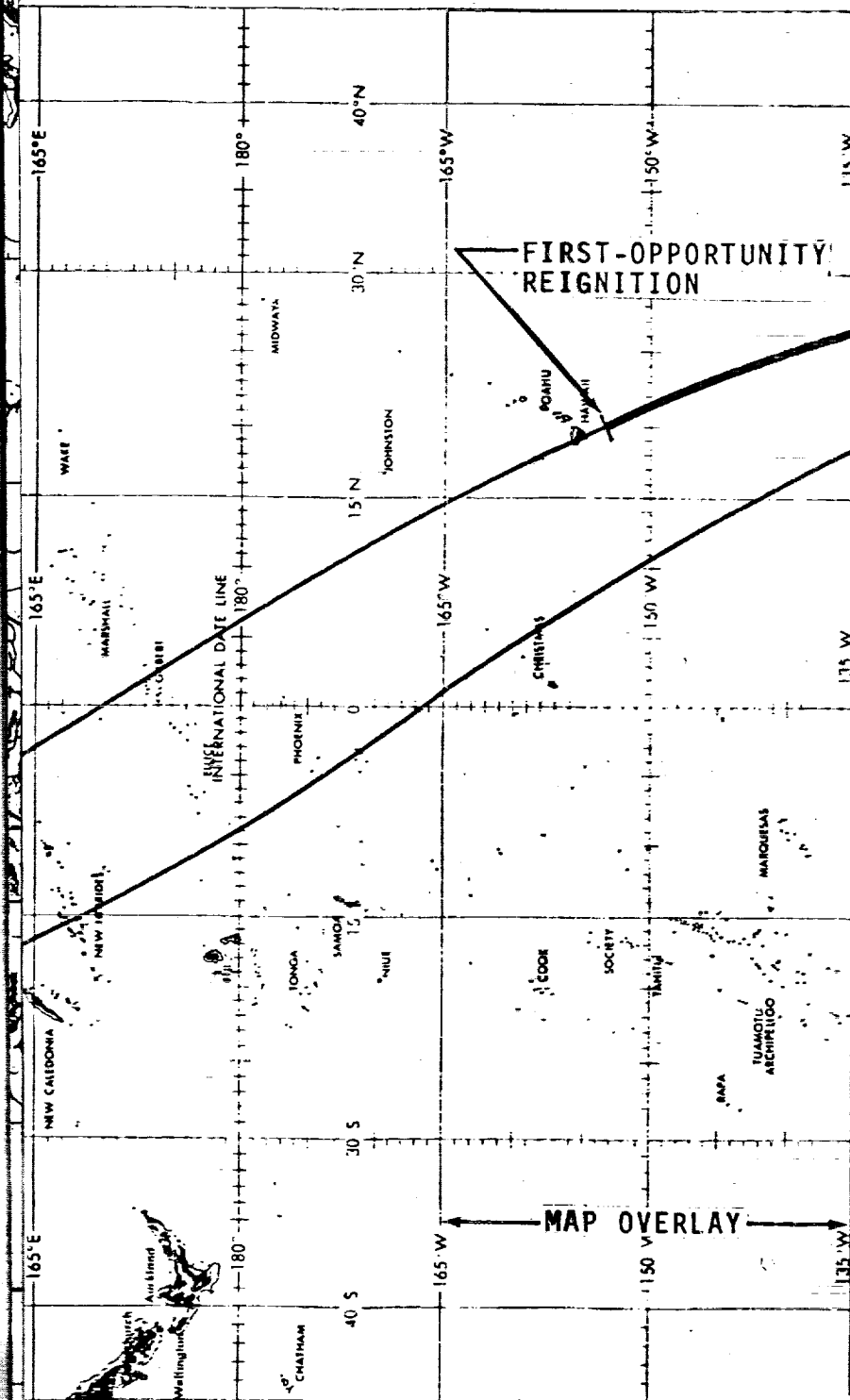


FIGURE 1-8

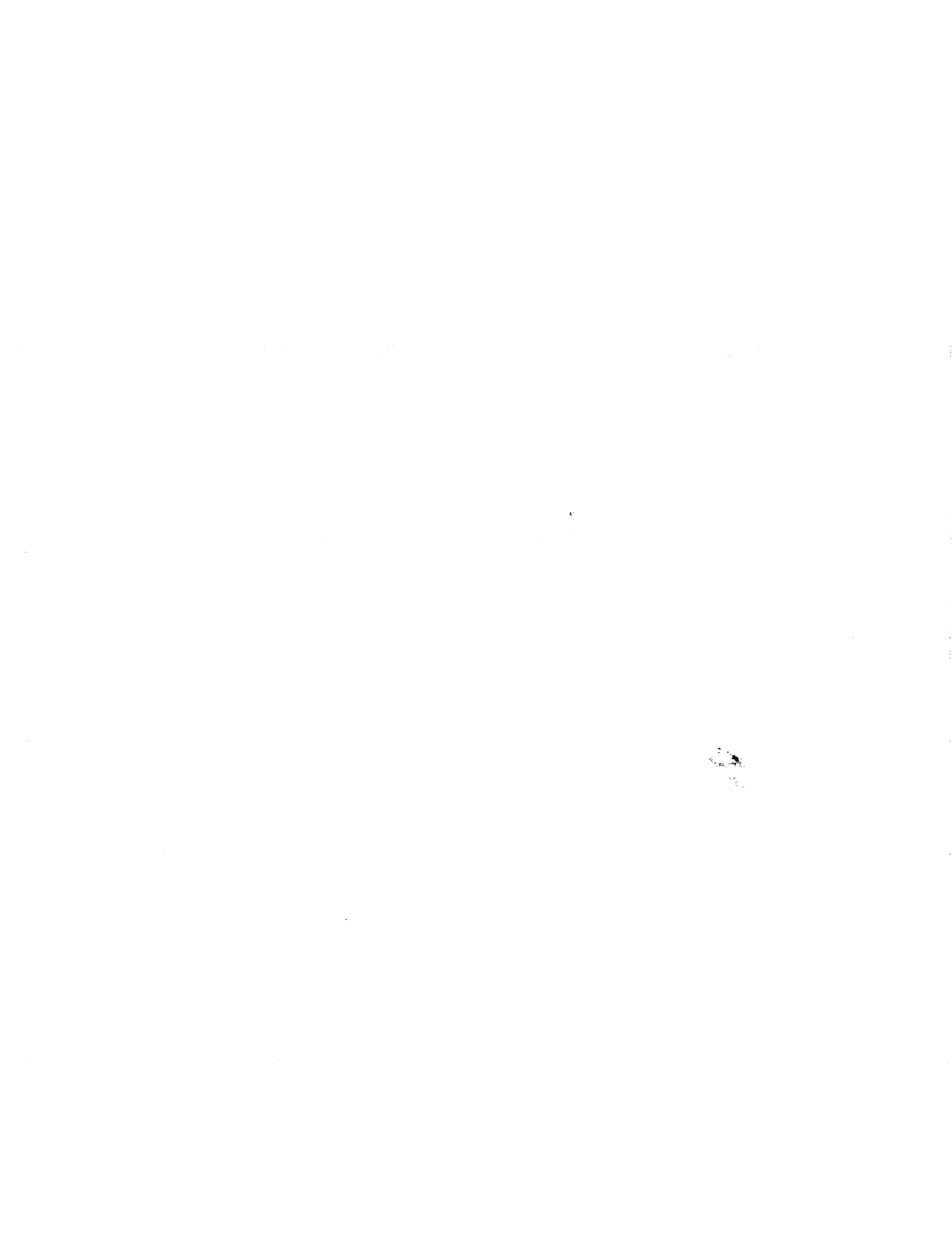
FOLDOUT FRAME 4





AS-507 G MISSION OPERATIONAL TRAJECTORY
GROUNDTRACK THROUGH TLI + 7 HOURS FOR
13 SEPTEMBER 1969, 78.051-DEGREE AZIMUTH,
FIRST OPPORTUNITY

1-15/1-16



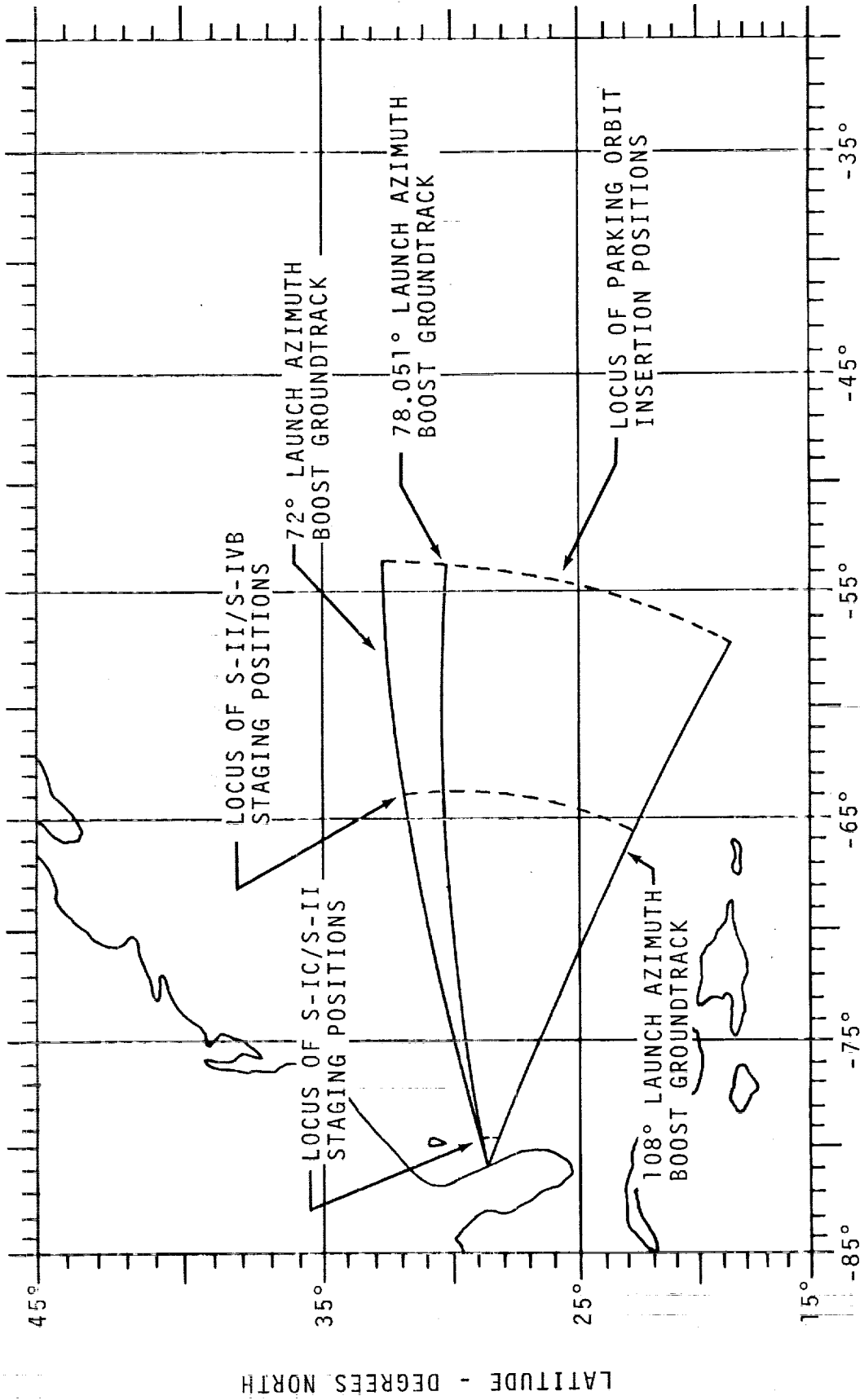


FIGURE 1-9 ENVELOPE OF EPO BOOST GROUNDTRACKS

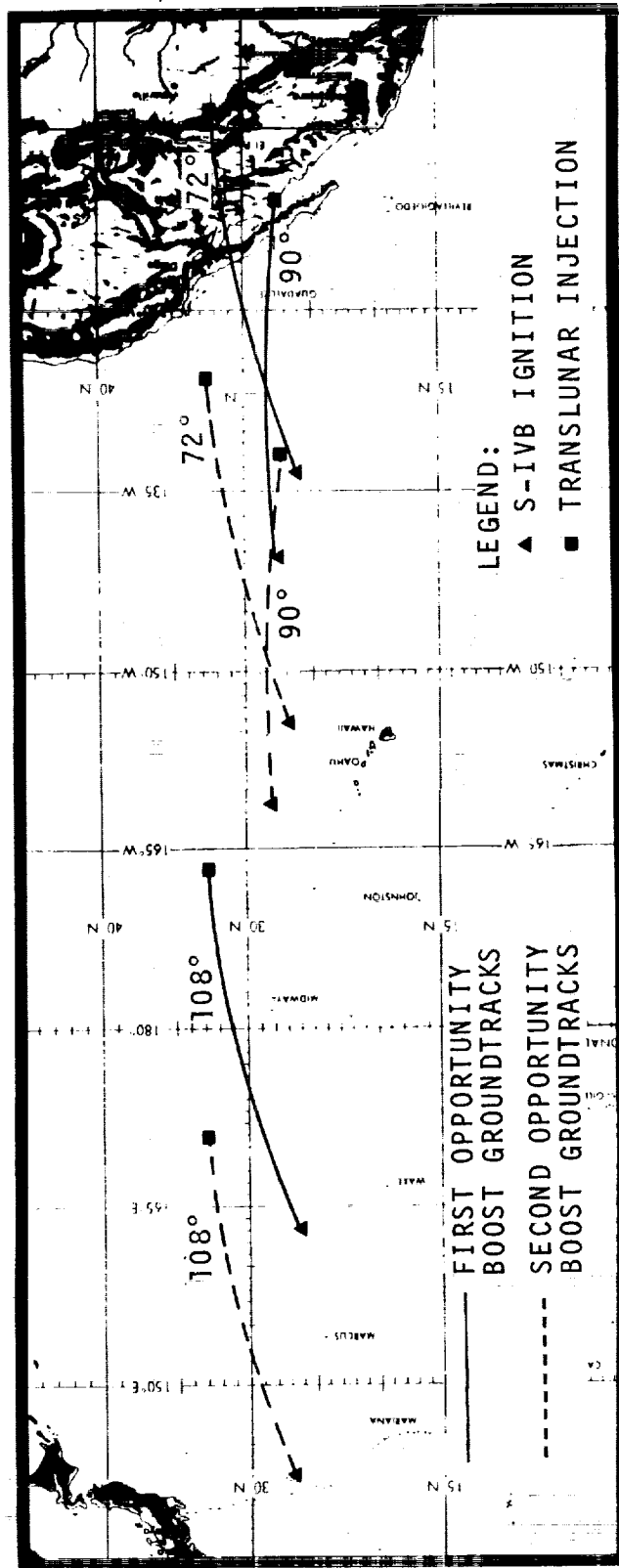


FIGURE 1-11 POSITION OF TI-BOOST GROUNDTRACKS FOR 15 SEPTEMBER 1969

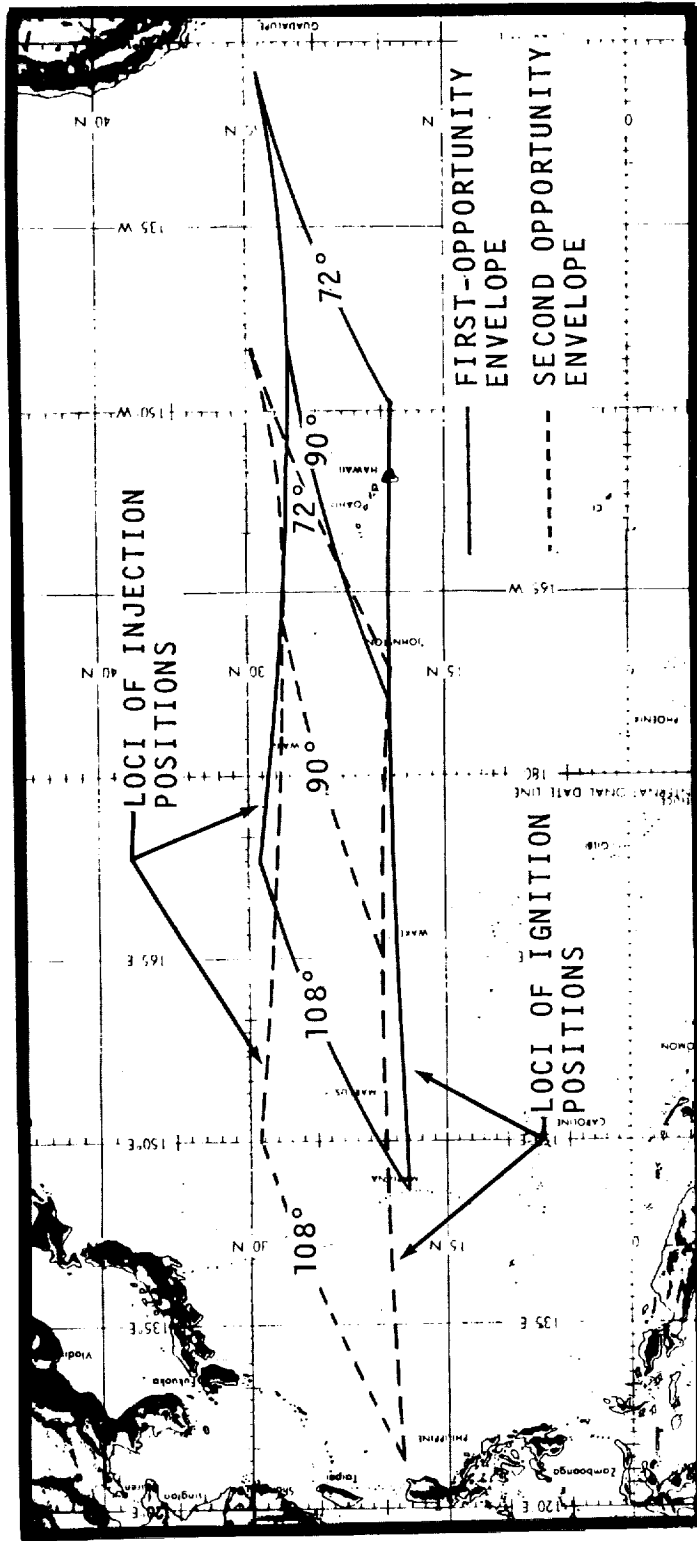


FIGURE 1-12 ENVELOPE OF TLI-BOOST GROUNDTRACKS FOR 18 SEPTEMBER 1969

TABLE 1-I. CRITICAL EVENT SEQUENCE

Nominal Time From First Motion (Hr:Min:Sec)	Nominal Time From First Motion (sec)	Program Time Reference (sec)	Predicted Sequence of Events
-00:00:17.250	-17.250		Guidance Reference Release (GRR)
00:00:00.000	0.000		First Motion (Holddown Arm Release)
00:00:00.398	0.398	(0.0) ₁	Liftoff; Timebase 1 Set
00:00:01.398	1.398	(1.0) ₁	Begin Tower Clearance Yaw Maneuver
00:00:09.398	9.398	(9.0) ₁	End Yaw Maneuver
00:00:11.375	11.375*		Pitch and Roll Initiation
00:00:20.398	20.398	(20.0) ₁	S-IC Radial Engine Cant
00:00:35.875	35.875*		Begin Second Segment of Pitch Polynomial
+00:01:04.750	64.750		Mach 1
00:01:10.000	70.000*		Begin Third Segment of Pitch Polynomial
+00:01:20.125	80.125		Maximum Dynamic Pressure
00:01:38.000	98.000*		Begin Fourth Segment of Pitch Polynomial

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*Denotes Simulation Major Cycle Occurrence Time.
 †Denotes Launch-Azimuth-Dependent Event Times.
 Time Given Is for 78.051° Launch.

TABLE 1-I. CRITICAL EVENT SEQUENCE (Continued)

Nominal Time From First Motion (Hr:Min:Sec)	Nominal Time From First Motion (sec)	Program Time Reference (sec)	Predicted Sequence of Events
00:01:45.398	105.398	(105.0) ₁	Computer Switch Point No. 1
00:02:10.398	130.398	(130.0) ₁	Computer Switch Point No. 2
00:02:14.000	134.000	(133.602) ₁ (0.0) ₂	S-IC Center-Engine Cutoff; Timebase 2 Set
00:02:38.250	158.250**		Begin Tilt Arrest
00:02:39.914	159.914		S-IC Outboard-Engine Cutoff
00:02:39.924	159.924	(0.0) ₃	Timebase 3 Set
00:02:40.424	160.424	(0.5) ₃	S-II Ullage Ignition
00:02:40.624	160.624	(0.7) ₃	Signal to Fire Separation Devices and Retrorocket Motors
00:02:40.694	160.694		Separation Structure Completely Severed
00:02:40.724	160.724		S-IC Retrorocket Thrust Build- up Begins
00:02:41.324	161.324	(1.4) ₃	S-II Engine Start Sequence Initiated

**Last Time that Minor-Loop CHI Is Updated.

TABLE I-1. CRITICAL EVENT SEQUENCE (Continued)

Nominal Time From First Motion (Hr:Min:Sec)	Nominal Time From First Motion (sec)	Program Time Reference (sec)	Predicted Sequence of Events
00:02:42.324	162.324		S-II Ignition
00:02:44.324	164.324		S-II Engine at 90% Thrust
00:02:44.924	164.924		S-II Ullage Thrust Termination
00:03:10.624	190.624	(30.7) 3	S-II Second-Plane Separation (Jettison S-II Aft Interstage)
00:03:16.124	196.124		LET Jettison
00:03:20.524	200.524	(40.6) 3	IGM Enable
00:03:21.250	201.250*		Initiation of IGM
00:03:41.324	221.324	(61.4) 3	Computer Switch Point No. 3
00:03:42.250	222.250*		SMC Turn-On
00:05:51.324	351.324	(191.4) 3	Computer Switch Point No. 4
00:07:38.924	458.924	(299.0) 3	S-II Center-Engine Cutoff Command
00:07:43.750	463.750*		IGM Senses Off-Nominal Perform- ance; Begin F/M Adjustment
00:08:03.000	483.000*		TLI < 0, Signal PU to Initiate MRS; Start Transitional Tau Mode
00:08:13.500	493.500*		End Transitional Tau Mode; Begin IGM Phase 2

*Denotes Simulation Major Cycle Occurrence Time.

TABLE I-I. CRITICAL EVENT SEQUENCE (Continued)

Nominal Time From First Motion (Hr:Min:Sec)	Nominal Time From First Motion (sec)	Program Time Reference (sec)	Predicted Sequence of Events
00:09:08.419	548.419		S-II Engine Cutoff; Enable Chi Freeze
00:09:08.429	548.429	(0.0) 4	Timebase 4 Set
00:09:09.129	549.129	(0.7) 4	S-IVB Ullage Ignition
00:09:09.229	549.229	(0.8) 4	Signal to Fire Separation Devices and Retrorocket Motors
00:09:09.304	549.304		Separation Structure Completely Severed
00:09:09.429	549.429	(1.0) 4	S-IVB Engine Start Sequence Initiated
00:09:12.429	552.429		S-IVB Ignition
00:09:14.929	554.929		S-IVB Engine at 90% Thrust
00:09:16.500	556.500*		End Chi Freeze (Begin IGM Phase 3); Start Artificial Tau Mode
00:09:16.929	556.929		S-IVB Ullage Thrust Termination

*Denotes Simulation Major Cycle Occurrence Time.

TABLE 1-1 CRITICAL EVENT SEQUENCE (Continued)

Nominal Time From First Motion (Hr:Min:Sec)	Nominal Time From First Motion (sec)	Program Time Reference (sec)	Predicted Sequence of Events
00:09:21.229	561.229	(12.8) ⁴	S-IVB Ullage Case Jettison
00:09:23.500	563.500*		SMC Turn-On
00:09:25.250	565.250*		End Artificial Tau Mode
+00:10:51.000	651.000*		Begin X Steering
+00:11:18.625	678.625**		Begin Chi Freeze; End IGM
+00:11:25.654	685.654		S-IVB First Guidance Cutoff (GCS1)
+00:11:25.864	685.864	(0.0) ⁵	Set Timebase 5
+00:11:26.164	686.164	(0.3) ⁵	S-IVB APS Ullage Engine No. 1 Ignition
+00:11:26.264	686.264	(0.4) ⁵	S-IVB APS Ullage Engine No. 2 Ignition
+00:11:35.654	695.654		Parking Orbit Insertion
+00:11:46.750	706.750*		Begin Orbital Guidance
+00:12:24.864	744.864	(59.0) ⁵	H ₂ Continuous Vent On

*Denotes Simulation Major Cycle Occurrence Time.

**Last Time that Minor-Loop Chi Is Updated.

†Denotes Launch-Azimuth-Dependent Event Times.

Time Given Is for 78.051° Launch.

TABLE 1-I. CRITICAL EVENT SEQUENCE (Continued)

Nominal Time From First Motion (Hr:Min:Sec)	Nominal Time From First Motion (sec)	Program Time Reference (sec)	Predicted Sequence of Events
+00:12:52.864	772.864	(87.0) 5	S-IVB APS Ullage Engine No. 1 Cutoff
+00:12:52.964	772.964	(87.1) 5	S-IVB APS Ullage Engine No. 2 Cutoff
+00:13:14.750	794.750*		First Orbital Navigation Calculation

*Denotes Simulation Major Cycle Occurrence Time.

+Denotes Launch-Azimuth-Dependent Event Times.

Time Given Is for 78.051° Launch.

TABLE I-I. CRITICAL EVENT SEQUENCE (Continued)

13 SEPTEMBER 1969 - 78.051° AZIMUTH - FIRST-OPPORTUNITY RESTART

Nominal Time From First Motion (Hr:Min:Sec)	Nominal Time From First Motion (sec)	Program Time Reference (sec)	Predicted Sequence of Events
2:45:12.000	9912.000*	(0.0) ₆	Begin S-IVB Restart Preparations; Timebase 6 Set
2:45:54.000	9954.000	(42.0) ₆	Helium Heater On
2:45:54.200	9954.200	(42.2) ₆	H ₂ Continuous Vent Off
2:53:28.300	10408.300	(496.3) ₆	S-IVB APS Ullage Engine No. 1 Ignition
2:53:28.400	10408.400	(496.4) ₆	S-IVB APS Ullage Engine No. 2 Ignition
2:53:28.800	10408.800	(496.8) ₆	Helium Heater Off
2:54:42.000	10482.000	(570.0) ₆	Initiate J-2 Fuel Lead
2:54:45.000	10485.000	(573.0) ₆	S-IVB APS Ullage Engine No. 1 Cutoff
2:54:45.100	10485.100	(573.1) ₆	S-IVB APS Ullage Engine No. 2 Cutoff
2:54:50.000	10490.000	(578.0) ₆	S-IVB Reignition
2:54:52.500	10492.500		S-IVB 90% Thrust
2:54:56.500	10496.500*		Initiate Out-of-Orbit IGM; Phase 4

*Denotes Simulation Major Cycle Occurrence Time.

TABLE 1-I. CRITICAL EVENT SEQUENCE (Continued)
 13 SEPTEMBER 1969 - 78.051° AZIMUTH - FIRST OPPORTUNITY RESTART

Nominal Time From First Motion (Hr:Min:Sec)	Nominal Time From First Motion (sec)	Program Time Reference (sec)	Predicted Sequence of Events
2:55:06.500	10506.500*		SMC Turn On
2:56:32.500	10592.500*		IGM MR Shift; Start Artificial Tau Mode
2:56:38.500	10598.500*		End Artificial Tau Mode; Begin IGM Phase 5
2:59:10.000	10750.000	(838.0) ₆	Computer Switch Point No. 5
3:00:04.500	10804.500*		Begin χ Steering
3:00:30.750	10830.750**		Begin Chi Freeze; End IGM
3:00:33.049	10833.049		S-IVB Second Guidance Cutoff Signal (GCS2)
3:00:33.259	10833.259	(0.0) ₇	Set Timebase 7
3:00:33.759	10833.759	(0.5) ₇	H ₂ Continuous Vent On
3:00:43.049	10843.049		Translunar Injection
3:00:53.375	10853.375*		Begin Orbital Guidance
3:00:54.375	10854.375*		First Calculation in Orbital Navigation
3:15:33.059	11733.059	(899.8) ₇	H ₂ Continuous Vent Off

*Denotes Simulation Major Cycle Occurrence Time.

**Last Time that Minor-Loop Chi Is Updated.

TABLE I-I. CRITICAL EVENT SEQUENCE (Continued)

13 SEPTEMBER 1969 - 78.051° AZIMUTH - FIRST-OPPORTUNITY RESTART

Nominal Time From First Motion (Hr:Min:Sec)	Nominal Time From First Motion (sec)	Program Time Reference (sec)	Predicted Sequence of Events
3:15:34.375	11734.375*		Begin Maneuver to Transposition and Docking Attitude
3:25:33.259	12333.259		Simulated CSM Separation
5:00:33.259	18033.259	(7200.0) 7 (0.0) 8	Begin Maneuver to and Maintain the Slingshot Attitude; Time- base 8 Set
5:00:33.659	18033.659	(0.4) 8	H ₂ Continuous Vent On (Latched).
5:12:33.259	18753.259	(720.0) 8	Begin LOX Dump
5:17:33.459	19053.459	(1020.2) 8	End LOX Dump
5:47:13.259	20833.259	(2800.0) 8	APS Ullage Ignition
6:02:13.259	21733.259	(3700.0) 8	APS Ullage Cutoff
6:02:18.259	21738.259	(3705.0) 8	Initiate Maneuver to and Main- tain Communications Attitude

*Denotes Simulation Major Cycle Occurrence Time.

TABLE 1-I. CRITICAL EVENT SEQUENCE (Continued)

13 SEPTEMBER 1969 - 78.051° AZIMUTH - SECOND-OPPORTUNITY RESTART

Nominal Time From First Motion (Hr:Min:Sec)	Nominal Time From First Motion (sec)	Program Time Reference (sec)	Predicted Sequence of Events
4:13:53.750	15233.750*	(0.0) ₆	Begin S-IVB Restart Preparations; Timebase 6 Set
4:14:35.750	15275.750	(42.0) ₆	Helium Heater On
4:14:35.950	15275.950	(42.2) ₆	H ₂ Continuous Vent Off
4:22:10.050	15730.050	(496.3) ₆	S-IVB APS Ullage Engine No. 1 Ignition
4:22:10.150	15730.150	(496.4) ₆	S-IVB APS Ullage Engine No. 2 Ignition
4:22:10.550	15730.550	(496.8) ₆	Helium Heater Off
4:23:23.750	15803.750	(570.0) ₆	Initiate J-2 Fuel Lead
4:23:26.750	15806.750	(573.0) ₆	S-IVB APS Ullage Engine No. 1 Cutoff
4:23:26.850	15806.850	(573.1) ₆	S-IVB APS Ullage Engine No. 2 Cutoff
4:23:31.750	15811.750	(578.0) ₆	S-IVB Reignition
4:23:34.250	15814.250		S-IVB 90% Thrust

*Denotes Simulation Major Cycle Occurrence Time.

TABLE 1-I. CRITICAL EVENT SEQUENCE (Continued)
 13 SEPTEMBER 1969 - 78.051° AZIMUTH - SECOND-OPPORTUNITY RESTART

Nominal Time From First Motion (Hr:Min:Sec)	Nominal Time From First Motion (sec)	Program Time Reference (sec)	Predicted Sequence of Events
4:23:38.250	15818.250*		Initiate Out-Of-Orbit IGM; Phase 4
4:23:40.250	15820.250*		Start Artificial Tau Mode
4:23:42.250	15822.250*		Begin IGM Phase 5; End Artificial Tau Mode
4:23:48.250	15828.250*		SMC Turn On
4:27:51.750	16071.750	(838.0) ₆	Computer Switch Point No. 5
4:28:32.250	16112.250*		Begin χ Steering
4:28:58.500	16138.500**		Begin Chi Freeze; End IGM
4:29:00.857	16140.857		S-IVB Second Guidance Cutoff Signal (GCS2)
4:29:01.067	16141.067	(0.0) ₇	Set Timebase 7
4:29:01.567	16141.567	(0.5) ₇	H ₂ Continuous Vent On
4:29:10.857	16150.857		Translunar Injection
4:29:21.125	16161.125*		Begin Orbital Guidance
4:29:22.125	16162.125*		First Calculation in Orbital Navigation

*Denotes Simulation Major Cycle Occurrence Time.
 **Last Time that Minor-loop Chi Is Updated.

TABLE 1-I. CRITICAL EVENT SEQUENCE (Continued)
 13 SEPTEMBER 1969 - 78.051° AZIMUTH - SECOND-OPPORTUNITY RESTART

Nominal Time From First Motion (Hr:Min:Sec)	Nominal Time From First Motion (sec)	Program Time Reference (sec)	Predicted Sequence of Events
4:44:00.867	17040.867	(899.8) ⁷	H ₂ Continuous Vent Off
4:44:02.125	17042.125*		Begin Maneuver to Transposition and Docking Attitude
4:54:01.067	17641.067		Simulated CSM Separation
6:29:01.067	23341.067	(7200.0) ⁷ (0.0) ⁸	Begin Maneuver to and Maintain the Slingshot Attitude; Time- base 8 Set
6:29:01.467	23341.467	(0.4) ⁸	H ₂ Continuous Vent On (Latched).
6:41:01.067	24061.067	(720.0) ⁸	Begin LOX Dump
6:46:01.267	24361.267	(1020.2) ⁸	End LOX Dump
7:15:41.067	26141.067	(2800.0) ⁸	APS Ullage Ignition
7:30:41.067	27041.067	(3700.0) ⁸	APS Ullage Cutoff
7:30:46.067	27046.067	(3705.0) ⁸	Initiate Maneuver to and Main- tain Communications Attitude

*Denotes Simulation Major Cycle Occurrence Time.

TABLE 1-II. AZIMUTH-DEPENDENT CRITICAL EVENT SEQUENCE
FOR 13 SEPTEMBER 1969

EVENT	NOMINAL TIME FROM FIRST MOTION		
	Hr:Min:Sec (Seconds)		
	<u>78.051°</u>	<u>90°</u>	<u>108°</u>
Mach 1	0:01:04.750 (64.750)	0:01:04.750 (64.750)	0:01:04.750 (64.750)
Maximum Dynamic Pressure	0:01:20.125 (80.125)	0:01:20.250 (80.250)	0:01:20.125 (80.125)
Begin χ Steering*	0:10:51.000 (651.000)	0:10:51.000 (651.000)	0:10:52.750 (652.750)
Begin Chi Freeze**	0:11:18.625 (678.625)	0:11:17.000 (677.000)	0:11:20.375 (680.375)
S-IVB First Guidance Cutoff (GCS1)	0:11:25.654 (685.654)	0:11:24.008 (684.008)	0:11:27.262 (687.262)
<u>FIRST OPPORTUNITY</u>			
Begin S-IVB Restart Preparations; TB6*	2:45:12.000 (9912.000)	2:41:21.000 (9681.000)	2:32:25.625 (9145.625)
Initiate J-2 Fuel Lead	2:54:42.000 (10482.000)	2:50:51.000 (10251.000)	2:41:55.625 (9715.625)
S-IVB 90% Thrust	2:54:52.500 (10492.500)	2:51:01.500 (10261.500)	2:42:06.125 (9726.125)
Initiate IGM*	2:54:56.500 (10496.500)	2:51:05.500 (10265.500)	2:42:10.125 (9730.125)
IGM MR Shift*	2:56:32.500 (10592.500)	2:52:41.500 (10361.500)	2:43:46.125 (9826.125)
Begin χ Steering*	3:00:04.500 (10804.500)	2:56:13.500 (10573.500)	2:47:18.125 (10038.125)
Begin Chi Freeze**	3:00:30.750 (10830.750)	2:56:41.375 (10601.375)	2:47:44.375 (10064.375)

*Denotes Simulation Major Cycle Occurrence Time.

**Last Time that Minor-Loop Chi is Updated.

TABLE 1-II. AZIMUTH-DEPENDENT CRITICAL EVENT SEQUENCE
FOR 13 SEPTEMBER 1969 (Continued)

EVENT	NOMINAL TIME FROM FIRST MOTION		
	Hr:Min:Sec (Seconds)		
<u>FIRST OPPORTUNITY</u>	<u>78.051°</u>	<u>90°</u>	<u>108°</u>
S-IVB Second Guidance Cutoff (GCS2)	3:00:33.049 (10833.049)	2:56:42.870 (10602.870)	2:47:46.351 (10066.351)
<u>SECOND OPPORTUNITY</u>			
Begin S-IVB Restart Preparations; TB6*	4:13:53.750 (15233.750)	4:10:01.000 (15001.000)	4:01:01.250 (14461.250)
Initiate J-2 Fuel Lead	4:23:23.750 (15803.750)	4:19:31.000 (15571.000)	4:10:31.250 (15031.250)
S-IVB 90% Thrust	4:23:34.250 (15814.250)	4:19:41.500 (15581.500)	4:10:41.750 (15041.750)
Initiate IGM*	4:23:38.250 (15818.250)	4:19:45.500 (15585.500)	4:10:45.750 (15045.750)
Begin χ Steering*	4:28:32.250 (16112.250)	4:24:39.500 (15879.500)	4:15:39.750 (15339.750)
Begin Chi Freeze**	4:28:58.500 (16138.500)	4:25:07.375 (15907.375)	4:16:06.000 (15366.000)
S-IVB Second Guidance Cutoff (GCS2)	4:29:00.857 (16140.857)	4:25:09.078 (15909.078)	4:16:07.702 (15367.702)

*Denotes Simulation Major Cycle Occurrence Time.

**Last Time that Minor-Loop Chi is Updated.

TABLE I-III. TRAJECTORY PARAMETERS AT S-IC/S-II SEPARATION

Launch Azimuth (deg)	72.0	78.051	90.0	108.0
Time (sec)	160.694	160.694	160.694	160.694
Geocentric Radius (m)	6443360.4	6443413.4	6443485.5	6443513.6
Geodetic Latitude (deg N)	28.881	28.794	28.619	28.358
Longitude (deg E)	-79.717	-79.692	-79.673	-79.724
Inertial Azimuth (deg)	75.304	80.469	90.625	105.907
Inertial Velocity (m/sec)	2761.595	2770.185	2776.975	2760.793
Altitude (m)	70151.	70177.	70190.	70141.
Inertial Path Angle (deg)	21.198	21.160	21.147	21.286
Range from Pad 39B (km)	92.683	92.652	92.648	92.702
Mass Before Separation (kg)	824952.	824952.	824952.	824952.
(lb)	1818708.	1818708.	1818708.	1818708.
Mass After Separation (kg)	658532.	658532.	658532.	658532.
(lb)	1451815.	1451815.	1451815.	1451815.

TABLE 1-IV. TRAJECTORY PARAMETERS AT S-II/S-IVB SEPARATION

Launch Azimuth (deg)	72.0	78.051	90.0	108.0
Time (sec)	549.304	549.304	549.304	549.304
Geocentric Radius (m)	6563871.8	6563915.4	6563977.4	6564027.6
Geodetic Latitude (deg N)	31.924	30.374	27.303	22.892
Longitude (deg E)	-64.038	-63.859	-64.048	-65.568
Inertial Azimuth (deg)	82.458	88.077	98.928	114.757
Inertial Velocity (m/sec)	6979.964	6992.661	7003.244	6981.527
Altitude (m)	191650.	191183.	190282.	189075.
Inertial Path Angle (deg)	0.310	0.295	0.281	0.294
Range from Pad 39B (km)	1635.122	1635.353	1635.923	1636.627
Mass Before Separation (kg)	212090.	212090.	212090.	212090.
(lb)	467578.	467578.	467578.	467578.
Mass After Separation (kg)	165244.	165244.	165244.	165244.
(lb)	364301.	364301.	364301.	364301.

TABLE I-V. TRAJECTORY PARAMETERS AT EARTH PARKING ORBIT INSERTION

Launch Azimuth (deg)	72.0	78.051	90.0	108.0
Time (sec)	697.595	695.654	694.008	697.262
Geocentric Radius (m)	6563394.5	6563391.0	6563393.2	6563388.1
Geodetic Latitude (deg N)	32.692	30.242	25.478	18.622
Longitude (deg E)	-53.394	-53.543	-54.427	-57.052
Inertial Azimuth (deg)	88.398	93.519	103.429	117.991
Inertial Velocity (m/sec)	7792.978	7792.991	7793.030	7793.046
Altitude (m)	191430.	190616.	189158.	187387.
Inertial Path Angle (deg)	0.0002	-0.0005	-0.0003	-0.0006
Range from Pad 39B (km)	2640.619	2627.340	2616.759	2641.254
Mass (kg)	135900.	136324.	136682.	135972.
(lb)	299609.	300544.	301333.	299768.
Inclination Angle, (deg)	32.5574	30.2661	28.4638	33.1394
Descending Node (deg)	123.1911	113.0616	90.0028	57.4030
Eccentricity	0.00001	0.00001	0.00005	0.00001
Orbital Period (sec)	5292.	5292.	5292.	5292.

TABLE 1-VI. TRAJECTORY PARAMETERS AT TIMEBASE 6 INITIATION FOR 13 SEPTEMBER 1969

	<u>First-Opportunity Injection</u>		<u>Second-Opportunity Injection</u>			
Launch Azimuth (deg)	78.051	90.0	108.0	78.051	90.0	108.0
Time (sec)	9912.000	9681.000	9145.625	15233.750	15001.000	14461.250
Geocentric Radius (m)	6573264.8	6570659.2	6565363.3	6576438.1	6573884.9	6568641.2
Geodetic Latitude (deg N)	1.855	4.022	0.105	2.826	4.952	1.052
Longitude (deg E)	173.295	155.473	117.954	152.242	134.493	96.724
Inertial Azimuth (deg)	59.747	61.766	56.847	59.814	61.901	56.862
Inertial Velocity (m/sec)	7790.610	7792.782	7797.987	7788.619	7790.727	7795.944
Altitude (m)	195122.	192598.	187198.	198325.	195878.	190483.
Inertial Path Angle (deg)	0.032	0.047	0.056	0.030	0.046	0.056
Mass (kg)	135169.	135545.	134877.	134766.	135142.	134473.
Mass (lb)	297997.	298826.	297353.	297108.	297937.	296462.

TABLE I-VII. TRAJECTORY PARAMETERS AT TRANSLUNAR INJECTION FOR 13 SEPTEMBER 1969

	<u>First-Opportunity Injection</u>		<u>Second-Opportunity Injection</u>			
Launch Azimuth (deg)	78.051	90.0	108.0	78.051	90.0	108.0
Time (sec)	10843.049	10612.870	10076.351	16150.857	15919.078	15377.702
Geocentric Radius (m)	6709466.6	6710743.7	6706256.5	6706656.0	6708260.1	6700956.9
Geodetic Latitude (deg N)	28.526	27.614	30.355	28.792	27.806	30.661
Longitude (deg E)	-125.624	-141.986	177.593	-147.304	-163.598	155.691
Inertial Azimuth (deg)	79.899	82.868	77.064	79.591	82.827	76.328
Inertial Velocity (m/sec)	10831.210	10830.314	10833.677	10833.228	10832.043	10837.829
Altitude (m)	336147.	337143.	333519.	333420.	334718.	328319.
Inertial Path Angle (deg)	7.323	7.375	7.349	7.158	7.227	7.089
Mass (kg)	63530.	63728.	63309.	63397.	63562.	63246.
(lb)	140060.	140495.	139572.	139766.	140131.	139434.
Inclination Angle (deg)	29.9761	28.3051	32.6084	30.3199	28.4991	33.1538
Descending Node (deg)	110.9225	88.2269	54.9307	111.8402	88.7765	56.2401
Eccentricity	0.97512	0.97517	0.97507	0.97501	0.97506	0.97500
Twice Specific Energy (m ² /sec ²)	-1503043.	-1499839.	-1506463.	-1509119.	-1506361.	-1510497.
Argument of Perigee (deg)	57.175	61.628	54.072	57.191	61.956	53.775

TABLE I-VIII. TRAJECTORY PARAMETERS AT CSM SEPARATION FOR 13 SEPTEMBER 1969

	<u>First-Opportunity Injection</u>	<u>Second-Opportunity Injection</u>
Launch Azimuth (deg)	78.051	78.051
Time (sec)	90.0	90.0
Geocentric Radius (m)	12333.259	17641.067
Geodetic Latitude (deg N)	13319979.13326029	13300306.13308369
Longitude (deg E)	15.179	12.453
Inertial Azimuth (deg)	-49.315	-88.625
Inertial Velocity (m/sec)	7638.178	7641.291
Altitude (m)	6943273.6948858	6915882.6931194
Inertial Path Angle (deg)	44.884	44.832
Mass Before Separation (kg)	62627.62823	62495.62658
Separation (lb)	138069.138501	137777.138138
		137444.137444

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SECTION 2

TRAJECTORY DESCRIPTION AND DATA

2.0 BOOST TO EARTH PARKING ORBIT

The simulated AS-507G flight is launched from Pad 39B of the Kennedy Space Center. A launch azimuth range of 72 to 108 degrees is used for lunar missions. The actual vehicle flight azimuth within this range is computed just prior to launch from a launch-day-dependent polynomial of launch azimuth as a function of launch time. The vehicle body axes are aligned for a 90-degree launch azimuth at liftoff.

Following launch, the vehicle rises 138 meters vertically to clear the launch umbilical tower. During vertical rise, a yaw maneuver is executed to increase the lateral distance between the vehicle and the tower. After clearing the tower vertically, the pitch and roll programs are initiated. The roll program aligns the vehicle body axes with the computed flight azimuth. The pitch program provides a near-zero-lift trajectory that satisfies vehicle performance, heating, and loads requirements. Maximum dynamic pressure is encountered approximately 80.1 seconds after first motion. S-IC center-engine cutoff (CECO) is timer commanded 133.602 seconds after liftoff (timebase 1). Timebase 2 initiation is coincident with the S-IC CECO command. Pitch tilt arrest begins 158.250 seconds after first motion. The S-IC outboard engine cutoff (OECO) command is initiated by propellant-depletion sensors. The nominal cutoff command is initiated by LOX-depletion sensors at 159.914 seconds after first motion. Simulated timebase 3 initiation is 0.01 second after the S-IC OECO command.

S-II ullage-rocket ignition is commanded 0.5 second after timebase 3. S-IC retrorocket ignition and structure severance are commanded 0.2 second later. Structure severance is complete 0.77 second after timebase 3 initiation, and nominal S-IC/S-II staging occurs 160.694 seconds after first motion. S-II ignition occurs 2.4 seconds after timebase 3 initiation, and thrust buildup to 90-percent thrust nominally requires 2.0 seconds from the ignition event. The S-II aft interstage is jettisoned 30.7 seconds after timebase 3 initiation. The Launch Escape Tower (LET) is jettisoned by crew command after assurance that S-II ignition and thrust buildup have occurred. The simulated time of LET jettison is 36.2 seconds after timebase 3 initiation. The Iterative Guidance Mode (IGM) is enabled 40.6 seconds after timebase 3 initiation, and provides steering commands during the remainder of launch vehicle boost flight. A switch selector signals the S-II stage center engine to shut down at 299.0 seconds after timebase 3 initiation.

2.0 (Continued)

The IGM continuously adjusts the time remaining in the first stage of iterative guidance based upon the filtered values of F/M data, and upon the preset value of characteristic velocity to be gained during S-II stage flight before and during the first stage of iterative guidance. After the IGM-calculated thrust, based upon filtered values of F/M, drops below 85 percent of the nominal anticipated thrust, the IGM also adjusts the anticipated acceleration during the second stage of iterative guidance. The S-II stage propellant utilization (PU) system operates in an open-loop configuration. Initiation of the S-II mixture-ratio shift (MRS) is commanded by the LVDC at the end of the first stage of iterative guidance. The approximate S-II LOX/LH₂ flowrate mixture ratios used are 5.5 before the mixture-ratio shift and 4.2 after the shift. The S-II engine-cutoff command is initiated by propellant-depletion sensors. The simulated cutoff command for the outboard engines is initiated by LOX-depletion sensors at 548.419 seconds after first motion. Simulated timebase 4 initiation is 0.01 second after the S-II engine cutoff command.

S-IVB ullage-rocket ignition is commanded 0.7 second after timebase 4 initiation. S-II retrorocket ignition and structure severance are commanded 0.8 second after timebase 4 initiation. Severance is complete 0.885 second after S-II cutoff, and nominal S-II/S-IVB staging occurs 549.304 seconds after first motion. S-IVB ignition occurs 3.0 seconds after timebase 4 initiation, and thrust buildup to 90-percent thrust nominally requires 2.5 seconds from the ignition event. Expended S-IVB ullage-rocket cases are jettisoned 12.8 seconds after timebase 4 initiation. The S-IVB stage PU system operates in an open-loop configuration during boost flight. The approximate S-IVB LOX/LH₂ flowrate mixture ratio used during the S-IVB first burn is 4.9.

Vehicle insertion into a circular 100-nautical-mile altitude (referenced to the earth's equatorial radius) parking orbit occurs at the end of the S-IVB first burn period. S-IVB stage cutoff (GCS1) is commanded by the guidance system when the desired cutoff conditions are achieved. Timebase 5 initiation is simulated 0.21 second after GCS1, and the time of parking orbit insertion is defined as 10.0 seconds after GCS1. The earliest time of parking orbit insertion is 694.008 seconds and corresponds to a launch azimuth of 90 degrees. The latest time of parking orbit insertion is 697.595 seconds and corresponds to a launch azimuth of 72 degrees.

Profiles of vehicle altitude, radius, velocity, inertial flight-path angle, inertial heading angle, range, F/M, angle of attack (α), dynamic pressure (q), $|q\alpha|$ product, axial force, normal force, and aerodynamic heating indicator are presented in Figures 2-1 through 2-17 for the EPO-boost phase of flight.

2.1 COAST IN EARTH PARKING ORBIT

The vehicle coasts in earth parking orbit for up to three revolutions while subsystems checkout is performed. During coast in parking orbit, the vehicle orbit is continuously perturbed by Auxiliary Propulsion System (APS) burns, aerodynamic drag, and thrust from the propulsive hydrogen vents. The hydrogen mass loss from parking orbit insertion to the nominal time of second-opportunity restart preparation is approximately 3257 pounds for a 78.051-degree azimuth launch on September 13.

The inclination of the parking orbit relative to the equator and the descending nodal angle relative to the inertial launch meridian are computed from polynomials of flight azimuth. The combination of inclination and node computed for each flight azimuth causes minimum yaw steering during the boost to parking orbit. The maximum and minimum parking orbit inclinations associated with the 72 to 108 degrees launch azimuth range are 33.139 and 28.464 degrees. Incremental descending-node longitudinal angles decrease from 123.191 to 57.403 degrees as the launch azimuth increases from 72 to 108 degrees. The variations of time of parking orbit insertion, the orbit inclination, and the descending nodal angle across the 72 to 108 degrees launch azimuth range are shown in Figures 2-18 through 2-20. Time histories of altitude and velocity during parking orbit are shown in Figures 2-21 and 2-22 for launch azimuths of 78.051, 90, and 108 degrees.

2.2 TRANSLUNAR INJECTION BOOST

The time to initialize restart preparations for the S-IVB stage is established by restart-geometry criteria. Variation of the time to initiate restart preparations (timebase 6 initiation) during the September 13 launch window is shown in Figure 2-23. The helium heater (O_2/H_2 burner) is ignited 42.0 seconds after timebase 6 initiation, and the propulsive hydrogen vent is closed 0.2 second later. The APS ullage motors are started 496.3 seconds after timebase 6 initiation, and 0.5 second later, the helium heater is cut off. J-2 fuel lead occurs at timebase 6 plus 570.0 seconds and marks the initiation of the J-2 restart sequence. The APS ullage motors are cut off 3.0 seconds later. J-2 engine ignition occurs 8.0 seconds after J-2 fuel lead initiation. The thrust buildup period from J-2 ignition until 90-percent thrust is nominally 2.5 seconds. TLI-boost IGM is enabled 4.0 seconds after the nominal time of 90-percent thrust.

A programmed propellant-flowrate mixture-ratio shift occurs 100.0 seconds after the nominal time of 90-percent thrust during the first-opportunity burn. The LOX/LH₂ flowrate mixture ratios

2.2 (Continued)

are approximately 4.3 before the shift and 4.9 after the shift. The second-opportunity S-IVB burn does not have a mixture-ratio shift and the full boost duration occurs at a flowrate mixture ratio of approximately 4.9. S-IVB second cutoff (GCS2) is guidance commanded when the translunar hypersurface is achieved. Timebase 7 initiation is simulated 0.21 second after GCS2, and translunar injection is defined to occur 10.0 seconds after GCS2. A summary of timebase 6 and GCS2 times for the September launch window is presented in Table 2-I.

Profiles of altitude, inertial velocity, inertial path angle, inertial heading angle, angle of attack, F/M, and radius are presented in Figures 2-24 through 2-37 for both September 13 translunar injection opportunities. The variations of the targeted hypersurface-defining parameters C_3 (twice the specific energy of the translunar orbit), cosine σ (cosine of the angle between the target vector and perigee of the translunar orbit), translunar orbit eccentricity, target-vector right ascension, and target-vector declination for the September 1969 launch window are presented in Figures 2-38 through 2-44.

2.3 PROPELLANT RESERVES SUMMARY

The variation of usable propellant reserves available at GCS2 during the September 13 launch window is shown in Figure 2-45. The usable propellant remaining at GCS2 for the September 1969 launch window is summarized in Table 2-II.

Flight Performance Reserves (FPR) compensate for launch vehicle and environmental perturbations. FPR is calculated as the root-sum-square of negative launch vehicle mass dispersions at GCS2. These dispersions are determined from available estimates of launch vehicle subsystem and environmental 3σ perturbations. Assuming normal distribution, availability of the required reserves provides 99.865 percent assurance that the launch vehicle has the performance capability to complete the targeted mission. The Dispersion Analysis for the AS-507 G mission is presently incomplete; however, an approximation of the required reserves can be obtained from the AS-506 G Mission Dispersion Analysis (Reference 13). The AS-506 G Mission Analysis specifies an FPR requirement of 2924.8 pounds of propellant (2266.8 pounds of LOX and 658.0 pounds of LH₂).

2.4 COAST IN TRANSLUNAR ORBIT AND SLINGSHOT OPERATIONS

The simulated translunar-orbit S-IVB coast-phase attitude and vent timeline is presented in Table 2-III. Following S-IVB cutoff, the translunar orbit is perturbed by a propulsive hydrogen vent that lasts for 15 minutes. After the hydrogen vent closes,

2.4 (Continued)

the vehicle maneuvers to the commanded TD&E attitude and this attitude is maintained inertially throughout TD&E operations. After spacecraft separation is completed, the S-IVB stage maneuvers to the slingshot attitude, a constant attitude relative to local horizontal coordinates. The retrograde velocity required to achieve S-IVB slingshot past the trailing side of the moon and into a solar orbit is provided by propulsive hydrogen venting, a LOX dump through the J-2 engine, and an APS ullage-motor burn.

The S-IVB spent-stage trajectory is simulated from the time of IV/CSM separation until 250 hours after launch. The slingshot ΔV is applied instantaneously at 9058 seconds after GCS2. Variation in S-IVB mass during the slingshot propulsive operations from launch day to launch day and across each launch window causes the slingshot ΔV to be variable. A single value of ΔV is simulated for each launch day; for September 13 the simulated value is 35.0 meters/second. A different slingshot attitude is implemented for each launch day. The slingshot attitude is maintained relative to the local horizontal coordinate system throughout slingshot operations. The slingshot attitude simulated for launch on September 13, 1969 is specified in Table 2-III. The slingshot ΔV magnitude and vehicle attitude are obtained from Reference 7. All nominal September 13 trajectories for which slingshot operations are simulated result in S-IVB lunar slingshot and earth escape. S-IVB radius at periselenium for September 13 launch is presented in Figure 2-46.

Midcourse correction velocity requirements (TLMC ΔV) at 1 hour and 50 minutes after translunar injection are presented as a function of launch azimuth for September 13 launch in Figure 2-47 and for the September launch window in Table 2-IV. TLMC ΔV values presented in Table 2-IV for launch on September 15 and 18 are based upon preliminary trajectory simulations that do not include the refinements defined in Reference 7 and minor data corrections. However, implementation of these simulation refinements results in only minor changes to values of TLMC ΔV . The desired TLMC ΔV is 6.1 meters/second and is consistent with the planned spacecraft evasive maneuver. Spacecraft midcourse correction velocity requirements at 7 hours after TLI following overspeed cutoff and the spacecraft separation/evasive maneuver are presented in Figure 2-48 and Table 2-V. The spacecraft separation/evasive maneuver is simulated at 1 hour and 50 minutes after TLI as an instantaneous ΔV of 20 feet/second applied in a local-horizontal-referenced direction of -75.0 degrees pitch and 0.0 degrees yaw. Translunar flight times for the September launch window are shown in Figure 2-49.

2.5 SPENT-STAGE IMPACT POSITIONS

The spent S-IC and S-II stages are jettisoned during nominal launch vehicle boost flight to parking orbit and impact in the Atlantic Ocean. Approximate masses of these pieces at impact are 363279 pounds and 102178 pounds for the S-IC and S-II stages, respectively. Nominal impact positions for these stages are established by simulating impact trajectories with the effects of aerodynamic drag for each stage from the stage jettison positions on the nominal trajectories for flight azimuths of 72, 78.051, 90, and 108 degrees. The computed impact positions and impact ranges from the launch site are presented in Table 2-VI. Spent stages jettisoned during nominal flight impact at approximately the same range from the launch site regardless of the launch azimuth used (Figure 2-50).

An inflight malfunction during S-IVB first burn that requires or causes preorbital J-2 engine shutdown may result in S-IVB/IU/LM impact on the African Continent, Madagascar, or neighboring islands. The vacuum impact traces across Africa resulting from premature J-2 engine shutdown during previously nominal flight along launch azimuths of 72, 78.051, 90, and 108 degrees are presented in Figure 2-51.

An inflight malfunction resulting in J-2 engine shutdown during the S-IVB second burn does not result in land impact. The S-IVB instantaneous perigee altitudes resulting from S-IVB second-burn thrust loss during previously nominal flight are presented in Figures 2-52 and 2-53 for both reignition opportunities for launch on September 13 along an azimuth of 78.051 degrees.

2.6 FLIGHT PROFILE ENVELOPE

A statistical analysis of the effects of 3-sigma variations in launch vehicle systems characteristics and environmental conditions for the AS-507 G mission is not presently available. For certain parameters, however, the 3-sigma statistical variations are not expected to vary significantly from vehicle to vehicle. AS-507 dispersions of these parameters are expected to be approximately the same as the dispersions generated during the analysis of the AS-506 G mission (Reference 13). Application of the AS-506G dispersions to the nominal AS-507G trajectory for 78.051 degrees launch azimuth and launch on September 13 results in the flight profile envelopes at parking orbit insertion and translunar injection presented in Tables 2-VII and 2-VIII.

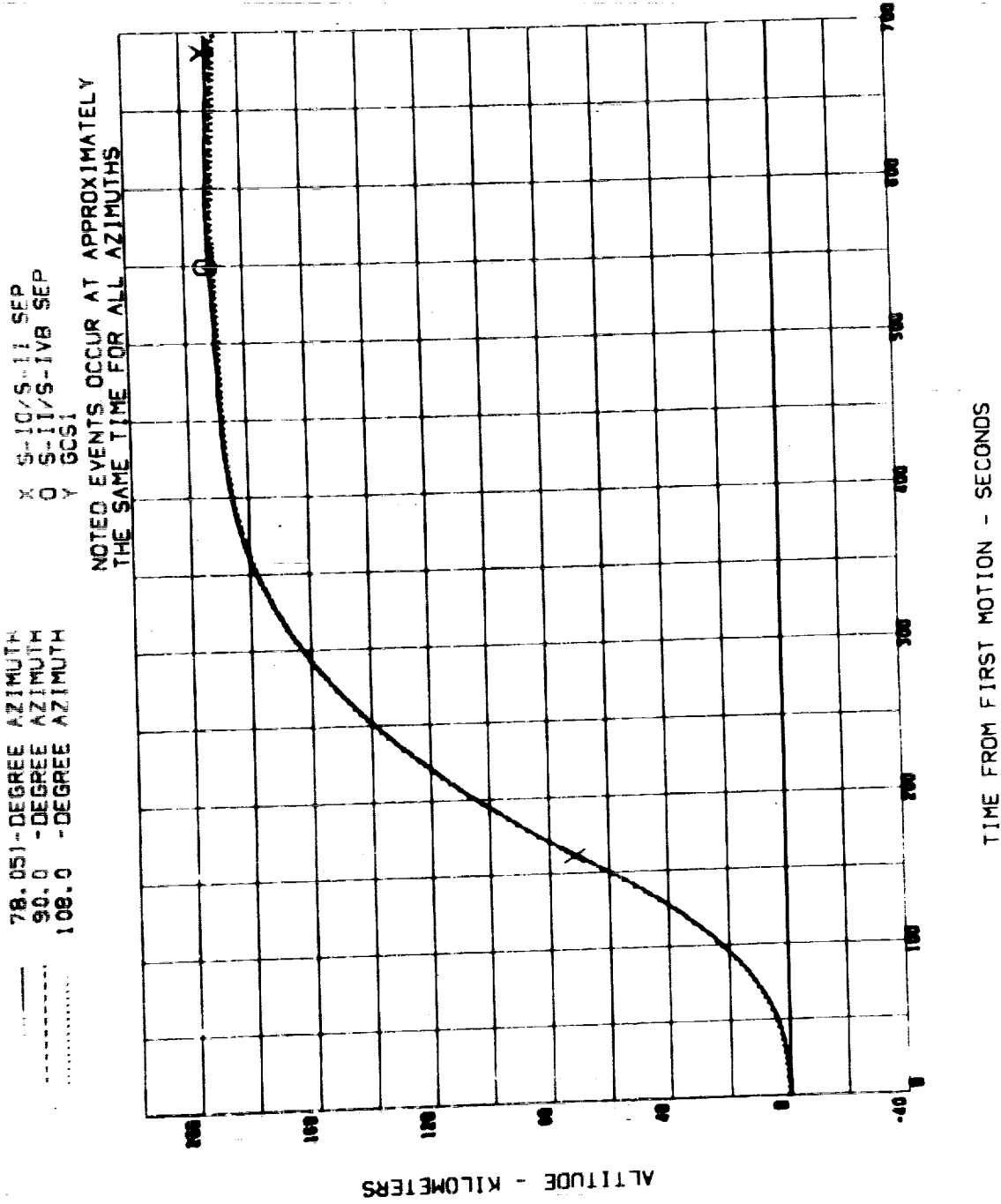


FIGURE 2-1 ALTITUDE VERSUS TIME DURING BOOST
TO PARKING ORBIT

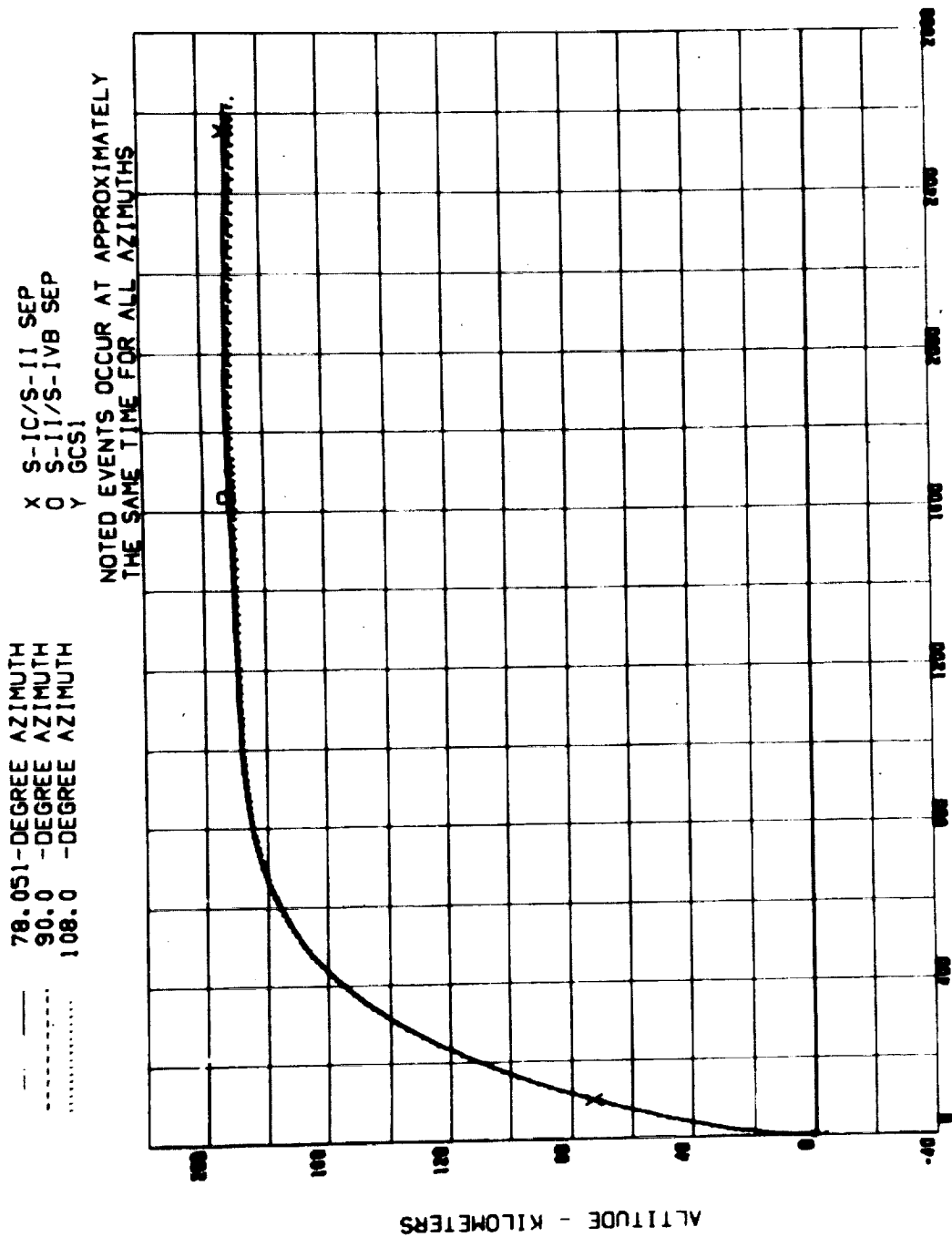
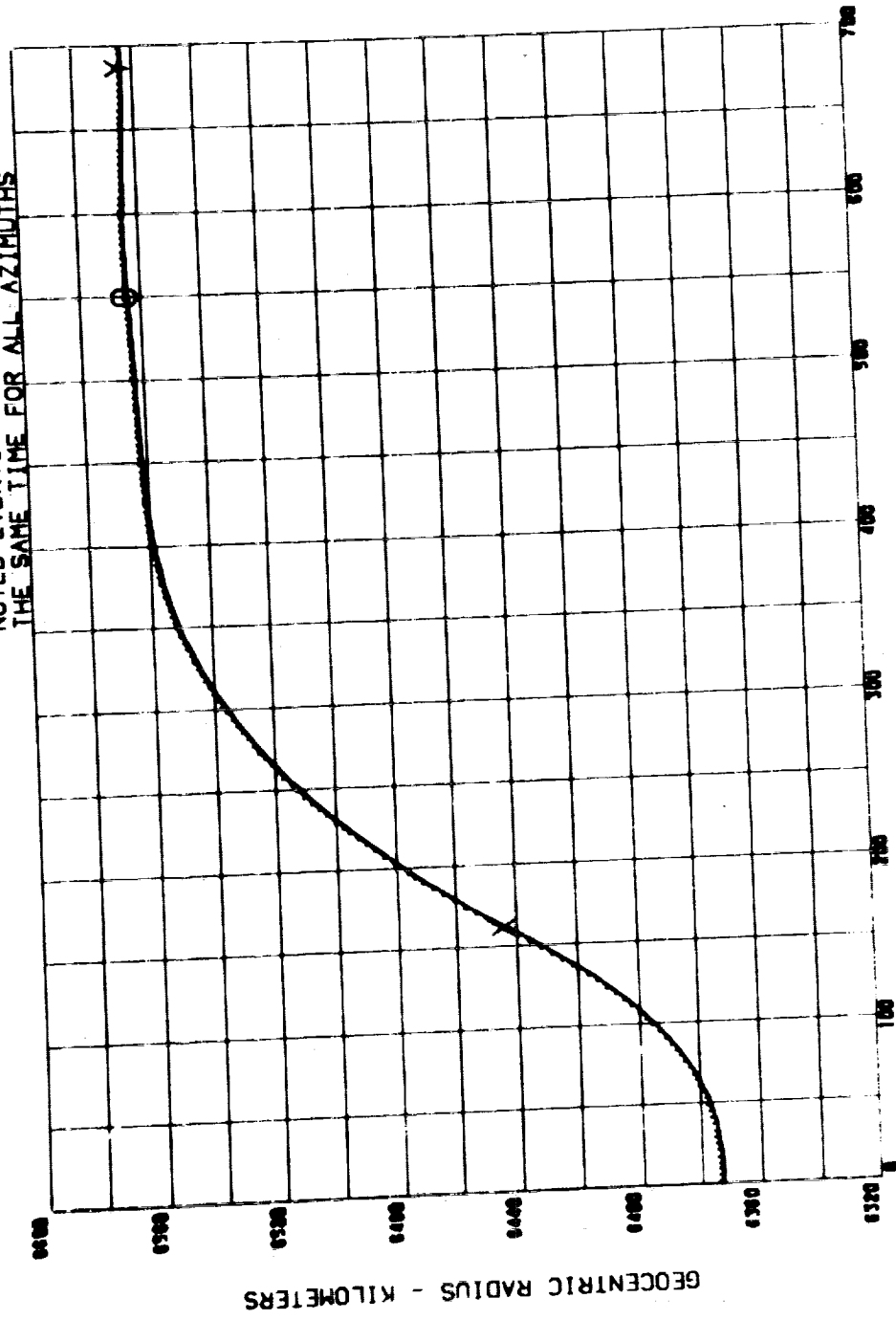


FIGURE 2-2 ALTITUDE VERSUS RANGE DURING BOOST TO
 PARKING ORBIT

78.051-DEGREE AZIMUTH
90.0 -DEGREE AZIMUTH
108.0 -DEGREE AZIMUTH

X S-10/S-11 SEP
O S-11/S-1VB SEP
Y GCS1

NOTED EVENTS OCCUR AT APPROXIMATELY
THE SAME TIME FOR ALL AZIMUTHS



TIME FROM FIRST MOTION - SECONDS

FIGURE 2-3 GEOCENTRIC RADIUS VERSUS TIME DURING BOOST TO PARKING ORBIT

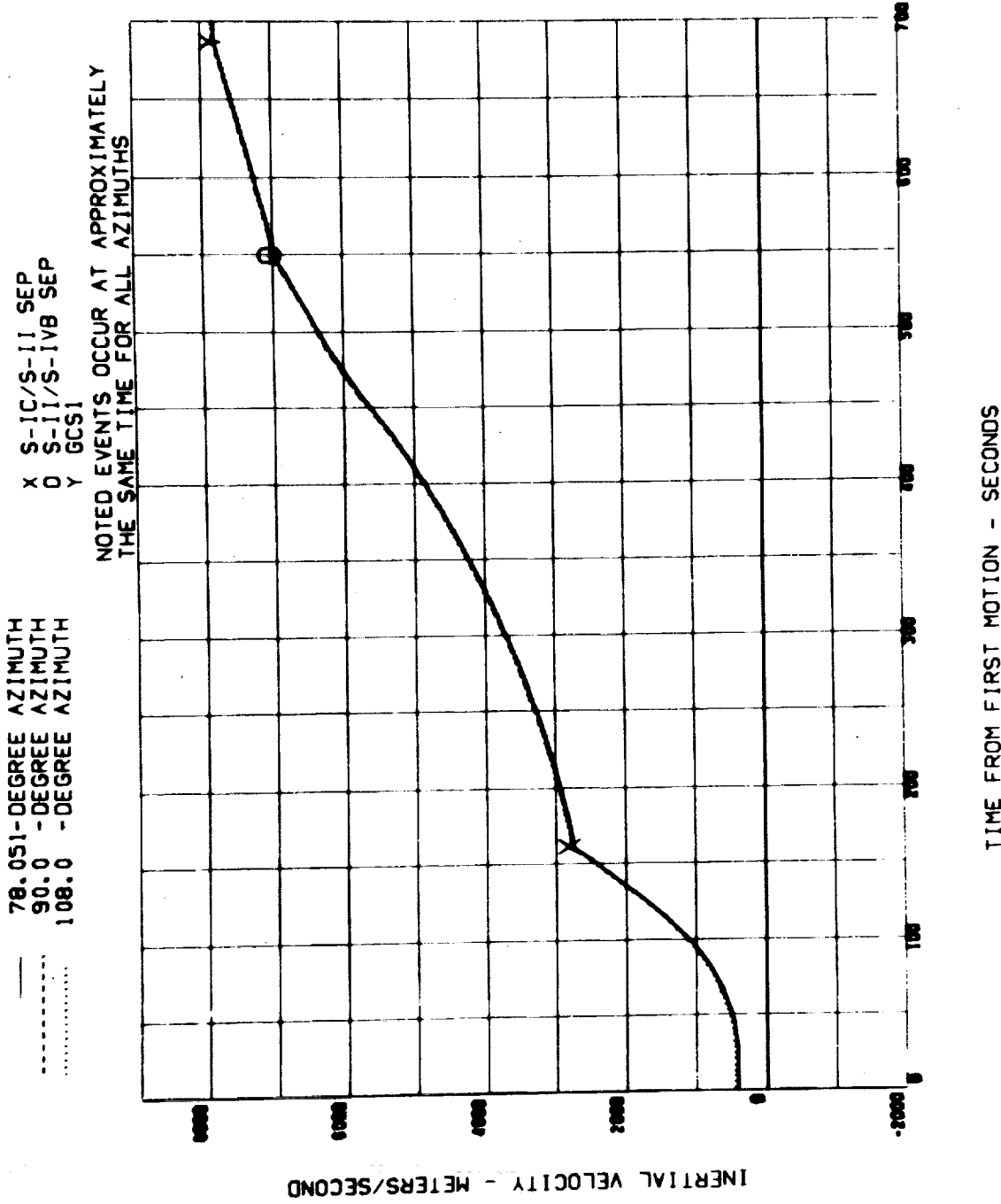
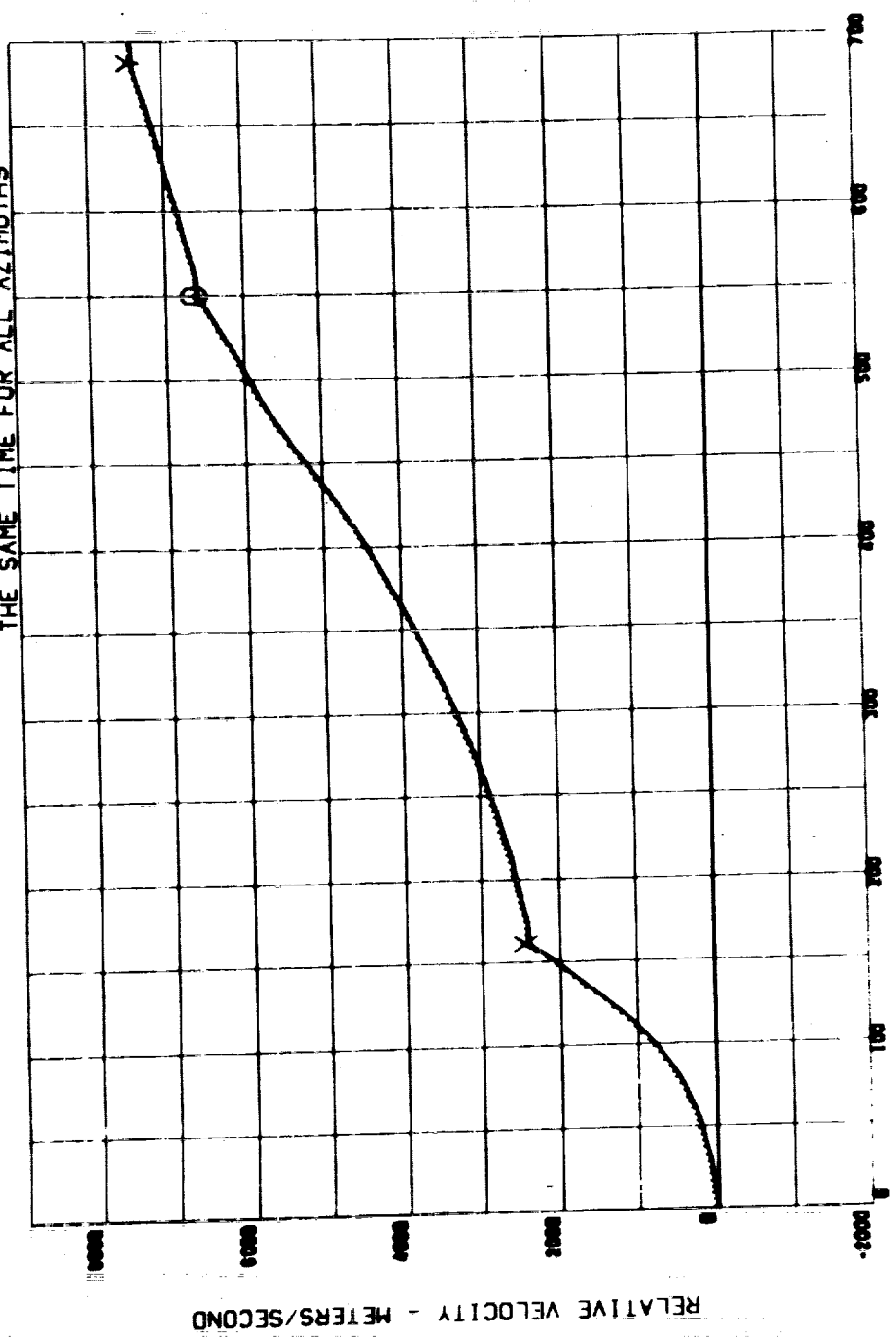


FIGURE 2-4 INERTIAL VELOCITY VERSUS TIME DURING BOOST TO PARKING ORBIT

78.051 - DEGREE AZIMUTH
 90.0 - DEGREE AZIMUTH
 108.0 - DEGREE AZIMUTH

X S-1C/S-11 SEP
 O S-11/S-1VB SEP
 Y GCS1

NOTED EVENTS OCCUR AT APPROXIMATELY
 THE SAME TIME FOR ALL AZIMUTHS



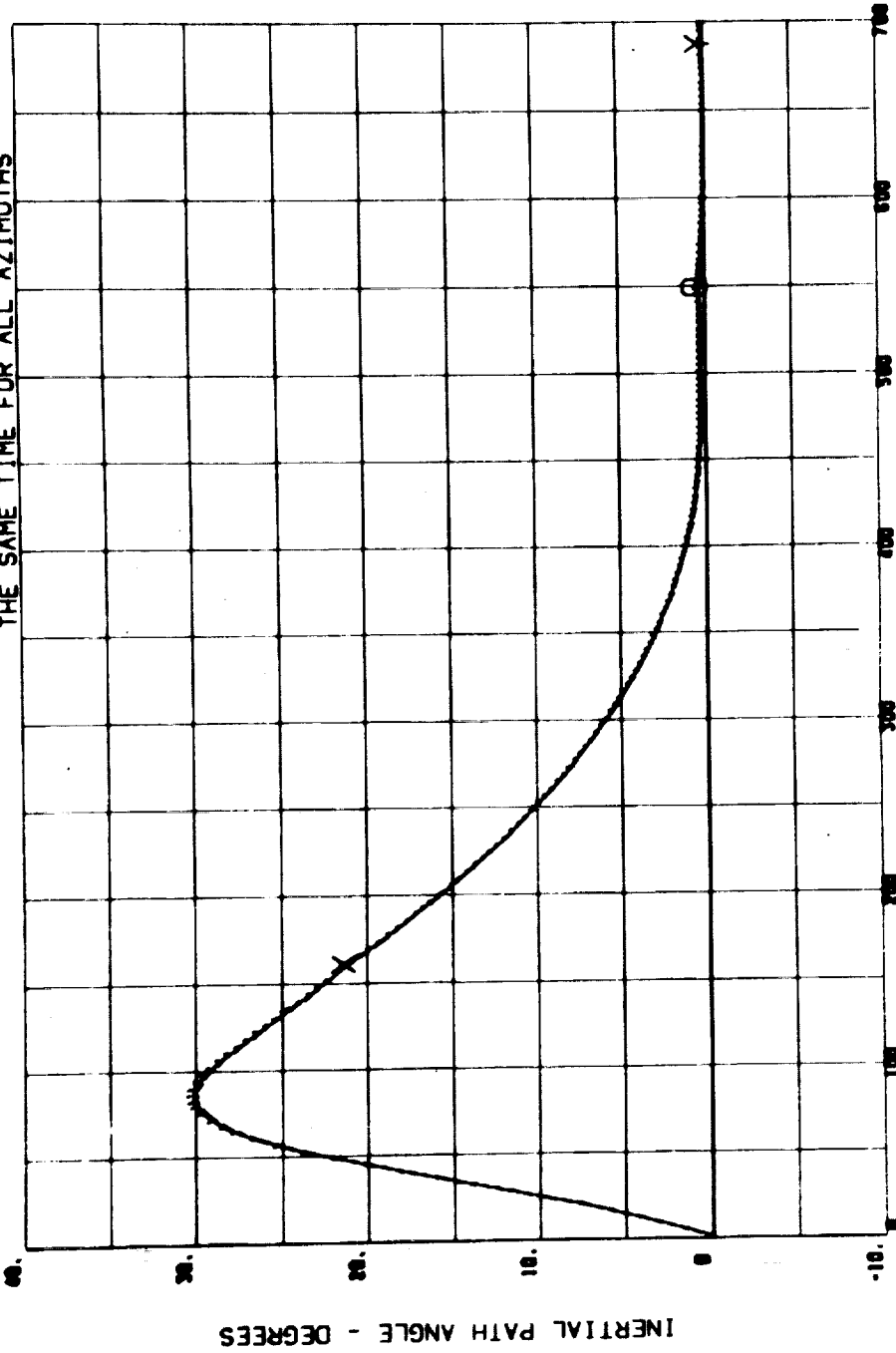
TIME FROM FIRST MOTION - SECONDS

FIGURE 2-5 RELATIVE VELOCITY VERSUS TIME DURING
 BOOST TO PARKING ORBIT

78.051-DEGREE AZIMUTH
 90.0 -DEGREE AZIMUTH
 108.0 -DEGREE AZIMUTH

X S-1C/S-11 SEP
 O S-11/S-1VB SEP
 Y GCSI

NOTED EVENTS OCCUR AT APPROXIMATELY
 THE SAME TIME FOR ALL AZIMUTHS



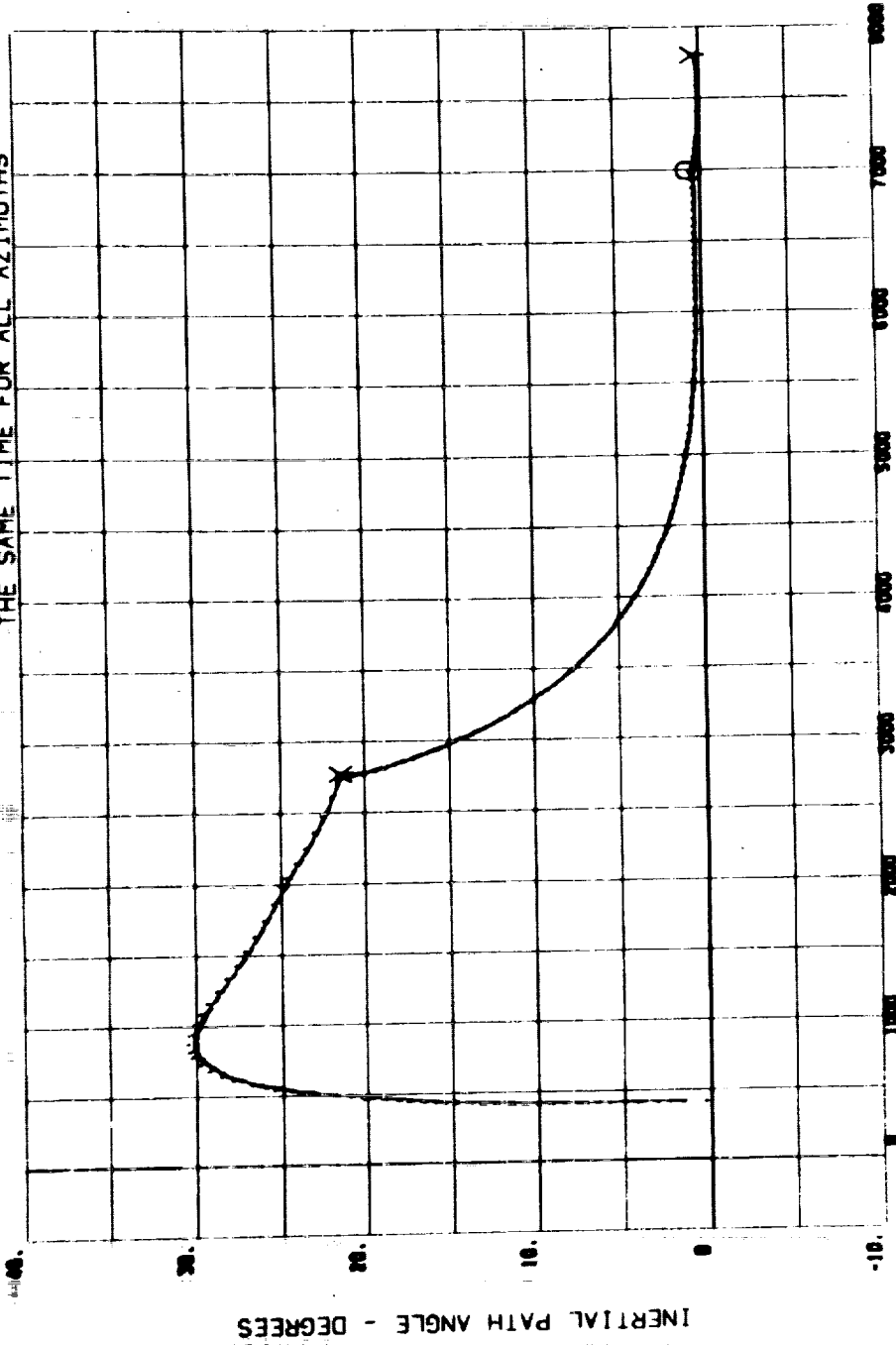
TIME FROM FIRST MOTION - SECONDS

FIGURE 2-6 INERTIAL PATH ANGLE VERSUS TIME DURING BOOST TO PARKING ORBIT

78.050 DEGREE AZIMUTH
190.0 DEGREE AZIMUTH
108.0 DEGREE AZIMUTH

X S-111/S-111/SEP
O S-111/S-111/SEP
Y (GCS)

NOTED EVENTS OCCUR AT APPROXIMATELY
THE SAME TIME FOR ALL AZIMUTHS



INERTIAL VELOCITY - METERS/SECOND

FIGURE 2-7 INERTIAL PATH ANGLE VERSUS INERTIAL VELOCITY
DURING BOOST TO PARKING ORBIT

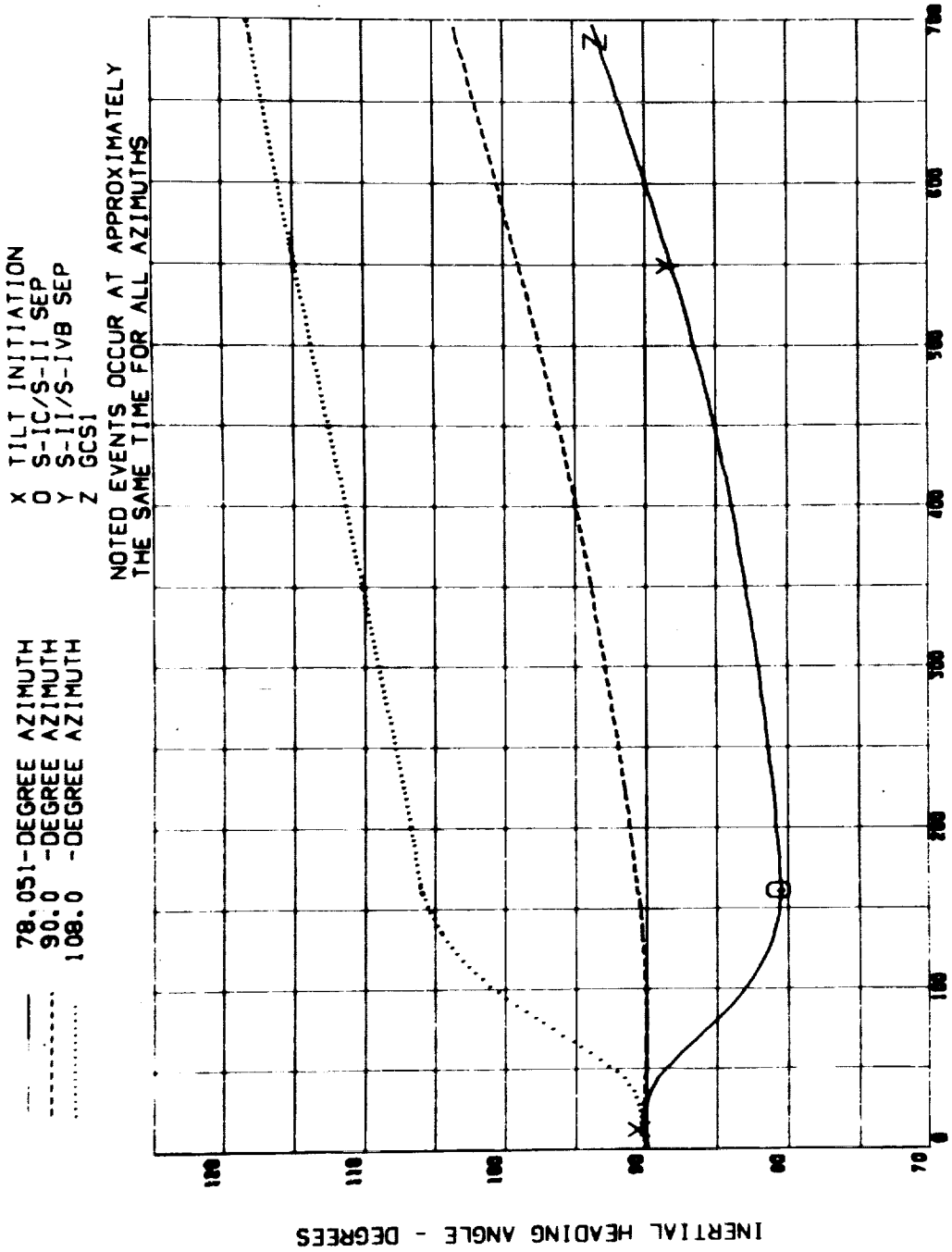
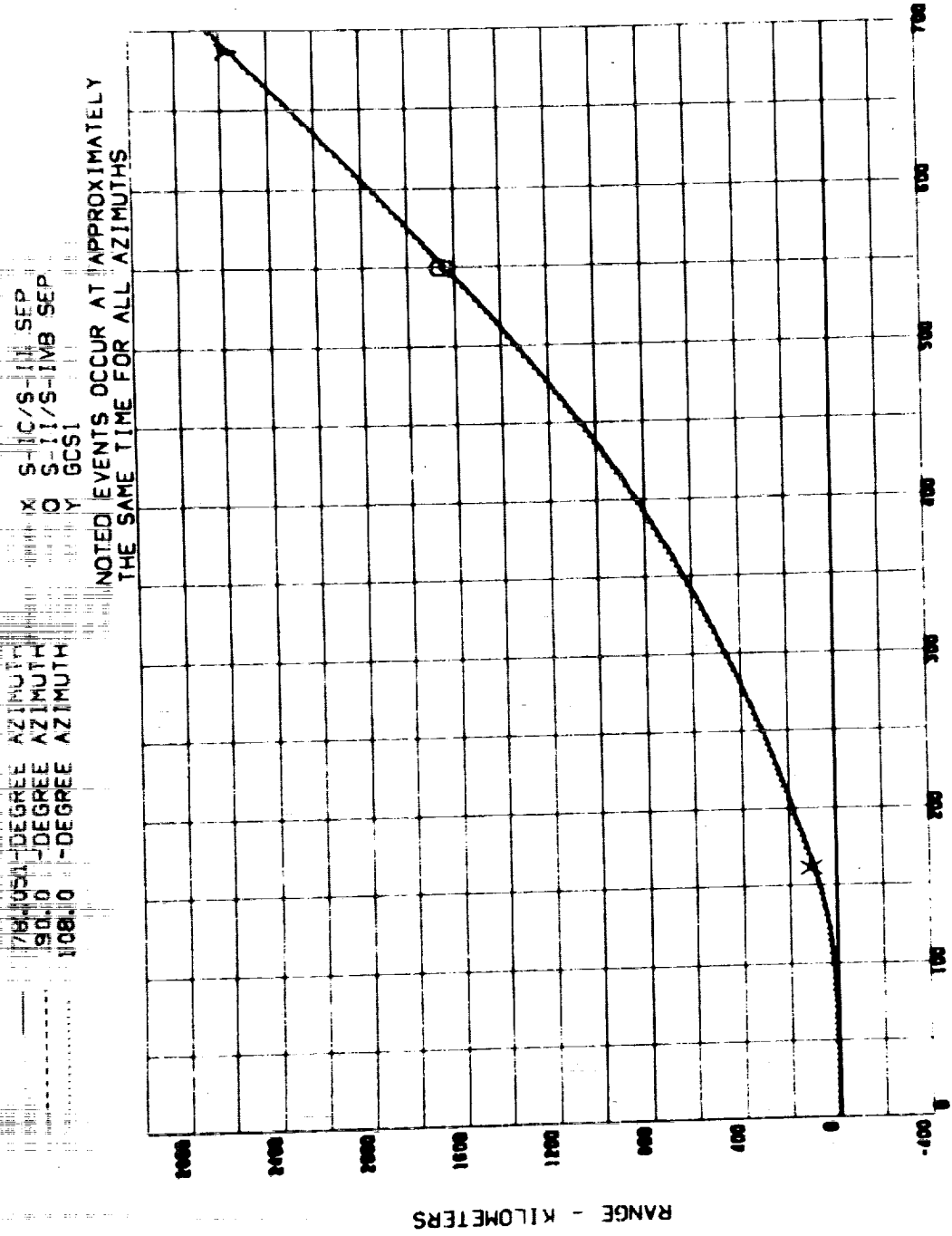


FIGURE 2-8 INERTIAL HEADING ANGLE VERSUS TIME DURING BOOST TO PARKING ORBIT



TIME FROM FIRST MOTION - SECONDS

FIGURE 2-9 RANGE VERSUS TIME DURING BOOST TO PARKING ORBIT

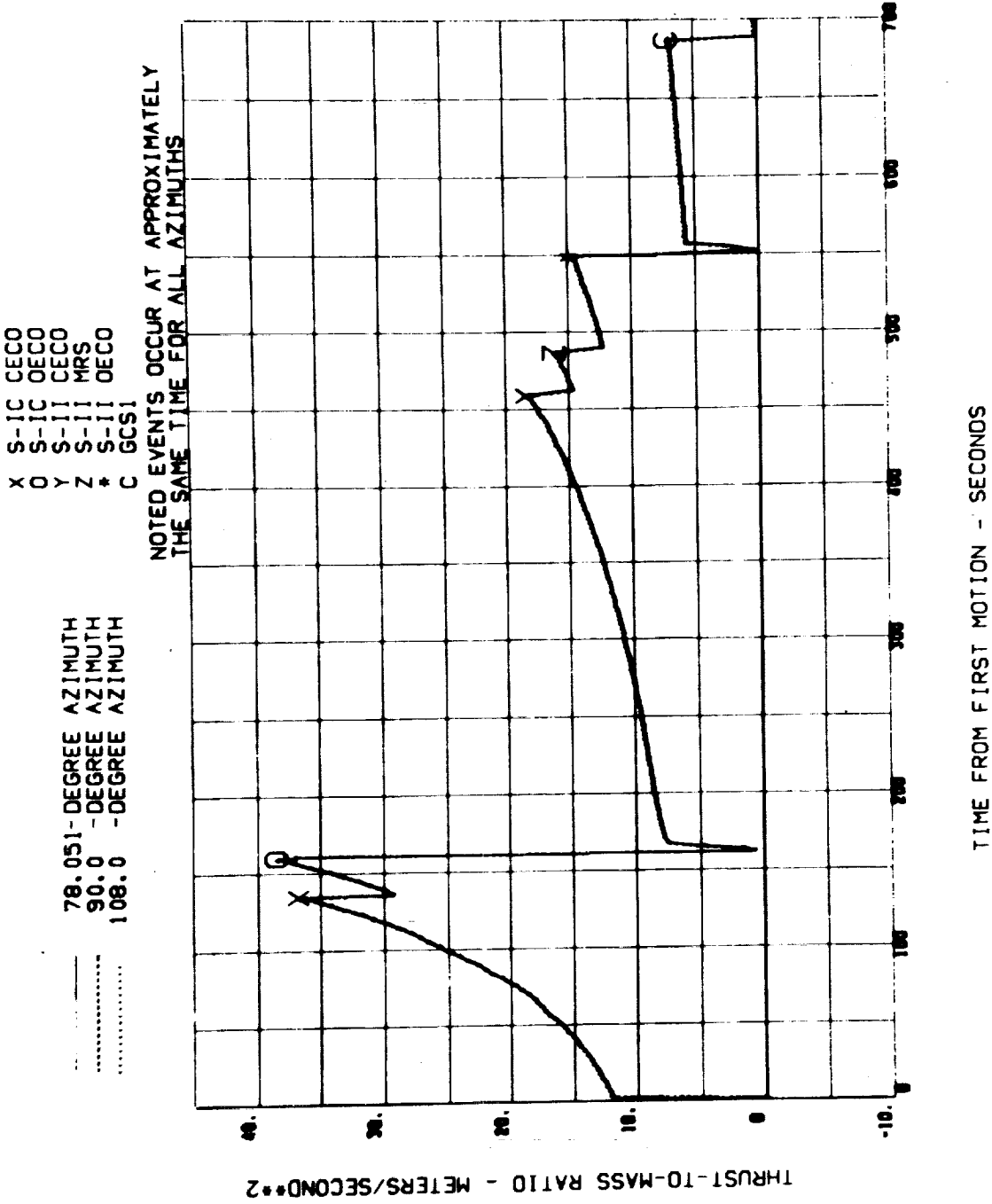
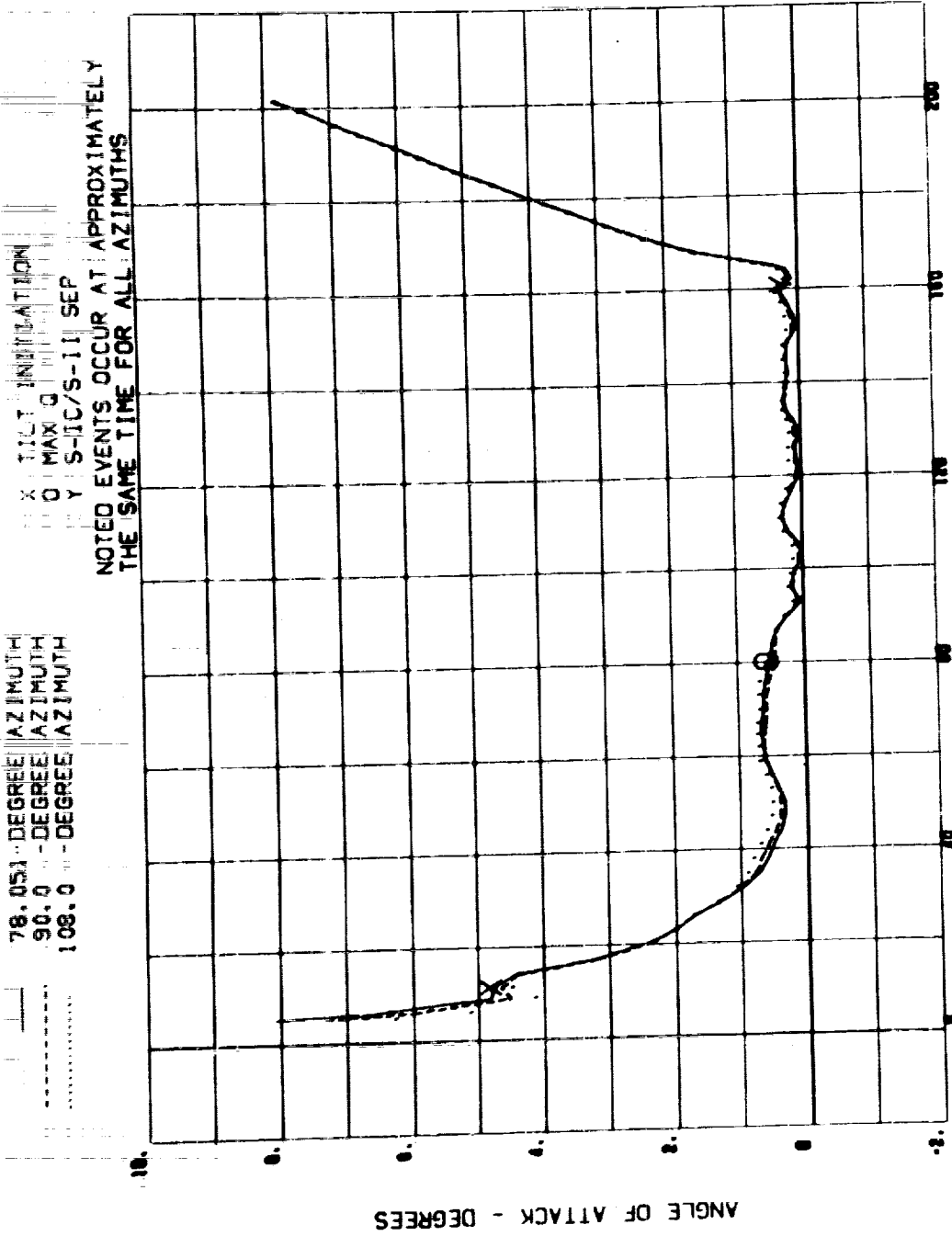


FIGURE 2-10 THRUST-TO-MASS RATIO VERSUS TIME DURING BOOST TO PARKING ORBIT



TIME FROM FIRST MOTION - SECONDS

FIGURE 2-11 TOTAL ANGLE OF ATTACK VERSUS TIME DURING BOOST TO INITIATION OF ITERATIVE GUIDANCE

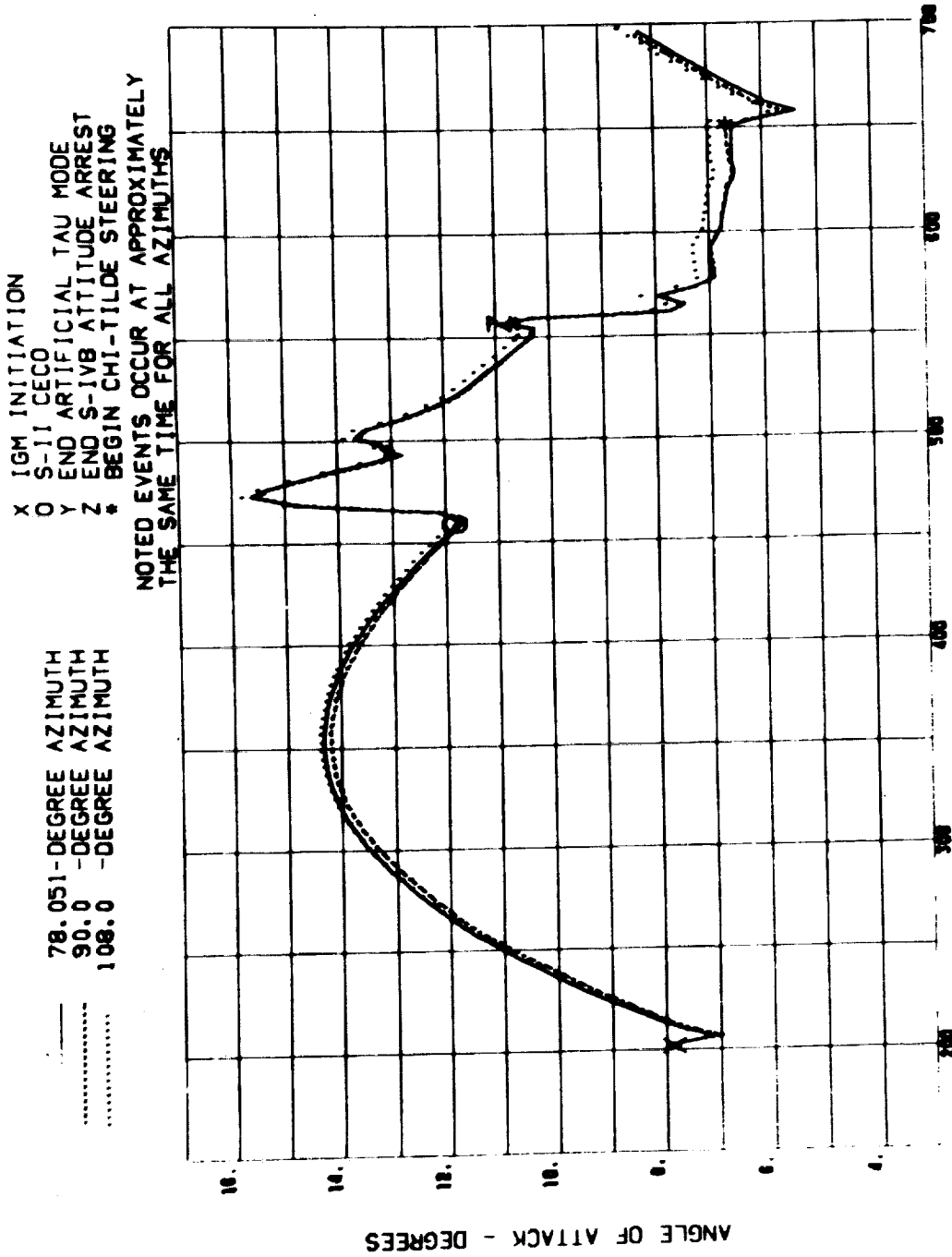


FIGURE 2-12 TOTAL ANGLE OF ATTACK VERSUS TIME FROM INITIATION OF ITERATIVE GUIDANCE TO PARKING ORBIT

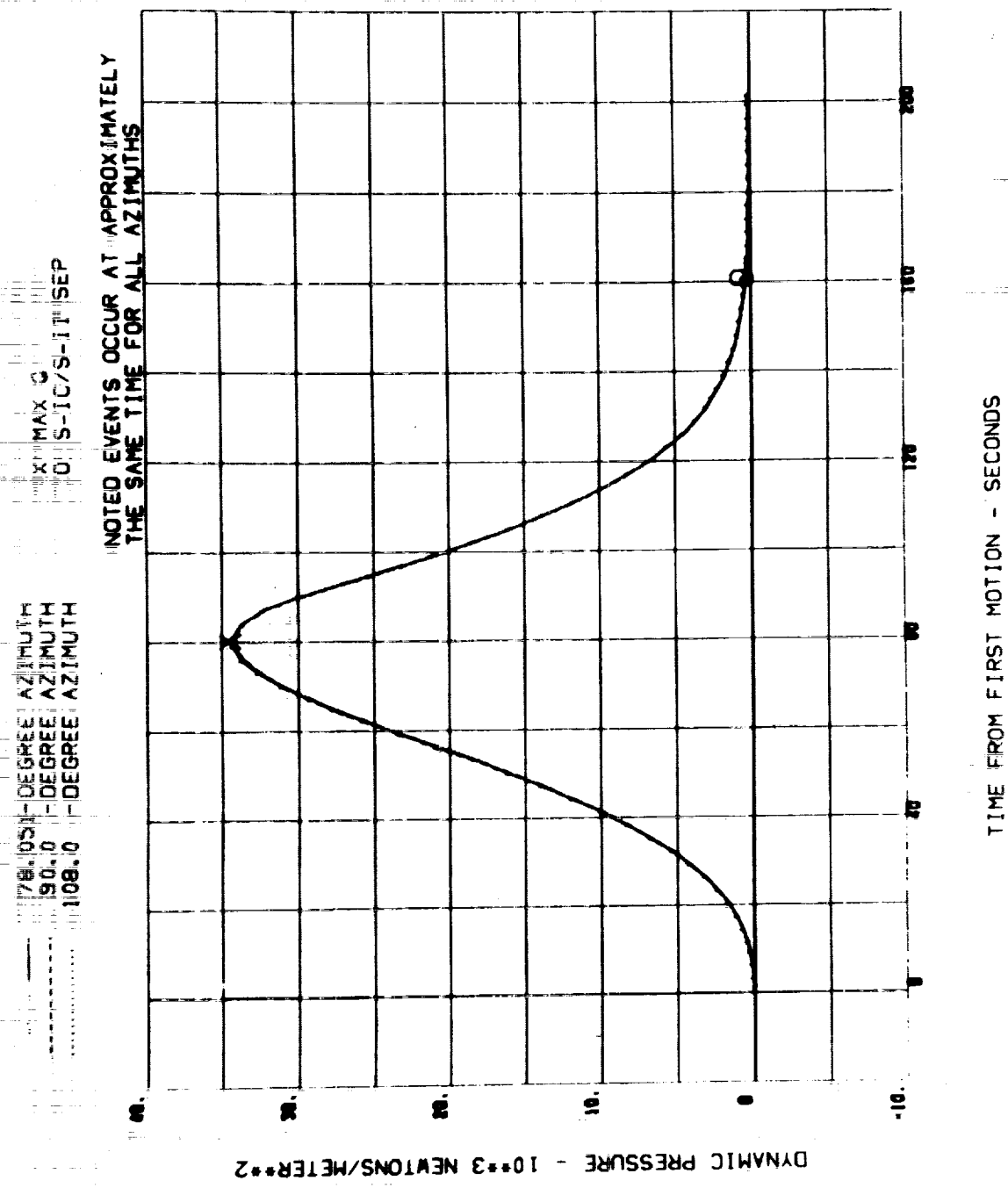


FIGURE 2-13 DYNAMIC PRESSURE VERSUS TIME DURING BOOST TO INITIATION OF ITERATIVE GUIDANCE

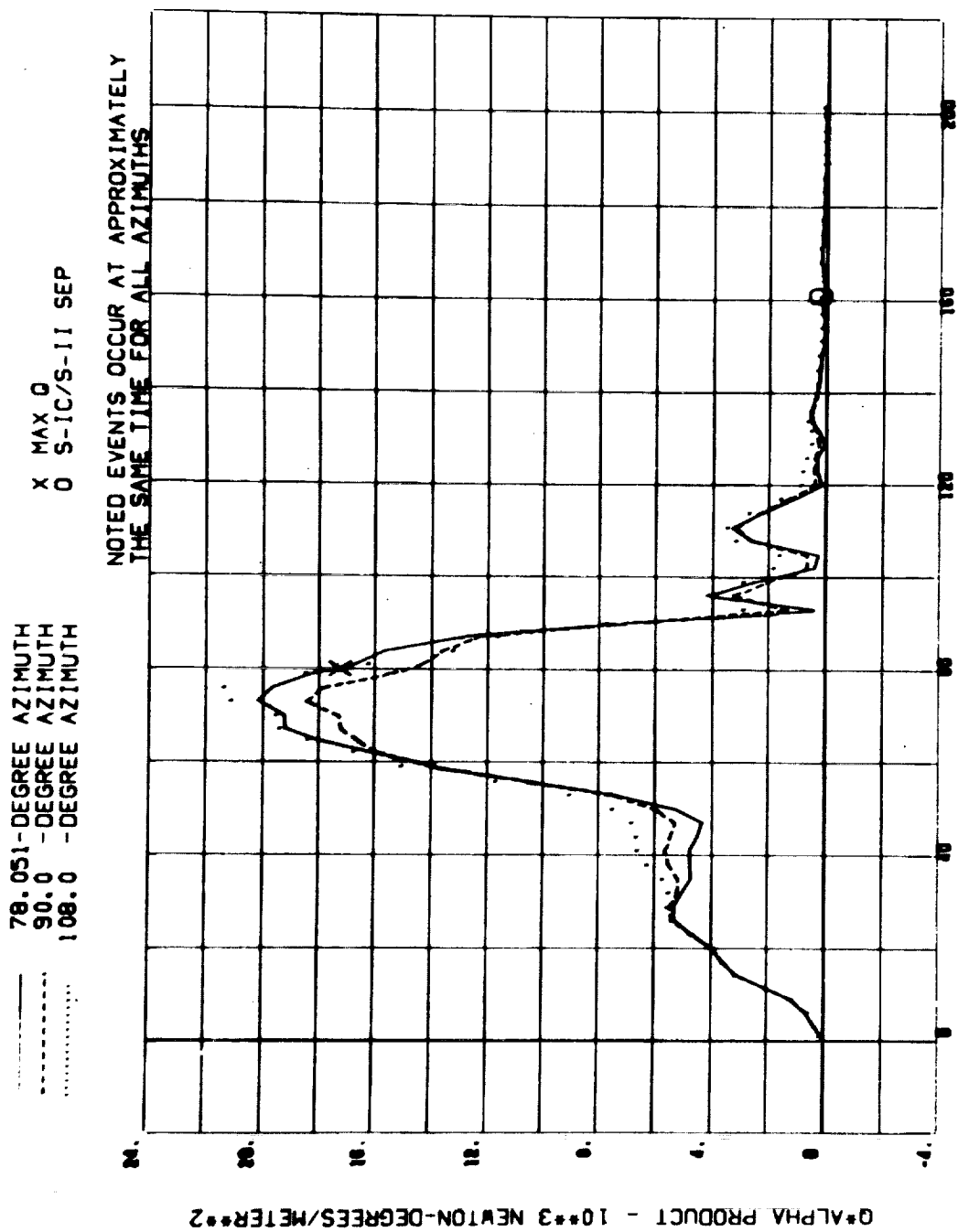
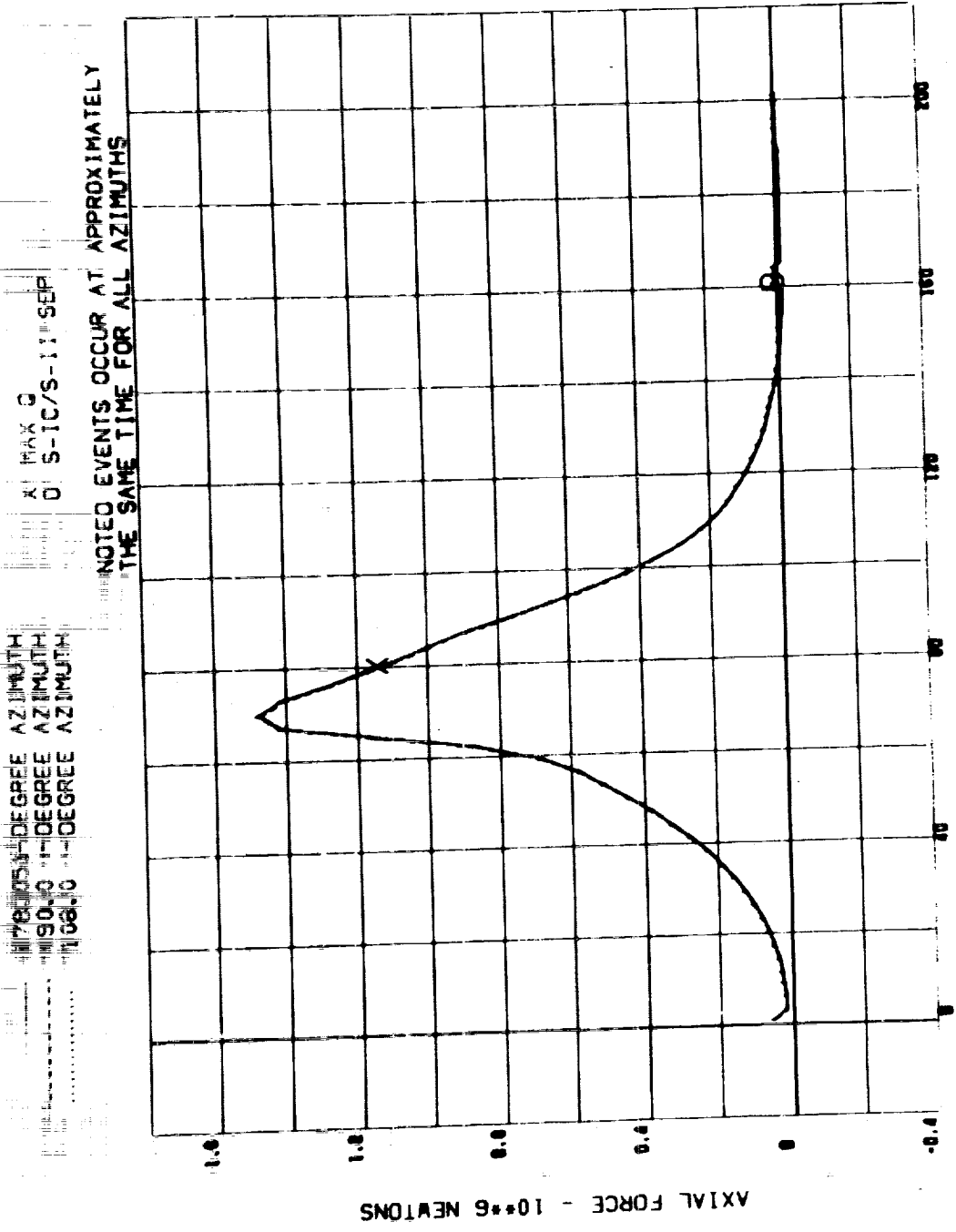
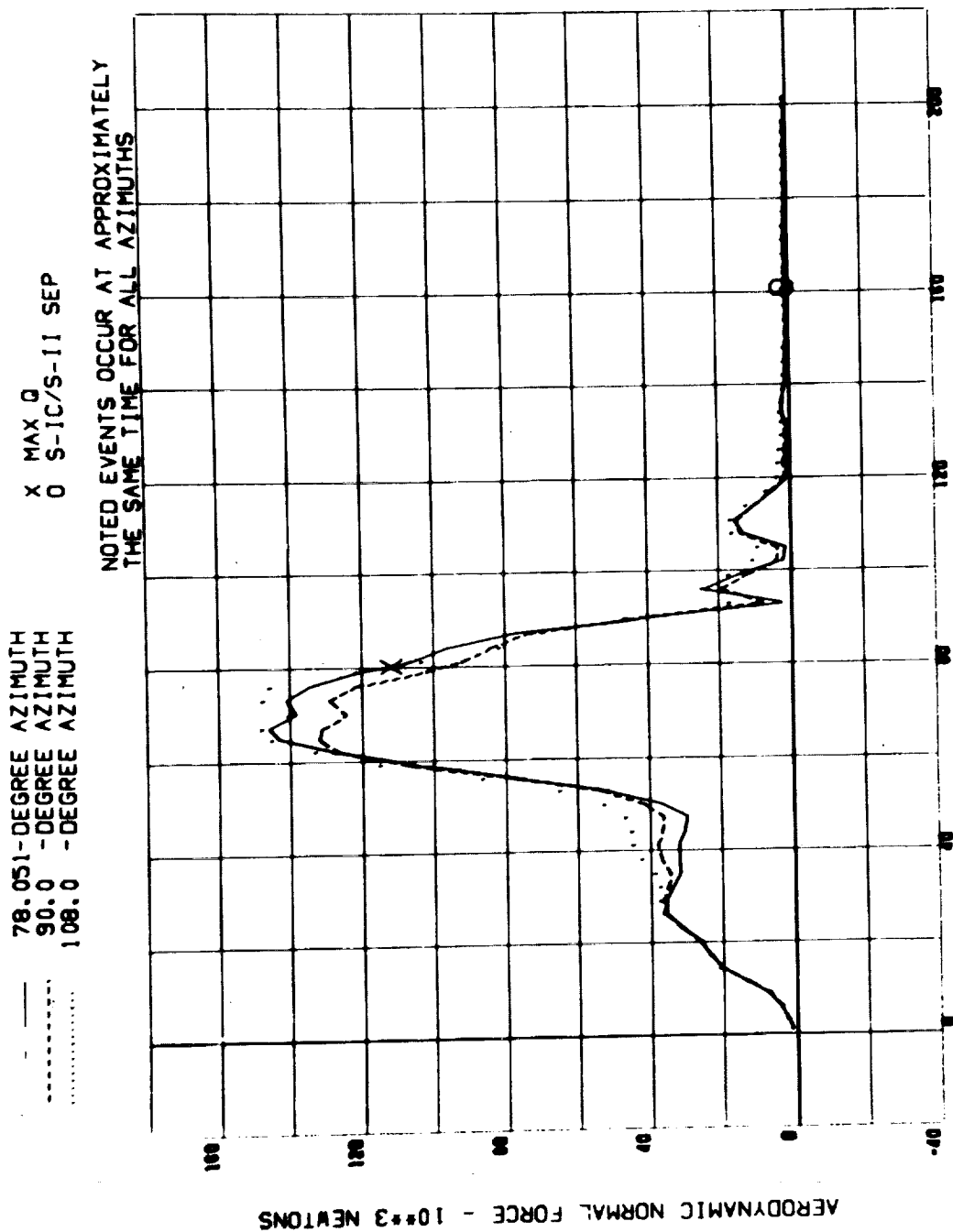


FIGURE 2-14 Q*ALPHA PRODUCT VERSUS TIME DURING BOOST
 TO INITIATION OF ITERATIVE GUIDANCE



TIME FROM FIRST MOTION - SECONDS

FIGURE 2-15 AERODYNAMIC AXIAL FORCE VERSUS TIME DURING BOOST TO INITIATION OF ITERATIVE GUIDANCE



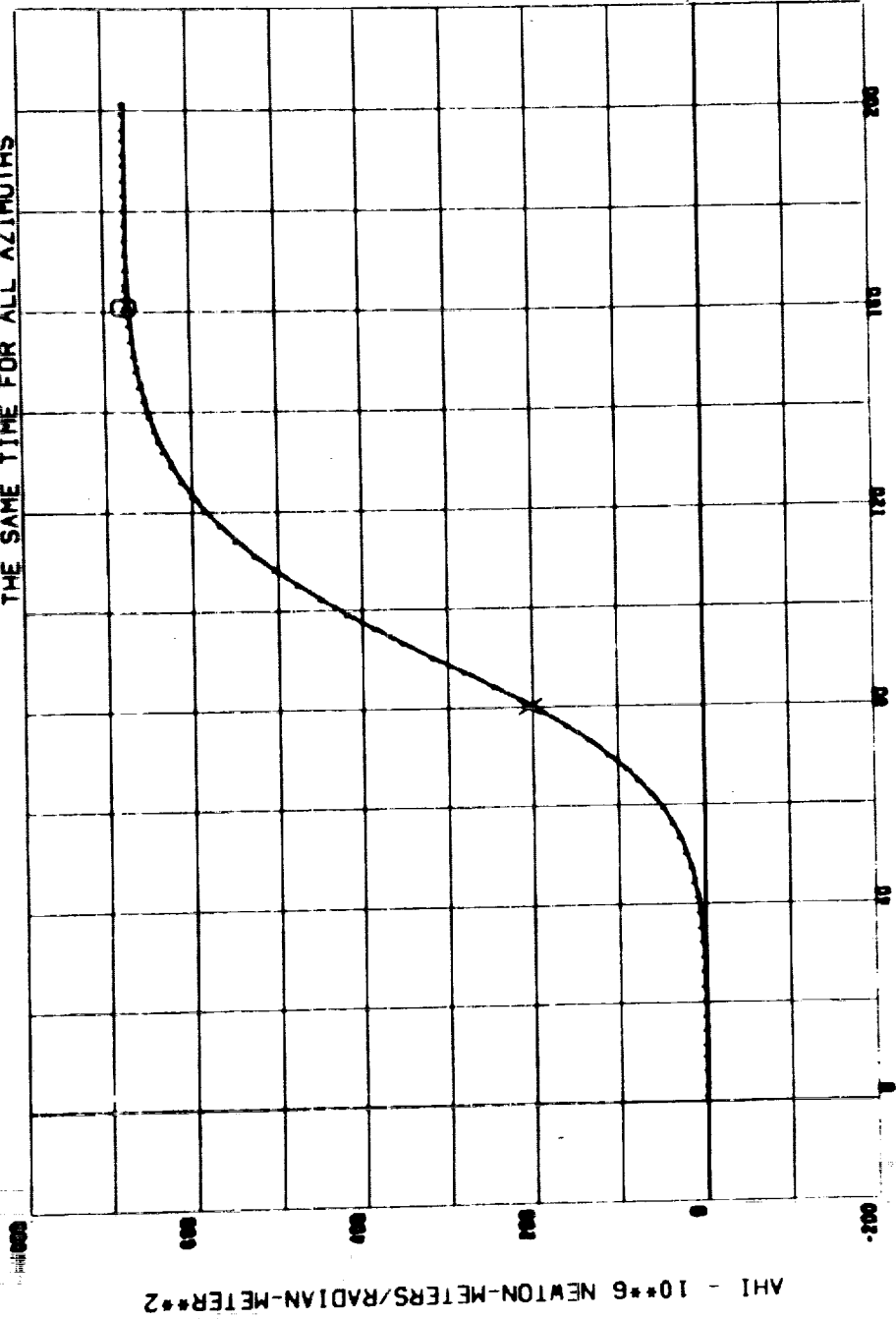
TIME FROM FIRST MOTION - SECONDS

FIGURE 2-16 AERODYNAMIC NORMAL FORCE VERSUS TIME DURING BOOST TO INITIATION OF ITERATIVE GUIDANCE

78.051 - DEGREE AZIMUTH
130.0 - DEGREE AZIMUTH
106.0 - DEGREE AZIMUTH

X MAX Q
O S-1C/S-II SEP

NOTED EVENTS OCCUR AT APPROXIMATELY
THE SAME TIME FOR ALL AZIMUTHS



TIME FROM FIRST MOTION - SECONDS

FIGURE 2-17 AERODYNAMIC HEATING INDICATOR VERSUS TIME
DURING BOOST TO INITIATION OF ITERATIVE
GUIDANCE

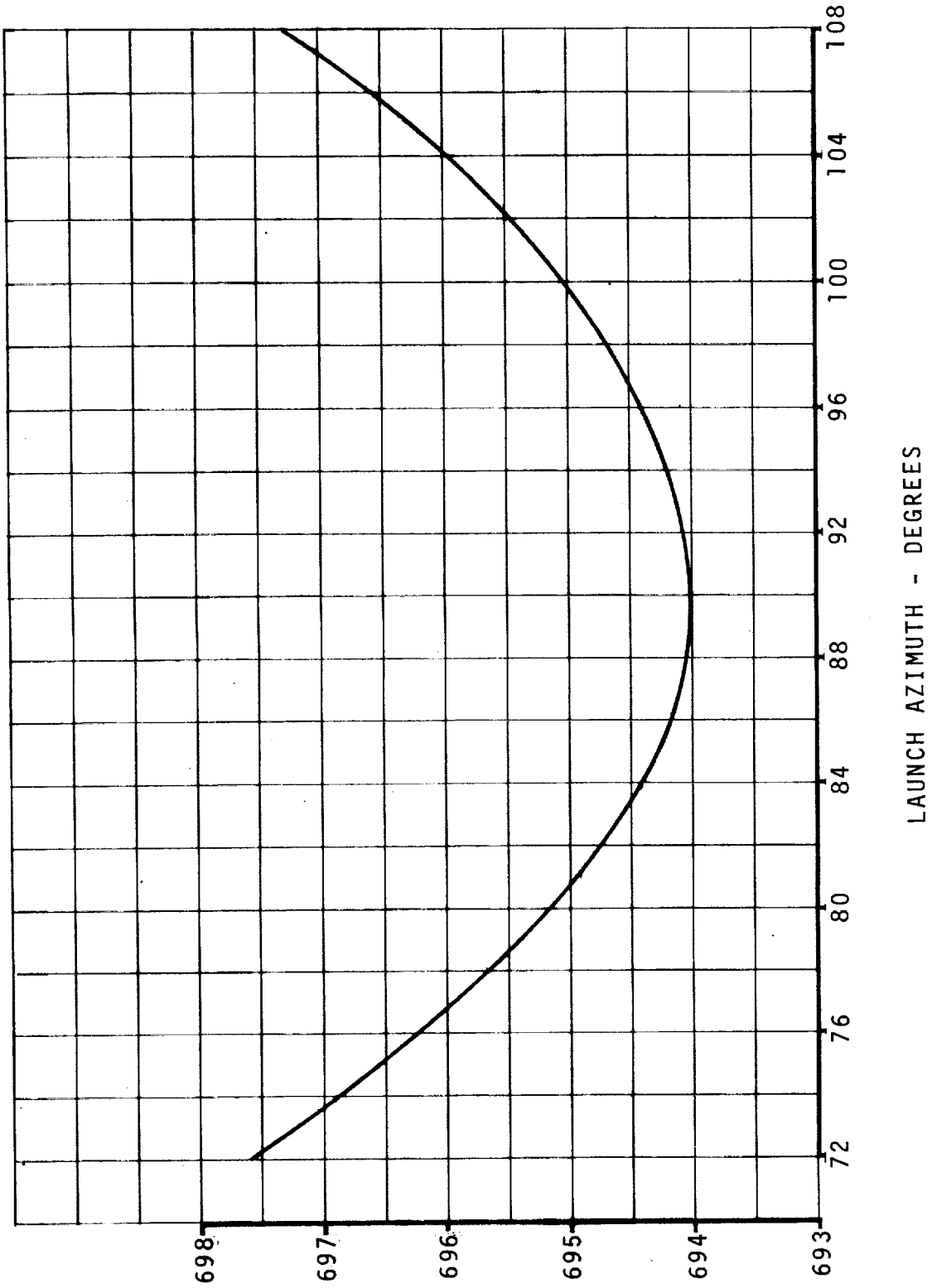
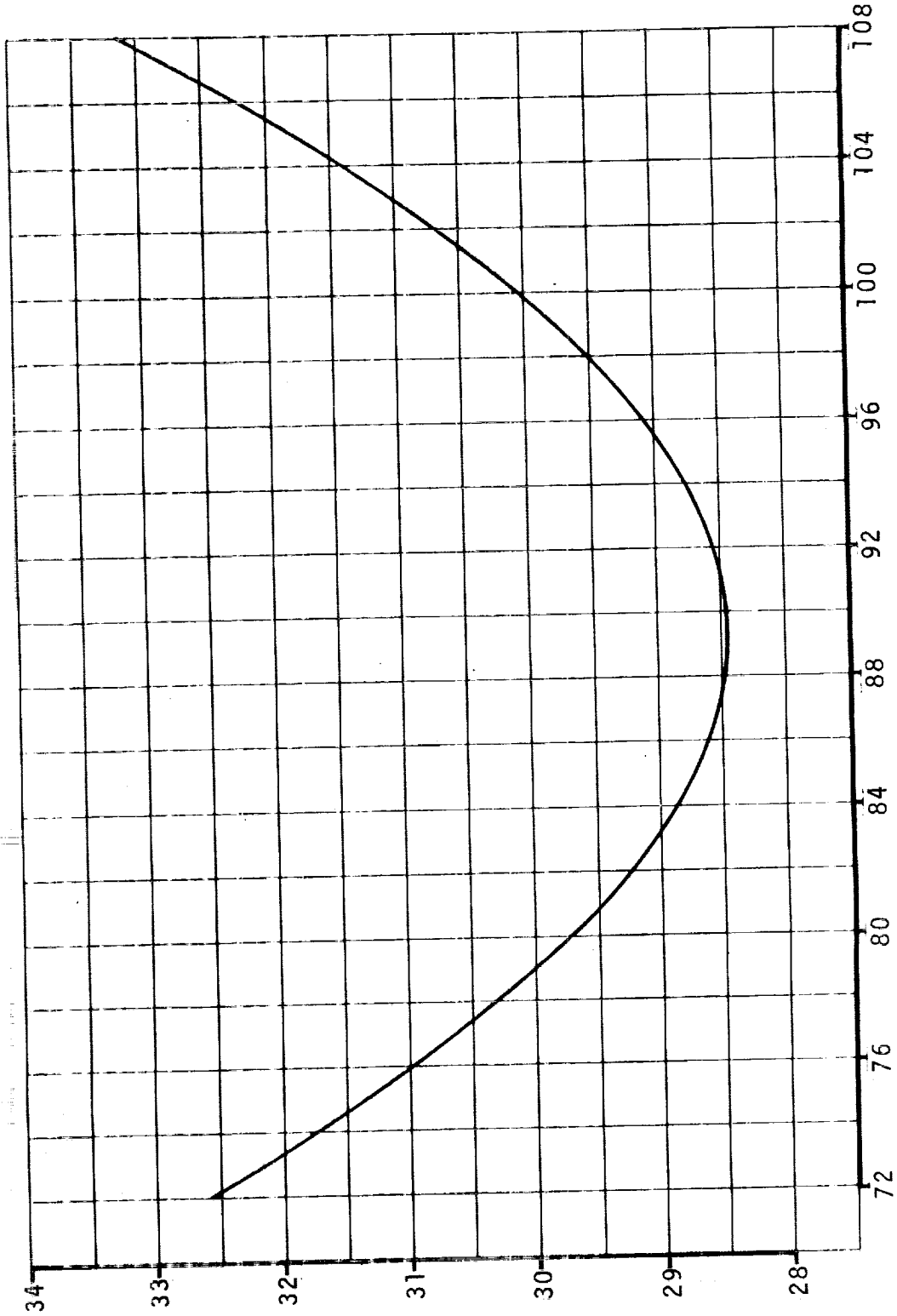


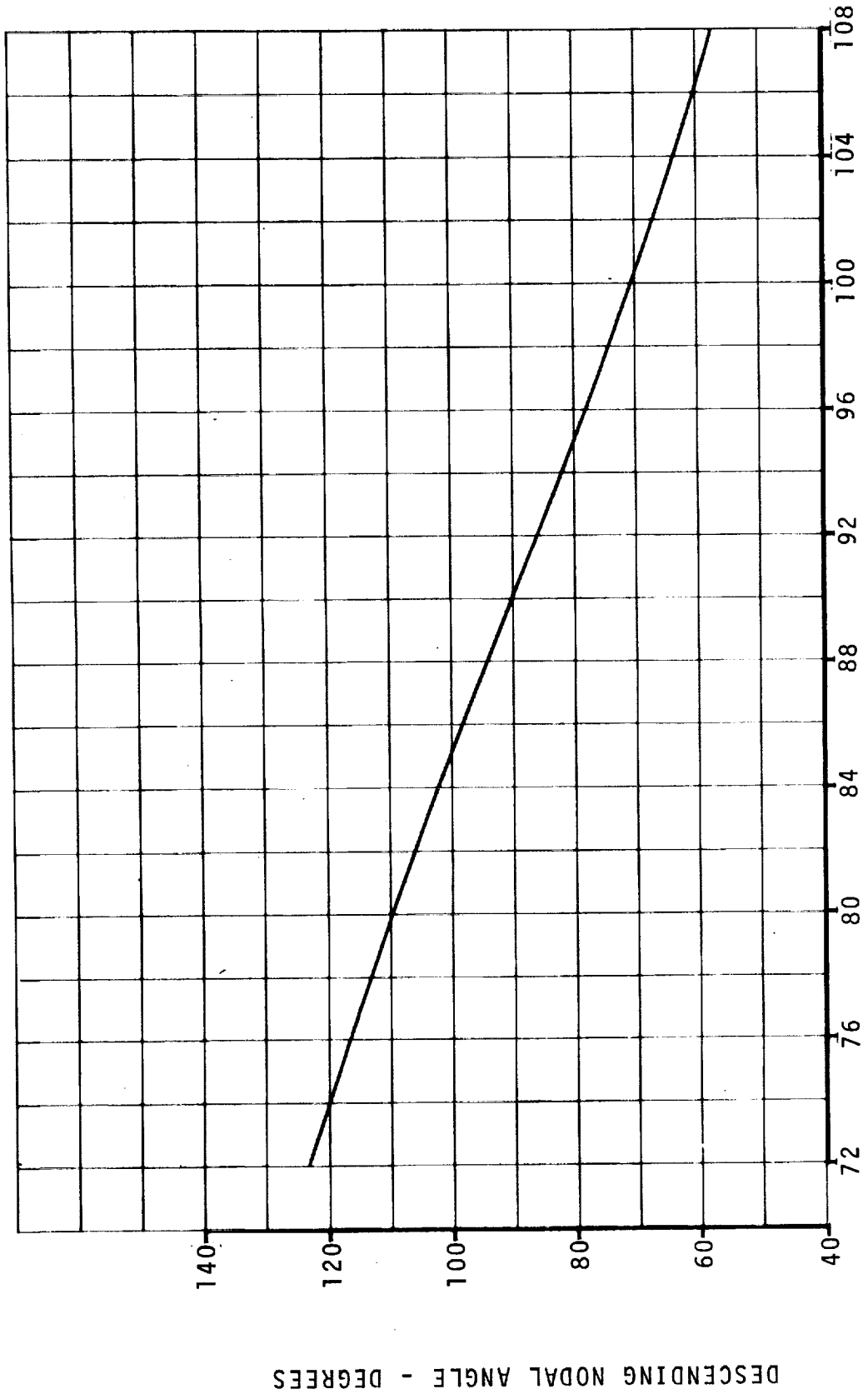
FIGURE 2-18 TIME OF PARKING ORBIT INSERTION VERSUS LAUNCH AZIMUTH



PARKING ORBIT INCLINATION - DEGREES

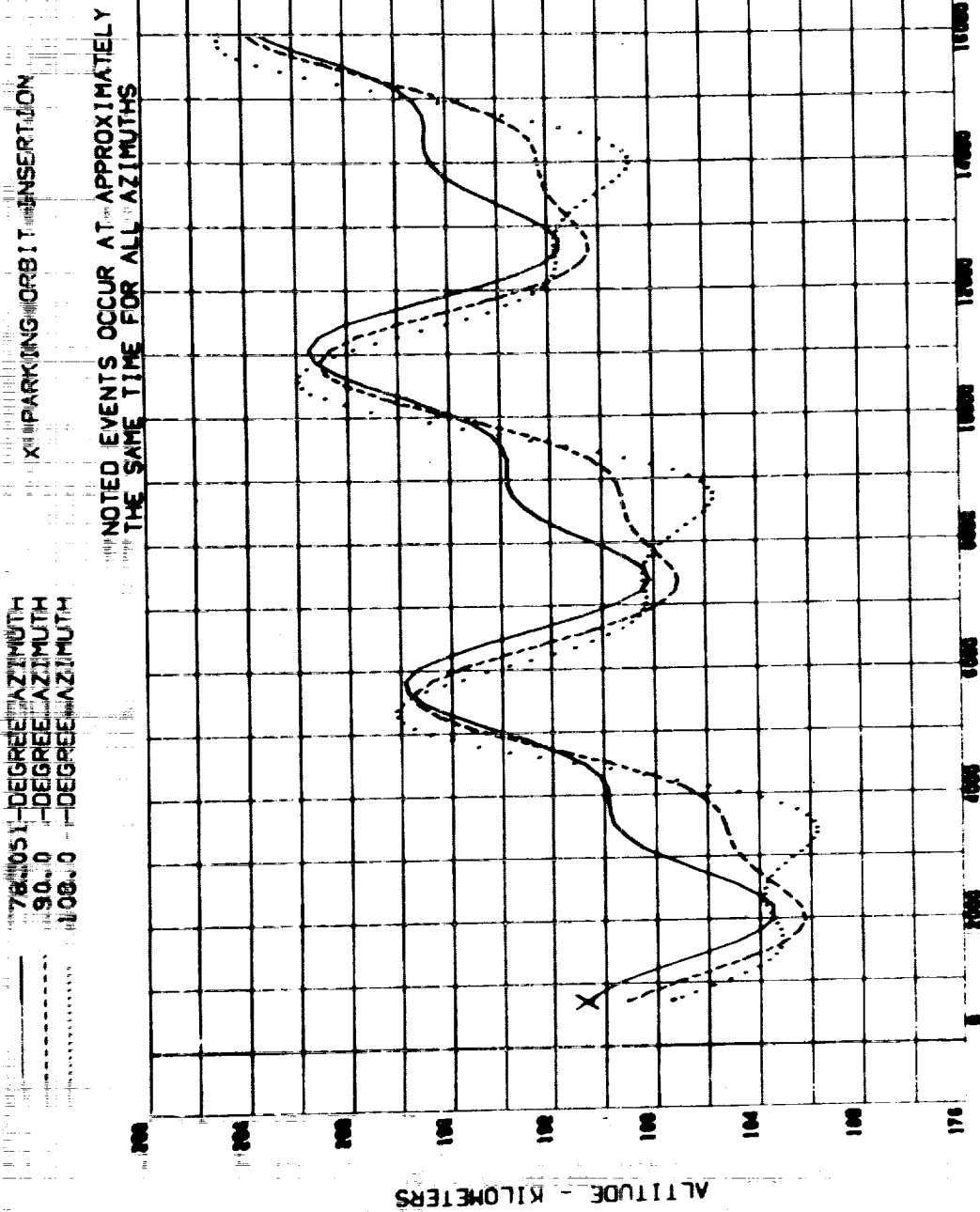
LAUNCH AZIMUTH - DEGREES

FIGURE 2-19 PARKING ORBIT INCLINATION VERSUS LAUNCH AZIMUTH



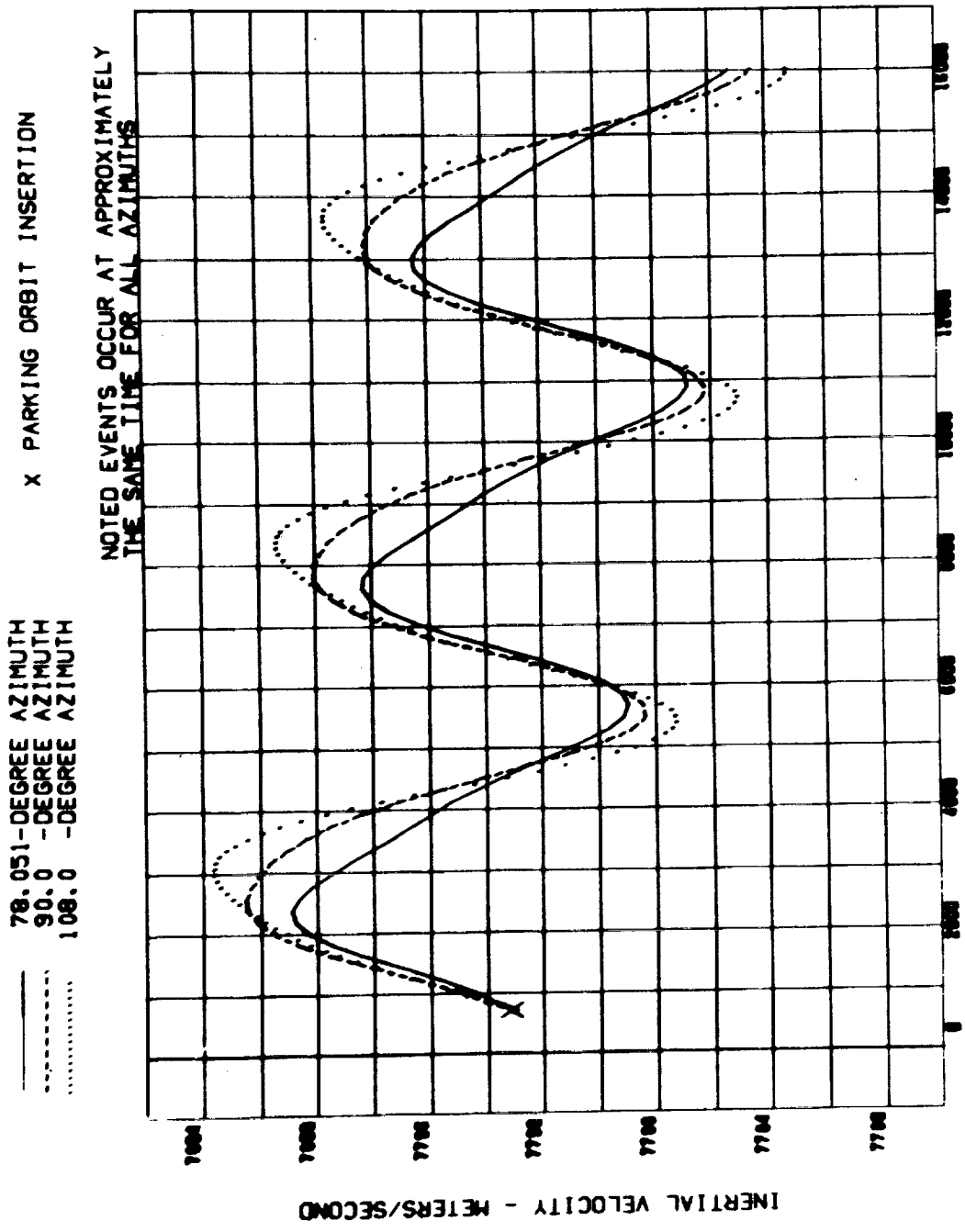
LAUNCH AZIMUTH - DEGREES

FIGURE 2-20 PARKING ORBIT DESCENDING NODAL ANGLE VERSUS LAUNCH AZIMUTH



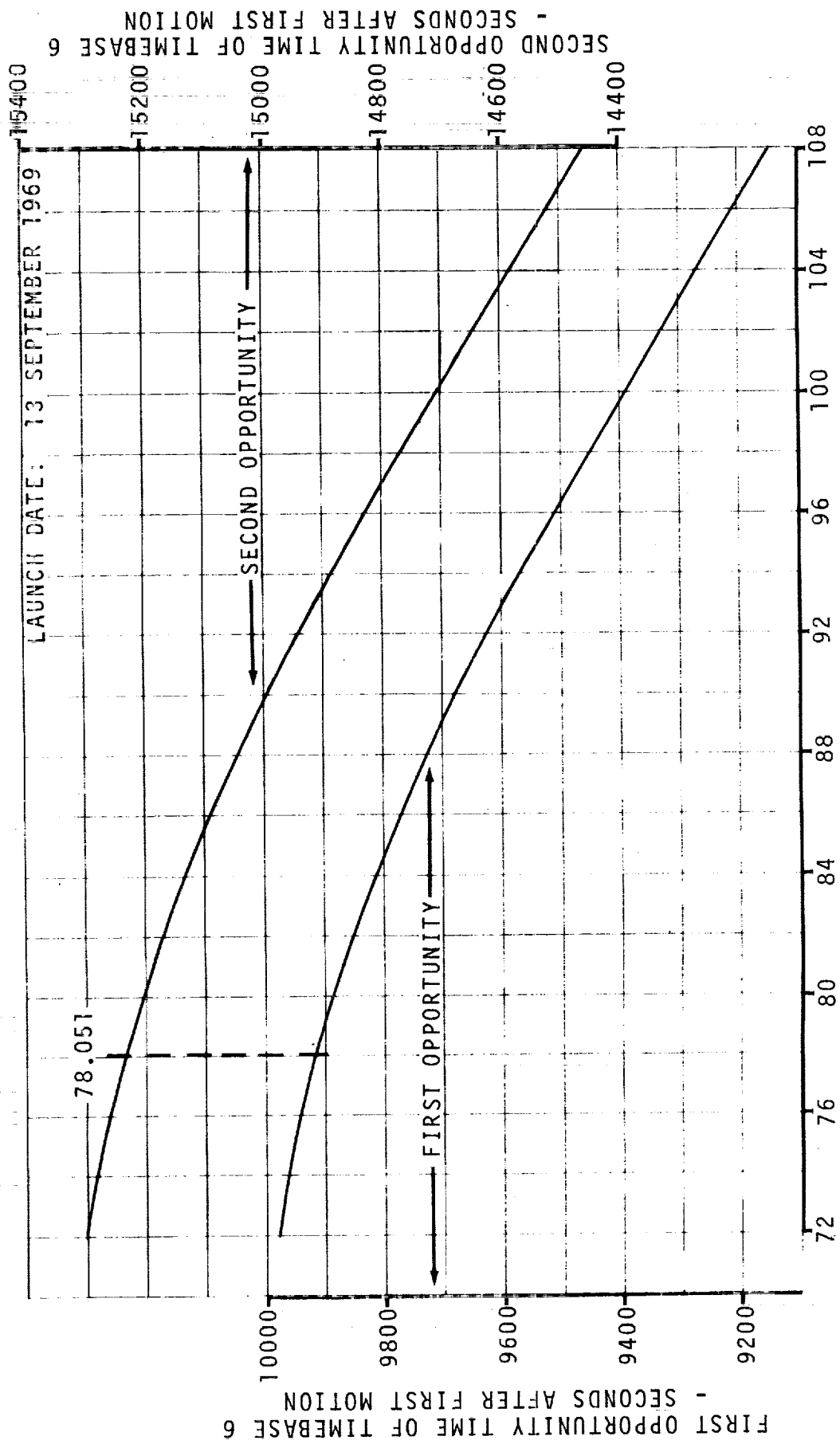
TIME FROM FIRST MOTION - SECONDS

FIGURE 2-21 ALTITUDE VERSUS TIME DURING PARKING ORBIT



TIME FROM FIRST MOTION - SECONDS

FIGURE 2-22 INERTIAL VELOCITY VERSUS TIME DURING PARKING ORBIT



LAUNCH AZIMUTH - DEGREES

FIGURE 2-23 TIME OF TIMEBASE 6 INITIATION FOR 13 SEPTEMBER 1969

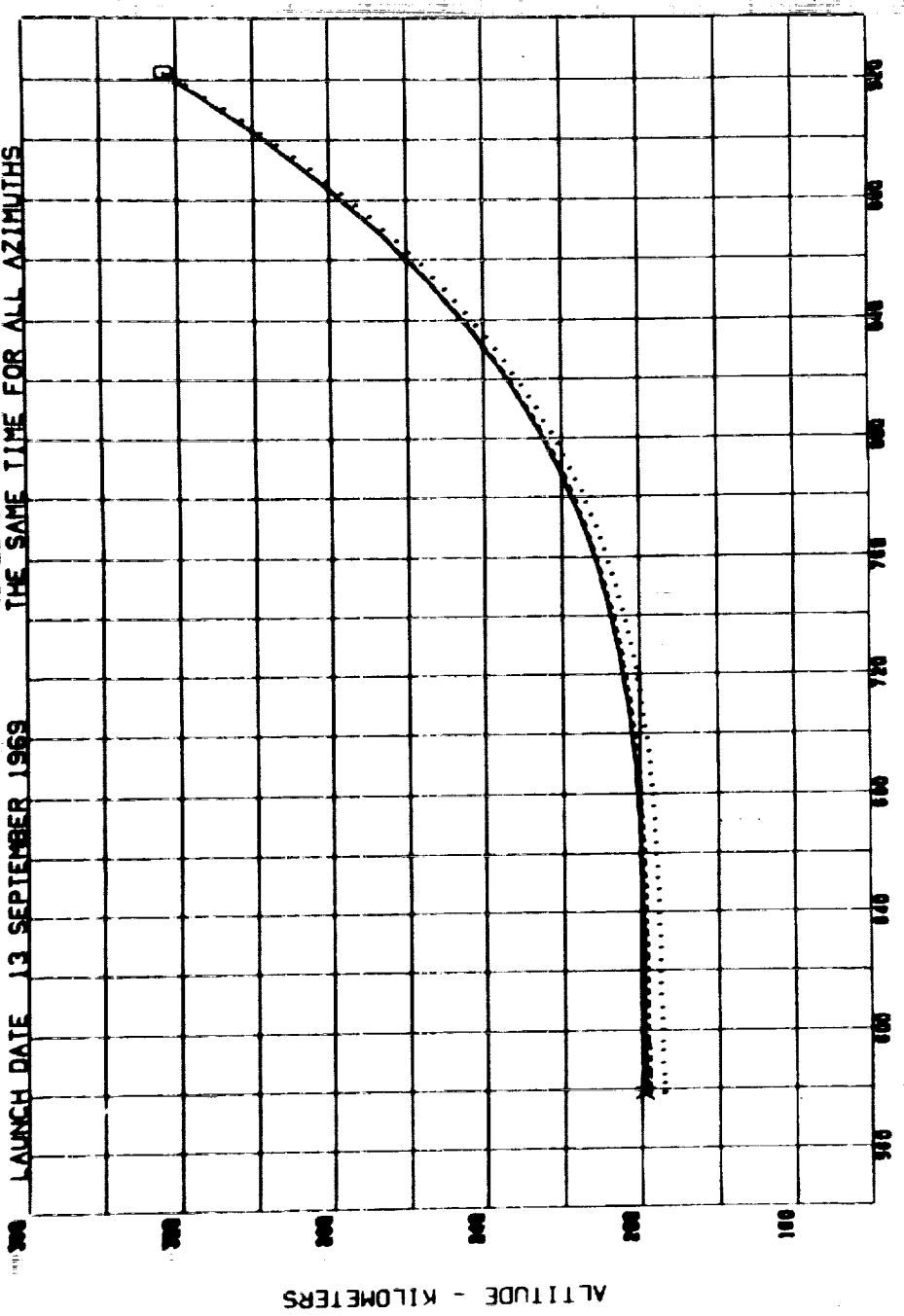
TABLE 2-I. TIMES OF TIMEBASE 6 AND SECOND S-IVB CUTOFF (GCS2) FOR THE SEPTEMBER LAUNCH WINDOW

TRAJECTORY	FIRST OPPORTUNITY		SECOND OPPORTUNITY	
<u>Date/Azimuth</u>	<u>TB6</u>	<u>GCS2</u>	<u>TB6</u>	<u>GCS2</u>
September 13, 1969				
72°	9979.625	10899.855	15302.375	16208.410
78.051°	9912.000	10833.049	15233.750	16140.857
81°*	9868.000	10789.378	15188.875	16096.383
90°	9681.000	10602.870	15001.000	15909.078
99°*	9418.250	10339.846	14737.250	15644.950
108°	9145.625	10066.351	14461.250	15367.702
September 15, 1969				
72°*	10213.375	11133.572	15534.375	16440.222
81°*	10198.500	11119.563	15520.500	16427.797
90°*	10114.875	11036.393	15434.875	16342.737
99°*	9725.500	10646.851	15044.500	15952.026
108°*	9351.875	10272.715	14667.875	15574.183
September 18, 1969				
72°*	9961.375	10882.178	15270.375	16176.570
81°*	9828.500	10750.616	15146.500	16053.958
90°*	9619.875	10542.560	14938.875	15846.825
99°*	9345.500	10267.938	14659.500	15567.160
108°*	9074.875	9996.174	14375.875	15282.595

*The GCS2 times for these dates and azimuths are based upon the times published in Reference 26, but are adjusted to reflect the differences in burn time noted during preparation of improved simulations of September 13 trajectories for azimuths of 72, 90, and 108 degrees.

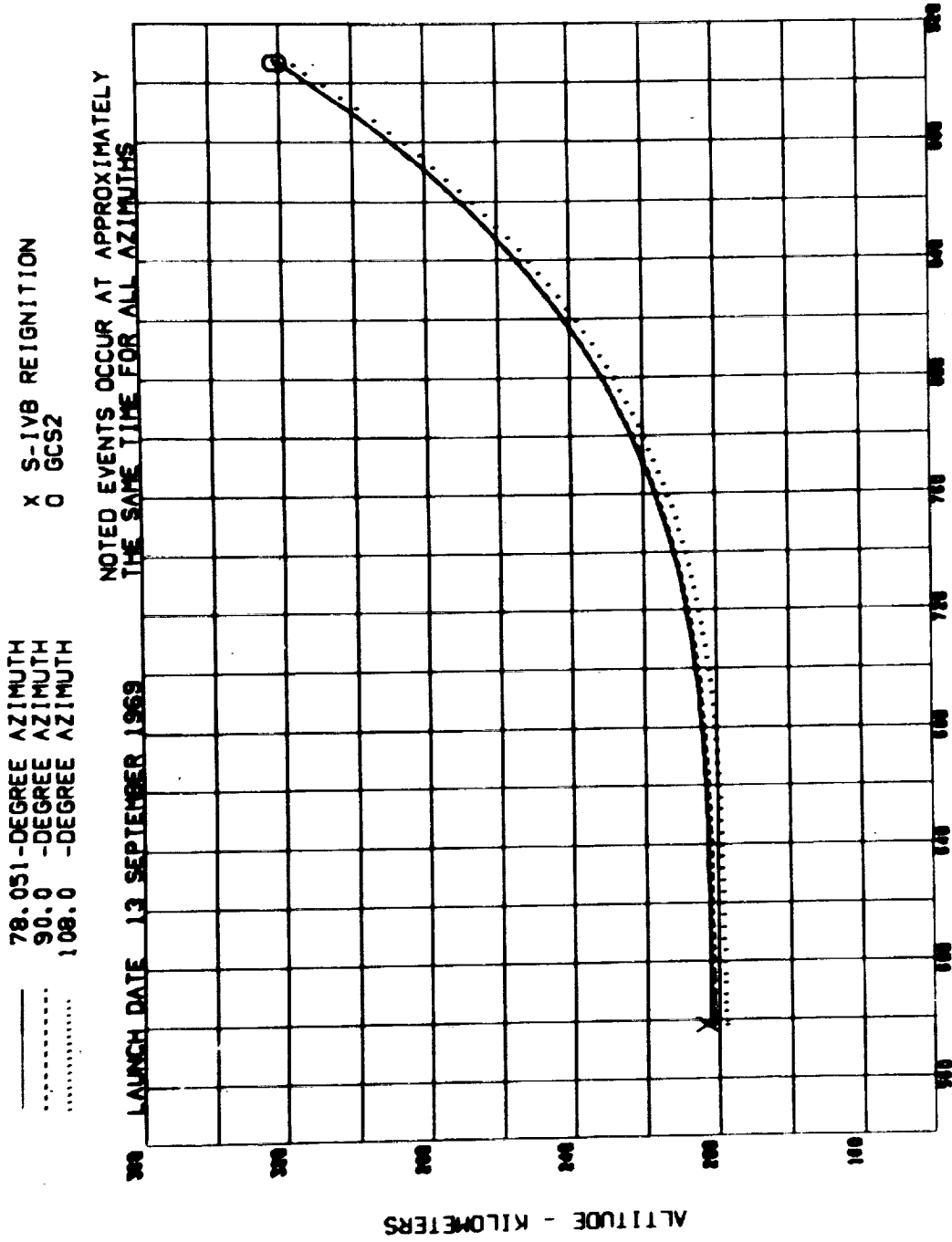
LAUNCH DATE 13 SEPTEMBER 1969
78.054 DEGREE AZIMUTH
90.0 DEGREE AZIMUTH
108.0 DEGREE AZIMUTH
X S-IVB REIGNITION
O GCS2

NOTED EVENTS OCCUR AT APPROXIMATELY
THE SAME TIME FOR ALL AZIMUTHS



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 2-24 ALTITUDE VERSUS TIME DURING S-IVB SECOND BURN (FIRST OPPORTUNITY)



TIME FROM TIMEBASE 6 - SECONDS

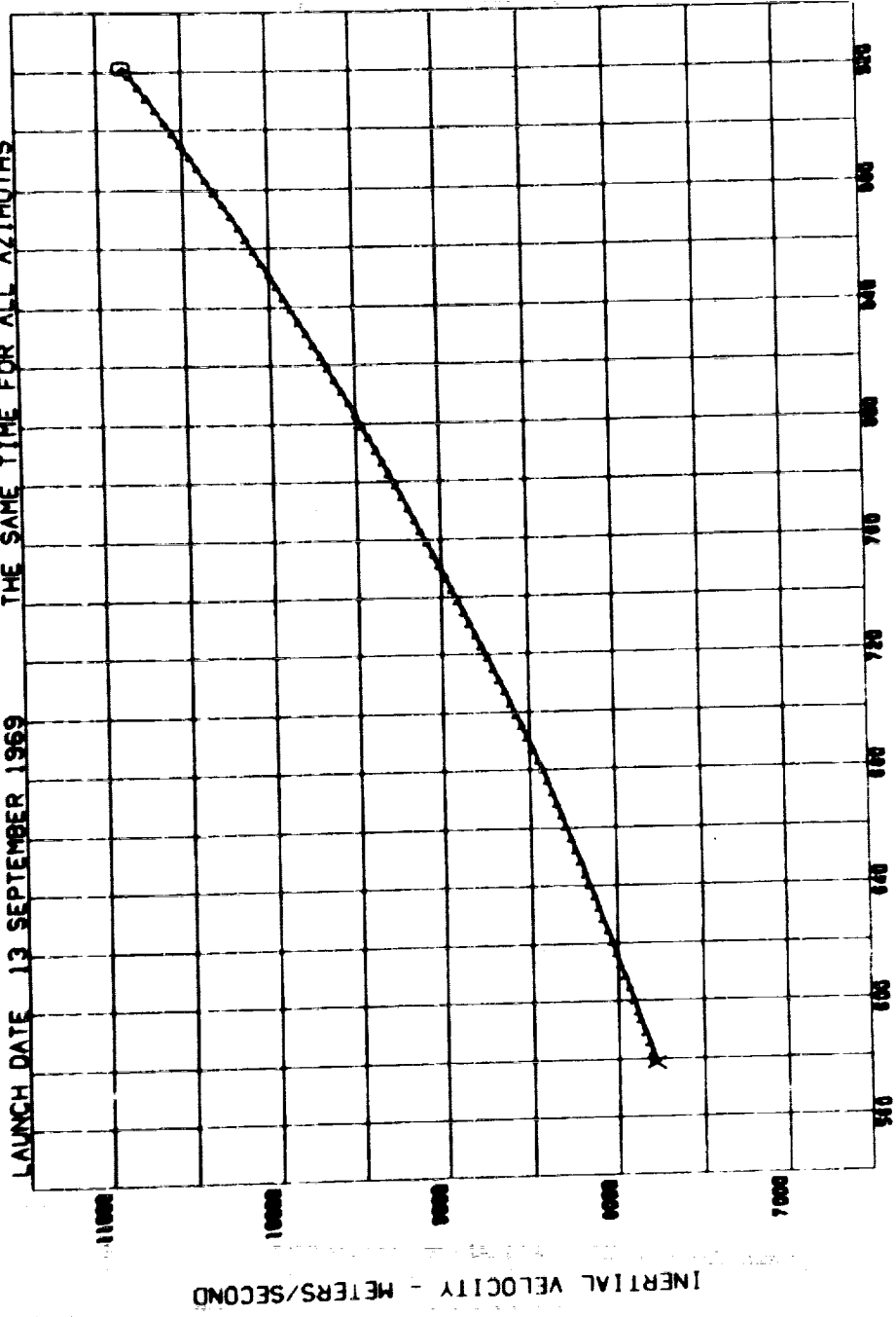
FIGURE 2-25 ALTITUDE VERSUS TIME DURING S-IVB SECOND BURN (SECOND OPPORTUNITY)

78.05 DEGREE AZIMUTH
90.0 DEGREE AZIMUTH
108.0 DEGREE AZIMUTH

X S-IVB REIGNITION
O CCS2

LAUNCH DATE 13 SEPTEMBER 1969

NOTED EVENTS OCCUR AT APPROXIMATELY
THE SAME TIME FOR ALL AZIMUTHS



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 2-26 INERTIAL VELOCITY VERSUS TIME DURING S-IVB
SECOND BURN (FIRST OPPORTUNITY)

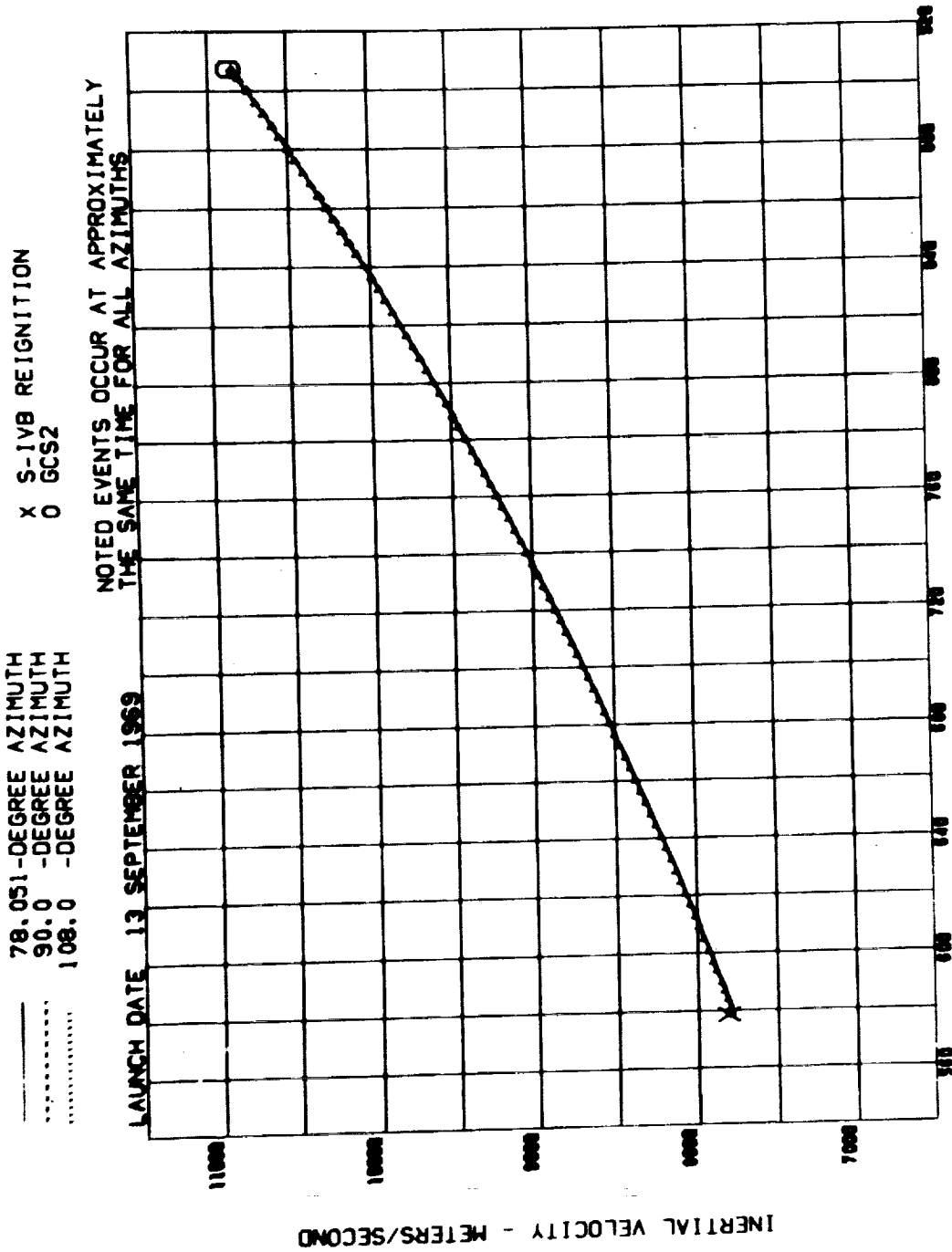


FIGURE 2-27 INERTIAL VELOCITY VERSUS TIME DURING S-IVB SECOND BURN (SECOND OPPORTUNITY)

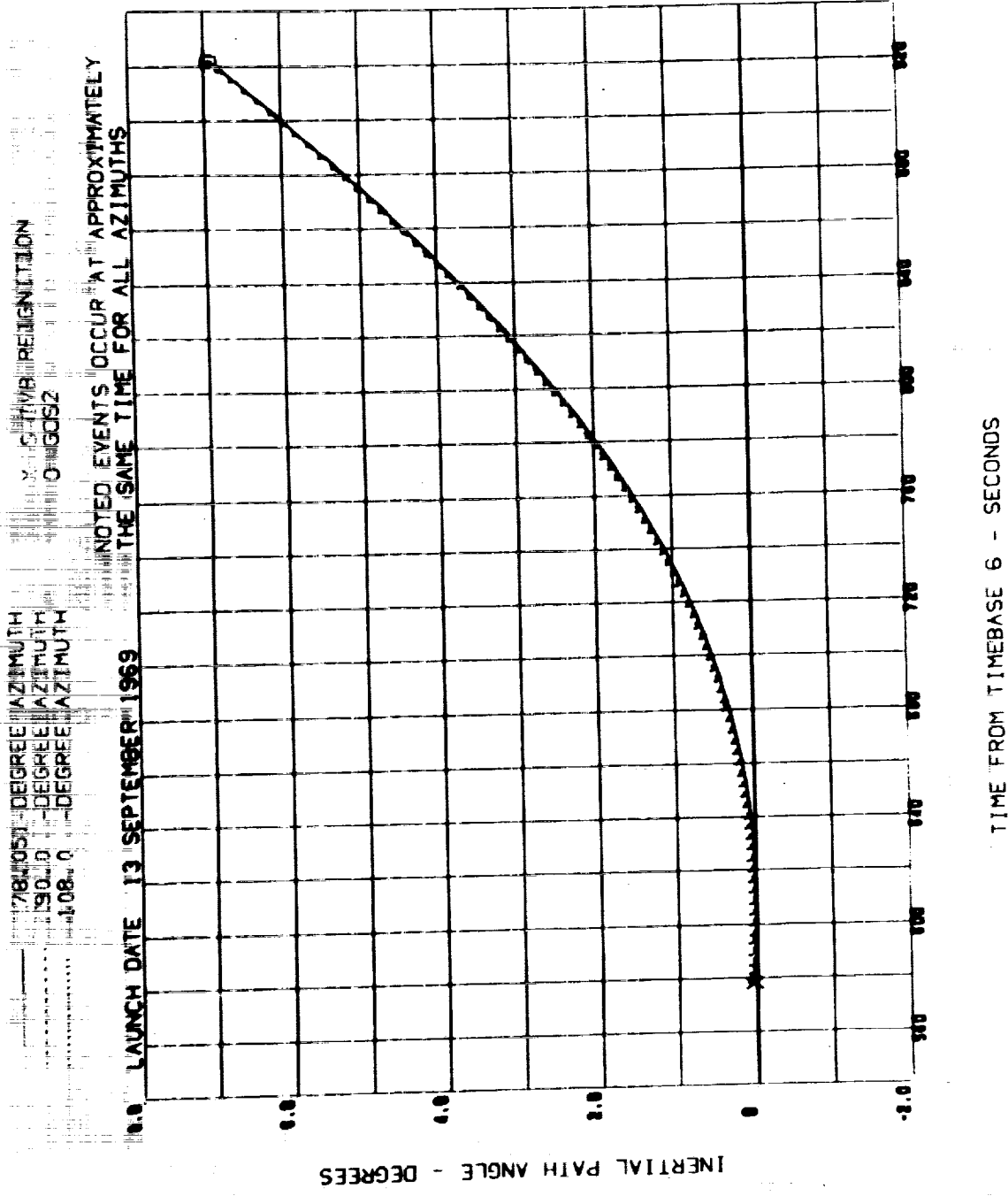
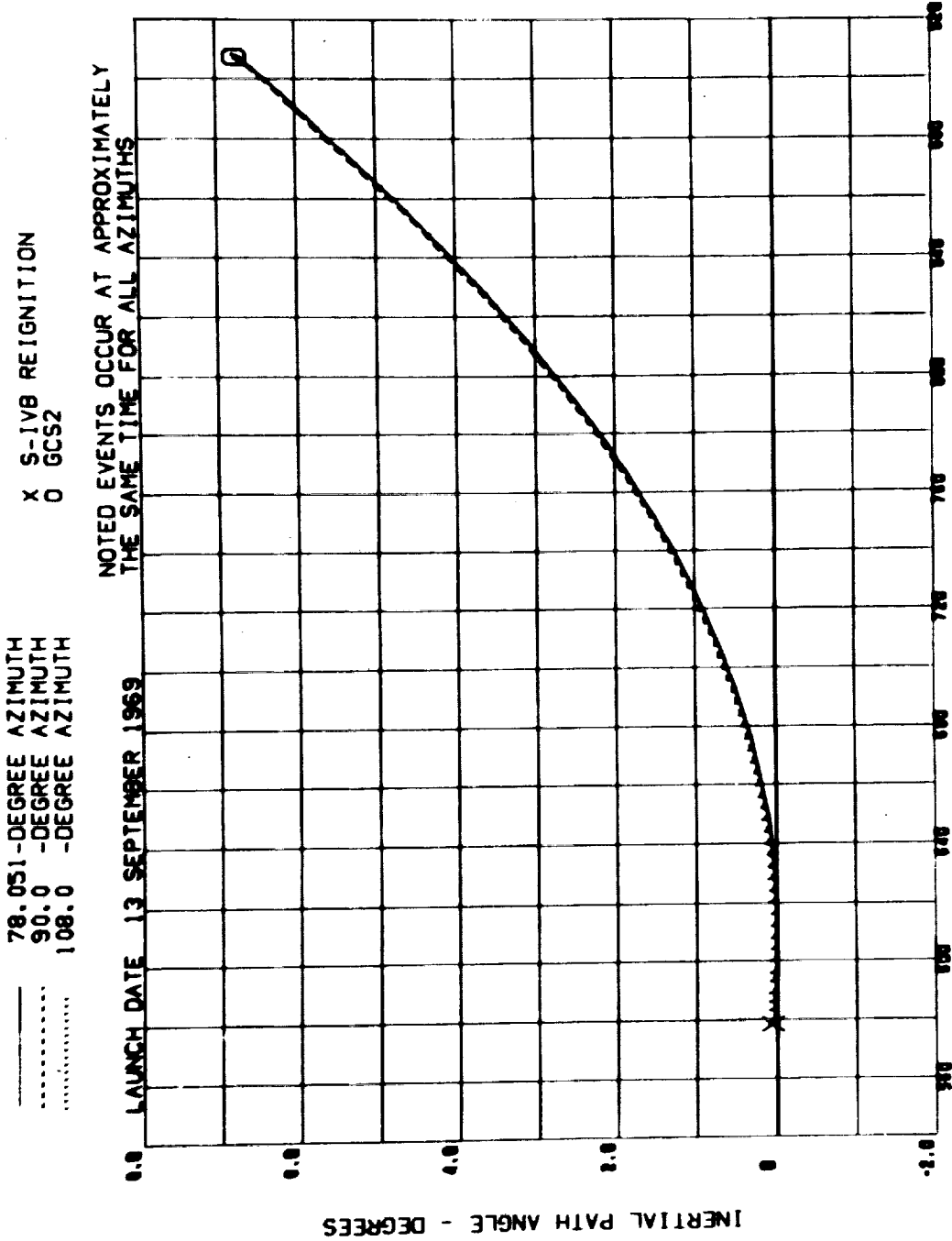


FIGURE 2-28 INERTIAL PATH ANGLE VERSUS TIME DURING S-1VB SECOND BURN (FIRST OPPORTUNITY)

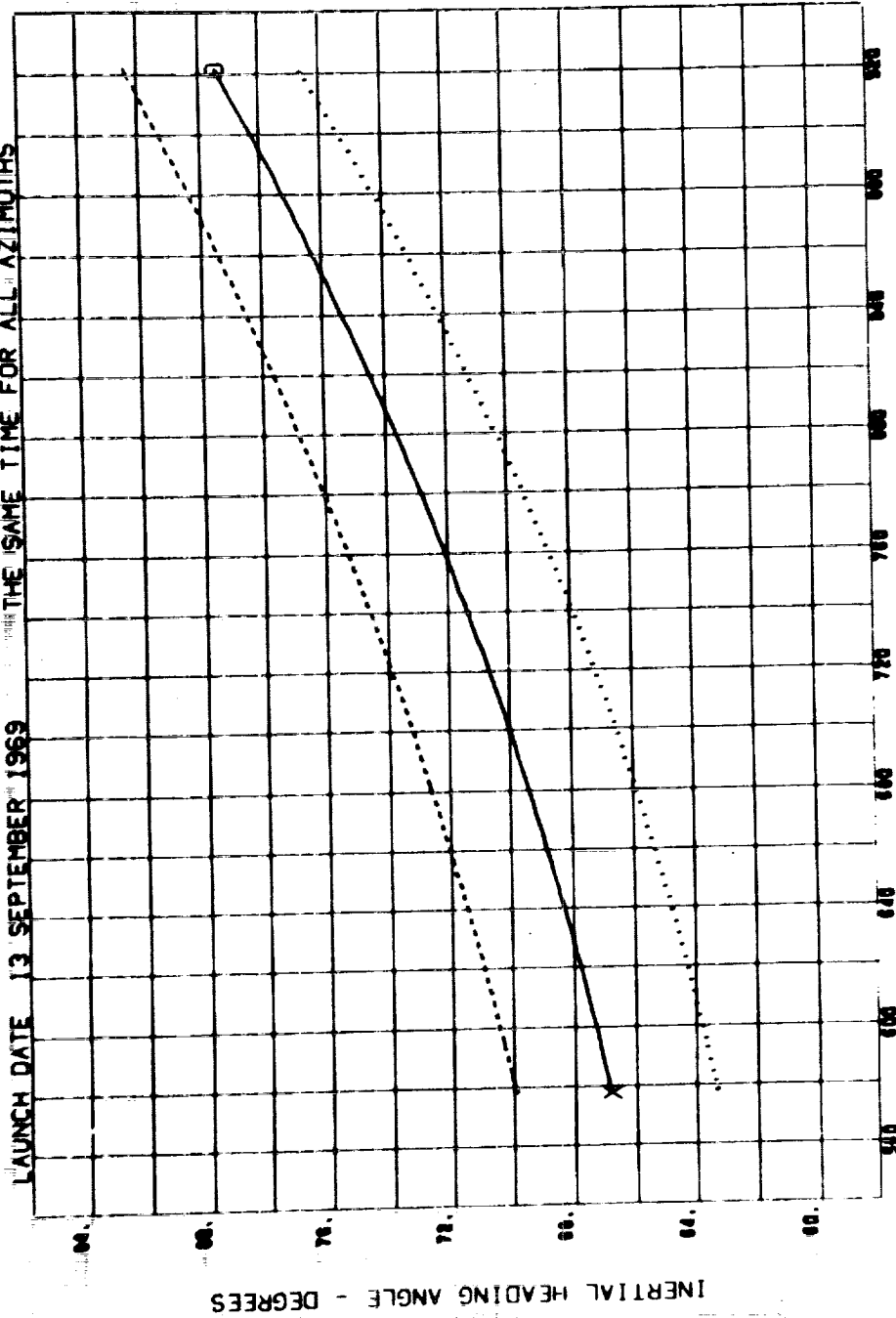


TIME FROM TIMEBASE 6 - SECONDS

FIGURE 2-29 INERTIAL PATH ANGLE VERSUS TIME DURING S-IVB SECOND BURN (SECOND OPPORTUNITY)

78.051 DEGREE AZIMUTH
90.0 DEGREE AZIMUTH
008.0 DEGREE AZIMUTH

NOTED EVENTS OCCUR AT APPROXIMATELY THE SAME TIME FOR ALL AZIMUTHS



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 2-30 INERTIAL HEADING ANGLE VERSUS TIME DURING S-IVB SECOND BURN (FIRST OPPORTUNITY)

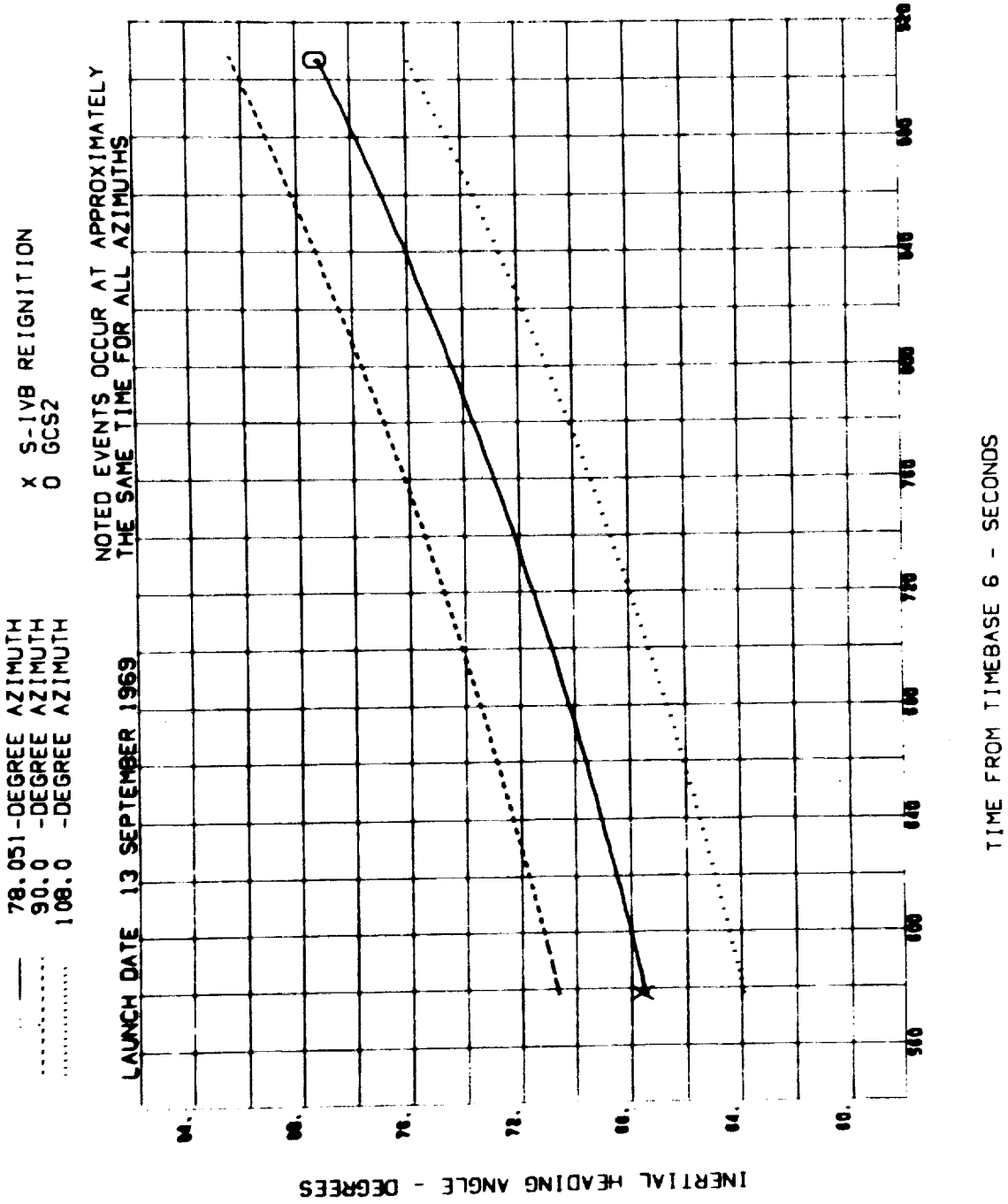


FIGURE 2-31 INERTIAL HEADING ANGLE VERSUS TIME DURING S-IVB SECOND BURN (SECOND OPPORTUNITY)

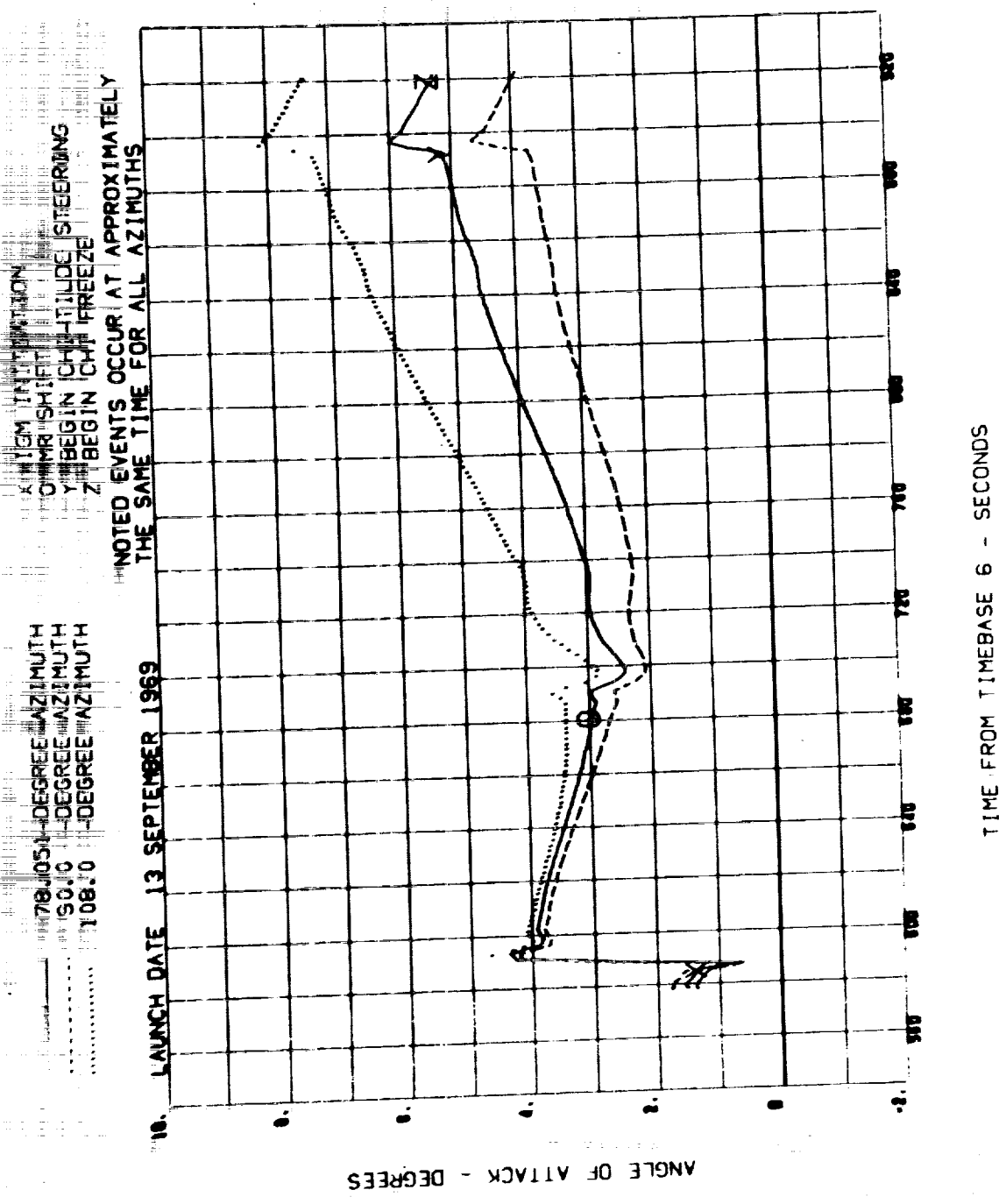
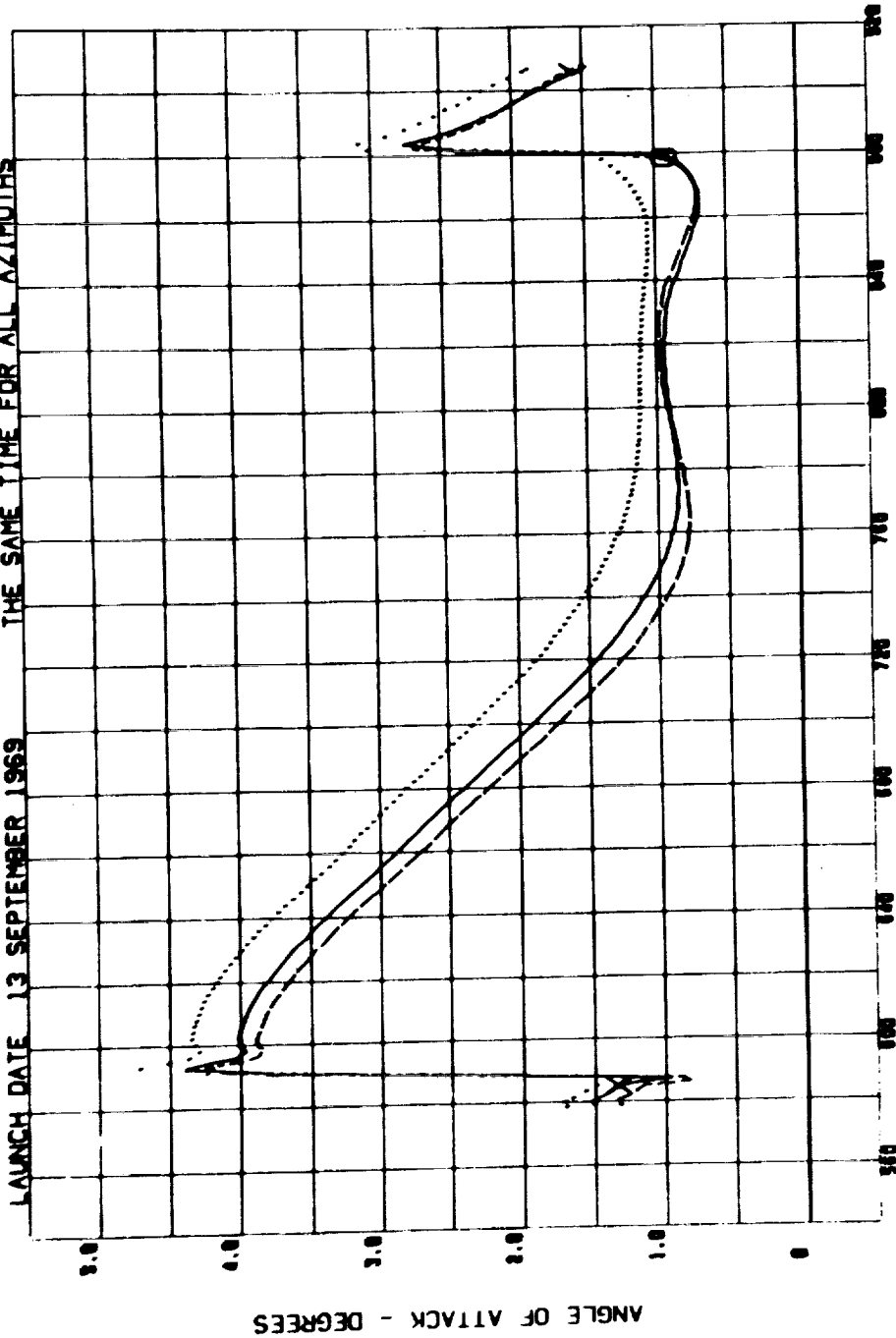


FIGURE 2-32 ANGLE OF ATTACK VERSUS TIME DURING S-IVB SECOND BURN (FIRST OPPORTUNITY)

X IGM INITIATION
 O BEGIN CHI-TILDE STEERING
 Y BEGIN CHI FREEZE

78.051 -DEGREE AZIMUTH
 90.0 -DEGREE AZIMUTH
 108.0 -DEGREE AZIMUTH

NOTED EVENTS OCCUR AT APPROXIMATELY
 THE SAME TIME FOR ALL AZIMUTHS



LAUNCH DATE 13 SEPTEMBER 1969

TIME FROM TIMEBASE 6 - SECONDS

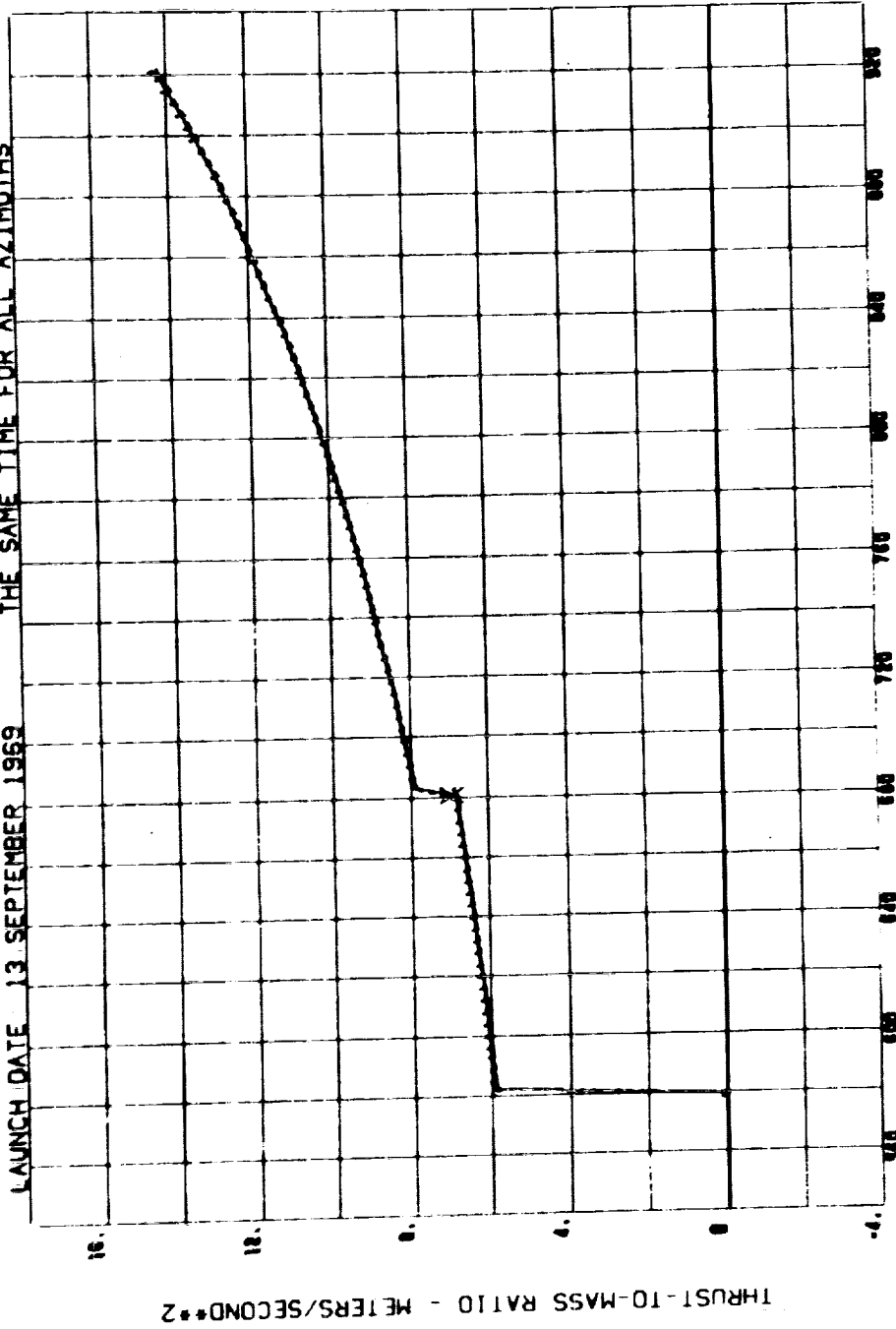
FIGURE 2-33 ANGLE OF ATTACK VERSUS TIME DURING S-IVB SECOND BURN (SECOND OPPORTUNITY)

78.051 -DEGREE AZIMUTH
90.0 -DEGREE AZIMUTH
108.0 -DEGREE AZIMUTH

X MR SHIFT

NOTED EVENTS OCCUR AT APPROXIMATELY
THE SAME TIME FOR ALL AZIMUTHS

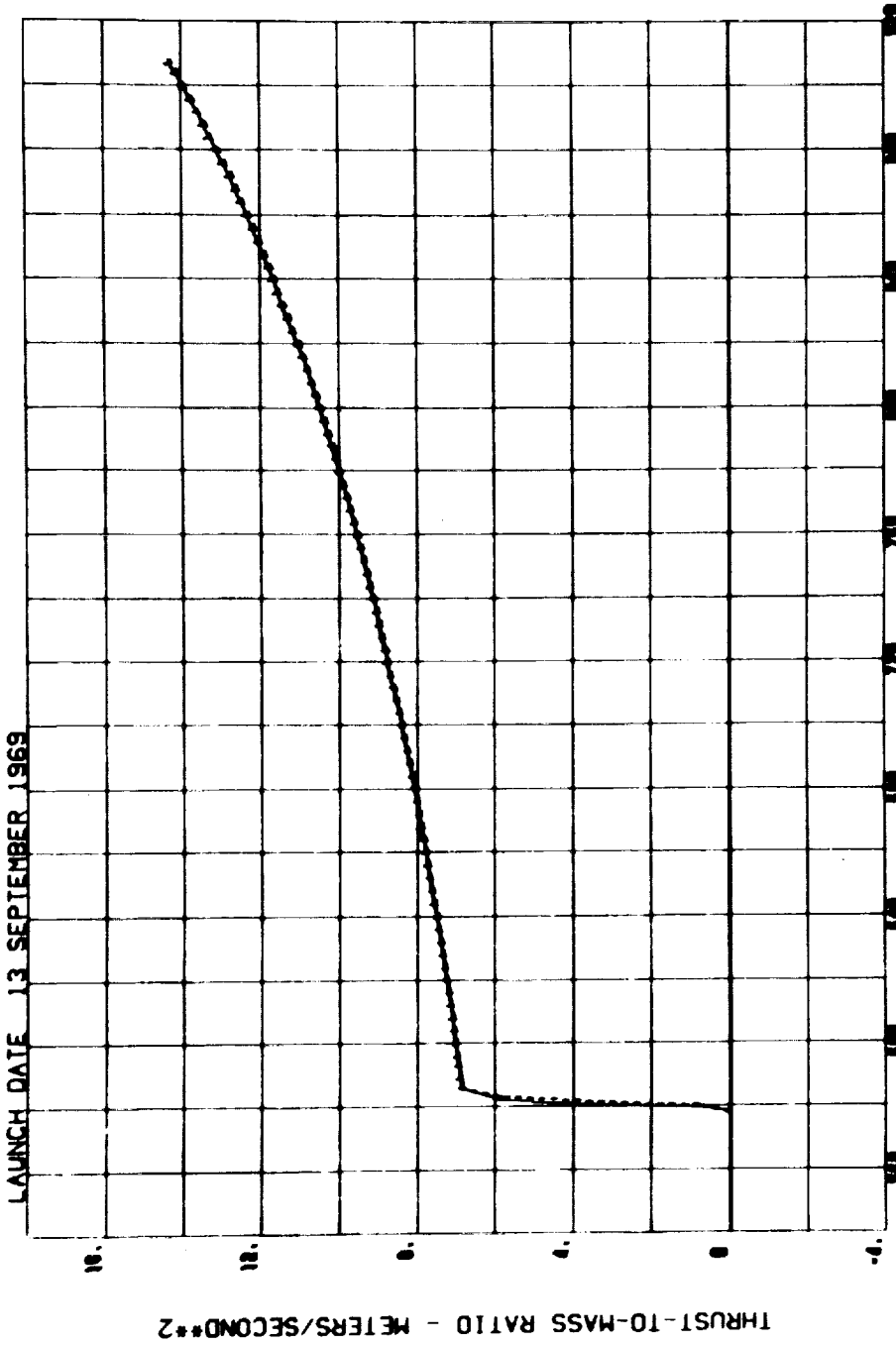
LAUNCH DATE 13 SEPTEMBER 1969



TIME FROM TIMEBASE 6 - SECONDS

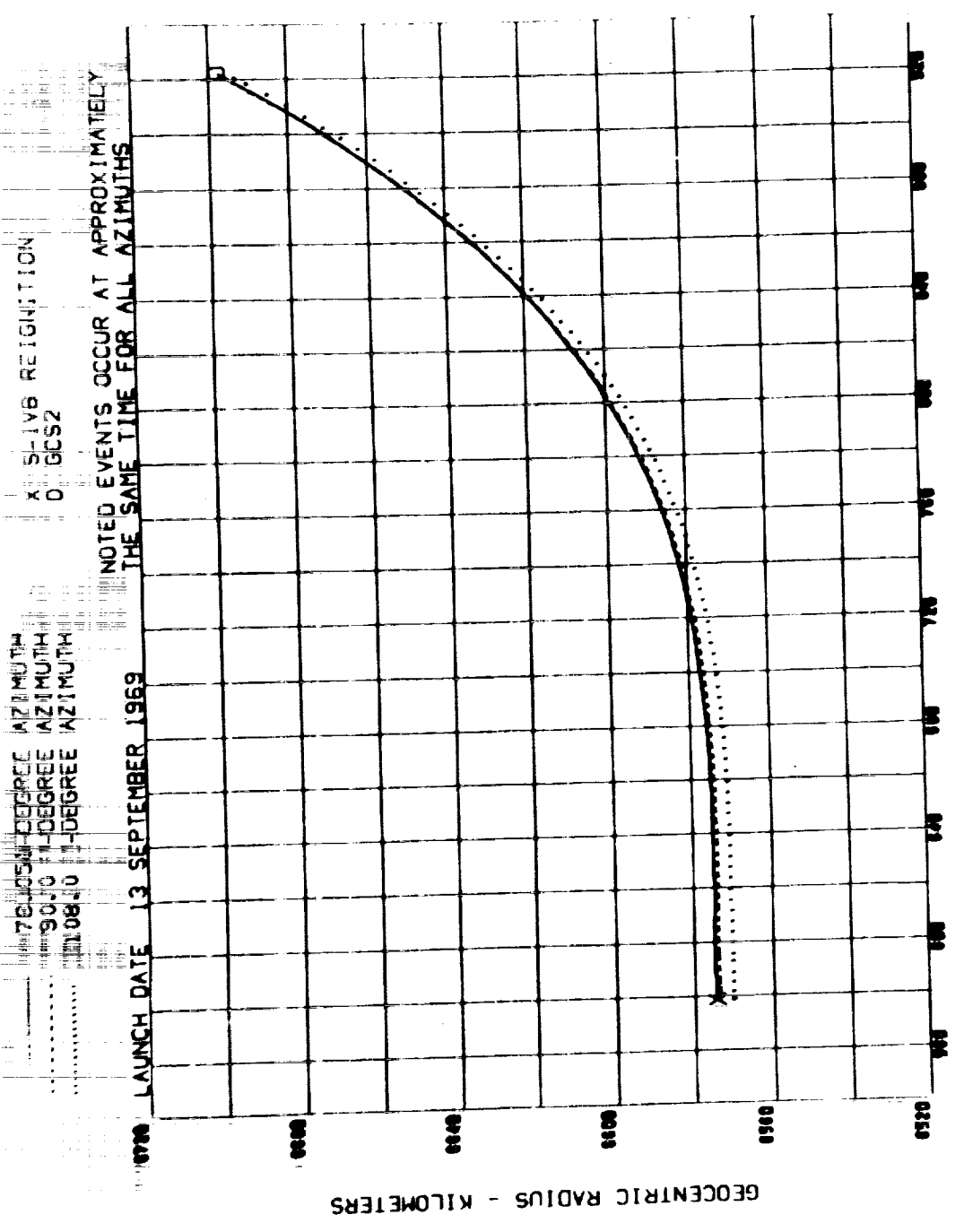
FIGURE 2-34 THRUST-TO-MASS RATIO VERSUS TIME DURING
S-IVB SECOND BURN (FIRST OPPORTUNITY)

78.051 -DEGREE AZIMUTH
90.0 -DEGREE AZIMUTH
108.0 -DEGREE AZIMUTH



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 2-35 THRUST-TO-MASS RATIO VERSUS TIME DURING
S-IVB SECOND BURN (SECOND OPPORTUNITY)



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 2-36 GEOCENTRIC RADIUS VERSUS TIME DURING S-IVB SECOND BURN (FIRST OPPORTUNITY)

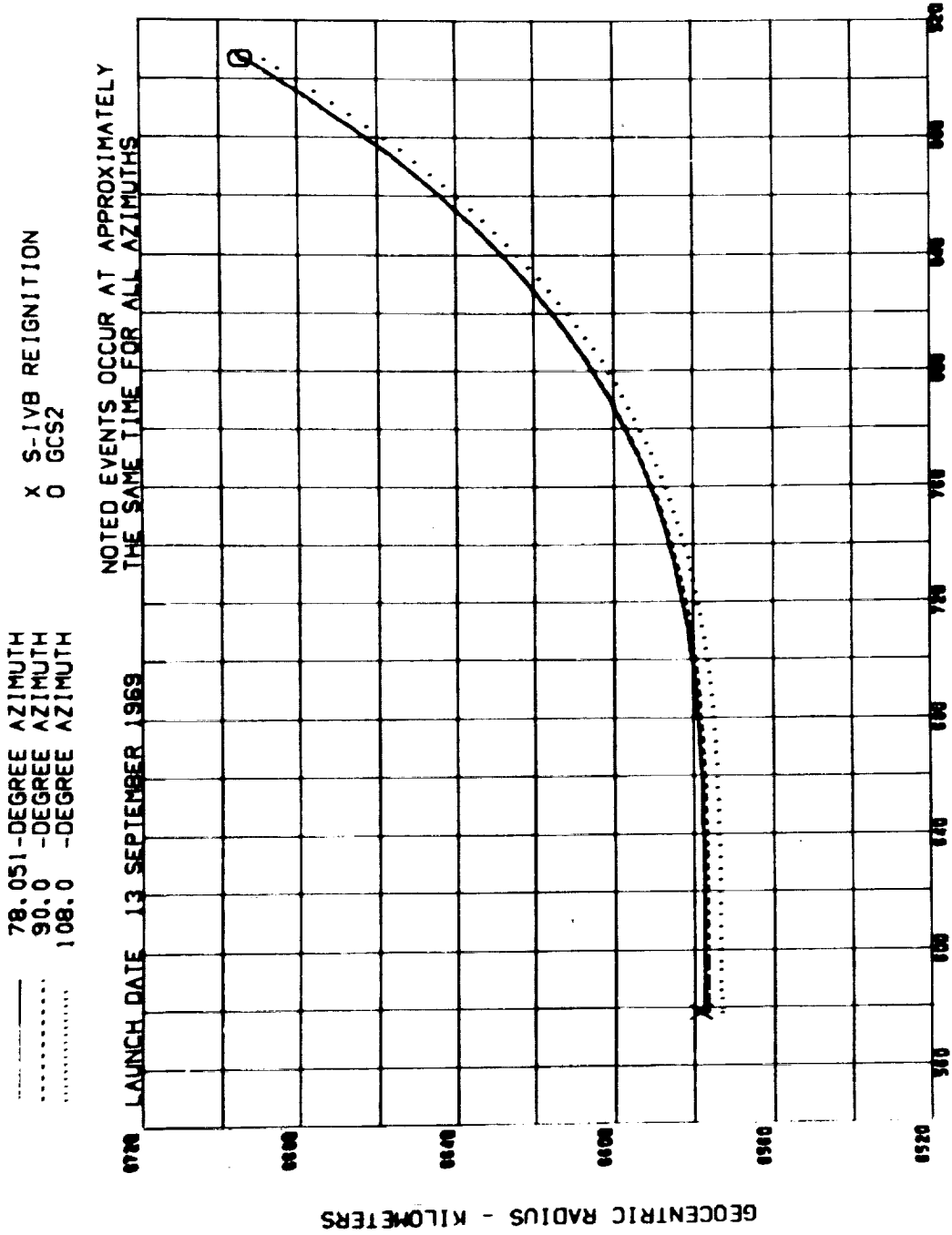
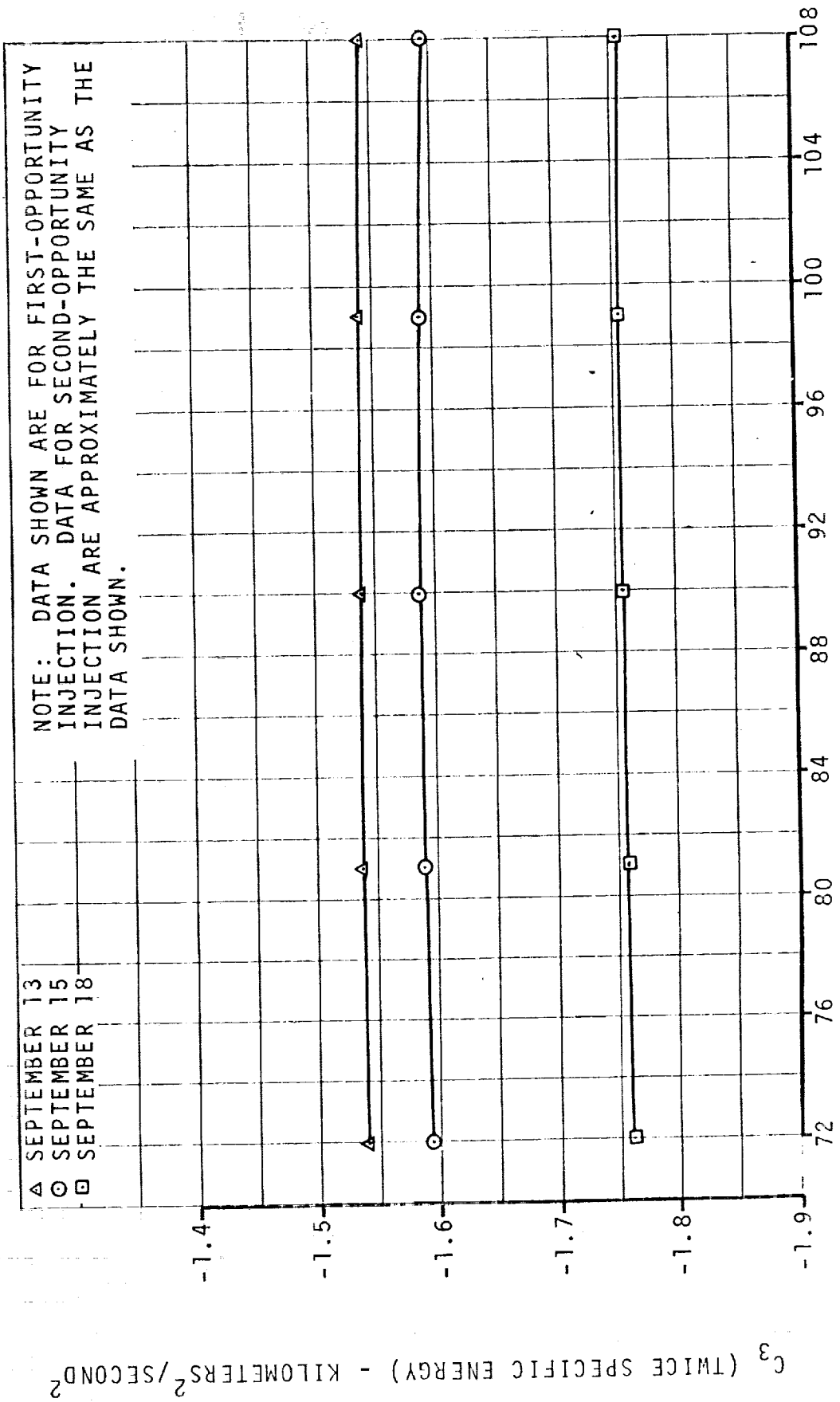


FIGURE 2-37 GEOCENTRIC RADIUS VERSUS TIME DURING S-IVB SECOND BURN (SECOND OPPORTUNITY)



LAUNCH AZIMUTH - DEGREES

FIGURE 2-38 TRANSLUNAR ORBIT C₃ VARIATION FOR THE SEPTEMBER LAUNCH WINDOW

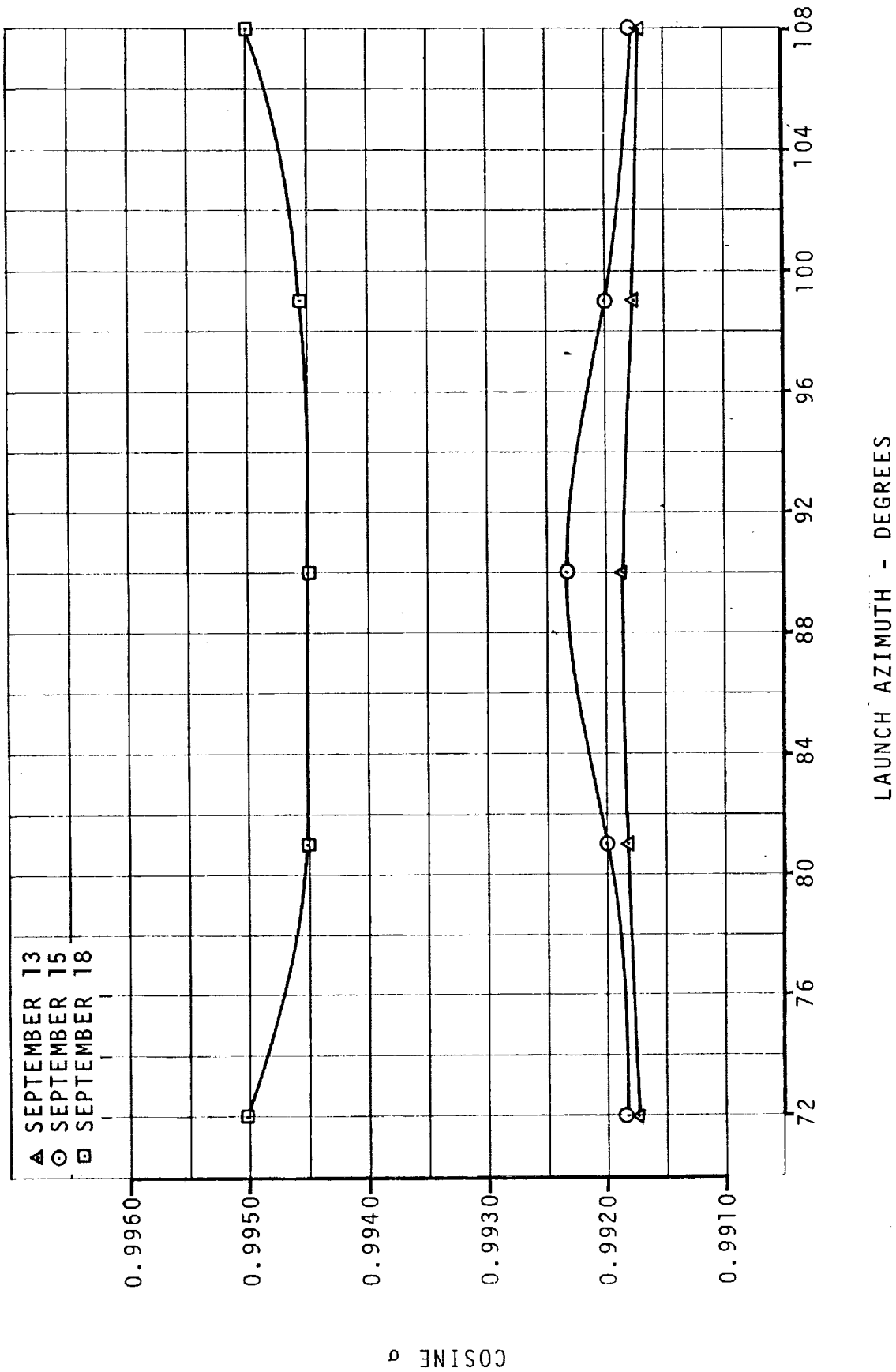
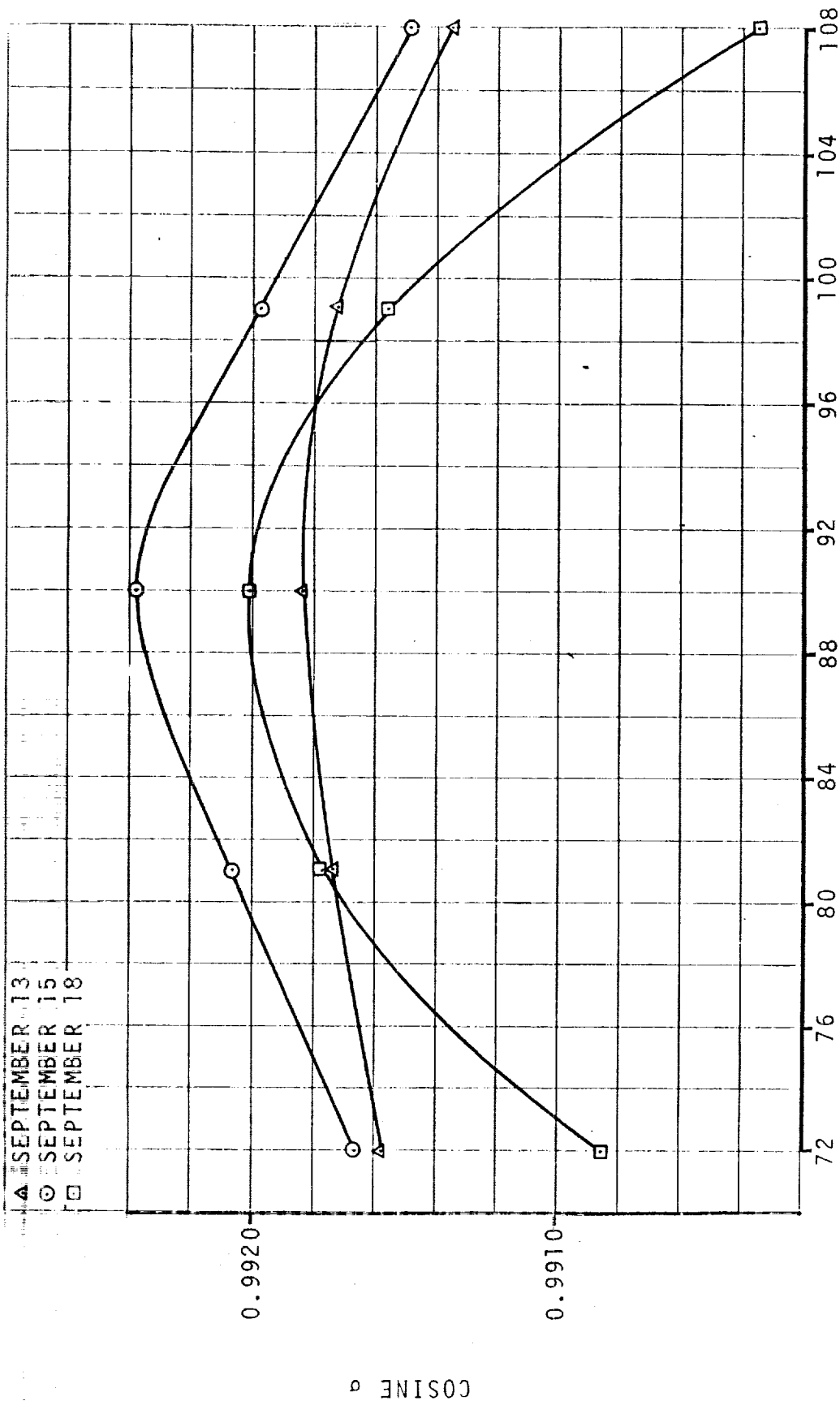


FIGURE 2-39 COSINE σ VARIATION FOR THE FIRST-OPPORTUNITY SEPTEMBER LAUNCH WINDOW



LAUNCH AZIMUTH - DEGREES

FIGURE 2-40 COSINE σ VARIATION FOR THE SECOND-OPPORTUNITY SEPTEMBER LAUNCH WINDOW

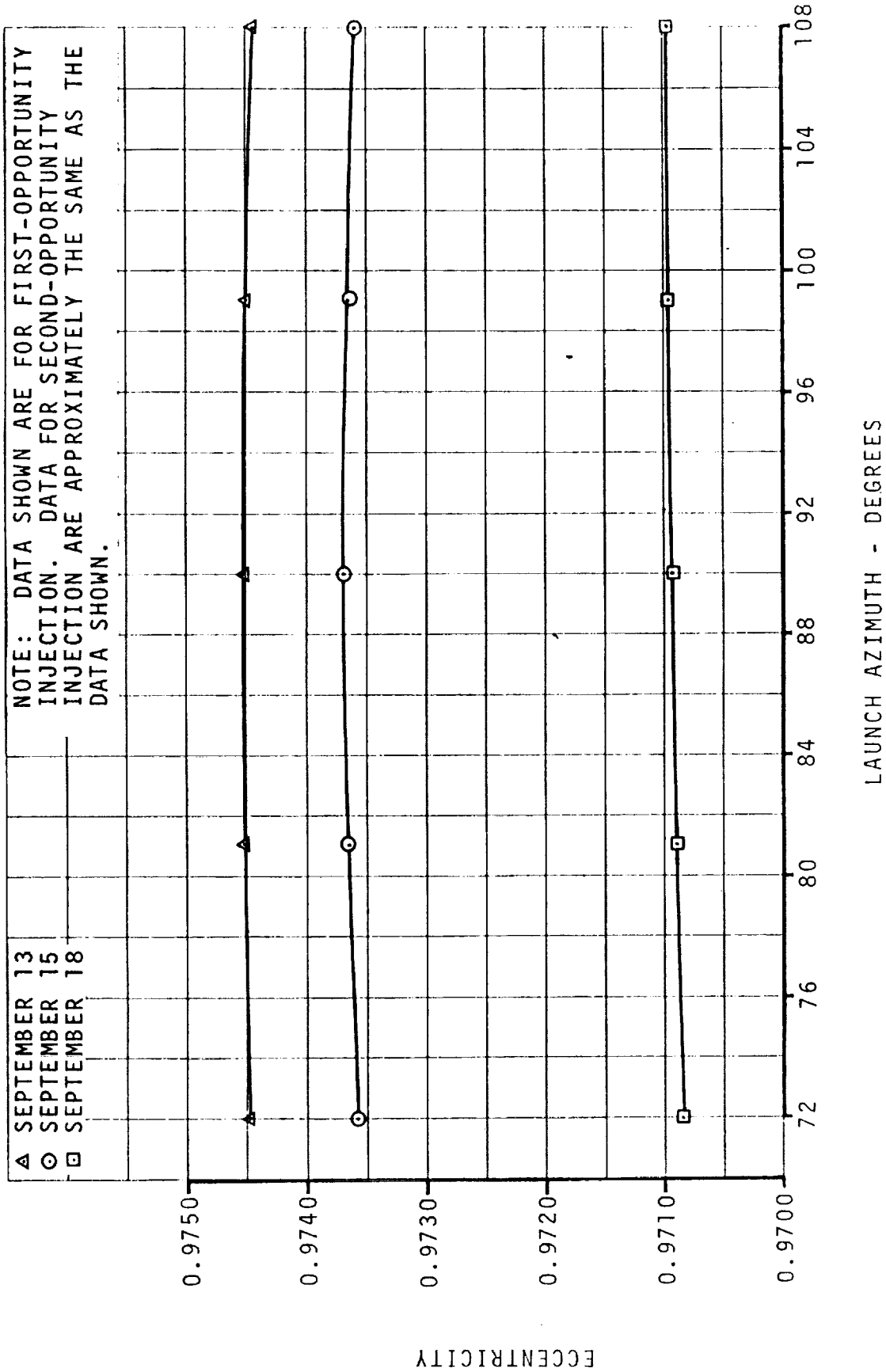
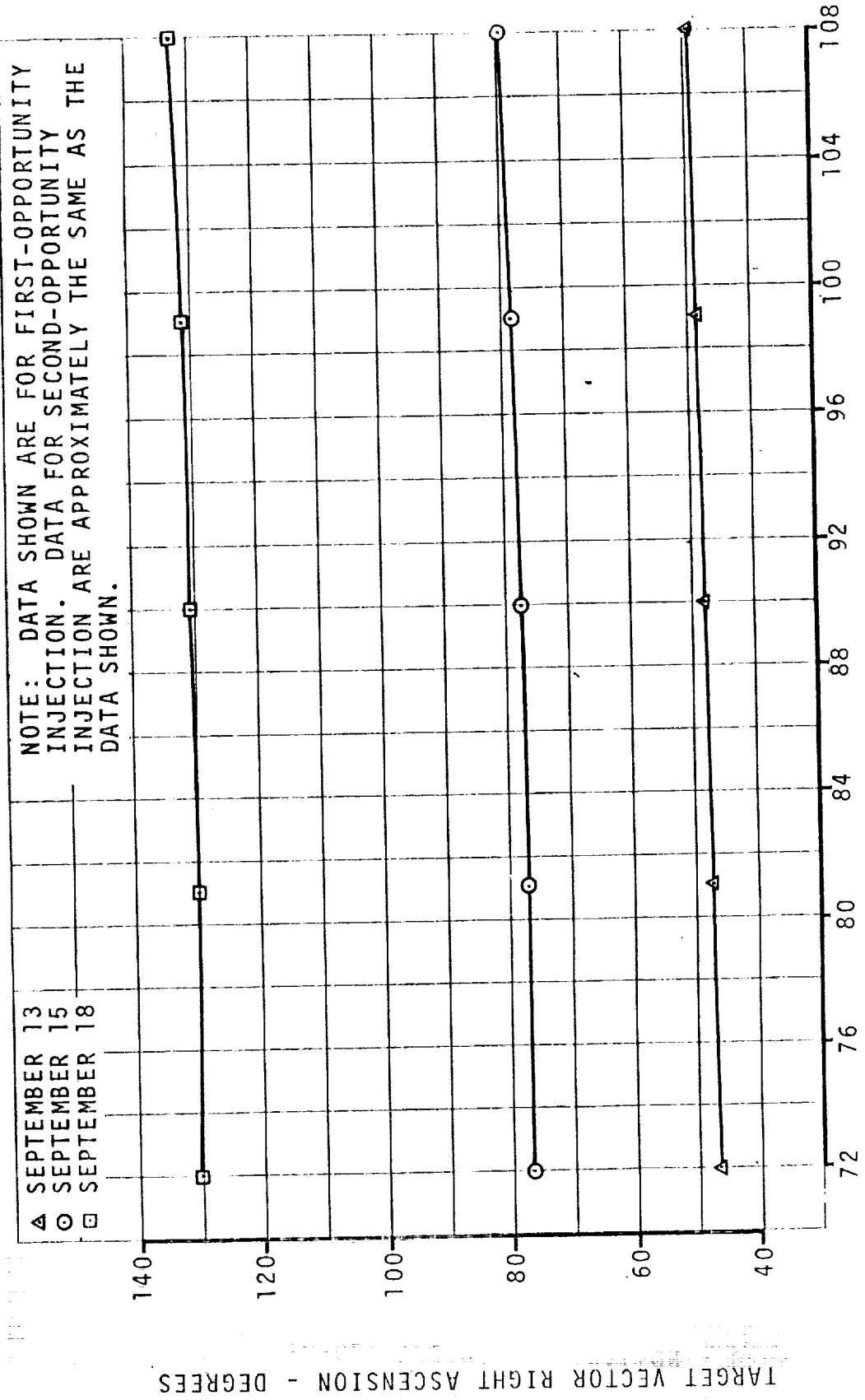


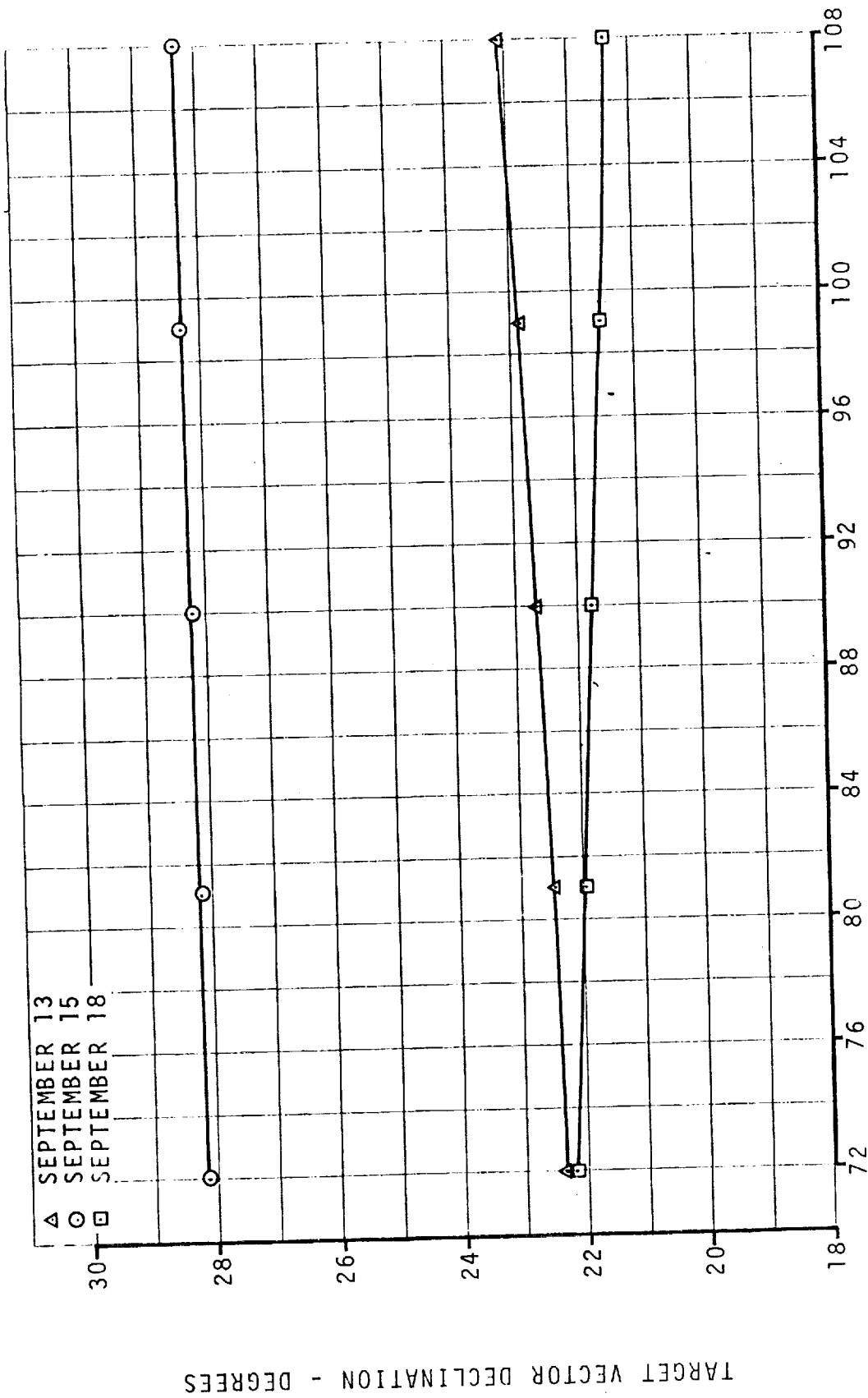
FIGURE 2-41 TRANSLUNAR ORBIT ECCENTRICITY VARIATION FOR THE SEPTEMBER LAUNCH WINDOW



TARGET VECTOR RIGHT ASCENSION - DEGREES

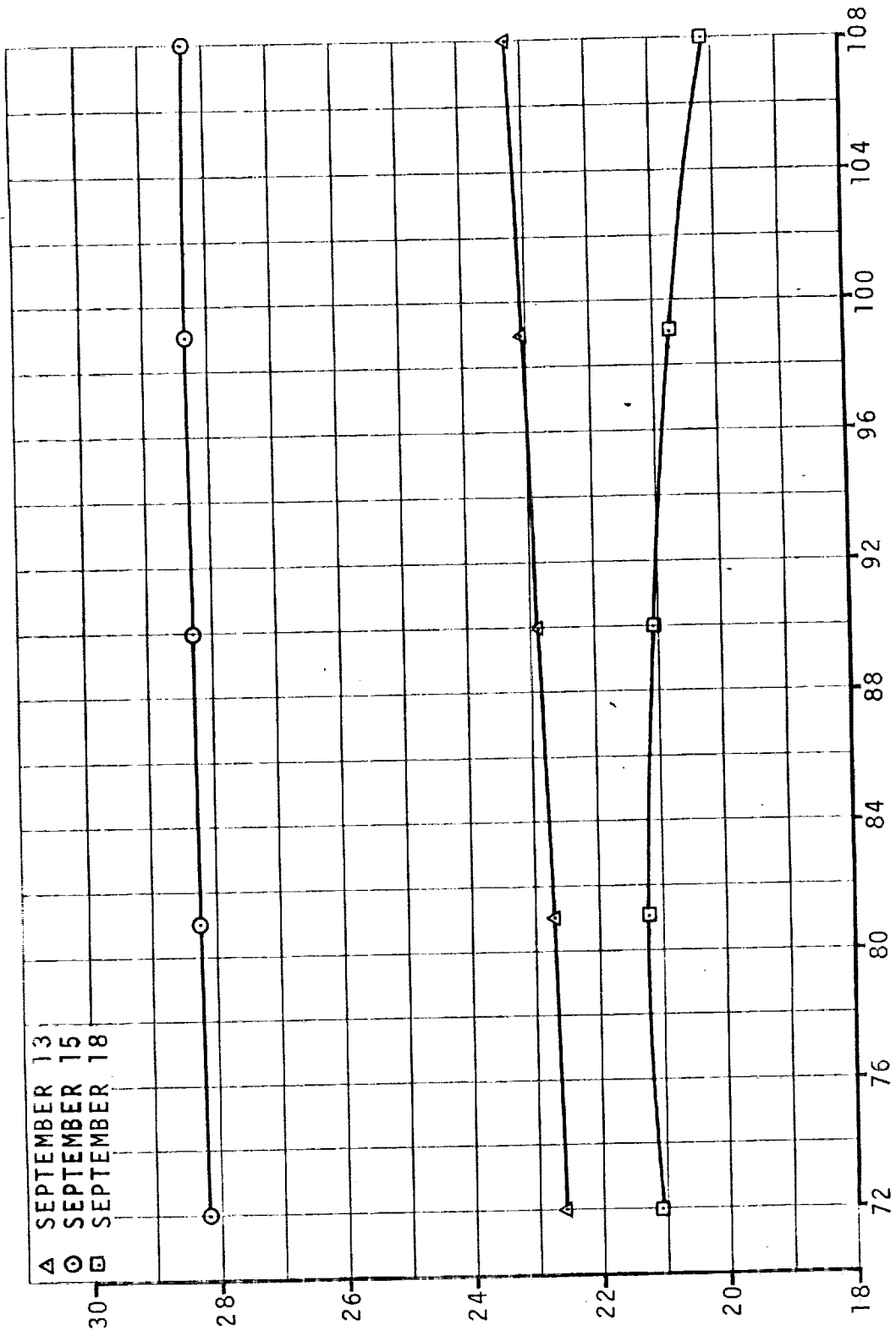
LAUNCH AZIMUTH - DEGREES

FIGURE 2-42 TARGET VECTOR RIGHT ASCENSION FOR THE SEPTEMBER LAUNCH WINDOW



LAUNCH AZIMUTH - DEGREES

FIGURE 2-43 TARGET VECTOR DECLINATION FOR THE FIRST-OPPORTUNITY SEPTEMBER LAUNCH WINDOW



TARGET VECTOR DECLINATION - DEGREES

LAUNCH AZIMUTH - DEGREES

FIGURE 2-44 TARGET VECTOR DECLINATION FOR THE SECOND-OPPORTUNITY SEPTEMBER LAUNCH WINDOW

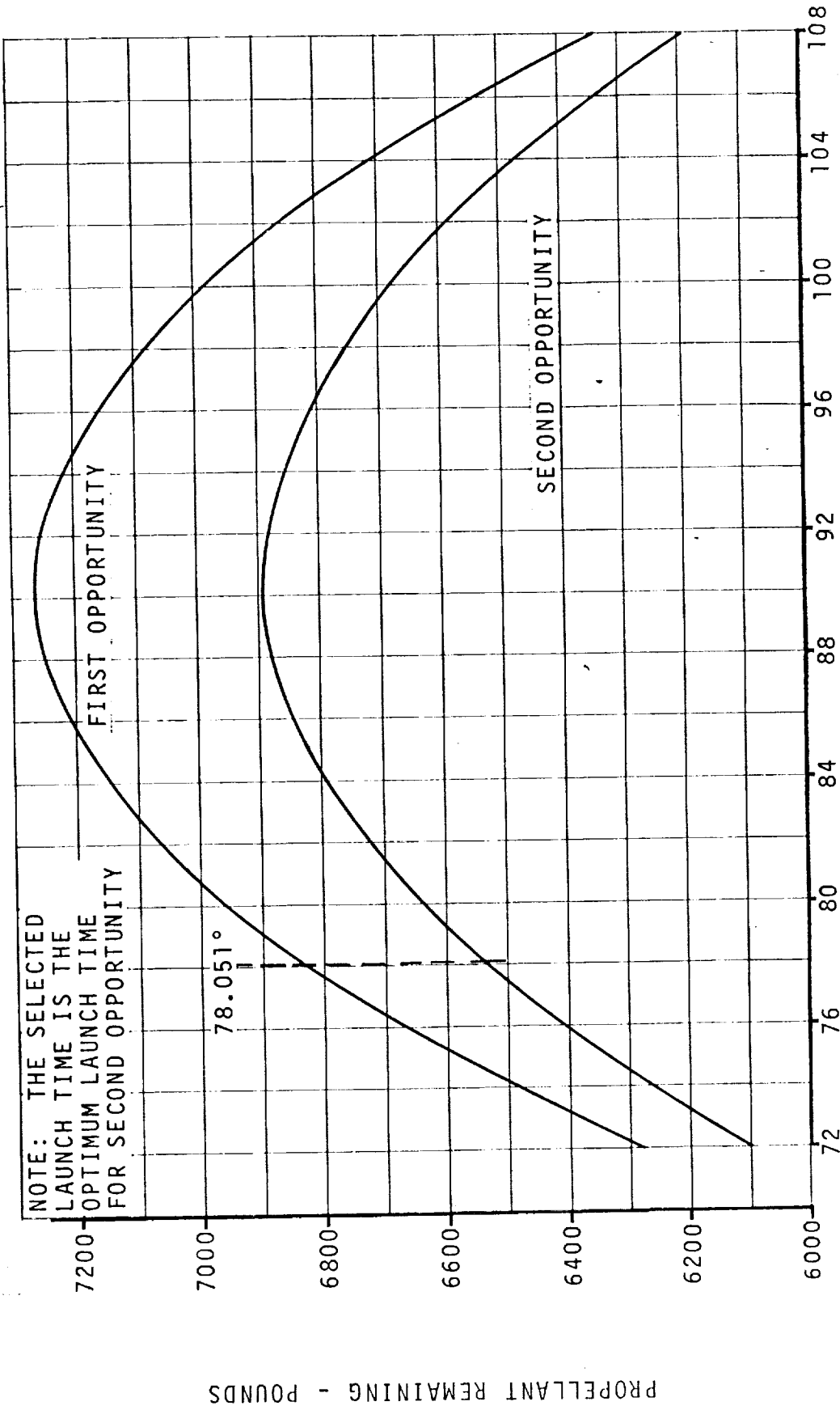


FIGURE 2-45 USABLE S-IVB PROPELLANT REMAINING AT GCS2 FOR 13 SEPTEMBER 1969

TABLE 2-II. SUMMARY OF PROPELLANT REMAINING AT GCS2 FOR SEPTEMBER 1969 LAUNCH WINDOW

Launch Date	Azimuth/ Opportunity	LOX Remaining in Tanks and Lines at GCS2 (lb)	LH ₂ Remaining in Tanks and Lines at GCS2 (lb)	Total Propellant Remaining in Tanks & Lines at GCS2 (lb)	Usable* Propellant Remaining in Tanks at GCS2 (lb)	
9/13/69	72°/1	5465	2260	7725	6271	
	72°/2	5316	2236	7552	6094	
	78.051°/1	5917	2364	8281	6827	
	78.051°/2	5667	2319	7986	6528	
	81°/1**	6066	2402	8468	7014	
	81°/2**	5788	2352	8140	6682	
	90°/1	6246	2471	8717	7263	
	90°/2	5937	2414	8351	6893	
	99°/1**	6023	2470	8493	7039	
	99°/2**	5756	2421	8177	6719	
	108°/1	5400	2390	7790	6336	
	108°/2	5282	2369	7651	6193	
9/15/69	72°/1**	5480	2223	7703	6249	
	72°/2**	5393	2212	7605	6147	
	81°/1**	6191	2372	8563	7109	
	81°/2**	5872	2313	8185	6727	
	90°/1**	6386	2426	8812	7358	
	90°/2**	6024	2359	8383	6925	
	99°/1**	6121	2437	8558	7104	
	99°/2**	5826	2383	8209	6751	
	108°/1**	5353	2344	7697	6243	
	108°/2**	5339	2346	7685	6227	
	9/18/69	72°/1**	5239	2216	7455	6001
		72°/2**	5254	2228	7482	6024
81°/1**		5772	2348	8120	6666	
81°/2**		5808	2363	8171	6713	

TABLE 2-II. SUMMARY OF PROPELLANT REMAINING AT GCS2 FOR SEPTEMBER 1969 LAUNCH WINDOW (Continued)

Launch Date	Azimuth/ Opportunity	LOX Remaining in Tanks and Lines at GCS2 (lb)	LH ₂ Remaining in Tanks and Lines at GCS2 (lb)	Total Propellant Remaining in Tanks & Lines at GCS2 (lb)	Usable* Propellant Remaining at GCS2 (lb)
9/18/69	90°/1**	5922	2415	8337	6883
	90°/2**	5989	2435	8424	6966
	99°/1**	5688	2414	8102	6648
	99°/2**	5772	2437	8209	6751
	108°/1**	5171	2354	7525	6071
	108°/2**	5175	2361	7536	6078

* Based upon propellant residuals in the tanks and lines at nominal LOX-depletion cutoff for 72 degrees flight azimuth on September 13, 1969. LOX residuals at cutoff are 423 pounds for both first and second opportunity TLI boost. LH₂ residuals at cutoff are 1031 and 1035 pounds for first and second opportunity, respectively.

** The LOX and LH₂ residuals for these dates and azimuths are based upon the residuals published in Reference 26, but are adjusted to reflect incremental differences in LOX and LH₂ residuals noted during preparation of improved simulations of September 13 trajectories for azimuths of 72, 78.051, 90, and 108 degrees.

TABLE 2-III. TRANSLUNAR ORBIT ATTITUDE AND VENT TIMELINE

<u>TIME</u>	<u>EVENT</u>												
TB7 + 0.0 SEC	Maintain commanded cutoff inertial attitude.												
TB7 + 0.5 SEC	H ₂ Continuous Vent on.												
TB7 + 20.0 SEC	Initiate maneuver to and maintain local horizontal attitude. Simulated rates in this maneuver are as follows: <p style="margin-left: 40px;">0.3°/Sec Pitch 0.3°/Sec Yaw 0.5°/Sec Roll</p>												
TB7 + 899.8 SEC	H ₂ Continuous Vent off.												
TB7 + 900.0 SEC	Initiate maneuver to CSM separation attitude. The separation attitude is specified relative to local horizontal coordinates; the commanded attitude is the inertial attitude corresponding to the specified local attitude at TB7 + 900 seconds. Simulated vehicle rotation to this attitude is at 0.7 degree per second in pitch, yaw, and roll. The attitudes of transposition, docking, and ejection for the September 1969 launch window are as follows:												
	<table border="1"> <thead> <tr> <th>LAUNCH DATE</th> <th>PITCH (DEG)</th> <th>YAW (DEG)</th> <th>ROLL (DEG)</th> </tr> </thead> <tbody> <tr> <td>13 and 15 September</td> <td>120.0</td> <td>40.0</td> <td>180.0</td> </tr> <tr> <td>18 September</td> <td>120.0</td> <td>-40.0</td> <td>180.0</td> </tr> </tbody> </table>	LAUNCH DATE	PITCH (DEG)	YAW (DEG)	ROLL (DEG)	13 and 15 September	120.0	40.0	180.0	18 September	120.0	-40.0	180.0
LAUNCH DATE	PITCH (DEG)	YAW (DEG)	ROLL (DEG)										
13 and 15 September	120.0	40.0	180.0										
18 September	120.0	-40.0	180.0										
TB7 + 7200.0 SEC (TB8 + 0.0 SEC)	Maneuver to and maintain the slingshot attitude. The simulated slingshot attitude angles for 13 September 1969 launch are 210, 0, 180, degrees pitch, yaw and roll. These angles are commanded and maintained relative to local horizontal coordinates. Simulated rates in this maneuver are as follows: <p style="margin-left: 40px;">0.3°/Sec Pitch 0.3°/Sec Yaw 0.5°/Sec Roll</p>												

TABLE 2-III. TRANSLUNAR ORBIT ATTITUDE AND VENT TIMELINE
(Continued)

<u>TIME</u>	<u>EVENT</u>
TB8 + 0.4 SEC	H ₂ Continuous Vent on.
TB8 + 720.0 SEC	Begin LOX Dump.
TB8 + 1020.2 SEC	End LOX Dump.
TB8 + 1858.0 SEC	Apply slingshot ΔV . (Simulation of LOX Dump, LH ₂ Vent, and APS thrust is performed instantaneously.) The simulated ΔV magnitude for 13 September 1969 is 35.0 meters per second.
TB8 + 2800.0 SEC	APS Ullage Ignition.
TB8 + 3700.0 SEC	APS Ullage Cutoff.
TB8 + 3705.0 SEC	Initiate maneuver to and maintain communications attitude of the following:

180° Pitch
0° Yaw
180° Roll

These angles are commanded relative to local horizontal coordinates. Simulated rates in this maneuver are as follows:

0.3°/Sec Pitch
0.3°/Sec Yaw
0.5°/Sec Roll

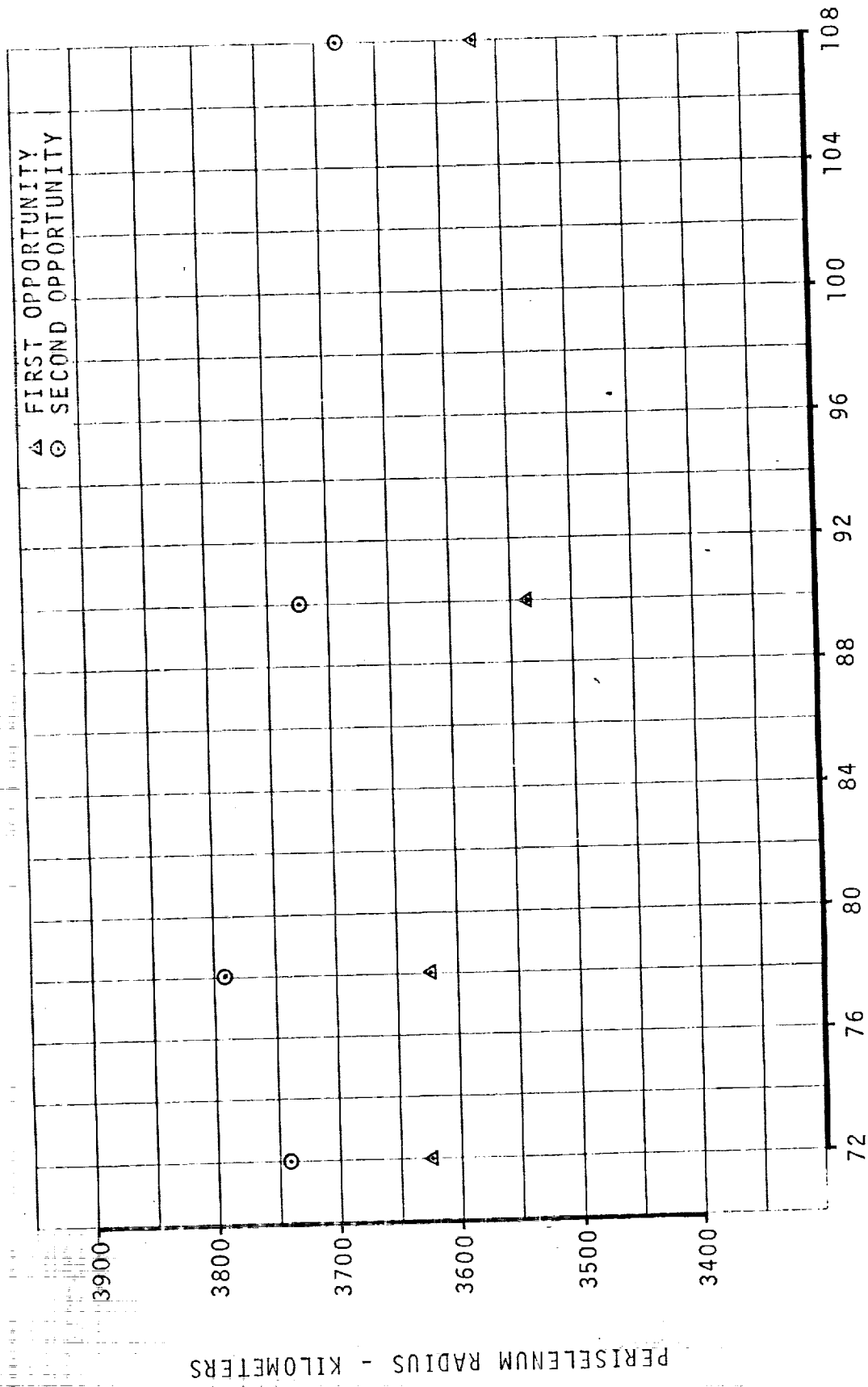


FIGURE 2-46 SPENT S-IVB SLINGSHOT PERISELENUM RADIUS FOR 13 SEPTEMBER 1969

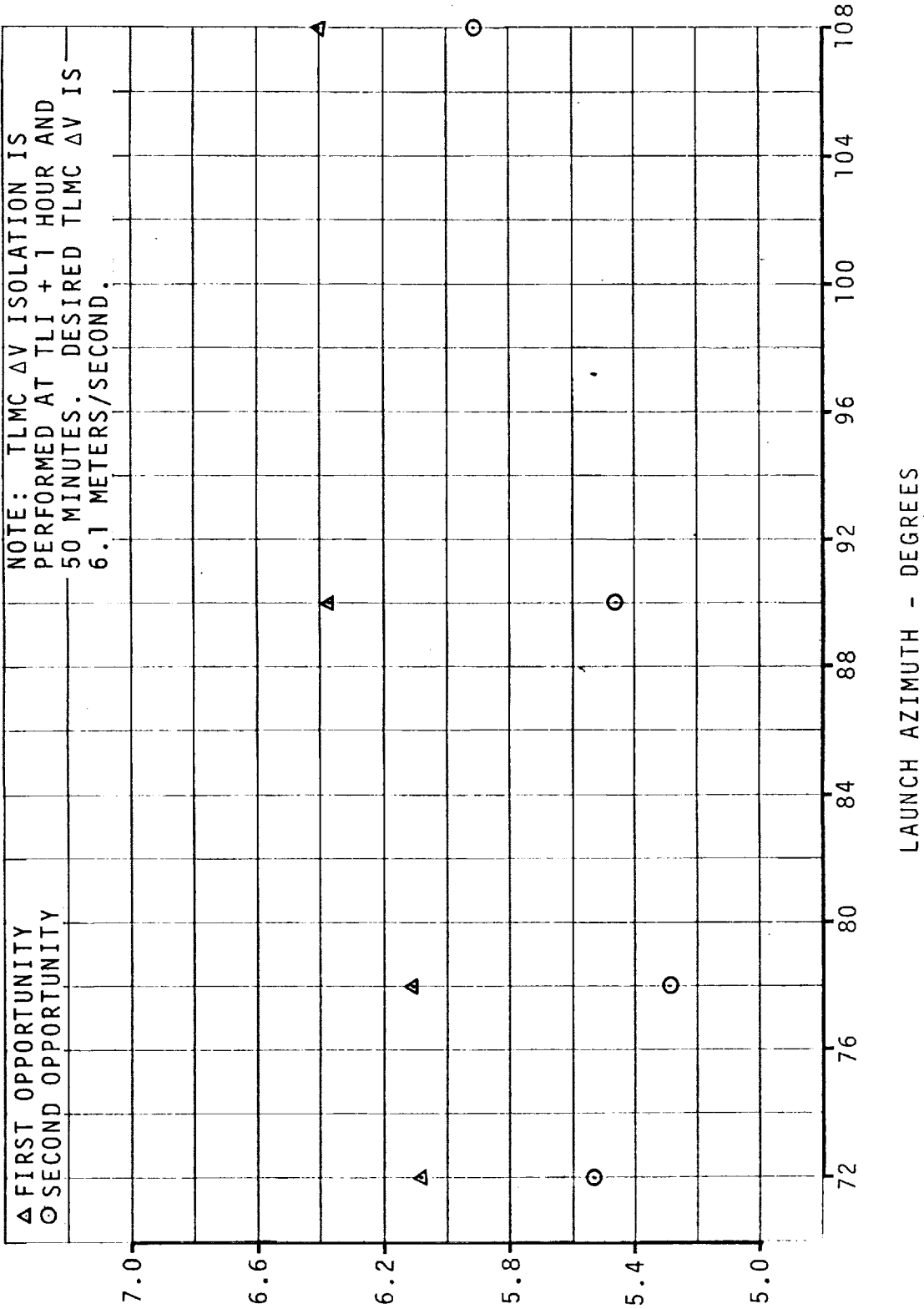
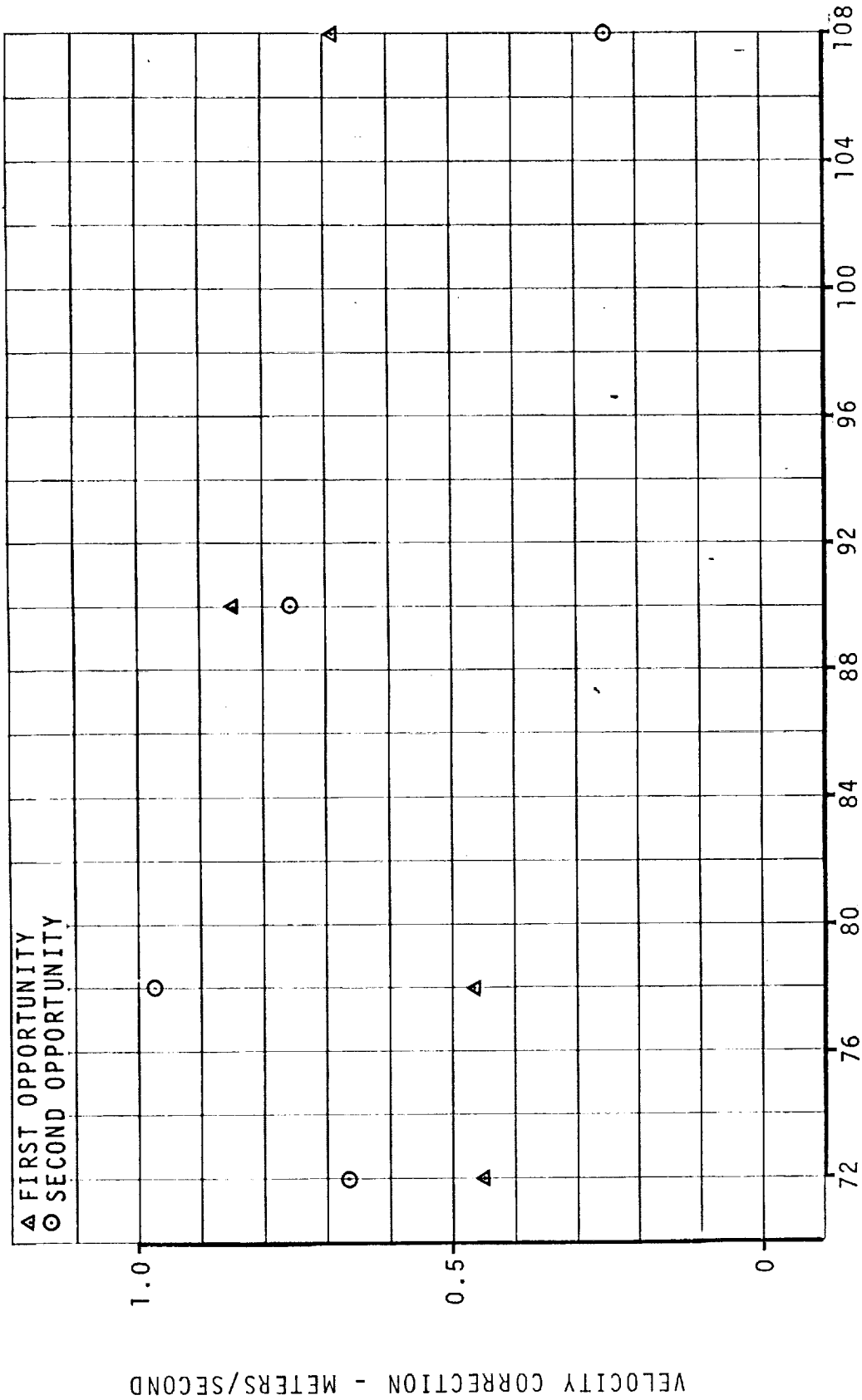


FIGURE 2-47 MIDCOURSE CORRECTION VELOCITY INCREMENT REQUIRED TO RETURN TO A FREE-RETURN TRAJECTORY FOR 13 SEPTEMBER 1969

TABLE 2-IV. MIDCOURSE CORRECTION VELOCITY REQUIREMENTS
1 HOUR AND 50 MINUTES AFTER TLI FOLLOWING
OVERSPEED CUTOFF FOR THE SEPTEMBER LAUNCH
WINDOW

<u>Launch Date</u>	<u>Azimuth</u>	<u>First Opportunity</u> (m/sec)	<u>Second Opportunity</u> (m/sec)
September 13, 1969	72	6.075	5.525
	78.051	6.099	5.282
	81*	6.058	5.926
	90	6.378	5.455
	99*	6.341	6.154
	108	6.400	5.905
September 15, 1969	72*	6.347	6.206
	81*	6.039	6.026
	90*	5.884	6.005
	99*	6.143	6.012
	108*	6.327	6.468
September 18, 1969	72*	6.024	6.064
	81*	5.973	6.007
	90*	5.945	6.012
	99*	6.126	5.999
	108*	6.347	6.162

*The TLMC ΔV values for these dates and azimuths are as published in Reference 26. Improved trajectory simulations prepared for September 13 for launch azimuths of 72, 78.051, 90, and 108 degrees differ in TLMC ΔV requirements by less than 1.0 meter per second from TLMC ΔV values presented in Reference 26.



LAUNCH AZIMUTH - DEGREES

FIGURE 2-48 SPACECRAFT MIDCOURSE CORRECTION VELOCITY REQUIREMENTS 7 HOURS AFTER TLI FOLLOWING OVERSPEED CUTOFF AND SPACECRAFT SEPARATION/EVASIVE MANEUVER FOR 13 SEPTEMBER 1969

TABLE 2-V. SPACECRAFT MIDCOURSE CORRECTION VELOCITY REQUIREMENTS 7 HOURS AFTER TLI FOLLOWING OVERSPEED CUTOFF AND SPACECRAFT SEPARATION/EVASIVE MANEUVER FOR 13 SEPTEMBER 1969

Azimuth (deg)	First Opportunity (m/sec)	Second Opportunity (m/sec)
72.0	0.449	0.665
78.051	0.465	0.975
90.0	0.848	0.754
108.0	0.686	0.248

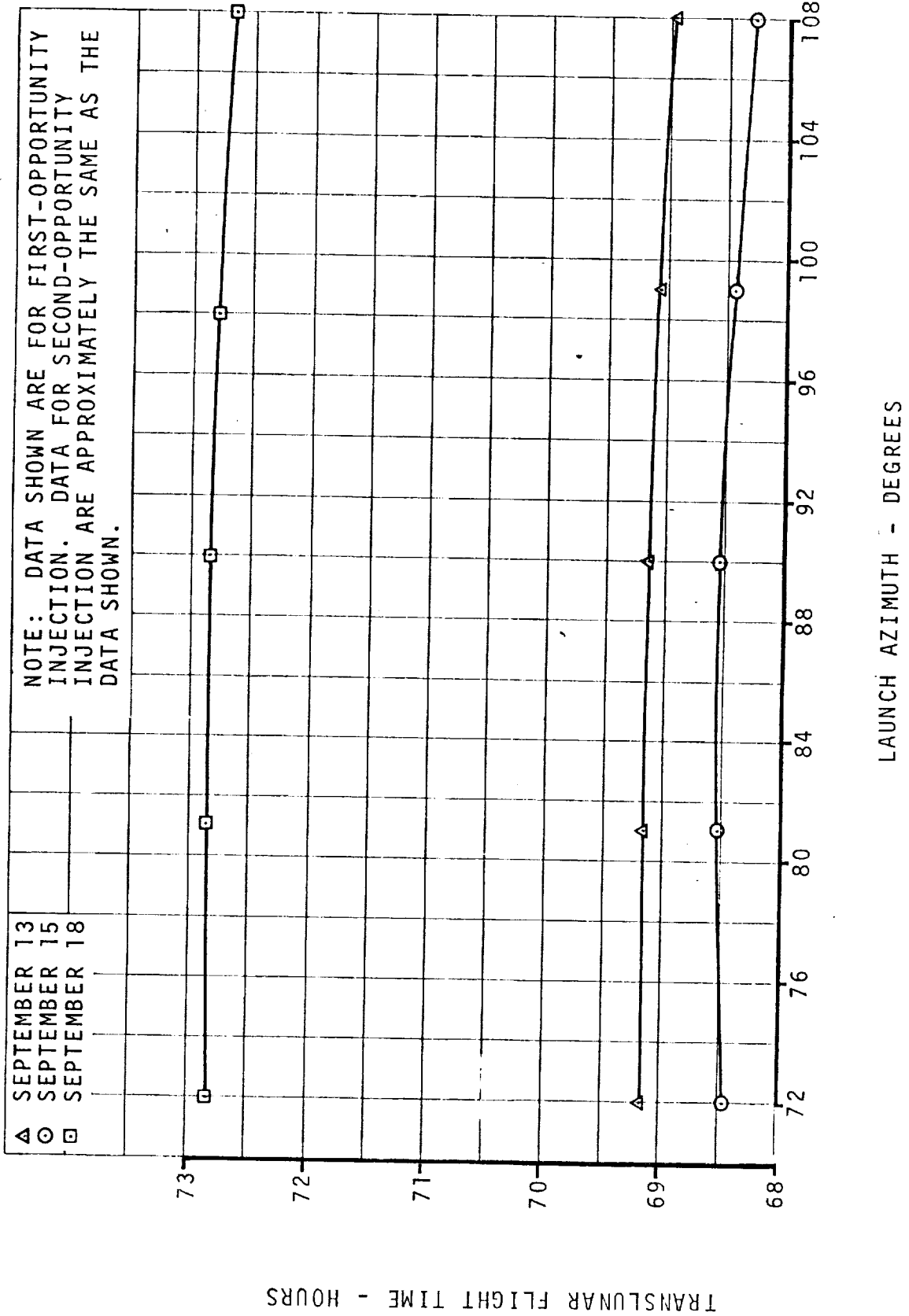


FIGURE 2-49 TRANSLUNAR FLIGHT TIME FROM TLI TO PERISELENUM FOR THE SEPTEMBER LAUNCH WINDOW

TABLE 2-VI. SUMMARY OF S-IC AND S-II IMPACT POSITIONS

SPENT STAGE	AZIMUTH (Degrees)	IMPACT TIME FROM FIRST MOTION (Seconds)	GEODEIC LATITUDE (Degrees N)	LONGITUDE (Degrees E)	RANGE (Kilometers)
	72	560.425	30.304	-73.795	687.660
	78.051	560.797	29.656	-73.646	688.237
S-IC Stage	90	561.082	28.353	-73.594	688.744
	108	560.398	26.447	-74.103	687.667
	72	1214.487	31.523	-34.483	4427.860
	78.051	1215.328	27.696	-35.225	4432.947
S-II Stage	90	1214.452	20.346	-37.651	4427.479
	108	1206.777	10.276	-43.372	4379.817

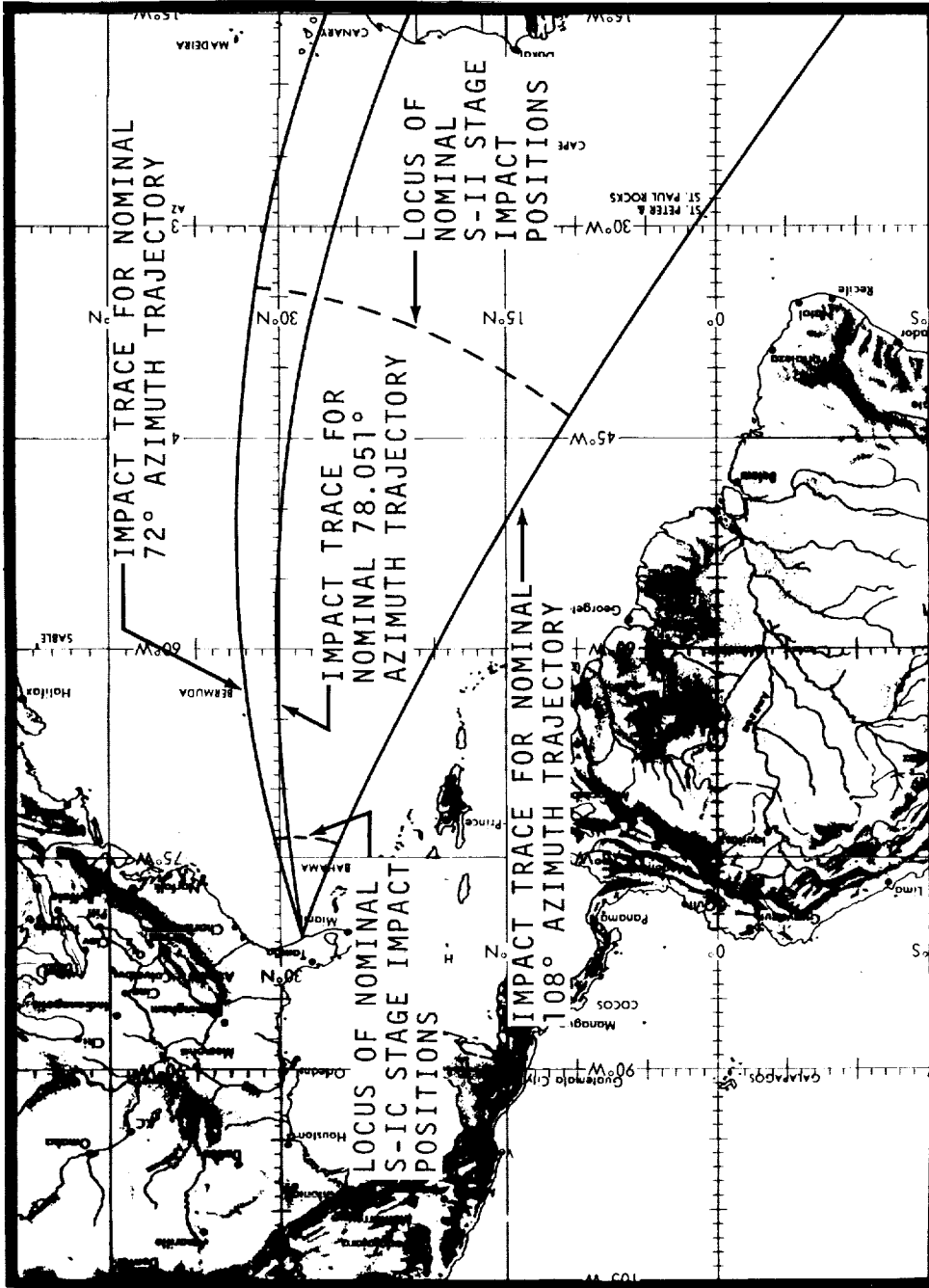


FIGURE 2-50 IMPACT POSITIONS OF SPENT S-IC AND S-II STAGES

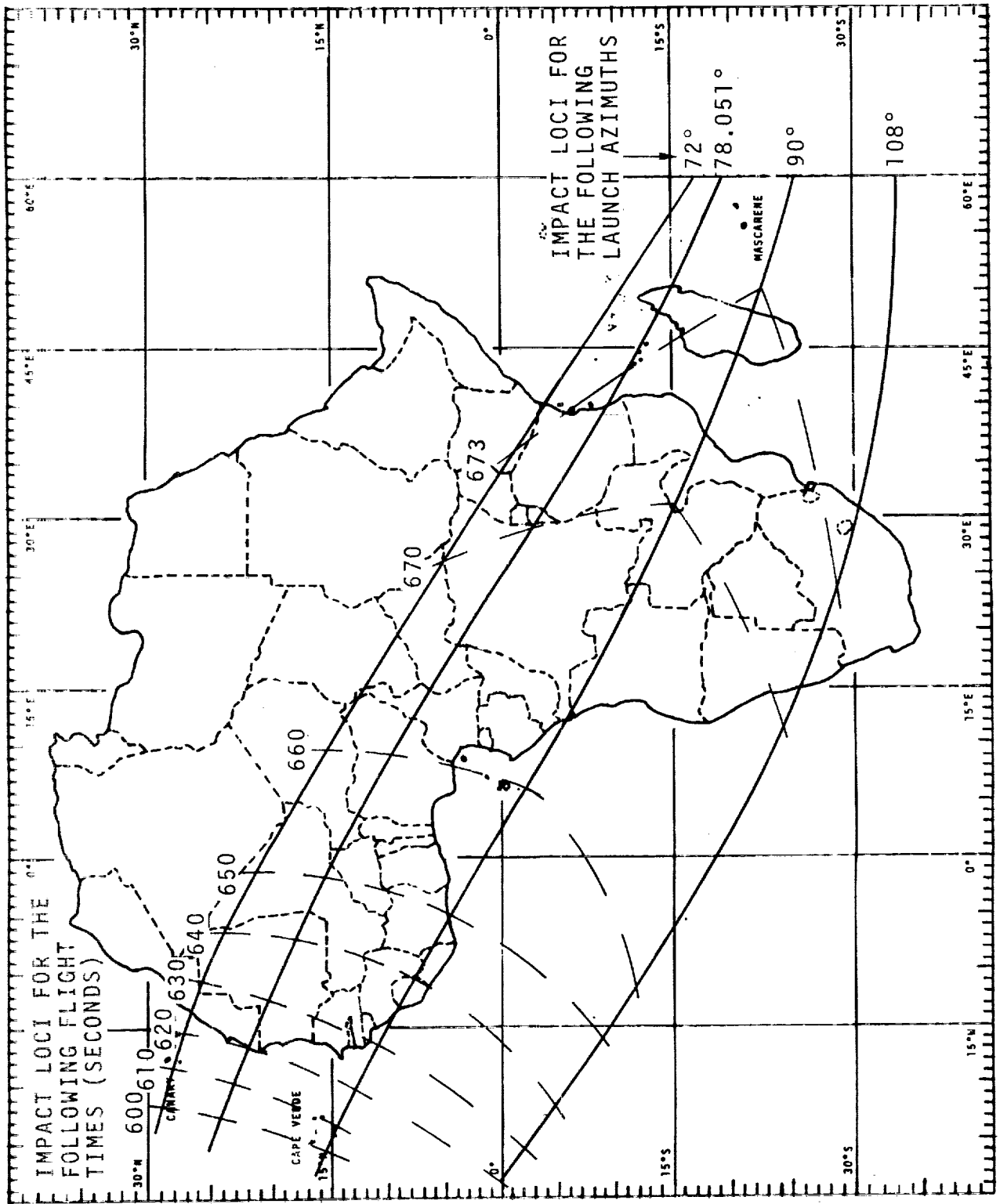


FIGURE 2-51 VACUUM IMPACT TRACE DURING S-IVB FIRST BURN

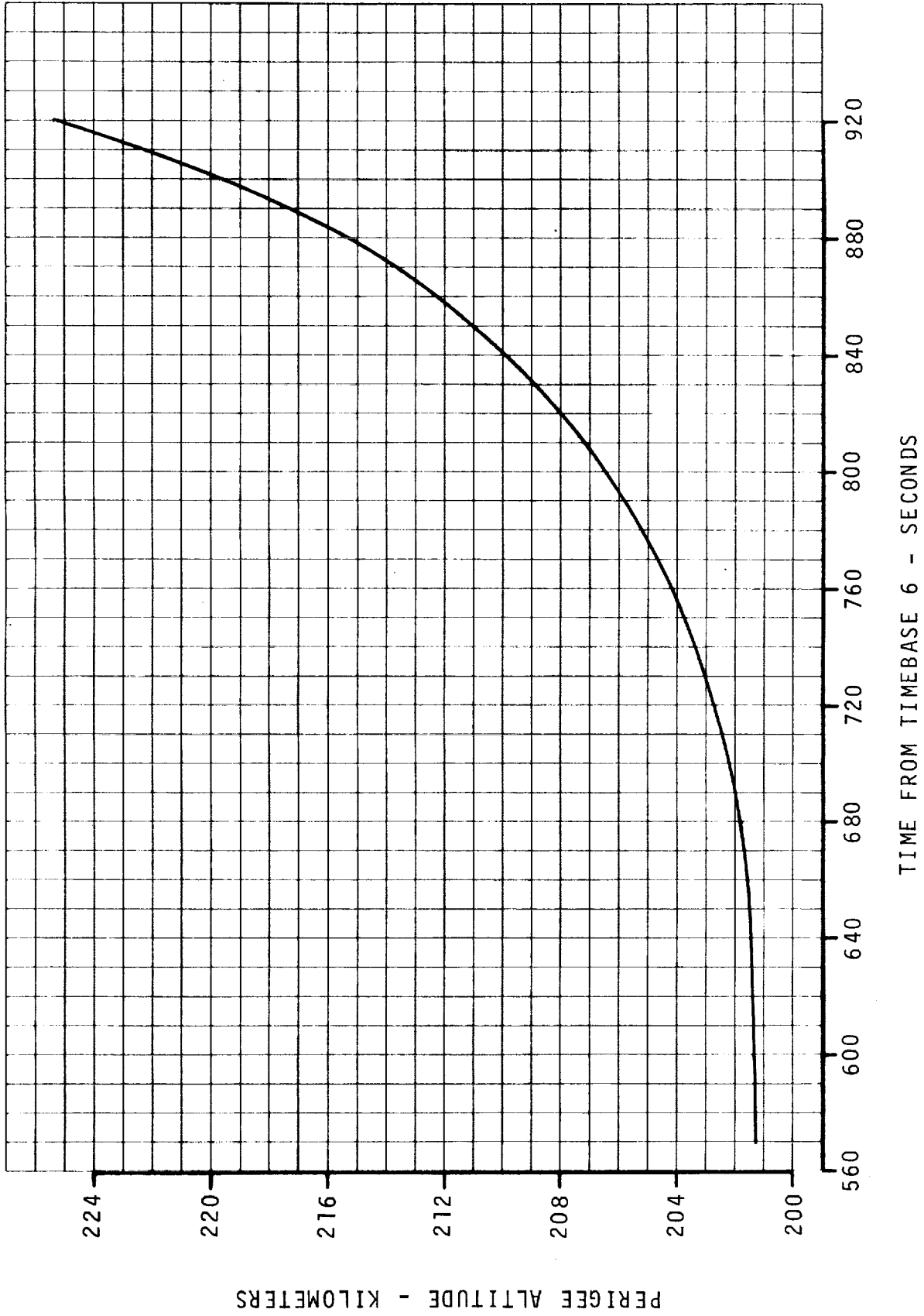


FIGURE 2-52 S-IVB INSTANTANEOUS PERIGEE ALTITUDE DURING SECOND BURN (FIRST OPPORTUNITY, 13 SEPTEMBER 1969, 78.051-DEGREE LAUNCH AZIMUTH)

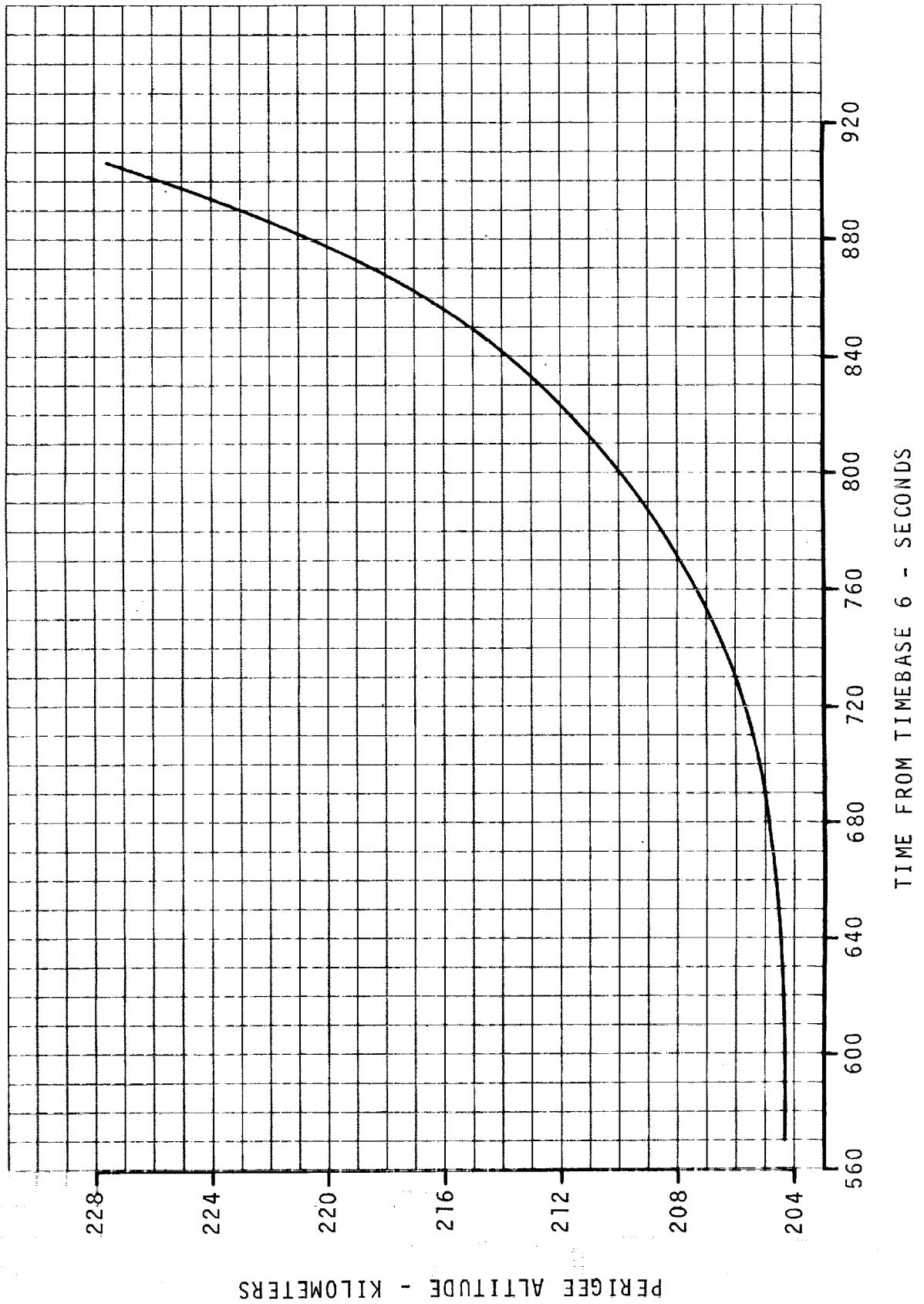


FIGURE 2-53 S-IVB INSTANTANEOUS PERIGEE ALTITUDE DURING SECOND BURN (SECOND OPPORTUNITY, 13 SEPTEMBER 1969, 78.051-DEGREE LAUNCH AZIMUTH)

TABLE 2-VII. LAUNCH VEHICLE DISPERSION ENVELOPE AT PARKING ORBIT INSERTION

QUANTITY	NOMINAL*	POSITIVE DEVIATION**	NEGATIVE DEVIATION**
Vehicle Weight (kg)	136324.2	1978.7	2301.9
Time from First Motion (sec)	695.6542	18.0302	15.3570
Earth-Fixed Position			
Geodetic Latitude (deg N)	30.242	0.0259	0.0244
Longitude (deg E)	-53.543	0.8334	0.6940
Altitude (m)	190616.	705.7	705.1
Surface Range (km)	2627.34	78.19	65.15
Vehicle Parameters in Inertial Spherical System			
Radius (m)	6563391.0	705.7	705.3
Velocity (m/sec)	7792.9906	1.3872	1.3868
Flight-Path Angle (deg)	0.0000	0.0160	0.0159
Azimuth (deg)	93.519	0.4880	0.4069
Orbital Elements			
Twice Specific Energy, C_3 (m^2/sec^2)	-60731875.8	15971.1	15966.9
Inclination (deg)	30.2661	0.0103	0.0102
Descending Node (deg)	113.0616	0.0388	0.0388
Eccentricity	0.000010	0.000290	0.000287
Radius of Apogee (km)	6563.4	2.3	2.2
Radius of Perigee (km)	6563.2	2.9	2.9

*78.051-Degree Launch Azimuth.

**Taken from Reference 13, 72-Degree Launch Azimuth for AS-506 G Mission.

TABLE 2-VIII. LAUNCH VEHICLE DISPERSION ENVELOPE AT TRANSLUNAR INJECTION

QUANTITY	NOMINAL*	POSITIVE DEVIATION**	NEGATIVE DEVIATION**
Vehicle Weight (kg)	63396.9	1000.2	1144.0
Time from First Motion (sec)	16150.8571	11.9029	11.0834
Earth-Fixed Position			
Geodetic Latitude (deg N)	28.792	0.6516	0.5459
Longitude (deg E)	-147.304	1.0653	0.8825
Altitude (m)	333420.	15081.8	14083.4
Surface Range (km)	6422.42	114.54	136.99
Vehicle Parameters in Inertial Spherical System			
Radius (m)	6706656.0	15011.1	14015.2
Velocity (m/sec)	10833.2277	12.0509	12.5709
Flight-Path Angle (deg)	7.1582	0.5556	0.5056
Azimuth (deg)	79.591	0.2474	0.2166
Orbital Elements			
Twice Specific Energy, C_3 (m^2/sec^2)	-1509119.0	29732.7	31876.9
Inclination (deg)	30.3199	0.1423	0.1424
Descending Node (deg)	111.8402	0.0506	0.0507
Eccentricity	0.975008	0.000492	0.000519
Radius of Apogee (km)	521658.3	11690.3	12501.5
Radius of Perigee (km)	6601.2	2.6	6.4
Argument of Perigee (deg)	57.1908	0.2702	0.3831

*78.051-Degree Launch Azimuth for 13 September 1969, Second Opportunity.

**Taken from Reference 13, AS-506 G Mission 72-Degree Launch Azimuth for 16 July 1969, Second Opportunity.

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SECTION 3

OPERATIONAL VEHICLE AND ENVIRONMENT CHARACTERISTICS

3.0 GENERAL

This section defines AS-507 launch vehicle characteristics used in this analysis. These characteristics are categorized as configuration, aerodynamics, propulsion, mass, navigation, guidance, control, and environmental data, and are presented in Paragraphs 3.1 through 3.5.

3.1 VEHICLE CONFIGURATION SUMMARY

The basic AS-507 launch vehicle flight configurations used during flight from liftoff through slingshot operations are shown in Figure 3-1. The first three flight configurations are identified by the main booster stage being used; i.e., S-IC stage configuration, S-II stage configuration, and S-IVB stage configuration. The final LV flight configuration is the S-IVB stage and Instrument Unit. Configuration dimensional data, initial mass characteristics, and cutoff performance characteristics for the first three configurations are summarized in Table 3-I.

The S-IC stage configuration is powered by five clustered F-1 engines that burn liquid oxygen (LOX) and RP-1 (Kerosene) at an approximate flowrate mixture ratio of 2.3. A time history of S-IC mainstage thrust is presented in Figure 3-2.

The S-II stage configuration is propelled by five clustered J-2 engines that consume LOX and liquid hydrogen (LH₂). Two basic propellant mixture ratios are used: a LOX/LH₂ flowrate mixture ratio of approximately 5.5 is used for the first 322 seconds of S-II mainstage operation, and a LOX/LH₂ ratio of approximately 4.2 is used during the remainder of S-II stage flight. The S-II stage center engine is shut down by a timer command at 299.0 seconds after timebase 3 initiation. A time history of S-II mainstage thrust is presented in Figure 3-3. S-II stage configuration modifications result from inflight jettison of the S-II aft interstage and the Launch Escape Tower (LET). Jettison of these pieces causes significant discrete mass losses.

The S-IVB stage configuration is powered by a single J-2 engine using LOX and LH₂ as the propellants. The LOX/LH₂ flowrate mixture ratio used during the boost to parking orbit (S-IVB first burn) is approximately 4.9. The second burn of the S-IVB stage boosts the vehicle out of parking orbit onto the targeted translunar hypersurface. The S-IVB stage propellants are nominally loaded for the second-opportunity translunar injection burn so

3.1 (Continued)

that a mixture-ratio shift is required during the first-opportunity injection boost to evenly deplete the fuel and LOX. The LOX/LH₂ flowrate mixture ratio during the S-IVB first-opportunity injection boost is approximately 4.3 during the first 100 seconds of burn, and 4.9 during the remainder of the burn. The mixture ratio during the second-opportunity S-IVB burn is approximately 4.9 during the complete burn duration. Time histories of S-IVB mainstage thrust for the first and second burn phases and two injection opportunities are presented in Figures 3-4 through 3-6.

Shortly after injection, the Command and Service Modules separate from the LM/S-IVB, transpose, and dock with the LM. During CSM first separation, the Spacecraft LM Adapter (SLA) panels are jettisoned. After CSM/LM ejection from the launch vehicle, the remaining S-IVB/IU configuration is the final LV flight configuration. This configuration performs post-separation launch vehicle operations including the slingshot maneuver.

3.2 AERODYNAMICS

AS-507 flight-vehicle and spent-stage aerodynamic characteristics used in this analysis are obtained from the following sources:

- a. Vehicle axial-force coefficients as functions of Mach number and angle of attack for the S-IC and S-II stage flight configurations are obtained from References 14 and 15, respectively. S-IVB stage flight configuration data are consistent with Reference 6 (See Section 1.4).
- b. Normal-force coefficients and center-of-pressure data as functions of Mach number and angle of attack are obtained from References 16 and 17 for the S-IC flight configuration, from Reference 15 for the S-II flight configuration, and from Reference 6 for the S-IVB flight configuration.
- c. Base-pressure force as a function of flight time for the S-IC flight configuration is obtained from Reference 16. The differential base pressure as a function of altitude for the S-IC stage is given in Reference 14. Base-pressure force for the S-II stage configuration is obtained from Reference 18 as a function of time.
- d. Drag coefficients for tumbling launch vehicle spent stages are obtained from Reference 15.

3.3 PROPULSION AND MASS

Mainstage propulsion characteristics used in this analysis for the S-IC, S-II, and S-IVB stages are obtained from MSFC tapes numbered 31101, 32381, and 31104, respectively. Total mainstage thrust profiles for these stages are presented in Figures 3-2 through 3-6. Specific propulsion parameters that are necessary for stage performance comparisons are presented in Table 3-II for the S-IC, S-II, and S-IVB stages.

S-IC thrust, referenced to sea-level atmospheric pressure, is averaged over the time interval from first motion to the nearest integer second before center-engine cutoff to obtain the average thrust shown in Table 3-II. The thrust is averaged at the intervals that appear on the nominal S-IC propulsion tape. The sea-level turbine exhaust thrust at first motion is also obtained from this tape. The average flowrate is based on the weight difference between first motion and the nearest integer second before CECO minus any auxiliary weight losses during S-IC burn. The average specific impulse is determined from the average mainstage thrust and average flowrate. The total impulse is determined from the average mainstage thrust and the time interval specified. S-IC average values of thrust, specific impulse, and total impulse referenced to sea-level conditions are significantly smaller than values based on inflight atmospheric conditions.

S-II and S-IVB stage propulsion parameters are determined for the following time intervals:

- a. S-II 90-percent thrust to S-II outboard-engine cutoff.
- b. S-II 90-percent thrust to 90-percent thrust + 294.6 seconds.
- c. S-II 90-percent thrust to 90-percent thrust + 322.0 seconds.
- d. S-II 90-percent thrust + 325.0 seconds to outboard-engine cutoff.
- e. S-IVB first burn: 90-percent thrust to S-IVB GCS1.
- f. S-IVB second burn - first opportunity:
 1. 90-percent thrust to S-IVB GCS2.
 2. 90-percent thrust to 90-percent thrust + 100.0 seconds.
 3. 90-percent thrust + 101.0 seconds to GCS2.
- g. S-IVB second burn - second opportunity: 90-percent thrust to S-IVB GCS2.

The S-II and S-IVB vacuum thrust levels are averaged at 1-second intervals over the periods specified in Enumerations a through g. Other S-II and S-IVB propulsion parameters are obtained by the same techniques used for the S-IC stage.

3.3 (Continued)

Thrust histories during S-IC/S-II and S-II/S-IVB staging events are presented in Figures 3-7 and 3-8. The data of these figures provide a composite history of mainstage thrust decay, ullage thrust, and mainstage thrust buildup. Thrust histories for first- and second-burn S-IVB thrust decays, the S-IVB restart sequence, and S-IVB thrust buildup after reignition are presented in Figures 3-9 through 3-12.

During the coast in parking orbit and during coast from translunar injection until the time to begin the maneuver to the transposition, docking, and ejection (TD&E) attitude, APS ullage-motor burns and propulsive hydrogen venting are used to maintain propellant seating and to control LH₂ tank pressure. LH₂ vent thrust histories during parking orbit and early post-TLI coast are presented in Figures 3-13 and 3-14.

AS-507 launch vehicle mass characteristics are simulated using data contained in MSFC mass data decks numbered 362A, 362B, 362C, and 362D. The simulated mass history at key events during the mission is defined in Table 3-III. Vehicle mass values shown in Table 3-III after S-IVB first cutoff do not agree with the reference data because of differences in the propulsion-predicted and simulated-trajectory S-IVB burn times.

3.4 NAVIGATION, GUIDANCE, AND CONTROL

The interrelationship between the navigation, guidance, and control subsystems is presented in Figure 3-15. These three subsystems operate as a unit to provide stabilized launch vehicle flight and to achieve the desired mission objectives.

The ST-124M3 inertial platform provides gimbals angles and measured velocity components through the Launch Vehicle Data Adapter (LVDA) to the Launch Vehicle Digital Computer (LVDC). Gravitational acceleration components as a function of vehicle position are determined from a gravity model in the LVDC. These components are integrated once by a trapezoidal method and are then added to the platform velocities to obtain geocentric inertial vehicle velocity. A second integration is then performed to yield vehicle position components. Platform velocities are differentiated, and the reciprocal of the launch vehicle thrust-to-mass ratio (F/M) is computed. During IGM phases of flight, the vehicle position, velocity components, and the reciprocal of F/M are input to the guidance equations.

A four-segment, open-loop tilt polynomial provides the pitch attitude profile during S-IC stage flight. A tilt-arrest mode of flight is initiated at 158.250 seconds after first motion.

3.4 (Continued)

Tilt arrest continues until the time of S-II stage IGM initiation, approximately 41.3 seconds after S-IC outboard-engine cutoff. A tilt-arrest mode is also used during S-II/S-IVB staging. IGM is employed during both burns of the S-IVB stage and provides cutoff commands at GCS1 and GCS2. Steering-misalignment-correction angle increments are added to IGM pitch and yaw commands after IGM initiation to improve vehicle flight performance. IGM is reenabled during the translunar injection burn 14.5 seconds after lead thrust initiation.

The total pitch and yaw steering commands in pre-IGM and IGM phases are input to minor-loop servicing of the digitized attitude difference angles. The attitude difference angles are transformed to the body-fixed attitude error angles and sent through the LVDA to provide analog signals to the control computer. The vehicle commanded and actual pitch and yaw attitudes after minor-loop servicing are presented during the boost-to-parking-orbit phase of flight in Figures 3-16 through 3-27.

The IGM steering parameters $\tilde{\chi}_Y$, $\tilde{\chi}_Z$, K_1 and K_3 are presented in Figures 3-28 through 3-31 for the S-II stage and in Figures 3-32 through 3-35 for the S-IVB stage first burn. The time-to-go in the third stage of IGM, T_3 , is shown in Figure 3-36 for the first S-IVB burn.

The vehicle commanded and actual pitch and yaw attitudes after minor-loop servicing for the first- and second-opportunity S-IVB second burns are presented in Figures 3-37 through 3-44. The corresponding IGM steering parameters, $\tilde{\chi}_Y$, $\tilde{\chi}_Z$, K_1 , and K_3 are presented in Figures 3-45 through 3-52. IGM times-to-go during the two boost-to-TLI opportunities are presented in Figures 3-53 and 3-54.

The control computer processes and combines the attitude-error and attitude-rate signals according to the control law to generate the control commands for each engine actuator. The essential elements of the flight-control computer needed to generate the actuator commands for powered flight are identified in Figure 3-55. The associated angular limits are also shown.

Gimbaling the engines provides pitch, yaw, and roll control for the S-IC and S-II stages. One gimballed engine provides pitch and yaw control for S-IVB powered flight. An Auxiliary Propulsion System (APS) provides roll control during S-IVB powered and coast flight and also provides pitch and yaw control during coast flight.

Flight control computer filters shape the attitude-error and attitude-rate signals to achieve phase and gain stabilization.

3.4 (Continued)

Inflight adjustment of control gains is accomplished by switching in scaling resistors at discrete times during flight. The vehicle body attitude rates predicted for the three stages of powered flight are shown in Figures 3-56 through 3-65.

Simplified models of the guidance system filters compatible with the vehicle model are used in the rigid-body simulation program. The gains and filter configurations implemented are shown in Table 3-IV. (See References 19 and 20.)

An ideal actuator model is considered adequate for this simulation. Engine and actuator identification nomenclature is presented in Figure 3-66. Predicted S-IC, S-II, and S-IVB nozzle-position time histories for both the pitch and yaw planes of motion are shown in Figures 3-67 through 3-80.

3.5 ENVIRONMENT

The reference atmosphere for the AS-507 Launch Vehicle Operational Trajectory is obtained from Reference 21. The operational trajectory is simulated in a mean 50-percentile September/October wind. The winds used in the trajectory simulation for the 72 through 82.5, 82.5 through 97.5, and 97.5 through 108 degrees launch azimuths are shown respectively in Figures 3-81 through 3-83. (See Reference 22.)

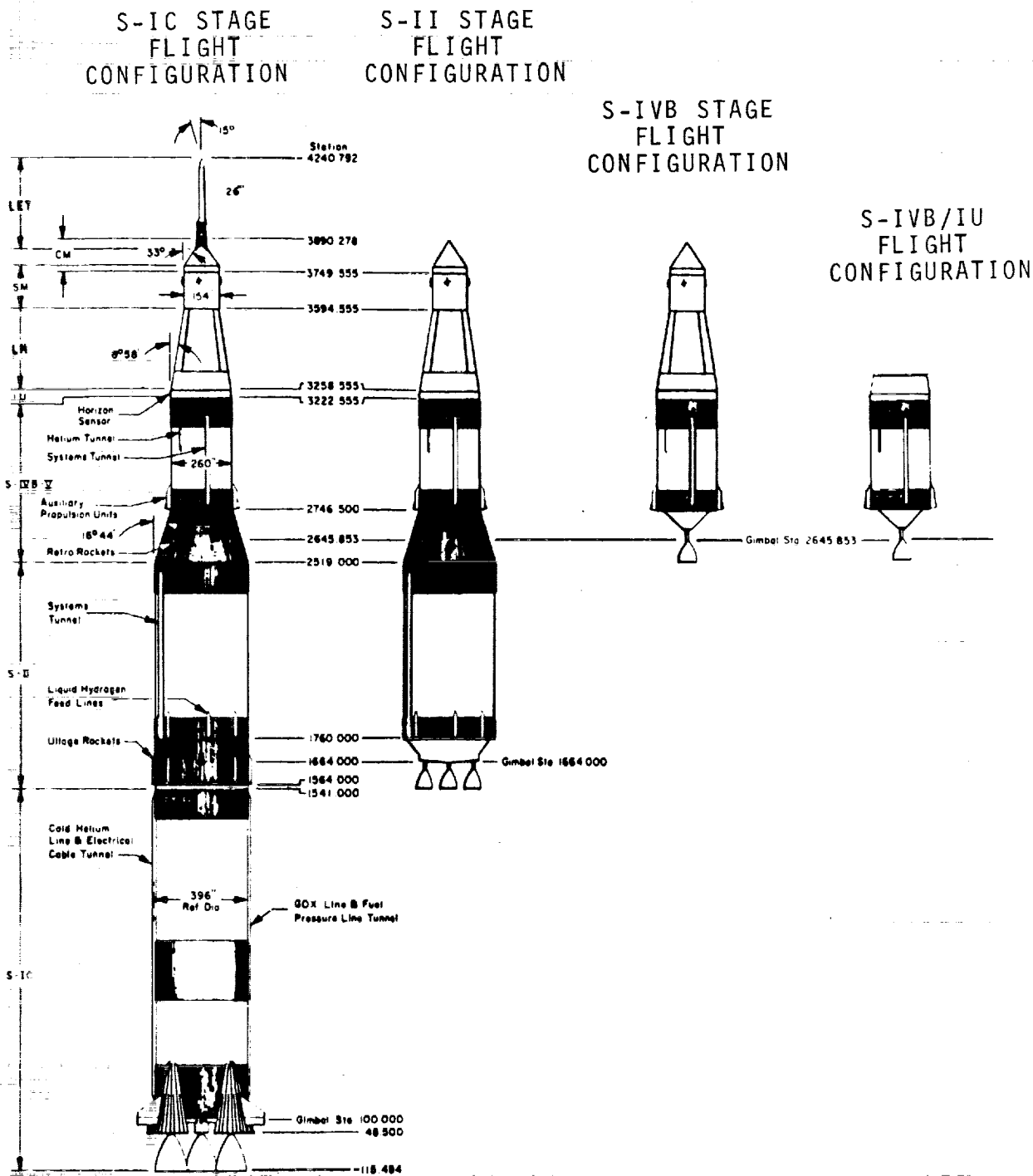


FIGURE 3-1 LAUNCH VEHICLE FLIGHT CONFIGURATIONS

TABLE 3-I. NOMINAL AS-507 FLIGHT CONFIGURATION

	S-IC Stage Flight Configu- ration	S-II Stage Flight Configu- ration	S-IVB Stage Flight Configu- ration
Length			
Meters	110.65	59.67	34.83
(Feet)	(363.02)	(195.77)	(114.27)
Diameter			
Meters	10.06	10.06	6.6
(Feet)	(33.0)	(33.0)	(21.7)
Initial Mass of Flight Configuration			
Kilograms	2900960.	658532.	165244.
(Pounds)	(6395523.)	(1451815.)	(364301.)
*Initial Propellant Mass of Operating Booster Stage			
Kilograms	2108565.	444303.	105805.
(Pounds)	(4648591.)	(979520.)	(233260.)
*Initial Inert Mass of Operating Booster Stage			
Kilograms	132822.	36957.	11956.
(Pounds)	(292822.)	(81476.)	(26359.)
Inertial Velocity at Engine Cutoff			
Meters/Second	2760.661+	6988.734+	7791.386+
(Feet/Second)	(9057.286)	(22928.917)	(25562.289)
			10838.811++
			(35560.403)
			10840.589+++
			(35566.236)
Altitude at Engine Cutoff			
Meters	69405.+	191151.+	190629.+
(Feet)	(227707.)	(627136.)	(625423.)
			322708.++
			(1058753.)
			320286.+++
			(1050807.)

*Initial Characteristics are for Ground Liftoff.

+78.051° Launch Azimuth.

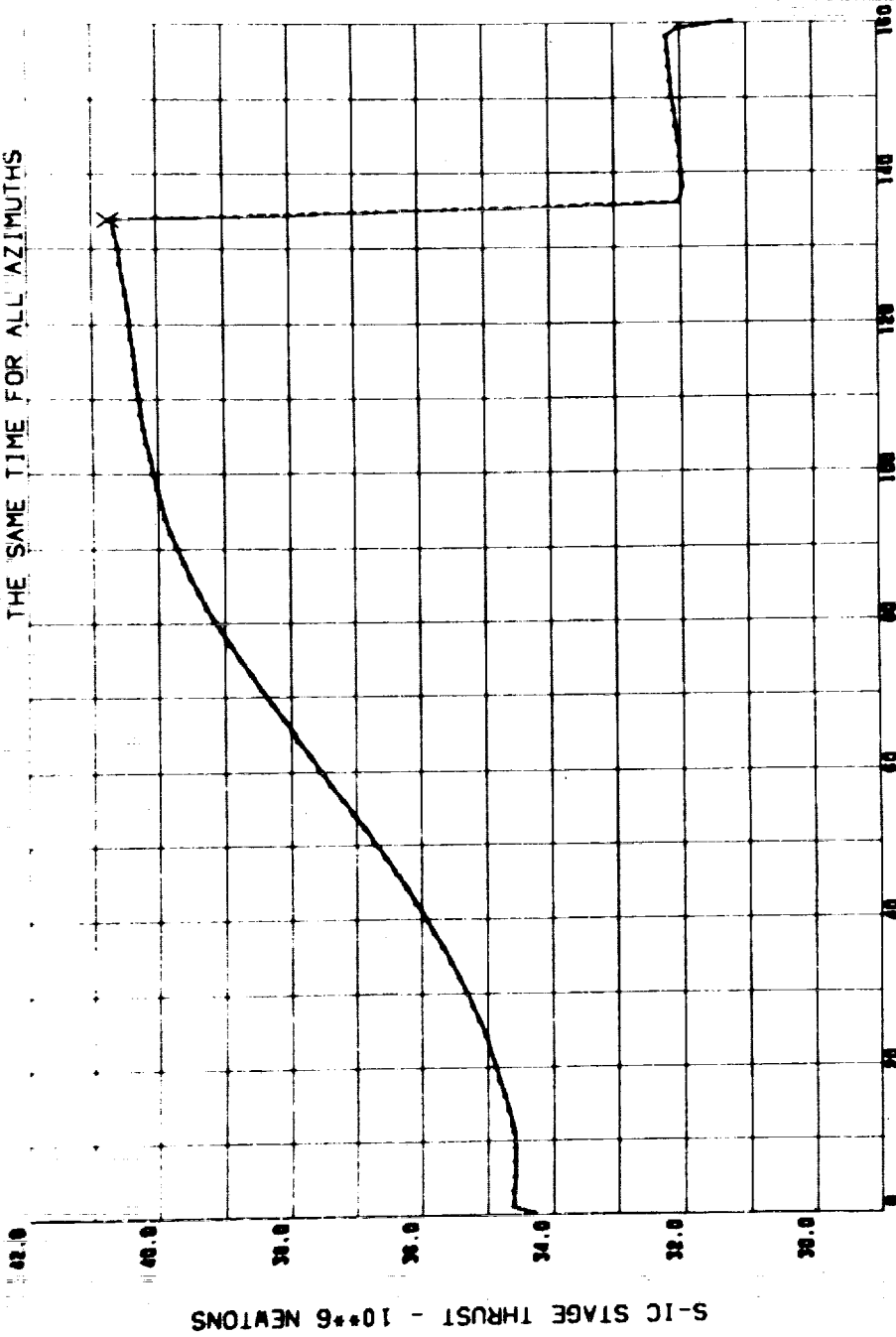
++78.051° First-Opportunity Restart 13 September 1969.

+++78.051° Second-Opportunity Restart 13 September 1969.

— 78.051-DEGREE AZIMUTH
- - - 90.0-DEGREE AZIMUTH
..... 108.0-DEGREE AZIMUTH

X S-IC DECO

NOTED EVENTS OCCUR AT APPROXIMATELY
THE SAME TIME FOR ALL AZIMUTHS



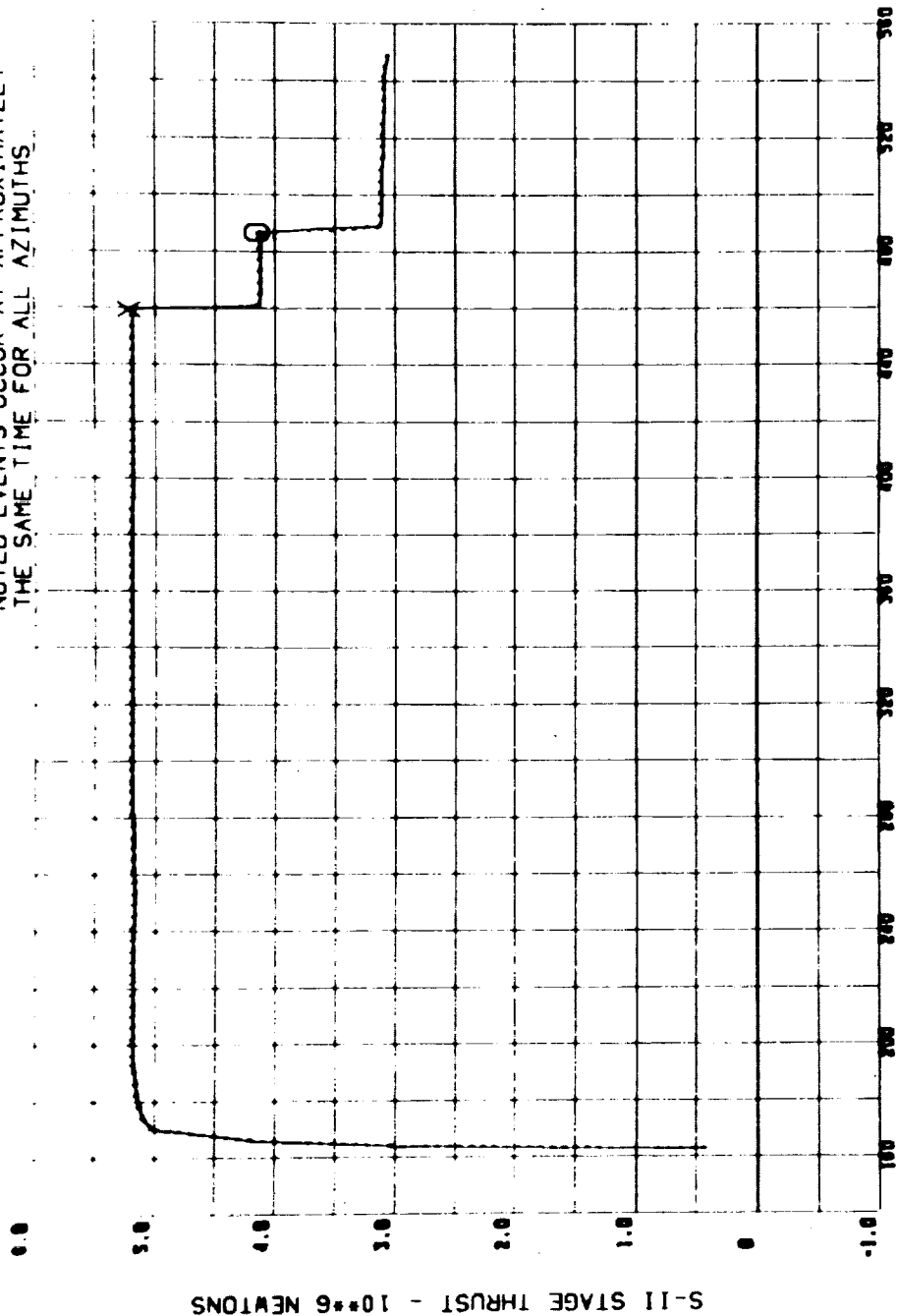
TIME FROM FIRST MOTION - SECONDS

FIGURE 3-2 S-IC STAGE THRUST HISTORY

78.051-DEGREE AZIMUTH
90.0 -DEGREE AZIMUTH
108.0 -DEGREE AZIMUTH

X S-II CECO
O S-II MRS

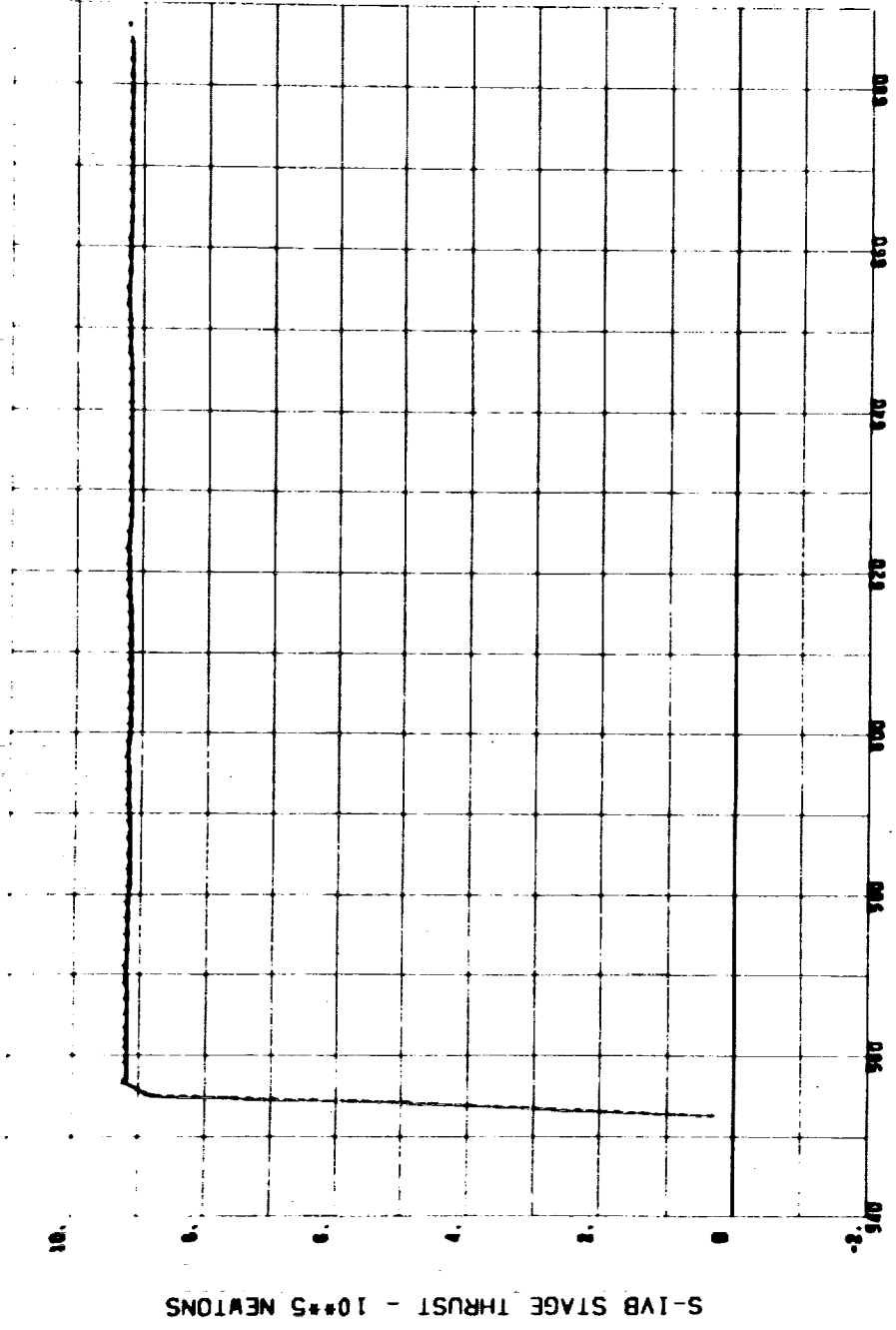
NOTED EVENTS OCCUR AT APPROXIMATELY
THE SAME TIME FOR ALL AZIMUTHS.



TIME FROM FIRST MOTION - SECONDS

FIGURE 3-3 S-II STAGE THRUST HISTORY

78.051 DEGREE AZIMUTH
90.0 DEGREE AZIMUTH
108.0 DEGREE AZIMUTH



TIME FROM FIRST MOTION - SECONDS

FIGURE 3-4 S-IVB STAGE THRUST HISTORY (FIRST BURN)

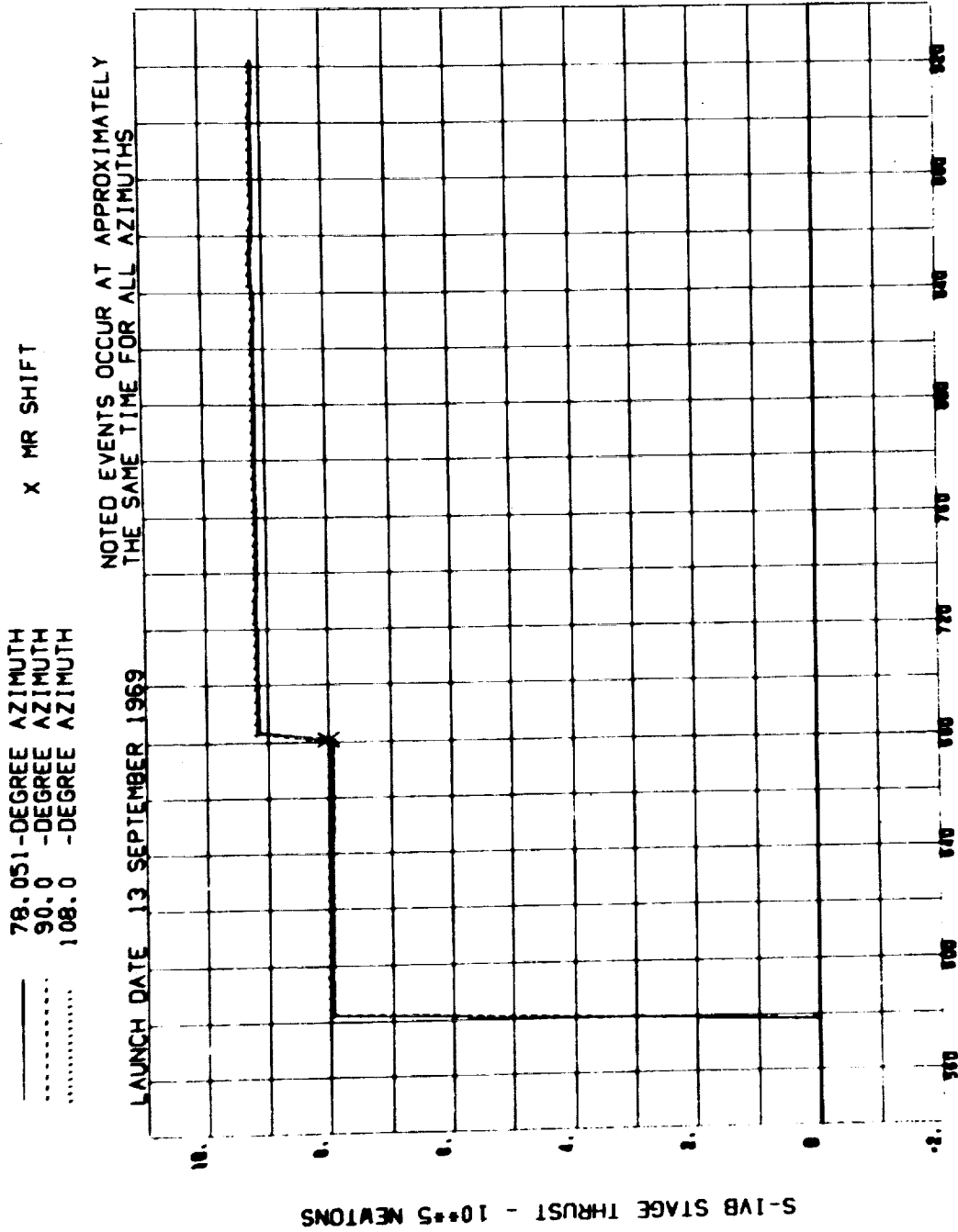
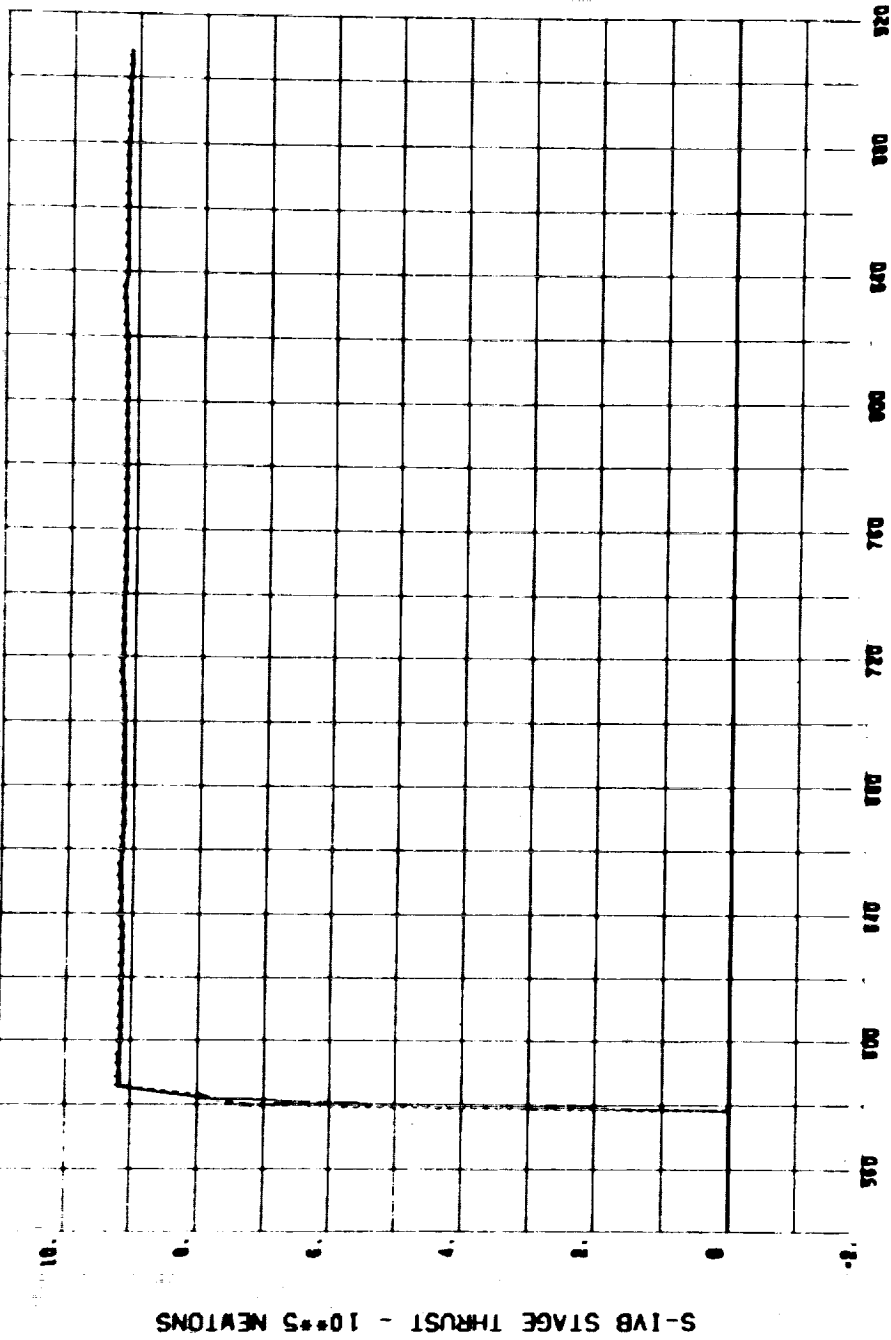


FIGURE 3-5 S-1VB STAGE THRUST HISTORY
(SECOND BURN, FIRST OPPORTUNITY)

78.051 - DEGREE AZIMUTH
90.0 - DEGREE AZIMUTH
108.0 - DEGREE AZIMUTH

LAUNCH DATE 13 SEPTEMBER 1969



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 3-6 S-IVB STAGE THRUST HISTORY
(SECOND BURN, SECOND OPPORTUNITY)

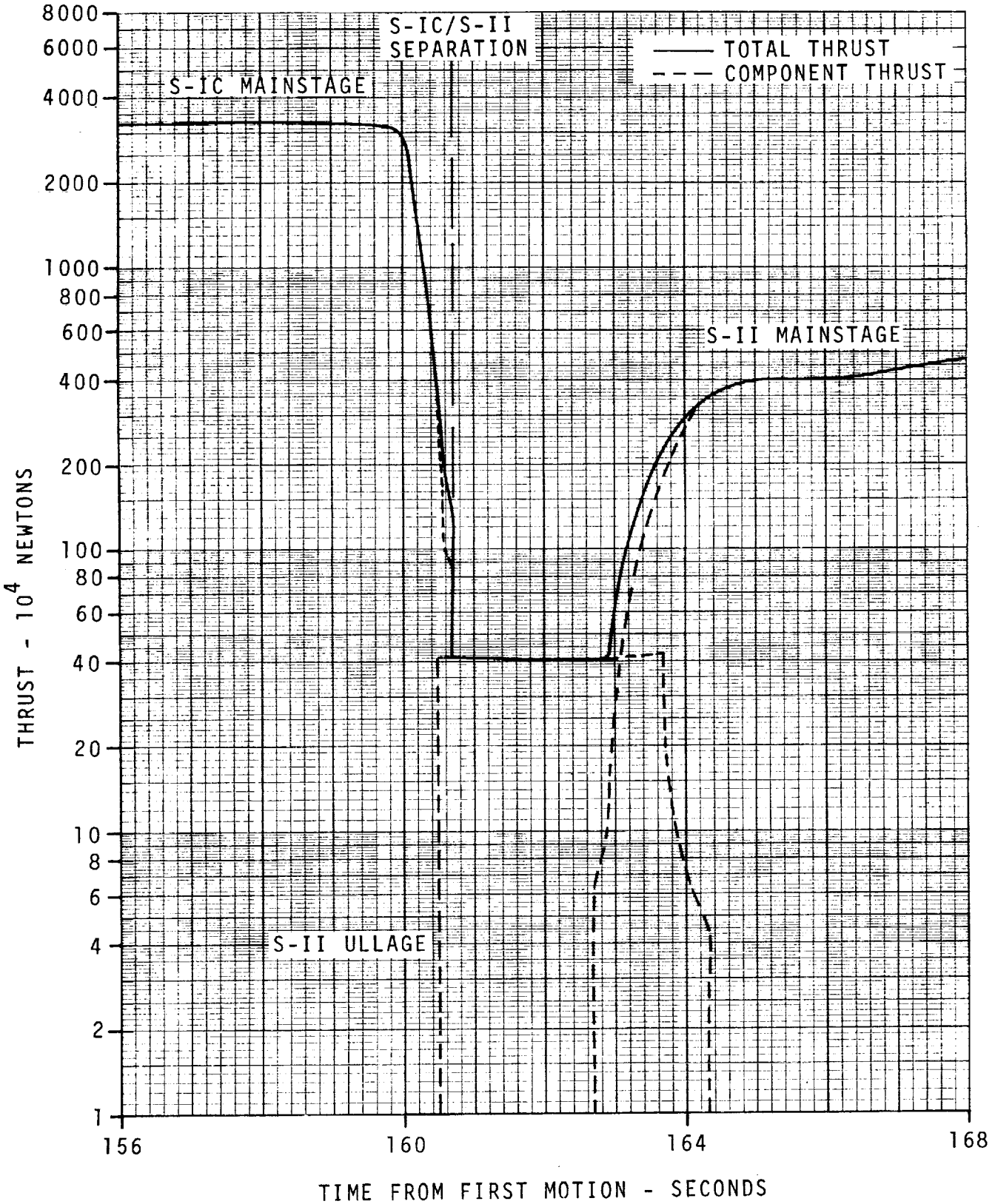


FIGURE 3-7 S-IC/S-II STAGING THRUST HISTORY

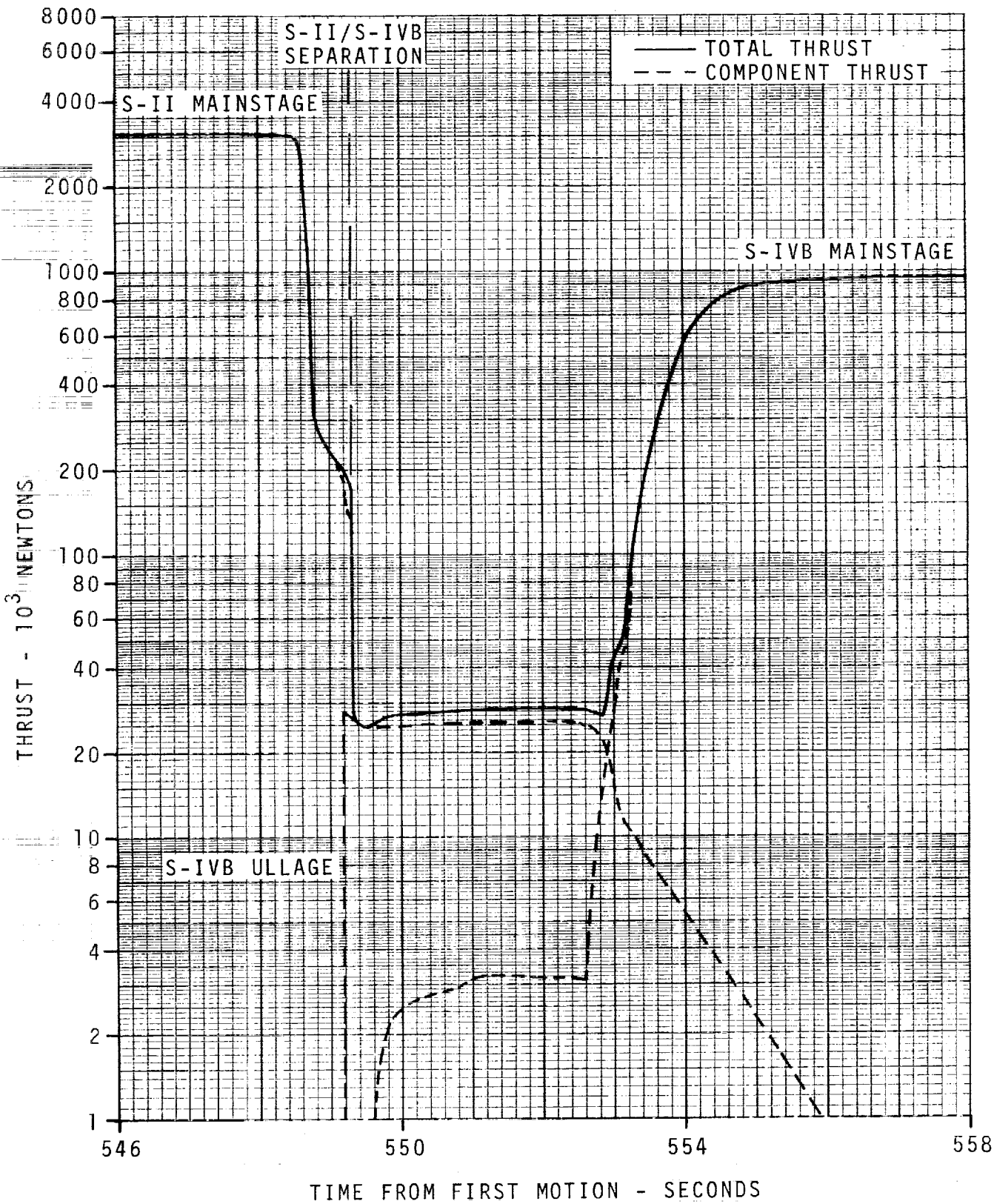


FIGURE 3-8 S-II/S-IVB STAGING THRUST HISTORY

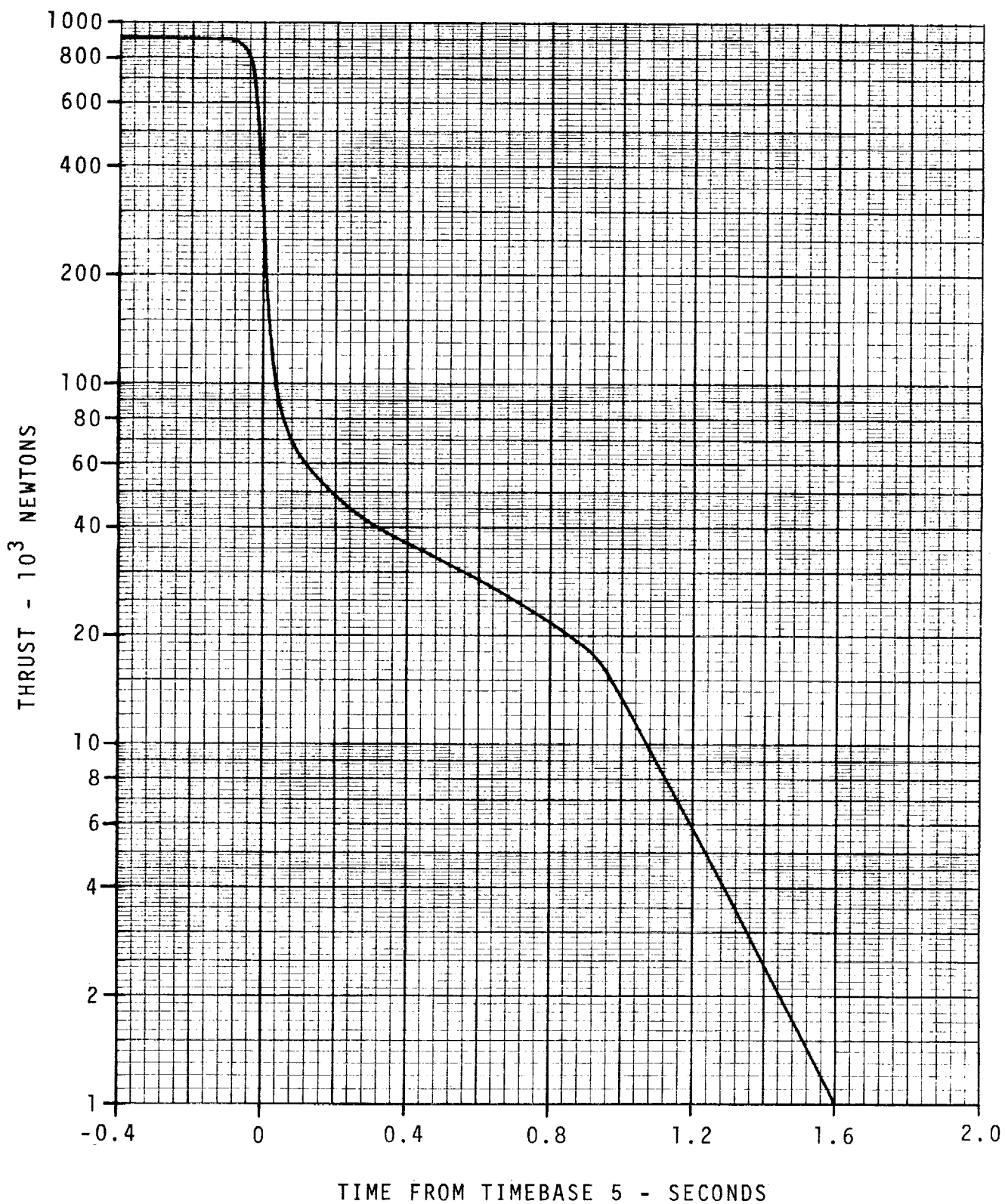


FIGURE 3-9 S-IVB FIRST-BURN THRUST DECAY HISTORY

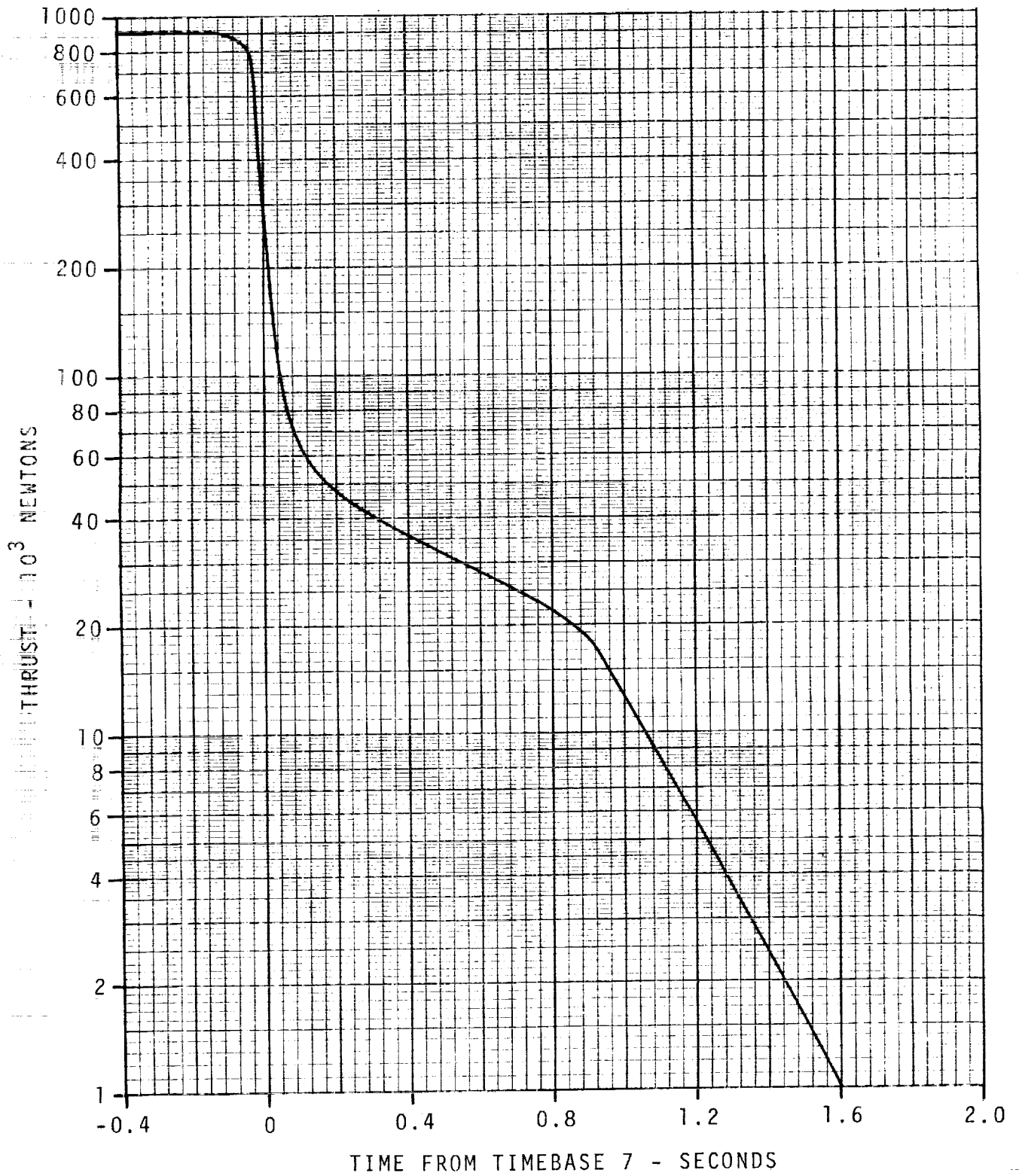
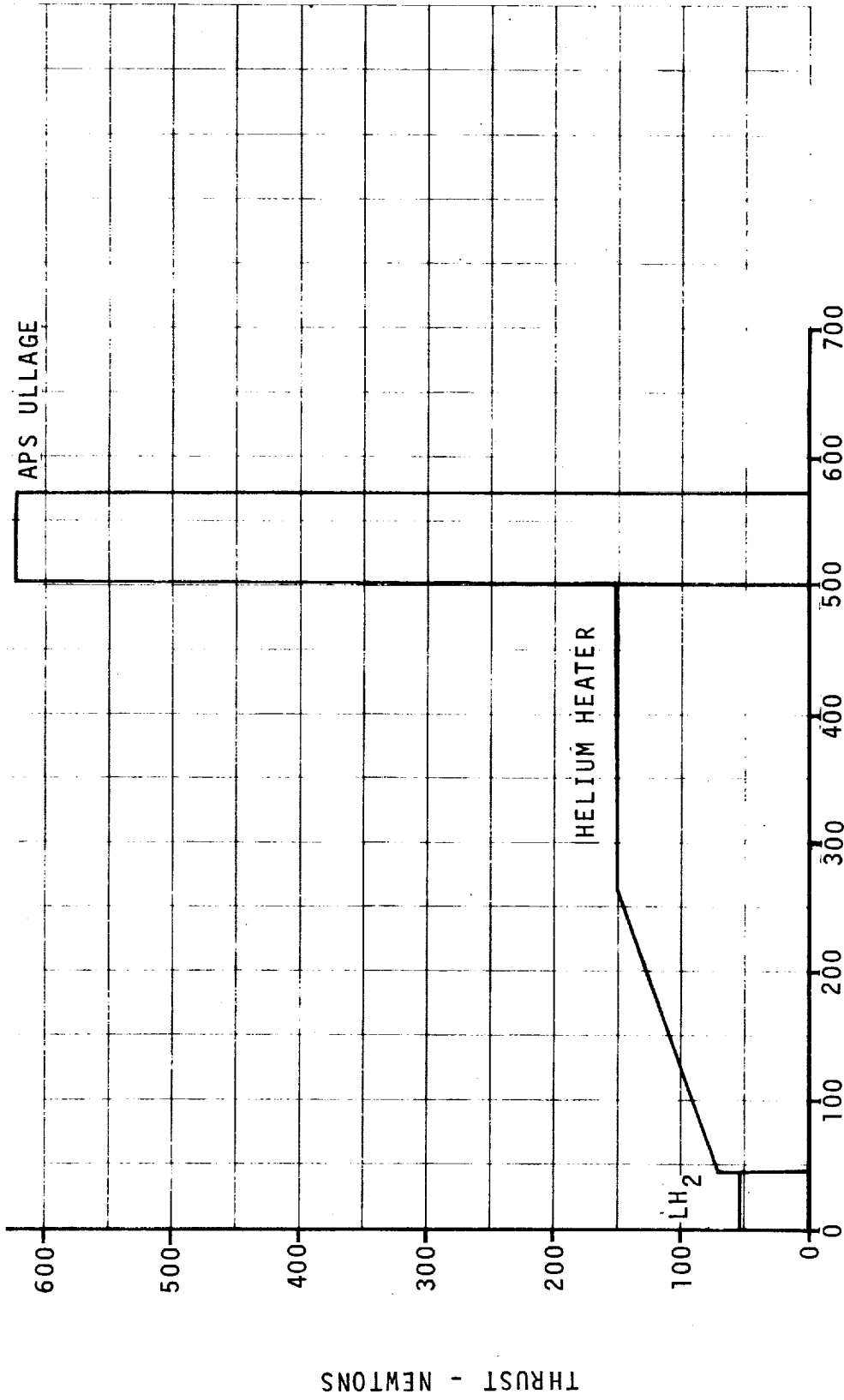


FIGURE 3-10 S-IVB SECOND-BURN THRUST DECAY HISTORY



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 3-11 S-IVB RESTART SEQUENCE THRUST HISTORY

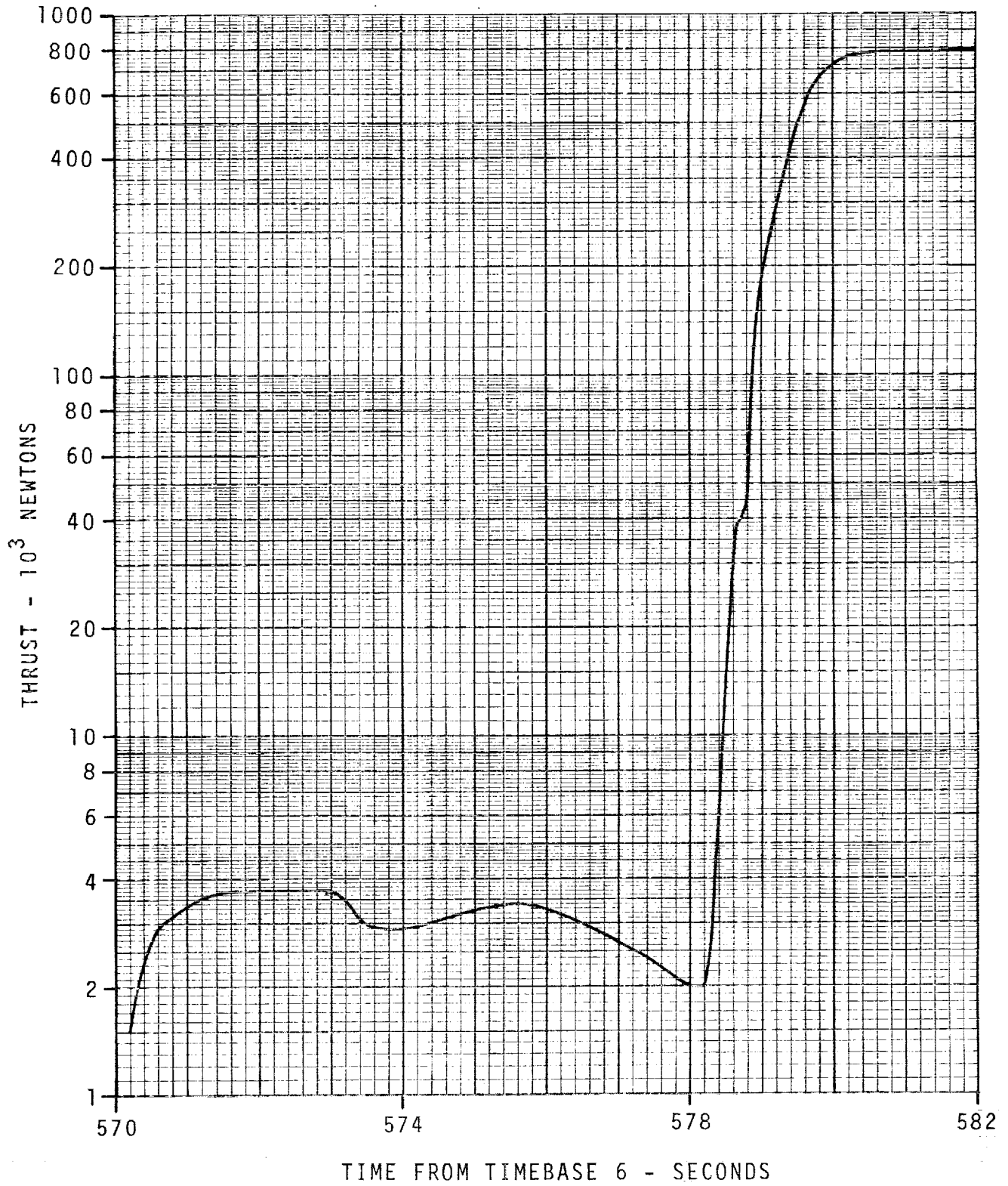
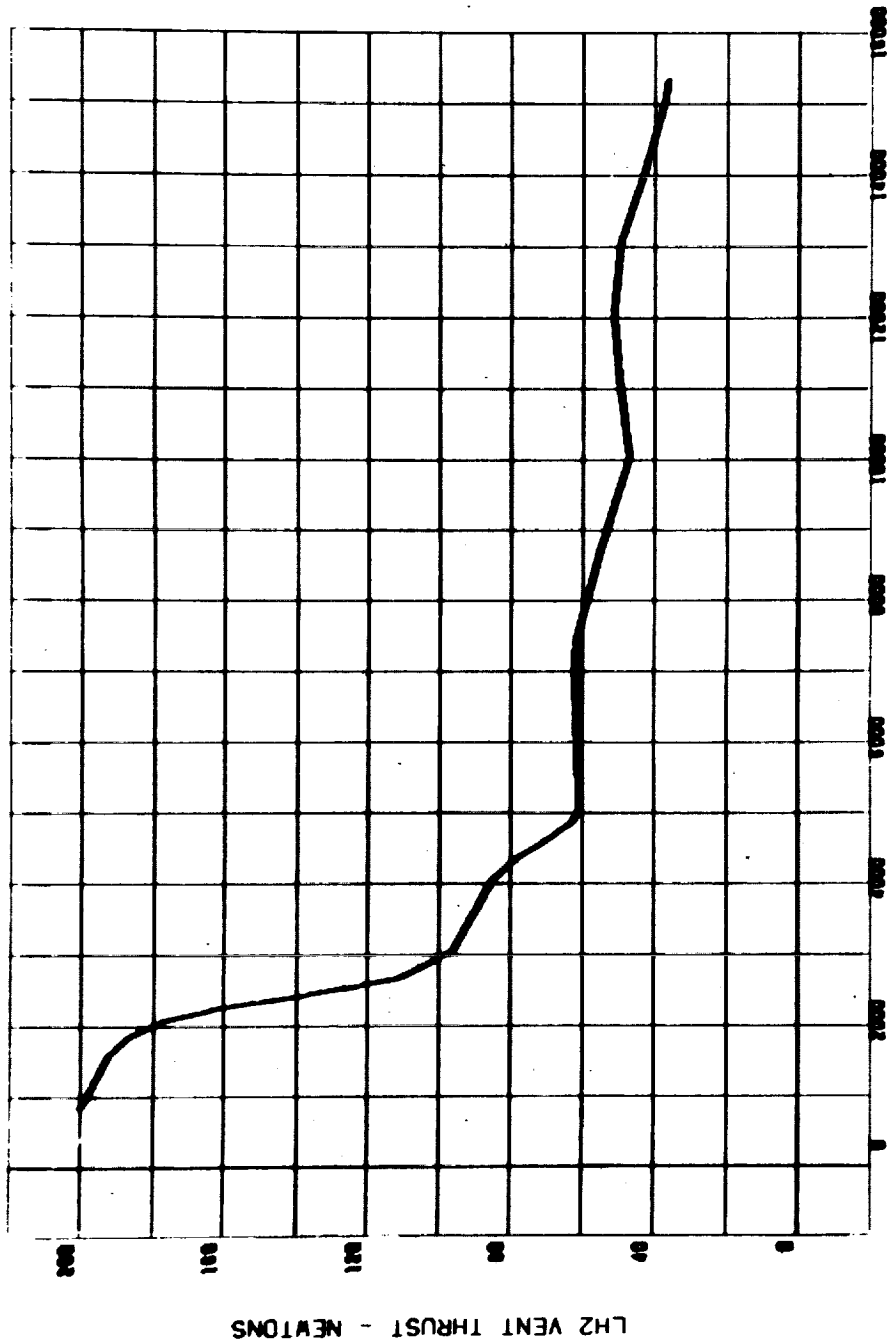


FIGURE 3-12 S-IVB SECOND-BURN THRUST BUILDUP HISTORY

78.051-DEGREE AZIMUTH
90.0 -DEGREE AZIMUTH
108.0 -DEGREE AZIMUTH



TIME FROM FIRST MOTION - SECONDS

FIGURE 3-13 PARKING ORBIT LH2 VENT THRUST HISTORY

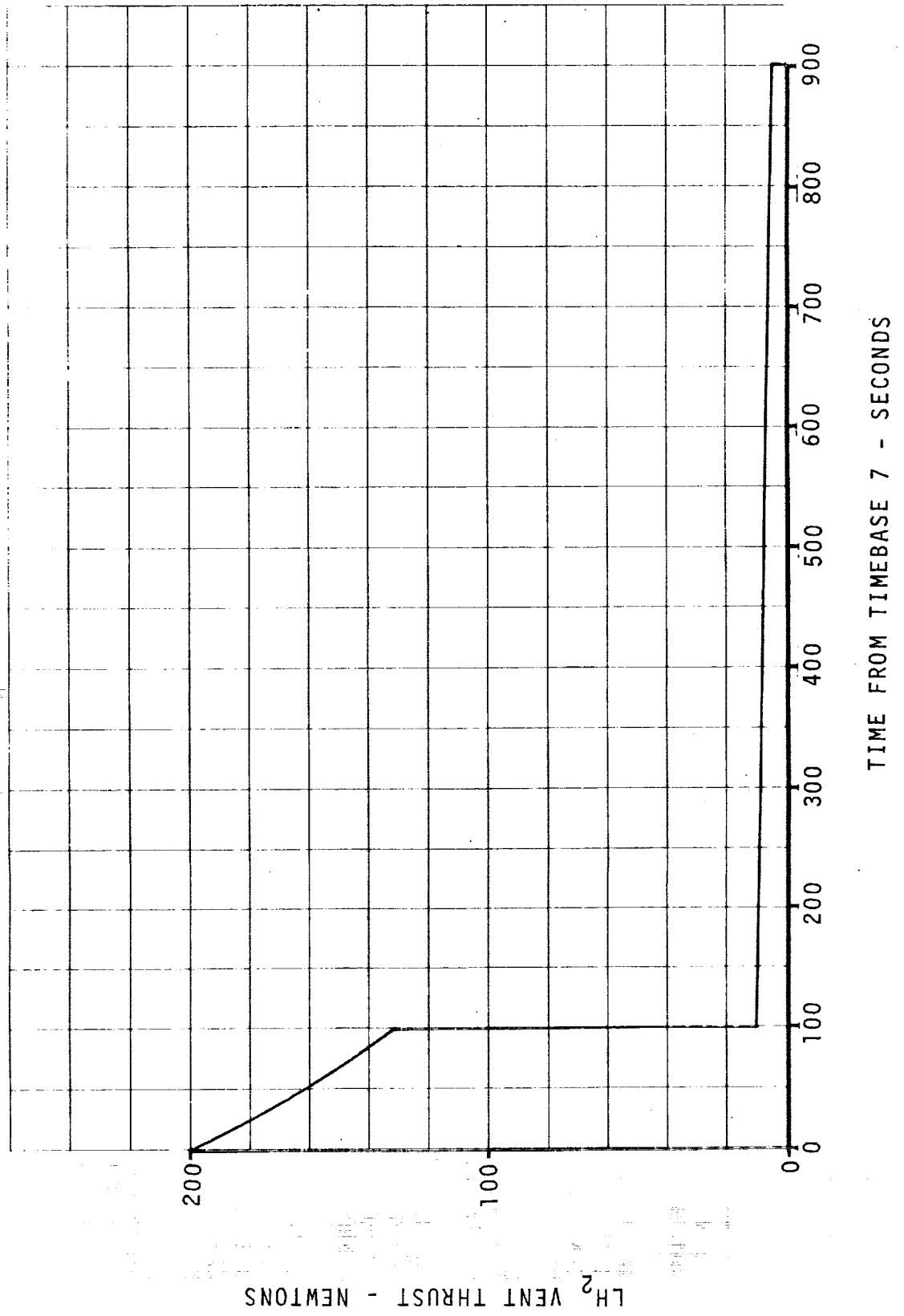


FIGURE 3-14 POST-TLI LH₂ VENT THRUST HISTORY

TABLE 3-III. AS-507 G MISSION LAUNCH VEHICLE MASS SEQUENCING SUMMARY

	WEIGHT CHANGE (POUNDS)	EVENT WEIGHT (POUNDS)	WEIGHT CHANGE (KG)	EVENT WEIGHT (KG)
Vehicle Weight at Ignition		6483778		2940992
Thrust Buildup Propellant	88255		40032	
Vehicle Weight at Holddown Arm Release		6395523		2900960
S-IC Frost	650		295	
S-IC Mainstage Propellant	3953755		1793393	
S-IC N2 Purge	37		17	
S-II Frost	450		204	
S-II Insulation Purge Gas	120		54	
S-IVB Frost	300		136	
Vehicle Weight at CECO Signal		2440211		1106861
Center-Engine Decay Propellant	1737		788	
Center-Engine Expended Propellant	408		185	
S-IC Mainstage Propellant	612398		277779	
Vehicle Weight at OECO Signal		1825668		828109
Outer-Engine Decay Propellant	6887		3124	
S-IC Stage Drop Weight	365540		165806	
S-IC/S-II Small Interstage	1352		613	
S-II Ullage Propellant	74		34	
Vehicle Weight at S-IC/S-II Physical Separation		1451815		658532
S-II Ullage Propellant	564		256	

TABLE 3-III. AS-507 G MISSION LAUNCH VEHICLE MASS SEQUENCING SUMMARY (Continued)

	WEIGHT CHANGE (POUNDS)	EVENT WEIGHT (POUNDS)	WEIGHT CHANGE (KG)	EVENT WEIGHT (KG)
Vehicle Weight at S-II Ignition		1451251		658276
Thrust Buildup Propellant	1323		600	
S-II Start Tank	25		11	
S-II Ullage Propellant	724		329	
Vehicle Weight at S-II 90% Thrust		1449179		657336
Mainstage Propellant and Venting	963642		437100	
Launch Escape Tower	8852		4015	
S-II Aft Interstage	8750		3969	
Vehicle Weight at S-II CECO Signal		467935		212252
Thrust Decay Propellant	323		147	
S-IVB Ullage Propellant	3		1	
Vehicle Weight at S-II/S-IVB Separation		467609		212104
Signal				
S-II Thrust Decay Propellant	30		14	
S-II Stage Drop Weight	95083		43129	
S-II/S-IVB Interstage	8143		3693	
S-IVB Aft Frame Dropped	48		22	
S-IVB Detonator Package	3		1	
S-IVB Ullage Rocket Propellant	1		1	
Vehicle Weight at S-II/S-IVB Physical Separation		364301		165244
S-IVB Ullage Rocket Propellant	92		42	

TABLE 3-III. AS-507 G MISSION LAUNCH VEHICLE MASS SEQUENCING SUMMARY (Continued)

	WEIGHT CHANGE (POUNDS)	EVENT WEIGHT (POUNDS)	WEIGHT CHANGE (KG)	EVENT WEIGHT (KG)
Vehicle Weight at 1st S-IVB Ignition				
S-IVB Ullage Propellant	18	364209	8	165202
S-IVB H2 in Start Tank	4		2	
Thrust Buildup Propellant	455		206	
Vehicle Weight at 1st S-IVB 90% Thrust				
S-IVB Mainstage Propellant	62898	363732	28530	164986
S-IVB Ullage Rocket Cases	135		61	
S-IVB APS Propellant	2		1	
Vehicle Weight at 1st S-IVB Cutoff				
Signal		300697*		136394*
Thrust Decay Propellant	100		45	
APS Ullage Propellant	6		3	
Engine Propellant Loss	40		18	
LOX Tank Vent	8		4	

*78.051° Launch Azimuth

TABLE 3-III. AS-507 G MISSION LAUNCH VEHICLE MASS SEQUENCING SUMMARY (Continued)

13 SEPTEMBER 1969 LAUNCH DAY, 78.051° LAUNCH AZIMUTH, 1ST-OPPORTUNITY REIGNITION

	WEIGHT CHANGE (POUNDS)	EVENT WEIGHT (POUNDS)	WEIGHT CHANGE (KG)	EVENT WEIGHT (KG)
Vehicle Weight at Parking Orbit Insertion		300543		136324
Fuel Tank Vent	2375		1077	
APS Propellant	216		98	
H2 in Start Tank	2		1	
O2/H2 Burner	16		7	
Vehicle Weight at S-IVB Lead Thrust Initiation		297934		135141
S-IVB Fuel Lead Loss	20		9	
Vehicle Weight at 2nd S-IVB Ignition		297914		135132
S-IVB H2 in Start Tank	4		2	
Thrust Buildup Propellant	462		210	
Vehicle Weight at 2nd S-IVB 90% Thrust		297448		134920
S-IVB Mainstage Propellant	157180		71295	
APS Propellant	4		2	
Vehicle Weight at 2nd S-IVB Cutoff Signal		140264		63623
Thrust Decay Propellant	100		45	
Fuel Tank Vent	20		9	
Engine Propellant Lost	40		18	
LOX Tank Vent	14		6	
Helium Dump	30		14	

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TABLE 3-III. AS-507 G MISSION LAUNCH VEHICLE MASS SEQUENCING SUMMARY (Continued)
 13 SEPTEMBER 1969 LAUNCH DAY, 78.051° LAUNCH AZIMUTH, 1ST-OPPORTUNITY REIGNITION

	WEIGHT CHANGE (POUNDS)	EVENT WEIGHT (POUNDS)	WEIGHT CHANGE (KG)	EVENT WEIGHT (KG)
Vehicle Weight at Translunar Injection		140060		63531
CSM	63443		28777	
LM and SLA	34632		15709	
SLA Panels	2658		1206	
APS	155		70	
Fuel Tank Vent	1412		641	
LOX Tank Vent	144		65	
Pressurization Dump	967		439	
Vehicle Weight at Start of Slingshot		36649		16624
Maneuver				

TABLE 3-III. AS-507 G MISSION LAUNCH VEHICLE MASS SEQUENCING SUMMARY (Continued)
 13 SEPTEMBER 1969 LAUNCH DAY, 78.051° LAUNCH AZIMUTH, 2ND-OPPORTUNITY REIGNITION

	WEIGHT CHANGE (POUNDS)	EVENT WEIGHT (POUNDS)	WEIGHT CHANGE (KG)	EVENT WEIGHT (KG)
Vehicle Weight at Parking Orbit Insertion		300543		136324
Fuel Tank Vent	3264		1481	
APS Propellant	216		98	
H2 in Start Tank	2		1	
O2/H2 Burner	16		7	
Vehicle Weight at S-IVB Lead Thrust Initiation		297045		134737
S-IVB Fuel Lead Loss	20		9	
Vehicle Weight at 2nd S-IVB Ignition		297025		134728
S-IVB H2 in Start Tank	4		2	
Thrust Buildup Propellant	461		209	
Vehicle Weight at 2nd S-IVB 90% Thrust		296560		134517
S-IVB Mainstage Propellant	156586		71026	
APS Propellant	4		2	
Vehicle Weight at 2nd S-IVB Cutoff Signal		139970		63489
Thrust Decay Propellant	100		45	
Fuel Tank Vent	20		9	
Engine Propellant Lost	40		18	
LOX Tank Vent	14		6	
Helium Dump	30		14	

TABLE 3-III. AS-507 G MISSION LAUNCH VEHICLE MASS SEQUENCING SUMMARY (Continued)
 13 SEPTEMBER 1969 LAUNCH DAY, 78.051° LAUNCH AZIMUTH, 2ND-OPPORTUNITY REIGNITION

	WEIGHT CHANGE (POUNDS)	EVENT WEIGHT (POUNDS)	WEIGHT CHANGE (KG)	EVENT WEIGHT (KG)
Vehicle Weight at Translunar Injection		139766		63397
CSM	63443		28777	
LM & SLA	34632		15709	
SLA Panels	2658		1206	
APS	155		70	
Fuel Tank Vent	1412		641	
LOX Tank Vent	144		65	
Pressurization Dump	967		439	
Vehicle Weight at Start of Slingshot Maneuver		36355		16490

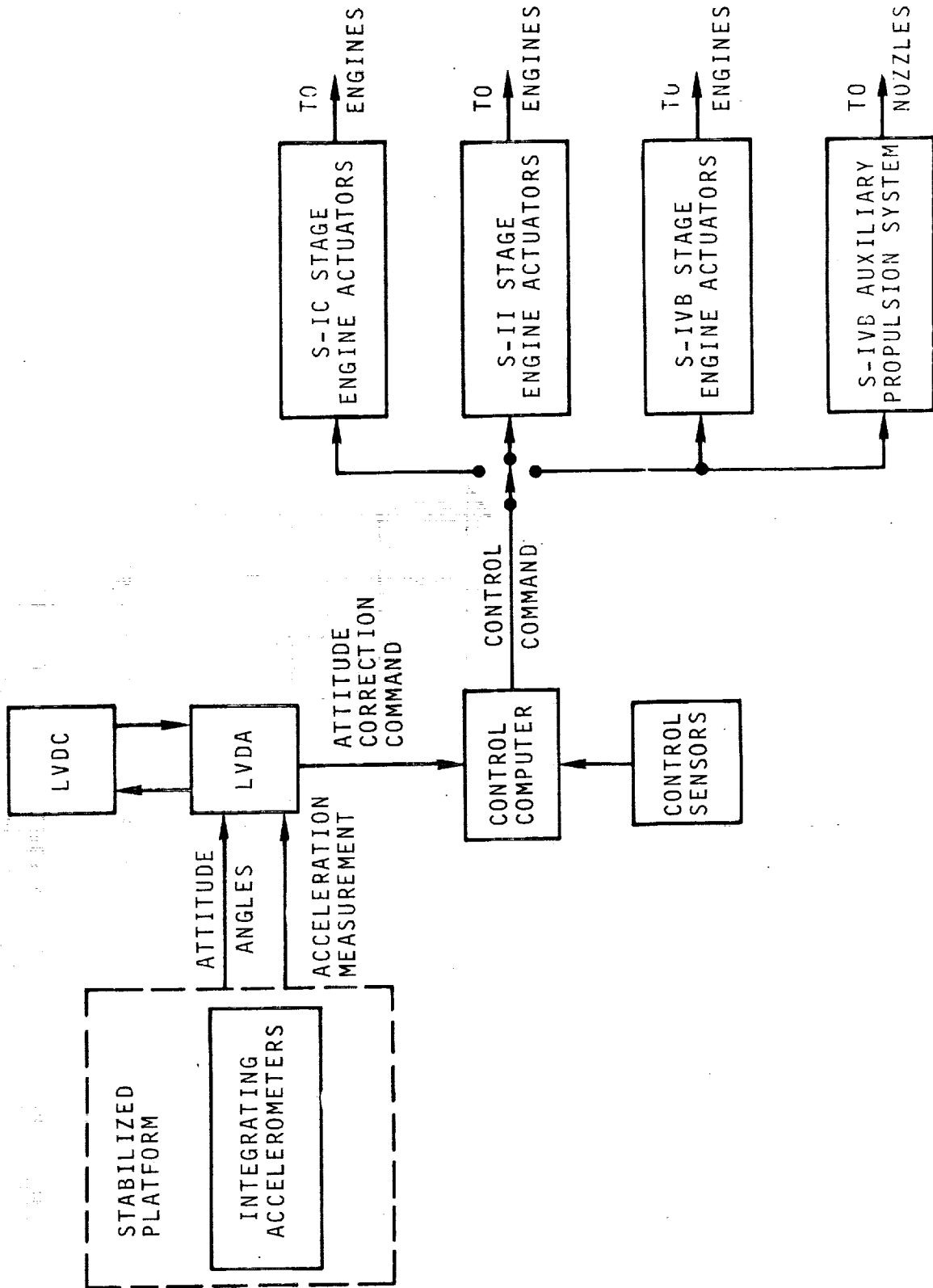


FIGURE 3-15 NAVIGATION, GUIDANCE, AND CONTROL SYSTEM

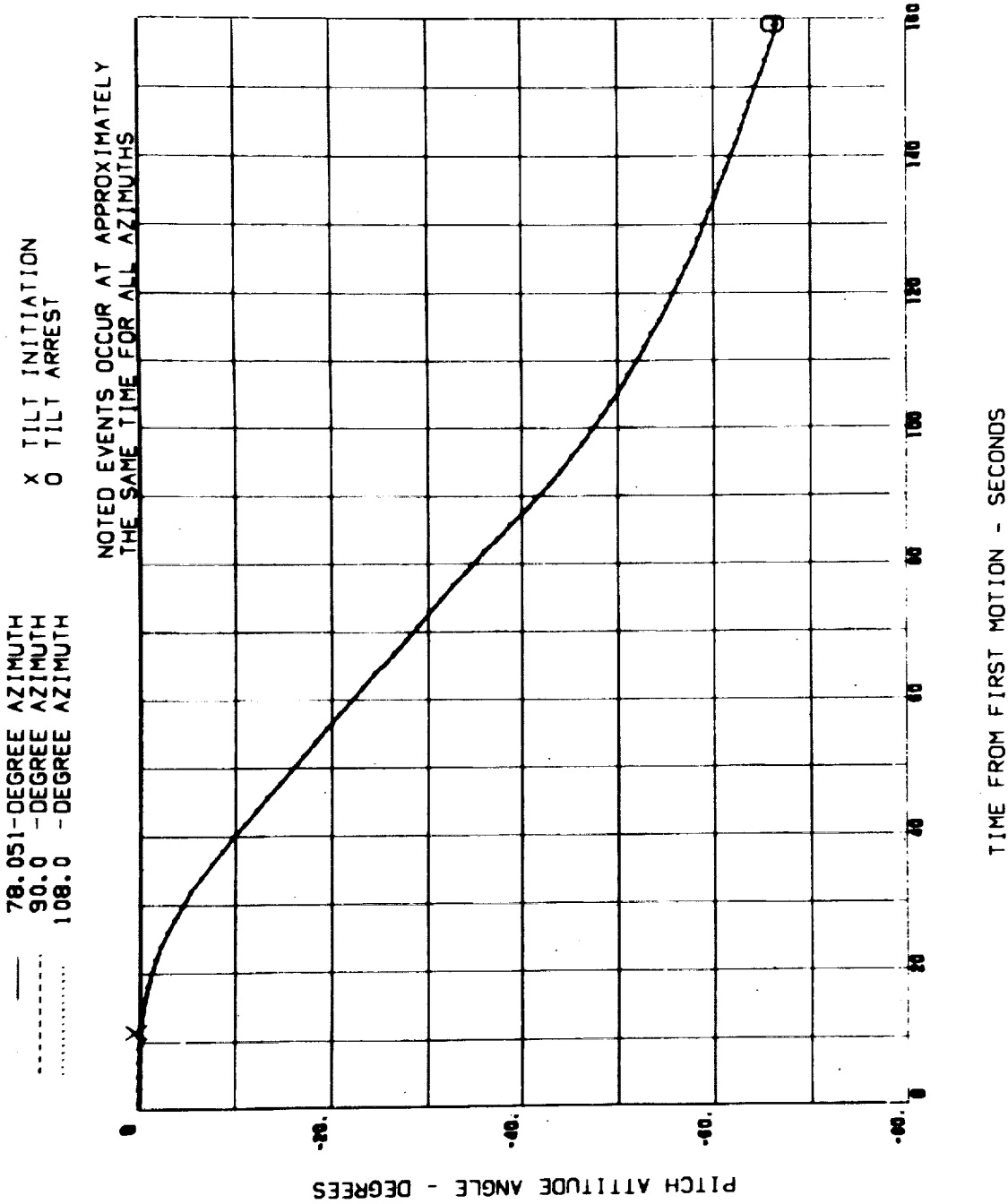


FIGURE 3-16 COMMANDED VEHICLE PITCH ATTITUDE FOR S-IC STAGE FLIGHT

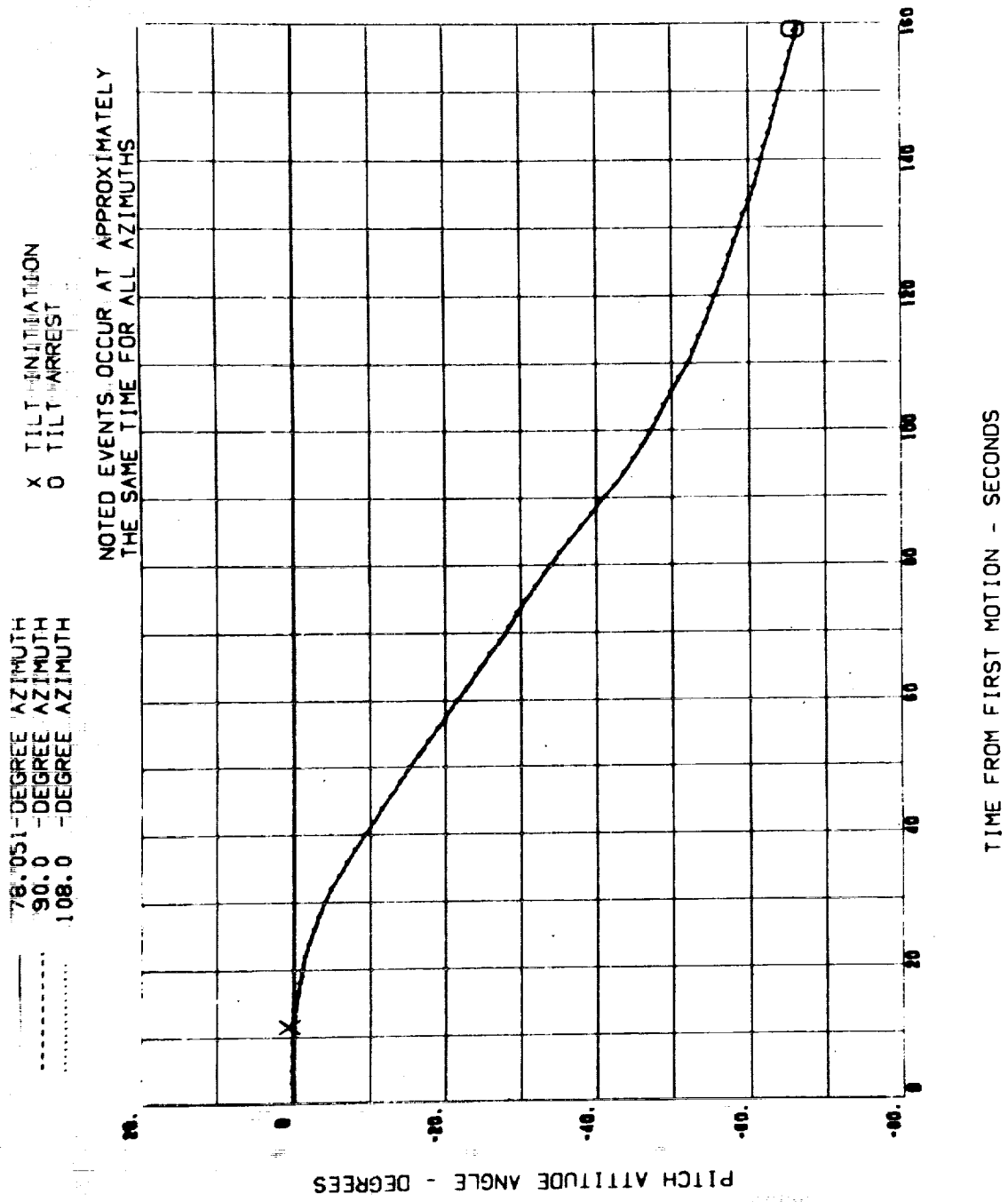


FIGURE 3-17 ACTUAL VEHICLE PITCH ATTITUDE FOR S-IC STAGE FLIGHT

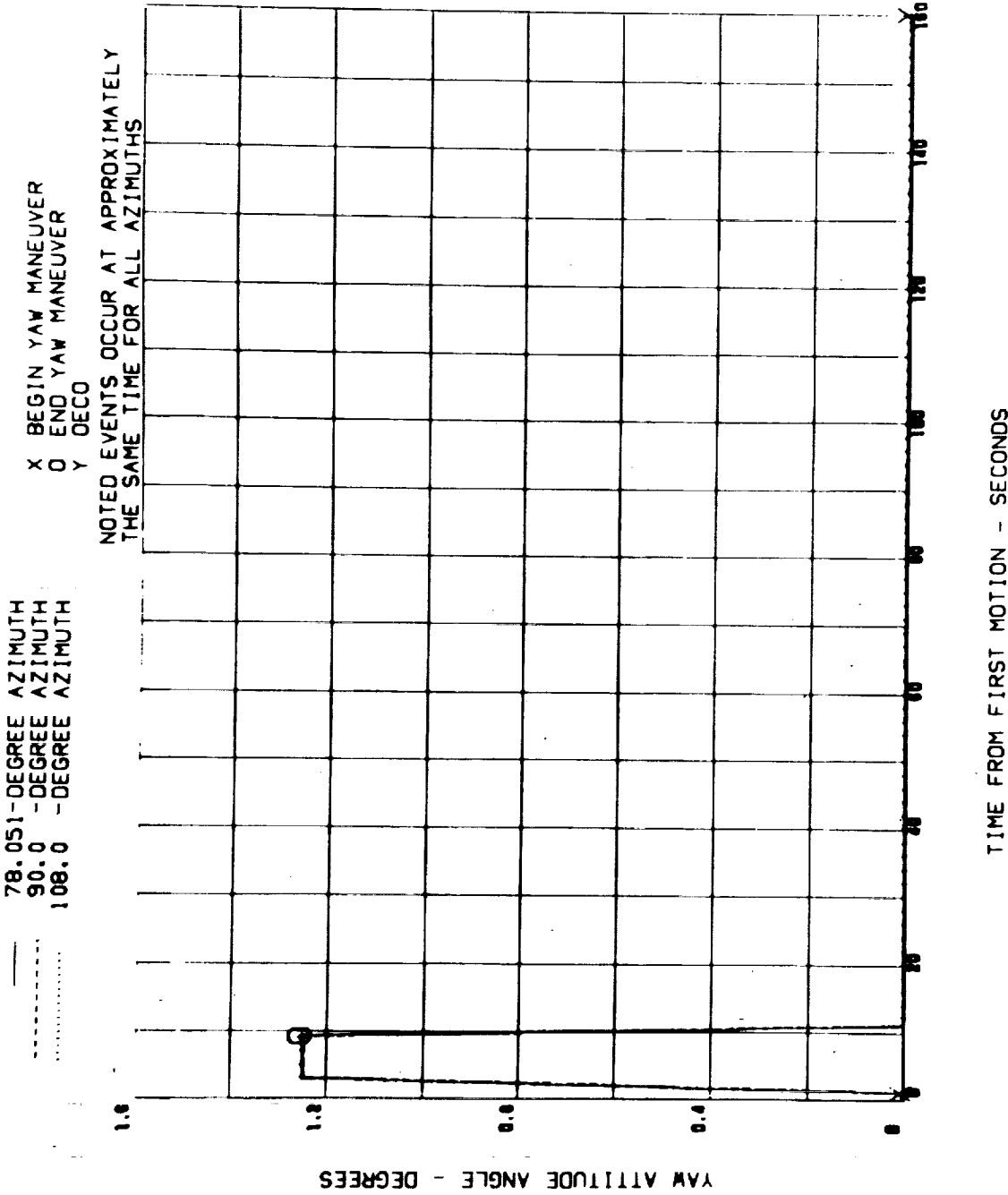
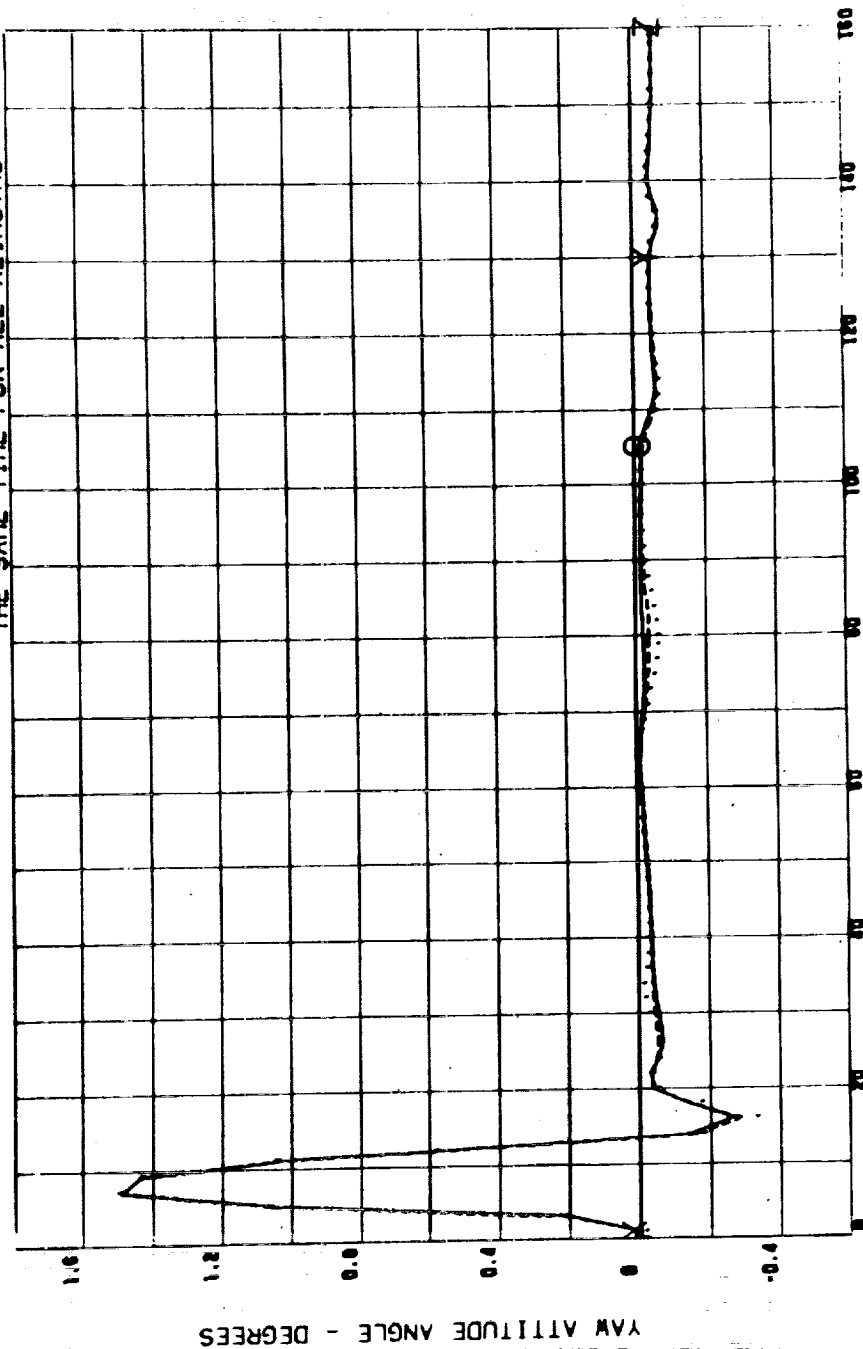


FIGURE 3-18 COMMANDED VEHICLE YAW ATTITUDE FOR
S-IC STAGE FLIGHT

78.051 - DEGREE AZIMUTH
 90.0 - DEGREE AZIMUTH
 108.0 - DEGREE AZIMUTH

X - BEGIN YAW MANEUVER
 O - GAIN CHANGE
 Y - GAIN CHANGE
 Z - DECO

NOTED EVENTS OCCUR AT APPROXIMATELY
 THE SAME TIME FOR ALL AZIMUTHS



TIME FROM FIRST MOTION - SECONDS

FIGURE 3-19 ACTUAL VEHICLE YAW ATTITUDE FOR S-IC
 STAGE FLIGHT

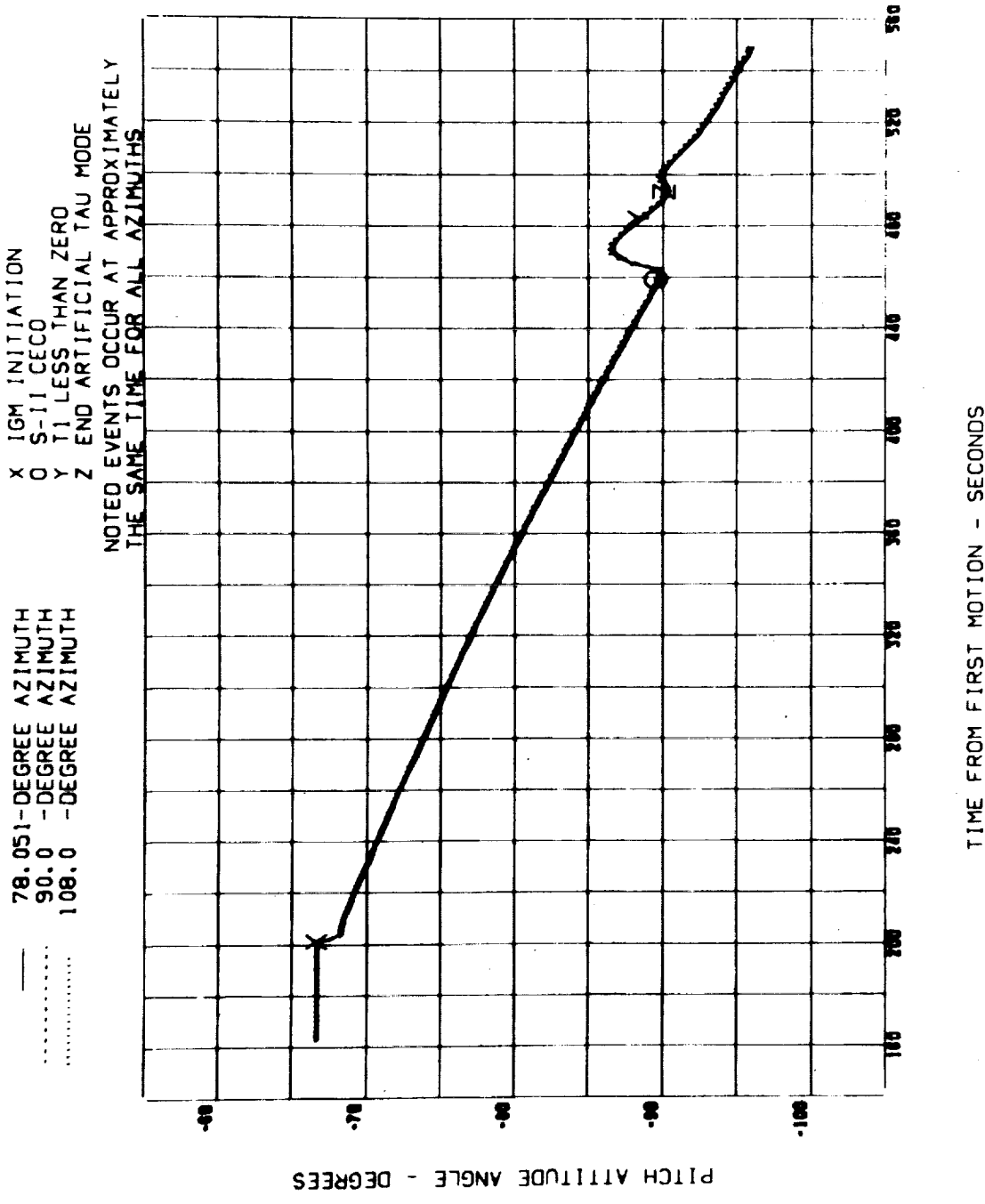
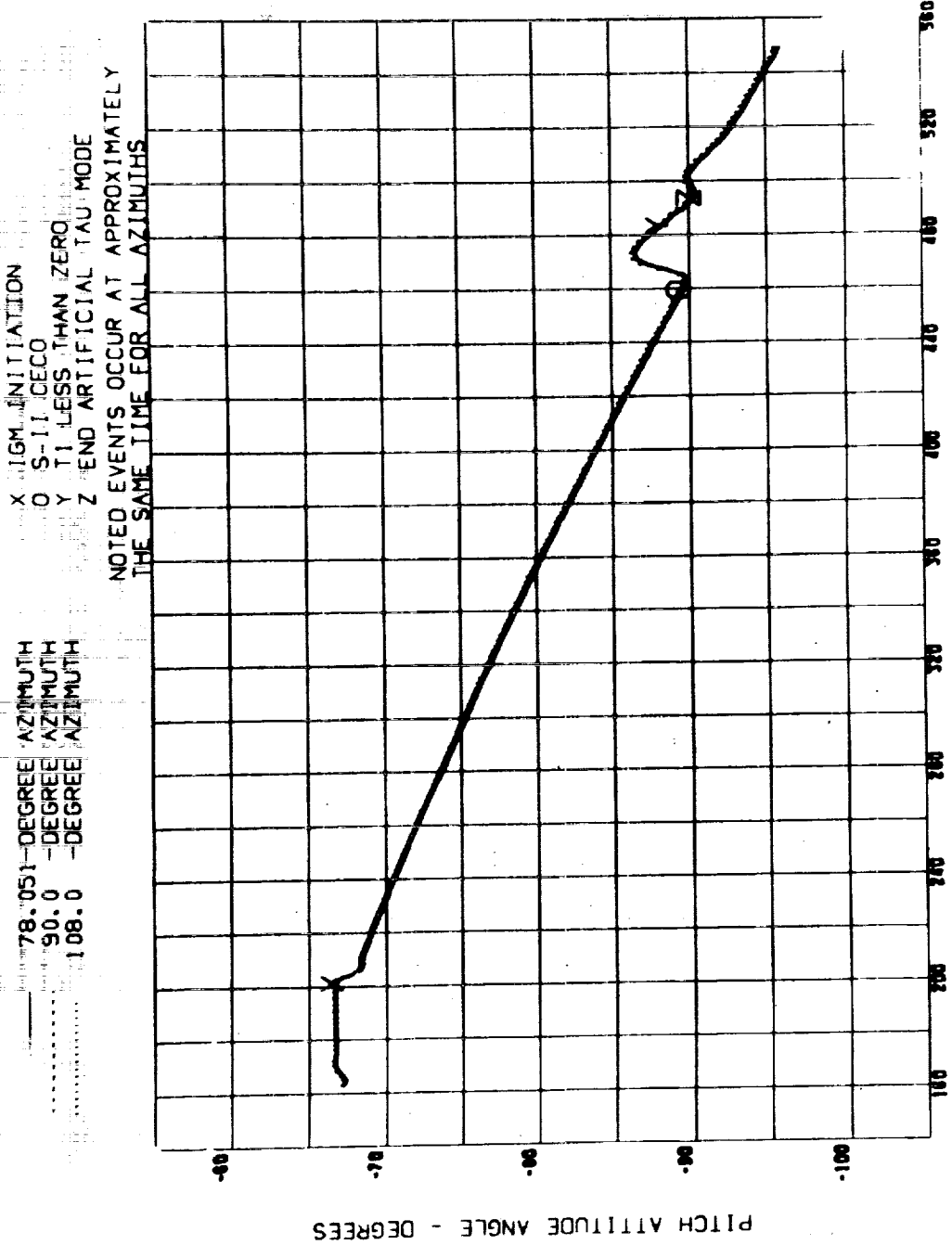


FIGURE 3-20 COMMANDED VEHICLE PITCH ATTITUDE FOR S-II STAGE FLIGHT



TIME FROM FIRST MOTION - SECONDS

FIGURE 3-21 ACTUAL VEHICLE PITCH ATTITUDE FOR S-II STAGE FLIGHT

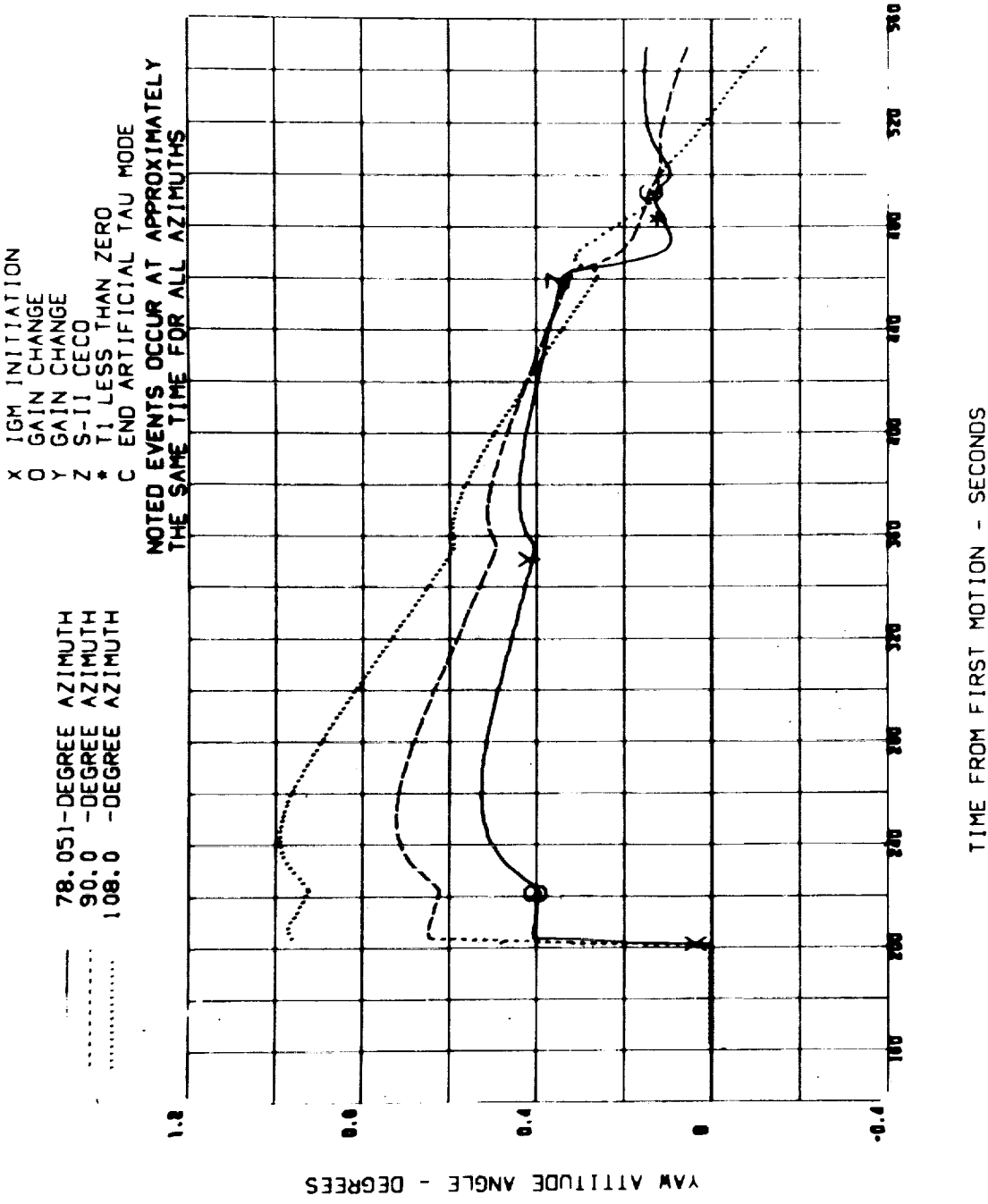


FIGURE 3-22 COMMANDED VEHICLE YAW ATTITUDE FOR S-II STAGE FLIGHT

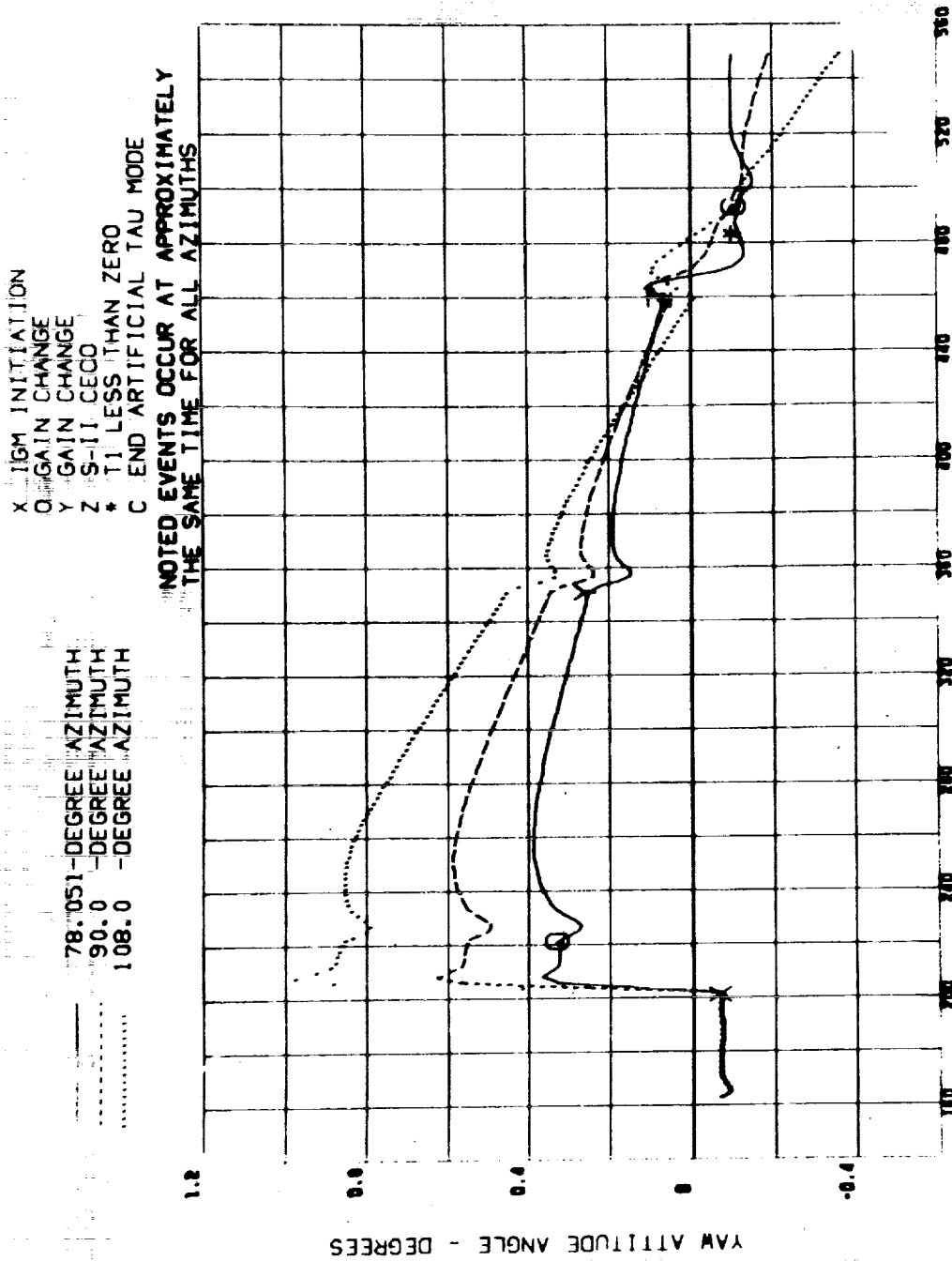


FIGURE 3-23 ACTUAL VEHICLE YAW ATTITUDE FOR S-II STAGE FLIGHT

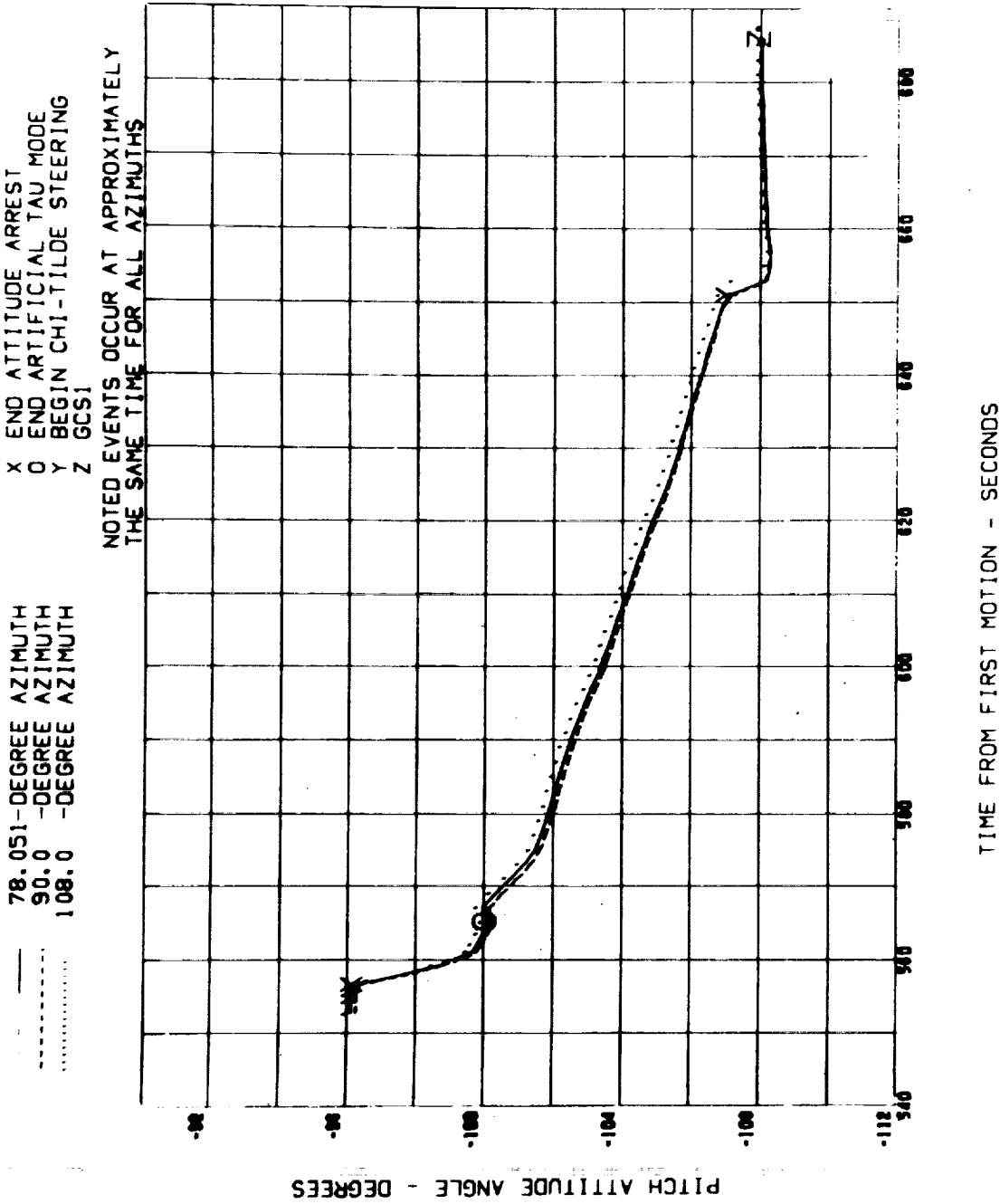
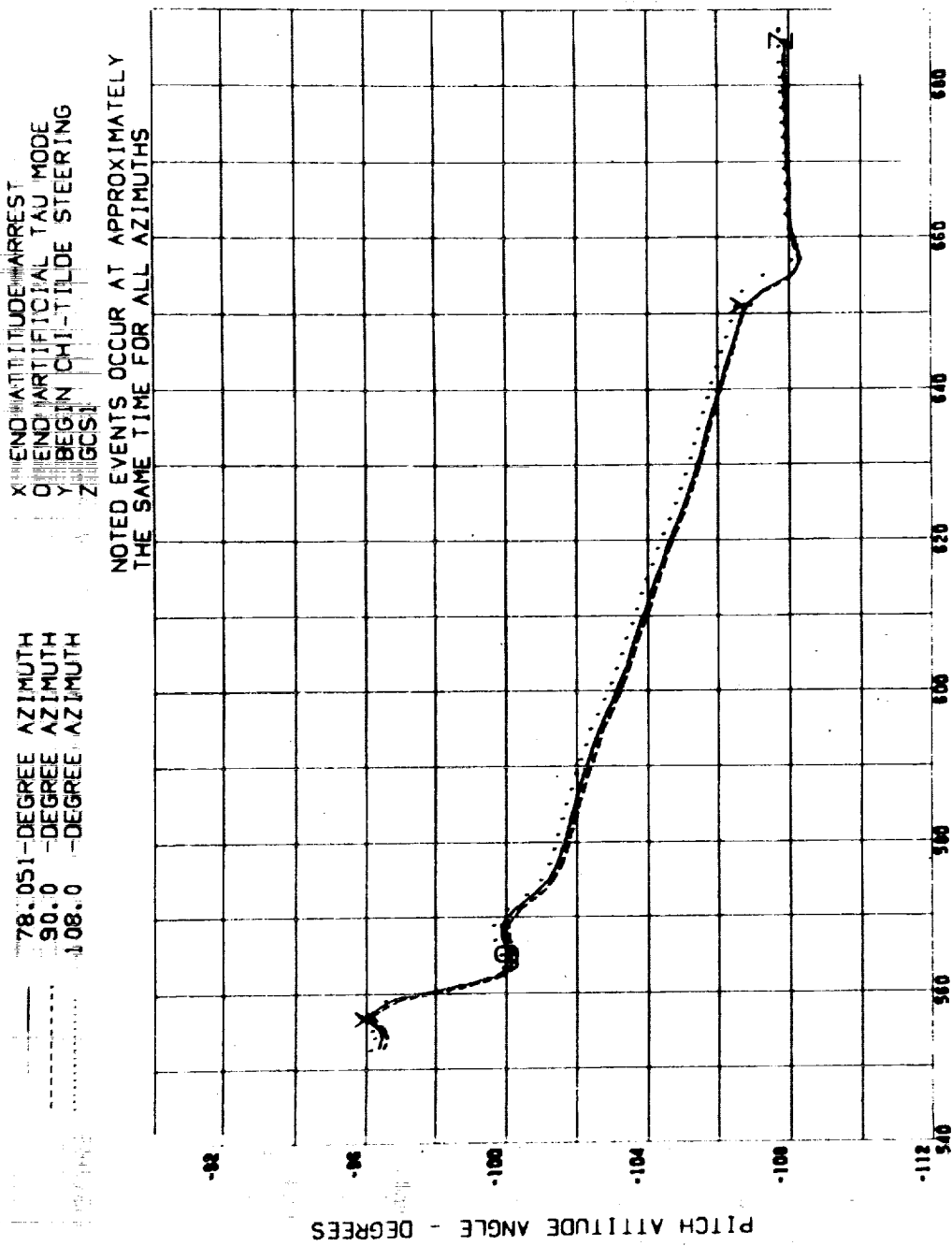


FIGURE 3-24 COMMANDED VEHICLE PITCH ATTITUDE FOR S-IVB STAGE FLIGHT (FIRST BURN)



TIME FROM FIRST MOTION - SECONDS

FIGURE 3-25 ACTUAL VEHICLE PITCH ATTITUDE FOR S-IVB STAGE FLIGHT (FIRST BURN)

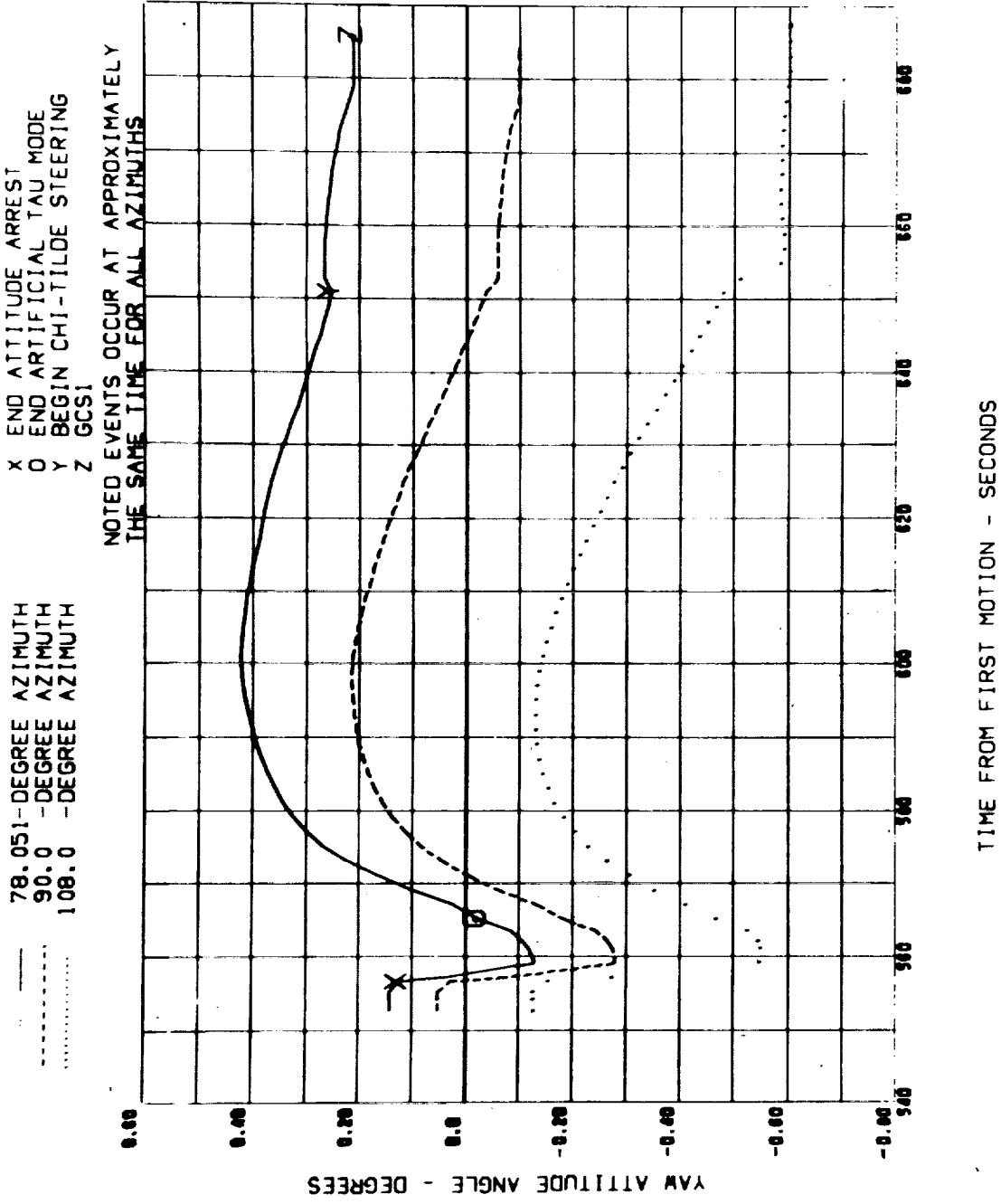


FIGURE 3-26 COMMANDED VEHICLE YAW ATTITUDE FOR S-IVB STAGE FLIGHT (FIRST BURN)

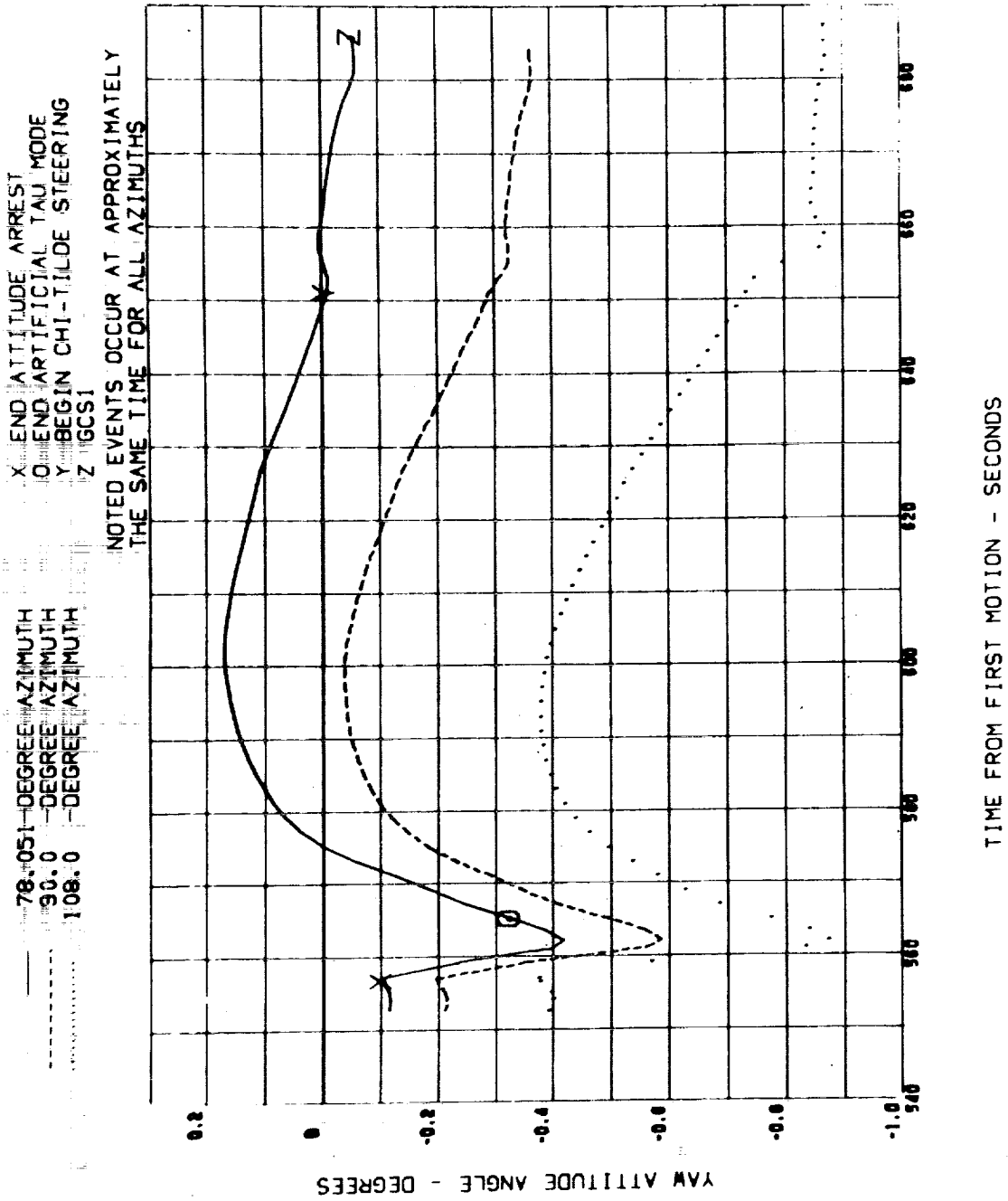


FIGURE 3-27 ACTUAL VEHICLE YAW ATTITUDE FOR S-IVB STAGE FLIGHT (FIRST BURN)

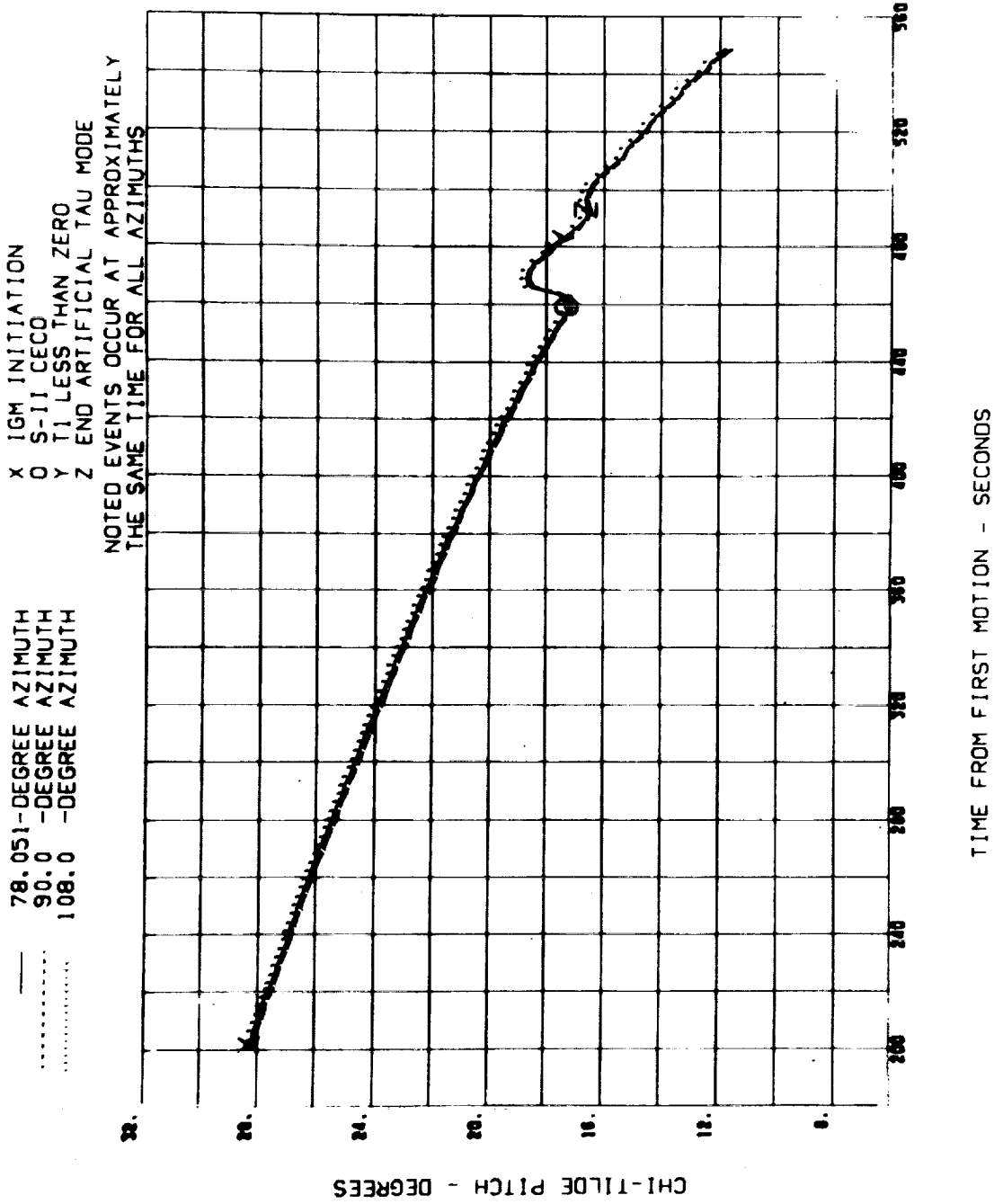
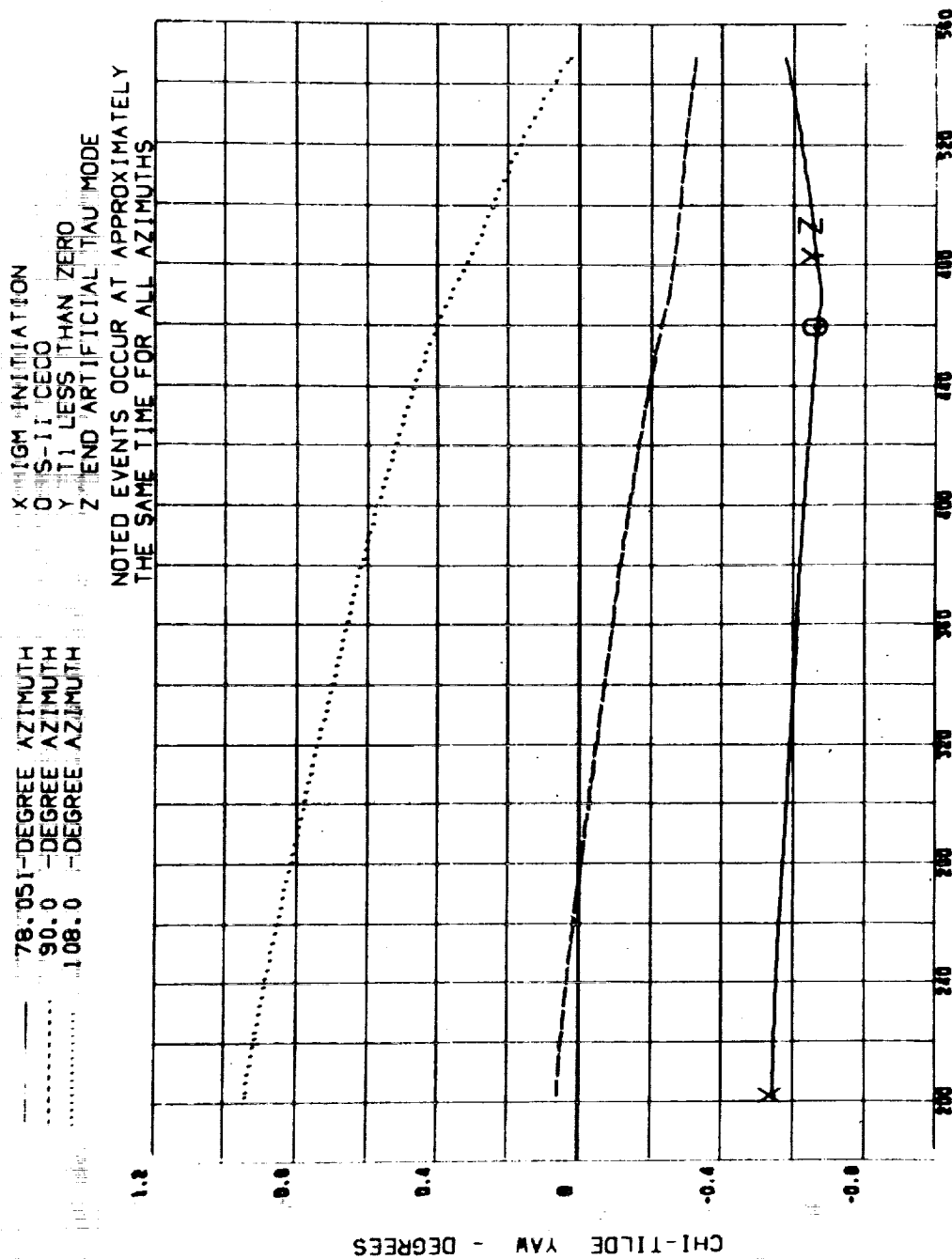


FIGURE 3-28 REQUIRED PITCH STEERING ANGLE TO SATISFY
 TERMINAL VELOCITY REQUIREMENTS FOR S-II



TIME FROM FIRST MOTION - SECONDS

FIGURE 3-29 REQUIRED YAW STEERING ANGLE TO SATISFY
 TERMINAL VELOCITY REQUIREMENTS FOR S-II

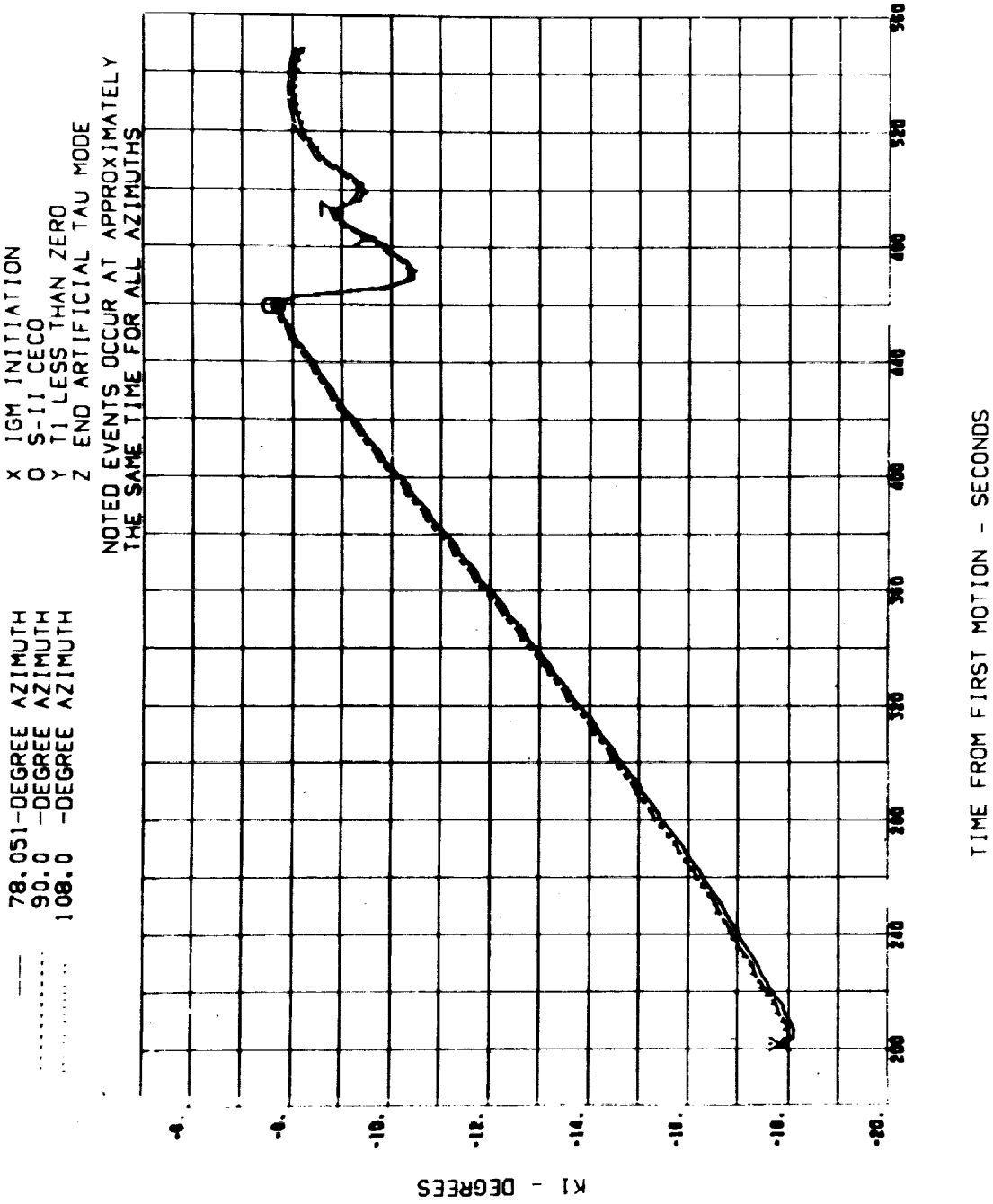
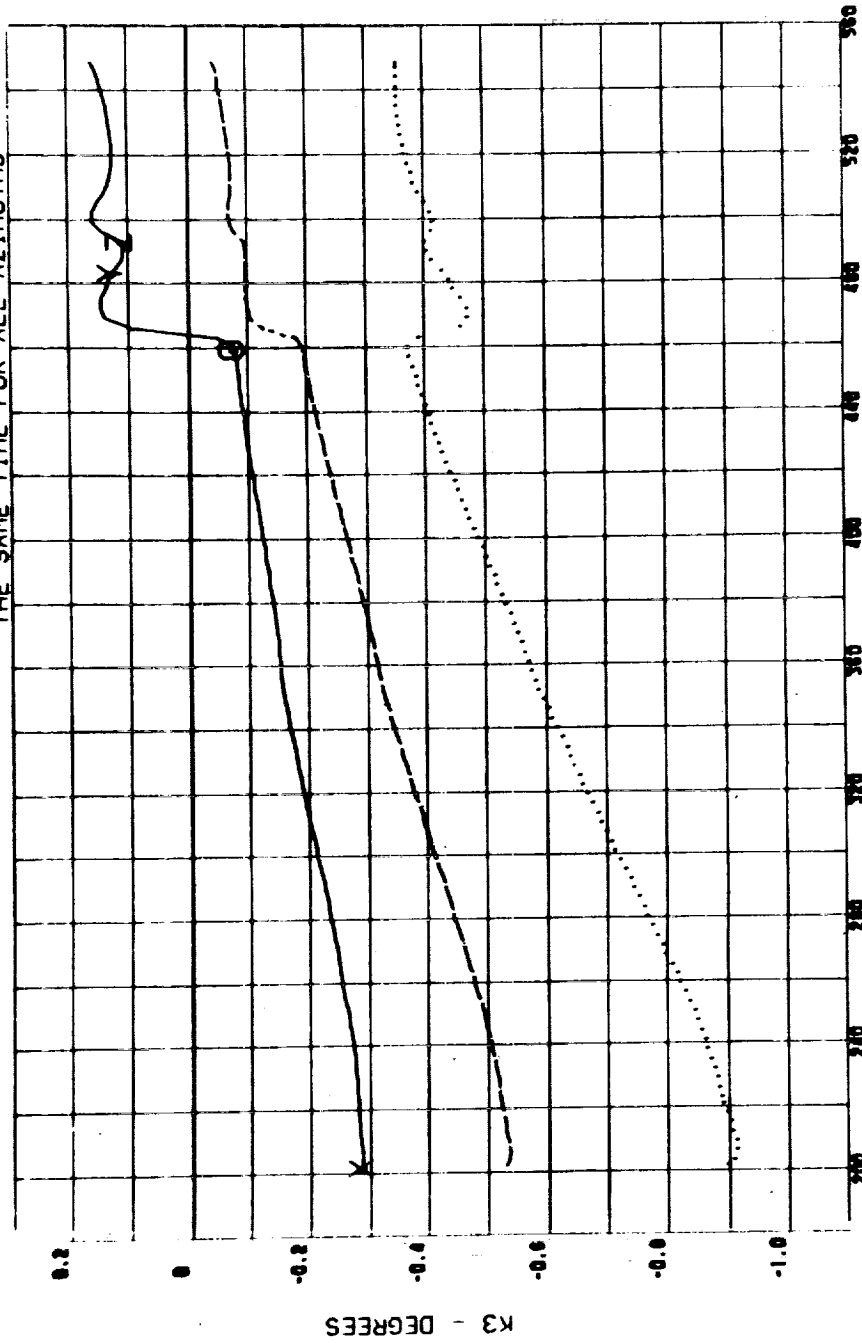


FIGURE 3-30 PITCH STEERING ANGLE BIAS TO ENFORCE
TERMINAL POSITION REQUIREMENTS FOR S-II

78.051 - DEGREE AZIMUTH
 90.0 - DEGREE AZIMUTH
 108.0 - DEGREE AZIMUTH

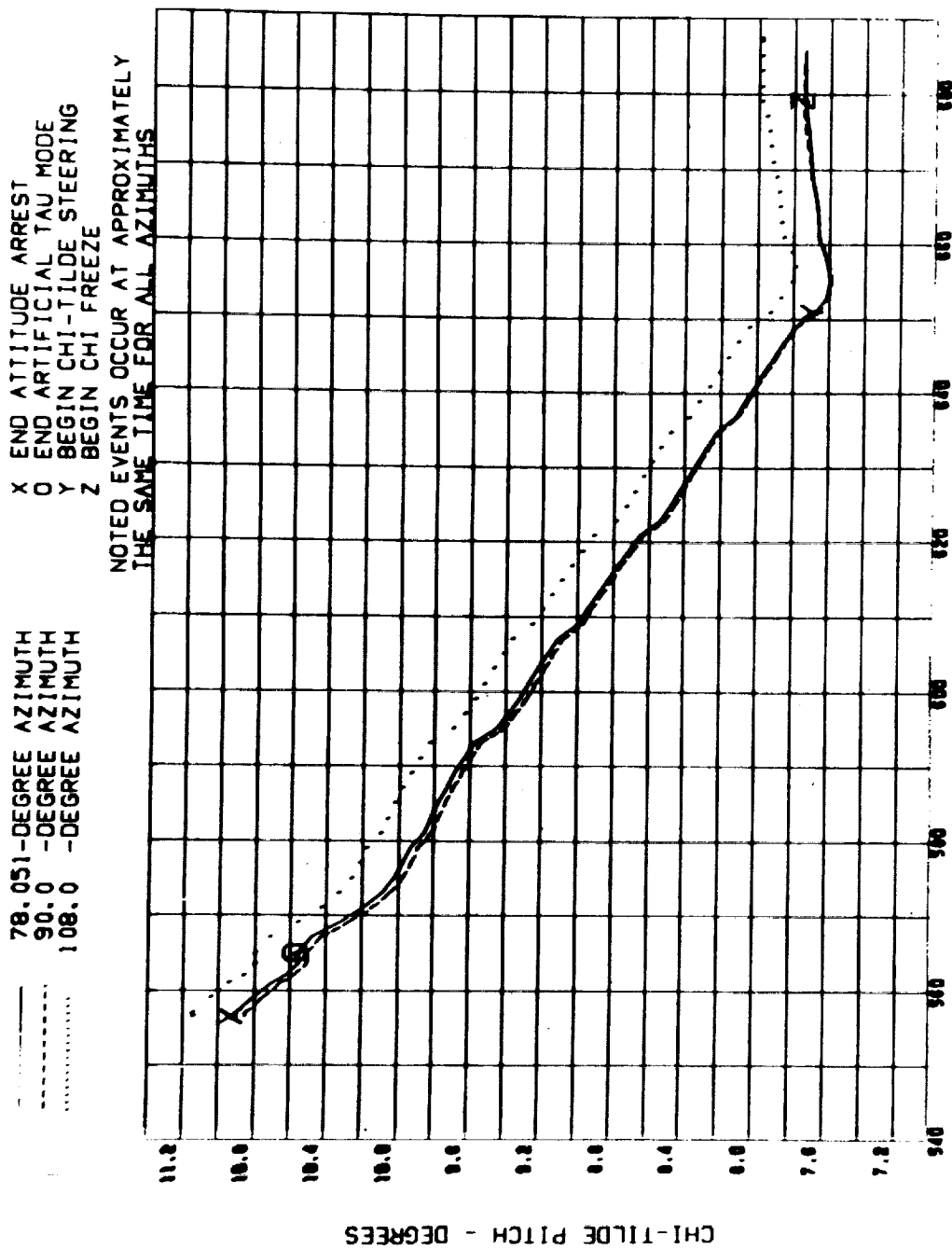
X - TIGM INITIATION
 O - S-II CECO
 Y - T1 LESS THAN ZERO
 Z - END ARTIFICIAL TAU MODE

NOTED EVENTS OCCUR AT APPROXIMATELY
 THE SAME TIME FOR ALL AZIMUTHS



TIME FROM FIRST MOTION - SECONDS

FIGURE 3-31 YAW STEERING ANGLE BIAS TO ENFORCE
 TERMINAL POSITION REQUIREMENTS FOR S-II



TIME FROM FIRST MOTION - SECONDS

FIGURE 3-32 REQUIRED PITCH STEERING ANGLE TO SATISFY
 TERMINAL VELOCITY REQUIREMENTS FOR S-IVB
 FIRST BURN

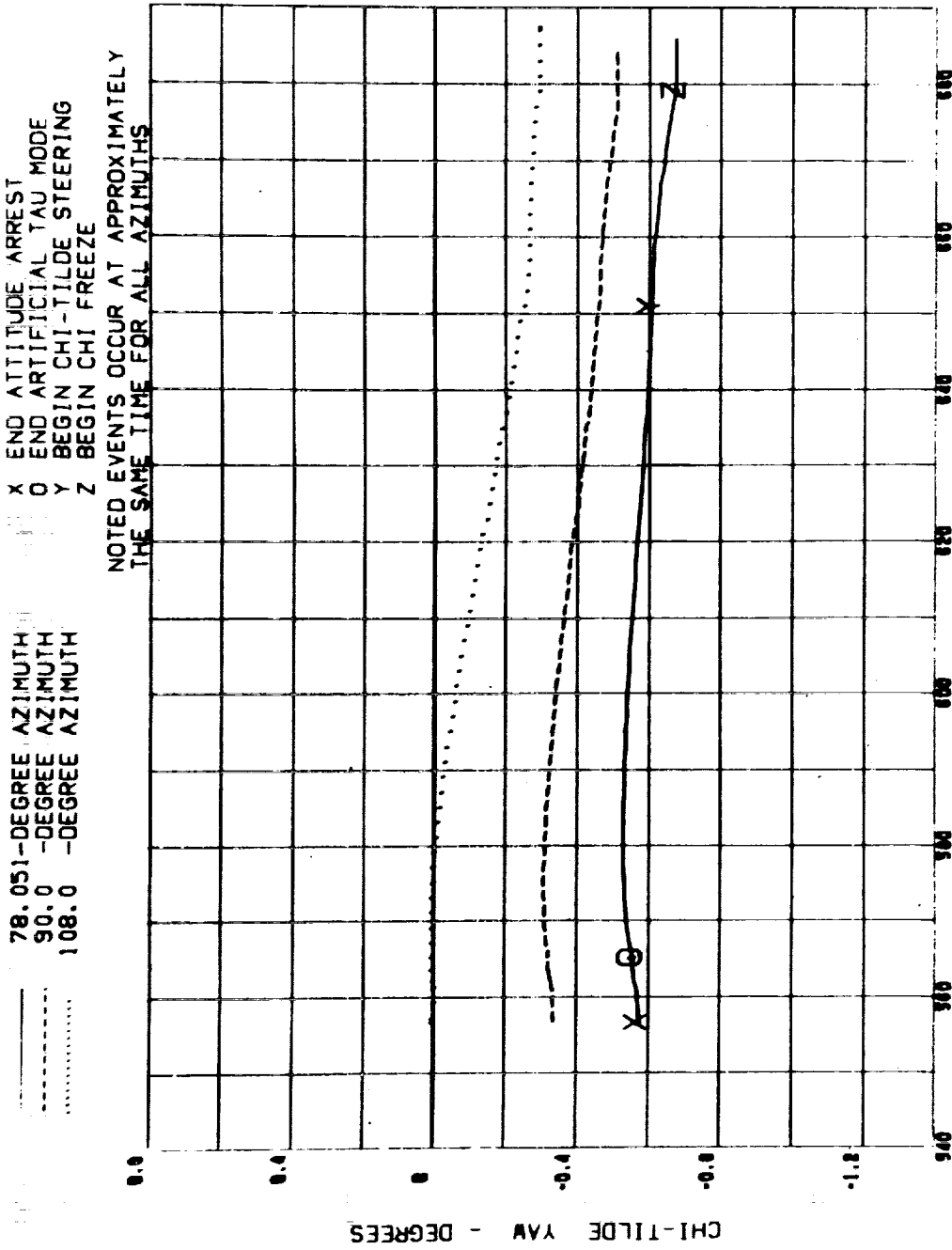


FIGURE 3-33 REQUIRED YAW STEERING ANGLE TO SATISFY TERMINAL VELOCITY REQUIREMENTS FOR S-IVB FIRST BURN

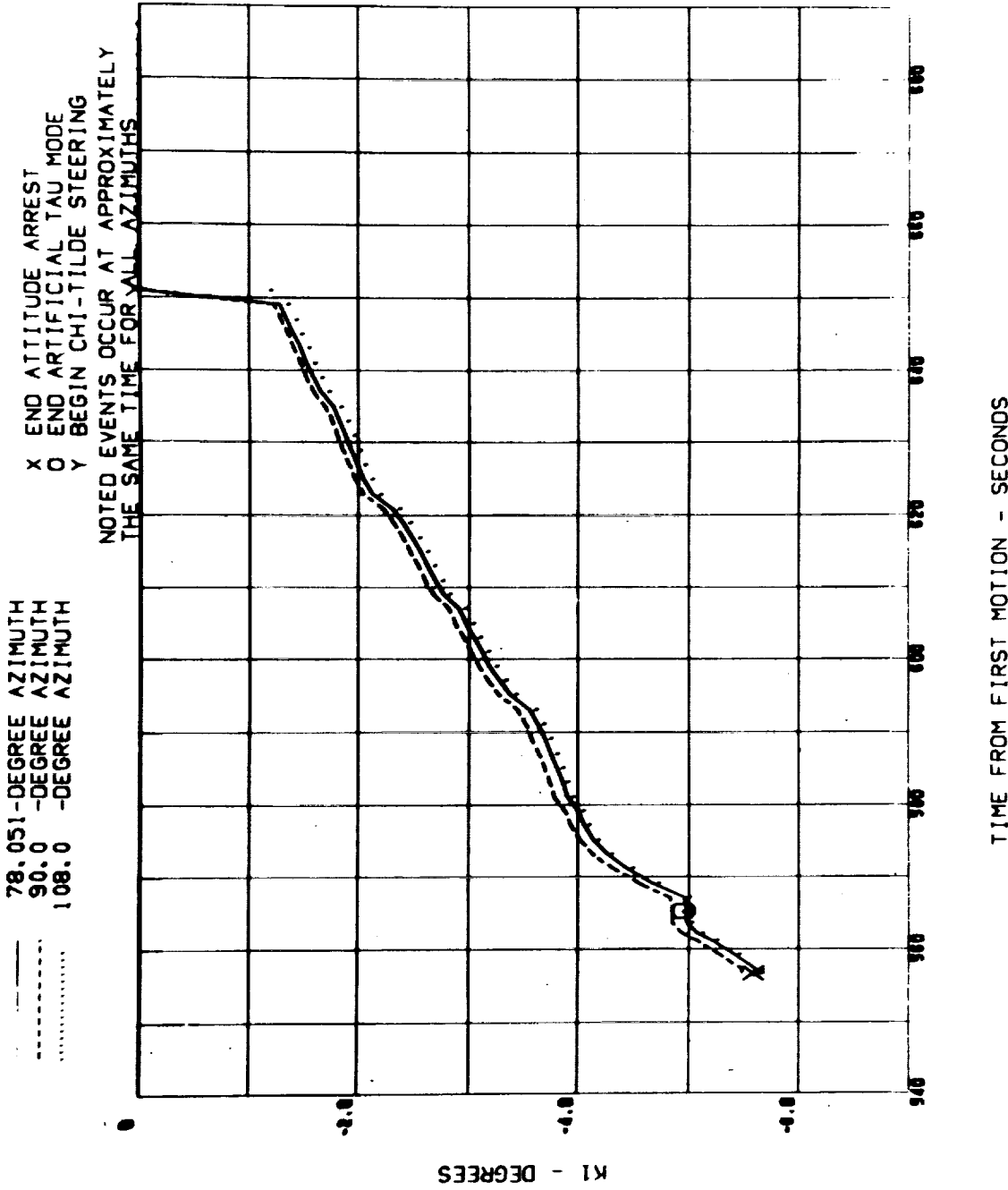


FIGURE 3-34 PITCH STEERING ANGLE BIAS TO ENFORCE
 TERMINAL POSITION REQUIREMENTS FOR S-IVB
 FIRST BURN

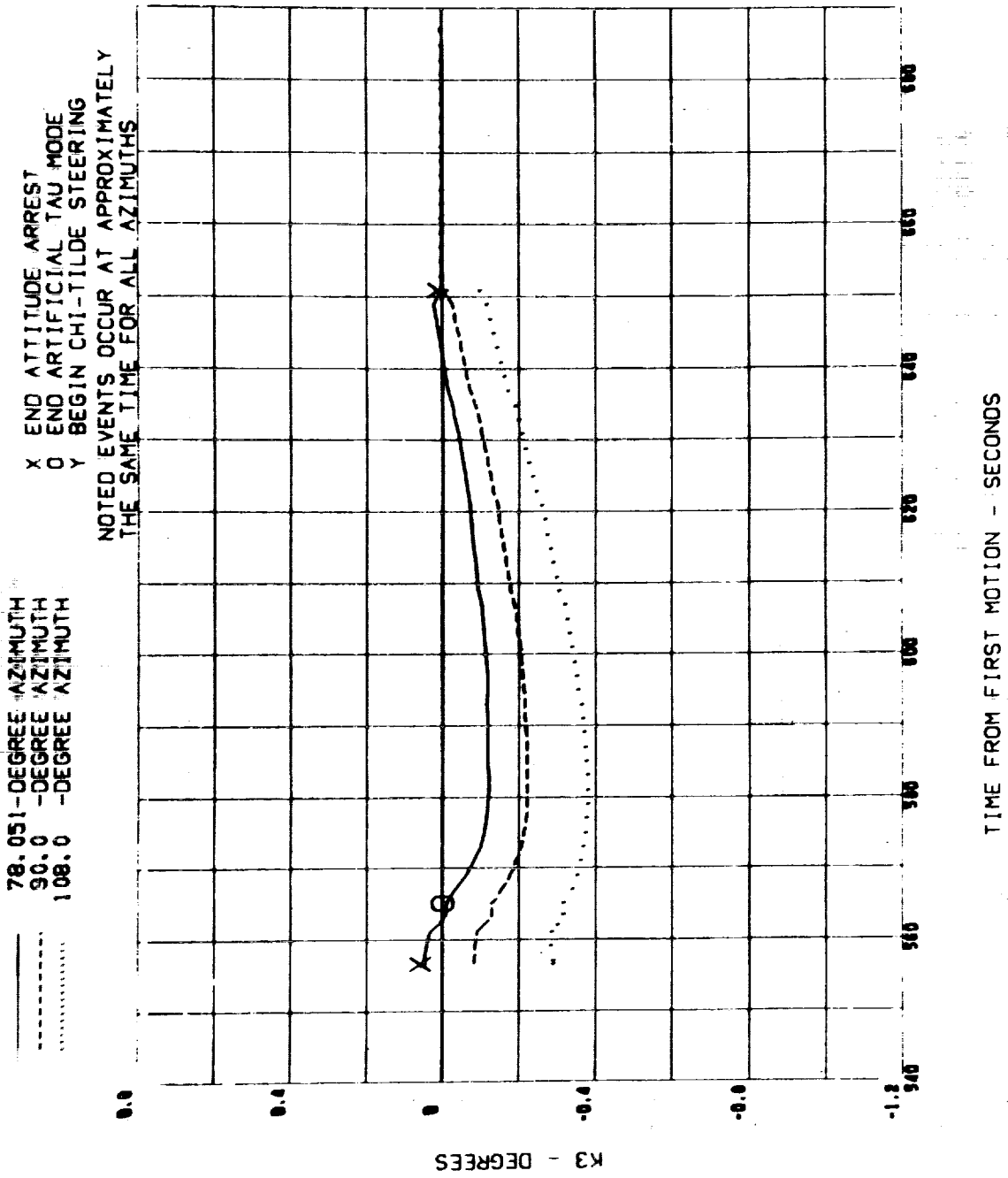


FIGURE 3-35 YAW STEERING ANGLE BIAS TO ENFORCE
TERMINAL POSITION REQUIREMENTS FOR S-IVB
FIRST BURN

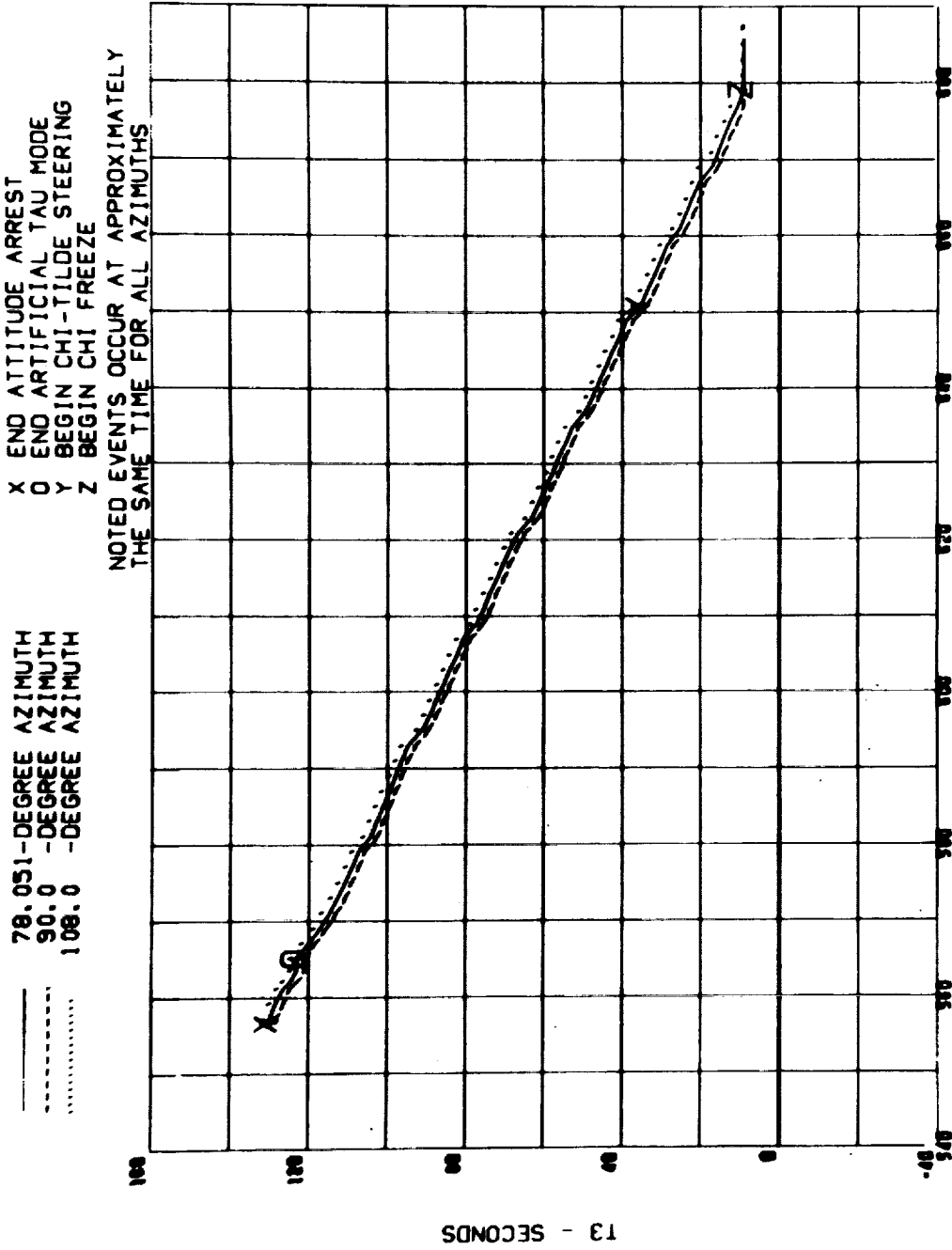


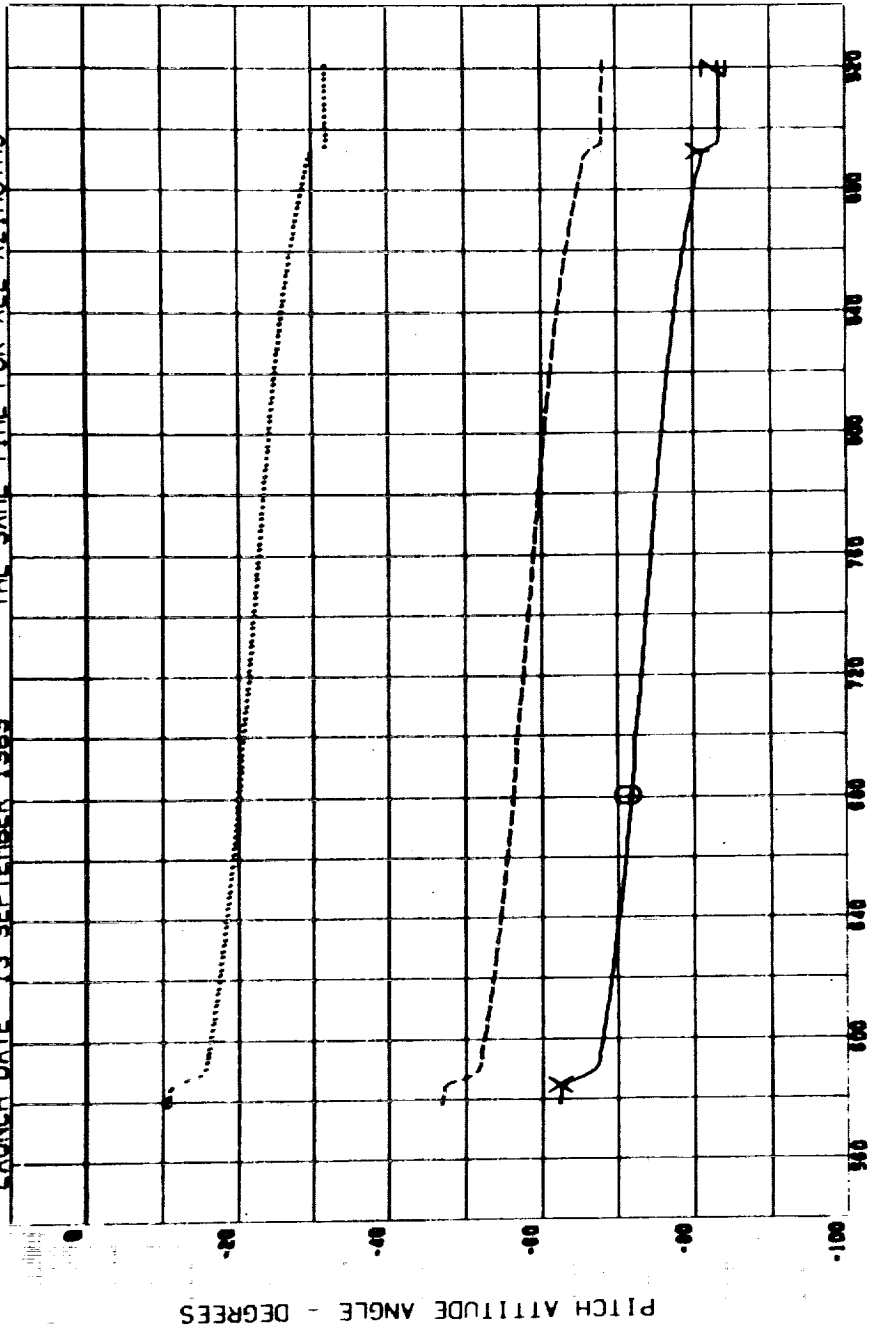
FIGURE 3-36 TIME-TO-GO IN THIRD STAGE OF IGM

X IGM INITIATION
 O MR SHIFT
 Y BEGIN CH1-TILDE STEERING
 Z BEGIN CH1 FREEZE

78.051 -DEGREE AZIMUTH
 90.0 -DEGREE AZIMUTH
 108.0 -DEGREE AZIMUTH

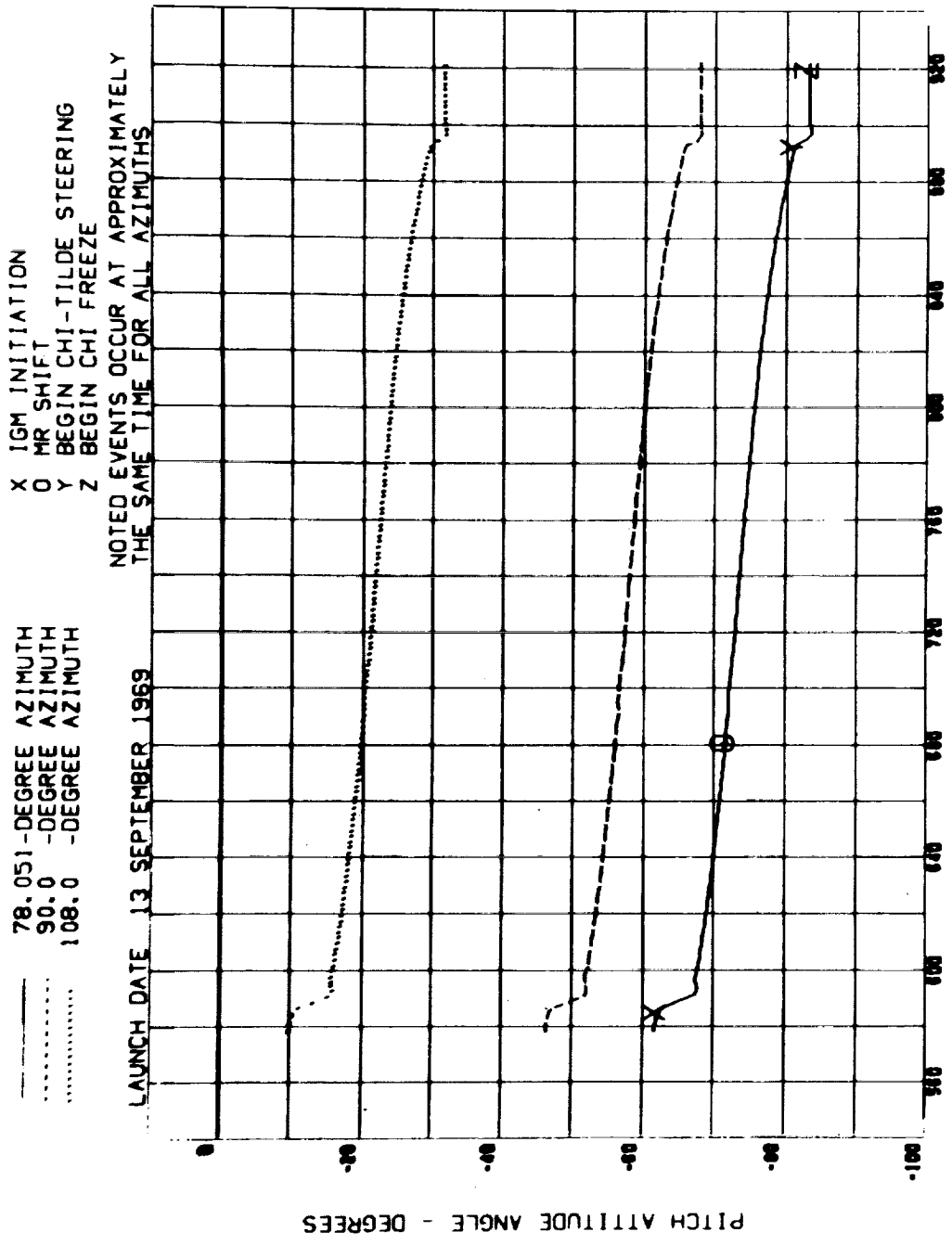
NOTED EVENTS OCCUR AT APPROXIMATELY
 THE SAME TIME FOR ALL AZIMUTHS

LAUNCH DATE 13 SEPTEMBER 1969



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 3-37 COMMANDED VEHICLE PITCH ATTITUDE FOR S-IVB SECOND BURN (FIRST OPPORTUNITY)



TIME FROM TIMEBASE 6 - SECONDS

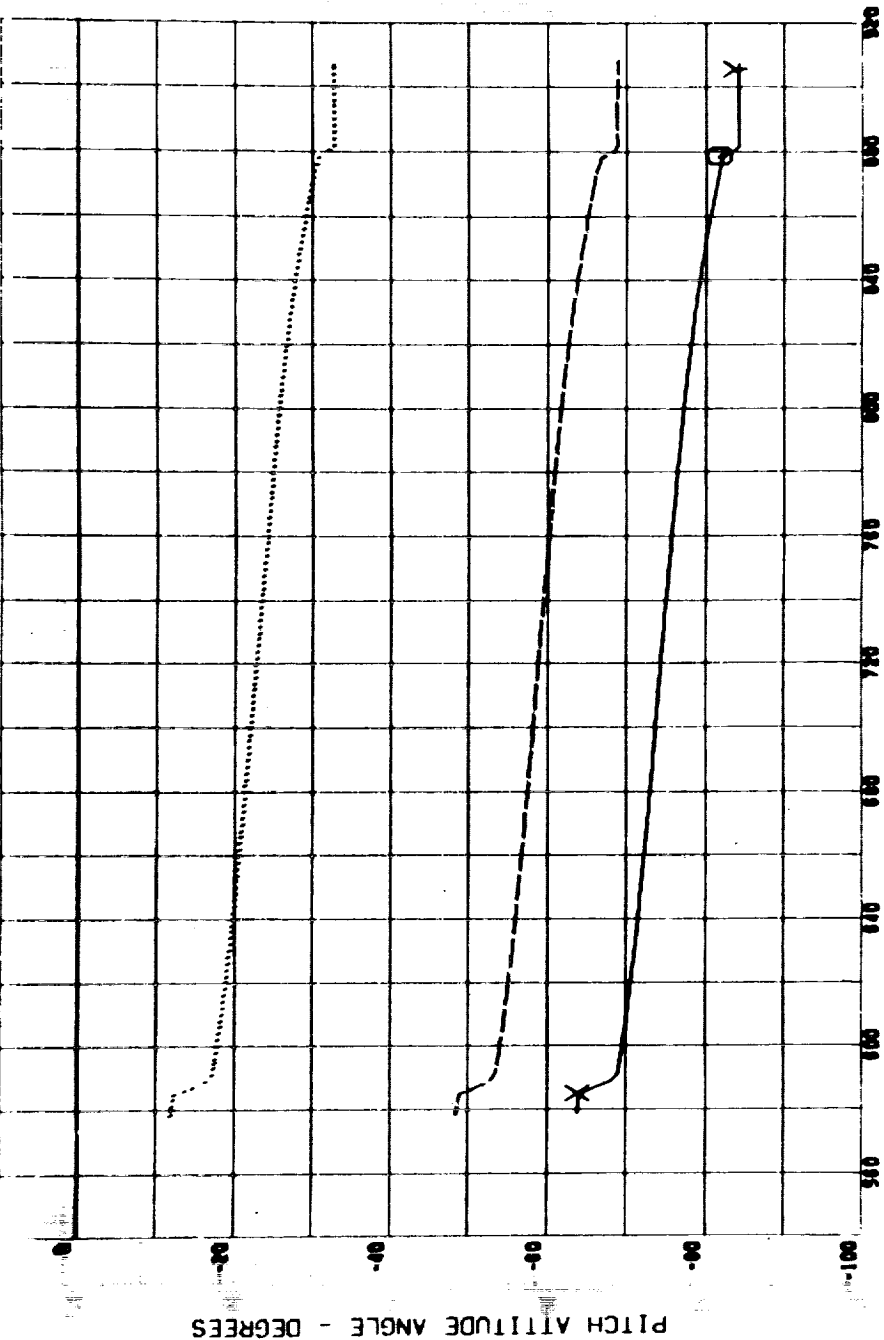
FIGURE 3-38 ACTUAL VEHICLE PITCH ATTITUDE FOR S-IVB SECOND BURN (FIRST OPPORTUNITY)

78.051 - DEGREE AZIMUTH
 90.0 - DEGREE AZIMUTH
 108.0 - DEGREE AZIMUTH

X IGM INITIATION
 O BEGIN CHI-TILDE STEERING
 Y BEGIN CHI FREEZE

NOTED EVENTS OCCUR AT APPROXIMATELY
 THE SAME TIME FOR ALL AZIMUTHS

LAUNCH DATE 13 SEPTEMBER 1969



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 3-39 COMMANDED VEHICLE PITCH ATTITUDE FOR
 S-IVB SECOND BURN (SECOND OPPORTUNITY)

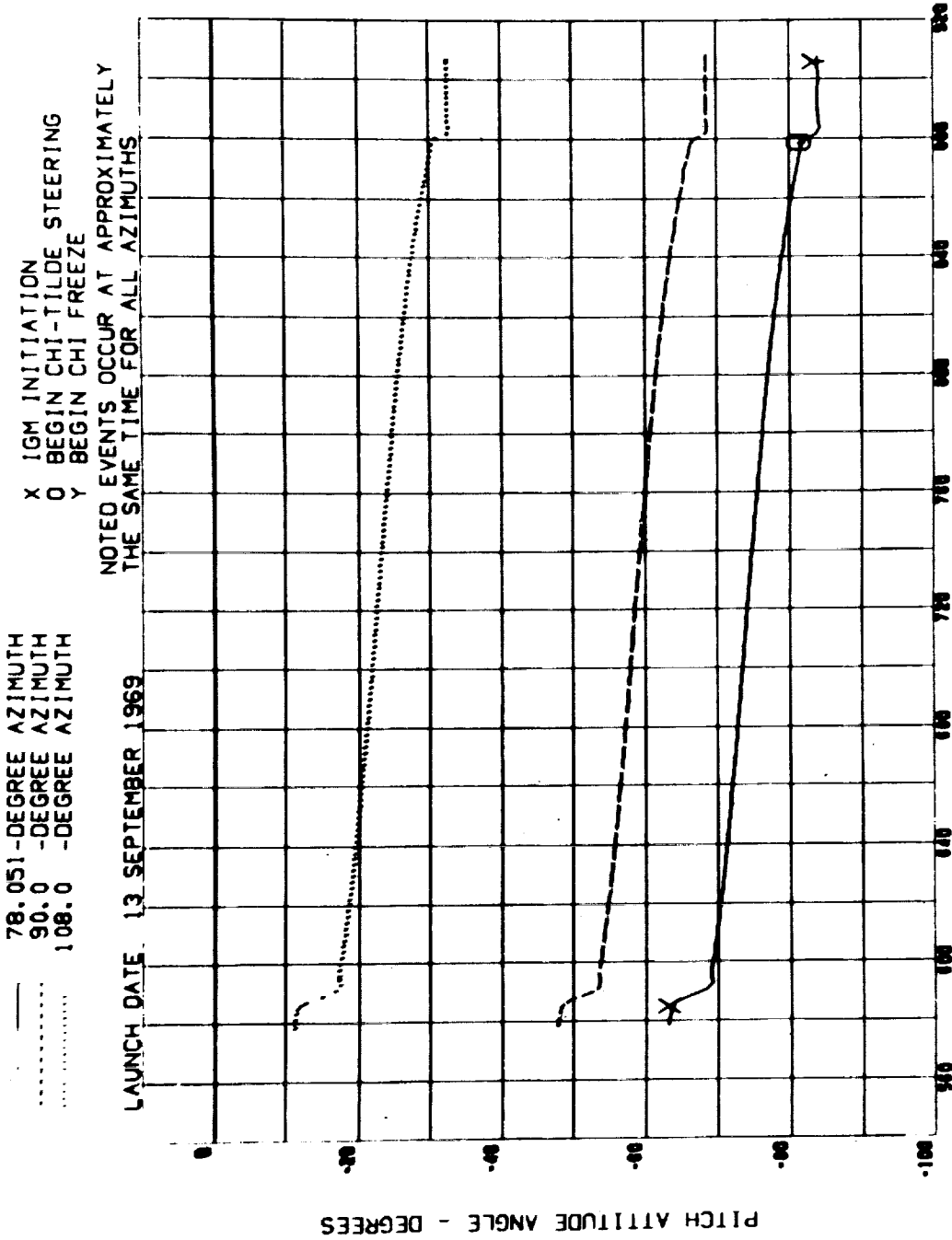
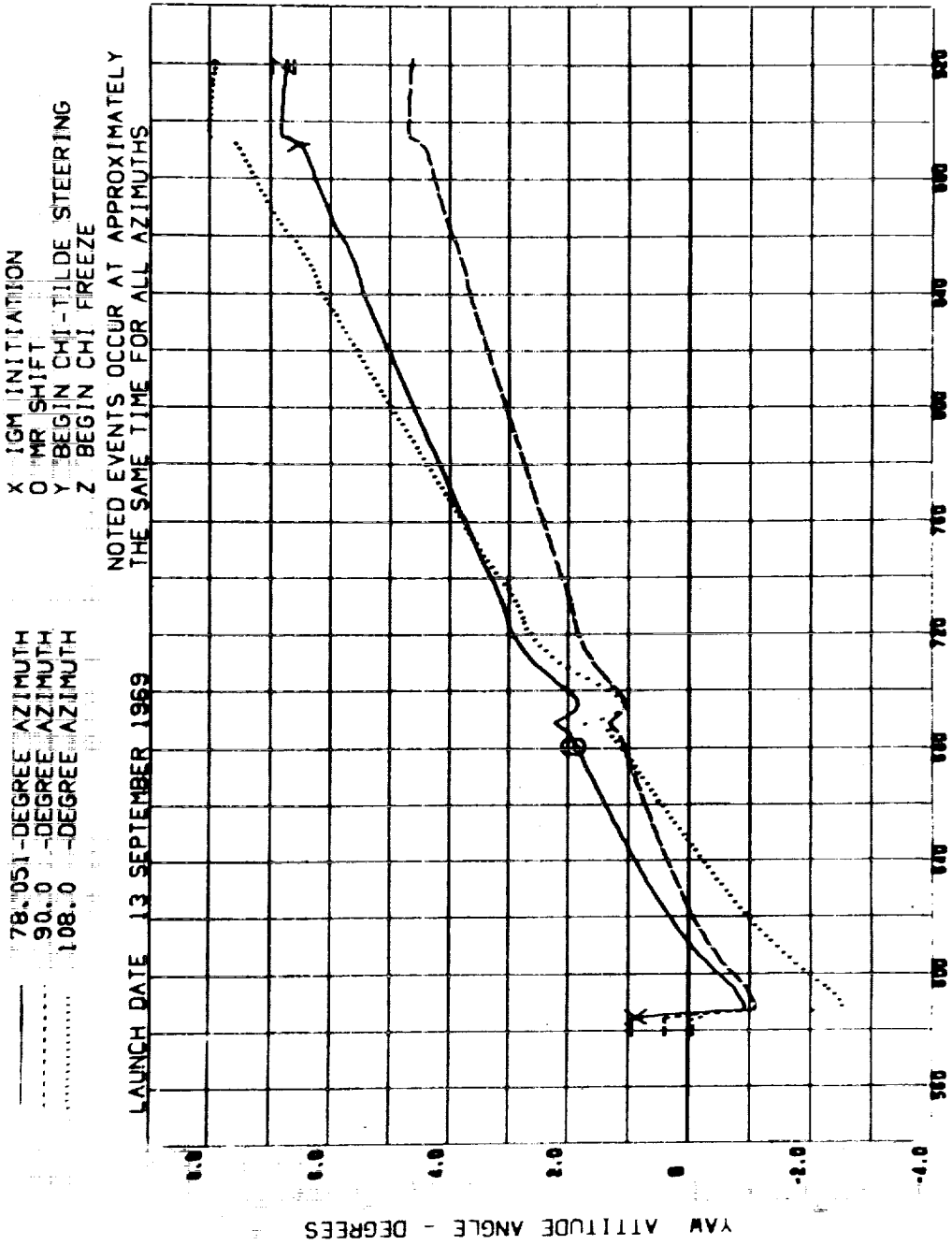


FIGURE 3-40 ACTUAL VEHICLE PITCH ATTITUDE FOR S-IVB SECOND BURN (SECOND OPPORTUNITY)



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 3-41 COMMANDED VEHICLE YAW ATTITUDE FOR S-IVB SECOND BURN (FIRST OPPORTUNITY)

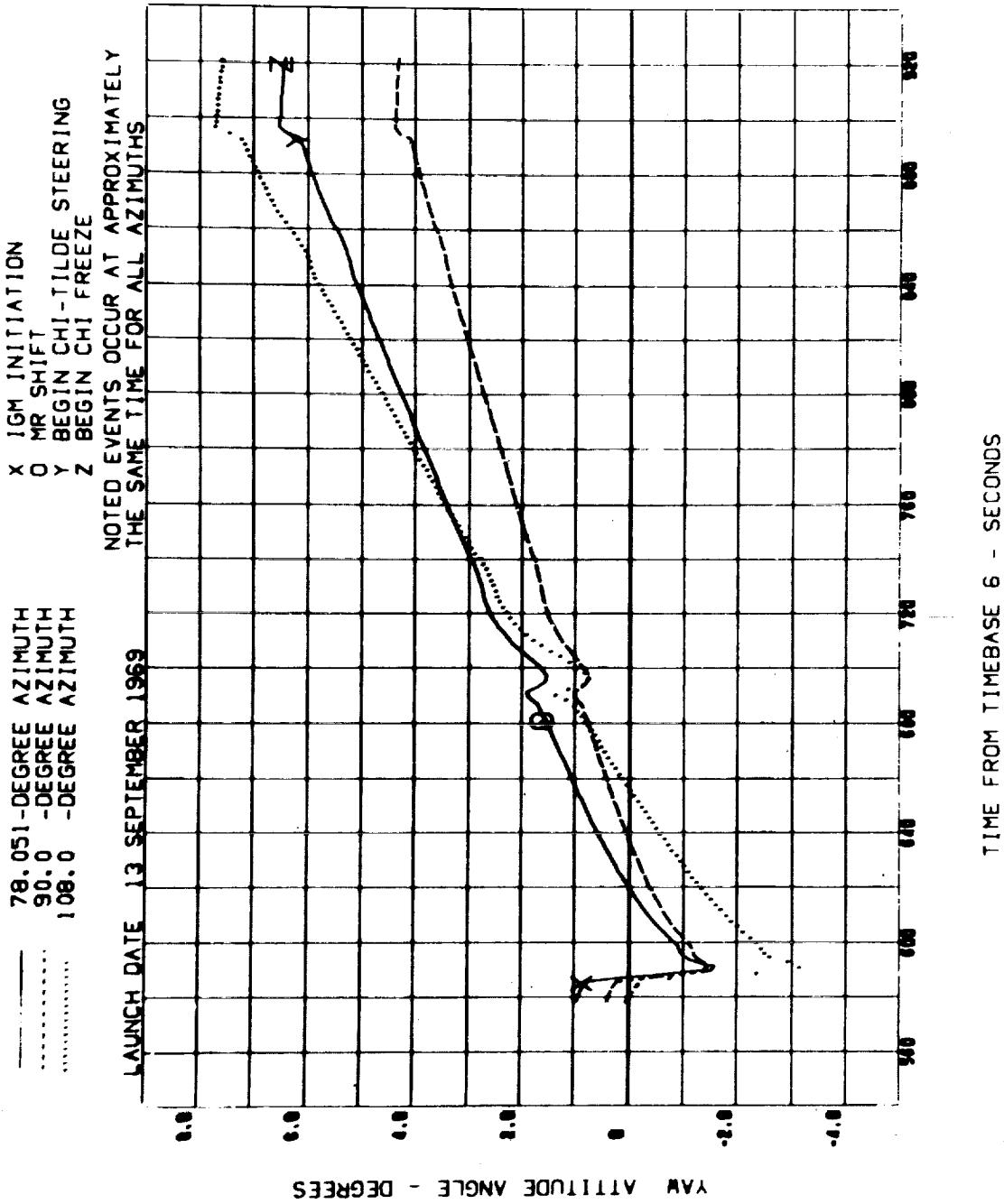
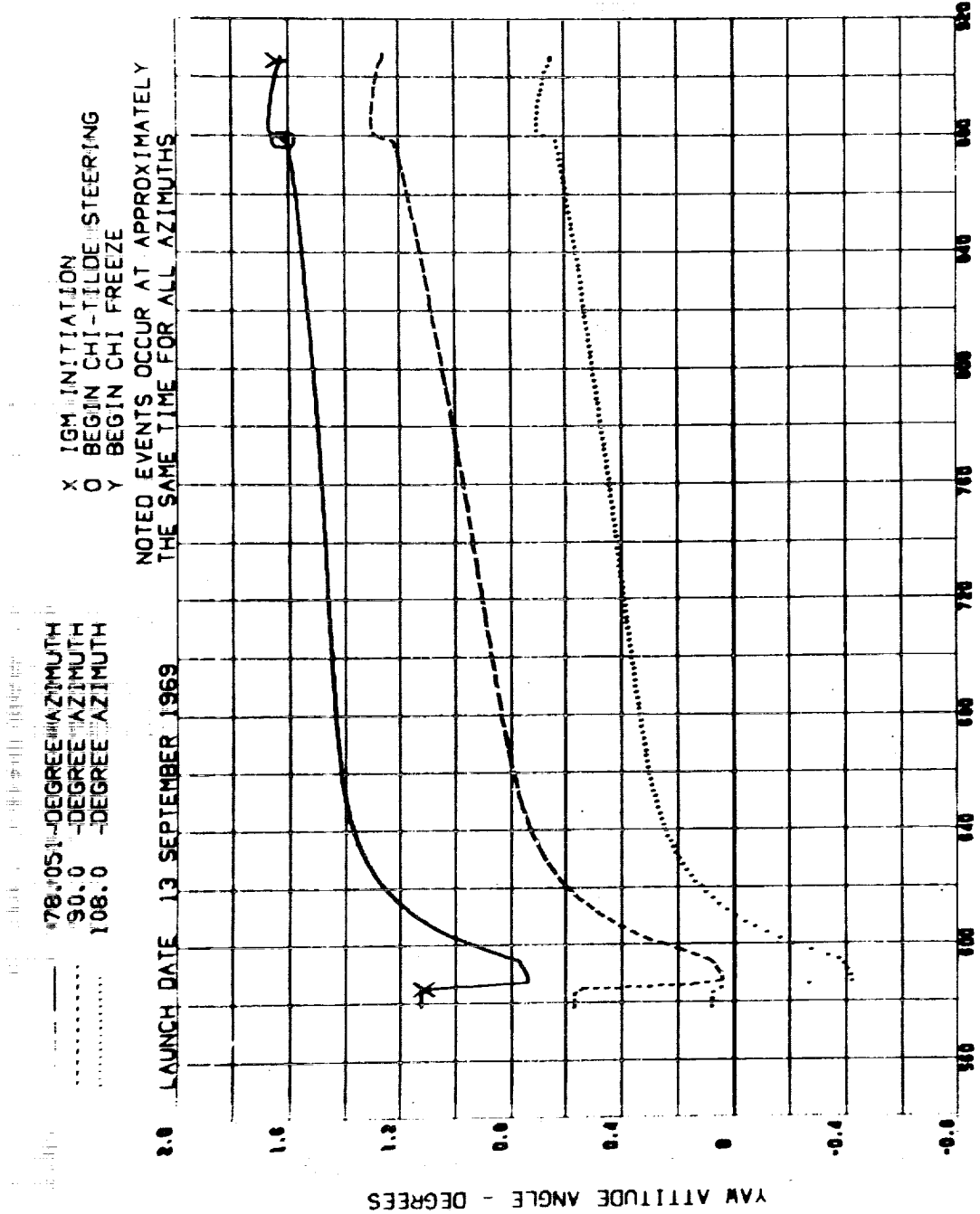


FIGURE 3-42 ACTUAL VEHICLE YAW ATTITUDE FOR S-IVB SECOND BURN (FIRST OPPORTUNITY)



TIME FROM TIMEBASE 6 - SECONDS

FIGURB 3-43 COMMANDED VEHICLE YAW ATTITUDE FOR S-IVB SECOND BURN (SECOND OPPORTUNITY)

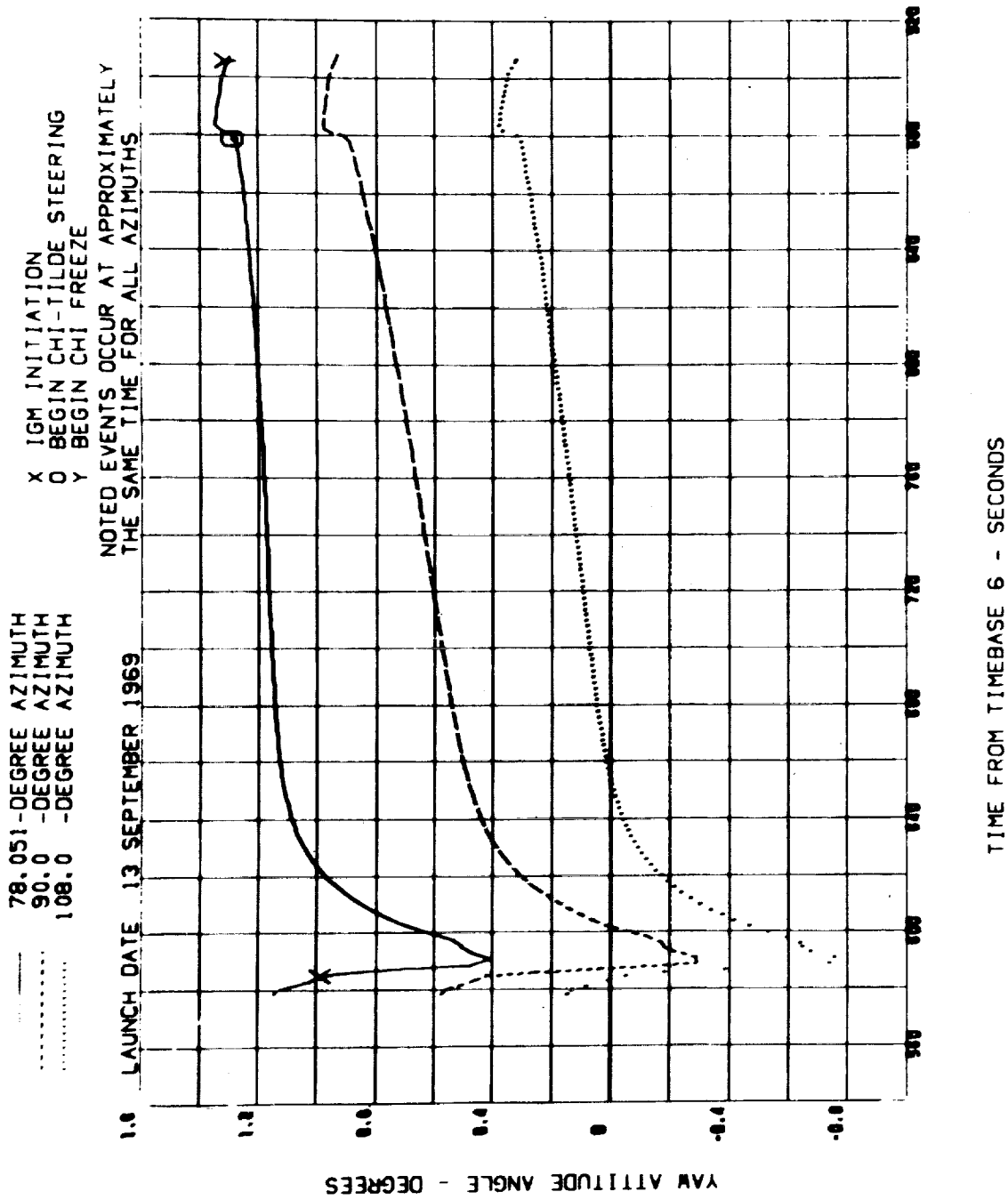
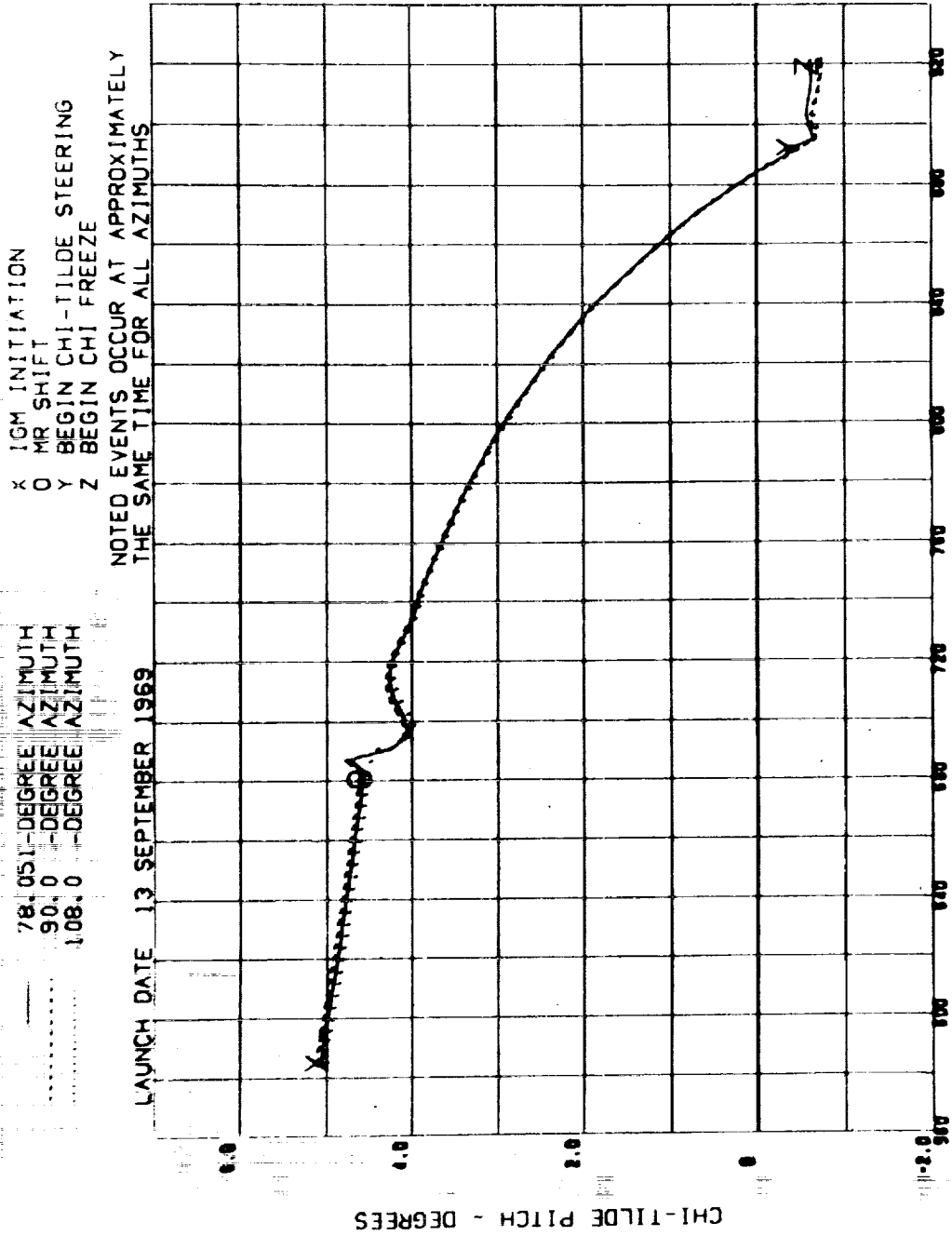


FIGURE 3-44 ACTUAL VEHICLE YAW ATTITUDE FOR S-IVB SECOND BURN (SECOND OPPORTUNITY)



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 3-45 REQUIRED PITCH STEERING ANGLE TO SATISFY
 TERMINAL VELOCITY REQUIREMENTS FOR S-1VB
 SECOND BURN (FIRST OPPORTUNITY)

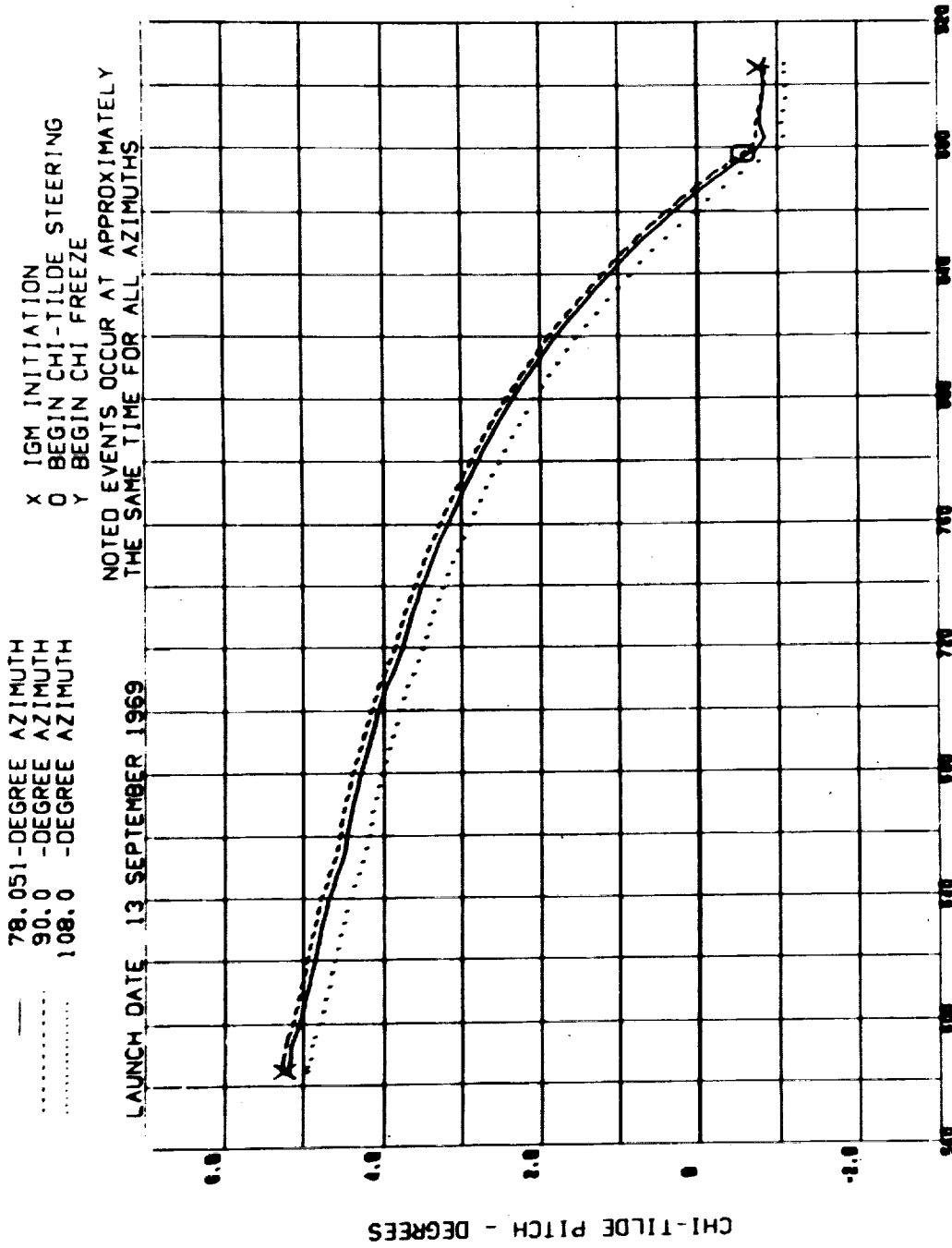
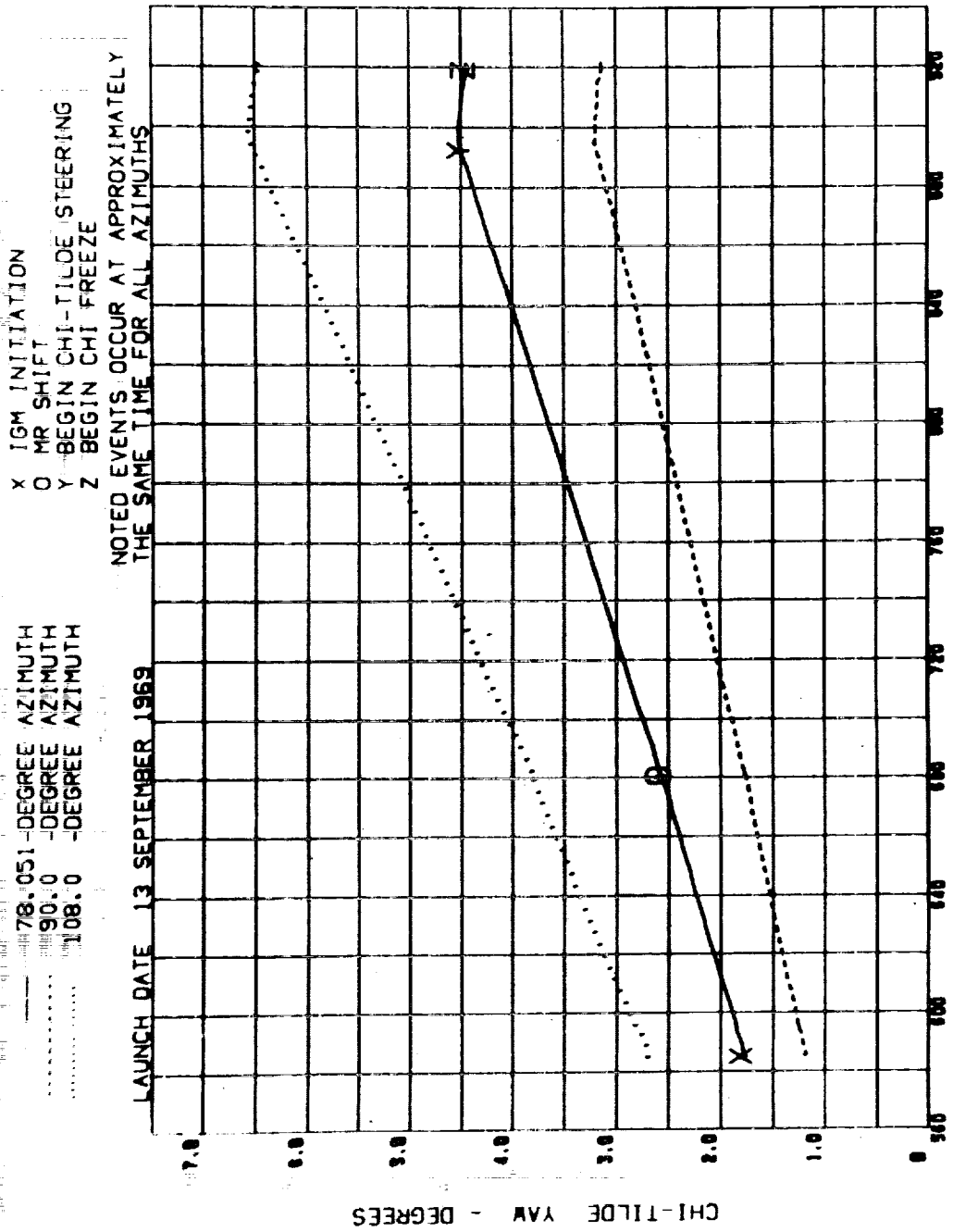


FIGURE 3-46 REQUIRED PITCH STEERING ANGLE TO SATISFY
TERMINAL VELOCITY REQUIREMENTS FOR S-IVB
SECOND BURN (SECOND OPPORTUNITY)



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 3-47 REQUIRED YAW STEERING ANGLE TO SATISFY
 TERMINAL VELOCITY REQUIREMENTS FOR S-IVB
 SECOND BURN (FIRST OPPORTUNITY)

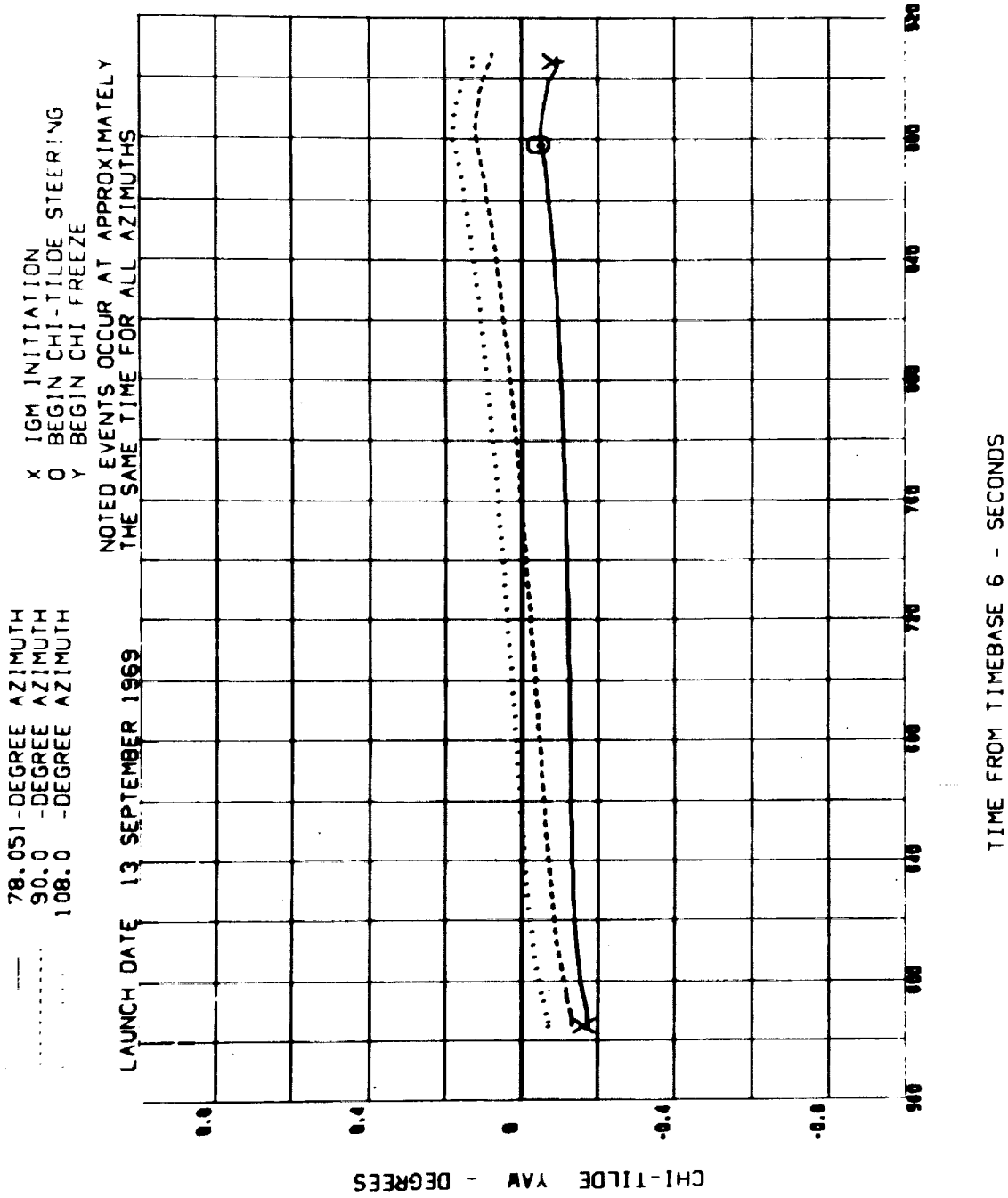


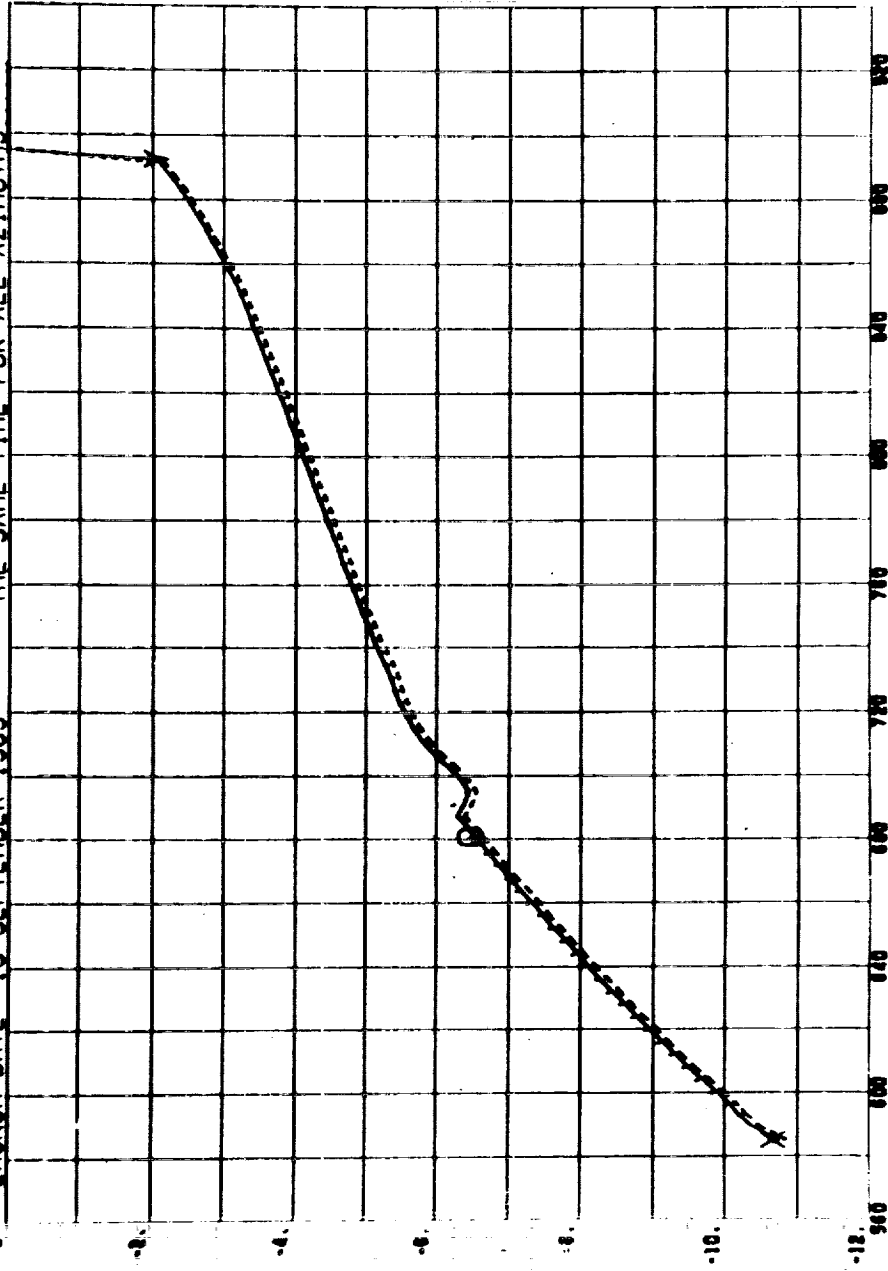
FIGURE 3-48 REQUIRED YAW STEERING ANGLE TO SATISFY
 TERMINAL VELOCITY REQUIREMENTS FOR S-1 VB
 SECOND BURN (SECOND OPPORTUNITY)

--- 78.051-DEGREE AZIMUTH
 90.0 -DEGREE AZIMUTH
 108.0 -DEGREE AZIMUTH

X IGM INITIATION
 O MR SHIFT
 Y BEGIN CHI-TILDE STEERING

NOTED EVENTS OCCUR AT APPROXIMATELY THE SAME TIME FOR ALL AZIMUTHS

LAUNCH DATE 13 SEPTEMBER 1969

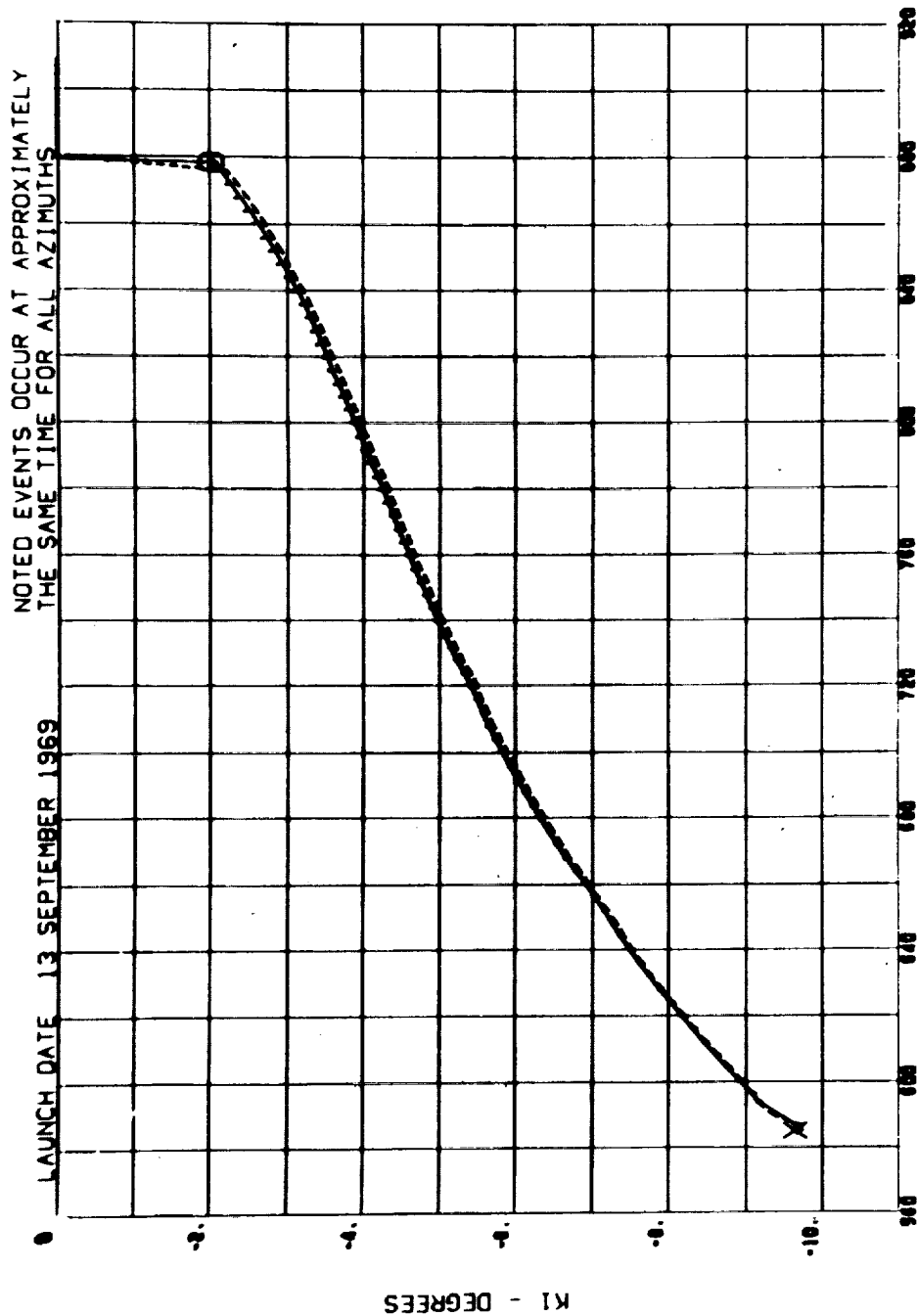


TIME FROM TIMEBASE 6 - SECONDS

FIGURE 3-49 PITCH STEERING ANGLE BIAS TO ENFORCE TERMINAL POSITION REQUIREMENTS FOR S-1VB SECOND BURN (FIRST OPPORTUNITY)

78.051 -DEGREE AZIMUTH
90.0 -DEGREE AZIMUTH
108.0 -DEGREE AZIMUTH

X IGM INITIATION
O BEGIN CHI-TILDE STEERING



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 3-50 PITCH STEERING ANGLE BIAS TO ENFORCE
TERMINAL POSITION REQUIREMENTS FOR S-IVB
SECOND BURN (SECOND OPPORTUNITY)

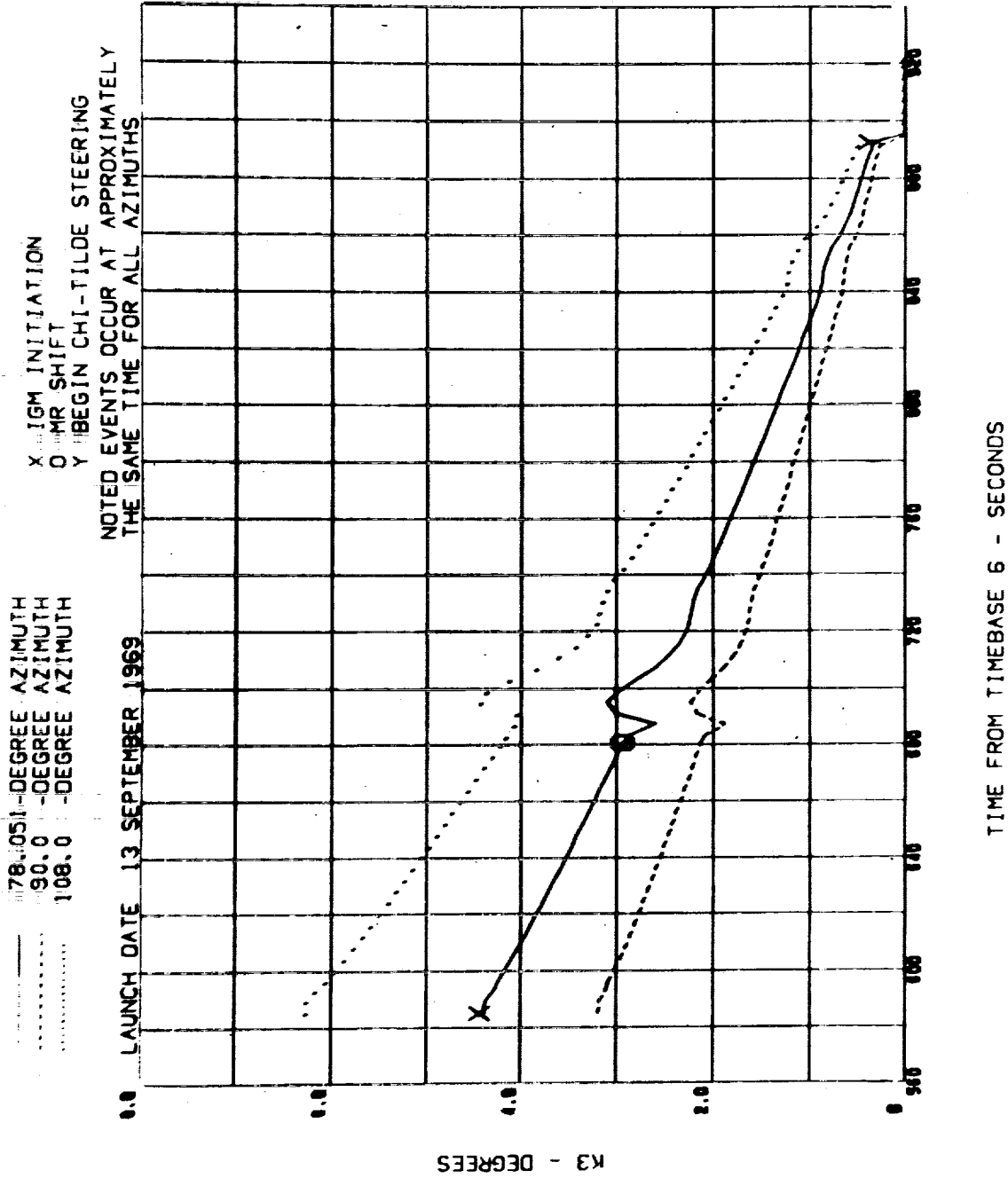


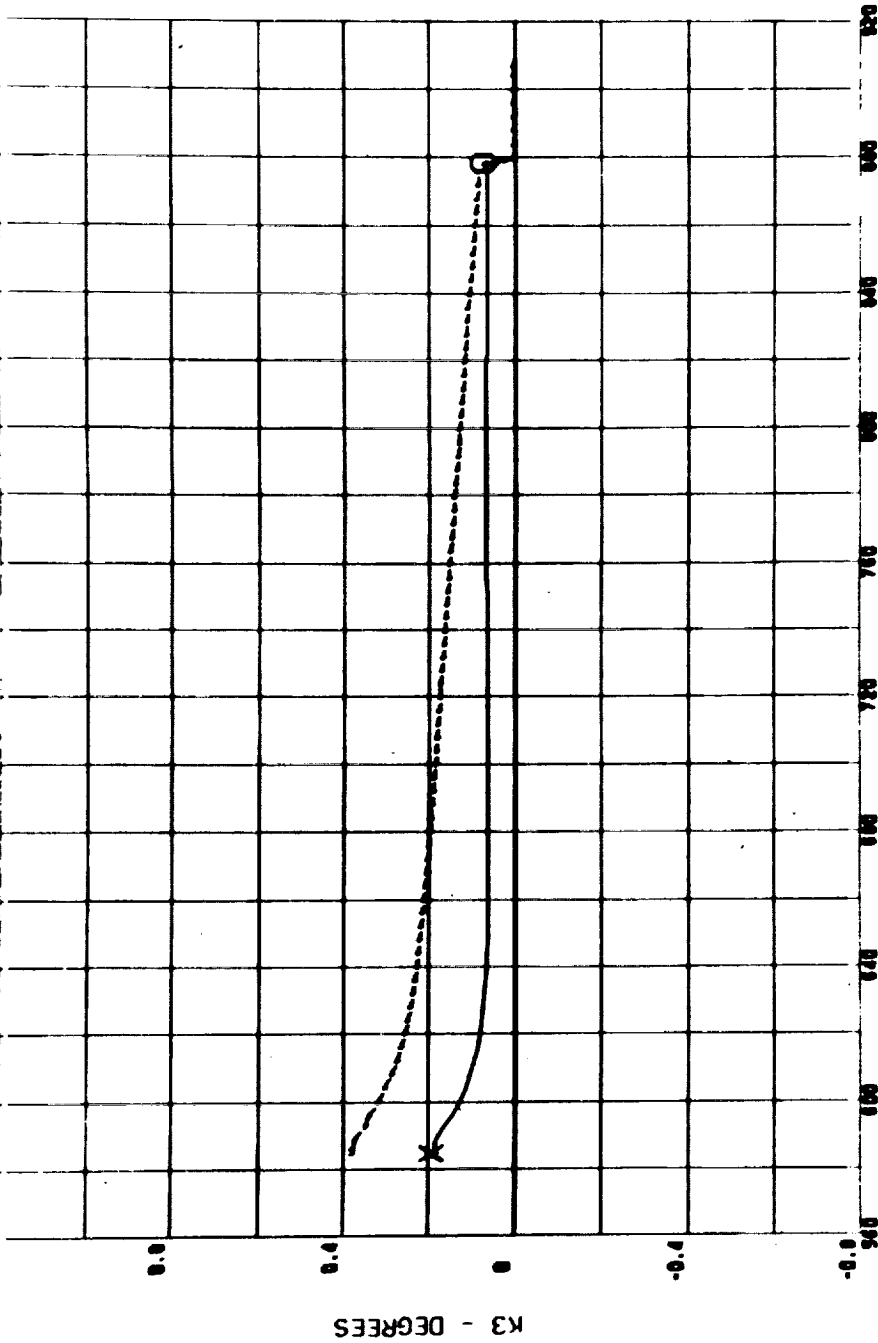
FIGURE 3-51 YAW STEERING ANGLE BIAS TO ENFORCE TERMINAL POSITION REQUIREMENTS FOR S-IVB SECOND BURN (FIRST OPPORTUNITY)

78.051-DEGREE AZIMUTH
 90.0 -DEGREE AZIMUTH
 108.0 -DEGREE AZIMUTH

X IGM INITIATION
 O BEGIN CHI TILDE STEERING

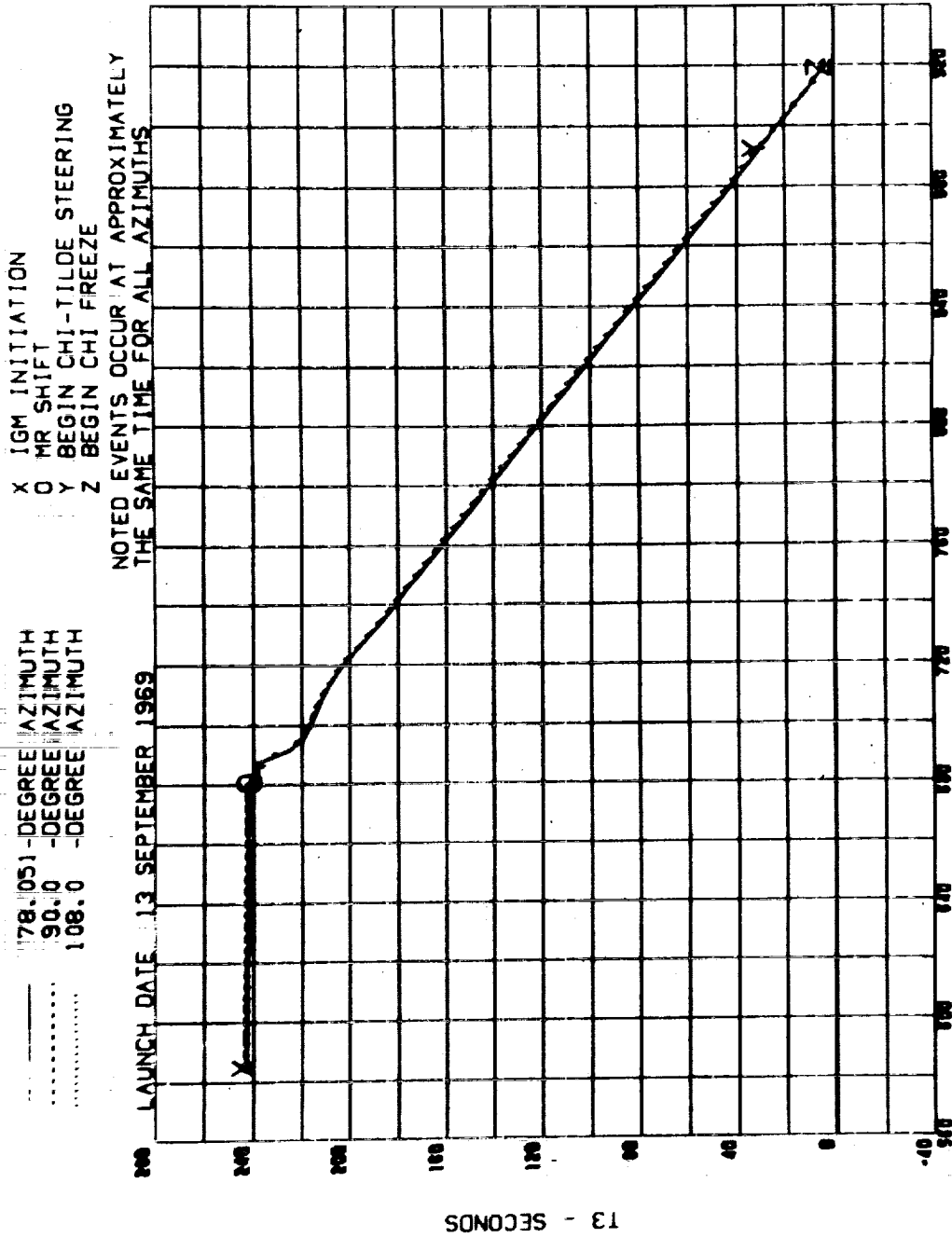
NOTED EVENTS OCCUR AT APPROXIMATELY
 THE SAME TIME FOR ALL AZIMUTHS

1.8 LAUNCH DATE 13 SEPTEMBER 1969



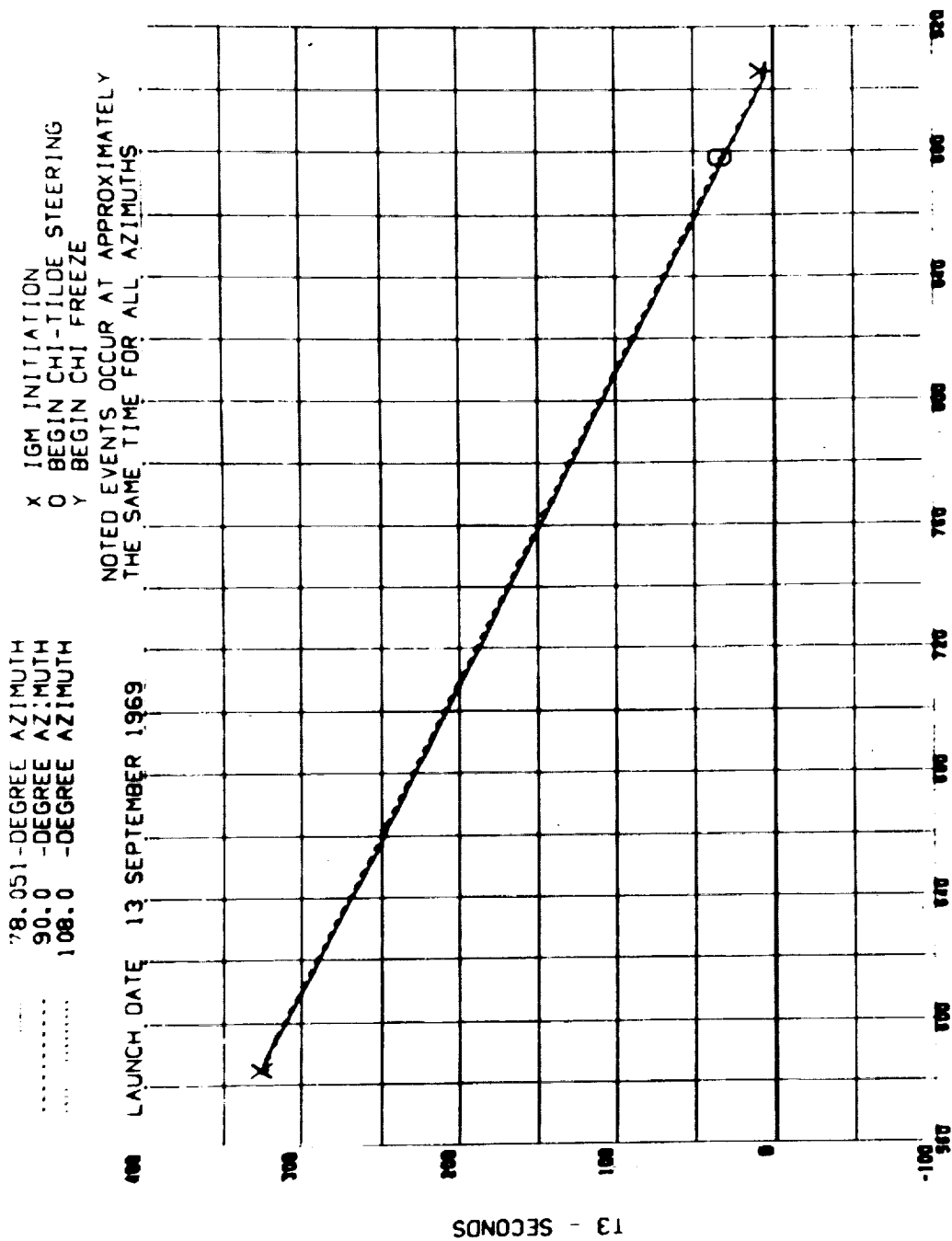
TIME FROM TIMEBASE 6 - SECONDS

FIGURE 3-52 YAW STEERING ANGLE BIAS TO ENFORCE
 TERMINAL POSITION REQUIREMENTS FOR S 1.8
 SECOND BURN (SECOND OPPORTUNITY)



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 3-53 TIME-TO-GO IN FIFTH STAGE OF IGM (FIRST OPPORTUNITY)



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 3-54 TIME-TO-GO IN FIFTH STAGE OF IGM
 (SECOND OPPORTUNITY)

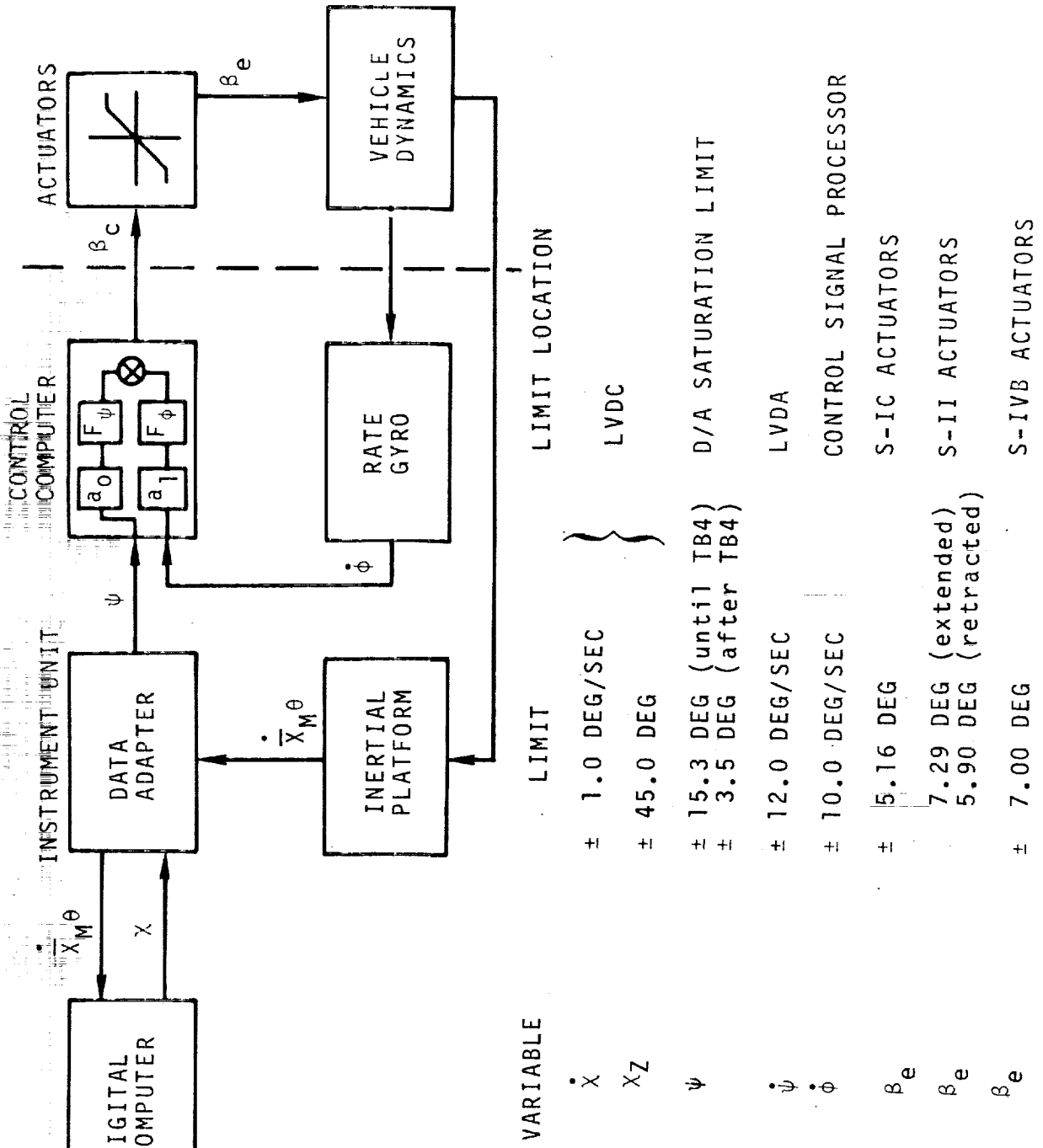


FIGURE 3-55 ATTITUDE CONTROL SYSTEM

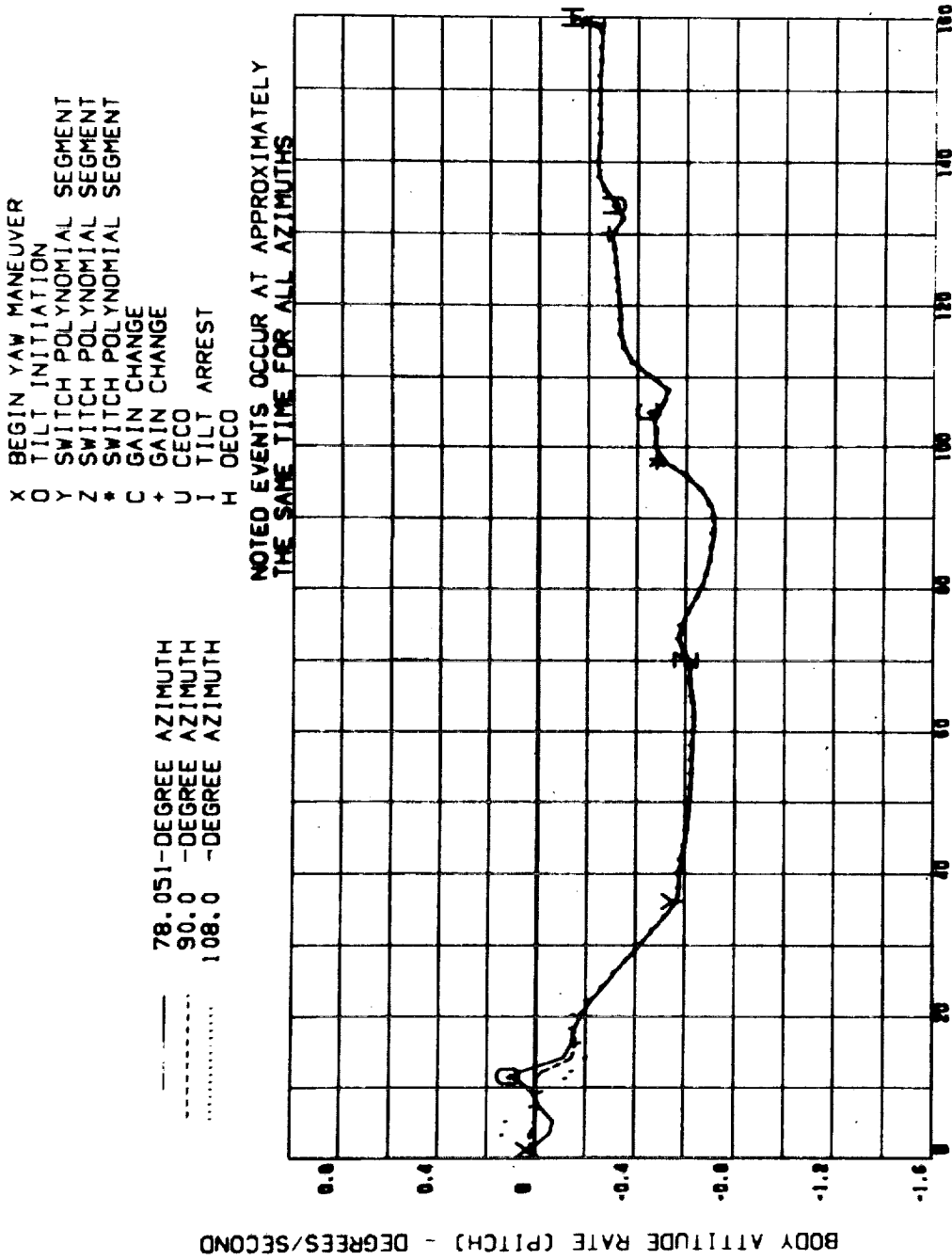


FIGURE 3-56 PREDICTED BODY PITCH ATTITUDE RATE FOR S-1C STAGE FLIGHT

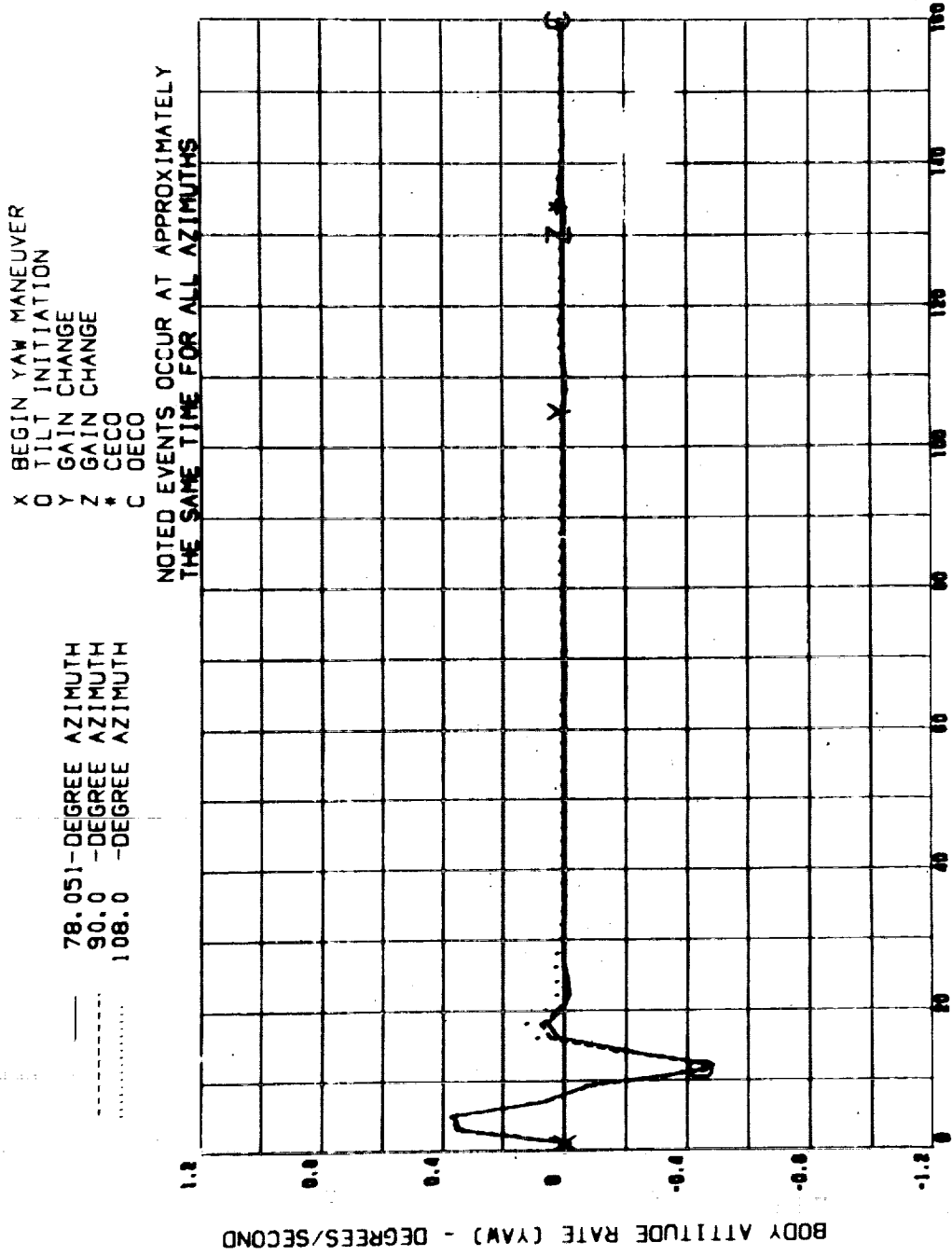


FIGURE 3-57 PREDICTED BODY YAW ATTITUDE RATE FOR S-IC STAGE FLIGHT

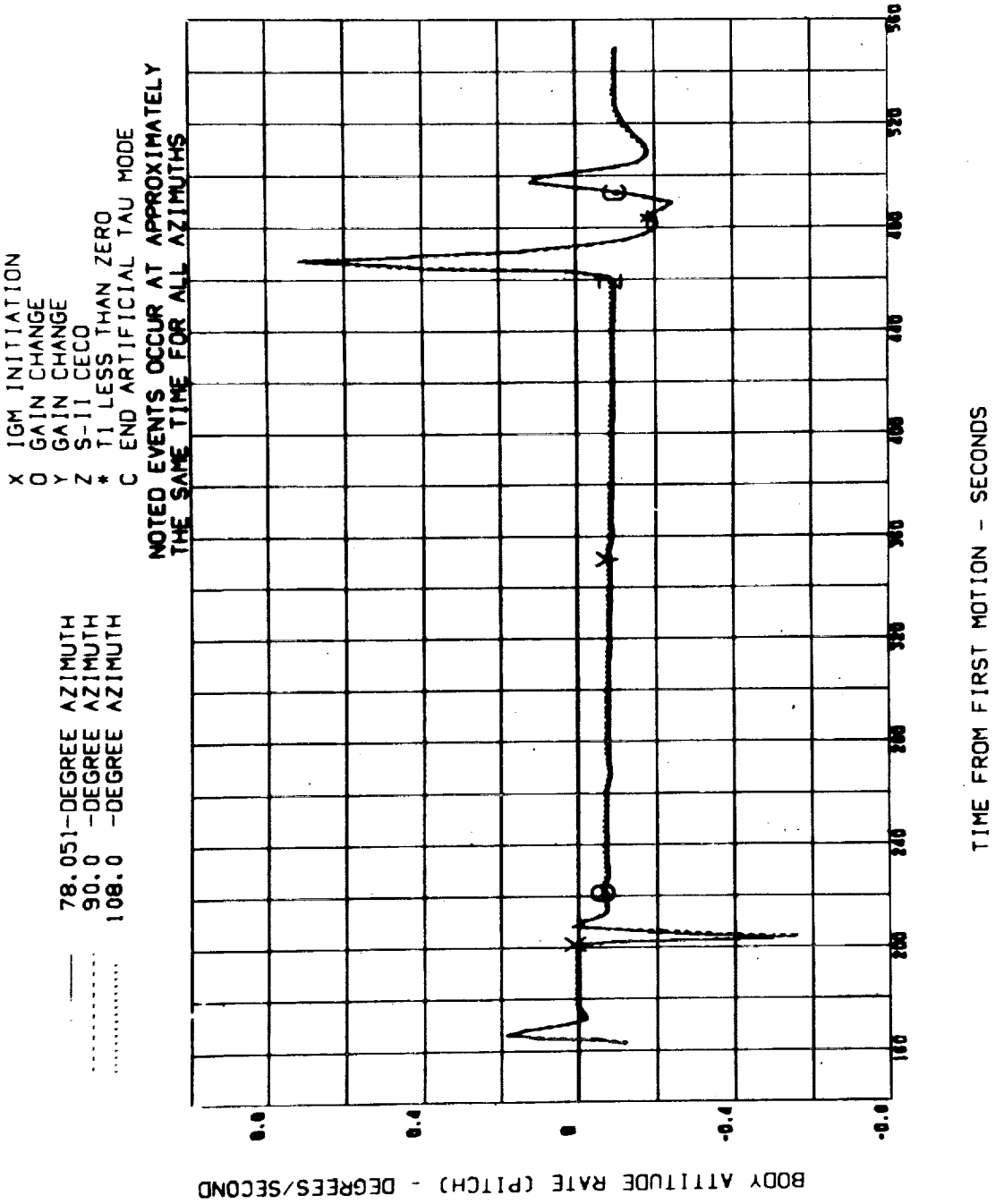


FIGURE 3-58 PREDICTED BODY PITCH ATTITUDE RATE FOR S-II STAGE FLIGHT

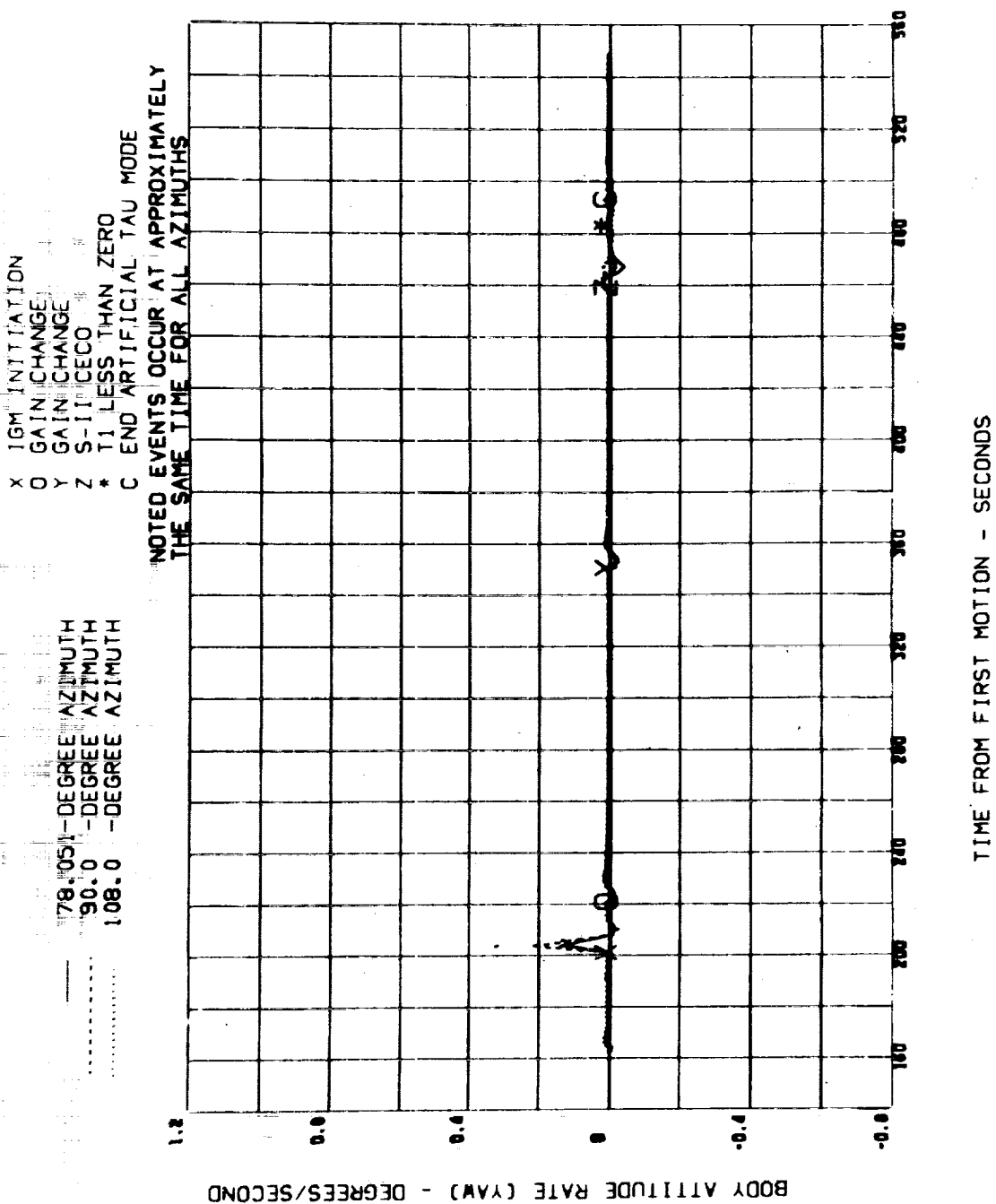


FIGURE 3-59 PREDICTED BODY YAW ATTITUDE RATE FOR S-II STAGE FLIGHT

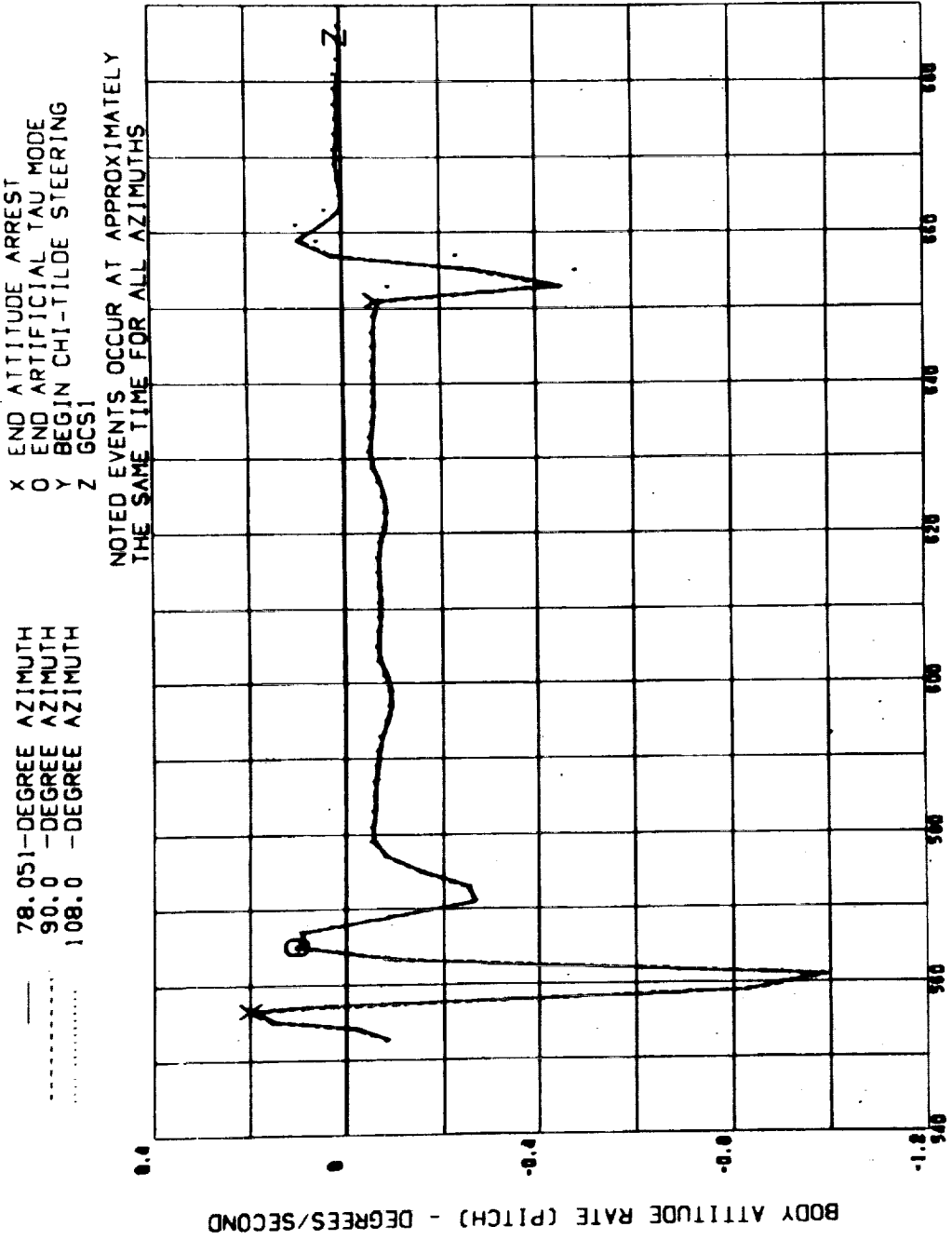
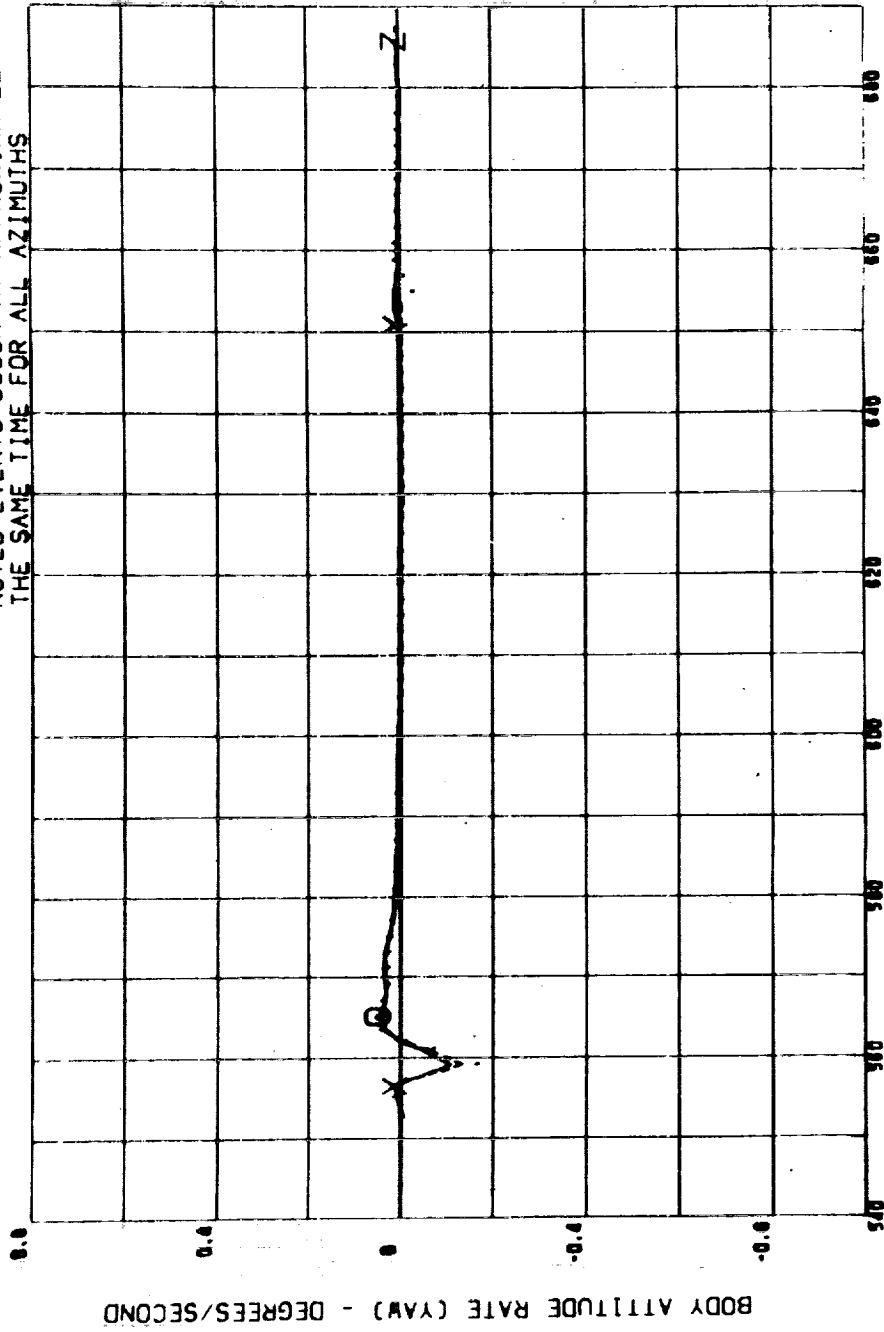


FIGURE 3-60 PREDICTED BODY PITCH ATTITUDE RATE
 FOR S-IVB STAGE FLIGHT (FIRST BURN)

78.051 - DEGREE AZIMUTH
 90.0 - DEGREE AZIMUTH
 108.0 - DEGREE AZIMUTH

X END ATTITUDE ARREST
 O END ARTIFICIAL TAU MODE
 Y BEGIN CHI-TILDE STEERING
 Z GCSI

NOTED EVENTS OCCUR AT APPROXIMATELY
 THE SAME TIME FOR ALL AZIMUTHS



TIME FROM FIRST MOTION - SECONDS

FIGURE 3-61 PREDICTED BODY YAW ATTITUDE RATE
 FOR S-IVB STAGE FLIGHT (FIRST BURN)

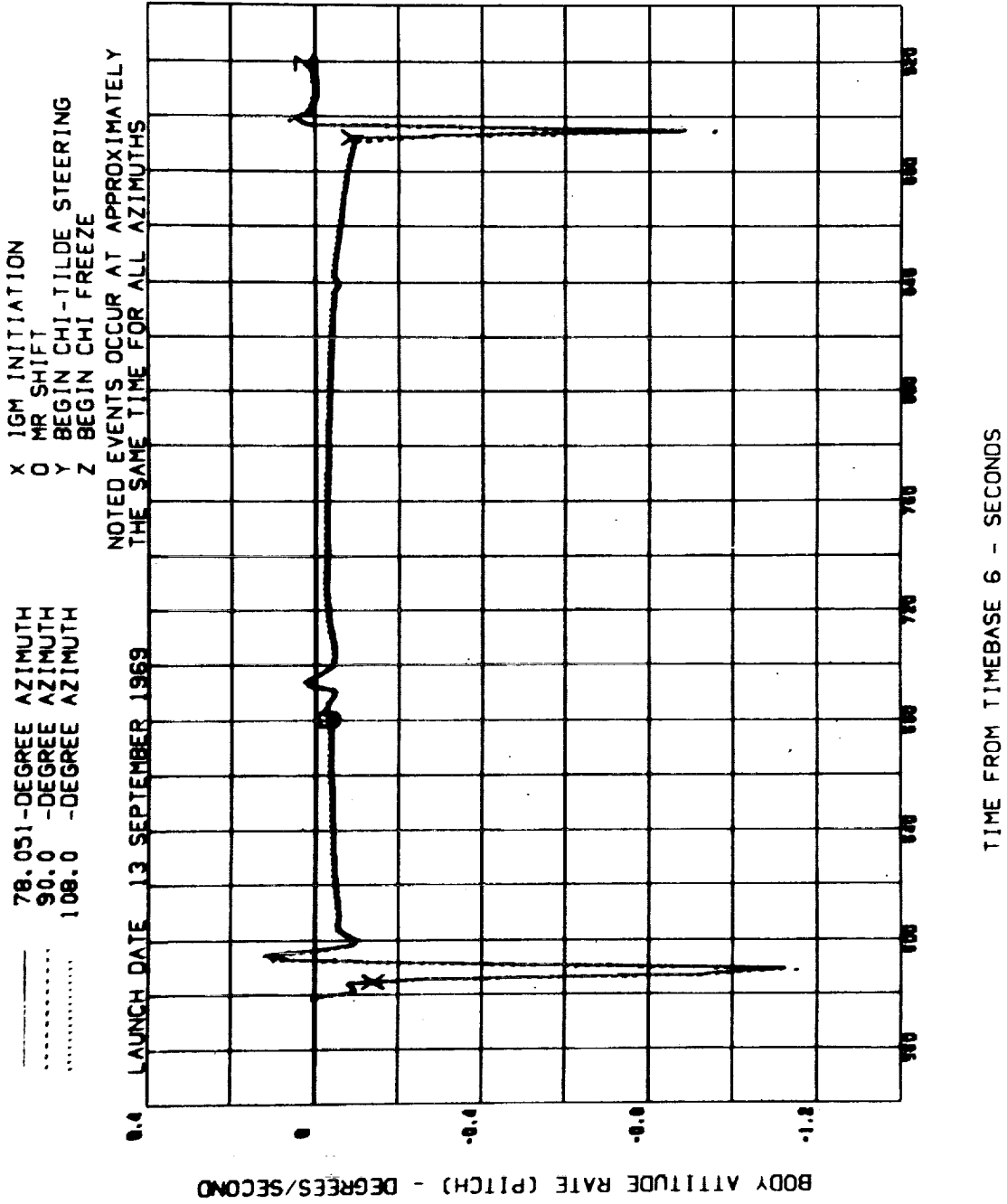


FIGURE 3-62 PREDICTED BODY PITCH ATTITUDE RATE FOR S-IVB SECOND BURN (FIRST OPPORTUNITY)

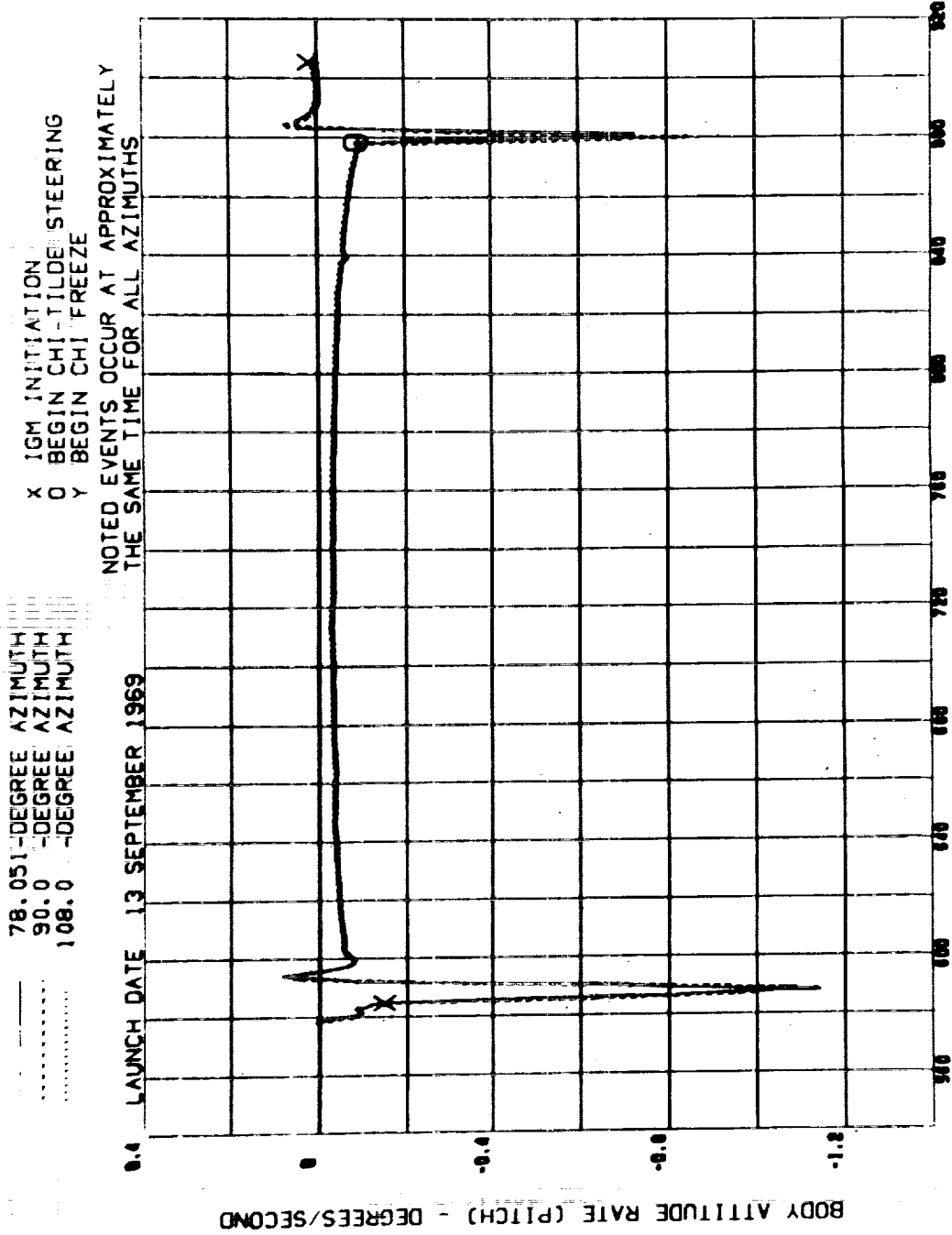


FIGURE 3-63 PREDICTED BODY PITCH ATTITUDE RATE FOR S-IVB SECOND BURN (SECOND OPPORTUNITY)

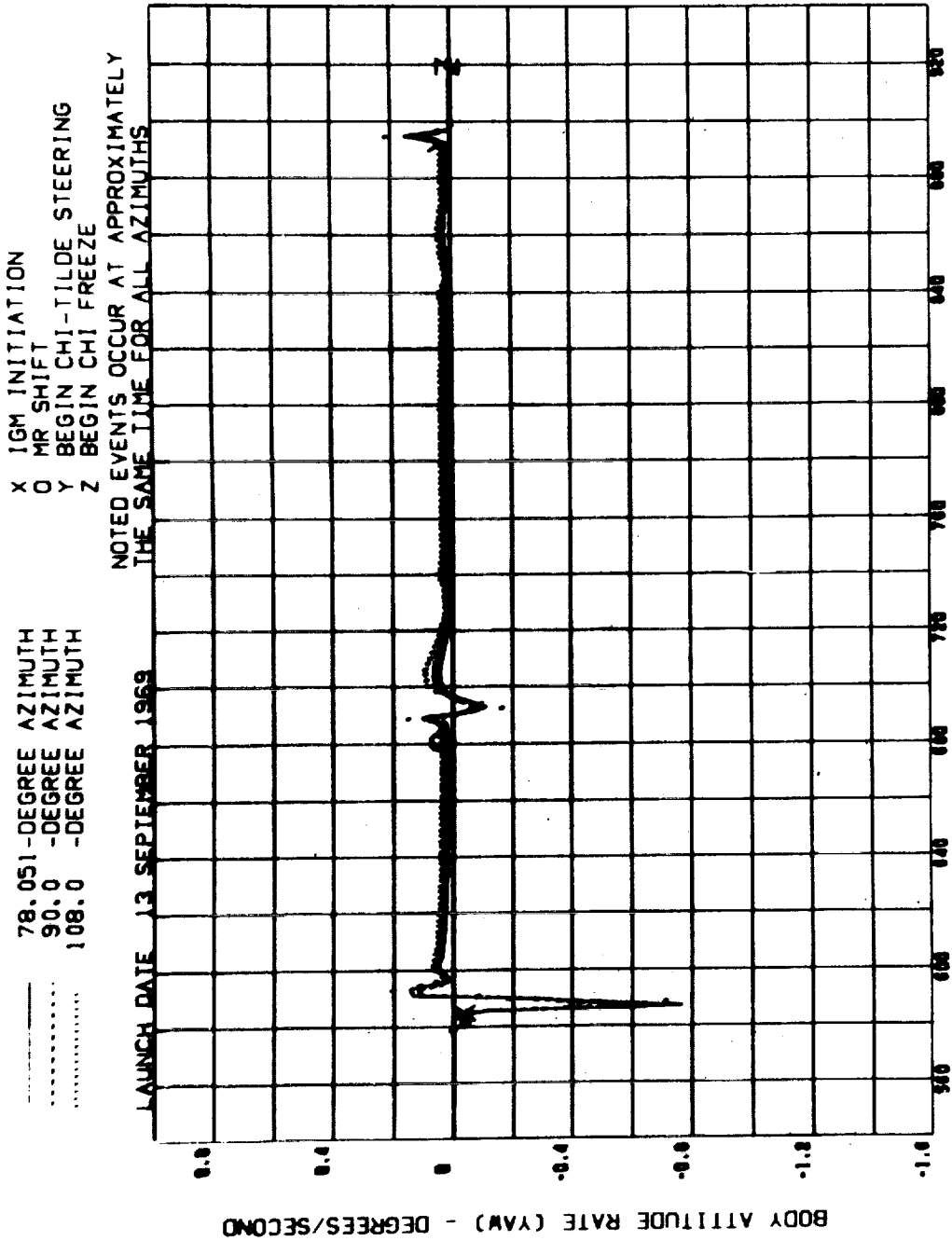
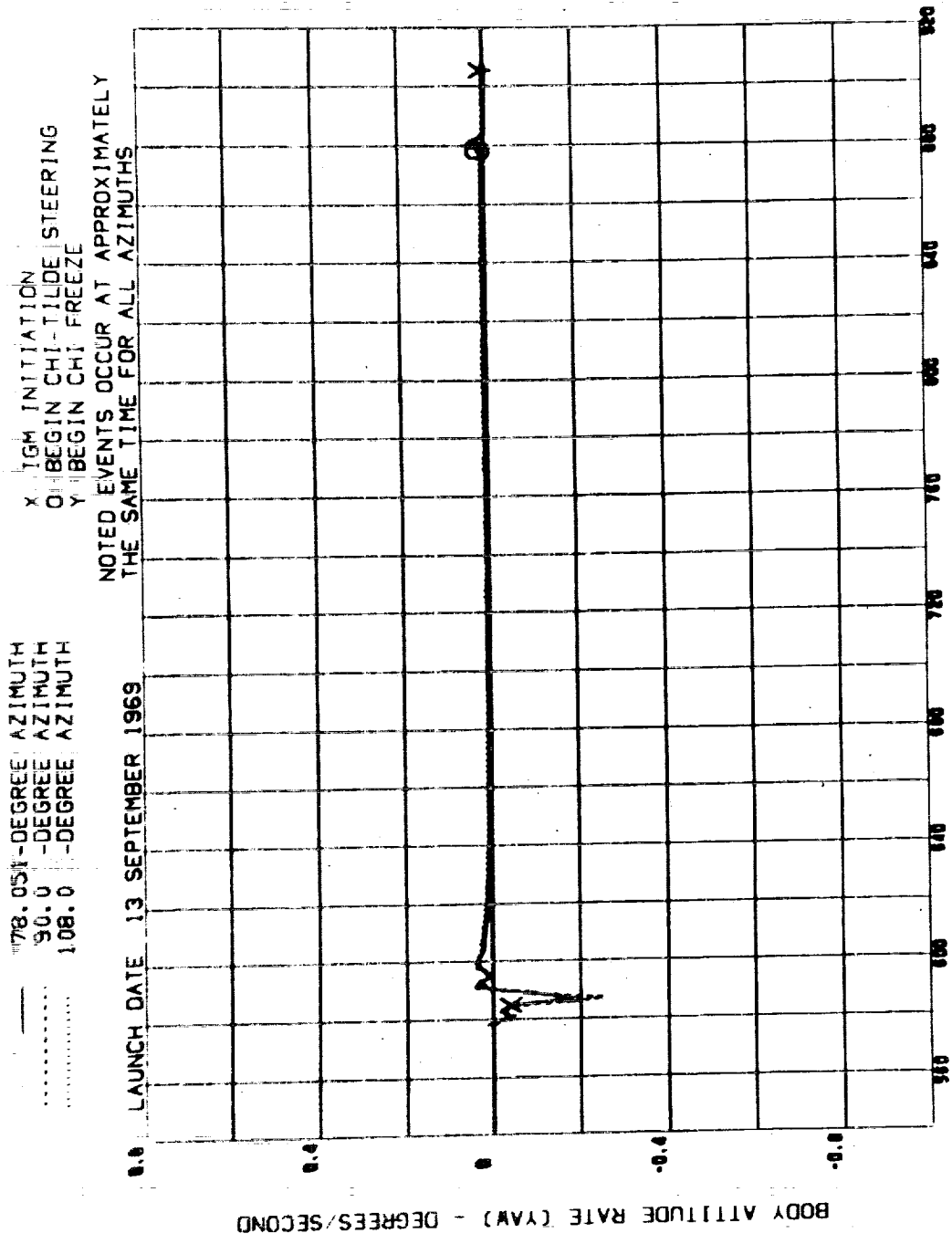


FIGURE 3-64 PREDICTED BODY YAW ATTITUDE RATE FOR S-IVB SECOND BURN (FIRST OPPORTUNITY)



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 3-65 PREDICTED BODY YAW ATTITUDE RATE FOR S-IVB SECOND BURN (SECOND OPPORTUNITY)

TABLE 3-IV AS-507 CONTROL GAINS AND SIMPLIFIED FILTERS

	S-IC BURN (FROM TB1)		S-II BURN (FROM TB3)		S-IVB BURN	
	0 to 105	105 to 130.0	0 to 61.4	61.4 to 191.4	191.4 to CO	CO
a_0 * DEG/DEG	0.90	0.45	1.12	0.65	0.44	0.810
a_1 * DEG/DEG/SEC	0.69	0.44	1.89	1.10	0.74	0.970
F_{ψ} *	$\frac{.47(S+.1)}{S+.047}$	$\frac{.47(S+.1)}{S+.047}$	1	1	1	1
F_{ϕ} *	1	1	1	1	1	1
a_0 ** DEG/DEG	0.245	0.245	0.250	0.250	0.250	-
a_1 ** DEG/DEG/SEC	0.150	0.150	0.200	0.200	0.200	-
F_{\downarrow} **	$\frac{2.35}{S + 2.35}$	$\frac{2.35}{S + 2.35}$	1	1	1	-
F_{\uparrow} **	1	1	1	1	1	-

① THROUGH FIRST BURN AND TB6 + 838 SECONDS OF SECOND BURN

② TB6 + 838 SECONDS OF SECOND BURN TO SECOND-BURN CUTOFF

* PITCH AND YAW

** ROLL

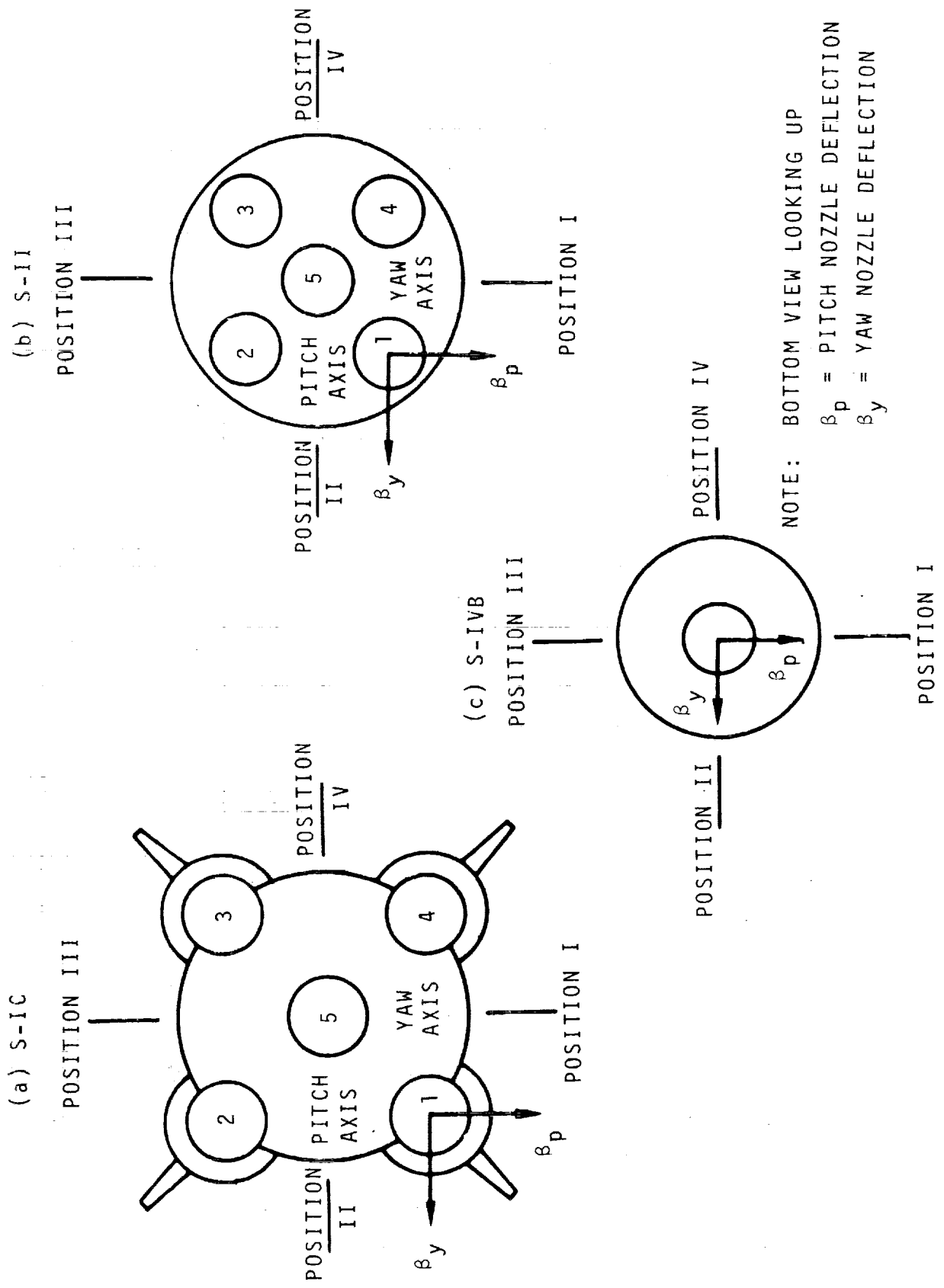


FIGURE 3-66 ENGINE AND ACTUATOR IDENTIFICATION

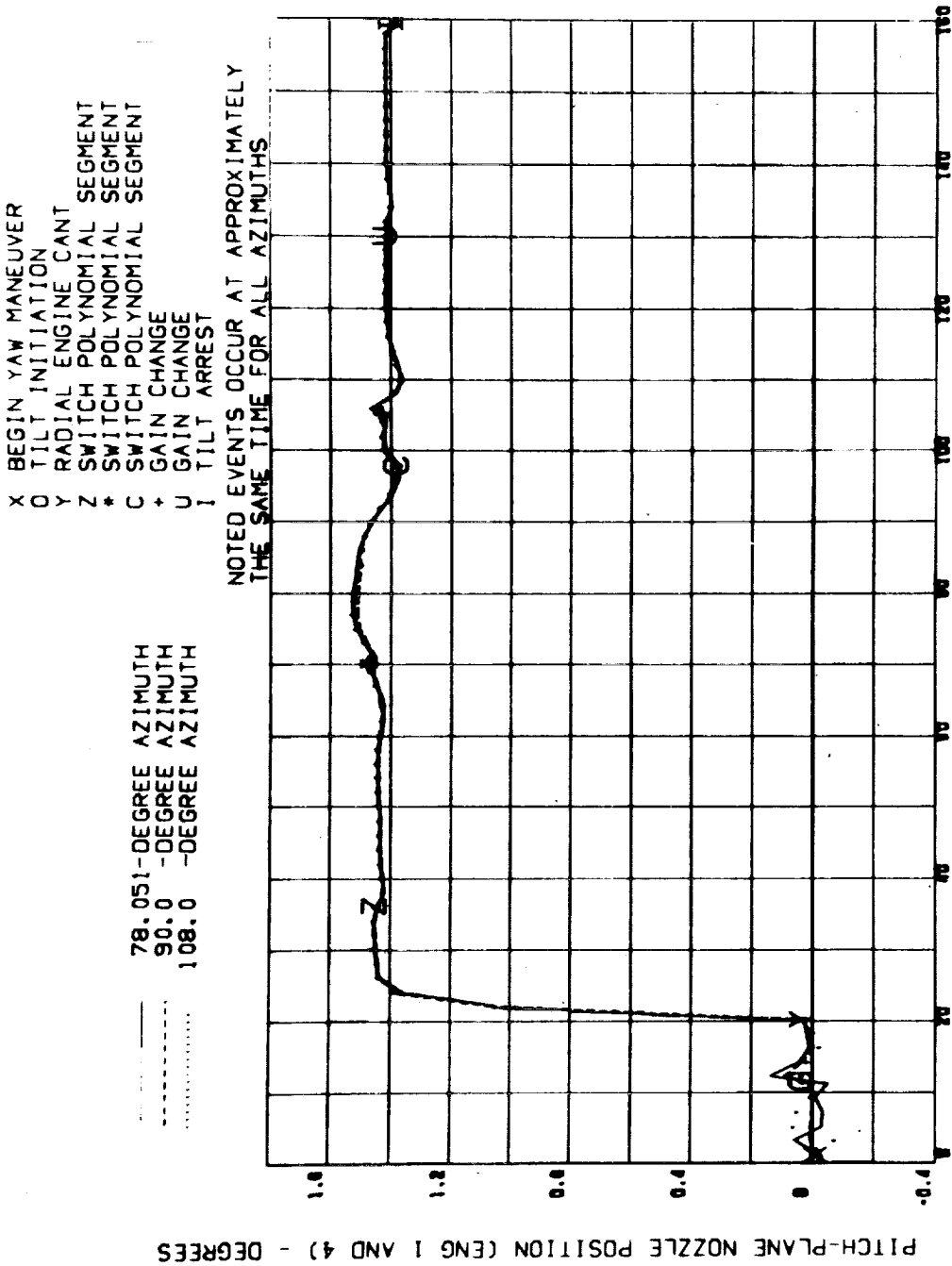


FIGURE 3-67 PITCH-PLANE NOZZLE POSITION HISTORY FOR S-IC STAGE (ENGINES 1 AND 4)

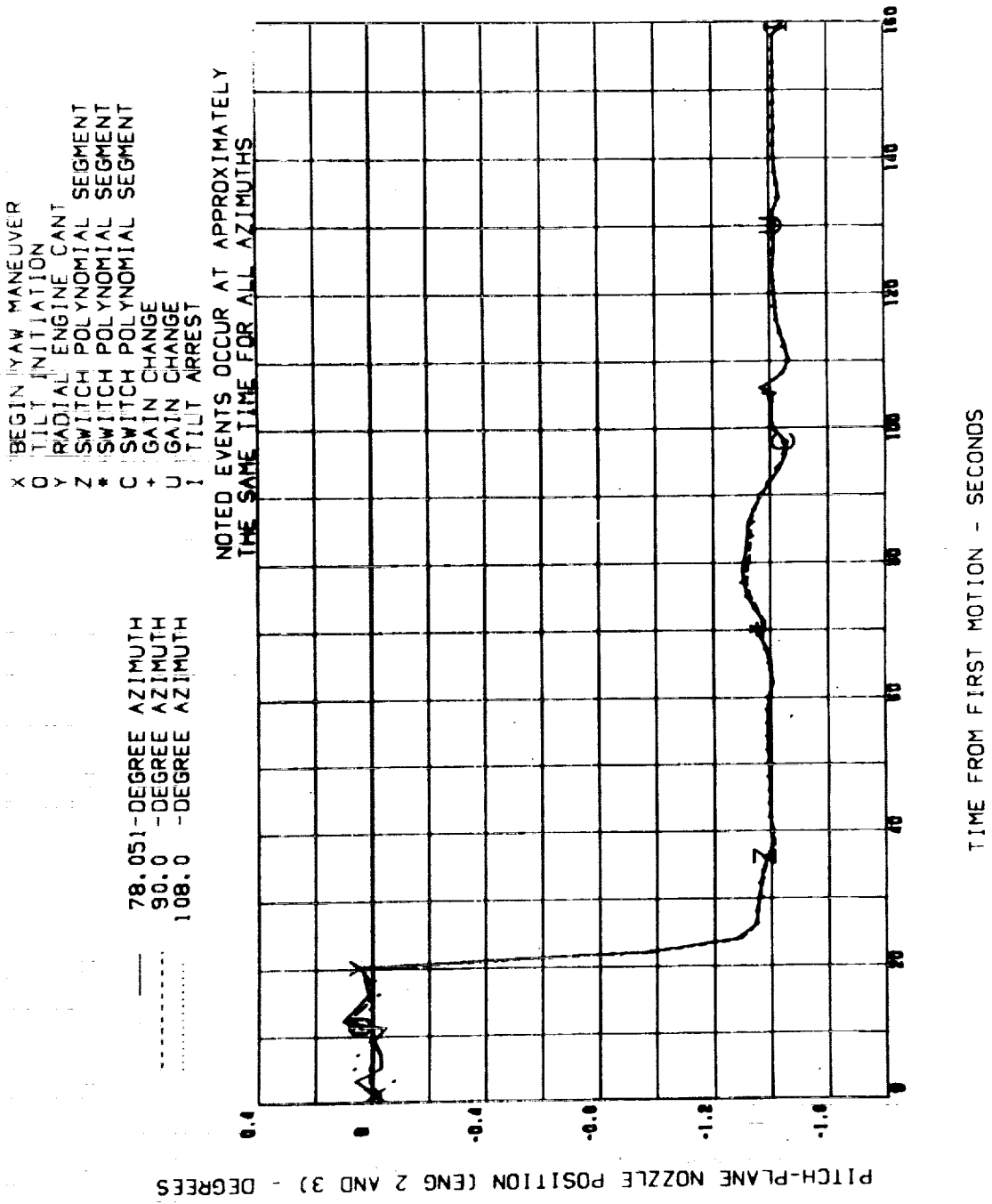
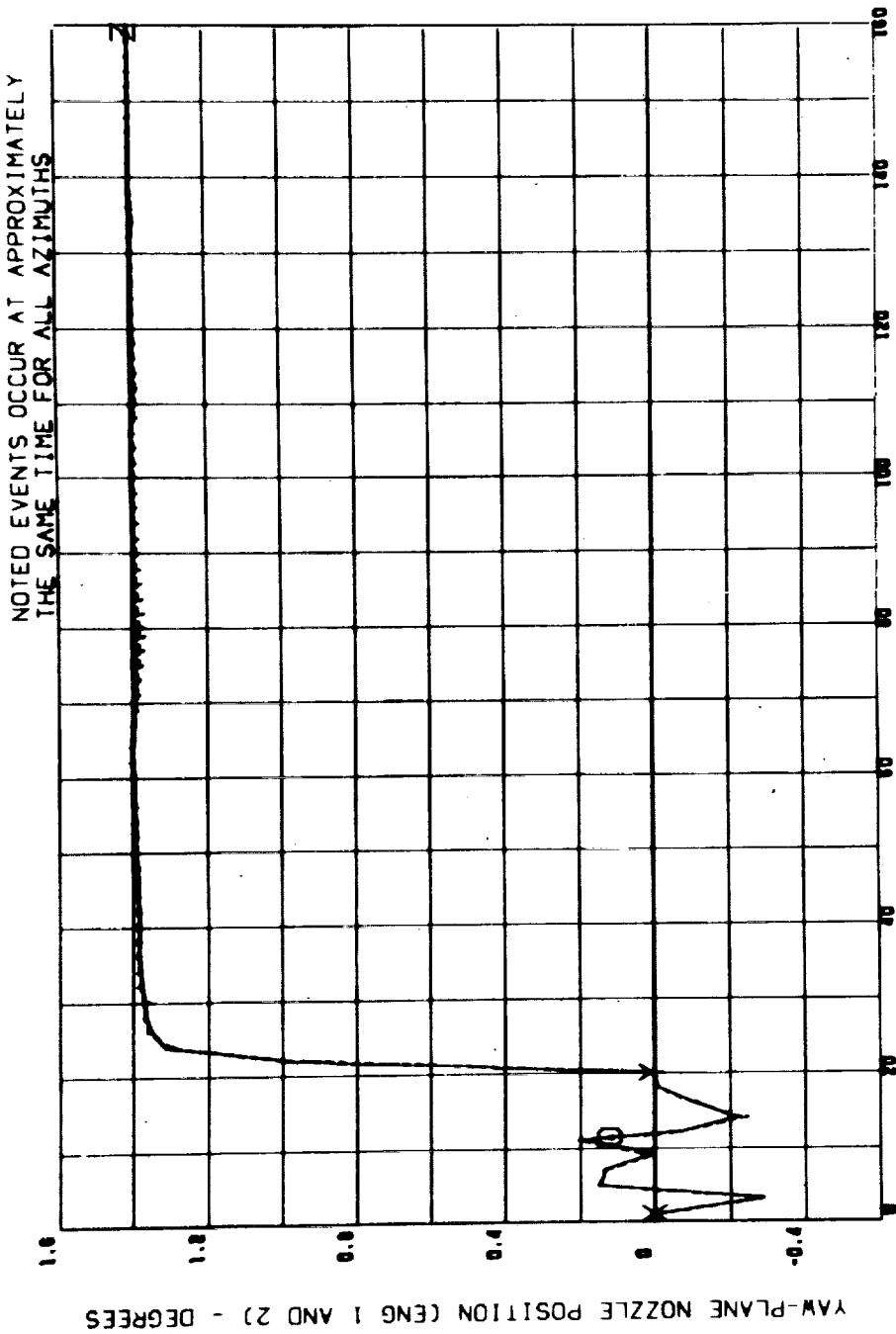


FIGURE 3-68 PITCH-PLANE NOZZLE POSITION HISTORY FOR S-IC STAGE (ENGINES 2 AND 3)

X BEGIN YAW MANEUVER
 O TILT INITIATION
 Y RADIAL ENGINE CANT
 Z TILT ARREST

78.051-DEGREE AZIMUTH
 90.0 -DEGREE AZIMUTH
 108.0 -DEGREE AZIMUTH



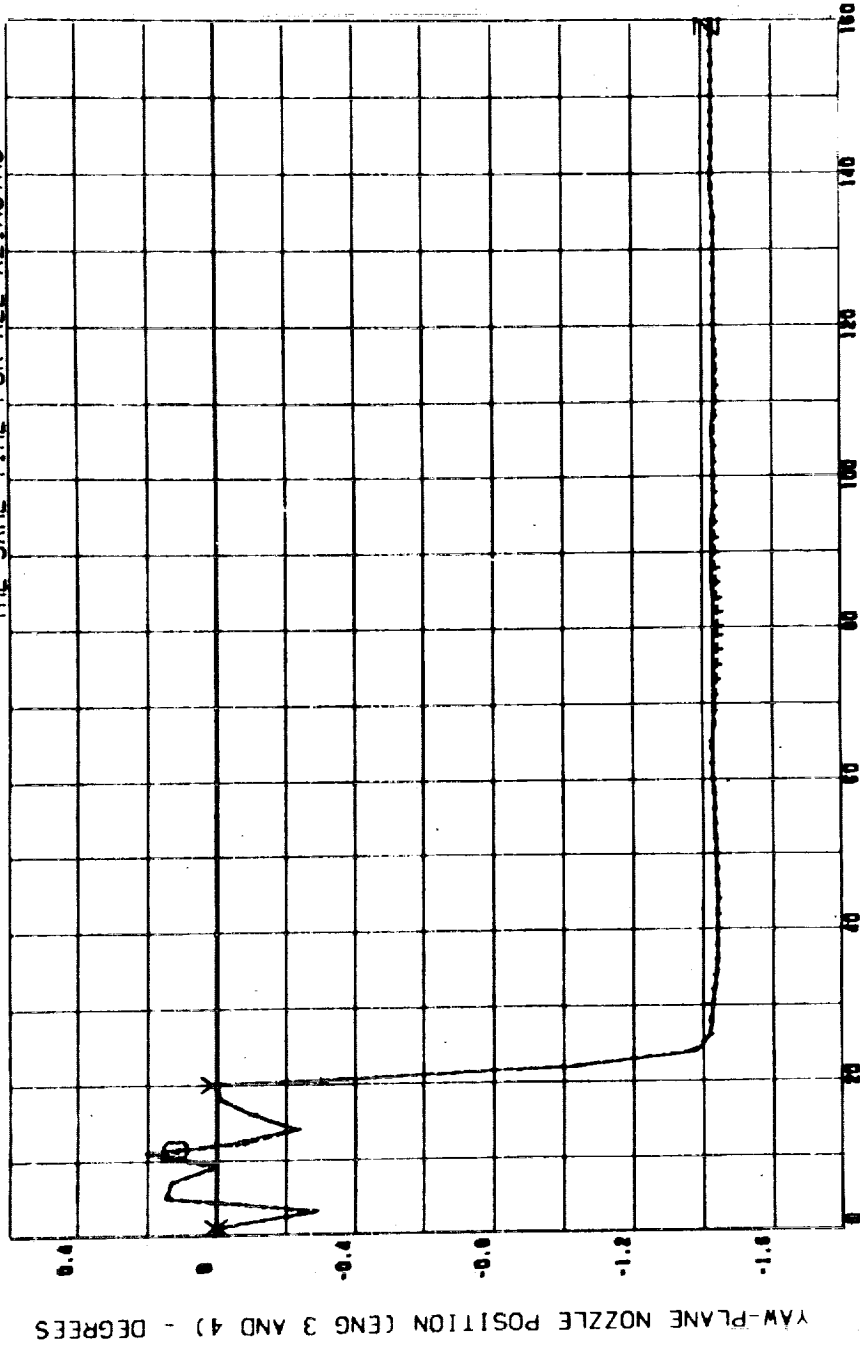
TIME FROM FIRST MOTION - SECONDS

FIGURE 3-69 YAW-PLANE NOZZLE POSITION HISTORY FOR S-1C STAGE (ENGINES 1 AND 2)

X BEGIN YAW MANEUVER
O TILT INITIATION
Y RADIAL ENGINE CANT
Z TILT ARREST

78.051 - DEGREE AZIMUTH
90.0 - DEGREE AZIMUTH
108.0 - DEGREE AZIMUTH

NOTED EVENTS OCCUR AT APPROXIMATELY
THE SAME TIME FOR ALL AZIMUTHS



TIME FROM FIRST MOTION - SECONDS

FIGURE 3-70 YAW-PLANE NOZZLE POSITION HISTORY FOR
S-IC STAGE (ENGINES 3 AND 4)

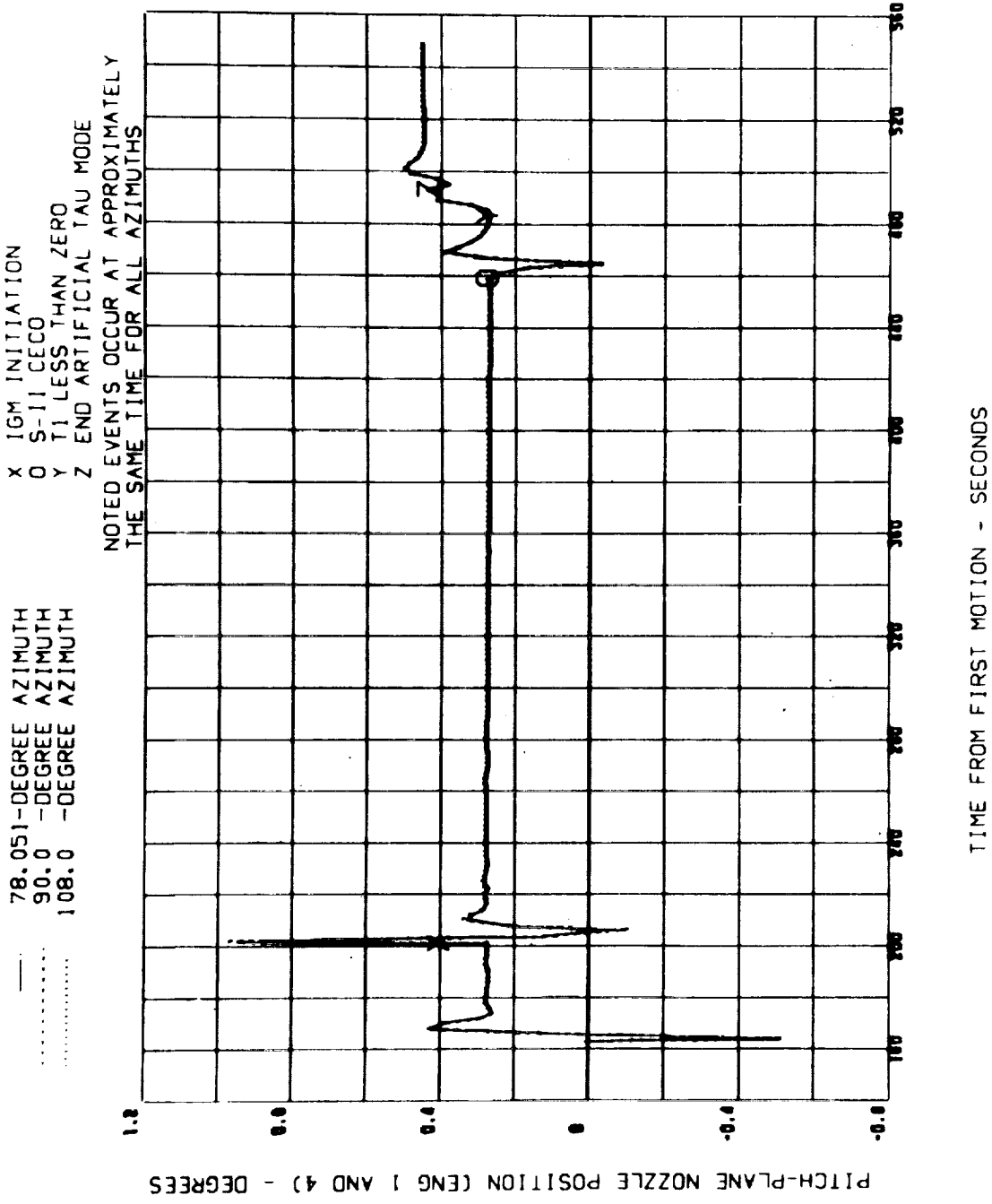
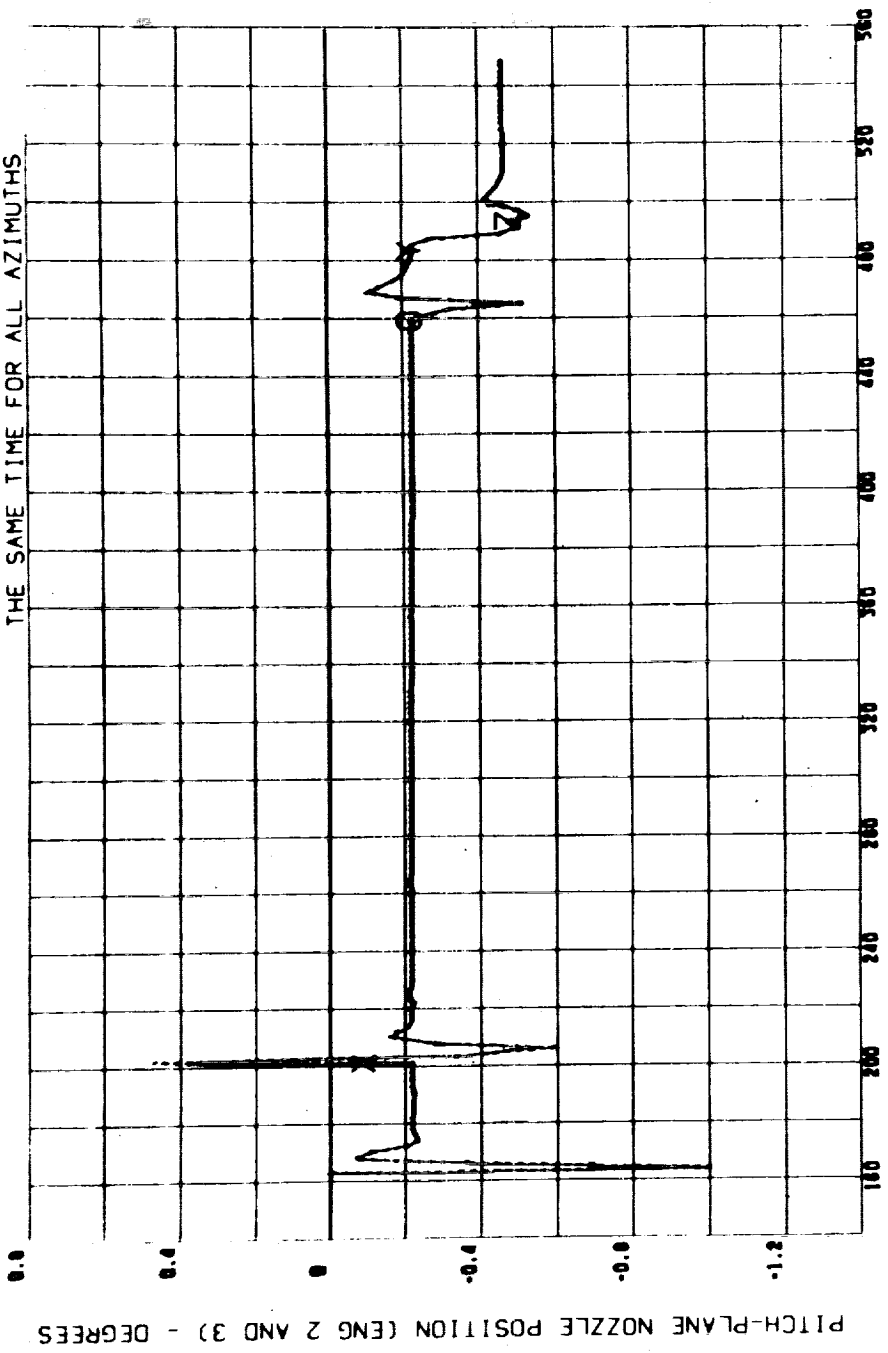


FIGURE 3-71 PITCH-PLANE NOZZLE POSITION HISTORY FOR S-II STAGE (ENGINES 1 AND 4)

X IGM INITIATION
 O S-II CECCO #
 Y T1 LESS THAN ZERO
 Z END ARTIFICIAL TAU MODE
 NOTED EVENTS OCCUR AT APPROXIMATELY
 THE SAME TIME FOR ALL AZIMUTHS

78.051 - DEGREE AZIMUTH
 90.0 - DEGREE AZIMUTH
 108.0 - DEGREE AZIMUTH



TIME FROM FIRST MOTION - SECONDS

FIGURE 3-72 PITCH-PLANE NOZZLE POSITION HISTORY FOR S-II STAGE (ENGINES 2 AND 3)

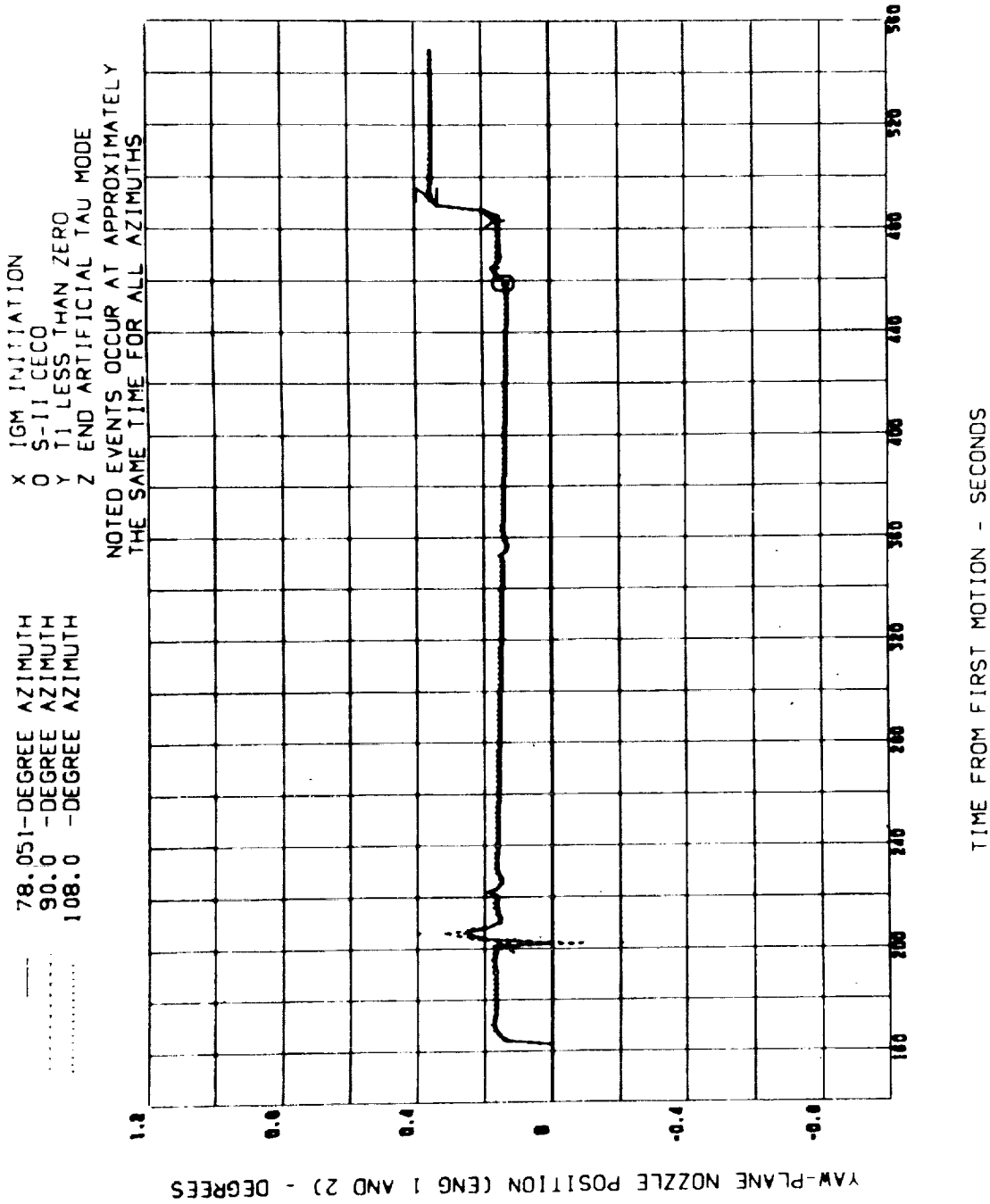
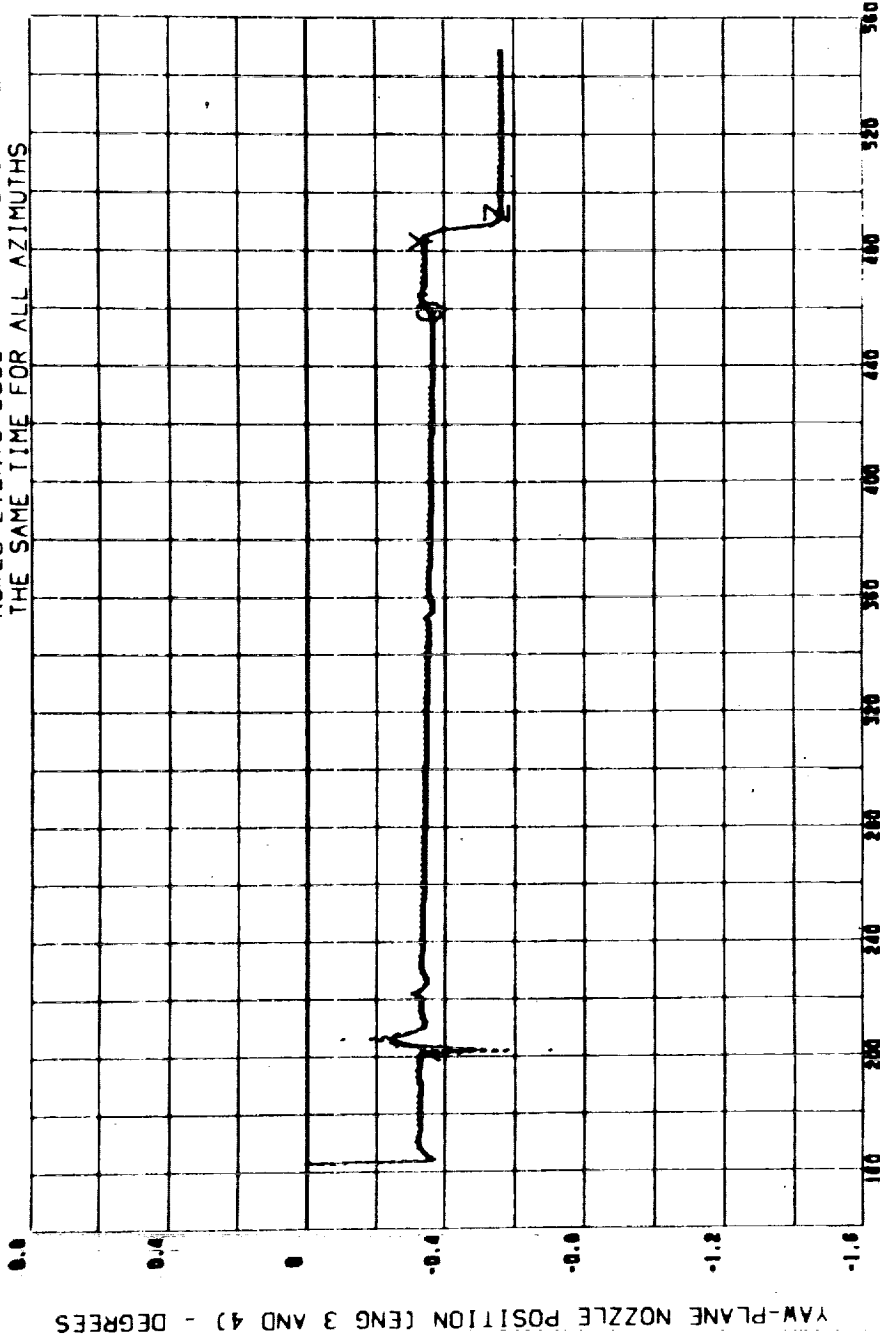


FIGURE 3-73 YAW-PLANE NOZZLE POSITION HISTORY
 FOR S-II STAGE (ENGINES 1 AND 2)

78.051-DEGREE-AZIMUTH
 90.0-DEGREE-AZIMUTH
 108.0-DEGREE-AZIMUTH

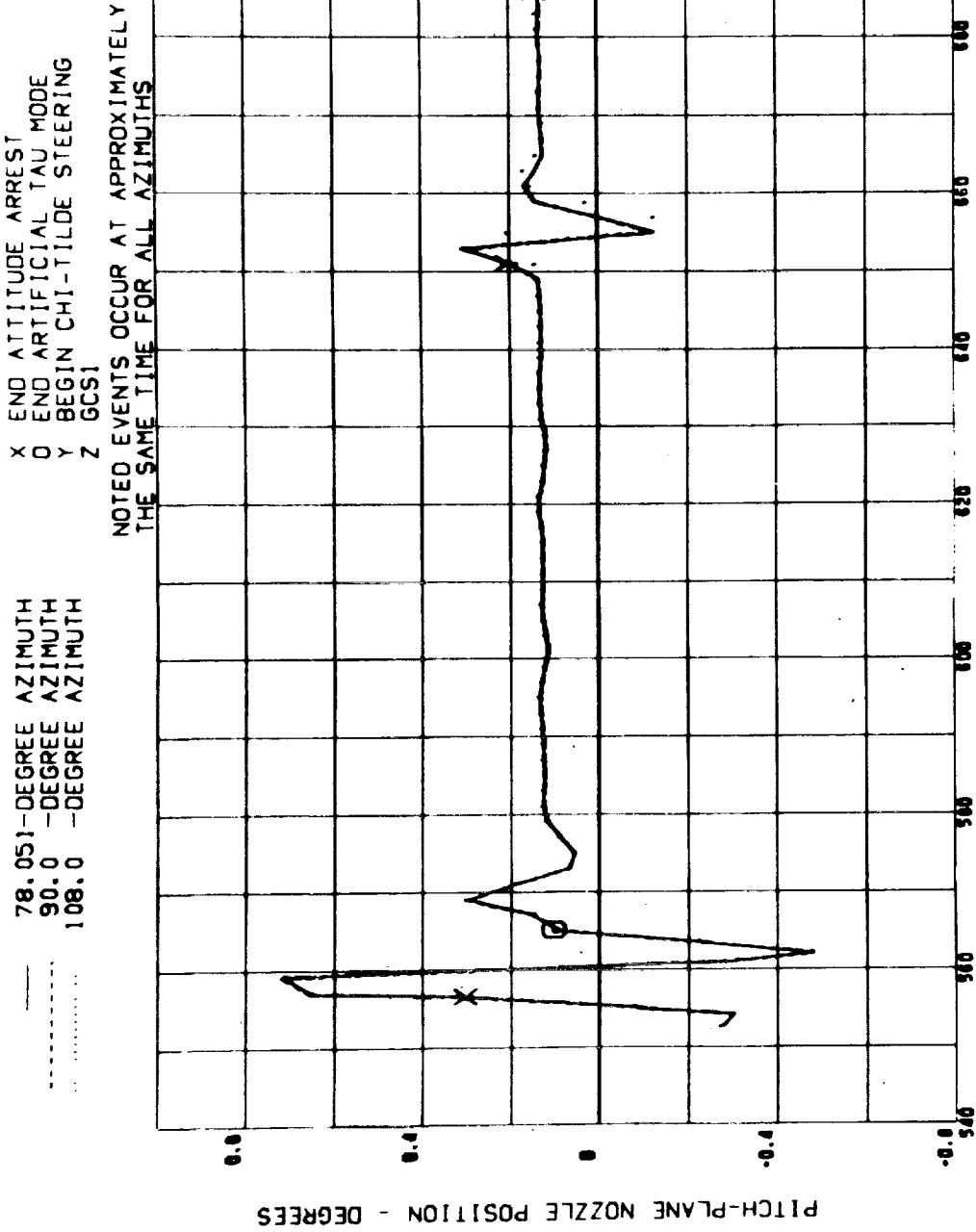
X IGM INITIATION
 O S-II CECCO
 Y T1 LESS THAN ZERO
 Z END ARTIFICIAL TAU MODE

NOTED EVENTS OCCUR AT APPROXIMATELY
 THE SAME TIME FOR ALL AZIMUTHS



TIME FROM FIRST MOTION - SECONDS

FIGURE 3-74 YAW-PLANE NOZZLE POSITION HISTORY
 FOR S-II STAGE (ENGINES 3 AND 4)



TIME FROM FIRST MOTION - SECONDS

FIGURE 3-75 PITCH-PLANE NOZZLE POSITION HISTORY
 FOR S-IVB STAGE (FIRST BURN)

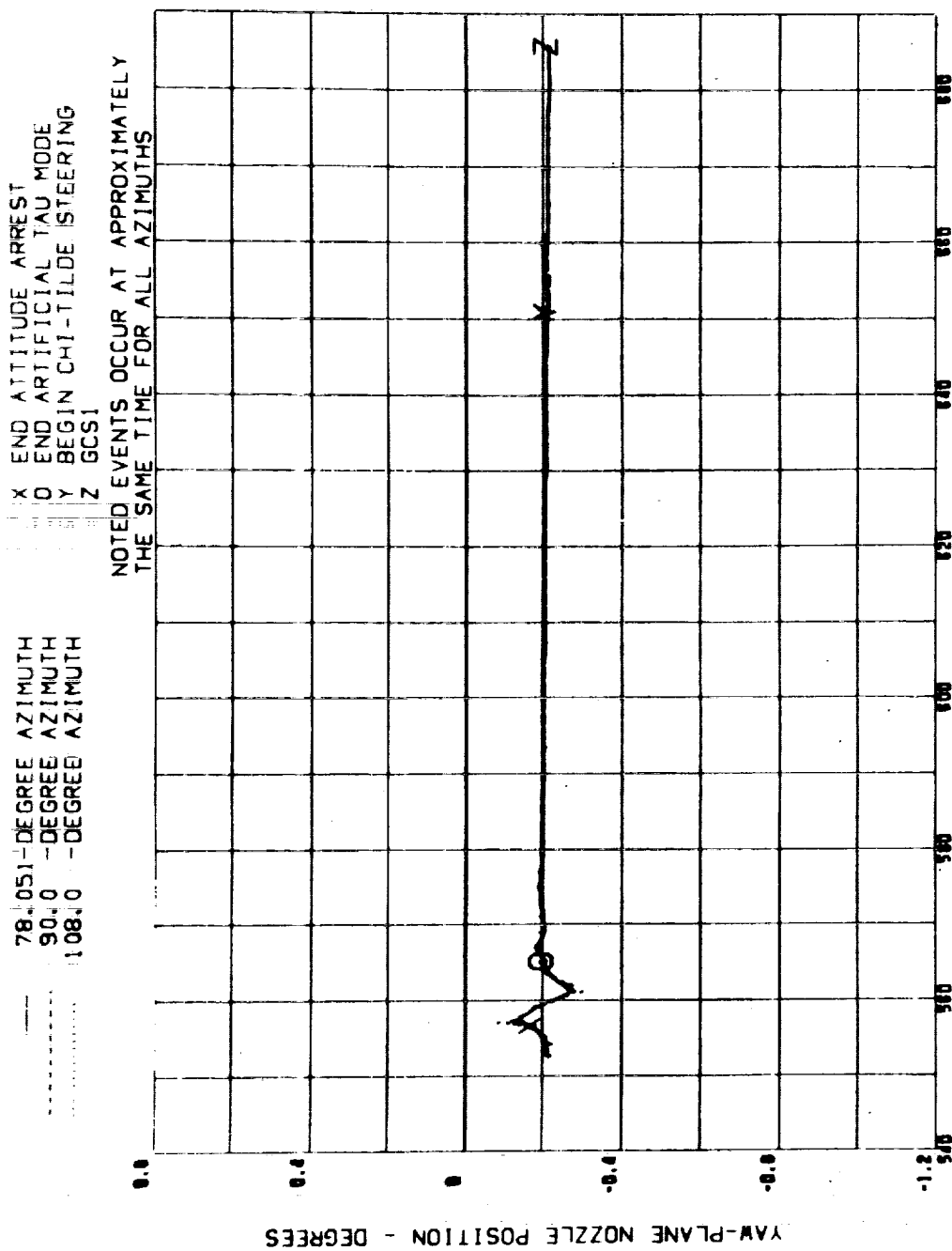


FIGURE 3-76 YAW-PLANE NOZZLE POSITION HISTORY FOR S-IVB STAGE (FIRST BURN)

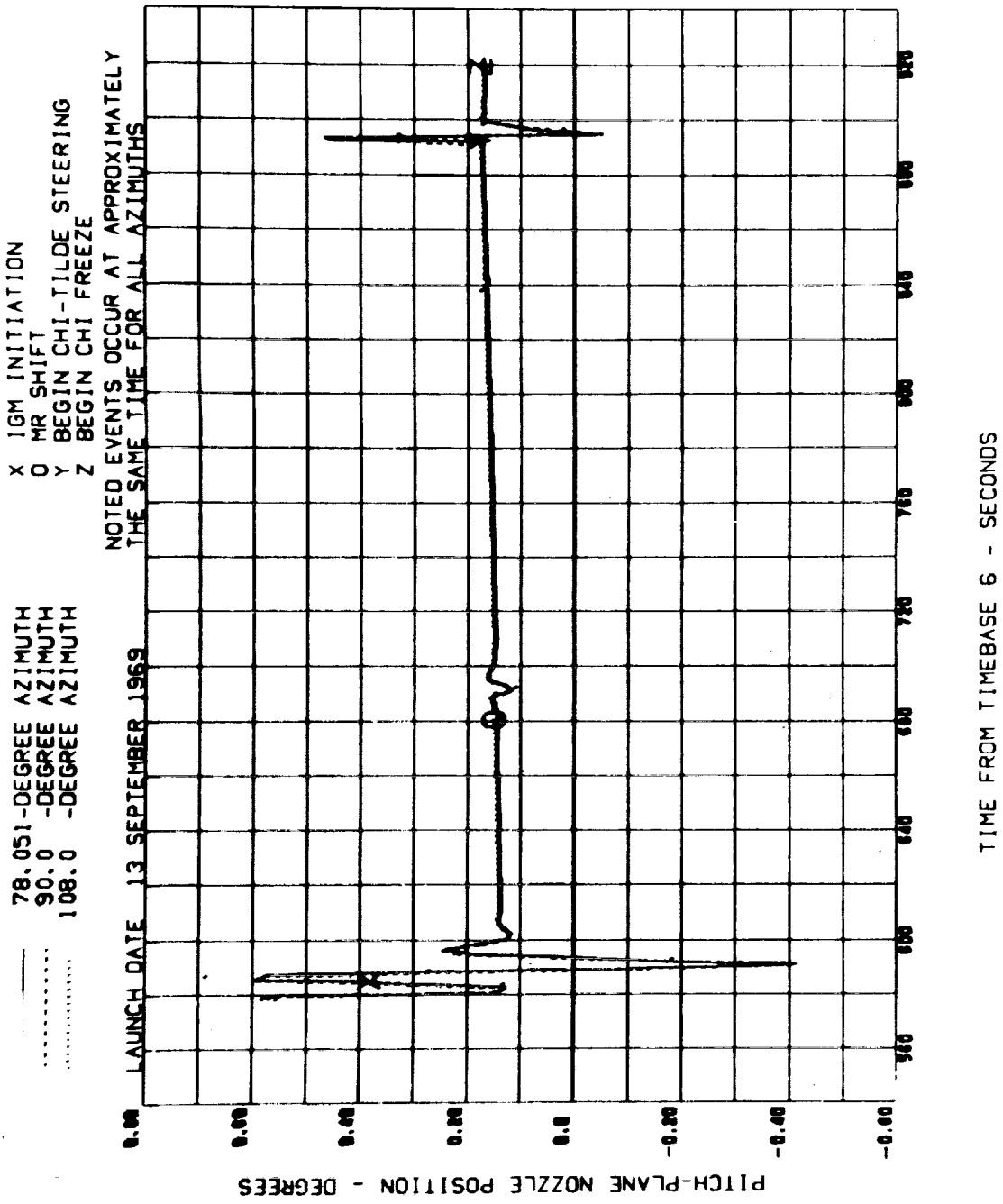


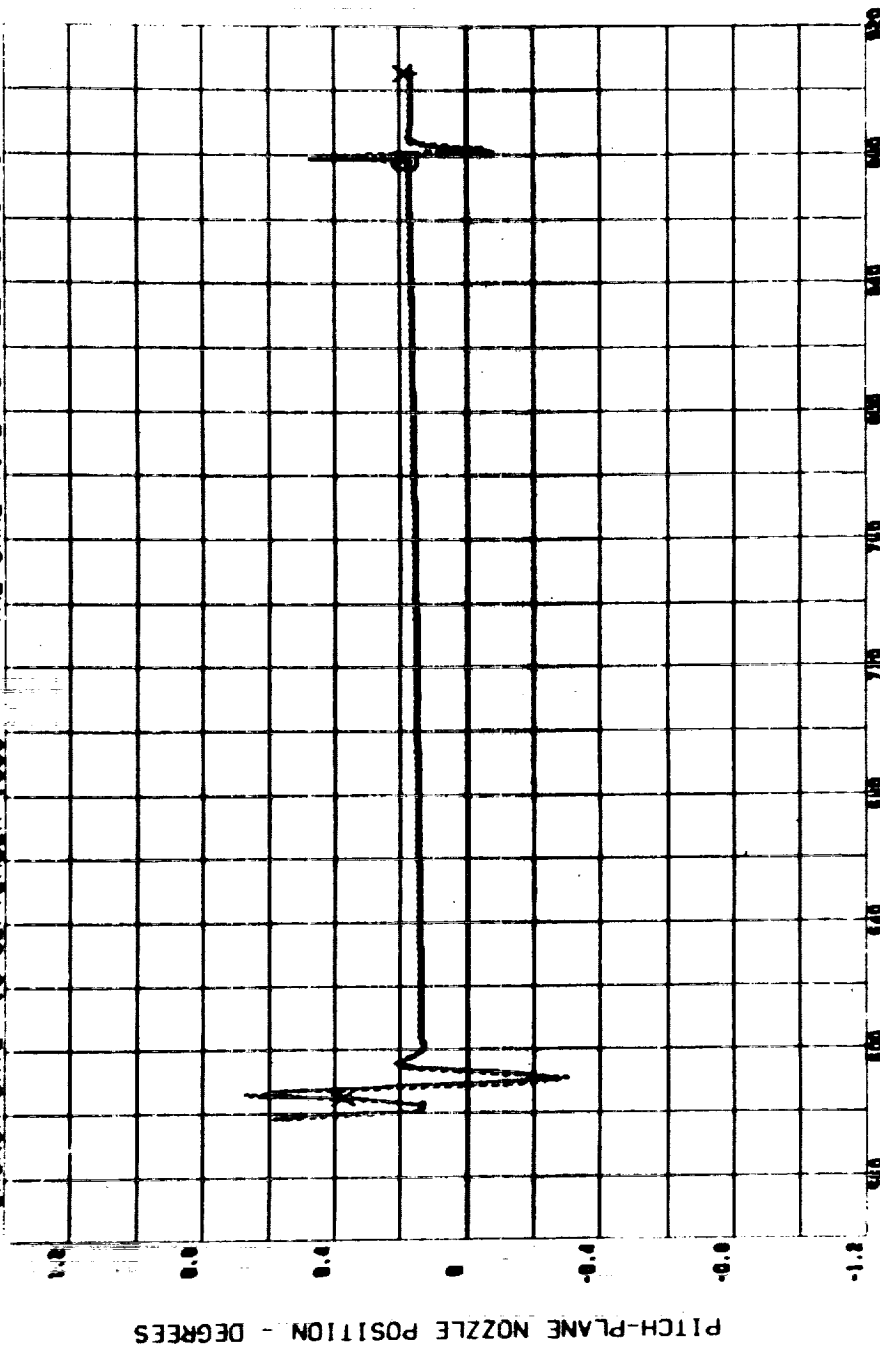
FIGURE 3-77 PITCH-PLANE NOZZLE POSITION HISTORY FOR S-IVB SECOND BURN (FIRST OPPORTUNITY)

78.051 - DEGREE AZIMUTH
90.0 - DEGREE AZIMUTH
108.0 - DEGREE AZIMUTH

X - IGM INITIATION
O - BEGIN CHI - TILDE STEERING
Y - BEGIN CHI FREEZE

NOTED EVENTS OCCUR AT APPROXIMATELY
THE SAME TIME FOR ALL AZIMUTHS

LAUNCH DATE 13 SEPTEMBER 1969



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 3-78 PITCH-PLANE NOZZLE POSITION HISTORY FOR
S-IVB SECOND BURN (SECOND OPPORTUNITY)

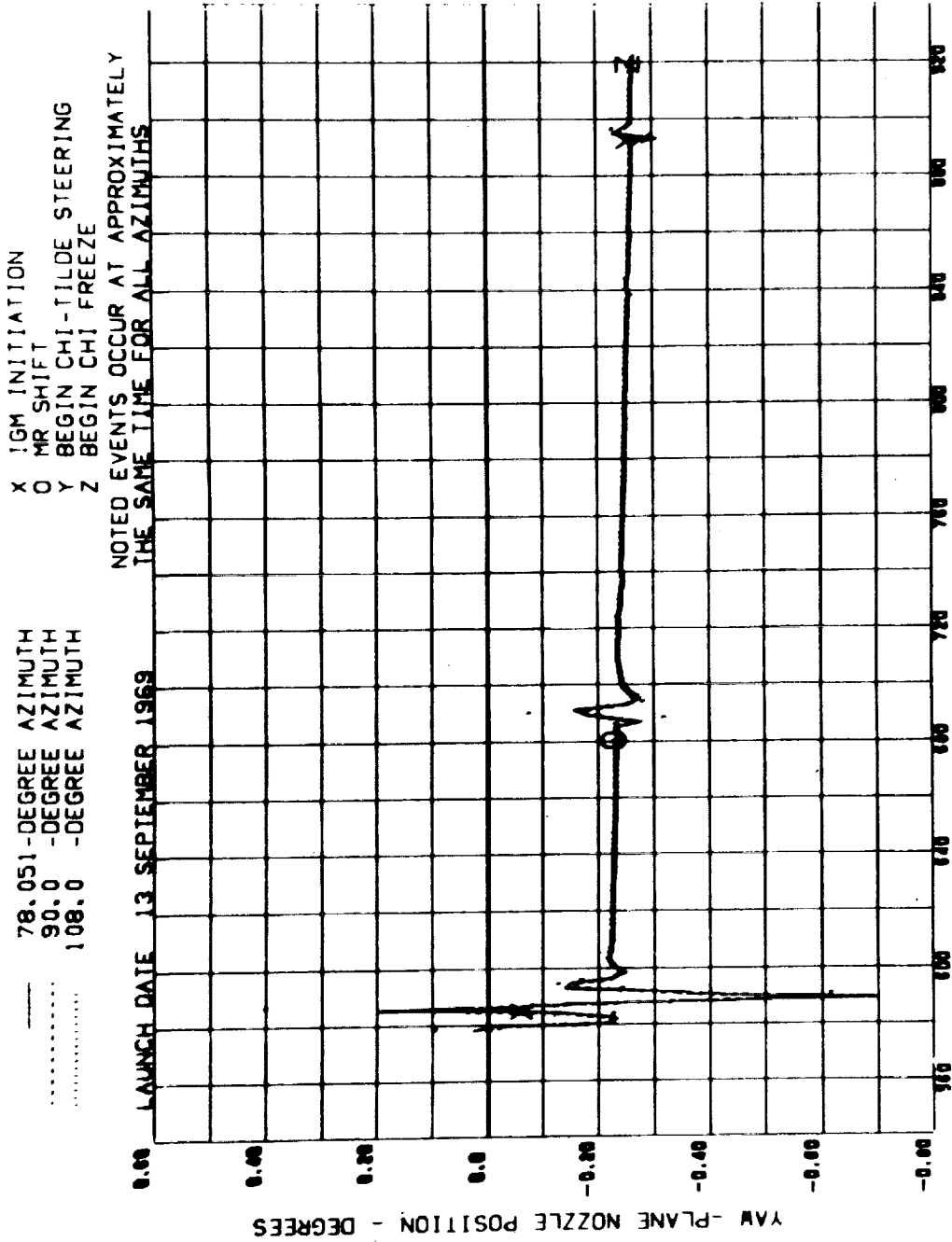


FIGURE 3-79 YAW-PLANE NOZZLE POSITION HISTORY FOR S-1VB SECOND BURN (FIRST OPPORTUNITY)

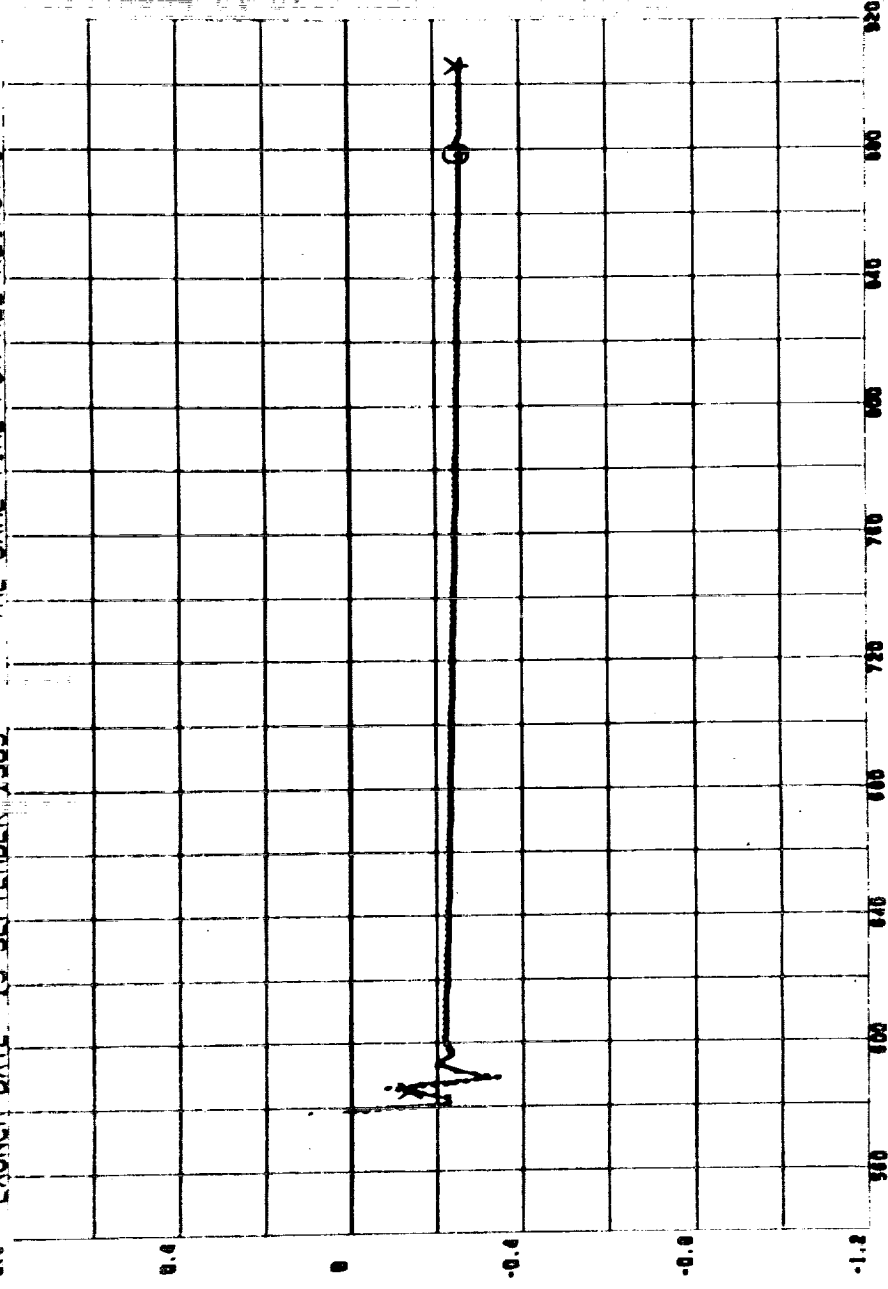
78.051 - DEGREE AZIMUTH
90.0 - DEGREE AZIMUTH
108.0 - DEGREE AZIMUTH

X IGM INITIATION
O BEGIN CHI-TILDE STEERING
Y BEGIN CHI FREEZE

NOTED EVENTS OCCUR AT APPROXIMATELY
THE SAME TIME FOR ALL AZIMUTHS

LAUNCH DATE 13 SEPTEMBER 1969

YAW-PLANE NOZZLE POSITION - DEGREES



TIME FROM TIMEBASE 6 - SECONDS

FIGURE 3-80 YAW-PLANE NOZZLE POSITION HISTORY FOR S-1VB
SECOND BURN (SECOND OPPORTUNITY)

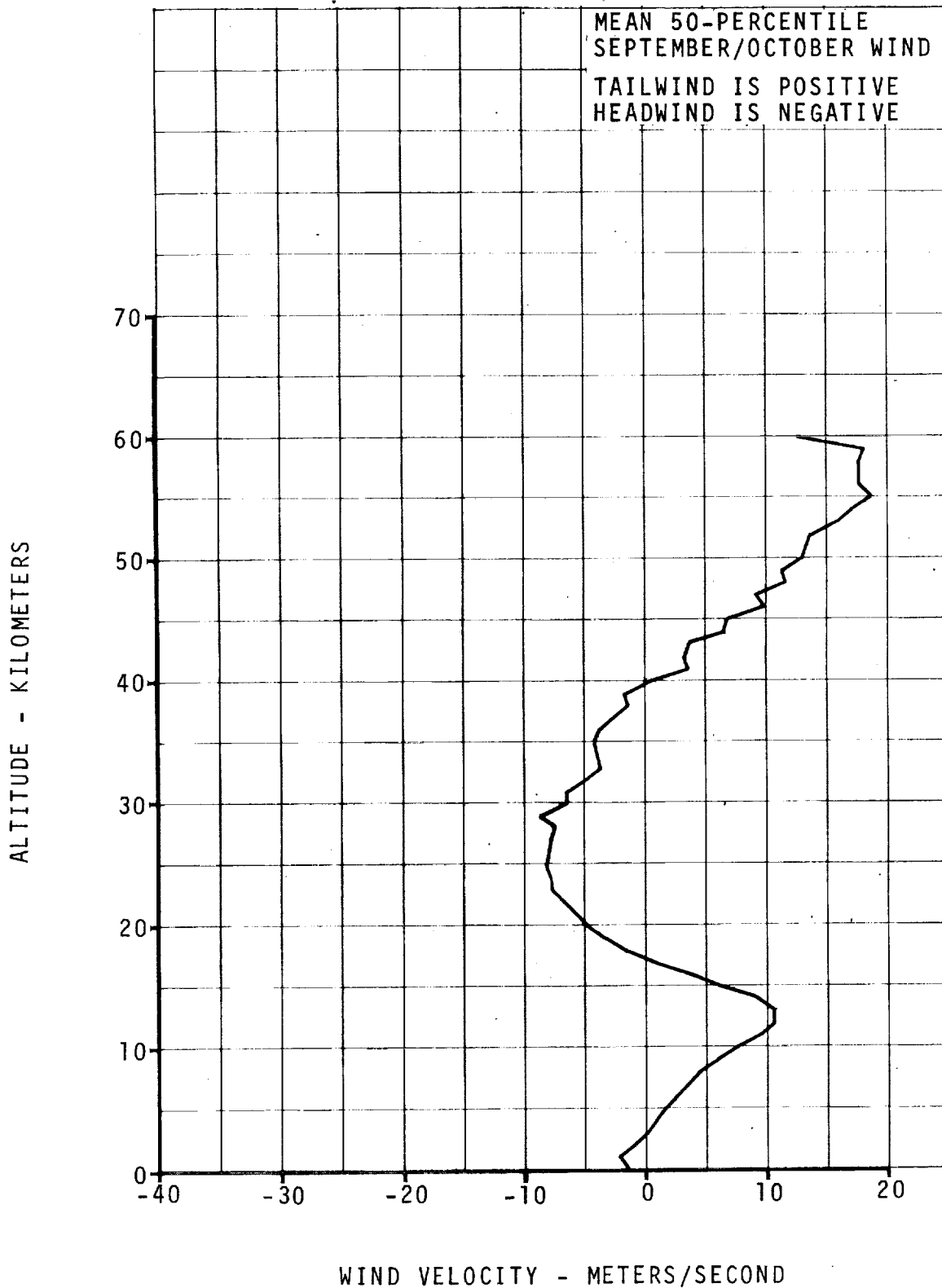


FIGURE 3-81 MEAN WIND FOR FLIGHT SIMULATION
(72- THROUGH 82.5-DEGREE LAUNCH AZIMUTH)

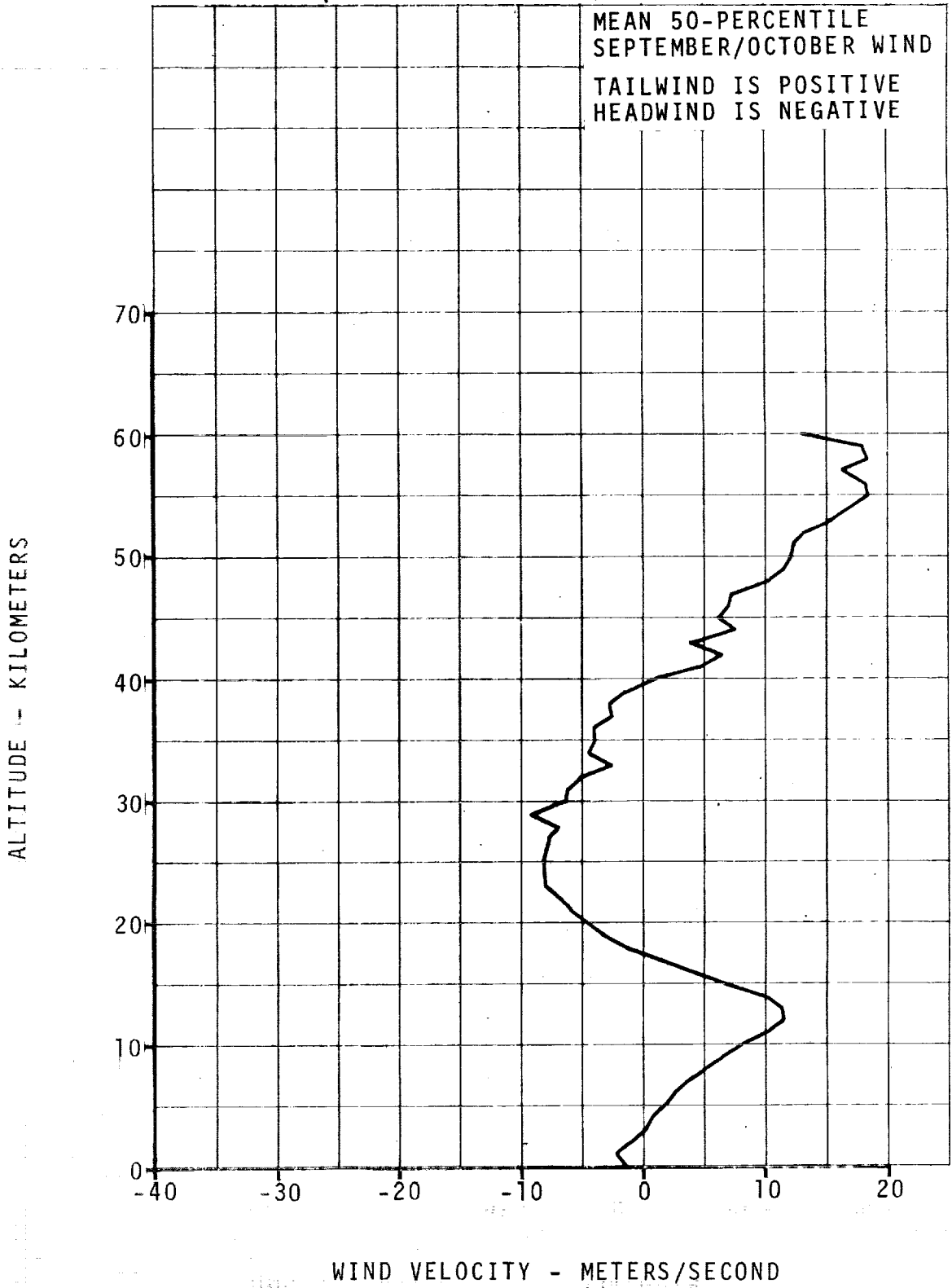


FIGURE 3-82 MEAN WIND FOR FLIGHT SIMULATION
(82.5- THROUGH 97.5-DEGREE LAUNCH AZIMUTH)

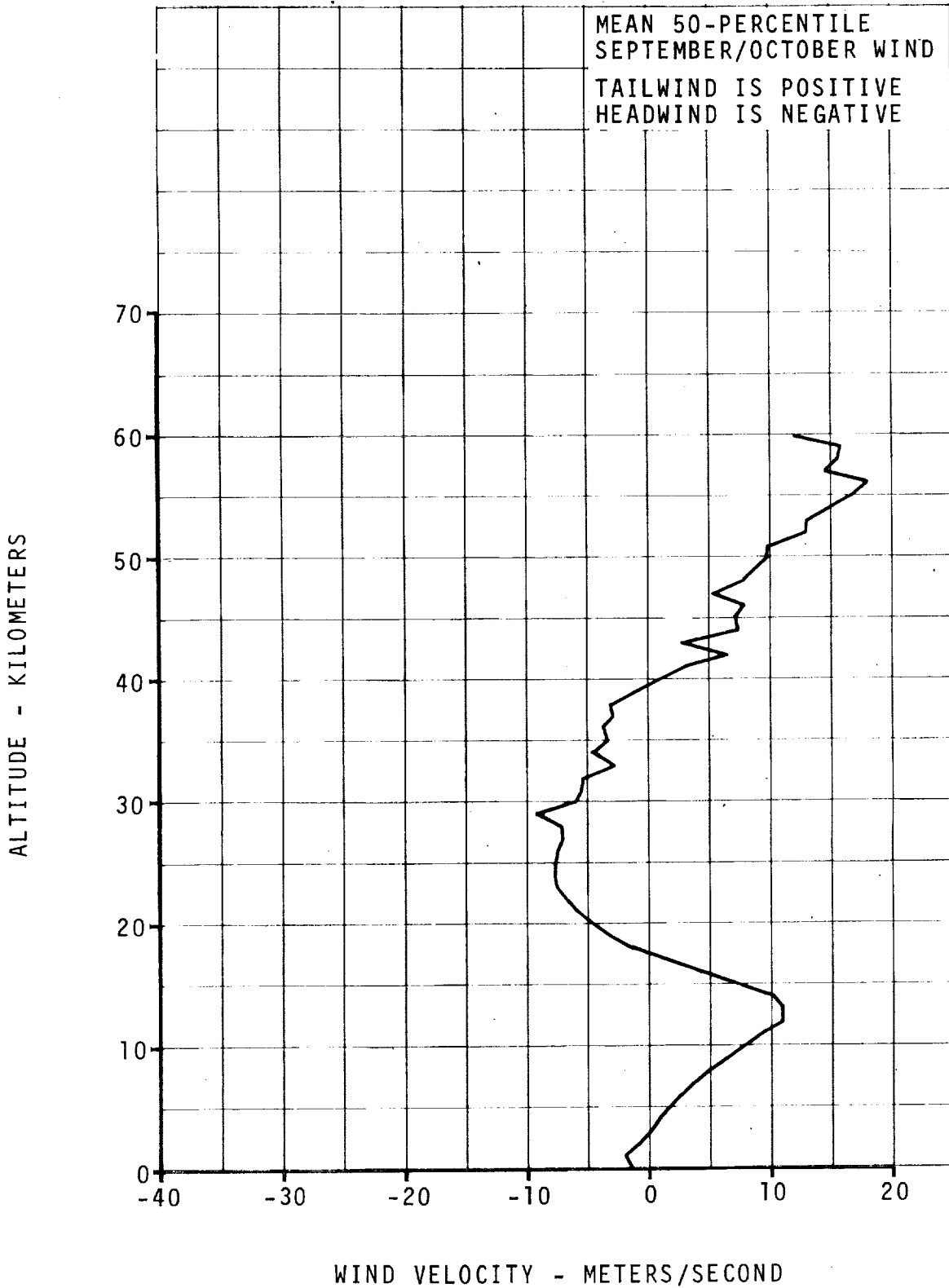


FIGURE 3-83 MEAN WIND FOR FLIGHT SIMULATION
(97.5- THROUGH 108-DEGREE LAUNCH AZIMUTH)

SECTION 4

LAUNCH VEHICLE GUIDANCE AND TARGETING PRESETTINGS

4.0 LAUNCH VEHICLE GUIDANCE PRESETTINGS

Guidance presetting requirements for the Launch Vehicle Flight Program are established by Reference 23. A list of presettings to be prepared for this mission are specified in Reference 4. Boost-to-earth-parking-orbit guidance presettings and definitions are presented in Table 4-I. Translunar-injection-boost guidance presettings and definitions are presented in Table 4-II. The presetting values presented in these tables are Boeing-recommended values consistent with vehicle characteristics and trajectory data presented in Sections 2, 3, and 5.

The nominal tilt polynomial for the AS-507 mission is generated for mean September through November winds. Polynomial coefficients and segment switch times are included in Table 4-I. Simulated minor-loop pitch-attitude commands resulting from use of this polynomial are presented in Table 4-III and in Figure 3-16. The method used to establish the minor-loop pitch-attitude commands is discussed in Reference 24.

4.1 LAUNCH VEHICLE TARGETING PRESETTINGS

Targeting presettings are the launch vehicle guidance presettings that are dependent upon launch date and launch azimuth. These presettings are furnished on PRESET tapes for mission analysis studies, and are punched on octal cards for input to the LVDC. Discussions of the techniques used in generating these presettings, procedures used to verify them, and Flight Program implementation logic are contained in Reference 25. Identification of AS-507G PRESET tapes is presented in Section 5. Definitions of targeting presettings used as inputs to the Flight Program are presented in Table 4-IV. Presetting values contained in Table 4-IV are for September 13, 1969 launch. These values are typical of all targeting presettings data, but are valid only for this specific launch date. A complete listing of the octal-card presettings for the September 1969 launch month is provided in Table 4-V.

Guidance and targeting presettings and values presented in Tables 4-I, 4-II, 4-IV, and 4-V are identical to those published in Reference 26 with the following exceptions agreed upon at the Reference 27 technical meeting:

- a. The guidance presettings OMEGA and T2I are deleted.

4.1 (Continued)

- b. The sign of the value for H is changed to be consistent with Flight Program logic.
- c. The scale factor on the octal card for PAD is changed from 25 to 0.
- d. Values for the TD&E pitch, yaw, and roll attitude angles, formerly not available, have been added.

TABLE 4-I. GUIDANCE PRESETTINGS FOR BOOST TO EARTH PARKING ORBIT.

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
AE	6378165.0	M	ON	EARTH'S SEMIMAJOR AXIS.
ALTI	1.5D5	M	ON	MAXIMUM ALTITUDE TO USE CONSTANT ATMOSPHERIC DENSITY, RHO.
ALT2	3.0D5	M	ON	MAXIMUM ALTITUDE TO USE ATMOSPHERIC DENSITY POLYNOMIAL.
A0	0.17914200D-06	KG/M**3	ON	ATMOSPHERIC DENSITY MODEL POLYNOMIAL COEFFICIENTS.
A1	-0.37213949D-11	KG/M**4	ON	
A2	0.31057886D-16	KG/M**5	ON	
A3	-0.12962178D-21	KG/M**6	ON	
A4	0.26986419D-27	KG/M**7	ON	
A5	-0.22388267D-33	KG/M**8	ON	
B	6356783.0	M	ON	EARTH'S SEMIMINOR AXIS.
BA	0.15	N/D	IGM	MINIMUM FRACTIONAL DEVIATION OF CALCULATED THRUST FROM NOMINAL THRUST WHICH INITIATES OFF-NOMINAL-PROPULSION LOGIC.
BN5	100.0	SEC	BN	TIME IN TIMEBASE 5 TO ENTER ORBIT INITIALIZE AND BEGIN ORBIT NAVIGATION.

TABLE 4-I. GUIDANCE PRESETTINGS FOR BOOST TO EARTH PARKING ORBIT. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
CO	10.0	SEC	IGM	LENGTH OF THE ARTIFICIAL TAU MODE FOR FIRST S-IVB BURN.
CSTHT	1.0	N/D	IGM	COSINE OF THE DESIRED TERMINAL FLIGHT-PATH ANGLE.
D	0.7875D-5	N/D	ON	COEFFICIENT OF 4TH HARMONIC IN GRAVITATIONAL POTENTIAL MODEL.
DVB	1.567	M/SEC	IGM	CUTOFF VELOCITY BIAS FOR S-IVB FIRST BURN.
EPLN2	35.0	SEC	IGM	CONSTANT TIME FOR SELECTION OF GUIDANCE OPTION THAT ENFORCES ONLY TERMINAL VELOCITY END-CONDITIONS.
FI0	32.55754	DEG	BI	COEFFICIENTS OF PARKING ORBIT INCLINATION POLYNOMIAL.
FI1	-15.84615	DEG		
FI2	11.64780	DEG		
FI3	9.890970	DEG		
FI4	-5.111430	DEG		
FI5	0.0	DEG		
FI6	0.0	DEG		

TABLE 4-I. GUIDANCE PRESETTINGS FOR BOOST TO EARTH-PARKING ORBIT. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
FMN20	15.8	M/SEC**2	IGM	NOMINAL ACCELERATION FOR S-II STAGE SECOND PHASE IGM COMPUTATIONS.
FN	5071096.7	NT	IGM	NOMINAL THRUST OF S-II STAGE BEFORE PMR.
GANTRY	138.0	M	PIGM	TOWER CLEARANCE ALTITUDE.
GL0	123.1935	DEG	BI	COEFFICIENTS OF PARKING ORBIT DESCENDING NODAL ANGLE POLYNOMIAL.
GL1	-55.06485	DEG		
GL2	-35.26208	DEG		
GL3	26.01324	DEG		
GL4	-1.47591	DEG		
GL5	0.0	DEG		
GL6	0.0	DEG		
H	0.575D-5 *	N/D	ON	THIRD ZONAL HARMONIC COEFFICIENT IN GRAVITATIONAL POTENTIAL MODEL.
IGBIA1	32.0	M/SEC**2	IGM	F/M TOLERANCE USED IN TEST TO SENSE PMR IN S-II STAGE.

*THE SIGN OF THIS VALUE IS CONSISTENT WITH LVDC IMPLEMENTATION LOGIC.

TABLE 4-I. GUIDANCE PRESETTINGS FOR BOOST TO EARTH PARKING ORBIT. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
IG2	0.0	SEC	IGM	TIME REMAINING IN FIRST IGM PHASE TO START CHECKING F/M FOR S-II PMR.
J	1.62345D-3	N/D	ON	SECOND ZONAL HARMONIC COEFFICIENT IN GRAVITATIONAL POTENTIAL MODEL.
KD	1.27323D-4	M**2/KG	ON	ORBITAL DRAG MODEL CONSTANT
KSCLNG	-80.620869	DEG	CB	LONGITUDE OF THE LAUNCH SITE, MEASURED POSITIVE EASTWARD FROM THE GREENWICH MERIDIAN (PAD B).
LIM1	1.0	DEG/SEC	MLS	BOOST PHASE CHI-RATE LIMIT FOR ROLL.
LIM2	1.0	DEG/SEC	MLS	BOOST PHASE CHI-RATE LIMIT FOR PITCH AND YAW.
MCD	649352.4	KG	IGM	NOMINAL MASS AT T3FMC NOT INCLUDING MASS TO BE JETTISONED.
MFK1	.39254895	N/D	BN	M/F FILTER COEFFICIENTS, FOR S-II STAGE.
MFK2	-0.3135895	N/D	BN	
MFK3	0.0	N/D	BN	
MFK4	0.0	N/D	BN	

TABLE 4-I. GUIDANCE PRESETTINGS FOR BOOST TO EARTH PARKING ORBIT. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
MFK5	0.0	N/D	BN	
MFK6	1.56507857	N/D	BN	
MFK7	-0.64403642	N/D	BN	
MFK8	0.0	N/D	BN	
MFK9	0.0	N/D	BN	
MOVFO	0.131	SEC**2/M	BN, IGM	MASS-TO-THRUST RATIO USED TO INITIALIZE S-II (M/F) SMOOTHING FILTER.
MOVFI	0.188	SEC**2/M	BN	MASS-TO-THRUST RATIO USED TO INITIALIZE S-IVB FIRST-BURN (M/F) SMOOTHING FILTER.
MU	3.986032D+14	M**3/SEC**2	BTST,MLS	PRODUCT OF UNIVERSAL GRAVITATIONAL CONSTANT AND MASS OF THE EARTH.
ONCDI	11.079923	N/D	ON	COEFFICIENTS OF THE POLYNOMIAL THAT CALCULATES DRAG COEFFICIENT AS A FUNCTION OF ANGLE OF ATTACK.

TABLE 4-I. GUIDANCE PRESETTINGS FOR BOOST TO EARTH PARKING ORBIT. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
ONCD2	0.17954281	N/D	ON	
ONCD3	-2.1771971	N/D	ON	
ONCD4	-0.28074902	N/D	ON	
ONCD5	-5.8764139	N/D	ON	
OXS	6373376.0	M	BI	INITIAL RADIUS COMPONENT OF IU ALONG XS AXIS (PAD B).
PCMR	10.0	SEC	IGM	NOMINAL DURATION OF S-II PMR THRUST TRANSIENT PERIOD.
PCD	0.0	SEC	IGM	TIME AFTER TII BECOMES NEGATIVE WHEN STAGING OF THE GUIDANCE EQUATIONS IS FORCED.
PHI	28.6273060	DEG	CB	GEODETTIC LATITUDE OF THE LAUNCH SITE (PAD B).
PHIP	28.4657803	DEG	CB	GEOCENTRIC LATITUDE OF THE LAUNCH SITE (PAD B).
R	6373401.3	M	BI	RADIUS FROM GEOCENTRIC CENTER OF THE EARTH TO CENTER OF IU ON LAUNCH PAD (PAD B).
RHO	0.5D-7	KG/M**3	ON	CONSTANT ATMOSPHERIC DENSITY USED BELOW ALTI.
ROV	1.5	N/D	IGM	CONSTANT FOR BIASING TERMINAL RANGE-ANGLE PREDICTION IN FIRST S-IVB BURN.

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TABLE 4-I. GUIDANCE PRESETTINGS FOR BOOST TO EARTH PARKING ORBIT. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
SMCG1	0.05	RAD/SEC	IGM	STEERING MISALIGNMENT CORRECTION GAINS FOR S-II AND S-IVB BURNS.
S4MFK1	0.39254895	N/D	BN	M/F FILTER COEFFICIENTS, FOR S-IVB STAGE.
S4MFK2	-0.3135895	N/D	BN	
S4MFK3	0.0	N/D	BN	
S4MFK4	0.0	N/D	BN	
S4MFK5	0.0	N/D	BN	
S4MFK6	1.56507857	N/D	BN	
S4MFK7	-0.64403642	N/D	BN	
S4MFK8	0.0	N/D	BN	
S4MFK9	0.0	N/D	BN	
TAR	158.0	SEC	PIGM	LVDC IMPLEMENTATION TIME OF TILT ARREST DURING TIMEBASE 1.
TAUN	754.0	SEC	IGM	NOMINAL TAU, USED IN THE S-IVB FIRST-BURN ARTIFICIAL TAU MODE.
TAU2	350.7	SEC	IGM	ESTIMATED TIME TO BURN UP VEHICLE COMPLETELY, FROM A SELECTED TIME BETWEEN T11=0 AND THE END OF THE ARTIFICIAL TAU MODE.

TABLE 4-I. GUIDANCE PRESETTINGS FOR BOOST TO EARTH PARKING ORBIT. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
TAU3	754.0	SEC	IGM	ESTIMATED TIME TO BURN UP S-IVB COMPLETELY, CONSTANT DURING FIRST AND SECOND STAGES OF IGM.
TCI	6.5	SEC	IGM	GUIDANCE COAST TIME BETWEEN S-II CUTOFF AND INITIATION OF THIRD STAGE OF IGM GUIDANCE.
THSLP1	8.0	SEC	IGM	VALUE OF THIRD-STAGE GUIDANCE TIME REMAINING AT WHICH THE HIGH-SPEED CUTOFF LOOP IS ENTERED.
TI5F2	20.0	SEC	ON	TIME IN TIMEBASE 5 TO MANEUVER TO LOCAL REFERENCE ATTITUDE.
TSMC	60.6	SEC	IGM,MLS	TIME IN TIMEBASE 3 TO BEGIN COMPUTING STEERING MISALIGNMENT CORRECTIONS (SMC).
TSMC2	15.0	SEC	IGM,MLS	TIME IN TIMEBASE 4 TO BEGIN COMPUTING STEERING MISALIGNMENT CORRECTIONS (SMC).
TTC10	9.01323708D-1	DEG	PIGM	COEFFICIENTS OF THE FIRST SEGMENT OF THE FOUR-SEGMENT FIRST-STAGE TILT POLYNOMIAL.
TTC11	-1.68866843D-1	DEG/SEC	PIGM	

TABLE 4-I. GUIDANCE PRESETTINGS FOR BOOST TO EARTH PARKING ORBIT. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
TTC12	1.19188983D-2	DEG/SEC**2	PIGM	COEFFICIENTS OF THE SECOND SEGMENT OF THE FOUR-SEGMENT FIRST-STAGE TILT POLYNOMIAL.
TTC13	-5.72547046D-4	DEG/SEC**3	PIGM	
TTC14	5.05617341D-6	DEG/SEC**4	PIGM	
TTC20	-6.20177984	DEG	PIGM	
TTC21	8.33849773D-1	DEG/SEC	PIGM	COEFFICIENTS OF THE THIRD SEGMENT OF THE FOUR-SEGMENT FIRST-STAGE TILT POLYNOMIAL.
TTC22	-3.76455551D-2	DEG/SEC**2	PIGM	
TTC23	4.33476142D-4	DEG/SEC**3	PIGM	
TTC24	-1.88326843D-6	DEG/SEC**4	PIGM	
TTC30	3.70536910D+2	DEG	PIGM	COEFFICIENTS OF THE FOURTH SEGMENT OF THE FOUR-SEGMENT FIRST-STAGE TILT POLYNOMIAL.
TTC31	-1.98106666D+1	DEG/SEC	PIGM	
TTC32	3.83547422D-1	DEG/SEC**2	PIGM	
TTC33	-3.36574843D-3	DEG/SEC**3	PIGM	
TTC34	1.09338278D-5	DEG/SEC**4	PIGM	COEFFICIENTS OF THE FOURTH SEGMENT OF THE FOUR-SEGMENT FIRST-STAGE TILT POLYNOMIAL.
TTC40	7.62662909D+1	DEG	PIGM	

TABLE 4-I. GUIDANCE PRESETTINGS FOR BOOST TO EARTH PARKING ORBIT. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
TTC41	-2.16303380	DEG/SEC	PIGM	
TTC42	1.06506544D-2	DEG/SEC**2	PIGM	
TTC43	-9.24376599D-6	DEG/SEC**3	PIGM	
TTC44	-4.91648930D-8	DEG/SEC**4	PIGM	
TTSEG2	35.477	SEC	PIGM	SEGMENT SWITCH TIMES FOR FOUR-SEGMENT FIRST-STAGE TILT POLYNOMIAL REFERENCED TO TIMEBASE 1.
TTSEG3	69.602	SEC	PIGM	
TTSEG4	97.602	SEC	PIGM	
TTI	279.6	SEC	IGM,GS	TIME REMAINING IN THE FIRST STAGE OF IGM GUIDANCE.
T3FM	6.7	SEC	AP,BN,BP	TIME FROM TIMEBASE 3 WHEN FIRST PASS THROUGH S-II (M/F) SMOOTHING FILTER IS ENABLED.
T3FMC	4.4	SEC	AP	TIME IN TIMEBASE 3 TO BEGIN ACCUMULATING CHARACTERISTIC VELOCITY, ENABLE ACCELEROMETER ZERO TEST, DECREASE X AND Z ACCELEROMETER RTC, START USING MDO2 AND F2 TO COMPUTE BACKUP ACCELERATION.

TABLE 4-I. GUIDANCE PRESETTINGS FOR BOOST TO EARTH PARKING ORBIT. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
T3IGM	40.6	SEC	GS	TIME FROM TIMEBASE 3 TO ENABLE FIRST STAGE OF IGM GUIDANCE.
T3P	133.18	SEC	IGM,BN	ESTIMATED THIRD STAGE BURN TIME
T4FM	12.0	SEC	IGM,AP, BN	TIME FROM TIMEBASE 4 WHEN FIRST PASS THROUGH S-IVB FIRST-BURN (F/M) SMOOTHING FILTER IS ENABLED.
T4FMC	6.5	SEC	AP	TIME IN TIMEBASE 4 TO DECREASE X AND Z RTC, START USING MDOOT4 AND F4 TO COMPUTE BACKUP ACCELERATION, ENABLE ACCELEROMETER ZERO TEST.
VCN	4685.8	M/SEC	IGM	CHARACTERISTIC VELOCITY GAINED BETWEEN T3+0 AND T4+0.
VCO	25.0	M/SEC	IGM	INITIAL CHARACTERISTIC VELOCITY AT T3+T3FMC.
VC1N	3825.0	M/SEC	IGM	CHARACTERISTIC VELOCITY GAINED BETWEEN T3+0 AND S-II PMR.
VENT1A	0.001350	M/SEC**2	ON	ORBITAL VENT ACCELERATIONS.
VENT2A	0.000647	M/SEC**2	ON	
VENT3A	0.000451	M/SEC**2	ON	

TABLE 4-I. GUIDANCE PRESETTINGS FOR BOOST TO EARTH PARKING ORBIT. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
VENT4A	0.000372	M/SEC**2	ON	
VENT5A	0.000294	M/SEC**2	ON	
VEX1	4087.3412	M/SEC	IGM	EXHAUST VELOCITIES FOR THE FIRST, SECOND, AND THIRD STAGES OF IGM GUIDANCE, RESPECTIVELY.
VEX2	4195.5155	M/SEC	IGM	
VEX3	4194.6525	M/SEC	IGM	
VGRD1	300.0	M/SEC	IGM	S-IVB FIRST BURN VELOCITY GUARD FOR HIGH-SPEED LOOP ENTRANCE.
VT	7793.0429	M/SEC	IGM	DESIRED TERMINAL VELOCITY
VTIM1	1800.	SEC	ON	SEGMENT SWITCH TIMES FOR ORBITAL VENT ACCELERATIONS MEASURED FROM T85.
VTIM2	4300.	SEC	ON	
VTIM3	7300.	SEC	ON	
VTIM4	12800.	SEC	ON	
XVT	6563366.0	M	IGM	DESIRED TERMINAL RADIUS
XAGT	-9.255	M/SEC**2	IGM	COMPONENTS OF TERMINAL GRAVITY VECTOR IN GUIDANCE COORDINATE SYSTEM FOR S-IVB FIRST BURN.

TABLE 4-I. GUIDANCE PRESETTINGS FOR BOOST TO EARTH PARKING ORBIT. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
YAGT	0.0	M/SEC**2	IGM	
ZAGT	0.0	M/SEC**2	IGM	

TABLE 4-II. GUIDANCE PRESETTINGS FOR TRANSLUNAR INJECTION BOOST.

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
BN2	578.0	SEC	BN	TIME IN TIMEBASE 6 TO CALCULATE FIRST GUESS AT ACCELERATION USING FNR, MNR, AND MDOTNR.
BN4	20.0	SEC	BN	TIME IN TIMEBASE 7 TO ENTER ORBIT INITIALIZE AND RESUME ORBIT NAVIGATION.
EPLN2R	30.0	SEC	IGM	CONSTANT TIME FOR SELECTION OF GUIDANCE OPTION THAT ENFORCES ONLY TERMINAL VELOCITY END-CONDITIONS DURING S-IVB SECOND BURN.
EPLN3R	30.0	SEC	IGM	CONSTANT TIME FOR SELECTION OF GUIDANCE OPTION THAT FREEZES THE TERMINAL CONDITIONS DURING THE SECOND S-IVB BURN.
FNR	796632.0	NEWTONS	BN	NOMINAL THRUST USED AT PRECALCULATIONS FOR FIRST OPPORTUNITY.
FNRB	916218.0	NEWTONS	BN	NOMINAL THRUST USED AT PRECALCULATIONS FOR SECOND OPPORTUNITY.
IGBIA2	32.0	M/SEC**2	IGM	F/M TOLERANCE USED IN TEST TO SENSE PMR DURING S-IVB SECOND BURN.
IG7	0.0	SEC	IGM	TIME BEFORE NOMINAL S-IVB SECOND BURN EMRC TO SEARCH FOR EMRC.

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TABLE 4-II. GUIDANCE PRESETTINGS FOR TRANSLUNAR INJECTION BOOST. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
MDO1NR	218.5586	KG/SEC	BN	NOMINAL S-IVB FIRST BURN FLOW-RATE USED AT PRECALCULATIONS.
MDO15G	188.7647	KG/SEC	IGM	AVERAGE MASS FLOWRATE DURING FOURTH STAGE OF IGM GUIDANCE FOR FIRST OPPORTUNITY.
	12.93449	SLUG/SEC		
MDO16G	217.7635	KG/SEC	IGM	AVERAGE MASS FLOWRATE DURING FIFTH STAGE OF IGM GUIDANCE FOR FIRST OPPORTUNITY.
	14.92154	SLUG/SEC		
MDT5GB	217.4909	KG/SEC	IGM	AVERAGE MASS FLOWRATE DURING FOURTH STAGE OF IGM GUIDANCE FOR SECOND OPPORTUNITY.
	14.90286	SLUG/SEC		
MDT6GB	217.4909	KG/SEC	IGM	AVERAGE MASS FLOWRATE DURING FIFTH STAGE OF IGM GUIDANCE FOR SECOND OPPORTUNITY.
	14.90286	SLUG/SEC		
MNR	133710.4	KG	BN	NOMINAL MASS USED AT PRECALCULATIONS FOR FIRST OPPORTUNITY.
MNRB	133607.0	KG	BN	NOMINAL MASS USED AT PRECALCULATIONS FOR SECOND OPPORTUNITY.
PCOR	0.0	SEC	IGM	TIME AFTER NOMINAL S-IVB SECOND BURN PMR SHIFT WHEN STAGING OF THE GUIDANCE EQUATIONS IS FORCED.
ROVR	-0.40		IGM	CONSTANT FOR BIASING TERMINAL RANGE-ANGLE PREDICTION IN SECOND S-IVB BURN.

TABLE 4-II. GUIDANCE PRESETTINGS FOR TRANSLUNAR INJECTION BOOST. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
SMCG3	0.05	RAD/SEC	IGM	SMC GAIN FOR S-IVB SECOND-BURN.
TB3	5.0	SEC	IGM	NOMINAL TRANSITION TIME FOR S-IVB SECOND-BURN PMR SHIFT USED IN IGM STAGE LOGIC FOR FIRST OPPORTUNITY.
TB3B	1.0	SEC	IGM	NOMINAL TRANSITION TIME FOR S-IVB SECOND-BURN PMR SHIFT USED IN IGM STAGE LOGIC FOR SECOND OPPORTUNITY.
THSLP2	3.0	SEC	IGM	VALUE OF SECOND S-IVB BURN GUIDANCE TIME REMAINING AT WHICH THE HIGH-SPEED CUTOFF LOOP IS IMPLEMENTED.
TI7AF2	3705.	SEC		TIME IN TIMEBASE 8 TO BEGIN MANEUVER TO COMMUNICATIONS ATTITUDE.
TI7F10	20.0	SEC	ON	TIME IN TIMEBASE 7 TO BEGIN MANEUVER TO LOCAL HORIZONTAL ATTITUDE.
TI7F11	900.0	SEC	ON	TIME IN TIMEBASE 7 TO COMPUTE INERTIAL ATTITUDE CORRESPONDING TO LOCALLY REFERENCED SEPARATION ATTITUDE.
TSMCR	595.0	SEC	MLS	TIME IN TIMEBASE 6 TO BEGIN COMPUTING STEERING MISALIGNMENT CORRECTIONS (SMC).

TABLE 4-II. GUIDANCE PRESETTINGS FOR TRANSLUNAR INJECTION BOOST. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
T2IR	96.0	SEC	IGM	NOMINAL DURATION OF FOURTH STAGE OF IGM FOR FIRST OPPORTUNITY.
T2IRB	1.0	SEC	IGM	NOMINAL DURATION OF FOURTH STAGE OF IGM FOR SECOND OPPORTUNITY.
T4N	137.6	SEC	OIN	NOMINAL TIME FROM TB4 TO FIRST GCS.
T6FM	583.0	SEC	BN	TIME IN TIMEBASE 6 TO BEGIN SMOOTHED M/F COMPUTATION.
T6FMC	580.5	SEC	AP	TIME IN TIMEBASE 6 TO BEGIN BACKUP ACCELERATION CALCULATION
T6IGM	584.0	SEC	GS	TIME IN TIMEBASE 6 TO ENABLE FOURTH PHASE OF IGM.
VEX2R	4217.7239	M/SEC	IGM	EXHAUST VELOCITIES FOR FOURTH AND FIFTH STAGES OF IGM GUIDANCE FOR FIRST OPPORTUNITY.
VEX3R	4202.0581	M/SEC	IGM	
VEX2RB	4211.6061	M/SEC	IGM	EXHAUST VELOCITIES FOR FOURTH AND FIFTH STAGES OF IGM GUIDANCE FOR SECOND OPPORTUNITY
VEX3RB	4211.6061	M/SEC	IGM	

TABLE 4-II. GUIDANCE PRESETTINGS FOR TRANSLUNAR INJECTION BOOST. (CONTINUED)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
VGRD2	150.0	M/SEC	IGM	VELOCITY GUARD FOR HIGH SPEED LOOP ENTRANCE.

TABLE 4-III. MINOR-LOOP CHI COMMANDS

<u>TIME FROM TIMEBASE 1</u>	<u>MINOR-LOOP CHI (DEG)</u>
11.852	- 0.29151
12.727	- 0.37823
13.602	- 0.47282
14.477	- 0.57650
15.352	- 0.69042
16.227	- 0.81565
17.102	- 0.95321
17.977	- 1.10404
18.852	- 1.26899
19.727	- 1.44887
20.602	- 1.64438
21.477	- 1.85620
22.352	- 2.08489
23.227	- 2.33097
24.102	- 2.59488
24.977	- 2.87698
25.852	- 3.17757
26.727	- 3.49688
27.602	- 3.83505
28.477	- 4.19218
29.352	- 4.56827
30.227	- 4.96326
31.102	- 5.37703
31.977	- 5.80937
32.852	- 6.26001
33.727	- 6.72860
34.602	- 7.21251
35.477	- 7.69612
36.352	- 8.17133
37.227	- 8.65457
38.102	- 9.14522
38.977	- 9.64269
39.852	-10.14639
40.727	-10.65579
41.602	-11.17037
42.477	-11.68963
43.352	-12.21311
44.227	-12.74037
45.102	-13.27100
45.977	-13.80461
46.852	-14.34084
47.727	-14.87935
48.602	-15.41985
49.477	-15.96205
50.352	-16.50570

TABLE 4-III. MINOR-LOOP CHI COMMANDS (Continued)

<u>TIME FROM TIMEBASE 1</u>	<u>MINOR-LOOP CHI (DEG)</u>
51.227	-17.05057
52.102	-17.59645
52.977	-18.14319
53.852	-18.69062
54.727	-19.23862
55.602	-19.78711
56.477	-20.33601
57.352	-20.88529
58.227	-21.43492
59.102	-21.98491
59.977	-22.53532
60.852	-23.08619
61.727	-23.63762
62.602	-24.18973
63.477	-24.74267
64.352	-25.29659
65.227	-25.85170
66.102	-26.40823
66.977	-26.96641
67.852	-27.52653
68.727	-28.08187
69.602	-28.59730
70.477	-29.11361
71.352	-29.63348
72.227	-30.15792
73.102	-30.68785
73.977	-31.22398
74.852	-31.76689
75.727	-32.31702
76.602	-32.87462
77.477	-33.43983
78.352	-34.01260
79.227	-34.59274
80.102	-35.17991
80.977	-35.77361
81.852	-36.37318
82.727	-36.97783
83.602	-37.58660
84.477	-38.19836
85.352	-38.81186
86.227	-39.42567
87.102	-40.03822
87.977	-40.64778
88.852	-41.25247
89.727	-41.85024
90.602	-42.43892
91.477	-43.01616
92.352	-43.57945

TABLE 4-III. MINOR-LOOP CHI COMMANDS (Continued)

<u>TIME FROM TIMEBASE 1</u>	<u>MINOR-LOOP CHI (DEG)</u>
93.227	-44.12616
94.102	-44.65347
94.977	-45.15842
95.852	-45.63790
96.727	-46.08791
97.602	-46.51240
98.477	-46.97201
99.352	-47.42389
100.227	-47.86815
101.102	-48.30492
101.977	-48.73431
102.852	-49.15643
103.727	-49.57140
104.602	-49.97935
105.477	-50.38039
106.352	-50.77465
107.227	-51.16223
108.102	-51.54328
108.977	-51.91790
109.852	-52.28622
110.727	-52.64837
111.602	-53.00446
112.477	-53.35463
113.352	-53.69900
114.227	-54.03770
115.102	-54.37085
115.977	-54.69858
116.852	-55.02102
117.727	-55.33830
118.602	-55.65055
119.477	-55.95790
120.352	-56.26048
121.227	-56.55843
122.102	-56.85187
122.977	-57.14094
123.852	-57.42578
124.727	-57.70651
125.602	-57.98328
126.477	-58.25622
127.352	-58.52546
128.227	-58.79115
129.102	-59.05342
129.977	-59.31242
130.852	-59.56828
131.727	-59.82113
132.602	-60.07114

TABLE 4-III. MINOR-LOOP CHI COMMANDS (Continued)

<u>TIME FROM TIMEBASE 1</u>	<u>MINOR-LOOP CHI (DEG)</u>
133.477	-60.31842
134.352	-60.56314
135.227	-60.80542
136.102	-61.04542
136.977	-61.28327
137.852	-61.51913
138.727	-61.75314
139.602	-61.98545
140.477	-62.21620
141.352	-62.44554
142.227	-62.67362
143.102	-62.90059
143.977	-63.12660
144.852	-63.35180
145.727	-63.57634
146.602	-63.80038
147.477	-64.02406
148.352	-64.24754
149.227	-64.47098
150.102	-64.69452
150.977	-64.91833
151.852	-65.14256
152.727	-65.36737
153.602	-65.59291
154.477	-65.81935
155.352	-66.04684
156.227	-66.27554
157.102	-66.47256

TABLE 4-IV. TARGETING PRESETTINGS FROM 13 SEPTEMBER 1969 OCTAL CARDS.

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
ALFSA	8.025005D-02	PIRADS	BTST	DESIRED ANGLE BETWEEN THE S VECTOR (NODAL CROSSING OF TARGET ELLIPSE AND EARTH PARKING ORBIT) AND T (UNIT TARGET) VECTOR AT RESTART PREPARATION FOR FIRST OPPORTUNITY. (CONSTANT ACROSS DAILY LAUNCH WINDOW.)
ALFSB	8.832118D-02	PIRADS	BTST	DESIRED ANGLE BETWEEN THE S VECTOR AND TARGET VECTOR AT RESTART PREPARATION FOR SECOND OPPORTUNITY. (CONSTANT ACROSS DAILY LAUNCH WINDOW.)
AZO	4.000000D-01	PIRADS	BTST	AZIMUTH AT OPENING OF LAUNCH WINDOW.
AZS	2.000000D-01	PIRADS	BTST	DIFFERENCE BETWEEN OPENING AND CLOSING AZIMUTHS OF LAUNCH WINDOW.
BETAA	3.305411D-01	PIRADS	BTST	ANGLE BETWEEN S VECTOR AND RADIUS VECTOR AT INITIATION OF S-IVB RESTART PREPARATIONS FOR FIRST OPPORTUNITY. (CONSTANT ACROSS LAUNCH WINDOW.)
BETAB	3.346715D-01	PIRADS	BTST	ANGLE BETWEEN S VECTOR AND RADIUS VECTOR AT INITIATION OF S-IVB RESTART PREPARATIONS FOR SECOND OPPORTUNITY. (CONSTANT

TABLE 4-IV. TARGETING PRESETTINGS FROM 13 SEPTEMBER 1969 OCTAL CARDS. (CONT.)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
BETAB	(CONT.)			ACROSS LAUNCH WINDOW.)
COSA0	9.9174290-01	NONE	BTST	COSA0 THROUGH COSA14 ARE VALUES OF A 15 POINT TABLE OF THE COSINE OF THE TRUE ANOMALY OF THE TARGET VECTOR AS A FUNCTION OF TIME INTO THE LAUNCH WINDOW FOR FIRST OPPORTUNITY.
COSA1	9.9180680-01	NONE	BTST	
COSA2	9.9185270-01	NONE	BTST	
COSA3	9.9174270-01	NONE	BTST	
COSA4	9.9169040-01	NONE	BTST	
COSA5 TO COSA14	0.0	NONE	BTST	
COSB0	9.9158310-01	NONE	BTST	COSB0 THROUGH COSB14 ARE VALUES OF A 15 POINT TABLE OF THE COSINE OF THE TRUE ANOMALY OF THE TARGET VECTOR AS A FUNCTION OF TIME INTO THE LAUNCH WINDOW FOR SECOND OPPORTUNITY.
COSB1	9.9173930-01	NONE	BTST	
COSB2	9.9183820-01	NONE	BTST	
COSB3	9.9173370-01	NONE	BTST	

TABLE 4-IV. TARGETING PRESETTINGS FROM 13 SEPTEMBER 1969 OCTAL CARDS. (CONT.)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
CDS84	9.913488D-01	NONE	BTST	
CDS85 TO COSB140.0		NONE	BTST	
C3A0	-1.541156D 06	M**2/SEC**2	BTST	C3A0 THROUGH C3A14 ARE VALUES OF A 15 POINT TABLE OF TWICE THE SPECIFIC ENERGY OF THE TARGET ELLIPSE AS A FUNCTION OF TIME INTO THE LAUNCH WINDOW FOR FIRST OPPORTUNITY.
C3A1	-1.538846D 06	M**2/SEC**2	BTST	
C3A2	-1.538154D 06	M**2/SEC**2	BTST	
C3A3	-1.539849D 06	M**2/SEC**2	BTST	
C3A4	-1.543141D 06	M**2/SEC**2	BTST	
C3A5 TO C3A14	0.0	M**2/SEC**2	BTST	
C3B0	-1.541714D 06	M**2/SEC**2	BTST	C3B0 THROUGH C3B14 ARE VALUES OF A 15 POINT TABLE OF TWICE THE SPECIFIC ENERGY OF THE TARGET ELLIPSE AS A FUNCTION OF TIME INTO THE LAUNCH WINDOW FOR SECOND OPPORTUNITY.
C3B1	-1.539392D 06	M**2/SEC**2	BTST	
C3B2	-1.538593D 06	M**2/SEC**2	BTST	

TABLE 4-IV. TARGETING PRESETTINGS FROM 13 SEPTEMBER 1969 OCTAL CARDS. (CONT.)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
C3B3	-1.540368D 06	M**2/SEC**2	BTST	
C3B4	-1.543855D 06	M**2/SEC**2	BTST	
C3B5 TO C3B14	0.0	M**2/SEC**2	BTST	
DATE	2.550000D 02	DAYS	BTST	DATE OF LAUNCH EXPRESSED IN DAYS AFTER JAN. 1 OF YEAR OF LAUNCH (JAN. 1 IS DAY '0').
DECA0	1.242982D-01	PIRADS	BTST	DECA0 THROUGH DECA14 ARE VALUES OF A 15 POINT TABLE OF TARGET VECTOR DECLINATION AS A FUNCTION OF TIME INTO THE LAUNCH WINDOW FOR FIRST OPPORTUNITY.
DECA1	1.248918D-01	PIRADS	BTST	
DECA2	1.258150D-01	PIRADS	BTST	
DECA3	1.269651D-01	PIRADS	BTST	
DECA4	1.282259D-01	PIRADS	BTST	
DECA5 TO DECA14	0.0	PIRADS	BTST	
DEC80	1.255438D-01	PIRADS	BTST	DEC80 THROUGH DEC814 ARE VALUES OF A 15 POINT TABLE OF TARGET VECTOR DECLINATION AS A FUNCTION OF TIME INTO THE LAUNCH WINDOW FOR SECOND OPPORTUNITY.

TABLE 4-IV • TARGETING PRESETTINGS FROM 13 SEPTEMBER 1969 OCTAL CARDS. (CONT.)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
DEC81	1.262321D-01	PIRADS	BTST	
DEC82	1.271837D-01	PIRADS	BTST	
DEC83	1.283165D-01	PIRADS	BTST	
DEC84	1.292218D-01	PIRADS	BTST	
DEC85 TO DEC14 0.0		PIRADS	BTST	
DPIT1	6.666667D-01	PIRADS	OG	LAUNCH VEHICLE PITCH ATTITUDE REQUIRED FOR S/C SEPARATION MEASURED FROM LOCAL HORIZONTAL COORDINATE SYSTEM AT T87 + 900 SECONDS.
DPIT2	NOT AVAILABLE	PIRADS	OG	LV PITCH ATTITUDE REQUIRED FOR SLINGSHOT ATTITUDE MEASURED FROM LOCAL HORIZONTAL COORDINATE SYSTEM.
DROLL1	9.999999D-01	PIRADS	OG	LV ROLL ATTITUDE REQUIRED FOR S/C SEPARATION ATTITUDE.
DROLL2	NOT AVAILABLE	PIRADS	OG	LV ROLL ATTITUDE REQUIRED FOR SLINGSHOT ATTITUDE.
DVBRA	1.4595	M/SEC	BTST	CUTOFF VELOCITY BIAS FOR TRANSLUNAR INJECTION FOR FIRST OPPORTUNITY (CONSTANT ACROSS DAILY LAUNCH WINDOW).

TABLE 4-IV. TARGETING PRESETTINGS FROM 13 SEPTEMBER 1969 UCTAL CARDS. (CONT.)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
DVBR8	1.6656	M/SEC	BTST	CUTOFF VELOCITY BIAS FOR TRANSLUNAR INJECTION FOR SECOND OPPORTUNITY (CONSTANT ACROSS DAILY LAUNCH WINDOW).
DYAW1	2.222222D-01	PIRADS	OG	LV YAW ATTITUDE REQUIRED FOR S/C SEPARATION ATTITUDE.
DYAW2	NOT AVAILABLE	PIRADS	OG	LV YAW ATTITUDE REQUIRED FOR SLINGSHOT ATTITUDE.
ENAO	9.744932D-01	NONE	BTST	ENAO THROUGH ENA14 ARE VALUES OF A 15 POINT TABLE OF TARGET ELLIPSE ECCENTRICITY AS A FUNCTION OF TIME INTO THE LAUNCH WINDOW FOR FIRST OPPORTUNITY.
ENAI1	9.745275D-01	NONE	BTST	
ENAI2	9.745371D-01	NONE	BTST	
ENAI3	9.745073D-01	NONE	BTST	
ENAI4	9.744535D-01	NONE	BTST	
ENAI5 TO ENAI4	0.0	NONE	BTST	
ENBO	9.744743D-01	NONE	BTST	ENBO THROUGH ENB14 ARE VALUES OF A 15 POINT TABLE OF TARGET ELLIPSE ECCENTRICITY AS A FUNCTION OF TIME INTO THE LAUNCH WINDOW FOR SECOND OPPORTUNITY.

TABLE 4-IV. TARGETING PRESETTINGS FROM 13 SEPTEMBER 1969 OCTAL CARDS. (CONT.)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
ENB1	9.745104D-01	NONE	BTST	
ENB2	9.745221D-01	NONE	BTST	
ENB3	9.744909D-01	NONE	BTST	
ENB4	9.744326D-01	NONE	BTST	
ENB5 TO ENB14	0.0	NONE	BTST	
FA	7.725203D-02	PIRADS	BTST	TRUE ANOMALY OF THE PREDICTED CUTOFF RADIUS VECTOR FOR FIRST OPPORTUNITY (CONSTANT ACROSS DAILY LAUNCH WINDOW).
FB	7.519447D-02	PIRADS	BTST	TRUE ANOMALY OF THE PREDICTED CUTOFF RADIUS VECTOR FOR SECOND OPPORTUNITY (CONSTANT ACROSS DAILY LAUNCH WINDOW).
H10	4.001011D-01	PIRADS	BTST	H10 THROUGH H14 ARE COEFFICIENTS OF THE FIRST-SEGMENT POLYNOMIAL OF LAUNCH AZIMUTH VERSUS TIME.
H11	1.491297D-01	PIRADS	BTST	
H12	-1.156542D-01	PIRADS	BTST	
H13	8.065616D-02	PIRADS	BTST	

TABLE 4-IV. TARGETING PRESETTINGS FROM 13 SEPTEMBER 1969 OCTAL CARDS. (CONT.)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
H14	-2.582306D-02	PIRADS	BTST	
H20	4.885217D-01	PIRADS	BTST	H20 THROUGH H24 ARE COEFFICIENTS OF THE SECOND-SEGMENT POLYNOMIAL OF LAUNCH AZIMUTH VERSUS TIME.
H21	1.408099D-01	PIRADS	BTST	
H22	-6.843093D-02	PIRADS	BTST	
H23	5.030271D-02	PIRADS	BTST	
H24	-1.123907D-02	PIRADS	BTST	
H30	0.0	PIRADS	BTST	H30 THROUGH H34 ARE COEFFICIENTS OF THE THIRD-SEGMENT POLYNOMIAL OF LAUNCH AZIMUTH VERSUS TIME.
H31	0.0	PIRADS	BTST	
H32	0.0	PIRADS	BTST	
H33	0.0	PIRADS	BTST	
H34	0.0	PIRADS	BTST	
PAD	-2.980232D-08	N/D	BTST	LAUNCH PAD INDICATOR FLAG (SET TO OCTAL VALUE OF 77777776 FOR PAD 398 LAUNCH).

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TABLE 4-IV. TARGETING PRESETTINGS FROM 13 SEPTEMBER 1969 OCIAL CARDS. (CONT.)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
RASAO	2.624370D-01	PIRADS	BTST	RASAO THROUGH RASAI4 ARE VALUES OF A 15 POINT TABLE OF THE TARGET VECTOR RIGHT ASCENSION AS A FUNCTION OF TIME INTO THE LAUNCH WINDOW FOR FIRST OPPORTUNITY.
RASAI	2.643561D-01	PIRADS	BTST	
RASAI2	2.674063D-01	PIRADS	BTST	
RASAI3	2.712720D-01	PIRADS	BTST	
RASAI4	2.756226D-01	PIRADS	BTST	
RASAI5 TO RASAI4	0.0	PIRADS	BTST	
RASBO	2.666546D-01	PIRADS	BTST	RASBO THROUGH RASBI4 ARE VALUES OF A 15 POINT TABLE OF THE TARGET VECTOR RIGHT ASCENSION AS A FUNCTION OF TIME INTO THE LAUNCH WINDOW FOR SECOND OPPORTUNITY.
RASBI	2.688082D-01	PIRADS	BTST	
RASBI2	2.720059D-01	PIRADS	BTST	
RASBI3	2.759033D-01	PIRADS	BTST	
RASBI4	2.794540D-01	PIRADS	BTST	

TABLE 4-IV. TARGETING PRESETTINGS FROM 13 SEPTEMBER 1969 OCTAL CARDS. (CONT.)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
RAS85 TO RASB1	4 0.0	PIRADS	BTST	
RNA	6.573373D 06	M	BTST	PREDICTED RADIUS AT REIGNITION FOR FIRST OPPORTUNITY (CONSTANT ACROSS DAILY LAUNCH WINDOW).
RNB	6.576506D 06	M	BTST	PREDICTED RADIUS AT REIGNITION FOR SECOND OPPORTUNITY (CONSTANT ACROSS DAILY LAUNCH WINDOW).
TAU3RA	5.322558D 02	SEC	IGM	ESTIMATED PERIOD OF TIME REQUIRED TO CONSUME THE VEHICLE MASS AT THE TIME OF FIRST OPPORTUNITY MIXTURE-RATIO SHIFT USING THE POST-SHIFT NOMINAL PROPELLANT FLOWRATE.
TAU3RB	6.148043D 02	SEC	IGM	ESTIMATED PERIOD OF TIME REQUIRED TO CONSUME THE VEHICLE MASS AT THE TIME OF SECOND OPPORTUNITY MIXTURE-RATIO SHIFT USING THE POST-SHIFT NOMINAL PROPELLANT FLOWRATE.
TDSO	0.0	SEC	BTST	TDSO THROUGH TDS3 ARE THE PARTITION TIMES FOR LAUNCH AZIMUTH POLYNOMIAL SEGMENTS.
TDS1	4.693070D 03	SEC	BTST	

TABLE 4-IV. TARGETING PRESETTINGS FROM 13 SEPTEMBER 1969 OCTAL CARDS. (CONT.)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
TDS2	1.613939D 04	SEC	BTST	
TDS3	0.0	SEC	BTST	
TD1	0.0	SEC	BTST	TD1 THROUGH TD3 ARE THE INITIAL TIMES FOR THE AZIMUTH POLYNOMIAL SEGMENTS.
TD2	4.693070D 03	SEC	BTST	
TD3	1.613939D 04	SEC	BTST	
THTEO	3.637837D-01	PIRADS	BTST	ANGLE BETWEEN THE INERTIAL MERIDIAN OF THE VERNAL EQUINOX AND PAD 39A MERIDIAN AT TLO. PAD 39A VALUE IS SUPPLIED EVEN FOR PAD 39B LAUNCHES.
TLO	3.692523D 04	SEC	BTST	TIME FROM MIDNIGHT GREENWICH MEAN TIME TO GRR AT THE OPENING OF THE DAILY LAUNCH WINDOW.
TPAO	0.0	SEC	BTST	TPAO THROUGH TPAI4 ARE VALUES OF A 15 POINT TABLE OF TIME SINCE LAUNCH WINDOW OPENING. THESE TIMES ARE VALUES OF THE INDEPENDENT VARIABLE FOR ALL OUT-OF-ORBIT TARGETING TABLES FOR FIRST OPPORTUNITY.

TABLE 4-IV . TARGETING PRESETTINGS FROM 13 SEPTEMBER 1969 OCTAL CARDS. (CONT.)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
TPA1	2.107718D 03	SEC	BTST	
TPA2	5.661168D 03	SEC	BTST	
TPA3	1.069927D 04	SEC	BTST	
TPA4	1.613939D 04	SEC	BTST	
TPA5 TO TPA14	0.0	SEC	BTST	
TPB0	0.0	SEC	BTST	
TPB1	2.107718D 03	SEC	BTST	
TPB2	5.661168D 03	SEC	BTST	
TPB3	1.069927D 04	SEC	BTST	
TPB4	1.613939D 04	SEC	BTST	
TPB5 TO TPB14	0.0	SEC	BTST	
TSD1	4.693070D 03	SEC	BTST	

TPB0 THROUGH TPB14 ARE VALUES OF A 15 POINT TABLE OF TIME SINCE LAUNCH WINDOW OPENING. THESE TIMES ARE VALUES OF THE INDEPENDENT VARIABLE FOR ALL OUT-OF-ORBIT TARGETING TABLES FOR SECOND OPPORTUNITY.

TSD1 THROUGH TSD3 ARE AZIMUTH POLYNOMIAL NORMALIZING COEFFICIENTS.

TABLE 4-IV . TARGETING PRESETTINGS FROM 13 SEPTEMBER 1969 OCTAL CARDS. (CONT.)

PROGRAM SYMBOL	PRESETTING	UNITS	LVDC SECTION	DEFINITION
TSD2	1.1446320 04	SEC	BTST	
TSD3	0.0	SEC	BTST	
TSTA	8.357772D 03	SEC	BTST	TIME TO BEGIN TESTING FOR RESTART PREPARATIONS REFERENCED TO TIMEBASE 5 FOR FIRST OPPORTUNITY.
TSTB	1.366862D 04	SEC	BTST	TIME TO BEGIN TESTING FOR RESTART PREPARATIONS REFERENCED TO TIMEBASE 5 FOR SECOND OPPORTUNITY.
TVRATE	2.321150D-05	PIRADS/SEC	BI,VLAS	EARTH ROTATION RATE (0 IS USED FOR FIXED AZIMUTH MISSIONS).
T3PRA	2.405459D 02	SEC	BTST	ESTIMATE OF THE FIFTH STAGE IGM BURN TIME FOR FIRST OPPORTUNITY
T3PRB	3.230873D 02	SEC	BTST	ESTIMATE OF THE FIFTH STAGE IGM BURN TIME FOR SECOND OPPORTUNITY.
CKSJ5	NOT AVAILABLE			CHECK SUM CONSTANTS FOR SECTOR 15
CKSJ6	NOT AVAILABLE			CHECK SUM CONSTANTS FOR SECTOR 16

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
015200146314630		AZO	4.000000D-01	0	AS-507	13 SEP 69
015201063146314		AZS	2.000000D-01	0	AS-507	13 SEP 69
015202135101666		THTEO	3.637837D-01	0	AS-507	13 SEP 69
015203777777776		PAD	-2.980232D-08	0	AS-507	13 SEP 69
015210000013532		DVBRA	1.459500D	0014	AS-507	13 SEP 69
015211000015246		DVBRB	1.665600D	0014	AS-507	13 SEP 69
015212023615446		FA	7.725203D-02	0	AS-507	13 SEP 69
015213023177706		FB	7.519447D-02	0	AS-507	13 SEP 69
015214004121012		TAU3RA	5.322558D	0215	AS-507	13 SEP 69
015215004633156		TAU3RB	6.148043D	0215	AS-507	13 SEP 69
015220024426422		ALFTSA	8.025005D-02	0	AS-507	13 SEP 69
015221026470334		ALFTSB	8.832118D-02	0	AS-507	13 SEP 69
015222310464750		RNA	6.573373D	0623	AS-507	13 SEP 69
015223310545716		RNB	6.576506D	0623	AS-507	13 SEP 69
015230101227054		TSTA	8.357772D	0315	AS-507	13 SEP 69
015231152622354		TSTB	1.366862D	0415	AS-507	13 SEP 69
015232252525252		DPIT1	6.666667D-01	0	AS-507	13 SEP 69
015233070707070		DYAW1	2.222222D-01	0	AS-507	13 SEP 69
015234377777776		DROLL1	9.999999D-01	0	AS-507	13 SEP 69
015235		DPIT2	NOT AVAILABLE		AS-507	13 SEP 69
015236		DYAW2	NOT AVAILABLE		AS-507	13 SEP 69
015237		DROLL2	NOT AVAILABLE		AS-507	13 SEP 69
015240001702134		T3PRA	2.405459D	0215	AS-507	13 SEP 69
015241002414262		T3PRB	3.230873D	0215	AS-507	13 SEP 69
015250000000000		TD1	0.0	15	AS-507	13 SEP 69
015251044524220		TD2	4.693070D	0315	AS-507	13 SEP 69
015252176055430		TD3	1.613939D	0415	AS-507	13 SEP 69
015260044524220		TSD1	4.693070D	0315	AS-507	13 SEP 69
015261131331210		TSD2	1.144632D	0415	AS-507	13 SEP 69
015262000000000		TSD3	0.0	15	AS-507	13 SEP 69
015377		CKS15	NOT AVAILABLE		AS-507	13 SEP 69
016000000000000		TPA0	0.0	15	AS-507	13 SEP 69
016001020356676		TPA1	2.107718D	0315	AS-507	13 SEP 69
016002054164530		TPA2	5.661168D	0315	AS-507	13 SEP 69
016003123455052		TPA3	1.069927D	0415	AS-507	13 SEP 69
016004176055432		TPA4	1.613939D	0415	AS-507	13 SEP 69
016005000000000		TPA5	0.0	15	AS-507	13 SEP 69
016006000000000		TPA6	0.0	15	AS-507	13 SEP 69
016007000000000		TPA7	0.0	15	AS-507	13 SEP 69
016010000000000		TPA8	0.0	15	AS-507	13 SEP 69
016011000000000		TPA9	0.0	15	AS-507	13 SEP 69
016012000000000		TPA10	0.0	15	AS-507	13 SEP 69
016013000000000		TPA11	0.0	15	AS-507	13 SEP 69
016014000000000		TPA12	0.0	15	AS-507	13 SEP 69
016015000000000		TPA13	0.0	15	AS-507	13 SEP 69
016016000000000		TPA14	0.0	15	AS-507	13 SEP 69

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
016017124474532		BETAA	3.305411D-01	0	AS-507	13 SEP 69
016020772075734		C3A0	-1.541156D	0626	AS-507	13 SEP 69
016021772102342		C3A1	-1.538846D	0626	AS-507	13 SEP 69
016022772103626		C3A2	-1.538154D	0626	AS-507	13 SEP 69
016023772100366		C3A3	-1.539849D	0626	AS-507	13 SEP 69
016024772072032		C3A4	-1.543141D	0626	AS-507	13 SEP 69
016025000000000		C3A5	0.0	26	AS-507	13 SEP 69
016026000000000		C3A6	0.0	26	AS-507	13 SEP 69
016027000000000		C3A7	0.0	26	AS-507	13 SEP 69
016030000000000		C3A8	0.0	26	AS-507	13 SEP 69
016031000000000		C3A9	0.0	26	AS-507	13 SEP 69
016032000000000		C3A10	0.0	26	AS-507	13 SEP 69
016033000000000		C3A11	0.0	26	AS-507	13 SEP 69
016034000000000		C3A12	0.0	26	AS-507	13 SEP 69
016035000000000		C3A13	0.0	26	AS-507	13 SEP 69
016036000000000		C3A14	0.0	26	AS-507	13 SEP 69
016040375705562		COSA0	9.917429D-01	0	AS-507	13 SEP 69
016041375716066		COSA1	9.918068D-01	0	AS-507	13 SEP 69
016042375724070		COSA2	9.918527D-01	0	AS-507	13 SEP 69
016043375705542		COSA3	9.917427D-01	0	AS-507	13 SEP 69
016044375676662		COSA4	9.916904D-01	0	AS-507	13 SEP 69
016045000000000		COSA5	0.0	0	AS-507	13 SEP 69
016046000000000		COSA6	0.0	0	AS-507	13 SEP 69
016047000000000		COSA7	0.0	0	AS-507	13 SEP 69
016050000000000		COSA8	0.0	0	AS-507	13 SEP 69
016051000000000		COSA9	0.0	0	AS-507	13 SEP 69
016052000000000		COSA10	0.0	0	AS-507	13 SEP 69
016053000000000		COSA11	0.0	0	AS-507	13 SEP 69
016054000000000		COSA12	0.0	0	AS-507	13 SEP 69
016055000000000		COSA13	0.0	0	AS-507	13 SEP 69
016056000000000		COSA14	0.0	0	AS-507	13 SEP 69
016060103136112		RASA0	2.624370D-01	0	AS-507	13 SEP 69
016061103531532		RASA1	2.643561D-01	0	AS-507	13 SEP 69
016062104351362		RASA2	2.674063D-01	0	AS-507	13 SEP 69
016063105344124		RASA3	2.712720D-01	0	AS-507	13 SEP 69
016064106436316		RASA4	2.756226D-01	0	AS-507	13 SEP 69
016065000000000		RASA5	0.0	0	AS-507	13 SEP 69
016066000000000		RASA6	0.0	0	AS-507	13 SEP 69
016067000000000		RASA7	0.0	0	AS-507	13 SEP 69
016070000000000		RASA8	0.0	0	AS-507	13 SEP 69
016071000000000		RASA9	0.0	0	AS-507	13 SEP 69
016072000000000		RASA10	0.0	0	AS-507	13 SEP 69
016073000000000		RASA11	0.0	0	AS-507	13 SEP 69
016074000000000		RASA12	0.0	0	AS-507	13 SEP 69
016075000000000		RASA13	0.0	0	AS-507	13 SEP 69
016076000000000		RASA14	0.0	0	AS-507	13 SEP 69
016100037644012		DECA0	1.242982D-01	0	AS-507	13 SEP 69

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
016101037761644		DECA1	1.248918D-01	0	AS-507	13 SEP 69
016102040152642		DECA2	1.258150D-01	0	AS-507	13 SEP 69
016103040401442		DECA3	1.269651D-01	0	AS-507	13 SEP 69
016104040646646		DECA4	1.282259D-01	0	AS-507	13 SEP 69
016105000000000		DECA5	0.0	0	AS-507	13 SEP 69
016106000000000		DECA6	0.0	0	AS-507	13 SEP 69
016107000000000		DECA7	0.0	0	AS-507	13 SEP 69
016110000000000		DECA8	0.0	0	AS-507	13 SEP 69
016111000000000		DECA9	0.0	0	AS-507	13 SEP 69
016112000000000		DECA10	0.0	0	AS-507	13 SEP 69
016113000000000		DECA11	0.0	0	AS-507	13 SEP 69
016114000000000		DECA12	0.0	0	AS-507	13 SEP 69
016115000000000		DECA13	0.0	0	AS-507	13 SEP 69
016116000000000		DECA14	0.0	0	AS-507	13 SEP 69
016120371360612		ENA0	9.744932D-01	0	AS-507	13 SEP 69
016121371365210		ENA1	9.745275D-01	0	AS-507	13 SEP 69
016122371366412		ENA2	9.745371D-01	0	AS-507	13 SEP 69
016123371362500		ENA3	9.745073D-01	0	AS-507	13 SEP 69
016124371353442		ENA4	9.744535D-01	0	AS-507	13 SEP 69
016125000000000		ENA5	0.0	0	AS-507	13 SEP 69
016126000000000		ENA6	0.0	0	AS-507	13 SEP 69
016127000000000		ENA7	0.0	0	AS-507	13 SEP 69
016130000000000		ENA8	0.0	0	AS-507	13 SEP 69
016131000000000		ENA9	0.0	0	AS-507	13 SEP 69
016132000000000		ENA10	0.0	0	AS-507	13 SEP 69
016133000000000		ENA11	0.0	0	AS-507	13 SEP 69
016134000000000		ENA12	0.0	0	AS-507	13 SEP 69
016135000000000		ENA13	0.0	0	AS-507	13 SEP 69
016136000000000		ENA14	0.0	0	AS-507	13 SEP 69
016140000000000		TPB0	0.0	15	AS-507	13 SEP 69
016141020356676		TPB1	2.107718D	0315	AS-507	13 SEP 69
016142054164530		TPB2	5.661168D	0315	AS-507	13 SEP 69
016143123455052		TPB3	1.069927D	0415	AS-507	13 SEP 69
016144176055432		TPB4	1.613939D	0415	AS-507	13 SEP 69
016145000000000		TPB5	0.0	15	AS-507	13 SEP 69
016146000000000		TPB6	0.0	15	AS-507	13 SEP 69
016147000000000		TPB7	0.0	15	AS-507	13 SEP 69
016150000000000		TPB8	0.0	15	AS-507	13 SEP 69
016151000000000		TPB9	0.0	15	AS-507	13 SEP 69
016152000000000		TPB10	0.0	15	AS-507	13 SEP 69
016153000000000		TPB11	0.0	15	AS-507	13 SEP 69
016154000000000		TPB12	0.0	15	AS-507	13 SEP 69
016155000000000		TPB13	0.0	15	AS-507	13 SEP 69
016156000000000		TPB14	0.0	15	AS-507	13 SEP 69
016157125532036		BETAB	3.346715D-01	0	AS-507	13 SEP 69
016160772074656		C3B0	-1.541714D	0626	AS-507	13 SEP 69
016161772101300		C3B1	-1.539392D	0626	AS-507	13 SEP 69

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
016162772102736		C3B2	-1.538593D	0626	AS-507	13 SEP 69
016163772077360		C3B3	-1.540368D	0626	AS-507	13 SEP 69
016164772070522		C3B4	-1.543855D	0626	AS-507	13 SEP 69
016165000000000		C3B5	0.0	26	AS-507	13 SEP 69
016166000000000		C3B6	0.0	26	AS-507	13 SEP 69
016167000000000		C3B7	0.0	26	AS-507	13 SEP 69
016170000000000		C3B8	0.0	26	AS-507	13 SEP 69
016171000000000		C3B9	0.0	26	AS-507	13 SEP 69
016172000000000		C3B10	0.0	26	AS-507	13 SEP 69
016173000000000		C3B11	0.0	26	AS-507	13 SEP 69
016174000000000		C3B12	0.0	26	AS-507	13 SEP 69
016175000000000		C3B13	0.0	26	AS-507	13 SEP 69
016176000000000		C3B14	0.0	26	AS-507	13 SEP 69
016200375660616		COSB0	9.915831D-01	0	AS-507	13 SEP 69
016201375705176		CUSB1	9.917393D-01	0	AS-507	13 SEP 69
016202375722152		COSB2	9.918382D-01	0	AS-507	13 SEP 69
016203375704412		COSB3	9.917337D-01	0	AS-507	13 SEP 69
016204375622046		COSH4	9.913488D-01	0	AS-507	13 SEP 69
016205000000000		COSB5	0.0	0	AS-507	13 SEP 69
016206000000000		CUSB6	0.0	0	AS-507	13 SEP 69
016207000000000		COSB7	0.0	0	AS-507	13 SEP 69
016210000000000		COSB8	0.0	0	AS-507	13 SEP 69
016211000000000		CUSB9	0.0	0	AS-507	13 SEP 69
016212000000000		COSB10	0.0	0	AS-507	13 SEP 69
016213000000000		COSB11	0.0	0	AS-507	13 SEP 69
016214000000000		COSB12	0.0	0	AS-507	13 SEP 69
016215000000000		COSB13	0.0	0	AS-507	13 SEP 69
016216000000000		COSB14	0.0	0	AS-507	13 SEP 69
016220104206746		RASB0	2.666546D-01	0	AS-507	13 SEP 69
016221104641166		RASB1	2.688082D-01	0	AS-507	13 SEP 69
016222105504264		RASB2	2.720059D-01	0	AS-507	13 SEP 69
016223106503146		RASB3	2.759033D-01	0	AS-507	13 SEP 69
016224107424460		RASB4	2.794540D-01	0	AS-507	13 SEP 69
016225000000000		RASB5	0.0	0	AS-507	13 SEP 69
016226000000000		RASB6	0.0	0	AS-507	13 SEP 69
016227000000000		RASB7	0.0	0	AS-507	13 SEP 69
016230000000000		RASB8	0.0	0	AS-507	13 SEP 69
016231000000000		RASB9	0.0	0	AS-507	13 SEP 69
016232000000000		RASB10	0.0	0	AS-507	13 SEP 69
016233000000000		RASB11	0.0	0	AS-507	13 SEP 69
016234000000000		RASB12	0.0	0	AS-507	13 SEP 69
016235000000000		RASB13	0.0	0	AS-507	13 SEP 69
016236000000000		RASB14	0.0	0	AS-507	13 SEP 69
016240040107214		DECB0	1.255438D-01	0	AS-507	13 SEP 69
016241040241372		DECB1	1.262321D-01	0	AS-507	13 SEP 69
016242040436164		DECB2	1.271837D-01	0	AS-507	13 SEP 69
016243040662550		DECB3	1.283165D-01	0	AS-507	13 SEP 69

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
016244041051264		DECB4	1.292218D-01	0	AS-507	13 SEP 69
016245000000000		DECB5	0.0	0	AS-507	13 SEP 69
016246000000000		DECB6	0.0	0	AS-507	13 SEP 69
016247000000000		DECB7	0.0	0	AS-507	13 SEP 69
016250000000000		DECB8	0.0	0	AS-507	13 SEP 69
016251000000000		DECB9	0.0	0	AS-507	13 SEP 69
016252000000000		DECB10	0.0	0	AS-507	13 SEP 69
016253000000000		DECB11	0.0	0	AS-507	13 SEP 69
016254000000000		DECB12	0.0	0	AS-507	13 SEP 69
016255000000000		DECB13	0.0	0	AS-507	13 SEP 69
016256000000000		DECB14	0.0	0	AS-507	13 SEP 69
016260371356226		ENB0	9.744743D-01	0	AS-507	13 SEP 69
016261371363012		ENB1	9.745104D-01	0	AS-507	13 SEP 69
016262371364436		ENB2	9.745221D-01	0	AS-507	13 SEP 69
016263371360356		ENB3	9.744909D-01	0	AS-507	13 SEP 69
016264371350652		ENB4	9.744326D-01	0	AS-507	13 SEP 69
016265000000000		ENB5	0.0	0	AS-507	13 SEP 69
016266000000000		ENB6	0.0	0	AS-507	13 SEP 69
016267000000000		ENB7	0.0	0	AS-507	13 SEP 69
016270000000000		ENB8	0.0	0	AS-507	13 SEP 69
016271000000000		ENB9	0.0	0	AS-507	13 SEP 69
016272000000000		ENB10	0.0	0	AS-507	13 SEP 69
016273000000000		ENB11	0.0	0	AS-507	13 SEP 69
016274000000000		ENB12	0.0	0	AS-507	13 SEP 69
016275000000000		ENB13	0.0	0	AS-507	13 SEP 69
016276000000000		ENB14	0.0	0	AS-507	13 SEP 69
016300146332034		H10	4.001011D-01	0	AS-507	13 SEP 69
016301046132560		H11	1.491297D-01	0	AS-507	13 SEP 69
016302742310764		H12	-1.156542D-01	0	AS-507	13 SEP 69
016303024513606		H13	8.065616D-02	0	AS-507	13 SEP 69
016304771307244		H14	-2.582306D-02	0	AS-507	13 SEP 69
016305044524220		TDS1	4.693070D	0315	AS-507	13 SEP 69
016306000000000		TDS0	0.0	15	AS-507	13 SEP 69
016310175037412		H20	4.885217D-01	0	AS-507	13 SEP 69
016311044030166		H21	1.408099D-01	0	AS-507	13 SEP 69
016312756366476		H22	-6.843093D-02	0	AS-507	13 SEP 69
016313014701214		H23	5.030271D-02	0	AS-507	13 SEP 69
016314775076676		H24	-1.123907D-02	0	AS-507	13 SEP 69
016315176055430		TDS2	1.613939D	0415	AS-507	13 SEP 69
016320000000000		H30	0.0	0	AS-507	13 SEP 69
016321000000000		H31	0.0	0	AS-507	13 SEP 69
016322000000000		H32	0.0	0	AS-507	13 SEP 69
016323000000000		H33	0.0	0	AS-507	13 SEP 69
016324000000000		H34	0.0	0	AS-507	13 SEP 69
016325000000000		TDS3	0.0	15	AS-507	13 SEP 69
016347		CKS16	NOT AVAILABLE		AS-507	13 SEP 69
016354077600000		DATE	2.550000D	0210	AS-507	13 SEP 69

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
016355302554504		TVRATE	2.321150D-0515-		AS-507	13 SEP 69
016373110075164		TLO	3.692523D 0417		AS-507	13 SEP 69
END						

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
015200146314630		AZD	4.000000D-01	0	AS-507	15 SEP 69
015201063146314		AZS	2.000000D-01	0	AS-507	15 SEP 69
015202160173160		THTEO	4.384401D-01	0	AS-507	15 SEP 69
015203777777776		PAD	-2.980232D-08	0	AS-507	15 SEP 69
015210000013532		DVBRA	1.459500D	0014	AS-507	15 SEP 69
015211000015246		DVBRB	1.665600D	0014	AS-507	15 SEP 69
015212023577730		FA	7.714787D-02	0	AS-507	15 SEP 69
015213023151306		FB	7.502280D-02	0	AS-507	15 SEP 69
015214004120404		TAU3RA	5.321276D	0215	AS-507	15 SEP 69
015215004632554		TAU3RB	6.146783D	0215	AS-507	15 SEP 69
015220024437042		ALFTSA	8.031514D-02	0	AS-507	15 SEP 69
015221026331272		ALFTSB	8.759587D-02	0	AS-507	15 SEP 69
015222310476074		RNA	6.573960D	0623	AS-507	15 SEP 69
015223310555414		RNB	6.576994D	0623	AS-507	15 SEP 69
015230102741550		TSTA	8.568426D	0315	AS-507	15 SEP 69
015231154320510		TSTB	1.387616D	0415	AS-507	15 SEP 69
015232252525252		DPIT1	6.666667D-01	0	AS-507	15 SEP 69
015233070707070		DYAW1	2.222222D-01	0	AS-507	15 SEP 69
015234377777776		DROLL1	9.999999D-01	0	AS-507	15 SEP 69
015235		DPIT2	NOT AVAILABLE		AS-507	15 SEP 69
015236		DYAW2	NOT AVAILABLE		AS-507	15 SEP 69
015237		DROLL2	NOT AVAILABLE		AS-507	15 SEP 69
015240001701330		T3PRA	2.403561D	0215	AS-507	15 SEP 69
015241002413426		T3PRB	3.228862D	0215	AS-507	15 SEP 69
015250000000000		TD1	0.0	15	AS-507	15 SEP 69
015251006055546		TD2	7.794248D	0215	AS-507	15 SEP 69
015252031123152		TD3	3.220802D	0315	AS-507	15 SEP 69
015260006055546		TSD1	7.794248D	0215	AS-507	15 SEP 69
015261023045404		TSD2	2.441377D	0315	AS-507	15 SEP 69
015262151033706		TSD3	1.344697D	0415	AS-507	15 SEP 69
015377		CKS15	NOT AVAILABLE		AS-507	15 SEP 69
016000000000000		TPA0	0.0	15	AS-507	15 SEP 69
016001001417750		TPA1	1.959887D	0215	AS-507	15 SEP 69
016002016046140		TPA2	1.801548D	0315	AS-507	15 SEP 69
016003110301534		TPA3	9.264420D	0315	AS-507	15 SEP 69
016004202157062		TPA4	1.666777D	0415	AS-507	15 SEP 69
016005000000000		TPA5	0.0	15	AS-507	15 SEP 69
016006000000000		TPA6	0.0	15	AS-507	15 SEP 69
016007000000000		TPA7	0.0	15	AS-507	15 SEP 69
016010000000000		TPA8	0.0	15	AS-507	15 SEP 69
016011000000000		TPA9	0.0	15	AS-507	15 SEP 69
016012000000000		TPA10	0.0	15	AS-507	15 SEP 69
016013000000000		TPA11	0.0	15	AS-507	15 SEP 69
016014000000000		TPA12	0.0	15	AS-507	15 SEP 69
016015000000000		TPA13	0.0	15	AS-507	15 SEP 69
016016000000000		TPA14	0.0	15	AS-507	15 SEP 69

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
016017124560660		BETAA	3.309391D-01	0	AS-507	15 SEP 69
016020771725074		C3A0	-1.594819D	0626	AS-507	15 SEP 69
016021771735114		C3A1	-1.590708D	0626	AS-507	15 SEP 69
016022771743030		C3A2	-1.587689D	0626	AS-507	15 SEP 69
016023771733752		C3A3	-1.591317D	0626	AS-507	15 SEP 69
016024771724356		C3A4	-1.595154D	0626	AS-507	15 SEP 69
016025000000000		C3A5	0.0	26	AS-507	15 SEP 69
016026000000000		C3A6	0.0	26	AS-507	15 SEP 69
016027000000000		C3A7	0.0	26	AS-507	15 SEP 69
016030000000000		C3A8	0.0	26	AS-507	15 SEP 69
016031000000000		C3A9	0.0	26	AS-507	15 SEP 69
016032000000000		C3A10	0.0	26	AS-507	15 SEP 69
016033000000000		C3A11	0.0	26	AS-507	15 SEP 69
016034000000000		C3A12	0.0	26	AS-507	15 SEP 69
016035000000000		C3A13	0.0	26	AS-507	15 SEP 69
016036000000000		C3A14	0.0	26	AS-507	15 SEP 69
016040375726164		COSA0	9.918688D-01	0	AS-507	15 SEP 69
016041375750402		COSA1	9.920083D-01	0	AS-507	15 SEP 69
016042376022204		COSA2	9.923268D-01	0	AS-507	15 SEP 69
016043375751404		COSA3	9.920159D-01	0	AS-507	15 SEP 69
016044375707730		COSA4	9.917597D-01	0	AS-507	15 SEP 69
016045000000000		COSA5	0.0	0	AS-507	15 SEP 69
016046000000000		COSA6	0.0	0	AS-507	15 SEP 69
016047000000000		COSA7	0.0	0	AS-507	15 SEP 69
016050000000000		COSA8	0.0	0	AS-507	15 SEP 69
016051000000000		COSA9	0.0	0	AS-507	15 SEP 69
016052000000000		COSA10	0.0	0	AS-507	15 SEP 69
016053000000000		COSA11	0.0	0	AS-507	15 SEP 69
016054000000000		COSA12	0.0	0	AS-507	15 SEP 69
016055000000000		COSA13	0.0	0	AS-507	15 SEP 69
016056000000000		COSA14	0.0	0	AS-507	15 SEP 69
016060155467140		RASA0	4.281554D-01	0	AS-507	15 SEP 69
016061155622060		RASA1	4.288490D-01	0	AS-507	15 SEP 69
016062156325216		RASA2	4.313147D-01	0	AS-507	15 SEP 69
016063157746142		RASA3	4.373031D-01	0	AS-507	15 SEP 69
016064161400222		RASA4	4.433616D-01	0	AS-507	15 SEP 69
016065000000000		RASA5	0.0	0	AS-507	15 SEP 69
016066000000000		RASA6	0.0	0	AS-507	15 SEP 69
016067000000000		RASA7	0.0	0	AS-507	15 SEP 69
016070000000000		RASA8	0.0	0	AS-507	15 SEP 69
016071000000000		RASA9	0.0	0	AS-507	15 SEP 69
016072000000000		RASA10	0.0	0	AS-507	15 SEP 69
016073000000000		RASA11	0.0	0	AS-507	15 SEP 69
016074000000000		RASA12	0.0	0	AS-507	15 SEP 69
016075000000000		RASA13	0.0	0	AS-507	15 SEP 69
016076000000000		RASA14	0.0	0	AS-507	15 SEP 69
016100050036164		DECA0	1.564806D-01	0	AS-507	15 SEP 69

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
016101050061442		DECA1	1.566282D-01	0	AS-507	15 SEP 69
016102050116454		DECA2	1.568496D-01	0	AS-507	15 SEP 69
016103050205740		DECA3	1.572719D-01	0	AS-507	15 SEP 69
016104050250506		DECA4	1.575366D-01	0	AS-507	15 SEP 69
016105000000000		DECA5	0.0	0	AS-507	15 SEP 69
016106000000000		DECA6	0.0	0	AS-507	15 SEP 69
016107000000000		DECA7	0.0	0	AS-507	15 SEP 69
016110000000000		DECA8	0.0	0	AS-507	15 SEP 69
016111000000000		DECA9	0.0	0	AS-507	15 SEP 69
016112000000000		DECA10	0.0	0	AS-507	15 SEP 69
016113000000000		DECA11	0.0	0	AS-507	15 SEP 69
016114000000000		DECA12	0.0	0	AS-507	15 SEP 69
016115000000000		DECA13	0.0	0	AS-507	15 SEP 69
016116000000000		DECA14	0.0	0	AS-507	15 SEP 69
016120371174206		ENA0	9.736043D-01	0	AS-507	15 SEP 69
016121371204460		ENA1	9.736679D-01	0	AS-507	15 SEP 69
016122371212774		ENA2	9.737167D-01	0	AS-507	15 SEP 69
016123371202644		ENA3	9.736543D-01	0	AS-507	15 SEP 69
016124371172534		ENA4	9.735922D-01	0	AS-507	15 SEP 69
016125000000000		ENA5	0.0	0	AS-507	15 SEP 69
016126000000000		ENA6	0.0	0	AS-507	15 SEP 69
016127000000000		ENA7	0.0	0	AS-507	15 SEP 69
016130000000000		ENA8	0.0	0	AS-507	15 SEP 69
016131000000000		ENA9	0.0	0	AS-507	15 SEP 69
016132000000000		ENA10	0.0	0	AS-507	15 SEP 69
016133000000000		ENA11	0.0	0	AS-507	15 SEP 69
016134000000000		ENA12	0.0	0	AS-507	15 SEP 69
016135000000000		ENA13	0.0	0	AS-507	15 SEP 69
016136000000000		ENA14	0.0	0	AS-507	15 SEP 69
016140000000000		TPB0	0.0	15	AS-507	15 SEP 69
016141001417750		TPB1	1.959887D	0215	AS-507	15 SEP 69
016142016046140		TPB2	1.801548D	0315	AS-507	15 SEP 69
016143110301534		TPB3	9.264420D	0315	AS-507	15 SEP 69
016144202157062		TPB4	1.666777D	0415	AS-507	15 SEP 69
016145000000000		TPB5	0.0	15	AS-507	15 SEP 69
016146000000000		TPB6	0.0	15	AS-507	15 SEP 69
016147000000000		TPB7	0.0	15	AS-507	15 SEP 69
016150000000000		TPB8	0.0	15	AS-507	15 SEP 69
016151000000000		TPB9	0.0	15	AS-507	15 SEP 69
016152000000000		TPB10	0.0	15	AS-507	15 SEP 69
016153000000000		TPB11	0.0	15	AS-507	15 SEP 69
016154000000000		TPB12	0.0	15	AS-507	15 SEP 69
016155000000000		TPB13	0.0	15	AS-507	15 SEP 69
016156000000000		TPB14	0.0	15	AS-507	15 SEP 69
016157125516572		BETAB	3.345851D-01	0	AS-507	15 SEP 69
016160771724556		C3B0	-1.595026D	0626	AS-507	15 SEP 69
016161771734732		C3B1	-1.590822D	0626	AS-507	15 SEP 69

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
016162771743416		C3B2	-1.587443D	0626	AS-507	15 SEP 69
016163771734272		C3B3	-1.591110D	0626	AS-507	15 SEP 69
016164771724506		C3B4	-1.595065D	0626	AS-507	15 SEP 69
016165000000000		C3B5	0.0	26	AS-507	15 SEP 69
016166000000000		C3B6	0.0	26	AS-507	15 SEP 69
016167000000000		C3B7	0.0	26	AS-507	15 SEP 69
016170000000000		C3B8	0.0	26	AS-507	15 SEP 69
016171000000000		C3B9	0.0	26	AS-507	15 SEP 69
016172000000000		C3B10	0.0	26	AS-507	15 SEP 69
016173000000000		C3B11	0.0	26	AS-507	15 SEP 69
016174000000000		C3B12	0.0	26	AS-507	15 SEP 69
016175000000000		C3B13	0.0	26	AS-507	15 SEP 69
016176000000000		C3B14	0.0	26	AS-507	15 SEP 69
016200375673132		COSB0	9.916624D-01	0	AS-507	15 SEP 69
016201375760322		COSB1	9.920686D-01	0	AS-507	15 SEP 69
016202376031336		COSB2	9.923816D-01	0	AS-507	15 SEP 69
016203375745246		COSB3	9.919840D-01	0	AS-507	15 SEP 69
016204375644352		COSB4	9.914891D-01	0	AS-507	15 SEP 69
016205000000000		COSB5	0.0	0	AS-507	15 SEP 69
016206000000000		COSB6	0.0	0	AS-507	15 SEP 69
016207000000000		COSB7	0.0	0	AS-507	15 SEP 69
016210000000000		COSB8	0.0	0	AS-507	15 SEP 69
016211000000000		COSB9	0.0	0	AS-507	15 SEP 69
016212000000000		COSB10	0.0	0	AS-507	15 SEP 69
016213000000000		COSB11	0.0	0	AS-507	15 SEP 69
016214000000000		COSB12	0.0	0	AS-507	15 SEP 69
016215000000000		COSB13	0.0	0	AS-507	15 SEP 69
016216000000000		COSB14	0.0	0	AS-507	15 SEP 69
016220156630220		RASB0	4.328025D-01	0	AS-507	15 SEP 69
016221157125332		RASB1	4.342455D-01	0	AS-507	15 SEP 69
016222157627642		RASB2	4.367052D-01	0	AS-507	15 SEP 69
016223161210654		RASB3	4.424502D-01	0	AS-507	15 SEP 69
016224162516354		RASB4	4.478642D-01	0	AS-507	15 SEP 69
016225000000000		RASB5	0.0	0	AS-507	15 SEP 69
016226000000000		RASB6	0.0	0	AS-507	15 SEP 69
016227000000000		RASB7	0.0	0	AS-507	15 SEP 69
016230000000000		RASB8	0.0	0	AS-507	15 SEP 69
016231000000000		RASB9	0.0	0	AS-507	15 SEP 69
016232000000000		RASB10	0.0	0	AS-507	15 SEP 69
016233000000000		RASB11	0.0	0	AS-507	15 SEP 69
016234000000000		RASB12	0.0	0	AS-507	15 SEP 69
016235000000000		RASB13	0.0	0	AS-507	15 SEP 69
016236000000000		RASB14	0.0	0	AS-507	15 SEP 69
016240050101230		DECB0	1.567482D-01	0	AS-507	15 SEP 69
016241050152374		DECB1	1.570625D-01	0	AS-507	15 SEP 69
016242050203014		DECB2	1.572496D-01	0	AS-507	15 SEP 69
016243050262424		DECB3	1.576122D-01	0	AS-507	15 SEP 69

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
016244050266632		DECB4	1.576447D-01	0	AS-507	15 SEP 69
016245000000000		DECB5	0.0	0	AS-507	15 SEP 69
016246000000000		DECB6	0.0	0	AS-507	15 SEP 69
016247000000000		DECB7	0.0	0	AS-507	15 SEP 69
016250000000000		DECB8	0.0	0	AS-507	15 SEP 69
016251000000000		DECB9	0.0	0	AS-507	15 SEP 69
016252000000000		DECB10	0.0	0	AS-507	15 SEP 69
016253000000000		DECB11	0.0	0	AS-507	15 SEP 69
016254000000000		DECB12	0.0	0	AS-507	15 SEP 69
016255000000000		DECB13	0.0	0	AS-507	15 SEP 69
016256000000000		DECB14	0.0	0	AS-507	15 SEP 69
016260371172352		ENB0	9.735905D-01	0	AS-507	15 SEP 69
016261371203242		ENB1	9.736581D-01	0	AS-507	15 SEP 69
016262371212456		ENB2	9.737136D-01	0	AS-507	15 SEP 69
016263371202212		ENB3	9.736501D-01	0	AS-507	15 SEP 69
016264371171430		ENB4	9.735836D-01	0	AS-507	15 SEP 69
016265000000000		ENB5	0.0	0	AS-507	15 SEP 69
016266000000000		ENB6	0.0	0	AS-507	15 SEP 69
016267000000000		ENB7	0.0	0	AS-507	15 SEP 69
016270000000000		ENB8	0.0	0	AS-507	15 SEP 69
016271000000000		ENB9	0.0	0	AS-507	15 SEP 69
016272000000000		ENB10	0.0	0	AS-507	15 SEP 69
016273000000000		ENB11	0.0	0	AS-507	15 SEP 69
016274000000000		ENB12	0.0	0	AS-507	15 SEP 69
016275000000000		ENB13	0.0	0	AS-507	15 SEP 69
016276000000000		ENB14	0.0	0	AS-507	15 SEP 69
016300146706756		H10	4.019086D-01	0	AS-507	15 SEP 69
016301115635004		H11	3.039323D-01	0	AS-507	15 SEP 69
016302554656736		H12	-5.748372D-01	0	AS-507	15 SEP 69
016303222277616		H13	5.717756D-01	0	AS-507	15 SEP 69
016304710054602		H14	-2.184085D-01	0	AS-507	15 SEP 69
016305006055546		TDS1	7.794248D	0215	AS-507	15 SEP 69
016306000000000		TDS0	0.0	15	AS-507	15 SEP 69
016310174046042		H20	4.846654D-01	0	AS-507	15 SEP 69
016311017036200		H21	5.882456D-02	0	AS-507	15 SEP 69
016312753442530		H22	-7.981359D-02	0	AS-507	15 SEP 69
016313023326600		H23	7.585719D-02	0	AS-507	15 SEP 69
016314770651366		H24	-2.800385D-02	0	AS-507	15 SEP 69
016315031123152		TDS2	3.220802D	0315	AS-507	15 SEP 69
016320202762342		H30	5.116153D-01	0	AS-507	15 SEP 69
016321027256154		H31	9.117288D-02	0	AS-507	15 SEP 69
016322771651610		H32	-2.409541D-02	0	AS-507	15 SEP 69
016323007054740		H33	2.768662D-02	0	AS-507	15 SEP 69
016324776270064		H34	-6.407928D-03	0	AS-507	15 SEP 69
016325202157060		TDS3	1.666777D	0415	AS-507	15 SEP 69
016347		CKS16	NOT AVAILABLE		AS-507	15 SEP 69
016354100200000		DATE	2.570000D	0210	AS-507	15 SEP 69

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
016355302554504		TVRATE	2.3211500	-0515-	AS-507	15 SEP 69
016373115365612		TLO	3.9669770	0417	AS-507	15 SEP 69
END						

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TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
015200146314630		AZO	4.000000D-01	0	AS-507	18 SEP 69
015201063146314		AZS	2.000000D-01	0	AS-507	18 SEP 69
015202324262166		THTED	8.294848D-01	0	AS-507	18 SEP 69
015203777777777		PAD	-2.980232D-08	0	AS-507	18 SEP 69
015210000013532		DVBRA	1.459500D	0014	AS-507	18 SEP 69
015211000015246		DVBRB	1.665600D	0014	AS-507	18 SEP 69
015212024667416		FA	8.147833D-02	0	AS-507	18 SEP 69
015213023751760		FB	7.795692D-02	0	AS-507	18 SEP 69
015214004121012		TAU3RA	5.322558D	0215	AS-507	18 SEP 69
015215004633156		TAU3RB	6.148043D	0215	AS-507	18 SEP 69
015220023620522		ALFTSA	7.727556D-02	0	AS-507	18 SEP 69
015221025710360		ALFTSB	8.551384D-02	0	AS-507	18 SEP 69
015222310461702		RNA	6.573176D	0623	AS-507	18 SEP 69
015223310542450		RNB	6.576293D	0623	AS-507	18 SEP 69
015230100574322		TSTA	8.287103D	0315	AS-507	18 SEP 69
015231152101526		TSTB	1.358442D	0415	AS-507	18 SEP 69
015232252525252		DPIT1	6.666667D-01	0	AS-507	18 SEP 69
015233707070710		DYAW1	-2.222222D-01	0	AS-507	18 SEP 69
015234377777777		DROLL1	9.999999D-01	0	AS-507	18 SEP 69
015235		DPIT2	NOT AVAILABLE		AS-507	18 SEP 69
015236		DYAW2	NOT AVAILABLE		AS-507	18 SEP 69
015237		DROLL2	NOT AVAILABLE		AS-507	18 SEP 69
015240001703654		T3PRA	2.409599D	0215	AS-507	18 SEP 69
015241002414406		T3PRB	3.231287D	0215	AS-507	18 SEP 69
015250000000000		TD1	0.0	15	AS-507	18 SEP 69
015251033017600		TD2	3.459938D	0315	AS-507	18 SEP 69
015252176707310		TD3	1.624185D	0415	AS-507	18 SEP 69
015260033017600		TSD1	3.459938D	0315	AS-507	18 SEP 69
015261143667506		TSD2	1.278191D	0415	AS-507	18 SEP 69
015262006125660		TSD3	7.894609D	0215	AS-507	18 SEP 69
015377		CKS15	NOT AVAILABLE		AS-507	18 SEP 69
016000000000000		TPA0	0.0	15	AS-507	18 SEP 69
016001022636574		TPA1	2.407686D	0315	AS-507	18 SEP 69
016002061376322		TPA2	6.335603D	0315	AS-507	18 SEP 69
016003132473660		TPA3	1.159896D	0415	AS-507	18 SEP 69
016004205035170		TPA4	1.703131D	0415	AS-507	18 SEP 69
016005000000000		TPA5	0.0	15	AS-507	18 SEP 69
016006000000000		TPA6	0.0	15	AS-507	18 SEP 69
016007000000000		TPA7	0.0	15	AS-507	18 SEP 69
016010000000000		TPA8	0.0	15	AS-507	18 SEP 69
016011000000000		TPA9	0.0	15	AS-507	18 SEP 69
016012000000000		TPA10	0.0	15	AS-507	18 SEP 69
016013000000000		TPA11	0.0	15	AS-507	18 SEP 69
016014000000000		TPA12	0.0	15	AS-507	18 SEP 69
016015000000000		TPA13	0.0	15	AS-507	18 SEP 69
016016000000000		TPA14	0.0	15	AS-507	18 SEP 69

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
016017124531426		BETAA	3.307613D-01	0	AS-507	18 SEP 69
016020771222064		C3A0	-1.760204D	0626	AS-507	18 SEP 69
016021771226042		C3A1	-1.758175D	0626	AS-507	18 SEP 69
016022771231056		C3A2	-1.756625D	0626	AS-507	18 SEP 69
016023771232444		C3A3	-1.755868D	0626	AS-507	18 SEP 69
016024771232604		C3A4	-1.755773D	0626	AS-507	18 SEP 69
016025000000000		C3A5	0.0	26	AS-507	18 SEP 69
016026000000000		C3A6	0.0	26	AS-507	18 SEP 69
016027000000000		C3A7	0.0	26	AS-507	18 SEP 69
016030000000000		C3A8	0.0	26	AS-507	18 SEP 69
016031000000000		C3A9	0.0	26	AS-507	18 SEP 69
016032000000000		C3A10	0.0	26	AS-507	18 SEP 69
016033000000000		C3A11	0.0	26	AS-507	18 SEP 69
016034000000000		C3A12	0.0	26	AS-507	18 SEP 69
016035000000000		C3A13	0.0	26	AS-507	18 SEP 69
016036000000000		C3A14	0.0	26	AS-507	18 SEP 69
016040376563734		COSA0	9.950251D-01	0	AS-507	18 SEP 69
016041376461362		COSA1	9.945181D-01	0	AS-507	18 SEP 69
016042376460564		COSA2	9.945124D-01	0	AS-507	18 SEP 69
016043376467330		COSA3	9.945635D-01	0	AS-507	18 SEP 69
016044376561260		COSA4	9.950054D-01	0	AS-507	18 SEP 69
016045000000000		COSA5	0.0	0	AS-507	18 SEP 69
016046000000000		COSA6	0.0	0	AS-507	18 SEP 69
016047000000000		COSA7	0.0	0	AS-507	18 SEP 69
016050000000000		COSA8	0.0	0	AS-507	18 SEP 69
016051000000000		COSA9	0.0	0	AS-507	18 SEP 69
016052000000000		COSA10	0.0	0	AS-507	18 SEP 69
016053000000000		COSA11	0.0	0	AS-507	18 SEP 69
016054000000000		COSA12	0.0	0	AS-507	18 SEP 69
016055000000000		COSA13	0.0	0	AS-507	18 SEP 69
016056000000000		COSA14	0.0	0	AS-507	18 SEP 69
016060271241654		RASA0	7.238910D-01	0	AS-507	18 SEP 69
016061271404136		RASA1	7.246413D-01	0	AS-507	18 SEP 69
016062272314636		RASA2	7.281251D-01	0	AS-507	18 SEP 69
016063273456570		RASA3	7.327785D-01	0	AS-507	18 SEP 69
016064275053004		RASA4	7.386094D-01	0	AS-507	18 SEP 69
016065000000000		RASA5	0.0	0	AS-507	18 SEP 69
016066000000000		RASA6	0.0	0	AS-507	18 SEP 69
016067000000000		RASA7	0.0	0	AS-507	18 SEP 69
016070000000000		RASA8	0.0	0	AS-507	18 SEP 69
016071000000000		RASA9	0.0	0	AS-507	18 SEP 69
016072000000000		RASA10	0.0	0	AS-507	18 SEP 69
016073000000000		RASA11	0.0	0	AS-507	18 SEP 69
016074000000000		RASA12	0.0	0	AS-507	18 SEP 69
016075000000000		RASA13	0.0	0	AS-507	18 SEP 69
016076000000000		RASA14	0.0	0	AS-507	18 SEP 69
016100037510274		DECA0	1.235990D-01	0	AS-507	18 SEP 69

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
016101037215402		DECA1	1.221734D-01	0	AS-507	18 SEP 69
016102036773060		DECA2	1.210563D-01	0	AS-507	18 SEP 69
016103036513400		DECA3	1.197167D-01	0	AS-507	18 SEP 69
016104036352312		DECA4	1.189758D-01	0	AS-507	18 SEP 69
016105000000000		DECA5	0.0	0	AS-507	18 SEP 69
016106000000000		DECA6	0.0	0	AS-507	18 SEP 69
016107000000000		DECA7	0.0	0	AS-507	18 SEP 69
016110000000000		DECA8	0.0	0	AS-507	18 SEP 69
016111000000000		DECA9	0.0	0	AS-507	18 SEP 69
016112000000000		DECA10	0.0	0	AS-507	18 SEP 69
016113000000000		DECA11	0.0	0	AS-507	18 SEP 69
016114000000000		DECA12	0.0	0	AS-507	18 SEP 69
016115000000000		DECA13	0.0	0	AS-507	18 SEP 69
016116000000000		DECA14	0.0	0	AS-507	18 SEP 69
016120370426466		ENA0	9.708756D-01	0	AS-507	18 SEP 69
016121370432344		ENA1	9.709049D-01	0	AS-507	18 SEP 69
016122370435420		ENA2	9.709284D-01	0	AS-507	18 SEP 69
016123370436736		ENA3	9.709392D-01	0	AS-507	18 SEP 69
016124370437142		ENA4	9.709411D-01	0	AS-507	18 SEP 69
016125000000000		ENA5	0.0	0	AS-507	18 SEP 69
016126000000000		ENA6	0.0	0	AS-507	18 SEP 69
016127000000000		ENA7	0.0	0	AS-507	18 SEP 69
016130000000000		ENA8	0.0	0	AS-507	18 SEP 69
016131000000000		ENA9	0.0	0	AS-507	18 SEP 69
016132000000000		ENA10	0.0	0	AS-507	18 SEP 69
016133000000000		ENA11	0.0	0	AS-507	18 SEP 69
016134000000000		ENA12	0.0	0	AS-507	18 SEP 69
016135000000000		ENA13	0.0	0	AS-507	18 SEP 69
016136000000000		ENA14	0.0	0	AS-507	18 SEP 69
016140000000000		TPB0	0.0	15	AS-507	18 SEP 69
016141022636574		TPB1	2.407686D	0315	AS-507	18 SEP 69
016142061376322		TPB2	6.335603D	0315	AS-507	18 SEP 69
016143132473660		TPB3	1.159896D	0415	AS-507	18 SEP 69
016144205035170		TPB4	1.703131D	0415	AS-507	18 SEP 69
016145000000000		TPB5	0.0	15	AS-507	18 SEP 69
016146000000000		TPB6	0.0	15	AS-507	18 SEP 69
016147000000000		TPB7	0.0	15	AS-507	18 SEP 69
016150000000000		TPB8	0.0	15	AS-507	18 SEP 69
016151000000000		TPB9	0.0	15	AS-507	18 SEP 69
016152000000000		TPB10	0.0	15	AS-507	18 SEP 69
016153000000000		TPB11	0.0	15	AS-507	18 SEP 69
016154000000000		TPB12	0.0	15	AS-507	18 SEP 69
016155000000000		TPB13	0.0	15	AS-507	18 SEP 69
016156000000000		TPB14	0.0	15	AS-507	18 SEP 69
016157123737264		BETAB	3.278759D-01	0	AS-507	18 SEP 69
016160771225070		C3B0	-1.758664D	0626	AS-507	18 SEP 69
016161771230662		C3B1	-1.756750D	0626	AS-507	18 SEP 69

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
016162771234034		C3B2	-1.755108D	0626	AS-507	18 SEP 69
016163771235346		C3B3	-1.754393D	0626	AS-507	18 SEP 69
016164771235552		C3B4	-1.754262D	0626	AS-507	18 SEP 69
016165000000000		C3B5	0.0	26	AS-507	18 SEP 69
016166000000000		C3B6	0.0	26	AS-507	18 SEP 69
016167000000000		C3B7	0.0	26	AS-507	18 SEP 69
016170000000000		C3B8	0.0	26	AS-507	18 SEP 69
016171000000000		C3B9	0.0	26	AS-507	18 SEP 69
016172000000000		C3B10	0.0	26	AS-507	18 SEP 69
016173000000000		C3B11	0.0	26	AS-507	18 SEP 69
016174000000000		C3B12	0.0	26	AS-507	18 SEP 69
016175000000000		C3B13	0.0	26	AS-507	18 SEP 69
016176000000000		C3B14	0.0	26	AS-507	18 SEP 69
016200375522744		COSB0	9.908672D-01	0	AS-507	18 SEP 69
016201375711356		COSB1	9.917714D-01	0	AS-507	18 SEP 69
016202375751212		COSB2	9.920141D-01	0	AS-507	18 SEP 69
016203375656150		COSB3	9.915635D-01	0	AS-507	18 SEP 69
016204375420204		COSB4	9.903584D-01	0	AS-507	18 SEP 69
016205000000000		COSB5	0.0	0	AS-507	18 SEP 69
016206000000000		COSB6	0.0	0	AS-507	18 SEP 69
016207000000000		COSB7	0.0	0	AS-507	18 SEP 69
016210000000000		COSB8	0.0	0	AS-507	18 SEP 69
016211000000000		COSB9	0.0	0	AS-507	18 SEP 69
016212000000000		COSB10	0.0	0	AS-507	18 SEP 69
016213000000000		COSB11	0.0	0	AS-507	18 SEP 69
016214000000000		COSB12	0.0	0	AS-507	18 SEP 69
016215000000000		COSB13	0.0	0	AS-507	18 SEP 69
016216000000000		COSB14	0.0	0	AS-507	18 SEP 69
016220267570236		RASB0	7.177148D-01	0	AS-507	18 SEP 69
016221270637316		RASB1	7.219193D-01	0	AS-507	18 SEP 69
016222271661342		RASB2	7.259631D-01	0	AS-507	18 SEP 69
016223272572162		RASB3	7.294481D-01	0	AS-507	18 SEP 69
016224273210564		RASB4	7.315119D-01	0	AS-507	18 SEP 69
016225000000000		RASB5	0.0	0	AS-507	18 SEP 69
016226000000000		RASB6	0.0	0	AS-507	18 SEP 69
016227000000000		RASB7	0.0	0	AS-507	18 SEP 69
016230000000000		RASB8	0.0	0	AS-507	18 SEP 69
016231000000000		RASB9	0.0	0	AS-507	18 SEP 69
016232000000000		RASB10	0.0	0	AS-507	18 SEP 69
016233000000000		RASB11	0.0	0	AS-507	18 SEP 69
016234000000000		RASB12	0.0	0	AS-507	18 SEP 69
016235000000000		RASB13	0.0	0	AS-507	18 SEP 69
016236000000000		RASB14	0.0	0	AS-507	18 SEP 69
016240036022304		DECB0	1.173278D-01	0	AS-507	18 SEP 69
016241036147132		DECB1	1.179747D-01	0	AS-507	18 SEP 69
016242036004004		DECB2	1.172181D-01	0	AS-507	18 SEP 69
016243035361762		DECB3	1.151274D-01	0	AS-507	18 SEP 69

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
016244034506340		DEC84	1.118655D-01	0	AS-507	18 SEP 69
016245000000000		DEC85	0.0	0	AS-507	18 SEP 69
016246000000000		DEC86	0.0	0	AS-507	18 SEP 69
016247000000000		DEC87	0.0	0	AS-507	18 SEP 69
016250000000000		DEC88	0.0	0	AS-507	18 SEP 69
016251000000000		DEC89	0.0	0	AS-507	18 SEP 69
016252000000000		DEC810	0.0	0	AS-507	18 SEP 69
016253000000000		DEC811	0.0	0	AS-507	18 SEP 69
016254000000000		DEC812	0.0	0	AS-507	18 SEP 69
016255000000000		DEC813	0.0	0	AS-507	18 SEP 69
016256000000000		DEC814	0.0	0	AS-507	18 SEP 69
016260370430204		EN80	9.708882D-01	0	AS-507	18 SEP 69
016261370433744		EN81	9.709163D-01	0	AS-507	18 SEP 69
016262370437162		EN82	9.709414D-01	0	AS-507	18 SEP 69
016263370440464		EN83	9.709519D-01	0	AS-507	18 SEP 69
016264370440764		EN84	9.709547D-01	0	AS-507	18 SEP 69
016265000000000		EN85	0.0	0	AS-507	18 SEP 69
016266000000000		EN86	0.0	0	AS-507	18 SEP 69
016267000000000		EN87	0.0	0	AS-507	18 SEP 69
016270000000000		EN88	0.0	0	AS-507	18 SEP 69
016271000000000		EN89	0.0	0	AS-507	18 SEP 69
016272000000000		EN810	0.0	0	AS-507	18 SEP 69
016273000000000		EN811	0.0	0	AS-507	18 SEP 69
016274000000000		EN812	0.0	0	AS-507	18 SEP 69
016275000000000		EN813	0.0	0	AS-507	18 SEP 69
016276000000000		EN814	0.0	0	AS-507	18 SEP 69
016300146322132		H10	4.000410D-01	0	AS-507	18 SEP 69
016301027724230		H11	9.341660D-02	0	AS-507	18 SEP 69
016302764736512		H12	-4.322323D-02	0	AS-507	18 SEP 69
016303005461516		H13	2.186321D-02	0	AS-507	18 SEP 69
016304776211740		H14	-6.760126D-03	0	AS-507	18 SEP 69
016305033017600		TDS1	3.459938D	0315	AS-507	18 SEP 69
016306000000000		TDS0	0.0	15	AS-507	18 SEP 69
016310167115104		H20	4.654322D-01	0	AS-507	18 SEP 69
016311054433566		H21	1.740397D-01	0	AS-507	18 SEP 69
016312743364610		H22	-1.114138D-01	0	AS-507	18 SEP 69
016313026455772		H23	8.824150D-02	0	AS-507	18 SEP 69
016314771653642		H24	-2.407978D-02	0	AS-507	18 SEP 69
016315176707310		TDS2	1.624185D	0415	AS-507	18 SEP 69
016320227502700		H30	5.923071D-01	0	AS-507	18 SEP 69
016321001740032		H31	7.568767D-03	0	AS-507	18 SEP 69
016322000020232		H32	1.243772D-04	0	AS-507	18 SEP 69
016323000000000		H33	0.0	0	AS-507	18 SEP 69
016324000000000		H34	0.0	0	AS-507	18 SEP 69
016325205035170		TDS3	1.703131D	0415	AS-507	18 SEP 69
016347		CKS16	NOT AVAILABLE		AS-507	18 SEP 69
016354101000000		DATE	2.600000D	0210	AS-507	18 SEP 69

TABLE 4-V. AS-507 G MISSION OCTAL PRESET CARD LISTING
FOR THE SEPTEMBER LAUNCH WINDOW (Continued)

OCTAL ADD	OCTAL VALUE	NAME	DECIMAL VALUE	SCALE FACTOR	VEHICLE	LAUNCH DATE
016355302554504		TVRATE	2.321150D	0515-	AS-507	18 SEP 69
016373155001024		TLO	5.580904D	0417	AS-507	18 SEP 69
END						

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SECTION 5

TRAJECTORY LISTINGS AND MAGNETIC TAPE NUMBERS

5.0 MAGNETIC TAPES FOR AS-507 G MISSION TRAJECTORY DATA

Launch vehicle trajectory data are recorded in four magnetic tape formats: B-7, AFETR, PRESET, and TRIM. A summary of B-7 magnetic tapes for the AS-507 G mission is presented in Table 5-I for the September launch window. AFETR tapes of the AS-507 boost-to-parking-orbit and spent-stage trajectories are identified in Table 5-II. AFETR tapes contain three types of files: a BCD file describing tape contents and word format, a trajectory data file, and a tape end file. PRESET and TRIM tapes for the AS-507 G mission are identified in Table 5-III.

The nominal boost trajectories to earth orbit and the ensuing coast trajectories in earth orbit vary only with azimuth and are not simulated as launch-day-dependent data. For this reason, only one set of EPO-boost data is presented for each launch azimuth on the tapes listed in Tables 5-I and 5-II. Flight characteristics during the boost to translunar injection are both launch-date and launch-azimuth dependent.

5.1 TRAJECTORY DATA FROM GUIDANCE REFERENCE RELEASE TO LV/SC FIRST SEPARATION

A definition of trajectory parameters and of key-event nomenclature that are used in the computer-printed trajectory data from GRR until LV/SC first separation is presented in Table 5-IV. Computer-printed trajectory data are presented in Tables 5-V through 5-XIX for the AS-507 boost to earth parking orbit along a 78.051-degree launch azimuth and coast in earth parking orbit for approximately 2 1/2 revolutions. Data presented in these tables are in both English and metric units. Tables containing metric units are denoted by -A after the table number; tables containing English units are denoted by -B.

TLI-boost trajectory simulations are initialized in earth parking orbit prior to the time of timebase 6 initialization. Tables 5-XX through 5-XXXII contain computer-printed trajectory data for September 13, 1969, first-opportunity translunar injection boost and coast to LV/CSM separation for flight along a 78.051-degree azimuth. Tables 5-XXXIII through 5-XLV contain similar trajectory data for the second-opportunity translunar injection boost for September 13 and a 78.051-degree flight azimuth. LV/CSM separation is simulated at timebase 7 + 1500 seconds.

5.2 S-IC AND S-II SPENT-STAGE IMPACT TRAJECTORIES

The nominal S-IC and S-II spent-stage impact trajectories are dependent only upon launch azimuth and not upon launch date. Computer-printed trajectory data for the S-IC spent stage are presented in Tables 5-XLVI through 5-LIII from separation to impact for a launch azimuth of 78.051 degrees. S-II spent-stage impact trajectory data are presented in Tables 5-LIV through 5-LXI for the same launch azimuth.

5.3 S-IVB/IU SPENT-STAGE SLINGSHOT TRAJECTORY

After completion of LV/SC separation, the S-IVB/IU is maneuvered to the desired attitude for LOX dumping, vehicle safing, and APS propulsive boost. These "slingshot" operations provide a velocity increment that is large enough nominally to preclude lunar impact and to cause the S-IVB stage to pass behind the trailing side of the moon and use lunar velocity to achieve a solar orbit. Trajectory data for the spent S-IVB stage are simulated using the Apollo Reference Mission Program (ARMP). The slingshot velocity increment is simulated as an instantaneous impulse at 9058 seconds after GCS2 (Reference 7). Trajectory simulation is provided from the time of LV/CSM separation until 250 hours after launch.

The ARMP print format for the S-IVB spent-stage trajectory simulation is defined in Table 5-LXII. Data for the 78.051-degree-azimuth first-opportunity September 13 S-IVB spent-stage slingshot trajectory are presented in Table 5-LXIII.

TABLE 5-I. SUMMARY OF AS-507 G MISSION B-7 TAPES FOR THE SEPTEMBER LAUNCH WINDOW

IBM 360 TAPE NUMBER	IBM 7094 TAPE NUMBER	LAUNCH DATE	AZIMUTH/ OPPORTUNITY	CASE START	CASE STOP	COMMENTS
J02528*	J02550*		72°	-17.250	20000.0	EPO Boost
J05372*	J05306*		78.051°	-17.250	20000.0	EPO Boost
H07313	J00421		81°	-17.250	20000.0	EPO Boost
J04411*	J05801*		90°	-17.250	20000.0	EPO Boost
H01876	H02461		99°	-17.250	20000.0	EPO Boost
H02118*	H02132*		108°	-17.250	20000.0	EPO Boost
H08769	H08131	9/13	72°/1st	9706.375	30000.0	TLI Boost, File 1
			72°/2nd	15106.375	35000.0	File 2
J02309*	J00752*	9/13	78.051°/1st	9706.750	12900.0	TLI Boost, File 1
			78.051°/2nd	14802.750	18100.0	File 2
H08877	H07550	9/13	81°/1st	9704.500	30000.0	TLI Boost, File 1
			81°/2nd	15104.500	35000.0	File 2
H09785*	H02640*	9/13	90°/1st	9401.125	12600.0	TLI Boost, File 1
			90°/2nd	14801.125	18000.0	File 2
H00003	H06309	9/13	99°/1st	9400.500	30000.0	TLI Boost, File 1
			99°/2nd	14504.500	35000.0	File 2
H03505*	H09679*	9/13	108°/1st	8803.500	12080.0	TLI Boost, File 1
			108°/2nd	14203.500	17400.0	File 2
H07794	B07915	9/15	72°/1st	10002.375	30000.0	TLI Boost, File 1
			72°/2nd	15402.375	35000.0	File 2
			81°/1st	10000.500	30000.0	File 3
			81°/2nd	15400.500	35000.0	File 4
			90°/1st	10006.875	30000.0	File 5
			90°/2nd	15406.875	35000.0	File 6
			99°/1st	9704.500	30000.0	File 7
			99°/2nd	14800.500	35000.0	File 8
			108°/1st	9106.875	30000.0	File 9
			108°/2nd	15106.875	35000.0	File 10

* These tapes supersede data tapes identified in Reference 26.

TABLE 5-I. SUMMARY OF AS-507 G MISSION B-7 TAPES FOR THE SEPTEMBER LAUNCH WINDOW
(Continued)

IBM 360 TAPE NUMBER	IBM 7094 TAPE NUMBER	LAUNCH DATE	AZIMUTH/ OPPORTUNITY	CASE START	CASE STOP	COMMENTS
H00361	H06141	9/18	72°/1st	9706.375	30000.0	TLI Boost, File 1
			72°/2nd	15106.375	35000.0	File 2
			81°/1st	9704.500	30000.0	File 3
			81°/2nd	15104.500	35000.0	File 4
			90°/1st	9406.875	30000.0	File 5
			90°/2nd	14806.875	35000.0	File 6
			99°/1st	9104.500	30000.0	File 7
			99°/2nd	14504.500	35000.0	File 8
			108°/1st	8802.875	30000.0	File 9
			108°/2nd	14202.875	35000.0	File 10
J02162*	H09856*		72°	160.694	560.797	S-IC Spent Stage, File 1
				549.304	1215.328	S-II Spent Stage, File 2
			78.051°	160.694	560.797	S-IC Spent Stage, File 3
				549.304	1215.328	S-II Spent Stage, File 4
			90°	160.694	560.797	S-IC Spent Stage, File 5
				549.304	1215.328	S-II Spent Stage, File 6
			108°	160.694	560.797	S-IC Spent Stage, File 7
				549.304	1215.328	S-II Spent Stage, File 8

* These tapes supersede data tapes identified in Reference 26.

TABLE 5-II. SUMMARY OF AS-507 G MISSION AFETR TAPES

IBM 360 TAPE NUMBER	IBM 7094 TAPE NUMBER	AZIMUTH	CASE START	CASE STOP	COMMENTS
J02238*	J04027*, J04025*(Copy)	72°	-17.25	20000.	EPO Boost
J03791*	J03584*, J03677*(Copy)	78.051°	-17.25	20000.	EPO Boost
H06226	J03195, J02424(Copy)	81°	-17.25	20000.	EPO Boost
J04401*	J03730*, J04307*(Copy)	90°	-17.25	20000.	EPO Boost
H03960	J01125, J01103(Copy)	99°	-17.25	20000.	EPO Boost
H02128*	H02176*, H00874*(Copy)	108°	-17.25	20000.	EPO Boost
H06640*	H00065*	72°	160.694	560.797	S-IC Spent Stage
			549.304	1215.328	S-II Spent Stage
		78.051°	160.694	560.797	S-IC Spent Stage
			549.304	1215.328	S-II Spent Stage
		90°	160.694	560.797	S-IC Spent Stage
			549.304	1215.328	S-II Spent Stage
		108°	160.694	560.797	S-IC Spent Stage
			549.304	1215.328	S-II Spent Stage

* These tapes supersede data tapes identified in Reference 26.

TABLE 5-III. SUMMARY OF AS-507 G MISSION PRESET
AND TRIM TAPES FOR THE SEPTEMBER LAUNCH
WINDOW

<u>IBM 360 TAPE NUMBER</u>	<u>IBM 7094 TAPE NUMBER</u>	<u>LAUNCH DATE</u>	<u>COMMENTS</u>
H07891	H06438	9/13	PRESET
J04429*	H06997*	9/13	TRIM
H09773	H04371	9/15	PRESET
H09342	H09801	9/15	TRIM
J01625	J00649	9/18	PRESET
H04320	H00261	9/18	TRIM

* These tapes supersede data tapes identified in
Reference 26.

TABLE 5-IV. FLIGHT TRAJECTORY PARAMETER DEFINITION
AND KEY-EVENT NOMENCLATURE

<u>PRINTOUT PARAMETER</u>	<u>DEFINITION</u>
Time	Total time from first motion (holddown arm release).
Thrust	Magnitude of total thrust vector.
Mass	Instantaneous mass of the vehicle.
Inertial Acceleration	Magnitude of inertial acceleration vector.
Altitude	Altitude of vehicle center of mass referenced to subvehicle point.
Earth-Fixed Velocity	Magnitude of the earth-fixed velocity vector in Apollo 10 coordinates.
Earth-Fixed Flight-Path Angle	Angle between the earth-fixed velocity vector and its projection onto a plane perpendicular to the geocentric position vector.
Gravitational Acceleration	Magnitude of the gravitational acceleration vector.
Pitch Reference Angle	Angle from the local horizontal to the vehicle longitudinal axis projection on the instantaneous flight plane.
Yaw Reference Angle	Angle from the instantaneous flight plane to the vehicle longitudinal axis.
Range	Surface range from launch site to the subvehicle point.
Inertial Velocity	Magnitude of inertial velocity vector.
Inertial Flight-Path Angle	Angle between the inertial velocity vector and its projection onto a plane perpendicular to the geocentric position vector.

TABLE 5-IV. FLIGHT TRAJECTORY PARAMETER DEFINITION
AND KEY-EVENT NOMENCLATURE (Continued)

<u>PRINTOUT PARAMETER</u>	<u>DEFINITION</u>
Inertial Heading Angle	Inertial azimuth measured from the instantaneous meridian plane to the projection of the inertial velocity vector onto a plane perpendicular to the position vector; the positive angle is toward east from north.
Geocentric Radius	Magnitude of the vehicle geocentric position vector.
Geodetic Latitude	Geodetic latitude of the subvehicle point.
Longitude	Vehicle longitude measured positive eastward from the prime meridian.
Pitch, Yaw, and Roll Attitude Command	Platform-referenced minor-loop commanded vehicle pitch, yaw, and roll attitude angles.
Vehicle Pitch, Yaw, and Roll Attitude Angles	Platform-referenced actual vehicle pitch, yaw, and roll attitude angles.
Spacecraft Gimbal Angles	Attitude of the launch vehicle measured in the spacecraft inertial coordinate system.
Mach	Local free-stream Mach number.
Dynamic Pressure (Q)	Aerodynamic pressure equal to one-half the product of the atmospheric density (ρ) and the aerodynamic velocity (V) squared.
Angle of Attack (α)	Total angle measured between the aerodynamic velocity vector and the vehicle longitudinal axis.
Q*Alpha Product	Product of dynamic pressure and angle of attack.
Normal-Force Angle	Angle measured from the Y body axis to the projection of the aerodynamic velocity vector in the Y-Z body axes plane.
Normal Force	Aerodynamic force perpendicular to the vehicle longitudinal axis.

TABLE 5-IV. FLIGHT TRAJECTORY PARAMETER DEFINITION AND KEY-EVENT NOMENCLATURE (Continued)

<u>PRINTOUT PARAMETER</u>	<u>DEFINITION</u>
Axial Force	Aerodynamic force parallel to the vehicle longitudinal axis.
Aerodynamic Heating Indicator	Defined by the following equation: $AHI = \int_0^t \frac{QV}{\pi/2 - \alpha} dt$
Commanded Control Signals	Angular component of commanded nozzle deflection in the body axis system. (Roll component is multiplied by the cosine of 45 degrees).
Body Rotation Rates	Rotation rates measured about each of the body axes.
Vehicle Position - Inertial Coordinates	Position vector components of vehicle center of mass in the Apollo 13 coordinate system.
Vehicle Velocity - Inertial Coordinates	Velocity vector components of vehicle center of mass in the Apollo 13 coordinate system.
Vehicle Position - Earth-Fixed Coordinates	Position vector components of vehicle center of mass in the Apollo 10 earth-fixed launch site coordinate system.
Vehicle Velocity - Earth-Fixed Coordinates	Velocity vector components of vehicle center of mass in the Apollo 10 earth-fixed launch site coordinate system.
<u>PRINTOUT SYMBOL</u>	<u>TRAJECTORY KEY EVENT</u>
GRR	Guidance Reference Release
1ST MOT	First Motion (Holddown Arm Release)
TB1	Timebase 1
TILINIT	Tilt Initiation

TABLE 5-IV. FLIGHT TRAJECTORY PARAMETER DEFINITION
AND KEY-EVENT NOMENCLATURE (Continued)

<u>PRINTOUT SYMBOL</u>	<u>TRAJECTORY KEY EVENT</u>
MACH 1	Mach One
MAX Q	Maximum Dynamic Pressure
CECO	S-IC Center-Engine Cutoff
MAX F/M	Maximum Thrust-to-Mass Ratio
TB3	Timebase 3 Initiation
S2 UI	S-II Ullage Ignition
SIC RI	S-IC Retrorocket Ignition
SIC SEP	S-IC/S-II Separation
S2 IGN	S-II Ignition
S2 90T	S-II Engine 90-Percent Thrust
S2 UTT	S-II Ullage Rocket Thrust Termination
INT J	S-IC/S-II Interstage Jettison
LET J	Launch Escape Tower Jettison
IGM EN	IGM Enable
IGM ON	IGM Initiation
TSMC1	Initiate Steering Misalignment Correction
TB4	Timebase 4 Initiation
S4B UI	S-IVB Ullage Rocket Ignition
S2 RI	S-II Retrorocket Ignition
S2 SEP	S-II/S-IVB Separation
S4B IGN	S-IVB First Ignition
S4B 90T	S-IVB 90-Percent Thrust

TABLE 5-IV. FLIGHT TRAJECTORY PARAMETER DEFINITION
AND KEY-EVENT NOMENCLATURE (Continued)

<u>PRINTOUT SYMBOL</u>	<u>TRAJECTORY KEY EVENT</u>
IGM 3S	IGM Initiation
S4B UTT	S-IVB Ullage Thrust Termination
S4B UCJ	S-IVB Ullage Case Jettison
TSMC2	Initiate Steering Misalignment Correction
S4BGCS1	S-IVB First Guidance Cutoff Signal (GCS1)
TB5	Timebase 5 Initiation
S4B LUI	S-IVB APS Ullage Ignition
PO INS	Parking Orbit Insertion
ORB GID	Start Orbital Guidance
LH2VTO	H ₂ Continuous Vent On
S4BLUCO	S-IVB APS Ullage Cutoff
ORB NAV	Start Orbital Navigation Calculations
1ST OPP	Initiation Time of First-Opportunity Out-of-Orbit Trajectory Printout
2ND OPP	Initiation Time of Second-Opportunity Out-of-Orbit Trajectory Printout
FM NAV	Begin Powered-Flight Navigation
TB6	Timebase 6 Initiation (Restart Preparation)
O2H2I	Helium Heater Ignition
LH2VTCO	H ₂ Continuous Vent Off
S4B LUI	S-IVB APS Ullage Ignition
O2H2CO	Helium Heater Cutoff
LTI	Lead Thrust Initiation

TABLE 5-IV. FLIGHT TRAJECTORY PARAMETER DEFINITION
AND KEY-EVENT NOMENCLATURE (Continued)

<u>PRINTOUT SYMBOL</u>	<u>TRAJECTORY KEY EVENT</u>
S4BLUCO	S-IVB APS Ullage Cutoff
S4B REI	S-IVB Reignition
S4B 90T	S-IVB 90-Percent Thrust
IGM ON	IGM Initiation
TSMC3	Initiate Steering Misalignment Correction
MRS	S-IVB Mixture-Ratio Shift
S4BGCS2	S-IVB Second Guidance Cutoff Signal (GCS2)
TB7	Timebase 7 Initiation
TLI	Translunar Orbit Injection
ORB GID	Start Orbital Guidance
ORB NAV	Start Orbital Navigation
T&D MAN	Begin Maneuver to S/C Separation Attitude
CSM SEP	Simulated CSM Separation

TABLE 5-V-A

THRUST, MASS, AND INERTIAL ACCELERATION
(METRIC UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (NEWTONS)	MASS (KG)	INERTIAL ACCELERATION (M/(SEC) ²)
GRR	-17.250	6.163637D-39	2.940992D 06	9.7913
1ST MOT	0.0	3.428211D 07	2.900960D 06	0.8513
TRT	0.398	3.449148D 07	2.895684D 06	0.9942
	10.000	3.457711D 07	2.768437D 06	2.7007
TIL INIT	11.375	3.460924D 07	2.750223D 06	2.7849
	20.000	3.487840D 07	2.635900D 06	3.4216
	30.000	3.531477D 07	2.503122D 06	4.3377
	40.000	3.593794D 07	2.370129D 06	5.6164
	50.000	3.670541D 07	2.236933D 06	7.2337
	60.000	3.753871D 07	2.103535D 06	9.1014
MACH 1	64.750	3.792495D 07	2.040075D 06	9.9461
	70.000	3.834696D 07	1.969753D 06	11.0092
	80.000	3.912420D 07	1.835548D 06	13.6572
MAX Q	80.125	3.913287D 07	1.833872D 06	13.6937
	90.000	3.971064D 07	1.701344D 06	16.7311
	100.000	4.006348D 07	1.566671D 06	19.9477
	110.000	4.026610D 07	1.431805D 06	23.2450
	120.000	4.039549D 07	1.296770D 06	26.7346
	130.000	4.056706D 07	1.161243D 06	30.8997
	134.000	4.065506D 07	1.106861D 06	32.8540
CFCD	134.000	4.065506D 07	1.106861D 06	32.8540
	134.125	4.002542D 07	1.105414D 06	32.3566
	140.000	3.194780D 07	1.041699D 06	27.2969
	150.000	3.208313D 07	9.346221D 05	31.1980
MAX F/M	159.125	3.199056D 07	8.365961D 05	35.3417
TB3	159.924	3.117559D 07	8.280774D 05	34.7936
	160.000	3.003081D 07	8.277694D 05	33.4528
S2 UT	160.424	6.734310D 06	8.260478D 05	9.6859
SIC RI	160.624	1.620119D 06	8.252360D 05	8.9711
	160.694	1.220648D 06	8.249519D 05	9.0919
	160.694	1.220648D 06	8.249519D 05	9.0919
SIC SFP	160.694	4.187706D 05	6.585322D 05	9.3612
S2 IGN	162.324	4.155240D 05	6.582766D 05	9.3592
S2 90T	164.324	3.552297D 06	6.573365D 05	8.9203
S2 UTT	164.924	3.817433D 06	6.566984D 05	8.9826
	170.000	5.010634D 06	6.512016D 05	9.4037
	180.000	5.124947D 06	6.390071D 05	9.5071
	190.000	5.164851D 06	6.266731D 05	9.5563
INT J	190.624	5.166213D 06	6.219315D 05	9.5819
LFT J	196.124	5.171868D 06	6.150516D 05	9.5955

TABLE 5-V-A

THRUST, MASS, AND INERTIAL ACCELERATION
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (NEWTONS)	MASS (KG)	INERTIAL ACCELERATION (M/(SEC)SQ)
	200.000	5.173350D 06	6.062761D 05	9.6337
IGM FN	200.524	5.173365D 06	6.056252D 05	9.6355
IGM ON	201.250	5.173447D 06	6.047240D 05	9.6250
	210.000	5.173744D 06	5.938603D 05	9.8801
	220.000	5.170446D 06	5.814535D 05	10.0151
TSMC1	222.250	5.169205D 06	5.786639D 05	10.0473
	230.000	5.166874D 06	5.690588D 05	10.1634
	240.000	5.165293D 06	5.566711D 05	10.3243
	250.000	5.164551D 06	5.442882D 05	10.4940
	260.000	5.167442D 05	5.319058D 05	10.6790
	270.000	5.172888D 06	5.195097D 05	10.8854
	280.000	5.176018D 06	5.071049D 05	11.1007
	290.000	5.177624D 06	4.946935D 05	11.3256
	300.000	5.178038D 06	4.822800D 05	11.5622
	310.000	5.178505D 06	4.698660D 05	11.8147
	320.000	5.179133D 06	4.574501D 05	12.0855
	330.000	5.179388D 06	4.450327D 05	12.3742
	340.000	5.178845D 06	4.326153D 05	12.6808
	350.000	5.178499D 06	4.201991D 05	13.0080
	360.000	5.178600D 06	4.077825D 05	13.3578
	370.000	5.178083D 06	3.953659D 05	13.7346
	380.000	5.177134D 06	3.829508D 05	14.1354
	390.000	5.176036D 06	3.705379D 05	14.5644
	400.000	5.174751D 06	3.581273D 05	15.0244
	410.000	5.173548D 06	3.457193D 05	15.5191
	420.000	5.172417D 06	3.333136D 05	16.0523
	430.000	5.171009D 06	3.209105D 05	16.6270
	440.000	5.169385D 06	3.085105D 05	17.2480
	450.000	5.167680D 06	2.961141D 05	17.9213
	460.000	4.459626D 06	2.838731D 05	16.5145
	470.000	4.114288D 06	2.738777D 05	15.4104
	480.000	4.112579D 06	2.639949D 05	15.9309
	490.000	3.099370D 06	2.547881D 05	13.4795
	500.000	3.093809D 06	2.474751D 05	13.6754
	510.000	3.088561D 06	2.401742D 05	14.0598
	520.000	3.083135D 06	2.328854D 05	14.4944
	530.000	3.077199D 06	2.256099D 05	14.8864
	540.000	3.069997D 06	2.183498D 05	15.2884
TR4	548.429	3.039415D 06	2.122517D 05	15.5552
S4B UI	549.129	2.064103D 05	2.121222D 05	9.1255

TABLE 5-V-A

THRUST, MASS, AND INERTIAL ACCELERATION
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (NEWTONS)	MASS (KG)	INFRTIAL ACCELERATION (M/(SEC)SQ)
S2 RI	549.229	1.9542340 05	2.1210370 05	9.1299
	549.304	1.6119390 05	2.1208980 05	9.1453
	549.304	1.6119390 05	2.1208980 05	9.1453
S2 SFP	549.304	2.3594480 04	1.6524420 05	9.2295
	550.000	2.7122870 04	1.6523510 05	9.2262
S4B IGN	552.429	2.9068230 04	1.6520250 05	9.2248
S4B 90T	554.929	8.7702580 05	1.6498580 05	9.7916
IGM 3S	556.500	9.1975370 05	1.6464360 05	9.8232
S4B UTT	556.929	9.1917050 05	1.6455030 05	9.7901
	560.000	9.1837180 05	1.6388140 05	9.9582
S4B UCJ	561.229	9.1834480 05	1.6361280 05	10.1348
	563.500	9.1848060 05	1.6305520 05	10.2113
TSMC2	570.000	9.1546650 05	1.6163390 05	10.1453
	580.000	9.1719660 05	1.5944940 05	10.2764
	590.000	9.1619890 05	1.5726860 05	10.3096
	600.000	9.1715740 05	1.5508380 05	10.3712
	610.000	9.1648240 05	1.5290270 05	10.4197
	620.000	9.1893390 05	1.5072060 05	10.4781
	630.000	9.1701940 05	1.4853640 05	10.5302
	640.000	9.1648650 05	1.4635550 05	10.5703
	650.000	9.1890440 05	1.4417380 05	10.6260
	660.000	9.1720680 05	1.4198890 05	10.7381
	670.000	9.1683410 05	1.3980720 05	10.7157
	680.000	9.1634190 05	1.3762660 05	10.6929
	685.654	9.1828210 05	1.3639380 05	10.6929
	S4B GCS1	685.654	2.0753160 05	1.3634310 05
T85	685.864	4.2240980 04	1.3633710 05	9.2199
S4B LUT	686.164	6.2275100 02	1.3632770 05	9.2558
	690.000	6.2275100 02	1.3632420 05	9.2553
PD INS	695.654	6.2275100 02	1.3632420 05	9.2558
	695.750	6.2275100 02	1.3632420 05	9.2558
	700.000	6.2275100 02	1.3632310 05	9.2558
	700.750	6.2275100 02	1.3632290 05	9.2558
	705.864	6.2275100 02	1.3632170 05	9.2558
	705.864	6.2275100 02	1.3632170 05	9.2558
	706.750	6.2275100 02	1.3632150 05	9.2558
	744.864	8.2292100 02	1.3631230 05	9.2566
LH2VTO	744.864	7.6062120 02	1.3630110 05	9.2568
S4BLUCO	772.864	1.9994380 02	1.3629630 05	9.2569
ORB NAV	794.750	1.9885180 02	1.3627320 05	9.2578
	900.000			

TABLE 5-V-A

THRUST, MASS, AND INERTIAL ACCELERATION
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (NEWTONS)	MASS (KG)	INERTIAL ACCELERATION (M/(SEC)SQ)
	1002.750	1.9778570 02	1.3625080 05	9.2589
	1100.000	1.9677670 02	1.3622950 05	9.2603
	1300.000	1.9470160 02	1.3618570 05	9.2635
	1306.750	1.9463150 02	1.3618420 05	9.2636
	1500.000	1.9262650 02	1.3614190 05	9.2669
	1602.750	1.9095720 02	1.3611940 05	9.2685
	1700.000	1.8893840 02	1.3609310 05	9.2698
	1900.000	1.8371990 02	1.3606230 05	9.2718
	1906.750	1.8344970 02	1.3606120 05	9.2719
	2100.000	1.7300510 02	1.3603100 05	9.2726
	2202.750	1.6386400 02	1.3601490 05	9.2726
	2300.000	1.5275030 02	1.3599970 05	9.2722
	2500.000	1.2729190 02	1.3596840 05	9.2707
	2506.750	1.2654120 02	1.3596730 05	9.2706
	2700.000	1.0905140 02	1.3593710 05	9.2684
	2802.750	1.0505210 02	1.3592100 05	9.2671
	2900.000	1.0126700 02	1.3590580 05	9.2658
	3100.000	9.5021290 01	1.3587450 05	9.2632
	3106.750	9.4946220 01	1.3587340 05	9.2631
	3300.000	9.2797180 01	1.3584320 05	9.2609
	3402.750	9.1654540 01	1.3582710 05	9.2600
	3500.000	9.0573070 01	1.3581190 05	9.2592
	3700.000	8.8348960 01	1.3578060 05	9.2578
	3706.750	8.8273890 01	1.3577960 05	9.2577
	3900.000	8.6124840 01	1.3574930 05	9.2566
	4002.750	8.4982210 01	1.3573320 05	9.2560
	4100.000	8.3285260 01	1.3571800 05	9.2554
	4300.000	7.8837040 01	1.3568670 05	9.2538
	4306.750	7.8686910 01	1.3568570 05	9.2537
	4500.000	7.3006790 01	1.3565540 05	9.2516
	4602.750	6.9807410 01	1.3563930 05	9.2503
	4700.000	6.6779280 01	1.3562410 05	9.2488
	4900.000	6.1659630 01	1.3559280 05	9.2456
	4906.750	6.1584560 01	1.3559180 05	9.2455
	5100.000	6.0087920 01	1.3556150 05	9.2423
	5202.750	6.0156480 01	1.3554540 05	9.2407
	5300.000	6.0221370 01	1.3553020 05	9.2393
	5500.000	6.0354810 01	1.3551410 05	9.2371
	5506.750	6.0359320 01	1.3551360 05	9.2371
	5700.000	6.0488260 01	1.3549850 05	9.2361

TABLE 5-V-A

THRUST, MASS, AND INERTIAL ACCELERATION
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (NEWTONS)	MASS (KG)	INERTIAL ACCELERATION (M/(SEC) ²)
	5802.750	6.0556820 01	1.3549040 05	9.2361
	5900.000	6.0621710 01	1.3548280 05	9.2365
	6100.000	6.0755150 01	1.3546720 05	9.2384
	6106.750	6.0759660 01	1.3546670 05	9.2385
	6300.000	6.0888600 01	1.3545150 05	9.2415
	6402.750	6.0957160 01	1.3544350 05	9.2435
	6500.000	6.1022040 01	1.3543590 05	9.2455
	6700.000	6.1155490 01	1.3542020 05	9.2497
	6706.750	6.1159990 01	1.3541970 05	9.2498
	6900.000	6.1288940 01	1.3540460 05	9.2536
	7002.750	6.1357490 01	1.3539660 05	9.2554
	7100.000	6.1323910 01	1.3538890 05	9.2568
	7300.000	6.1101500 01	1.3537330 05	9.2587
	7306.750	6.1093990 01	1.3537280 05	9.2588
	7500.000	6.0653410 01	1.3535760 05	9.2593
	7602.750	6.0120180 01	1.3534960 05	9.2591
	7700.000	5.9615490 01	1.3534200 05	9.2587
	7900.000	5.8577580 01	1.3532630 05	9.2571
	7906.750	5.8542550 01	1.3532580 05	9.2570
	8100.000	5.7539660 01	1.3531070 05	9.2549
	8202.750	5.7006430 01	1.3530270 05	9.2537
	8300.000	5.6501740 01	1.3529510 05	9.2526
	8500.000	5.5463820 01	1.3527940 05	9.2504
	8506.750	5.5428790 01	1.3527890 05	9.2503
	8700.000	5.4379010 01	1.3526380 05	9.2486
	8802.750	5.3758720 01	1.3525570 05	9.2479
	8900.000	5.3171630 01	1.3524810 05	9.2473
	9100.000	5.1964260 01	1.3523250 05	9.2462
	9106.750	5.1923510 01	1.3523190 05	9.2461
	9300.000	5.0756880 01	1.3521680 05	9.2451
	9402.750	5.0136600 01	1.3520880 05	9.2445
	9500.000	4.9549510 01	1.3520120 05	9.2438
	9700.000	4.8342140 01	1.3518550 05	9.2419
1ST OPP	9706.750	4.8301390 01	1.3518500 05	9.2419
	9900.000	4.7134760 01	1.3517000 05	9.2395
	10002.750	4.6514470 01	1.3516220 05	9.2380
	10100.000	4.6409220 01	1.3515480 05	9.2365
	10300.000	4.6943000 01	1.3513970 05	9.2333
	10306.750	4.6961020 01	1.3513910 05	9.2332
	10500.000	4.7476790 01	1.3512450 05	9.2302

TABLE 5-V-A

THRUST, MASS, AND INERTIAL ACCELERATION
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (NEWTONS)	MASS (KG)	INERTIAL ACCELERATION (M/(SEC)SQ)
	10602.750	4.775102D 01	1.351167D 05	9.2288
	10700.000	4.801058D 01	1.351094D 05	9.2276
	10900.000	4.854437D 01	1.350942D 05	9.2261
	10906.750	4.856238D 01	1.350937D 05	9.2261
	11100.000	4.902891D 01	1.350791D 05	9.2260
	11202.750	4.921174D 01	1.350713D 05	9.2265
	11300.000	4.938477D 01	1.350639D 05	9.2273
	11500.000	4.974063D 01	1.350488D 05	9.2300
	11506.750	4.975264D 01	1.350482D 05	9.2301
	11700.000	5.009649D 01	1.350336D 05	9.2337
	11802.750	5.027931D 01	1.350258D 05	9.2359
	11900.000	5.045234D 01	1.350185D 05	9.2380
	12100.000	5.061125D 01	1.350033D 05	9.2423
	12106.750	5.059924D 01	1.350028D 05	9.2424
	12300.000	5.025539D 01	1.349882D 05	9.2459
	12402.750	5.007257D 01	1.349804D 05	9.2474
	12500.000	4.989953D 01	1.349730D 05	9.2485
	12700.000	4.954368D 01	1.349579D 05	9.2499
	12706.750	4.953167D 01	1.349573D 05	9.2499
	12900.000	4.918782D 01	1.349427D 05	9.2499
	13002.750	4.900500D 01	1.349349D 05	9.2494
	13100.000	4.856115D 01	1.349276D 05	9.2488
	13300.000	4.722669D 01	1.349124D 05	9.2469
	13306.750	4.718165D 01	1.349119D 05	9.2468
	13500.000	4.589222D 01	1.348973D 05	9.2446
	13602.750	4.520664D 01	1.348895D 05	9.2435
	13700.000	4.455775D 01	1.348821D 05	9.2424
	13900.000	4.322329D 01	1.348670D 05	9.2405
	13906.750	4.317825D 01	1.348664D 05	9.2404
	14100.000	4.193806D 01	1.348518D 05	9.2390
	14202.750	4.134389D 01	1.348440D 05	9.2384
	14300.000	4.078152D 01	1.348367D 05	9.2379
	14500.000	3.962498D 01	1.348215D 05	9.2369
	14506.750	3.958595D 01	1.348210D 05	9.2368
	14700.000	3.846844D 01	1.348064D 05	9.2357
2ND OPP	14802.750	3.787427D 01	1.347986D 05	9.2350
	14900.000	3.731191D 01	1.347912D 05	9.2342
	15100.000	3.631129D 01	1.347761D 05	9.2321
	15106.750	3.629127D 01	1.347755D 05	9.2320
	15300.000	3.571819D 01	1.347609D 05	9.2294

TABLE 5-V-B

THRUST, MASS, AND INERTIAL ACCELERATION
(ENGLISH UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (POUNDS)	MASS (POUNDS)	INERTIAL ACCELERATION (FT/SEC/SEC)
GRR	-17.250	1.385641D-39	6.483778D 06	32.1237
1ST MOT	0.0	7.706925D 06	6.395523D 06	2.7929
TBI	0.398	7.753993D 06	6.383890D 06	3.2617
	10.000	7.773243D 06	6.103358D 06	8.8604
TIL INIT	11.375	7.780466D 06	6.063204D 06	9.1367
	20.000	7.840977D 06	5.811165D 06	11.2256
	30.000	7.939076D 06	5.518440D 06	14.2314
	40.000	8.079169D 06	5.225239D 06	18.4267
	50.000	8.251704D 06	4.931592D 06	23.7326
	60.000	8.439037D 06	4.637500D 06	29.8603
MACH 1	64.750	8.525867D 06	4.497595D 06	32.6316
	70.000	8.620740D 06	4.342562D 06	36.1195
	80.000	8.795471D 06	4.046691D 06	44.8069
MAX Q	80.125	8.797418D 06	4.042995D 06	44.9270
	90.000	8.927307D 06	3.750822D 06	54.8920
	100.000	9.006628D 06	3.453917D 06	65.4452
	110.000	9.052180D 06	3.156590D 06	76.2631
	120.000	9.081266D 06	2.858889D 06	87.7118
	130.000	9.119837D 06	2.560102D 06	101.3771
	134.000	9.139621D 06	2.440211D 06	107.7888
CFCD	134.000	9.139621D 06	2.440211D 06	107.7888
	134.125	8.998072D 06	2.437020D 06	106.1567
	140.000	7.182152D 06	2.296554D 06	89.5566
	150.000	7.212574D 06	2.060489D 06	102.3556
MAX F/M	159.125	7.191765D 06	1.844379D 06	115.9505
TR3	159.924	7.008552D 06	1.825598D 06	114.1522
	160.000	6.751194D 06	1.824919D 06	109.7534
S2 UI	160.424	1.513933D 06	1.821124D 06	31.7780
SIC RI	160.624	3.642173D 05	1.819334D 06	29.4329
	160.694	2.744125D 05	1.818708D 06	29.8291
	160.694	2.744125D 05	1.818708D 06	29.8291
SIC SEP	160.694	9.414338D 04	1.451815D 06	30.7127
S2 IGN	162.324	9.341351D 04	1.451251D 06	30.7059
S2 90T	164.324	7.985880D 05	1.449179D 06	29.2662
S2 UTT	164.924	8.581930D 05	1.447772D 06	29.4706
	170.000	1.126435D 06	1.435654D 06	30.8521
	180.000	1.152134D 06	1.408769D 06	31.1914
	190.000	1.161105D 06	1.381578D 06	31.3527
INT J	190.624	1.161411D 06	1.371124D 06	31.4368
LFT J	196.124	1.162682D 06	1.355957D 06	31.4813

TABLE 5-V-B

THRUST, MASS, AND INERTIAL ACCELERATION
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (POUNDS)	MASS (POUNDS)	INERTIAL ACCELERATION (FT/SEC/SEC)
	200.000	1.163015D 06	1.336610D 06	31.6067
IGM EN	200.524	1.163019D 06	1.335175D 06	31.6125
IGM ON	201.250	1.163037D 06	1.333188D 06	31.5780
	210.000	1.163104D 06	1.309238D 06	32.4152
	220.000	1.162362D 06	1.281886D 06	32.8580
TSMC1	222.250	1.162084D 06	1.275735D 06	32.9637
	230.000	1.161559D 06	1.254560D 06	33.3446
	240.000	1.161204D 06	1.227250D 06	33.8725
	250.000	1.161037D 06	1.199950D 06	34.4292
	260.000	1.161687D 06	1.172652D 06	35.0360
	270.000	1.162911D 06	1.145323D 06	35.7131
	280.000	1.163615D 06	1.117975D 06	36.4196
	290.000	1.163976D 06	1.090612D 06	37.1575
	300.000	1.164069D 06	1.063245D 06	37.9339
	310.000	1.164174D 06	1.035877D 06	38.7622
	320.000	1.164315D 06	1.008505D 06	39.6505
	330.000	1.164373D 06	9.811293D 05	40.5979
	340.000	1.164251D 06	9.537535D 05	41.6037
	350.000	1.164173D 06	9.263805D 05	42.6773
	360.000	1.164196D 06	8.990065D 05	43.8247
	370.000	1.164079D 06	8.716325D 05	45.0610
	380.000	1.163866D 06	8.442619D 05	46.3759
	390.000	1.163619D 06	8.168962D 05	47.7835
	400.000	1.163330D 06	7.895356D 05	49.2926
	410.000	1.163060D 06	7.621807D 05	50.9156
	420.000	1.162806D 06	7.348308D 05	52.6649
	430.000	1.162489D 06	7.074864D 05	54.5505
	440.000	1.162124D 06	6.801492D 05	56.5878
	450.000	1.161741D 06	6.528198D 05	58.7970
	460.000	1.002564D 06	6.258331D 05	54.1815
	470.000	9.249287D 05	6.037970D 05	50.5590
	480.000	9.245445D 05	5.820092D 05	52.2666
	490.000	6.967660D 05	5.617116D 05	44.2240
	500.000	6.955160D 05	5.455893D 05	44.8669
	510.000	6.943362D 05	5.294934D 05	46.1278
	520.000	6.931163D 05	5.134245D 05	47.5540
	530.000	6.917818D 05	4.973848D 05	48.8400
	540.000	6.901627D 05	4.813790D 05	50.1589
TR4	548.429	6.832877D 05	4.679349D 05	51.0341
S4B UI	549.129	4.640289D 04	4.676494D 05	29.9394

TABLE 5-V-B

THRUST, MASS, AND INERTIAL ACCELERATION
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (POUNDS)	MASS (POUNDS)	INERTIAL ACCELERATION (FT/SEC/SEC)
S2 RI	549.229	4.393293D 04	4.676086D 05	29.9536
	549.304	3.623784D 04	4.675780D 05	30.0041
	549.304	3.623784D 04	4.675780D 05	30.0041
S2 SEP	549.304	5.304251D 03	3.643011D 05	30.2806
	550.000	6.097464D 03	3.642811D 05	30.2698
S4B IGN	552.429	6.534810D 03	3.642091D 05	30.2652
S4B 90T	554.929	1.971632D 05	3.637315D 05	32.1247
IGN 3S	556.500	2.067688D 05	3.629771D 05	32.2284
S4B UTT	556.929	2.066377D 05	3.627713D 05	32.1197
	560.000	2.064582D 05	3.612966D 05	32.6714
S4B UCJ	561.229	2.064521D 05	3.607044D 05	33.2507
TSMC2	563.500	2.064826D 05	3.594752D 05	33.5017
	570.000	2.067043D 05	3.563418D 05	33.2851
	580.000	2.061940D 05	3.515257D 05	33.7153
	590.000	2.059697D 05	3.467180D 05	33.8241
	600.000	2.061852D 05	3.419012D 05	34.0264
	610.000	2.060334D 05	3.370927D 05	34.1855
	620.000	2.065846D 05	3.322821D 05	34.3771
	630.000	2.061542D 05	3.274667D 05	34.5478
	640.000	2.060344D 05	3.226586D 05	34.6793
	650.000	2.065779D 05	3.178488D 05	34.8621
	660.000	2.061963D 05	3.130319D 05	35.2299
	670.000	2.061125D 05	3.082222D 05	35.1564
	680.000	2.060019D 05	3.034147D 05	35.0817
S4RGCS1	685.654	2.064380D 05	3.006969D 05	35.0816
TR5	685.864	4.665496D 04	3.005851D 05	30.1079
S4B LUI	686.164	9.496149D 03	3.005720D 05	30.2489
	690.000	1.400000D 02	3.005510D 05	30.3670
	695.654	1.400000D 02	3.005435D 05	30.3669
PO INS	695.654	1.400000D 02	3.005435D 05	30.3669
	695.750	1.400000D 02	3.005434D 05	30.3669
	700.000	1.400000D 02	3.005410D 05	30.3669
	700.750	1.400000D 02	3.005406D 05	30.3669
	705.864	1.400000D 02	3.005379D 05	30.3668
	705.864	1.400000D 02	3.005379D 05	30.3668
ORB GID	706.750	1.400000D 02	3.005374D 05	30.3668
LH2VTO	744.864	1.850000D 02	3.005171D 05	30.3696
S4BLUCO	772.864	1.709944D 02	3.004925D 05	30.3701
ORB NAV	794.750	4.494916D 01	3.004819D 05	30.3705
	900.000	4.470366D 01	3.004311D 05	30.3733

TABLE 5-V-R THRUST, MASS, AND INERTIAL ACCELERATION
(CONTINUED) (ENGLISH UNITS)

EVENT	TIME FROM 1ST MOT (SEC.)	THRUST (POUNDS)		MASS (POUNDS)		INERTIAL ACCELERATION (FT/SEC/SEC)
	1002.750	4.446400D	01	3.003815D	05	30.3771
	1100.000	4.423716D	01	3.003345D	05	30.3815
	1300.000	4.377066D	01	3.002380D	05	30.3920
	1306.750	4.375491D	01	3.002347D	05	30.3924
	1500.000	4.330415D	01	3.001415D	05	30.4031
	1602.750	4.292888D	01	3.000919D	05	30.4083
	1700.000	4.247504D	01	3.000449D	05	30.4127
	1900.000	4.130188D	01	2.999660D	05	30.4193
	1906.750	4.124113D	01	2.999637D	05	30.4195
	2100.000	3.889308D	01	2.998970D	05	30.4221
	2202.750	3.683808D	01	2.998616D	05	30.4218
	2300.000	3.433963D	01	2.998280D	05	30.4207
	2500.000	2.861635D	01	2.997590D	05	30.4157
	2506.750	2.844760D	01	2.997567D	05	30.4154
	2700.000	2.451572D	01	2.996900D	05	30.4081
	2802.750	2.361666D	01	2.996546D	05	30.4038
	2900.000	2.276572D	01	2.996210D	05	30.3995
	3100.000	2.136164D	01	2.995520D	05	30.3910
	3106.750	2.134476D	01	2.995497D	05	30.3907
	3300.000	2.086164D	01	2.994830D	05	30.3836
	3402.750	2.060476D	01	2.994476D	05	30.3804
	3500.000	2.036164D	01	2.994140D	05	30.3778
	3700.000	1.986164D	01	2.993450D	05	30.3733
	3706.750	1.984476D	01	2.993427D	05	30.3732
	3900.000	1.936164D	01	2.992760D	05	30.3695
	4002.750	1.910476D	01	2.992406D	05	30.3675
	4100.000	1.872327D	01	2.992070D	05	30.3654
	4300.000	1.772327D	01	2.991380D	05	30.3602
	4306.750	1.768952D	01	2.991357D	05	30.3600
	4500.000	1.641258D	01	2.990690D	05	30.3530
	4602.750	1.569333D	01	2.990336D	05	30.3486
	4700.000	1.501258D	01	2.990000D	05	30.3440
	4900.000	1.386164D	01	2.989310D	05	30.3334
	4906.750	1.384476D	01	2.989287D	05	30.3331
	5100.000	1.350830D	01	2.988620D	05	30.3225
	5202.750	1.352371D	01	2.988266D	05	30.3172
	5300.000	1.353830D	01	2.987930D	05	30.3127
	5500.000	1.356830D	01	2.987575D	05	30.3055
	5506.750	1.356931D	01	2.987564D	05	30.3053
	5700.000	1.359830D	01	2.987230D	05	30.3022

TABLE 5-V-B

THRUST, MASS, AND INERTIAL ACCELERATION
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (POUNDS)	MASS (POUNDS)	INERTIAL ACCELERATION (FT/SEC/SEC)
	5802.750	1.3613710 01	2.9870530 05	30.3023
	5900.000	1.3628300 01	2.9868850 05	30.3036
	6100.000	1.3658300 01	2.9865400 05	30.3097
	6106.750	1.3659310 01	2.9865290 05	30.3100
	6300.000	1.3688300 01	2.9861950 05	30.3199
	6402.750	1.3703710 01	2.9860180 05	30.3264
	6500.000	1.3718300 01	2.9858500 05	30.3329
	6700.000	1.3748300 01	2.9855050 05	30.3468
	6706.750	1.3749310 01	2.9854940 05	30.3473
	6900.000	1.3778300 01	2.9851600 05	30.3597
	7002.750	1.3793710 01	2.9849830 05	30.3654
	7100.000	1.3786160 01	2.9848150 05	30.3700
	7300.000	1.3736160 01	2.9844700 05	30.3764
	7306.750	1.3734480 01	2.9844590 05	30.3765
	7500.000	1.3635430 01	2.9841250 05	30.3784
	7602.750	1.3515550 01	2.9839480 05	30.3778
	7700.000	1.3402100 01	2.9837800 05	30.3763
	7900.000	1.3168760 01	2.9834350 05	30.3710
	7906.750	1.3160890 01	2.9834240 05	30.3708
	8100.000	1.2935430 01	2.9830900 05	30.3639
	8202.750	1.2815550 01	2.9829130 05	30.3599
	8300.000	1.2702100 01	2.9827450 05	30.3562
	8500.000	1.2468760 01	2.9824000 05	30.3491
	8506.750	1.2460890 01	2.9823890 05	30.3488
	8700.000	1.2224890 01	2.9820550 05	30.3432
	8802.750	1.2085440 01	2.9818780 05	30.3408
	8900.000	1.1953460 01	2.9817100 05	30.3388
	9100.000	1.1682030 01	2.9813650 05	30.3352
	9106.750	1.1672870 01	2.9813540 05	30.3351
	9300.000	1.1410600 01	2.9810200 05	30.3317
	9402.750	1.1271160 01	2.9808430 05	30.3297
	9500.000	1.1139170 01	2.9806750 05	30.3274
	9700.000	1.0867740 01	2.9803300 05	30.3213
1ST OPP	9706.750	1.0858580 01	2.9803190 05	30.3211
	9900.000	1.0596320 01	2.9799870 05	30.3133
	10002.750	1.0456870 01	2.9798160 05	30.3085
	10100.000	1.0433210 01	2.9796530 05	30.3036
	10300.000	1.0553210 01	2.9793190 05	30.2929
	10306.750	1.0557260 01	2.9793080 05	30.2926
	10500.000	1.0673210 01	2.9789850 05	30.2827

TABLE 5-V-B

THRUST, MASS, AND INERTIAL ACCELERATION
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (POUNDS)	MASS (POUNDS)	INERTIAL ACCELERATION (FT/SEC/SEC)
	10602.750	1.073486D 01	2.978814D 05	30.2781
	10700.000	1.079321D 01	2.978651D 05	30.2744
	10900.000	1.091321D 01	2.978317D 05	30.2695
	10906.750	1.091726D 01	2.978306D 05	30.2694
	11100.000	1.102214D 01	2.977983D 05	30.2690
	11202.750	1.106324D 01	2.977812D 05	30.2706
	11300.000	1.110214D 01	2.977649D 05	30.2733
	11500.000	1.118214D 01	2.977315D 05	30.2822
	11506.750	1.118484D 01	2.977304D 05	30.2825
	11700.000	1.126214D 01	2.976981D 05	30.2944
	11802.750	1.130324D 01	2.976810D 05	30.3016
	11900.000	1.134214D 01	2.976647D 05	30.3085
	12100.000	1.137786D 01	2.976313D 05	30.3224
	12106.750	1.137516D 01	2.976302D 05	30.3229
	12300.000	1.129786D 01	2.975979D 05	30.3344
	12402.750	1.125676D 01	2.975808D 05	30.3393
	12500.000	1.121786D 01	2.975645D 05	30.3430
	12700.000	1.113786D 01	2.975311D 05	30.3473
	12706.750	1.113516D 01	2.975300D 05	30.3474
	12900.000	1.105786D 01	2.974977D 05	30.3474
	13002.750	1.101676D 01	2.974806D 05	30.3459
	13100.000	1.091698D 01	2.974643D 05	30.3437
	13300.000	1.061698D 01	2.974309D 05	30.3375
	13306.750	1.060686D 01	2.974298D 05	30.3373
	13500.000	1.031698D 01	2.973975D 05	30.3301
	13602.750	1.016286D 01	2.973804D 05	30.3263
	13700.000	1.001698D 01	2.973641D 05	30.3228
	13900.000	9.716981D 00	2.973307D 05	30.3166
	13906.750	9.706856D 00	2.973296D 05	30.3164
	14100.000	9.428050D 00	2.972973D 05	30.3117
	14202.750	9.294475D 00	2.972802D 05	30.3096
	14300.000	9.168050D 00	2.972639D 05	30.3079
	14500.000	8.908050D 00	2.972305D 05	30.3047
	14506.750	8.899275D 00	2.972294D 05	30.3045
	14700.000	8.648050D 00	2.971971D 05	30.3010
2ND OPP	14802.750	8.514475D 00	2.971800D 05	30.2986
	14900.000	8.388050D 00	2.971637D 05	30.2959
	15100.000	8.163103D 00	2.971303D 05	30.2890
	15106.750	8.158603D 00	2.971292D 05	30.2887
	15300.000	8.029769D 00	2.970969D 05	30.2802

TABLE 5-VI-A ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(METRIC UNITS)

EVENT	TIME FROM 1ST MOT (SECS)	ALTITUDE (METERS)	VELOCITY (M/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (M/(SEC) ²)
GRR	-17.250	62.	0.00	0.0	9.8181
1ST MOT	0.0	62.	0.00	0.0	9.8181
TBI	0.398	62.	0.38	89.5981	9.8181
	10.000	172.	23.64	85.8649	9.8178
TIL INIT	11.375	207.	27.45	85.6407	9.8177
	20.000	555.	54.28	88.1588	9.8166
	30.000	1283.	92.83	86.4110	9.8143
	40.000	2437.	141.17	81.0660	9.8108
	50.000	4100.	202.02	74.2843	9.8057
	60.000	6352.	278.38	67.3574	9.7987
MACH 1	64.750	7648.	320.49	64.1667	9.7948
	70.000	9255.	371.24	60.7536	9.7898
	80.000	12852.	485.55	54.7092	9.7788
MAX Q	80.125	12902.	487.14	54.6369	9.7786
	90.000	17201.	626.63	49.0360	9.7655
	100.000	22320.	797.14	43.6108	9.7499
	110.000	28213.	999.35	38.9342	9.7319
	120.000	34898.	1235.97	34.9860	9.7116
	130.000	42423.	1511.95	31.7756	9.6888
	134.000	45686.	1635.07	30.6516	9.6790
CECO	134.000	45686.	1635.07	30.6516	9.6790
	134.125	45790.	1639.01	30.6175	9.6787
	140.000	50802.	1787.42	29.0881	9.6636
	150.000	59808.	2066.68	26.7858	9.6365
MAX F/M	159.125	68605.	2360.02	24.9547	9.6102
TR3	159.924	69405.	2387.24	24.8045	9.6078
	160.000	69481.	2389.74	24.7904	9.6076
S2 UT	160.424	69906.	2396.38	24.7125	9.6063
SIC RI	160.624	70107.	2396.54	24.6761	9.6057
	160.694	70177.	2396.38	24.6634	9.6055
	160.694	70177.	2396.38	24.6634	9.6055
SIC SEP	160.694	70181.	2396.38	24.6634	9.6055
S2 IGN	162.324	71802.	2390.92	24.3668	9.6007
S2 90T	164.324	73761.	2387.80	24.0004	9.5949
S2 UTT	164.924	74343.	2388.84	23.8903	9.5931
	170.000	79186.	2405.62	22.9822	9.5787
	180.000	88334.	2448.61	21.2663	9.5516
	190.000	96980.	2496.63	19.6400	9.5261
INT J	190.624	97504.	2499.79	19.5415	9.5246
LFT J	196.124	102038.	2528.42	18.6905	9.5112

TABLE 5-VI-A ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SFC)	ALTITUDE (METERS)	VELOCITY (M/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (M/(SEC)SQ)
	200.000	105149.	2549.53	18.1085	9.5021
IGM FN	200.524	105564.	2552.42	18.0309	9.5009
IGM ON	201.250	106137.	2556.46	17.9239	9.4992
	210.000	112858.	2606.82	16.6423	9.4795
	220.000	120110.	2668.07	15.2410	9.4584
TSMC1	222.250	121680.	2682.38	14.9357	9.4538
	230.000	126915.	2733.15	13.9130	9.4386
	240.000	133283.	2802.04	12.6574	9.4201
	250.000	139225.	2874.71	11.4741	9.4029
	260.000	144751.	2951.16	10.3623	9.3870
	270.000	149873.	3031.49	9.3206	9.3723
	280.000	154602.	3115.69	8.3462	9.3587
	290.000	158950.	3203.73	7.4382	9.3462
	300.000	162929.	3295.62	6.5949	9.3349
	310.000	166553.	3391.38	5.8144	9.3245
	320.000	169834.	3491.09	5.0945	9.3152
	330.000	172786.	3594.84	4.4328	9.3068
	340.000	175425.	3702.70	3.8272	9.2993
	350.000	177764.	3814.78	3.2758	9.2927
	360.000	179819.	3931.24	2.7768	9.2869
	370.000	181608.	4052.24	2.3277	9.2818
	380.000	183146.	4177.96	1.9268	9.2775
	390.000	184453.	4308.61	1.5726	9.2738
	400.000	185547.	4444.42	1.2633	9.2707
	410.000	186449.	4585.67	0.9977	9.2682
	420.000	187180.	4732.69	0.7743	9.2661
	430.000	187765.	4885.82	0.5921	9.2645
	440.000	188227.	5045.47	0.4498	9.2632
	450.000	188594.	5212.09	0.3468	9.2621
	460.000	188896.	5385.39	0.2803	9.2613
	470.000	189127.	5529.35	0.2034	9.2607
	480.000	189354.	5676.68	0.2378	9.2600
	490.000	189622.	5820.25	0.2537	9.2593
	500.000	189868.	5940.13	0.2110	9.2586
	510.000	190096.	6063.27	0.2066	9.2580
	520.000	190328.	6190.56	0.2103	9.2573
	530.000	190576.	6322.00	0.2301	9.2566
	540.000	190862.	6457.66	0.2709	9.2558
TR4	548.429	191151.	6575.36	0.3214	9.2550
S4B UI	549.129	191177.	6579.13	0.3165	9.2549

TABLE 5-VI-A ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (METERS)	VELOCITY (M/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (M/(SEC)SQ)
S2 RT	549.229	191181.	6579.22	0.3151	9.2549
	549.304	191183.	6579.28	0.3140	9.2549
	549.304	191183.	6579.28	0.3140	9.2549
S2 SEP	549.304	191185.	6579.28	0.3140	9.2549
	550.000	191210.	6579.35	0.3033	9.2548
S4B IGN	552.429	191291.	6579.65	0.2657	9.2546
S4B 90T	554.929	191363.	6584.83	0.2347	9.2544
IGM 35	556.500	191406.	6593.31	0.2243	9.2543
S4B UTT	556.929	191417.	6595.64	0.2218	9.2543
	560.000	191494.	6612.39	0.2040	9.2540
S4B UCJ	561.229	191523.	6619.16	0.1947	9.2540
TSMC?	563.500	191573.	6631.76	0.1749	9.2538
	570.000	191688.	6668.05	0.1253	9.2535
	580.000	191796.	6724.63	0.0540	9.2532
	590.000	191825.	6782.04	-0.0069	9.2531
	600.000	191788.	6840.45	-0.0560	9.2532
	610.000	191696.	6899.68	-0.0946	9.2535
	620.000	191563.	6959.86	-0.1216	9.2539
	630.000	191400.	7021.01	-0.1375	9.2543
	640.000	191223.	7083.00	-0.1412	9.2548
	650.000	191046.	7145.93	-0.1325	9.2553
	660.000	190882.	7209.98	-0.1178	9.2558
	670.000	190742.	7274.84	-0.0871	9.2562
	680.000	190650.	7340.54	-0.0376	9.2564
S4B GCS1	685.654	190629.	7378.05	-0.0014	9.2565
TR5	685.864	190629.	7379.28	-0.0001	9.2565
S4B LUI	686.164	190628.	7379.43	0.0001	9.2565
	690.000	190624.	7379.63	0.0002	9.2565
	695.654	190616.	7379.66	0.0000	9.2565
PO INS	695.654	190616.	7379.66	0.0000	9.2565
	695.750	190616.	7379.66	0.0000	9.2565
	700.000	190610.	7379.69	-0.0001	9.2565
	700.750	190609.	7379.69	-0.0001	9.2565
	705.864	190602.	7379.73	-0.0002	9.2565
	705.864	190602.	7379.73	-0.0002	9.2565
	706.750	190600.	7379.73	-0.0002	9.2565
ORB GIO	706.750	190600.	7379.73	-0.0002	9.2565
LH2VTO	744.864	190528.	7380.00	-0.0011	9.2567
S4B LUCO	772.864	190459.	7380.26	-0.0017	9.2568
ORB NAV	794.750	190396.	7380.37	-0.0021	9.2569
	900.000	189985.	7381.06	-0.0042	9.2578

TABLE 5-VI-A ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SFC)	ALTITUDE (METERS)	VELOCITY (M/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (M/(SEC)SQ)
	1002.750	189432.	7381.94	-0.0061	9.2589
	1100.000	188798.	7382.90	-0.0078	9.2603
	1300.000	187285.	7385.16	-0.0112	9.2635
	1306.750	187232.	7385.24	-0.0113	9.2636
	1500.000	185736.	7387.45	-0.0141	9.2669
	1602.750	185021.	7388.53	-0.0154	9.2685
	1700.000	184437.	7389.42	-0.0164	9.2698
	1900.000	183612.	7390.75	-0.0174	9.2718
	1906.750	183595.	7390.78	-0.0174	9.2719
	2100.000	183390.	7391.28	-0.0166	9.2726
	2202.750	183516.	7391.23	-0.0152	9.2726
	2300.000	183774.	7390.99	-0.0134	9.2722
	2500.000	184659.	7390.02	-0.0076	9.2707
	2506.750	184695.	7389.98	-0.0074	9.2706
	2700.000	185848.	7388.62	0.0006	9.2684
	2802.750	186503.	7387.85	0.0055	9.2671
	2900.000	187113.	7387.13	0.0106	9.2658
	3100.000	188238.	7385.82	0.0215	9.2632
	3106.750	188272.	7385.78	0.0218	9.2631
	3300.000	189076.	7384.90	0.0321	9.2609
	3402.750	189373.	7384.61	0.0371	9.2600
	3500.000	189572.	7384.44	0.0413	9.2592
	3700.000	189774.	7384.38	0.0479	9.2578
	3706.750	189777.	7384.38	0.0481	9.2577
	3900.000	189817.	7384.53	0.0512	9.2566
	4002.750	189837.	7384.61	0.0514	9.2560
	4100.000	189885.	7384.64	0.0507	9.2554
	4300.000	190160.	7384.48	0.0467	9.2538
	4306.750	190175.	7384.47	0.0465	9.2537
	4500.000	190777.	7383.85	0.0397	9.2516
	4602.750	191246.	7383.32	0.0352	9.2503
	4700.000	191782.	7382.69	0.0307	9.2488
	4900.000	193114.	7381.07	0.0207	9.2456
	4906.750	193163.	7381.01	0.0204	9.2455
	5100.000	194615.	7379.21	0.0108	9.2423
	5202.750	195378.	7378.26	0.0061	9.2407
	5300.000	196055.	7377.42	0.0019	9.2393
	5500.000	197185.	7376.02	-0.0055	9.2371
	5506.750	197215.	7375.98	-0.0057	9.2371
	5700.000	197786.	7375.31	-0.0112	9.2361

TABLE 5-VI-A ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(METRIC UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (METERS)	VELOCITY (M/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (M/(SEC) ²)
	5802.750	197839.	7375.27	-0.0135	9.2361
	5900.000	197719.	7375.46	-0.0154	9.2365
	6100.000	196957.	7376.52	-0.0184	9.2384
	6106.750	196920.	7376.57	-0.0185	9.2385
	6300.000	195596.	7378.36	-0.0208	9.2415
	6402.750	194727.	7379.53	-0.0218	9.2435
	6500.000	193839.	7380.72	-0.0226	9.2455
	6700.000	191959.	7383.24	-0.0242	9.2497
	6706.750	191897.	7383.33	-0.0243	9.2498
	6900.000	190248.	7385.54	-0.0254	9.2536
	7002.750	189521.	7386.52	-0.0257	9.2554
	7100.000	188961.	7387.28	-0.0257	9.2568
	7300.000	188265.	7388.24	-0.0246	9.2587
	7306.750	188252.	7388.26	-0.0245	9.2588
	7500.000	188214.	7388.36	-0.0215	9.2593
	7602.750	188422.	7388.12	-0.0190	9.2591
	7700.000	188743.	7387.73	-0.0161	9.2587
	7900.000	189688.	7386.55	-0.0083	9.2571
	7906.750	189724.	7386.51	-0.0080	9.2570
	8100.000	190825.	7385.14	0.0016	9.2549
	8202.750	191409.	7384.42	0.0073	9.2537
	8300.000	191928.	7383.79	0.0128	9.2526
	8500.000	192814.	7382.74	0.0243	9.2504
	8506.750	192839.	7382.71	0.0247	9.2503
	8700.000	193386.	7382.12	0.0349	9.2486
	8802.750	193554.	7381.97	0.0396	9.2479
	8900.000	193645.	7381.92	0.0433	9.2473
	9100.000	193691.	7382.01	0.0486	9.2462
	9106.750	193691.	7382.02	0.0487	9.2461
	9300.000	193688.	7382.17	0.0501	9.2451
	9402.750	193728.	7382.20	0.0494	9.2445
	9500.000	193822.	7382.15	0.0479	9.2438
	9700.000	194250.	7381.73	0.0422	9.2419
1ST OPP	9706.750	194271.	7381.71	0.0420	9.2419
	9900.000	195061.	7380.79	0.0340	9.2395
	10002.750	195625.	7380.12	0.0292	9.2380
	10100.000	196239.	7379.36	0.0244	9.2365
	10300.000	197665.	7377.59	0.0143	9.2333
	10306.750	197716.	7377.53	0.0139	9.2332
	10500.000	199138.	7375.74	0.0048	9.2302

TABLE 5-VI-A ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (METERS)	VELOCITY (M/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (M/(SEC) ²)
	10602.750	199832.	7374.87	0.0004	9.2288
	10700.000	200409.	7374.14	-0.0034	9.2276
	10900.000	201240.	7373.11	-0.0100	9.2261
	10906.750	201258.	7373.09	-0.0102	9.2261
	11100.000	201452.	7372.88	-0.0150	9.2260
	11202.750	201289.	7373.12	-0.0170	9.2265
	11300.000	200964.	7373.56	-0.0186	9.2273
	11500.000	199819.	7375.11	-0.0213	9.2300
	11506.750	199770.	7375.17	-0.0213	9.2301
	11700.000	198173.	7377.30	-0.0234	9.2337
	11802.750	197211.	7378.58	-0.0243	9.2359
	11900.000	196274.	7379.83	-0.0251	9.2380
	12100.000	194413.	7382.30	-0.0265	9.2423
	12106.750	194354.	7382.38	-0.0265	9.2424
	12300.000	192867.	7384.36	-0.0272	9.2459
	12402.750	192268.	7385.16	-0.0271	9.2474
	12500.000	191849.	7385.73	-0.0267	9.2485
	12700.000	191469.	7386.26	-0.0245	9.2499
	12706.750	191467.	7386.26	-0.0244	9.2499
	12900.000	191714.	7385.98	-0.0201	9.2499
	13002.750	192047.	7385.56	-0.0169	9.2494
	13100.000	192463.	7385.04	-0.0133	9.2488
	13300.000	193513.	7383.72	-0.0042	9.2469
	13306.750	193551.	7383.67	-0.0038	9.2468
	13500.000	194633.	7382.32	0.0067	9.2446
	13602.750	195166.	7381.66	0.0126	9.2435
	13700.000	195616.	7381.11	0.0183	9.2424
	13900.000	196321.	7380.29	0.0295	9.2405
	13906.750	196339.	7380.27	0.0299	9.2404
	14100.000	196702.	7379.91	0.0391	9.2390
	14202.750	196786.	7379.87	0.0431	9.2384
	14300.000	196815.	7379.90	0.0460	9.2379
	14500.000	196797.	7380.06	0.0493	9.2369
	14506.750	196797.	7380.06	0.0493	9.2368
	14700.000	196830.	7380.15	0.0488	9.2357
2ND OPP	14802.750	196926.	7380.10	0.0470	9.2350
	14900.000	197090.	7379.94	0.0446	9.2342
	15100.000	197700.	7379.26	0.0374	9.2321
	15106.750	197727.	7379.23	0.0371	9.2320
	15300.000	198694.	7378.06	0.0282	9.2294

TABLE 5-VI-B ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(ENGLISH UNITS)

EVENT	TIME FROM 1ST MOT (SFC)	ALTITUDE (FEET)	VELOCITY (FT/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (FT/SEC/SEC)
GRR	-17.250	204.	0.00	0.0	32.2116
1ST MOT	0.0	204.	0.00	0.0	32.2116
TRI	0.398	204.	1.26	89.5981	32.2116
	10.000	565.	77.56	85.8649	32.2105
TIL INIT	11.375	680.	90.05	85.6407	32.2102
	20.000	1822.	178.07	88.1588	32.2066
	30.000	4209.	304.56	86.4110	32.1993
	40.000	7994.	463.16	81.0660	32.1876
	50.000	13452.	662.80	74.2843	32.1708
	60.000	20840.	913.32	67.3574	32.1481
MACH 1	64.750	25091.	1051.47	64.1667	32.1350
	70.000	30365.	1217.99	60.7536	32.1189
	80.000	42167.	1593.02	54.7092	32.0827
MAX Q	80.125	42330.	1598.24	54.6369	32.0822
	90.000	56434.	2055.86	49.0360	32.0390
	100.000	73228.	2615.30	43.6108	31.9877
	110.000	92563.	3278.70	38.9342	31.9288
	120.000	114494.	4055.01	34.9860	31.8622
	130.000	139183.	4960.48	31.7756	31.7875
	134.000	149887.	5364.42	30.6516	31.7552
CFCO	134.000	149887.	5364.42	30.6516	31.7552
	134.125	150230.	5377.34	30.6175	31.7542
	140.000	166672.	5864.25	29.0881	31.7046
	150.000	196219.	6780.44	26.7858	31.6159
MAX F/M	159.125	225084.	7742.84	24.9547	31.5296
TR3	159.924	227705.	7832.16	24.8045	31.5218
	160.000	227955.	7840.36	24.7904	31.5210
S2 UI	160.424	229351.	7862.13	24.7125	31.5169
SIC RI	160.624	230009.	7862.66	24.6761	31.5149
	160.694	230239.	7862.14	24.6634	31.5142
	160.694	230239.	7862.14	24.6634	31.5142
SIC SEP	160.694	230252.	7862.14	24.6634	31.5142
S2 IGN	162.324	235570.	7844.21	24.3668	31.4983
S2 90T	164.324	241998.	7833.99	24.0004	31.4792
S2 UTT	164.924	243908.	7837.41	23.8903	31.4735
	170.000	259798.	7892.46	22.9822	31.4263
	180.000	289808.	8033.50	21.2663	31.3373
	190.000	318177.	8191.05	19.6400	31.2536
INT J	190.624	319895.	8201.41	19.5415	31.2486
LET J	196.124	334771.	8295.34	18.6905	31.2048

TABLE 5-VI-B ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (FFET)	VELOCITY (FT/SEC)	FLIGHT- PATH ANGLE (DEGRFES)	GRAVITATIONAL ACCELERATION (FT/SEC/SEC)
	200.000	344976.	8364.59	18.1085	31.1749
IGM EN	200.524	346339.	8374.10	18.0309	31.1709
IGM ON	201.250	348220.	8387.32	17.9239	31.1653
	210.000	370269.	8552.55	16.6423	31.1008
	220.000	394061.	8753.51	15.2410	31.0314
TSMC1	222.250	399211.	8800.47	14.9357	31.0164
	230.000	416387.	8967.03	13.9130	30.9664
	240.000	437281.	9193.04	12.6574	30.9058
	250.000	456775.	9431.46	11.4741	30.8495
	260.000	474905.	9682.27	10.3623	30.7972
	270.000	491709.	9945.84	9.3206	30.7489
	280.000	507224.	10222.07	8.3462	30.7044
	290.000	521489.	10510.93	7.4382	30.6635
	300.000	534545.	10812.40	6.5949	30.6262
	310.000	546433.	11126.58	5.8144	30.5923
	320.000	557198.	11453.72	5.0945	30.5617
	330.000	566885.	11794.08	4.4328	30.5341
	340.000	575540.	12147.96	3.8272	30.5096
	350.000	583214.	12515.68	3.2758	30.4878
	360.000	589958.	12897.76	2.7768	30.4687
	370.000	595825.	13294.75	2.3277	30.4521
	380.000	600873.	13707.22	1.9268	30.4379
	390.000	605160.	14135.85	1.5726	30.4258
	400.000	608749.	14581.42	1.2633	30.4157
	410.000	611708.	15044.85	0.9977	30.4073
	420.000	614108.	15527.19	0.7743	30.4006
	430.000	616026.	16029.60	0.5921	30.3952
	440.000	617543.	16553.38	0.4498	30.3910
	450.000	618748.	17100.04	0.3468	30.3876
	460.000	619736.	17668.60	0.2803	30.3848
	470.000	620496.	18140.90	0.2034	30.3827
	480.000	621239.	18624.29	0.2378	30.3807
	490.000	622118.	19095.31	0.2537	30.3782
	500.000	622926.	19488.63	0.2110	30.3760
	510.000	623676.	19892.61	0.2066	30.3739
	520.000	624436.	20310.23	0.2103	30.3718
	530.000	625249.	20741.47	0.2301	30.3695
	540.000	626187.	21186.56	0.2709	30.3669
TR4	548.429	627135.	21572.69	0.3214	30.3642
S4B UI	549.129	627221.	21585.08	0.3165	30.3640

TABLE 5-VI-B

 ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
 FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
 (ENGLISH UNITS)

(CONTINUED)

EVFNT	TIME FROM 1ST MOT (SEC)	ALTITUDE (FEET)	VELOCITY (FT/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (FT/SEC/SEC)	
S2 RI	549.229	627233.	21585.37	0.3151	30.3639	
	549.304	627242.	21585.56	0.3140	30.3639	
	549.304	627242.	21585.56	0.3140	30.3639	
S2 SEP	549.304	627246.	21585.56	0.3140	30.3639	
	550.000	627329.	21585.81	0.3033	30.3637	
S4B IGN	552.429	627594.	21586.79	0.2657	30.3629	
S4B 90T	554.929	627833.	21603.79	0.2347	30.3622	
IGN 3S	556.500	627972.	21631.60	0.2243	30.3619	
S4B UTT	556.929	628009.	21639.25	0.2218	30.3618	
	560.000	628262.	21694.18	0.2040	30.3610	
S4B UCJ	561.229	628357.	21716.39	0.1947	30.3608	
	563.500	628520.	21757.74	0.1749	30.3603	
TSMC2	570.000	628899.	21876.79	0.1253	30.3593	
	580.000	629254.	22062.44	0.0540	30.3583	
	590.000	629348.	22250.78	-0.0069	30.3580	
	600.000	629225.	22442.42	-0.0560	30.3584	
	610.000	628924.	22636.76	-0.0946	30.3592	
	620.000	628486.	22834.18	-0.1216	30.3604	
	630.000	627954.	23034.82	-0.1375	30.3619	
	640.000	627373.	23238.19	-0.1412	30.3636	
	650.000	626792.	23444.65	-0.1325	30.3652	
	660.000	626254.	23654.78	-0.1178	30.3667	
	670.000	625794.	23867.60	-0.0871	30.3680	
	680.000	625492.	24083.13	-0.0376	30.3688	
	685.654	625423.	24206.19	-0.0014	30.3690	
	S4RGCS1	685.864	625422.	24210.25	-0.0001	30.3690
	TR5	686.164	625421.	24210.72	0.0001	30.3690
S4B LUI	690.000	625406.	24211.37	0.0002	30.3690	
	695.654	625382.	24211.49	0.0000	30.3690	
PO INS	695.654	625382.	24211.49	0.0000	30.3690	
	695.750	625381.	24211.49	0.0000	30.3691	
	700.000	625362.	24211.58	-0.0001	30.3691	
	700.750	625358.	24211.59	-0.0001	30.3691	
	705.864	625334.	24211.70	-0.0002	30.3691	
	705.864	625334.	24211.70	-0.0002	30.3691	
	706.750	625329.	24211.72	-0.0002	30.3691	
ORB GIO	744.864	625093.	24212.60	-0.0011	30.3696	
LH2VTO	772.864	624867.	24213.45	-0.0017	30.3701	
S4BLUCD	794.750	624660.	24213.83	-0.0021	30.3705	
ORB NAV	900.000	623312.	24216.09	-0.0042	30.3733	

TABLE 5-VI-B ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (FEET)	VELOCITY (FT/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (FT/SEC/SEC)
	1002.750	621497.	24218.95	-0.0061	30.3771
	1100.000	619415.	24222.12	-0.0078	30.3815
	1300.000	614452.	24229.53	-0.0112	30.3921
	1306.750	614277.	24229.79	-0.0113	30.3924
	1500.000	609372.	24237.06	-0.0141	30.4031
	1602.750	607026.	24240.57	-0.0154	30.4083
	1700.000	605107.	24243.49	-0.0164	30.4127
	1900.000	602403.	24247.85	-0.0174	30.4193
	1906.750	602345.	24247.95	-0.0174	30.4195
	2100.000	601672.	24249.59	-0.0166	30.4221
	2202.750	602086.	24249.43	-0.0152	30.4218
	2300.000	602935.	24248.65	-0.0134	30.4207
	2500.000	605835.	24245.47	-0.0076	30.4157
	2506.750	605955.	24245.33	-0.0074	30.4154
	2700.000	609738.	24240.89	0.0006	30.4081
	2802.750	611887.	24238.35	0.0055	30.4038
	2900.000	613887.	24235.98	0.0106	30.3995
	3100.000	617580.	24231.68	0.0215	30.3910
	3106.750	617690.	24231.56	0.0218	30.3907
	3300.000	620328.	24228.67	0.0321	30.3836
	3402.750	621301.	24227.71	0.0371	30.3804
	3500.000	621954.	24227.17	0.0413	30.3778
	3700.000	622618.	24226.96	0.0479	30.3733
	3706.750	622628.	24226.97	0.0481	30.3732
	3900.000	622760.	24227.45	0.0512	30.3695
	4002.750	622824.	24227.72	0.0514	30.3675
	4100.000	622982.	24227.84	0.0507	30.3654
	4300.000	623885.	24227.29	0.0467	30.3602
	4306.750	623933.	24227.25	0.0465	30.3600
	4500.000	625909.	24225.22	0.0397	30.3530
	4602.750	627447.	24223.48	0.0352	30.3486
	4700.000	629205.	24221.41	0.0307	30.3440
	4900.000	633576.	24216.11	0.0207	30.3334
	4906.750	633737.	24215.92	0.0204	30.3331
	5100.000	638500.	24210.02	0.0108	30.3225
	5202.750	641005.	24206.90	0.0061	30.3172
	5300.000	643226.	24204.14	0.0019	30.3127
	5500.000	646933.	24199.54	-0.0055	30.3055
	5506.750	647032.	24199.42	-0.0057	30.3053
	5700.000	648904.	24197.20	-0.0112	30.3022

TABLE 5-VI-B ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (FEET)	VELOCITY (FT/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (FT/SEC/SEC)
	5802.750	649079.	24197.08	-0.0135	30.3023
	5900.000	648683.	24197.70	-0.0154	30.3036
	6100.000	646184.	24201.19	-0.0184	30.3097
	6106.750	646062.	24201.35	-0.0185	30.3100
	6300.000	641719.	24207.23	-0.0208	30.3199
	6402.750	638867.	24211.07	-0.0218	30.3264
	6500.000	635955.	24214.98	-0.0226	30.3329
	6700.000	629788.	24223.24	-0.0242	30.3468
	6706.750	629584.	24223.51	-0.0243	30.3473
	6900.000	624174.	24230.76	-0.0254	30.3597
	7002.750	621787.	24233.98	-0.0257	30.3654
	7100.000	619949.	24236.47	-0.0257	30.3700
	7300.000	617666.	24239.63	-0.0246	30.3764
	7306.750	617626.	24239.69	-0.0245	30.3765
	7500.000	617500.	24240.03	-0.0215	30.3784
	7602.750	618183.	24239.23	-0.0190	30.3778
	7700.000	619237.	24237.95	-0.0161	30.3763
	7900.000	622335.	24234.10	-0.0083	30.3710
	7906.750	622454.	24233.95	-0.0080	30.3708
	8100.000	626066.	24229.47	0.0016	30.3639
	8202.750	627981.	24227.11	0.0073	30.3599
	8300.000	629684.	24225.03	0.0128	30.3562
	8500.000	632592.	24221.58	0.0243	30.3491
	8506.750	632673.	24221.49	0.0247	30.3488
	8700.000	634467.	24219.54	0.0349	30.3432
	8802.750	635019.	24219.05	0.0396	30.3408
	8900.000	635320.	24218.89	0.0433	30.3388
	9100.000	635470.	24219.19	0.0486	30.3352
	9106.750	635469.	24219.21	0.0487	30.3351
	9300.000	635459.	24219.72	0.0501	30.3317
	9402.750	635591.	24219.80	0.0494	30.3297
	9500.000	635897.	24219.64	0.0479	30.3274
	9700.000	637305.	24218.27	0.0422	30.3214
1ST OPP	9706.750	637373.	24218.19	0.0420	30.3211
	9900.000	639964.	24215.21	0.0340	30.3133
	10002.750	641815.	24212.98	0.0292	30.3085
	10100.000	643828.	24210.51	0.0244	30.3036
	10300.000	648508.	24204.69	0.0143	30.2929
	10306.750	648673.	24204.49	0.0139	30.2926
	10500.000	653339.	24198.62	0.0048	30.2827

TABLE 5-VI-B ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (FEET)	VELOCITY (FT/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (FT/SEC/SEC)
	10602.750	655616.	24195.76	0.0004	30.2781
	10700.000	657510.	24193.38	-0.0034	30.2744
	10900.000	660237.	24189.99	-0.0100	30.2695
	10906.750	660296.	24189.91	-0.0102	30.2694
	11100.000	660931.	24189.24	-0.0150	30.2690
	11202.750	660397.	24190.01	-0.0170	30.2706
	11300.000	659332.	24191.48	-0.0186	30.2733
	11500.000	655573.	24196.54	-0.0213	30.2822
	11506.750	655414.	24196.76	-0.0213	30.2825
	11700.000	650174.	24203.75	-0.0234	30.2944
	11802.750	647018.	24207.95	-0.0243	30.3015
	11900.000	643944.	24212.04	-0.0251	30.3085
	12100.000	637837.	24220.16	-0.0265	30.3224
	12106.750	637644.	24220.41	-0.0265	30.3229
	12300.000	632765.	24226.91	-0.0272	30.3344
	12402.750	630801.	24229.54	-0.0271	30.3393
	12500.000	629426.	24231.39	-0.0267	30.3430
	12700.000	628179.	24233.14	-0.0245	30.3473
	12706.750	628174.	24233.15	-0.0244	30.3474
	12900.000	628984.	24232.21	-0.0201	30.3474
	13002.750	630077.	24230.85	-0.0169	30.3459
	13100.000	631439.	24229.14	-0.0133	30.3437
	13300.000	634884.	24224.80	-0.0042	30.3375
	13306.750	635008.	24224.64	-0.0038	30.3373
	13500.000	638561.	24220.20	0.0067	30.3301
	13602.750	640310.	24218.05	0.0126	30.3263
	13700.000	641786.	24216.25	0.0183	30.3229
	13900.000	644097.	24213.56	0.0295	30.3166
	13906.750	644157.	24213.49	0.0299	30.3164
	14100.000	645348.	24212.31	0.0391	30.3117
	14202.750	645625.	24212.16	0.0431	30.3096
	14300.000	645719.	24212.26	0.0460	30.3079
	14500.000	645661.	24212.79	0.0493	30.3047
	14506.750	645658.	24212.80	0.0493	30.3045
	14700.000	645768.	24213.10	0.0488	30.3010
2ND OPP	14802.750	646082.	24212.91	0.0470	30.2986
	14900.000	646620.	24212.41	0.0446	30.2959
	15100.000	648622.	24210.18	0.0374	30.2890
	15106.750	648711.	24210.07	0.0371	30.2887
	15300.000	651884.	24206.24	0.0282	30.2802

TABLE 5-VII PITCH AND YAW REFERENCE ANGLES (LOCAL HORIZONTAL COORDINATES) AND RANGE (METRIC AND ENGLISH UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	PITCH (DEG)	YAW (DEG)	RANGE (KM)	RANGE (NMI)
GRR	-17.250	90.000	-0.162	0.	0.
1ST MOT	0.0	89.991	-0.162	0.	0.
TBI	0.398	89.993	-0.162	0.	0.
TIL INIT	10.000	89.817	1.141	0.	0.
	11.375	89.917	0.700	0.	0.
	20.000	89.038	-0.435	0.	0.
	30.000	86.151	-1.062	0.	0.
	40.000	80.976	-2.042	0.	0.
	50.000	75.043	-2.953	1.	0.
	60.000	68.804	-3.605	1.	1.
MACH 1	64.750	65.789	-3.808	2.	1.
	70.000	62.522	-3.956	3.	1.
	80.000	56.458	-4.000	5.	3.
MAX Q	80.125	56.375	-4.000	5.	3.
	90.000	49.444	-3.899	8.	5.
	100.000	43.307	-3.591	13.	7.
	110.000	38.434	-3.216	20.	11.
	120.000	34.933	-2.787	29.	16.
	130.000	31.891	-2.402	40.	22.
	134.000	30.631	-2.284	46.	25.
CECO	134.000	30.631	-2.284	46.	25.
	134.125	30.593	-2.280	46.	25.
	140.000	29.145	-2.101	54.	29.
	150.000	26.840	-1.875	71.	39.
MAX F/M	159.125	24.721	-1.677	89.	48.
TR3	159.924	24.588	-1.660	91.	49.
	160.000	24.579	-1.658	91.	49.
S2 UI	160.424	24.534	-1.654	92.	50.
SIC RI	160.624	24.514	-1.653	93.	50.
	160.694	24.508	-1.653	93.	50.
	160.694	24.508	-1.653	93.	50.
SIC SEP	160.694	24.508	-1.653	93.	50.
S2 IGN	162.324	24.350	-1.659	96.	52.
S2 90T	164.324	24.218	-1.675	100.	54.
S2 UTT	164.924	24.268	-1.675	102.	55.
	170.000	25.044	-1.631	113.	61.
	180.000	25.220	-1.589	135.	73.
	190.000	25.456	-1.549	158.	85.
INT J	190.624	25.471	-1.547	159.	86.
LET J	196.124	25.610	-1.521	172.	93.

TABLE 5-VII PITCH AND YAW REFERENCE ANGLES (LOCAL HORIZONTAL COORDINATES) AND RANGE (METRIC AND ENGLISH UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	PITCH (DEG)	YAW (DEG)	RANGE (KM)	RANGE (NMI)
	200.000	25.706	-1.508	181.	98.
IGM EN	200.524	25.719	-1.506	183.	99.
IGM ON	201.250	25.738	-1.503	184.	100.
	210.000	24.341	-1.066	205.	111.
	220.000	23.947	-1.062	230.	124.
TSMC1	222.250	23.847	-1.064	236.	127.
	230.000	23.481	-1.058	256.	138.
	240.000	23.002	-0.971	282.	152.
	250.000	22.539	-0.927	310.	167.
	260.000	22.074	-0.900	338.	182.
	270.000	21.563	-0.882	366.	198.
	280.000	21.061	-0.871	396.	214.
	290.000	20.575	-0.862	427.	230.
	300.000	20.095	-0.855	458.	247.
	310.000	19.611	-0.850	490.	265.
	320.000	19.116	-0.845	524.	283.
	330.000	18.612	-0.839	558.	301.
	340.000	18.108	-0.833	594.	321.
	350.000	17.603	-0.827	630.	340.
	360.000	17.102	-0.896	668.	361.
	370.000	16.572	-0.835	706.	381.
	380.000	16.053	-0.809	746.	403.
	390.000	15.534	-0.792	788.	425.
	400.000	15.016	-0.777	830.	448.
	410.000	14.500	-0.766	874.	472.
	420.000	13.986	-0.756	919.	496.
	430.000	13.477	-0.747	966.	522.
	440.000	12.975	-0.736	1014.	548.
	450.000	12.481	-0.725	1064.	575.
	460.000	11.997	-0.713	1116.	602.
	470.000	15.428	-0.857	1169.	631.
	480.000	15.125	-0.873	1223.	660.
	490.000	13.470	-0.829	1279.	690.
	500.000	13.793	-0.842	1336.	721.
	510.000	13.061	-0.798	1394.	753.
	520.000	12.085	-0.747	1454.	785.
	530.000	11.554	-0.720	1514.	818.
	540.000	11.100	-0.698	1576.	851.
TR4	548.429	10.713	-0.682	1630.	880.
S4B UI	549.129	10.680	-0.682	1634.	882.

TABLE 5-VII PITCH AND YAW REFERENCE ANGLES (LOCAL HORIZONTAL COORDINATES) AND RANGE (METRIC AND ENGLISH UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	PITCH (DEG)	YAW (DEG)	RANGE (KM)	RANGE (NMI)
S2 RI	549.229	10.676	-0.682	1635.	883.
	549.304	10.672	-0.682	1635.	883.
	549.304	10.672	-0.682	1635.	883.
S2 SEP	549.304	10.672	-0.682	1635.	883.
	550.000	10.642	-0.683	1640.	885.
S4B IGN	552.429	10.557	-0.687	1655.	894.
S4B 90T	554.929	10.656	-0.685	1671.	902.
IGM 3S	556.500	11.056	-0.676	1691.	908.
S4B UTT	556.929	11.149	-0.675	1684.	909.
	560.000	9.607	-0.894	1704.	920.
S4B UCJ	561.229	8.383	-0.954	1712.	924.
TSMC2	563.500	7.442	-0.921	1726.	932.
	570.000	7.960	-0.691	1768.	955.
	580.000	6.947	-0.437	1833.	990.
	590.000	6.942	-0.361	1899.	1025.
	600.000	6.718	-0.324	1965.	1061.
	610.000	6.594	-0.326	2032.	1097.
	620.000	6.487	-0.346	2099.	1133.
	630.000	6.344	-0.371	2167.	1170.
	640.000	6.378	-0.412	2235.	1207.
	650.000	6.371	-0.449	2304.	1244.
	660.000	5.638	-0.424	2374.	1282.
	670.000	6.425	-0.440	2444.	1320.
	680.000	7.174	-0.475	2515.	1358.
S4BGCS1	685.654	7.559	-0.474	2556.	1380.
TR5	685.864	7.573	-0.473	2557.	1381.
S4B LUI	686.164	7.593	-0.471	2559.	1382.
	690.000	7.841	-0.445	2587.	1397.
	695.654	8.207	-0.409	2627.	1419.
PO INS	695.654	8.207	-0.409	2627.	1419.
	695.750	8.213	-0.409	2628.	1419.
	700.000	8.490	-0.384	2658.	1435.
	700.750	8.539	-0.380	2664.	1438.
	705.864	8.875	-0.353	2701.	1458.
	705.864	8.875	-0.353	2701.	1458.
ORR GID	706.750	8.935	-0.353	2707.	1462.
LH2VTO	744.864	0.131	-0.002	2980.	1609.
S4BLUCO	772.864	0.007	-0.000	3181.	1717.
ORR NAV	794.750	-0.001	-0.000	3337.	1802.
	900.000	0.084	-0.000	4092.	2209.

TABLE 5-VII PITCH AND YAW REFERENCE ANGLES (LOCAL HORIZONTAL
COORDINATES) AND RANGE (METRIC AND ENGLISH UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	PITCH (DEG)	YAW (DEG)	RANGE (KM)	RANGE (NMI)
	1002.750	-0.001	-0.000	4828.	2607.
	1100.000	0.084	-0.000	5525.	2983.
	1300.000	0.084	-0.000	6960.	3758.
	1306.750	-0.001	-0.000	7008.	3784.
	1500.000	0.083	-0.000	8394.	4532.
	1602.750	-0.002	-0.000	9131.	4930.
	1700.000	0.083	-0.000	9829.	5307.
	1900.000	0.083	0.000	11263.	6082.
	1906.750	-0.002	0.000	11312.	6108.
	2100.000	0.083	0.000	12698.	6856.
	2202.750	-0.002	0.000	13434.	7254.
	2300.000	0.083	0.000	14131.	7630.
	2500.000	0.082	0.000	15564.	8404.
	2506.750	-0.003	0.000	15612.	8430.
	2700.000	0.082	0.000	16995.	9177.
	2802.750	-0.003	0.000	17730.	9573.
	2900.000	0.082	0.000	18424.	9948.
	3100.000	0.082	0.000	19798.	10690.
	3106.750	-0.004	0.000	19829.	10707.
	3300.000	0.082	0.000	18735.	10116.
	3402.750	-0.004	0.000	18003.	9721.
	3500.000	0.082	0.000	17308.	9346.
	3700.000	0.082	0.000	15879.	8574.
	3706.750	-0.003	0.000	15830.	8548.
	3900.000	0.082	0.000	14449.	7802.
	4002.750	-0.003	0.000	13714.	7405.
	4100.000	0.082	0.000	13019.	7030.
	4300.000	0.082	0.000	11589.	6258.
	4306.750	-0.003	0.000	11541.	6231.
	4500.000	0.082	-0.000	10159.	5485.
	4602.750	-0.004	-0.000	9424.	5089.
	4700.000	0.081	-0.000	8729.	4713.
	4900.000	0.081	-0.000	7299.	3941.
	4906.750	-0.004	-0.000	7250.	3915.
	5100.000	0.081	-0.000	5869.	3169.
	5202.750	-0.004	-0.000	5135.	2773.
	5300.000	0.080	-0.000	4440.	2398.
	5500.000	0.080	-0.000	3013.	1627.
	5506.750	-0.005	-0.000	2965.	1601.
	5700.000	0.080	-0.000	1590.	858.

TABLE 5-VII PITCH AND YAW REFERENCE ANGLES (LOCAL HORIZONTAL COORDINATES) AND RANGE (METRIC AND ENGLISH UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	PITCH (DEG)	YAW (DEG)	RANGE (KM)	RANGE (NMI)
	5802.750	-0.005	-0.000	866.	468.
	5900.000	0.080	-0.000	247.	133.
	6100.000	0.080	-0.000	1296.	700.
	6106.750	-0.005	-0.000	1344.	726.
	6300.000	0.080	-0.000	2718.	1467.
	6402.750	-0.005	-0.000	3451.	1863.
	6500.000	0.080	-0.000	4146.	2238.
	6700.000	0.081	-0.000	5576.	3011.
	6706.750	-0.004	-0.000	5624.	3037.
	6900.000	0.081	-0.000	7007.	3783.
	7002.750	-0.003	0.000	7742.	4180.
	7100.000	0.082	-0.000	8438.	4556.
	7300.000	0.083	0.000	9870.	5329.
	7306.750	-0.002	0.000	9918.	5356.
	7500.000	0.084	0.000	11302.	6103.
	7602.750	-0.001	0.000	12037.	6500.
	7700.000	0.085	0.000	12733.	6875.
	7900.000	0.086	0.000	14165.	7648.
	7906.750	0.001	0.000	14213.	7674.
	8100.000	0.087	0.000	15595.	8421.
	8202.750	0.002	0.000	16330.	8818.
	8300.000	0.088	0.000	17026.	9193.
	8500.000	0.088	0.000	18456.	9965.
	8506.750	0.003	0.000	18504.	9991.
	8700.000	0.089	0.000	19849.	10718.
	8802.750	0.004	0.000	19405.	10478.
	8900.000	0.090	0.000	18715.	10105.
	9100.000	0.090	0.000	17287.	9334.
	9106.750	0.005	0.000	17239.	9308.
	9300.000	0.090	0.000	15858.	8563.
	9402.750	0.005	0.000	15124.	8166.
	9500.000	0.090	0.000	14429.	7791.
	9700.000	0.090	0.000	12999.	7019.
1ST OPP	9706.750	0.005	-0.000	12950.	6993.
	9900.000	0.089	-0.000	11568.	6246.
	10002.750	0.004	-0.000	10833.	5849.
	10100.000	0.089	-0.000	10137.	5474.
	10300.000	0.088	-0.000	8706.	4701.
	10306.750	0.003	-0.000	8658.	4675.
	10500.000	0.087	-0.000	7276.	3929.

TABLE 5-VII PITCH AND YAW REFERENCE ANGLES (LOCAL HORIZONTAL
COORDINATES) AND RANGE (METRIC AND ENGLISH UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	PITCH (DEG)	YAW (DEG)	RANGE (KM)	RANGE (NMI)
	10602.750	0.002	-0.000	6541.	3532.
	10700.000	0.087	-0.000	5845.	3156.
	10900.000	0.086	-0.000	4415.	2384.
	10906.750	0.001	-0.000	4367.	2358.
	11100.000	0.086	-0.000	2986.	1612.
	11202.750	0.000	-0.000	2251.	1216.
	11300.000	0.085	-0.000	1557.	841.
	11500.000	0.085	-0.000	152.	82.
	11506.750	0.000	-0.000	116.	63.
	11700.000	0.085	-0.000	1310.	708.
	11802.750	0.000	-0.000	2045.	1104.
	11900.000	0.085	-0.000	2741.	1480.
	12100.000	0.086	-0.000	4173.	2253.
	12106.750	0.001	-0.000	4221.	2279.
	12300.000	0.086	-0.000	5606.	3027.
	12402.750	0.002	0.000	6342.	3424.
	12500.000	0.087	0.000	7039.	3801.
	12700.000	0.088	0.000	8472.	4575.
	12706.750	0.003	0.000	8521.	4601.
	12900.000	0.090	0.000	9905.	5349.
	13002.750	0.005	0.000	10641.	5746.
	13100.000	0.091	0.000	11338.	6122.
	13300.000	0.092	0.000	12770.	6895.
	13306.750	0.007	0.000	12818.	6921.
	13500.000	0.093	0.000	14200.	7668.
	13602.750	0.009	0.000	14935.	8064.
	13700.000	0.095	0.000	15630.	8439.
	13900.000	0.096	0.000	17055.	9209.
	13906.750	0.011	0.000	17103.	9235.
	14100.000	0.097	0.000	18464.	9970.
	14202.750	0.012	0.000	19156.	10343.
	14300.000	0.097	0.000	19618.	10593.
	14500.000	0.098	0.000	18607.	10047.
	14506.750	0.013	0.000	18561.	10022.
	14700.000	0.098	0.000	17205.	9290.
2ND OPP	14802.750	0.013	0.000	16476.	8896.
	14900.000	0.098	0.000	15784.	8523.
	15100.000	0.098	-0.000	14358.	7753.
	15106.750	0.013	-0.000	14310.	7727.
	15300.000	0.097	-0.000	12930.	6982.

TABLE 5-VIII-A

 INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
 AND INERTIAL HEADING ANGLE
 (METRIC UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (M/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
GRR	-17.250	408.5645	0.0000	90.0000
1ST MOT	0.0	408.5645	0.0000	90.0000
FRI	0.398	408.5671	0.0537	89.9998
	10.000	409.4676	3.3011	90.2371
TIL INIT	11.375	409.7518	3.8299	90.2902
	20.000	412.9661	7.5483	90.2177
	30.000	424.6844	12.6010	90.0007
	40.000	452.3480	17.9568	89.4845
	50.000	501.7457	22.8044	88.6172
	60.000	574.8570	26.5472	87.5005
MACH 1	64.750	617.8439	27.8320	86.9268
	70.000	671.0624	28.8616	86.2873
	80.000	792.4006	30.0101	85.0916
MAX Q	80.125	794.0979	30.0182	85.0771
	90.000	943.1864	30.1113	83.9843
	100.000	1125.3350	29.2483	83.0181
	110.000	1338.3431	27.9856	82.2344
	120.000	1584.3718	26.5700	81.6131
	130.000	1868.0306	25.2277	81.1374
	134.000	1993.8415	24.7135	80.9796
CECO	134.000	1993.8415	24.7135	80.9796
	134.125	1997.8638	24.6974	80.9750
	140.000	2150.1742	23.8370	80.8235
	150.000	2435.2092	22.4859	80.6184
MAX F/M	159.125	2733.0673	21.3653	80.4770
TR3	159.924	2760.6609	21.2708	80.4669
	160.000	2763.1963	21.2618	80.4660
S2 UI	160.424	2770.0415	21.2028	80.4659
SIC RI	160.624	2770.3071	21.1715	80.4678
	160.694	2770.1846	21.1603	80.4687
	160.694	2770.1846	21.1603	80.4687
SIC SFP	160.694	2770.1846	21.1603	80.4687
S2 IGN	162.324	2765.5846	20.8966	80.4887
S2 90T	164.324	2763.5108	20.5757	80.5108
S2 UTT	164.924	2764.8600	20.4818	80.5161
	170.000	2784.1045	19.7165	80.5570
	180.000	2831.5295	18.2796	80.6371
	190.000	2883.4948	16.9187	80.7213
INT J	190.624	2886.8820	16.8364	80.7267
LFT J	196.124	2917.4670	16.1243	80.7751

TABLE 5-VIII-A INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
AND INERTIAL HEADING ANGLE
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (M/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
	200.000	2939.8718	15.6374	80.8100
IGM EN	200.524	2942.9412	15.5725	80.8148
IGM ON	201.250	2947.2073	15.4829	80.8214
	210.000	3000.2930	14.4086	80.9109
	220.000	3064.3429	13.2314	81.0206
TSMC1	222.250	3079.2389	12.9746	81.0459
	230.000	3131.8895	12.1127	81.1340
	240.000	3202.9512	11.0516	81.2538
	250.000	3277.5240	10.0482	81.3794
	260.000	3355.6278	9.1019	81.5104
	270.000	3437.3978	8.2119	81.6463
	280.000	3522.8315	7.3759	81.7873
	290.000	3611.9381	6.5936	81.9332
	300.000	3704.7314	5.8639	82.0843
	310.000	3801.2636	5.1856	82.2405
	320.000	3901.6233	4.5573	82.4020
	330.000	4005.9083	3.9772	82.5691
	340.000	4114.2195	3.4439	82.7419
	350.000	4226.6741	2.9562	82.9206
	360.000	4343.4330	2.5131	83.1040
	370.000	4464.6808	2.1126	83.2940
	380.000	4590.5981	1.7536	83.4916
	390.000	4721.4010	1.4350	83.6963
	400.000	4857.3344	1.1559	83.9084
	410.000	4998.6817	0.9152	84.1281
	420.000	5145.7684	0.7122	84.3555
	430.000	5298.9557	0.5459	84.5908
	440.000	5458.6441	0.4158	84.8346
	450.000	5625.2950	0.3213	85.0870
	460.000	5798.6117	0.2603	85.3486
	470.000	5942.5905	0.1892	85.6235
	480.000	6089.9398	0.2217	85.9019
	490.000	6233.5240	0.2368	86.1905
	500.000	6353.4258	0.1973	86.4907
	510.000	6476.5769	0.1934	86.7972
	520.000	6603.8838	0.1971	87.1116
	530.000	6735.3423	0.2160	87.4335
	540.000	6871.0256	0.2546	87.7629
TR4	548.429	6588.7339	0.3024	88.0464
S4R UT	549.129	6992.5141	0.2978	88.0709

TABLE 5-VIII-A

 INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
 AND INERTIAL HEADING ANGLE
 (METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (M/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
S2 RI	549.229	6992.6030	0.2964	88.0745
	549.304	6992.6614	0.2954	88.0771
	549.304	6992.6614	0.2954	88.0771
S2 SEP	549.304	6992.6614	0.2955	88.0772
	550.000	6992.7376	0.2853	88.1020
S4B IGN	552.429	6993.0453	0.2500	88.1884
S4B 90T	554.929	6998.2322	0.2209	88.2769
IGN 3S	556.500	7006.7132	0.2111	88.3319
S4B UTT	556.929	7009.0458	0.2087	88.3469
	560.000	7025.7959	0.1920	88.4545
S4B UCJ	561.229	7032.5679	0.1832	88.4974
	TSMC2	563.500	7045.1748	0.1646
	570.000	7081.4705	0.1180	88.8058
	580.000	7138.0650	0.0509	89.1627
	590.000	7195.4754	-0.0065	89.5238
	600.000	7253.8841	-0.0528	89.8884
	610.000	7313.1128	-0.0893	90.2560
	620.000	7373.2761	-0.1148	90.6265
	630.000	7434.4195	-0.1299	90.9998
	640.000	7496.3950	-0.1334	91.3756
	650.000	7559.3102	-0.1253	91.7539
	660.000	7623.3427	-0.1114	92.1350
	670.000	7688.1969	-0.0824	92.5188
	680.000	7753.8814	-0.0356	92.9052
S4B GCS1	685.654	7791.3859	-0.0013	93.1246
TR5	685.864	7792.6228	-0.0001	93.1328
S4B LUI	686.164	7792.7659	0.0001	93.1447
	690.000	7792.9610	0.0001	93.2961
	695.654	7792.9906	0.0000	93.5191
PO INS	695.654	7792.9906	0.0000	93.5191
	695.750	7792.9911	0.0000	93.5229
	700.000	7793.0136	-0.0001	93.6903
	700.750	7793.0176	-0.0001	93.7199
	705.864	7793.0450	-0.0002	93.9211
	705.864	7793.0450	-0.0002	93.9211
ORB GID	706.750	7793.0498	-0.0002	93.9560
LH2VTO	744.864	7793.2650	-0.0010	95.4471
S4BLUCO	772.864	7793.4755	-0.0016	96.5312
ORB NAV	794.750	7793.5463	-0.0020	97.3705
	900.000	7793.9561	-0.0040	101.2795

TABLE 5-VIII-A INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
AND INERTIAL HEADING ANGLE
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (M/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
	1002.750	7794.4568	-0.0058	104.8362
	1100.000	7795.0064	-0.0074	107.9115
	1300.000	7796.2918	-0.0106	113.2111
	1306.750	7796.3374	-0.0107	113.3646
	1500.000	7797.6466	-0.0134	117.0369
	1602.750	7798.3143	-0.0146	118.4252
	1700.000	7798.9027	-0.0155	119.3841
	1900.000	7799.9157	-0.0165	120.2904
	1906.750	7799.9443	-0.0165	120.2963
	2100.000	7800.5844	-0.0157	119.7780
	2202.750	7800.7751	-0.0144	118.9598
	2300.000	7800.8581	-0.0127	117.8326
	2500.000	7800.7437	-0.0072	114.4156
	2506.750	7800.7337	-0.0070	114.2742
	2700.000	7800.3101	0.0005	109.5108
	2802.750	7799.9995	0.0052	106.4355
	2900.000	7799.6687	0.0100	103.2115
	3100.000	7798.9227	0.0203	95.8233
	3106.750	7798.8967	0.0207	95.5609
	3300.000	7798.1557	0.0304	87.9097
	3402.750	7797.7704	0.0352	83.8741
	3500.000	7797.4143	0.0391	80.1905
	3700.000	7796.7038	0.0454	73.3243
	3706.750	7796.6801	0.0456	73.1133
	3900.000	7795.9974	0.0485	67.7393
	4002.750	7795.6218	0.0487	65.4344
	4100.000	7795.2505	0.0480	63.6156
	4300.000	7794.4182	0.0442	60.9747
	4306.750	7794.3883	0.0440	60.9110
	4500.000	7793.4782	0.0376	59.7794
	4602.750	7792.9561	0.0334	59.7163
	4700.000	7792.4445	0.0290	59.9996
	4900.000	7791.3756	0.0196	61.6400
	4906.750	7791.3401	0.0193	61.7205
	5100.000	7790.3716	0.0103	64.7352
	5202.750	7789.9207	0.0058	66.9017
	5300.000	7789.5546	0.0018	69.3112
	5500.000	7789.0439	-0.0052	75.3078
	5506.750	7789.0332	-0.0054	75.5328
	5700.000	7788.9346	-0.0106	82.4761

TABLE 5-VIII-A

 INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
 AND INERTIAL HEADING ANGLE
 (METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SFC)	INERTIAL VELOCITY (M/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
	5802.750	7789.0533	-0.0128	86.4596
	5900.000	7789.2776	-0.0146	90.3118
	6100.000	7790.0657	-0.0175	98.1199
	6106.750	7790.0994	-0.0175	98.3744
	6300.000	7791.2304	-0.0197	105.2135
	6402.750	7791.9373	-0.0206	108.4113
	6500.000	7792.6502	-0.0214	111.1070
	6700.000	7794.1678	-0.0230	115.5685
	6706.750	7794.2187	-0.0230	115.6931
	6900.000	7795.6153	-0.0240	118.5473
	7002.750	7796.2808	-0.0243	119.5096
	7100.000	7796.8407	-0.0243	120.0719
	7300.000	7797.7309	-0.0233	120.1753
	7306.750	7797.7542	-0.0232	120.1542
	7500.000	7798.2277	-0.0204	118.8595
	7602.750	7798.3278	-0.0180	117.6220
	7700.000	7798.3311	-0.0153	116.0927
	7900.000	7798.0932	-0.0079	111.8407
	7906.750	7798.0802	-0.0076	111.6713
	8100.000	7797.6008	0.0015	106.1357
	8202.750	7797.2814	0.0069	102.6955
	8300.000	7796.9530	0.0122	99.1781
	8500.000	7796.2384	0.0231	91.4193
	8506.750	7796.2140	0.0234	91.1510
	8700.000	7795.5175	0.0331	83.5312
	8802.750	7795.1538	0.0375	79.6652
	8900.000	7794.8137	0.0410	76.2255
	9100.000	7794.1152	0.0460	70.0425
	9106.750	7794.0914	0.0461	69.8574
	9300.000	7793.3859	0.0475	65.2645
	9402.750	7792.9851	0.0468	63.3867
	9500.000	7792.5833	0.0453	61.9698
	9700.000	7791.6783	0.0400	60.1368
1ST OPP	9706.750	7791.6458	0.0398	60.0999
	9900.000	7790.6724	0.0323	59.7268
	10002.750	7790.1284	0.0276	60.0640
	10100.000	7789.6076	0.0231	60.7277
	10300.000	7788.5675	0.0135	63.1634
	10306.750	7788.5340	0.0132	63.2711
	10500.000	7787.6637	0.0045	67.0709

TABLE 5-VIII-A INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
AND INERTIAL HEADING ANGLE
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (M/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
	10602.750	7787.2921	0.0003	69.6519
	10700.000	7787.0176	-0.0033	72.4406
	10900.000	7786.7374	-0.0095	79.1217
	10906.750	7786.7353	-0.0097	79.3663
	11100.000	7786.8957	-0.0142	86.7277
	11202.750	7787.1563	-0.0161	90.7973
	11300.000	7787.5121	-0.0176	94.6329
	11500.000	7788.5452	-0.0201	102.1197
	11506.750	7788.5863	-0.0202	102.3574
	11700.000	7789.8954	-0.0221	108.5965
	11802.750	7790.6666	-0.0230	111.4095
	11900.000	7791.4186	-0.0238	113.7203
	12100.000	7792.9481	-0.0251	117.3711
	12106.750	7792.9979	-0.0251	117.4685
	12300.000	7794.3203	-0.0257	119.5529
	12402.750	7794.9187	-0.0257	120.1153
	12500.000	7795.4014	-0.0253	120.3033
	12700.000	7796.1066	-0.0232	119.6404
	12706.750	7796.1234	-0.0231	119.5933
	12900.000	7796.4096	-0.0190	117.5463
	13002.750	7796.4166	-0.0160	115.9009
	13100.000	7796.3401	-0.0126	113.9818
	13300.000	7795.9701	-0.0039	108.9373
	13306.750	7795.9535	-0.0036	108.7420
	13500.000	7795.3953	0.0063	102.5222
	13602.750	7795.0522	0.0120	98.7902
	13700.000	7794.7115	0.0173	95.0660
	13900.000	7793.9941	0.0280	87.1518
	13906.750	7793.9699	0.0283	86.8852
	14100.000	7793.2847	0.0371	79.5002
	14202.750	7792.9264	0.0408	75.8982
	14300.000	7792.5883	0.0435	72.7503
	14500.000	7791.8791	0.0467	67.3034
	14506.750	7791.8545	0.0467	67.1448
	14700.000	7791.1165	0.0462	63.3202
2ND OPP	14802.750	7790.6911	0.0446	61.8498
	14900.000	7790.2636	0.0422	60.8128
	15100.000	7789.3070	0.0354	59.7429
	15106.750	7789.2731	0.0352	59.7315
	15300.000	7788.2704	0.0267	60.0829

TABLE 5-VIII-B

 INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
 AND INERTIAL HEADING ANGLE
 (ENGLISH UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (FT/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
GRR	-17.250	1340.4346	0.0000	90.0000
1ST MOT	0.0	1340.4346	0.0000	90.0000
TBI	0.398	1340.4433	0.0537	89.9998
	10.000	1343.3978	3.3011	90.2371
TIL INIT	11.375	1344.3301	3.8299	90.2902
	20.000	1354.8755	7.5483	90.2177
	30.000	1393.3215	12.6010	90.0007
	40.000	1484.0813	17.9568	89.4845
	50.000	1646.1473	22.8044	88.6172
	60.000	1886.0138	26.5472	87.5005
MACH 1	64.750	2027.0471	27.8320	86.9268
	70.000	2201.6483	28.8616	86.2873
	80.000	2599.7394	30.0101	85.0916
MAX Q	80.125	2605.3081	30.0182	85.0771
	90.000	3094.4436	30.1113	83.9843
	100.000	3692.0439	29.2483	83.0181
	110.000	4390.8895	27.9856	82.2344
	120.000	5198.0703	26.5700	81.6131
	130.000	6128.7095	25.2277	81.1374
	134.000	6541.4747	24.7135	80.9796
CFCO	134.000	6541.4747	24.7135	80.9796
	134.125	6554.6712	24.6974	80.9750
	140.000	7054.3772	23.8370	80.8235
	150.000	7989.5314	22.4859	80.6184
MAX F/M	159.125	8966.7564	21.3653	80.4770
TB3	159.924	9057.2863	21.2708	80.4669
	160.000	9065.6048	21.2618	80.4660
S2 UI	160.424	9088.0627	21.2028	80.4659
SIC RI	160.624	9088.9339	21.1715	80.4678
	160.694	9088.5321	21.1603	80.4687
	160.694	9088.5321	21.1603	80.4687
SIC SFP	160.694	9088.5321	21.1603	80.4687
S2 IGN	162.324	9073.4404	20.8966	80.4887
S2 90T	164.324	9066.6364	20.5757	80.5108
S2 UTT	164.924	9071.0630	20.4818	80.5161
	170.000	9134.2011	19.7165	80.5570
	180.000	9289.7949	18.2796	80.6371
	190.000	9460.2848	16.9187	80.7213
INT J	190.624	9471.3975	16.8364	80.7267
LFT J	196.124	9571.7422	16.1243	80.7751

TABLE 5-VIII-B

 INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
 AND INERTIAL HEADING ANGLE
 (ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (FT/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
	200.000	9645.2487	15.6374	80.8100
IGM FN	200.524	9655.3189	15.5725	80.8148
IGM ON	201.250	9669.3152	15.4829	80.8214
	210.000	9843.4809	14.4086	80.9109
	220.000	10053.6185	13.2314	81.0206
TSMC I	222.250	10102.4897	12.9746	81.0459
	230.000	10275.2281	12.1127	81.1340
	240.000	10508.3701	11.0516	81.2538
	250.000	10753.0316	10.0482	81.3794
	260.000	11009.2776	9.1019	81.5104
	270.000	11277.5517	8.2119	81.6463
	280.000	11557.8460	7.3759	81.7873
	290.000	11850.1905	6.5936	81.9332
	300.000	12154.6307	5.8639	82.0843
	310.000	12471.3371	5.1856	82.2405
	320.000	12800.6012	4.5573	82.4020
	330.000	13142.7436	3.9772	82.5691
	340.000	13498.0954	3.4439	82.7419
	350.000	13867.0410	2.9562	82.9206
	360.000	14250.1084	2.5131	83.1040
	370.000	14647.9030	2.1126	83.2940
	380.000	15061.0173	1.7536	83.4916
	390.000	15490.1608	1.4350	83.6963
	400.000	15936.1364	1.1559	83.9084
	410.000	16399.8744	0.9152	84.1281
	420.000	16882.4421	0.7122	84.3555
	430.000	17385.0254	0.5459	84.5908
	440.000	17908.9374	0.4158	84.8346
	450.000	18455.6922	0.3213	85.0870
	460.000	19024.3167	0.2603	85.3486
	470.000	19496.6879	0.1892	85.6235
	480.000	19980.1176	0.2217	85.9019
	490.000	20451.1942	0.2368	86.1905
	500.000	20844.5727	0.1973	86.4907
	510.000	21248.6118	0.1934	86.7972
	520.000	21666.2854	0.1971	87.1116
	530.000	22097.5797	0.2160	87.4335
	540.000	22542.7348	0.2546	87.7629
TR4	548.429	22928.9170	0.3024	88.0464
S4B UI	549.129	22941.3191	0.2978	88.0709

TABLE 5-VIII-B INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
AND INERTIAL HEADING ANGLE
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (FT/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
S2 RI	549.229	22941.6108	0.2964	88.0745
	549.304	22941.8024	0.2954	88.0771
	549.304	22941.8024	0.2954	88.0771
S2 SFP	549.304	22941.8024	0.2955	88.0772
	550.000	22942.0526	0.2853	88.1020
S4B IGN	552.479	22943.0621	0.2500	88.1884
S4B 90T	554.929	22960.0793	0.2209	88.2769
IGM 3S	556.500	22987.9040	0.2111	88.3319
S4B UTT	556.929	22995.5571	0.2087	88.3469
	560.000	23050.5115	0.1920	88.4545
S4B UCJ	561.229	23072.7292	0.1832	88.4974
TSMC2	563.500	23114.0906	0.1646	88.5768
	570.000	23233.1708	0.1180	88.8058
	580.000	23418.8483	0.0509	89.1627
	590.000	23607.2029	-0.0065	89.5238
	600.000	23798.8324	-0.0528	89.8884
	610.000	23993.1522	-0.0893	90.2560
	620.000	24190.5383	-0.1148	90.6265
	630.000	24391.1400	-0.1299	90.9998
	640.000	24594.4719	-0.1334	91.3756
	650.000	24800.8864	-0.1253	91.7539
	660.000	25010.9667	-0.1114	92.1350
	670.000	25223.7431	-0.0824	92.5188
	680.000	25439.2435	-0.0356	92.9052
S4B GCS1	685.654	25562.2895	-0.0013	93.1246
T85	685.864	25566.3479	-0.0001	93.1328
S4B LUI	686.164	25566.8172	0.0001	93.1447
	690.000	25567.4575	0.0001	93.2961
	695.654	25567.5546	0.0000	93.5191
PO INS	695.654	25567.5546	0.0000	93.5191
	695.750	25567.5563	0.0000	93.5229
	700.000	25567.6300	-0.0001	93.6903
	700.750	25567.6431	-0.0001	93.7199
	705.864	25567.7329	-0.0002	93.9211
	705.864	25567.7329	-0.0002	93.9211
ORB GID	706.750	25567.7486	-0.0002	93.9560
LH2VTO	744.864	25568.4548	-0.0010	95.4471
S4BLUCO	772.864	25569.1454	-0.0016	96.5312
ORB NAV	794.750	25569.3778	-0.0020	97.3705
	900.000	25570.7222	-0.0040	101.2795

TABLE 5-VIII-B INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
AND INERTIAL HEADING ANGLE
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (FT/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
	1002.750	25572.3649	-0.0058	104.8362
	1100.000	25574.1678	-0.0074	107.9115
	1300.000	25578.3852	-0.0106	113.2111
	1306.750	25578.5346	-0.0107	113.3646
	1500.000	25582.8301	-0.0134	117.0369
	1602.750	25585.0208	-0.0146	118.4252
	1700.000	25586.9513	-0.0155	119.3841
	1900.000	25590.2744	-0.0165	120.2904
	1906.750	25590.3683	-0.0165	120.2963
	2100.000	25592.4685	-0.0157	119.7780
	2202.750	25593.0941	-0.0144	118.9598
	2300.000	25593.3666	-0.0127	117.8326
	2500.000	25592.9911	-0.0072	114.4156
	2506.750	25592.9584	-0.0070	114.2742
	2700.000	25591.5687	0.0005	109.5108
	2802.750	25590.5496	0.0052	106.4355
	2900.000	25589.4643	0.0100	103.2115
	3100.000	25587.0166	0.0203	95.8233
	3106.750	25586.9315	0.0207	95.5609
	3300.000	25584.5005	0.0304	87.9097
	3402.750	25583.2362	0.0352	83.8741
	3500.000	25582.0678	0.0391	80.1905
	3700.000	25579.7369	0.0454	73.3243
	3706.750	25579.6591	0.0456	73.1133
	3900.000	25577.4194	0.0485	67.7393
	4002.750	25576.1870	0.0487	65.4344
	4100.000	25574.9688	0.0480	63.6156
	4300.000	25572.2382	0.0442	60.9747
	4306.750	25572.1400	0.0440	60.9110
	4500.000	25569.1541	0.0376	59.7794
	4602.750	25567.4414	0.0334	59.7163
	4700.000	25565.7628	0.0290	59.9996
	4900.000	25562.2561	0.0196	61.6400
	4906.750	25562.1393	0.0193	61.7205
	5100.000	25558.9621	0.0103	64.7352
	5202.750	25557.4825	0.0058	66.9017
	5300.000	25556.2814	0.0018	69.3112
	5500.000	25554.6059	-0.0052	75.3078
	5506.750	25554.5709	-0.0054	75.5328
	5700.000	25554.2474	-0.0106	82.4761

TABLE 5-VIII-B

 INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
 AND INERTIAL HEADING ANGLE
 (ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (FT/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
	5802.750	25554.6369	-0.0128	86.4596
	5900.000	25555.3727	-0.0146	90.3118
	6100.000	25557.9582	-0.0175	98.1199
	6106.750	25558.0688	-0.0175	98.3744
	6300.000	25561.7796	-0.0197	105.2135
	6402.750	25564.0989	-0.0206	108.4113
	6500.000	25566.4377	-0.0214	111.1070
	6700.000	25571.4166	-0.0230	115.5685
	6706.750	25571.5837	-0.0230	115.6931
	6900.000	25576.1656	-0.0240	118.5473
	7002.750	25578.3491	-0.0243	119.5096
	7100.000	25580.1859	-0.0243	120.0719
	7300.000	25583.1066	-0.0233	120.1753
	7306.750	25583.1831	-0.0232	120.1542
	7500.000	25584.7366	-0.0204	118.8595
	7602.750	25585.0648	-0.0180	117.6220
	7700.000	25585.0759	-0.0153	116.0927
	7900.000	25584.2952	-0.0079	111.8407
	7906.750	25584.2525	-0.0076	111.6713
	8100.000	25582.6798	0.0015	106.1357
	8202.750	25581.6317	0.0069	102.6955
	8300.000	25580.5546	0.0122	99.1781
	8500.000	25578.2100	0.0231	91.4193
	8506.750	25578.1298	0.0234	91.1510
	8700.000	25575.8448	0.0331	83.5312
	8802.750	25574.6516	0.0375	79.6652
	8900.000	25573.5359	0.0410	76.2255
	9100.000	25571.2442	0.0460	70.0425
	9106.750	25571.1659	0.0461	69.8574
	9300.000	25568.8514	0.0475	65.2645
	9402.750	25567.5364	0.0468	63.3867
	9500.000	25566.2181	0.0453	61.9698
	9700.000	25563.2489	0.0400	60.1368
1ST OPP	9706.750	25563.1425	0.0398	60.0999
	9900.000	25559.9488	0.0323	59.7268
	10002.750	25558.1640	0.0276	60.0640
	10100.000	25556.4554	0.0231	60.7277
	10300.000	25553.0428	0.0135	63.1634
	10306.750	25552.9332	0.0132	63.2711
	10500.000	25550.0777	0.0045	67.0709

TABLE 5-VIII-B

 INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
 AND INERTIAL HEADING ANGLE
 (ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (FT/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
	10602.750	25548.8587	0.0003	69.6519
	10700.000	25547.9579	-0.0033	72.4406
	10900.000	25547.0386	-0.0095	79.1217
	10906.750	25547.0317	-0.0097	79.3663
	11100.000	25547.5580	-0.0142	86.7277
	11202.750	25548.4131	-0.0161	90.7973
	11300.000	25549.5804	-0.0176	94.6329
	11500.000	25552.9698	-0.0201	102.1197
	11506.750	25553.1046	-0.0202	102.3574
	11700.000	25557.3996	-0.0221	108.5965
	11802.750	25559.9299	-0.0230	111.4095
	11900.000	25562.3970	-0.0238	113.7203
	12100.000	25567.4151	-0.0251	117.3711
	12106.750	25567.5783	-0.0251	117.4685
	12300.000	25571.9171	-0.0257	119.5529
	12402.750	25573.8804	-0.0257	120.1153
	12500.000	25575.4639	-0.0253	120.3033
	12700.000	25577.7776	-0.0232	119.6404
	12706.750	25577.8326	-0.0231	119.5933
	12900.000	25578.7717	-0.0190	117.5463
	13002.750	25578.7948	-0.0160	115.9009
	13100.000	25578.5437	-0.0126	113.9818
	13300.000	25577.3299	-0.0039	108.9373
	13306.750	25577.2753	-0.0036	108.7420
	13500.000	25575.4439	0.0063	102.5222
	13602.750	25574.3182	0.0120	98.7902
	13700.000	25573.2004	0.0173	95.0660
	13900.000	25570.8466	0.0280	87.1518
	13906.750	25570.7672	0.0283	86.8852
	14100.000	25568.5194	0.0371	79.5002
	14202.750	25567.3437	0.0408	75.8882
	14300.000	25566.2345	0.0435	72.7503
	14500.000	25563.9080	0.0467	67.3034
	14506.750	25563.8272	0.0467	67.1448
	14700.000	25561.4057	0.0462	63.3202
2ND OPP	14802.750	25560.0103	0.0446	61.8498
	14900.000	25558.6075	0.0422	60.8128
	15100.000	25555.4691	0.0354	59.7429
	15106.750	25555.3578	0.0352	59.7315
	15300.000	25552.0681	0.0267	60.0829

TABLE 5-IX-A

GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (METRIC UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (METERS)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
GRR	-17.250	6373351.	28.6273	-80.6209
1ST MOT	0.0	6373351.	28.6273	-80.6209
TBI	0.398	6373351.	28.6273	-80.6209
	10.000	6373461.	28.6273	-80.6209
TILINIT	11.375	6373496.	28.6272	-80.6209
	20.000	6373844.	28.6271	-80.6208
	30.000	6374572.	28.6270	-80.6206
	40.000	6375726.	28.6271	-80.6193
	50.000	6377389.	28.6277	-80.6156
	60.000	6379641.	28.6291	-80.6077
MACH 1	64.750	6380936.	28.6302	-80.6018
	70.000	6382543.	28.6318	-80.5934
	80.000	6386139.	28.6360	-80.5706
MAX Q	80.125	6386188.	28.6360	-80.5703
	90.000	6390485.	28.6423	-80.5364
	100.000	6395601.	28.6513	-80.4874
	110.000	6401491.	28.6637	-80.4202
	120.000	6408170.	28.6799	-80.3313
	130.000	6415689.	28.7006	-80.2172
	134.000	6418949.	28.7103	-80.1636
CECO	134.000	6418949.	28.7103	-80.1636
	134.125	6419053.	28.7106	-80.1619
	140.000	6424060.	28.7262	-80.0750
	150.000	6433056.	28.7564	-79.9059
MAX F/M	159.125	6441844.	28.7882	-79.7254
TB3	159.924	6442642.	28.7912	-79.7083
	160.000	6442718.	28.7915	-79.7067
S2 UI	160.424	6443143.	28.7931	-79.6976
SIC RI	160.624	6443343.	28.7939	-79.6932
	160.694	6443413.	28.7942	-79.6917
	160.694	6443413.	28.7942	-79.6917
SIC SEP	160.694	6443417.	28.7942	-79.6916
S2 IGN	162.324	6445036.	28.8004	-79.6564
S2 90T	164.324	6446993.	28.8079	-79.6131
S2 UTT	164.924	6447575.	28.8102	-79.6001
	170.000	6452412.	28.8294	-79.4893
	180.000	6461547.	28.8678	-79.2661
	190.000	6470181.	28.9068	-79.0364
INT J	190.624	6470704.	28.9093	-79.0218
LET J	196.124	6475232.	28.9310	-78.8922

TABLE 5-IX-A GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
 (CONTINUED) LONGITUDE (METRIC UNITS)

EVENT	TIME FROM 1ST MOT (SFC)	GEOCENTRIC RADIUS (METERS)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
	200.000	6478337.	28.9465	-78.7996
IGM EN	200.524	6478752.	28.9486	-78.7870
IGM ON	201.250	6479324.	28.9515	-78.7696
	210.000	6486034.	28.9867	-78.5558
	220.000	6493273.	29.0275	-78.3045
TSMCI	222.250	6494840.	29.0367	-78.2469
	230.000	6500065.	29.0698	-78.0455
	240.000	6506420.	29.1106	-77.7786
	250.000	6512348.	29.1530	-77.5036
	260.000	6517861.	29.1958	-77.2202
	270.000	6522969.	29.2390	-76.9281
	280.000	6527684.	29.2827	-76.6271
	290.000	6532018.	29.3267	-76.3167
	300.000	6535983.	29.3711	-75.9968
	310.000	6539593.	29.4158	-75.6669
	320.000	6542859.	29.4608	-75.3268
	330.000	6545798.	29.5060	-74.9761
	340.000	6548421.	29.5514	-74.6144
	350.000	6550746.	29.5969	-74.2414
	360.000	6552787.	29.6426	-73.8565
	370.000	6554560.	29.6882	-73.4594
	380.000	6556084.	29.7339	-73.0496
	390.000	6557376.	29.7793	-72.6266
	400.000	6558456.	29.8246	-72.1899
	410.000	6559344.	29.8696	-71.7390
	420.000	6560061.	29.9142	-71.2732
	430.000	6560631.	29.9582	-70.7920
	440.000	6561079.	30.0016	-70.2948
	450.000	6561433.	30.0443	-69.7808
	460.000	6561721.	30.0860	-69.2492
	470.000	6561939.	30.1265	-68.7012
	480.000	6562153.	30.1654	-68.1383
	490.000	6562409.	30.2026	-67.5599
	500.000	6562644.	30.2378	-66.9681
	510.000	6562862.	30.2707	-66.3637
	520.000	6563084.	30.3011	-65.7464
	530.000	6563323.	30.3289	-65.1156
	540.000	6563600.	30.3539	-64.4710
TR4	548.429	6563883.	30.3726	-63.9167
S4B UI	549.129	6563909.	30.3740	-63.8702

TABLE 5-IX-A

GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (METERS)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)	
S2 RI	549.229	6563913.	30.3742	-63.8636	
	549.304	6563915.	30.3744	-63.8586	
	549.304	6563915.	30.3744	-63.8586	
S2 SEP	549.304	6563917.	30.3744	-63.8585	
	550.000	6563941.	30.3758	-63.8123	
S4B IGN	552.429	6564021.	30.3806	-63.6510	
S4B 90T	554.929	6564092.	30.3853	-63.4849	
IGM 3S	556.500	6564133.	30.3882	-63.3803	
S4B UTT	556.929	6564144.	30.3889	-63.3518	
	560.000	6564220.	30.3942	-63.1470	
S4B UCJ	561.229	6564248.	30.3962	-63.0649	
	563.500	6564297.	30.3998	-62.9129	
TSMC2	570.000	6564409.	30.4090	-62.4763	
	580.000	6564514.	30.4200	-61.7998	
	590.000	6564540.	30.4272	-61.1175	
	600.000	6564502.	30.4304	-60.4292	
	610.000	6564410.	30.4296	-59.7349	
	620.000	6564278.	30.4247	-59.0346	
	630.000	6564119.	30.4155	-58.3283	
	640.000	6563946.	30.4019	-57.6160	
	650.000	6563775.	30.3839	-56.8975	
	660.000	6563618.	30.3614	-56.1729	
	670.000	6563487.	30.3342	-55.4422	
	680.000	6563405.	30.3022	-54.7054	
	S4B GCS1	685.654	6563391.	30.2819	-54.2860
	TR5	685.864	6563391.	30.2812	-54.2704
	S4B LUI	686.164	6563391.	30.2800	-54.2481
		690.000	6563391.	30.2653	-53.9630
	PO INS	695.654	6563391.	30.2424	-53.5428
695.654		6563391.	30.2424	-53.5428	
695.750		6563391.	30.2420	-53.5357	
700.000		6563391.	30.2237	-53.2200	
700.750		6563391.	30.2204	-53.1643	
705.864		6563391.	30.1972	-52.7847	
705.864		6563391.	30.1972	-52.7847	
706.750		6563391.	30.1930	-52.7189	
ORB GIO		744.864	6563388.	29.9798	-49.8963
LH2VTO		772.864	6563383.	29.7803	-47.8318
S4BLUCO	794.750	6563377.	29.5995	-46.2246	
ORB NAV	900.000	6563334.	28.4330	-38.5947	

TABLE 5-IX-A

GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (METERS)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
	1002.750	6563266.	26.8449	-31.3461
	1100.000	6563179.	24.9693	-24.7021
	1300.000	6562933.	20.1418	-11.7503
	1306.750	6562924.	19.9592	-11.3296
	1500.000	6562606.	14.3045	0.3084
	1602.750	6562411.	11.0267	6.2229
	1700.000	6562211.	7.8034	11.6909
	1900.000	6561772.	0.9586	22.6972
	1906.750	6561756.	0.7251	23.0660
	2100.000	6561328.	-5.9286	33.6589
	2202.750	6561117.	-9.3863	39.3826
	2300.000	6560937.	-12.5589	44.9106
	2500.000	6560661.	-18.6175	56.7653
	2506.750	6560654.	-18.8081	57.1792
	2700.000	6560565.	-23.7636	69.4703
	2802.750	6560605.	-25.9358	76.3703
	2900.000	6560706.	-27.6397	83.1291
	3100.000	6561118.	-29.9151	97.6077
	3106.750	6561137.	-29.9608	98.1065
	3300.000	6561811.	-30.3633	112.4991
	3402.750	6562271.	-29.8595	120.1248
	3500.000	6562763.	-28.9372	127.2338
	3700.000	6563920.	-25.7873	141.3053
	3706.750	6563961.	-25.6541	141.7647
	3900.000	6565205.	-21.2067	154.4485
	4002.750	6565885.	-18.4115	160.8321
	4100.000	6566526.	-15.5478	166.6661
	4300.000	6567788.	-9.1615	178.1491
	4306.750	6567828.	-8.9372	178.5271
	4500.000	6568906.	-2.3730	-170.8137
	4602.750	6569402.	1.1719	-165.2106
	4700.000	6569815.	4.5152	-159.8951
	4900.000	6570478.	11.2074	-148.7606
	4906.750	6570496.	11.4263	-148.3772
	5100.000	6570883.	17.3967	-137.0915
	5202.750	6570995.	20.2739	-130.7984
	5300.000	6571045.	22.7517	-124.6225
	5500.000	6570996.	26.9203	-111.2109
	5506.750	6570991.	27.0361	-110.7419
	5700.000	6570779.	29.5637	-96.9300

TABLE 5-IX-A

GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (METERS)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
	5802.750	6570615.	30.2400	-89.3577
	5900.000	6570434.	30.4270	-82.1251
	6100.000	6569996.	29.4179	-67.3411
	6106.750	6569980.	29.3519	-66.8493
	6300.000	6569490.	26.6422	-53.1139
	6402.750	6569209.	24.6113	-46.1383
	6500.000	6568930.	22.3640	-39.7691
	6700.000	6568326.	16.9252	-27.3610
	6706.750	6568305.	16.7256	-26.9572
	6900.000	6567685.	10.6776	-15.7347
	7002.750	6567347.	7.2621	-9.9797
	7100.000	6567025.	3.9516	-4.6187
	7300.000	6566374.	-2.9460	6.3081
	7306.750	6566352.	-3.1783	6.6776
	7500.000	6565775.	-9.7185	17.3804
	7602.750	6565505.	-13.0505	23.2325
	7700.000	6565284.	-16.0605	28.9235
	7900.000	6564965.	-21.6440	41.2199
	7906.750	6564958.	-21.8151	41.6506
	8100.000	6564874.	-26.1166	54.4472
	8202.750	6564933.	-27.8669	61.6088
	8300.000	6565058.	-29.1289	68.5859
	8500.000	6565538.	-30.3985	83.3463
	8506.750	6565559.	-30.4089	83.8495
	8700.000	6566305.	-29.7930	98.2078
	8802.750	6566799.	-28.7665	105.6940
	8900.000	6567318.	-27.3780	112.6086
	9100.000	6568509.	-23.3932	126.1650
	9106.750	6568552.	-23.2352	126.6057
	9300.000	6569789.	-18.1734	138.7672
	9402.750	6570448.	-15.1279	144.9030
	9500.000	6571058.	-12.0742	150.5345
	9700.000	6572226.	-5.4323	161.7209
	9706.750	6572262.	-5.2024	162.0920
1ST OPP	9900.000	6573213.	1.4419	172.6409
	10002.750	6573631.	4.9675	178.2559
	10100.000	6573967.	8.2528	-176.3724
	10300.000	6574464.	14.7014	-164.9907
	10306.750	6574476.	14.9091	-164.5960
	10500.000	6574707.	20.4690	-152.9191

TABLE 5-IX-A

GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (METERS)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
	10602.750	6574740.	23.0559	-146.3755
	10700.000	6574721.	25.2116	-139.9494
	10900.000	6574544.	28.5786	-126.0466
	10906.750	6574535.	28.6644	-125.5629
	11100.000	6574218.	30.2675	-111.4322
	11202.750	6574006.	30.4189	-103.7948
	11300.000	6573783.	30.1047	-96.5790
	11500.000	6573269.	28.1068	-82.0555
	11506.750	6573250.	28.0093	-81.5770
	11700.000	6572693.	24.4744	-68.2990
	11802.750	6572378.	22.0734	-61.5976
	11900.000	6572069.	19.5234	-55.4845
	12100.000	6571404.	13.6065	-43.5404
	12106.750	6571381.	13.3941	-43.1501
	12300.000	6570711.	7.0648	-32.2388
	12402.750	6570351.	3.5647	-26.5849
	12500.000	6570014.	0.2139	-21.2758
	12700.000	6569350.	-6.6476	-10.3206
	12706.750	6569329.	-6.8759	-9.9471
	12900.000	6568770.	-13.2214	0.9586
	13002.750	6568524.	-16.3849	6.9814
	13100.000	6568334.	-19.1916	12.8689
	13300.000	6568105.	-24.2166	25.6458
	13306.750	6568101.	-24.3655	26.0938
	13500.000	6568134.	-27.9406	39.3725
	13602.750	6568262.	-29.2394	46.7528
	13700.000	6568456.	-30.0410	53.8882
	13900.000	6569075.	-30.3069	68.7645
	13906.750	6569100.	-30.2829	69.2663
	14100.000	6569964.	-28.7107	83.4305
	14202.750	6570509.	-27.2144	90.7154
	14300.000	6571067.	-25.4188	97.3986
	14500.000	6572302.	-20.7318	110.4314
	14506.750	6572345.	-20.5535	110.8546
	14700.000	6573574.	-15.0025	122.5525
	14802.750	6574208.	-11.7679	128.4867
2ND OPP	14900.000	6574783.	-8.5781	133.9642
	15100.000	6575845.	-1.7798	144.9593
	15106.750	6575877.	-1.5474	145.3269
	15300.000	6576692.	5.0924	155.8649

TABLE 5-IX-B

GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (ENGLISH UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (FEET)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
GRR	-17.250	20909944.	28.6273	-80.6209
1ST MOT	0.0	20909944.	28.6273	-80.6209
TR1	0.398	20909945.	28.6273	-80.6209
	10.000	20910306.	28.6273	-80.6209
TIL INIT	11.375	20910421.	28.6272	-80.6209
	20.000	20911563.	28.6271	-80.6208
	30.000	20913950.	28.6270	-80.6206
	40.000	20917735.	28.6271	-80.6193
	50.000	20923192.	28.6277	-80.6156
	60.000	20930579.	28.6291	-80.6077
MACH 1	64.750	20934829.	28.6302	-80.6018
	70.000	20940102.	28.6318	-80.5934
	80.000	20951899.	28.6360	-80.5706
MAX Q	80.125	20952061.	28.6360	-80.5703
	90.000	20966160.	28.6423	-80.5364
	100.000	20982944.	28.6513	-80.4874
	110.000	21002266.	28.6637	-80.4202
	120.000	21024180.	28.6799	-80.3313
	130.000	21048848.	28.7006	-80.2172
	134.000	21059542.	28.7103	-80.1636
CFCO	134.000	21059542.	28.7103	-80.1636
	134.125	21059884.	28.7106	-80.1619
	140.000	21076311.	28.7262	-80.0750
	150.000	21105826.	28.7564	-79.9059
MAX F/M	159.125	21134658.	28.7882	-79.7254
TR3	159.924	21137277.	28.7912	-79.7083
	160.000	21137526.	28.7915	-79.7067
S2 UI	160.424	21138921.	28.7931	-79.6976
SIC RI	160.624	21139578.	28.7939	-79.6932
	160.694	21139808.	28.7942	-79.6917
	160.694	21139808.	28.7942	-79.6917
SIC SFP	160.694	21139821.	28.7942	-79.6916
S2 IGN	162.324	21145132.	28.8004	-79.6564
S2 90T	164.324	21151552.	28.8079	-79.6131
S2 UTT	164.924	21153460.	28.8102	-79.6001
	170.000	21169330.	28.8294	-79.4893
	180.000	21199301.	28.8678	-79.2661
	190.000	21227629.	28.9068	-79.0364
INT J	190.624	21229345.	28.9093	-79.0218
LET J	196.124	21244198.	28.9310	-78.8922

TABLE 5-IX-B

GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SFC)	GEOCENTRIC RADIUS (FEET)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
	200.000	21254388.	28.9465	-78.7996
IGM EN	200.524	21255748.	28.9486	-78.7870
IGM ON	201.250	21257626.	28.9515	-78.7696
	210.000	21279638.	28.9867	-78.5558
	220.000	21303388.	29.0275	-78.3045
TSMC1	222.250	21308529.	29.0367	-78.2469
	230.000	21325672.	29.0688	-78.0455
	240.000	21346522.	29.1106	-77.7786
	250.000	21365972.	29.1530	-77.5036
	260.000	21384057.	29.1958	-77.2202
	270.000	21400816.	29.2390	-76.9281
	280.000	21416286.	29.2827	-76.6271
	290.000	21430505.	29.3267	-76.3167
	300.000	21443515.	29.3711	-75.9968
	310.000	21455356.	29.4158	-75.6669
	320.000	21466074.	29.4608	-75.3268
	330.000	21475714.	29.5060	-74.9761
	340.000	21484322.	29.5514	-74.6144
	350.000	21491948.	29.5969	-74.2414
	360.000	21498644.	29.6426	-73.8565
	370.000	21504464.	29.6882	-73.4594
	380.000	21509463.	29.7339	-73.0496
	390.000	21513702.	29.7793	-72.6266
	400.000	21517244.	29.8246	-72.1899
	410.000	21520156.	29.8696	-71.7390
	420.000	21522509.	29.9142	-71.2732
	430.000	21524380.	29.9582	-70.7920
	440.000	21525851.	30.0016	-70.2948
	450.000	21527011.	30.0443	-69.7808
	460.000	21527955.	30.0860	-69.2492
	470.000	21528672.	30.1265	-68.7012
	480.000	21529374.	30.1654	-68.1383
	490.000	21530214.	30.2026	-67.5599
	500.000	21530984.	30.2378	-66.9681
	510.000	21531699.	30.2707	-66.3637
	520.000	21532427.	30.3011	-65.7464
	530.000	21533211.	30.3289	-65.1156
	540.000	21534122.	30.3539	-64.4710
TR4	548.429	21535050.	30.3726	-63.9167
S4B UI	549.129	21535135.	30.3740	-63.8702

TABLE 5-IX-B

GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (FEET)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
S2 RI	549.229	21535147.	30.3742	-63.8636
	549.304	21535155.	30.3744	-63.8586
	549.304	21535155.	30.3744	-63.8586
S2 SEP	549.304	21535159.	30.3744	-63.8585
	550.000	21535240.	30.3758	-63.8123
S4B IGN	552.429	21535500.	30.3806	-63.6510
S4B 90T	554.929	21535734.	30.3853	-63.4849
IGN 3S	556.500	21535870.	30.3882	-63.3803
S4B UTT	556.929	21535906.	30.3889	-63.3518
	560.000	21536154.	30.3942	-63.1470
S4B UCCJ TSMC2	561.229	21536247.	30.3962	-63.0649
	563.500	21536406.	30.3998	-62.9129
	570.000	21536775.	30.4090	-62.4763
	580.000	21537118.	30.4200	-61.7998
	590.000	21537205.	30.4272	-61.1175
	600.000	21537079.	30.4304	-60.4292
	610.000	21536779.	30.4296	-59.7349
	620.000	21536345.	30.4247	-59.0346
	630.000	21535823.	30.4155	-58.3283
	640.000	21535256.	30.4019	-57.6160
	650.000	21534694.	30.3839	-56.8975
	660.000	21534181.	30.3614	-56.1729
	670.000	21533750.	30.3342	-55.4422
	680.000	21533482.	30.3022	-54.7054
S4BGCS1	685.654	21533435.	30.2819	-54.2860
TR5	685.864	21533435.	30.2812	-54.2704
S4B LUI	686.164	21533435.	30.2800	-54.2481
	690.000	21533435.	30.2653	-53.9630
	695.654	21533435.	30.2424	-53.5428
PO INS	695.654	21533435.	30.2424	-53.5428
	695.750	21533435.	30.2420	-53.5357
	700.000	21533435.	30.2237	-53.2200
	700.750	21533435.	30.2204	-53.1643
	705.864	21533435.	30.1972	-52.7847
	705.864	21533435.	30.1972	-52.7847
	705.864	21533435.	30.1930	-52.7189
ORB GIO	706.750	21533435.	29.9798	-49.8963
LH2VTO	744.864	21533425.	29.7803	-47.8318
S4BLUCO	772.864	21533408.	29.5995	-46.2246
ORB NAV	794.750	21533391.	28.4330	-38.5947
	900.000	21533249.		

TABLE 5-IX-B

GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (FEET)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
	1002.750	21533025.	26.8449	-31.3461
	1100.000	21532738.	24.9693	-24.7021
	1300.000	21531934.	20.1418	-11.7503
	1306.750	21531902.	19.9592	-11.3296
	1500.000	21530861.	14.3045	0.3084
	1602.750	21530218.	11.0267	6.2229
	1700.000	21529563.	7.8034	11.6909
	1900.000	21528122.	0.9586	22.6972
	1906.750	21528072.	0.7251	23.0660
	2100.000	21526668.	-5.9286	33.6589
	2202.750	21525974.	-9.3863	39.3826
	2300.000	21525382.	-12.5589	44.9106
	2500.000	21524477.	-18.6175	56.7653
	2506.750	21524456.	-18.8081	57.1792
	2700.000	21524165.	-23.7636	69.4703
	2802.750	21524296.	-25.9358	76.3703
	2900.000	21524626.	-27.6397	83.1291
	3100.000	21525979.	-29.9151	97.6077
	3106.750	21526041.	-29.9608	98.1065
	3300.000	21528253.	-30.3633	112.4991
	3402.750	21529759.	-29.8595	120.1248
	3500.000	21531374.	-28.9372	127.2338
	3700.000	21535169.	-25.7873	141.3053
	3706.750	21535306.	-25.6541	141.7647
	3900.000	21539385.	-21.2067	154.4485
	4002.750	21541617.	-18.4115	160.8321
	4100.000	21543719.	-15.5478	166.6661
	4300.000	21547859.	-9.1615	178.1491
	4306.750	21547992.	-8.9372	178.5271
	4500.000	21551528.	-2.3730	-170.8137
	4602.750	21553157.	1.1719	-165.2106
	4700.000	21554512.	4.5152	-159.8951
	4900.000	21556686.	11.2074	-148.7606
	4906.750	21556744.	11.4263	-148.3772
	5100.000	21558015.	17.3967	-137.0915
	5202.750	21558382.	20.2739	-130.7984
	5300.000	21558546.	22.7517	-124.6225
	5500.000	21558387.	26.9203	-111.2109
	5506.750	21558371.	27.0361	-110.7419
	5700.000	21557673.	29.5637	-96.9300

TABLE 5-IX-B

GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (FEET)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
	5802.750	21557135.	30.2400	-89.3577
	5900.000	21556540.	30.4270	-82.1251
	6100.000	21555104.	29.4179	-67.3411
	6106.750	21555052.	29.3519	-66.8493
	6300.000	21553445.	26.6422	-53.1139
	6402.750	21552522.	24.6113	-46.1383
	6500.000	21551609.	22.3640	-39.7691
	6700.000	21549626.	16.9252	-27.3610
	6706.750	21549556.	16.7256	-26.9572
	6900.000	21547524.	10.6776	-15.7347
	7002.750	21546414.	7.2621	-9.9797
	7100.000	21545357.	3.9516	-4.6187
	7300.000	21543221.	-2.9460	6.3081
	7306.750	21543151.	-3.1783	6.6776
	7500.000	21541256.	-9.7185	17.3804
	7602.750	21540372.	-13.0505	23.2325
	7700.000	21539647.	-16.0605	28.9235
	7900.000	21538598.	-21.6440	41.2199
	7906.750	21538575.	-21.8151	41.6506
	8100.000	21538301.	-26.1166	54.4472
	8202.750	21538493.	-27.8669	61.6088
	8300.000	21538905.	-29.1289	68.5859
	8500.000	21540479.	-30.3985	83.3463
	8506.750	21540549.	-30.4089	83.8495
	8700.000	21542995.	-29.7930	98.2078
	8802.750	21544615.	-28.7665	105.6940
	8900.000	21546320.	-27.3780	112.6086
	9100.000	21550227.	-23.3932	126.1650
	9106.750	21550366.	-23.2352	126.6057
	9300.000	21554424.	-18.1734	138.7672
	9402.750	21556589.	-15.1279	144.9030
	9500.000	21558591.	-12.0742	150.5345
	9700.000	21562420.	-5.4323	161.7209
1ST OPP	9706.750	21562540.	-5.2024	162.0920
	9900.000	21565658.	1.4419	172.6409
	10002.750	21567032.	4.9675	178.2559
	10100.000	21568133.	8.2529	-176.3724
	10300.000	21569764.	14.7014	-164.9907
	10306.750	21569804.	14.9091	-164.5960
	10500.000	21570561.	20.4690	-152.9191

TABLE 5-IX-B

GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SFC)	GEOCENTRIC RADIUS (FEET)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
	10602.750	21570671.	23.0559	-146.3755
	10700.000	21570606.	25.2116	-139.9494
	10900.000	21570025.	28.5786	-126.0466
	10906.750	21569996.	28.6644	-125.5629
	11100.000	21568958.	30.2675	-111.4322
	11202.750	21568263.	30.4189	-103.7948
	11300.000	21567531.	30.1047	-96.5790
	11500.000	21565842.	28.1068	-82.0555
	11506.750	21565781.	28.0093	-81.5770
	11700.000	21563955.	24.4744	-68.2990
	11802.750	21562920.	22.0734	-61.5976
	11900.000	21561906.	19.5234	-55.4845
	12100.000	21559723.	13.6065	-43.5404
	12106.750	21559648.	13.3941	-43.1501
	12300.000	21557451.	7.0648	-32.2398
	12402.750	21556271.	3.5647	-26.5849
	12500.000	21555164.	0.2139	-21.2758
	12700.000	21552985.	-6.6476	-10.3206
	12706.750	21552915.	-6.8759	-9.9471
	12900.000	21551082.	-13.2214	0.9586
	13002.750	21550275.	-16.3849	6.9814
	13100.000	21549653.	-19.1916	12.8689
	13300.000	21548901.	-24.2166	25.6458
	13306.750	21548889.	-24.3655	26.0938
	13500.000	21548998.	-27.9406	39.3725
	13602.750	21549416.	-29.2394	46.7528
	13700.000	21550052.	-30.0410	53.8882
	13900.000	21552082.	-30.3069	68.7646
	13906.750	21552167.	-30.2829	69.2663
	14100.000	21555000.	-28.7107	83.4305
	14202.750	21556788.	-27.2144	90.7154
	14300.000	21558620.	-25.4188	97.3986
	14500.000	21562672.	-20.7318	110.4314
	14506.750	21562813.	-20.5535	110.8546
	14700.000	21566842.	-15.0025	122.5525
	14802.750	21568926.	-11.7679	128.4867
2ND OPP	14900.000	21570811.	-8.5781	133.9642
	15100.000	21574293.	-1.7798	144.9593
	15106.750	21574399.	-1.5474	145.3269
	15300.000	21577075.	5.0924	155.8649

TABLE 5-X COMMANDED AND ACTUAL ATTITUDE ANGLES

EVENT	TIME FROM 1ST MOT	PITCH ATTITUDE COMMAND	VEHICLE PITCH ATTITUDE	YAW ATTITUDE COMMAND	VEHICLE YAW ATTITUDE	ROLL ATTITUDE COMMAND	VEHICLE ROLL ATTITUDE
	(SEC)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)
GRR	-17.250	-0.0	-0.0	-0.0	-0.0	-11.95	-11.95
1ST MOT	0.0	-0.0	-0.07	-0.0	0.01	-11.95	-11.95
TRI	0.398	-0.0	-0.07	-0.0	0.01	-11.95	-11.95
	10.000	-0.0	-0.00	0.50	1.33	-11.95	-11.95
TILINIT	11.375	-0.04	-0.00	0.00	0.88	-11.82	-11.95
	20.000	-1.42	-1.13	-0.0	-0.04	-3.20	-3.87
	30.000	-4.68	-4.12	-0.0	-0.06	0.0	-0.00
	40.000	-10.00	-9.42	-0.0	-0.04	0.0	-0.00
	50.000	-16.04	-15.45	-0.0	-0.03	0.0	-0.00
	60.000	-22.30	-21.74	-0.0	-0.02	0.0	-0.00
MACH 1	64.750	-25.30	-24.77	-0.0	-0.01	0.0	-0.00
	70.000	-28.60	-28.04	-0.0	-0.02	0.0	-0.00
	80.000	-34.84	-34.11	-0.0	-0.02	0.0	-0.00
MAX Q	80.125	-34.93	-34.20	-0.0	-0.02	0.0	-0.00
	90.000	-41.77	-41.14	-0.0	-0.02	0.0	-0.00
	100.000	-47.55	-47.31	-0.0	-0.02	0.0	0.00
	110.000	-52.18	-52.24	-0.0	-0.06	0.0	0.00
	120.000	-56.00	-55.83	-0.0	-0.06	0.0	-0.00
	130.000	-59.20	-59.00	-0.0	-0.06	0.0	-0.00
	134.000	-60.35	-60.32	-0.0	-0.08	0.0	0.00
CECO	134.000	-60.35	-60.32	-0.0	-0.08	0.0	0.00
	134.125	-60.39	-60.36	-0.0	-0.08	0.0	0.00
	140.000	-61.99	-61.90	-0.0	-0.05	0.0	-0.00
	150.000	-64.57	-64.38	-0.0	-0.06	0.0	-0.00
MAX F/M	159.125	-66.70	-66.69	-0.0	-0.07	0.0	0.00
TB3	159.924	-66.70	-66.84	-0.0	-0.07	0.0	0.00
	160.000	-66.70	-66.86	-0.0	-0.07	0.0	0.00
S2 UI	160.424	-66.70	-66.91	-0.0	-0.07	0.0	0.00
SIC RI	160.624	-66.70	-66.93	-0.0	-0.07	0.0	0.00
	160.694	-66.70	-66.94	-0.0	-0.07	0.0	0.00
	160.694	-66.70	-66.94	-0.0	-0.07	0.0	0.00
SIC SEP	160.694	-66.70	-66.94	-0.0	-0.07	0.0	0.00
S2 IGN	162.324	-66.70	-67.14	-0.0	-0.07	0.0	0.00
S2 90T	164.324	-66.70	-67.32	-0.0	-0.09	0.0	0.01
S2 UTT	164.924	-66.70	-67.28	-0.0	-0.09	0.0	0.01
	170.000	-66.70	-66.62	-0.0	-0.07	0.0	-0.00
	180.000	-66.70	-66.68	-0.0	-0.07	0.0	-0.00
	190.000	-66.70	-66.68	-0.0	-0.07	0.0	0.00
INT J	190.624	-66.70	-66.68	-0.0	-0.07	0.0	0.00
LET J	196.124	-66.70	-66.68	-0.0	-0.07	0.0	0.00

TABLE 5-X
(CONTINUED)

COMMANDED AND ACTUAL ATTITUDE ANGLES

EVENT	TIME FROM 1ST MOT	PITCH	VEHICLE	YAW	VEHICLE	ROLL	VEHICLE
		ATTITUDE COMMAND	PITCH ATTITUDE	ATTITUDE COMMAND	YAW ATTITUDE	ATTITUDE COMMAND	ROLL ATTITUDE
	(SEC)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)
	200.000	-66.70	-66.68	-0.0	-0.07	0.0	0.00
IGM FN	200.524	-66.70	-66.68	-0.0	-0.07	0.0	0.00
IGM ON	201.250	-66.81	-66.68	0.03	-0.07	0.0	0.00
	210.000	-68.39	-68.30	0.40	0.34	0.0	-0.00
	220.000	-69.10	-68.95	0.40	0.32	0.0	-0.00
TSMC1	222.250	-69.26	-69.11	0.40	0.31	0.0	-0.00
	230.000	-69.86	-69.68	0.45	0.30	0.0	-0.00
	240.000	-70.60	-70.43	0.50	0.36	0.0	-0.00
	250.000	-71.35	-71.18	0.52	0.38	0.0	-0.00
	260.000	-72.10	-71.93	0.53	0.39	0.0	-0.00
	270.000	-72.92	-72.73	0.52	0.38	0.0	-0.00
	280.000	-73.72	-73.54	0.52	0.37	0.0	-0.00
	290.000	-74.51	-74.34	0.50	0.36	0.0	-0.00
	300.000	-75.31	-75.13	0.49	0.34	0.0	-0.00
	310.000	-76.13	-75.95	0.47	0.32	0.0	-0.00
	320.000	-76.96	-76.78	0.46	0.30	0.0	-0.00
	330.000	-77.81	-77.63	0.44	0.29	0.0	-0.00
	340.000	-78.67	-78.48	0.43	0.27	0.0	-0.00
	350.000	-79.54	-79.35	0.41	0.25	0.0	-0.00
	360.000	-80.44	-80.23	0.42	0.15	0.0	-0.00
	370.000	-81.35	-81.14	0.44	0.19	0.0	-0.00
	380.000	-82.26	-82.06	0.44	0.19	0.0	-0.00
	390.000	-83.19	-82.98	0.43	0.18	0.0	-0.00
	400.000	-84.13	-83.92	0.42	0.16	0.0	-0.00
	410.000	-85.07	-84.87	0.41	0.15	0.0	-0.00
	420.000	-86.03	-85.82	0.40	0.13	0.0	-0.00
	430.000	-86.99	-86.79	0.38	0.11	0.0	-0.00
	440.000	-87.97	-87.76	0.37	0.10	0.0	-0.00
	450.000	-88.94	-88.74	0.35	0.08	0.0	-0.00
	460.000	-89.92	-89.72	0.34	0.06	0.0	-0.00
	470.000	-86.66	-86.80	0.11	-0.09	0.0	-0.01
	480.000	-88.03	-87.63	0.10	-0.13	0.0	-0.00
	490.000	-90.11	-89.82	0.13	-0.12	0.0	0.00
	500.000	-90.04	-90.05	0.09	-0.15	0.0	-0.00
	510.000	-91.62	-91.34	0.12	-0.13	0.0	-0.00
	520.000	-93.06	-92.89	0.14	-0.11	0.0	0.00
	530.000	-94.15	-94.00	0.15	-0.10	0.0	-0.00
	540.000	-95.20	-95.05	0.15	-0.10	0.0	-0.00
TB4	548.429	-96.10	-95.94	0.14	-0.11	0.0	-0.00
S4B UI	549.129	-96.10	-96.02	0.14	-0.11	0.0	-0.00

TABLE 5-X
(CONTINUED)

EVENT	TIME FROM 1ST MOT	PITCH	VEHICLE	YAW	VEHICLE	ROLL	VEHICLE
		ATTITUDE COMMAND	PITCH ATTITUDE	ATTITUDE COMMAND	YAW ATTITUDE	ATTITUDE COMMAND	ROLL ATTITUDE
	(SEC)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)
S2 RI	549.229	-96.10	-96.03	0.14	-0.11	0.0	-0.00
	549.304	-96.10	-96.04	0.14	-0.11	0.0	-0.00
	549.304	-96.10	-96.04	0.14	-0.11	0.0	-0.00
S2 SFP	549.304	-96.10	-96.04	0.14	-0.11	0.0	-0.00
	550.000	-96.10	-96.11	0.14	-0.11	0.0	0.00
S4B IGN	552.429	-96.10	-96.34	0.14	-0.11	0.0	0.01
S4B 90T	554.929	-96.10	-96.40	0.14	-0.11	0.0	0.06
IGM 3S	556.500	-96.23	-96.09	0.12	-0.10	0.0	0.17
S4B UTT	556.929	-96.60	-96.03	0.07	-0.10	0.0	0.20
	560.000	-99.47	-97.75	-0.12	-0.34	0.0	-0.10
S4B UCJ	561.229	-99.65	-99.05	-0.12	-0.41	0.0	-0.25
TSMC2	563.500	-99.96	-100.13	-0.08	-0.39	0.0	-0.15
	570.000	-100.58	-100.02	0.14	-0.16	0.0	0.53
	580.000	-101.88	-101.65	0.33	0.08	0.0	0.80
	590.000	-102.53	-102.28	0.40	0.14	0.0	0.76
	600.000	-103.40	-103.14	0.42	0.17	0.0	0.86
	610.000	-104.15	-103.90	0.41	0.16	0.0	0.77
	620.000	-104.91	-104.65	0.38	0.13	0.0	0.80
	630.000	-105.66	-105.44	0.34	0.09	0.0	0.74
	640.000	-106.29	-106.05	0.29	0.04	0.0	0.78
	650.000	-106.97	-106.72	0.25	-0.01	0.0	0.78
	660.000	-108.24	-108.11	0.26	0.00	0.0	0.76
	670.000	-108.14	-107.99	0.24	-0.02	0.0	0.80
	680.000	-108.08	-107.92	0.21	-0.06	0.0	0.77
S4BGCS1	685.654	-108.08	-107.92	0.21	-0.06	0.0	0.87
TB5	685.864	-108.08	-107.92	0.21	-0.06	0.0	0.87
S4B LUT	686.164	-108.08	-107.92	0.21	-0.06	0.0	0.86
	690.000	-108.08	-107.93	0.21	-0.03	0.0	0.80
	695.654	-108.08	-107.95	0.21	0.01	0.0	0.72
PO INS	695.654	-108.08	-107.95	0.21	0.01	0.0	0.72
	695.750	-108.08	-107.95	0.21	0.01	0.0	0.71
	700.000	-108.08	-107.96	0.21	0.03	0.0	0.65
	700.750	-108.08	-107.96	0.21	0.04	0.0	0.64
	705.864	-108.08	-107.98	0.21	0.06	0.0	0.56
	705.864	-108.08	-107.98	0.21	0.06	0.0	0.56
ORB GIO	706.750	-116.92	-107.98	0.33	0.06	0.0	0.0
LH2VTO	744.864	-119.50	-119.38	0.30	0.30	0.0	-0.00
S4BLUCO	772.864	-121.41	-121.41	0.28	0.28	0.0	0.00
ORB NAV	794.750	-122.90	-122.90	0.27	0.27	0.0	0.00
	900.000	-129.98	-129.98	0.20	0.20	0.0	-0.00

TABLE 5-X
(CONTINUED)

COMMANDED AND ACTUAL ATTITUDE ANGLES

EVENT	TIME FROM 1ST MOT	PITCH	VEHICLE	YAW	VEHICLE	ROLL	VEHICLE
		ATTITUDE COMMAND	PITCH ATTITUDE	ATTITUDE COMMAND	YAW ATTITUDE	ATTITUDE COMMAND	ROLL ATTITUDE
	(SEC)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)
	1002.750	-137.05	-137.05	0.13	0.13	0.0	-0.00
	1100.000	-143.59	-143.59	0.05	0.05	0.0	-0.00
	1300.000	-157.20	-157.20	-0.10	-0.10	0.0	-0.00
	1306.750	-157.74	-157.74	-0.10	-0.10	0.0	-0.00
	1500.000	-170.81	-170.81	-0.24	-0.24	0.0	0.00
	1602.750	-177.89	-177.89	-0.32	-0.32	0.0	0.00
	1700.000	175.57	175.57	-0.38	-0.38	0.0	0.00
	1900.000	161.95	161.95	-0.50	-0.50	0.0	0.00
	1906.750	161.41	161.41	-0.51	-0.51	0.0	0.00
	2100.000	148.33	148.33	-0.60	-0.60	0.0	0.00
	2202.750	141.24	141.24	-0.64	-0.64	0.0	0.00
	2300.000	134.70	134.70	-0.67	-0.67	0.0	0.00
	2500.000	121.08	121.08	-0.70	-0.70	0.0	0.00
	2506.750	120.53	120.53	-0.70	-0.70	0.0	0.00
	2700.000	107.45	107.45	-0.70	-0.70	0.0	-0.00
	2802.750	100.37	100.37	-0.68	-0.68	0.0	0.00
	2900.000	93.83	93.83	-0.66	-0.66	0.0	-0.00
	3100.000	80.20	80.20	-0.58	-0.58	0.0	-0.00
	3106.750	79.66	79.66	-0.58	-0.58	0.0	-0.00
	3300.000	66.58	66.58	-0.48	-0.48	0.0	0.00
	3402.750	59.50	59.50	-0.41	-0.41	0.0	0.00
	3500.000	52.97	52.97	-0.34	-0.34	0.0	0.00
	3700.000	39.35	39.35	-0.19	-0.19	0.0	0.00
	3706.750	38.81	38.81	-0.18	-0.18	0.0	0.00
	3900.000	25.75	25.75	-0.02	-0.02	0.0	0.00
	4002.750	18.67	18.67	0.07	0.07	0.0	0.00
	4100.000	12.14	12.14	0.15	0.15	0.0	0.00
	4300.000	-1.46	-1.46	0.31	0.31	0.0	0.00
	4306.750	-2.00	-2.00	0.32	0.32	0.0	0.00
	4500.000	-15.06	-15.06	0.47	0.47	0.0	0.00
	4602.750	-22.12	-22.12	0.54	0.54	0.0	0.00
	4700.000	-28.65	-28.65	0.60	0.60	0.0	0.00
	4900.000	-42.24	-42.24	0.70	0.70	0.0	0.00
	4906.750	-42.78	-42.78	0.70	0.70	0.0	0.00
	5100.000	-55.83	-55.83	0.77	0.77	0.0	0.00
	5202.750	-62.89	-62.89	0.79	0.79	0.0	0.00
	5300.000	-69.41	-69.41	0.79	0.79	0.0	0.00
	5500.000	-83.00	-83.00	0.78	0.78	0.0	0.00
	5506.750	-83.54	-83.54	0.78	0.78	0.0	-0.00
	5700.000	-96.58	-96.58	0.72	0.72	0.0	-0.00

TABLE 5-X

COMMANDED AND ACTUAL ATTITUDE ANGLES

(CONTINUED)

EVENT	TIME FROM 1ST MOT	PITCH	VEHICLE	YAW	VEHICLE	ROLL	VEHICLE
		ATTITUDE COMMAND	PITCH ATTITUDE	ATTITUDE COMMAND	YAW ATTITUDE	ATTITUDE COMMAND	ROLL ATTITUDE
	(SEC)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)
	5802.750	-103.65	-103.65	0.68	0.68	0.0	0.00
	5900.000	-110.17	-110.17	0.63	0.63	0.0	0.00
	6100.000	-123.76	-123.76	0.50	0.50	0.0	-0.00
	6106.750	-124.30	-124.30	0.49	0.49	0.0	-0.00
	6300.000	-137.34	-137.34	0.34	0.34	0.0	-0.00
	6402.750	-144.41	-144.41	0.24	0.24	0.0	-0.00
	6500.000	-150.93	-150.93	0.16	0.16	0.0	-0.00
	6700.000	-164.53	-164.53	-0.04	-0.04	0.0	-0.00
	6706.750	-165.07	-165.07	-0.04	-0.04	0.0	-0.00
	6900.000	-178.13	-178.13	-0.23	-0.23	0.0	0.00
	7002.750	174.80	174.80	-0.33	-0.33	0.0	0.00
	7100.000	168.27	168.27	-0.42	-0.42	0.0	0.00
	7300.000	154.67	154.67	-0.58	-0.58	0.0	0.00
	7306.750	154.12	154.12	-0.59	-0.59	0.0	0.00
	7500.000	141.06	141.06	-0.72	-0.72	0.0	0.00
	7602.750	133.98	133.98	-0.78	-0.78	0.0	0.00
	7700.000	127.45	127.45	-0.82	-0.82	0.0	0.00
	7900.000	113.84	113.84	-0.88	-0.88	0.0	0.00
	7906.750	113.29	113.29	-0.88	-0.88	0.0	0.00
	8100.000	100.22	100.22	-0.89	-0.89	0.0	-0.00
	8202.750	93.15	93.15	-0.88	-0.88	0.0	0.00
	8300.000	86.61	86.61	-0.85	-0.85	0.0	-0.00
	8500.000	73.00	73.00	-0.77	-0.77	0.0	0.00
	8506.750	72.46	72.46	-0.77	-0.77	0.0	-0.00
	8700.000	59.40	59.40	-0.65	-0.65	0.0	-0.00
	8802.750	52.33	52.33	-0.57	-0.57	0.0	-0.00
	8900.000	45.80	45.80	-0.48	-0.48	0.0	-0.00
	9100.000	32.20	32.20	-0.29	-0.29	0.0	-0.00
	9106.750	31.66	31.66	-0.28	-0.28	0.0	-0.00
	9300.000	18.61	18.61	-0.08	-0.08	0.0	0.00
	9402.750	11.54	11.54	0.03	0.03	0.0	0.00
	9500.000	5.02	5.02	0.14	0.14	0.0	0.00
	9700.000	-8.57	-8.57	0.35	0.35	0.0	0.00
1ST OPP	9706.750	-9.11	-9.11	0.36	0.36	0.0	0.00
	9900.000	-22.15	-22.15	0.55	0.55	0.0	0.00
	10002.750	-29.21	-29.21	0.64	0.64	0.0	0.00
	10100.000	-35.73	-35.73	0.72	0.72	0.0	0.00
	10300.000	-49.31	-49.31	0.86	0.86	0.0	0.00
	10306.750	-49.85	-49.85	0.86	0.86	0.0	0.00
	10500.000	-62.89	-62.89	0.95	0.95	0.0	0.00

TABLE 5-X
(CONTINUED) COMMANDED AND ACTUAL ATTITUDE ANGLES

EVENT	TIME FROM 1ST MOT	PITCH	VEHICLE	YAW	VEHICLE	ROLL	VEHICLE
		ATTITUDE COMMAND	PITCH ATTITUDE	ATTITUDE COMMAND	YAW ATTITUDE	ATTITUDE COMMAND	ROLL ATTITUDE
	(SEC)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)
	10602.750	-69.95	-69.95	0.98	0.98	0.0	0.00
	10700.000	-76.46	-76.46	0.99	0.99	0.0	0.00
	10900.000	-90.04	-90.04	0.98	0.98	0.0	0.00
	10906.750	-90.58	-90.58	0.98	0.98	0.0	-0.00
	11100.000	-103.61	-103.61	0.92	0.92	0.0	-0.00
	11202.750	-110.67	-110.67	0.86	0.86	0.0	-0.00
	11300.000	-117.19	-117.19	0.80	0.80	0.0	-0.00
	11500.000	-130.76	-130.76	0.64	0.64	0.0	-0.00
	11506.750	-131.31	-131.31	0.63	0.63	0.0	-0.00
	11700.000	-144.34	-144.34	0.44	0.44	0.0	-0.00
	11802.750	-151.40	-151.40	0.33	0.33	0.0	-0.00
	11900.000	-157.92	-157.92	0.22	0.22	0.0	0.00
	12100.000	-171.51	-171.51	-0.02	-0.02	0.0	-0.00
	12106.750	-172.05	-172.05	-0.03	-0.03	0.0	-0.00
	12300.000	174.90	174.90	-0.27	-0.27	0.0	0.00
	12402.750	167.84	167.84	-0.39	-0.39	0.0	0.00
	12500.000	161.31	161.31	-0.50	-0.50	0.0	0.00
	12700.000	147.72	147.72	-0.71	-0.71	0.0	0.00
	12706.750	147.17	147.17	-0.72	-0.72	0.0	0.00
	12900.000	134.12	134.12	-0.88	-0.88	0.0	0.00
	13002.750	127.04	127.04	-0.95	-0.95	0.0	0.00
	13100.000	120.52	120.52	-1.01	-1.01	0.0	0.00
	13300.000	106.91	106.91	-1.08	-1.08	0.0	0.00
	13306.750	106.37	106.37	-1.09	-1.09	0.0	0.00
	13500.000	93.31	93.31	-1.10	-1.10	0.0	0.00
	13602.750	86.24	86.24	-1.08	-1.08	0.0	-0.00
	13700.000	79.71	79.71	-1.06	-1.06	0.0	0.00
	13900.000	66.11	66.11	-0.95	-0.95	0.0	-0.00
	13906.750	65.57	65.57	-0.95	-0.95	0.0	-0.00
	14100.000	52.52	52.52	-0.80	-0.80	0.0	-0.00
	14202.750	45.45	45.45	-0.70	-0.70	0.0	-0.00
	14300.000	38.93	38.93	-0.59	-0.59	0.0	-0.00
	14500.000	25.34	25.34	-0.36	-0.36	0.0	-0.00
	14506.750	24.80	24.80	-0.35	-0.35	0.0	-0.00
	14700.000	11.76	11.76	-0.10	-0.10	0.0	0.00
2ND OPP	14802.750	4.70	4.70	0.04	0.04	0.0	0.00
	14900.000	-1.82	-1.82	0.17	0.17	0.0	0.00
	15100.000	-15.39	-15.39	0.44	0.44	0.0	0.00
	15106.750	-15.93	-15.93	0.45	0.45	0.0	0.00
	15300.000	-28.96	-28.96	0.68	0.68	0.0	0.00

TABLE 5-XI

SPACECRAFT GIMBAL ANGLES

EVENT	TIME FROM 1ST MOT (SFCS)	SPACECRAFT GIMBAL ANGLES		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)
GPR	-17.250	90.00000	0.0	168.05104
1ST MOT	0.0	89.92949	0.01492	168.05104
TR1	0.398	89.92968	0.01391	168.05143
	10.000	89.99653	1.33298	168.05119
TIL INIT	11.375	89.99697	0.88153	168.05180
	20.000	88.86746	-0.03763	176.12525
	30.000	85.87834	-0.05594	179.99807
	40.000	80.57895	-0.04003	179.99991
	50.000	74.54941	-0.02785	179.99957
	60.000	68.25857	-0.01612	179.99879
MACH 1	64.750	65.23232	-0.01396	179.99854
	70.000	61.95698	-0.02293	179.99827
	80.000	55.88721	-0.02489	179.99798
MAX Q	80.125	55.80422	-0.02477	179.99800
	90.000	48.86193	-0.01849	179.99917
	100.000	42.69397	-0.02218	-179.99992
	110.000	37.75864	-0.05527	-179.99951
	120.000	34.16626	-0.05645	179.99989
	130.000	31.00151	-0.05534	179.99995
	134.000	29.68427	-0.07661	-179.99997
CEGO	134.000	29.68427	-0.07661	-179.99997
	134.125	29.64438	-0.07738	-179.99997
	140.000	28.10225	-0.05146	179.99992
	150.000	25.61530	-0.06413	179.99993
MAX F/M	159.125	23.30706	-0.06669	-179.99988
TR3	159.924	23.15600	-0.06670	-179.99957
	160.000	23.14491	-0.06671	-179.99956
S2 UT	160.424	23.09008	-0.06671	-179.99952
SIC RI	160.624	23.06611	-0.06672	-179.99952
	160.694	23.05778	-0.06674	-179.99952
	160.694	23.05778	-0.06674	-179.99952
SIC SFP	160.694	23.05778	-0.06674	-179.99952
S2 IGN	162.324	22.86279	-0.07173	-179.99933
S2 90T	164.324	22.68455	-0.08808	-179.99433
S2 UTT	164.924	22.72100	-0.09020	-179.99104
	170.000	23.38007	-0.07188	179.99674
	180.000	23.32027	-0.07189	179.99997
	190.000	23.31568	-0.07377	-179.99985
INT J	190.624	23.31549	-0.07382	-179.99983
LET J	196.124	23.31962	-0.07025	-179.99984

TABLE 5-XI
(CONTINUED) SPACECRAFT GIMBAL ANGLFS

EVENT	TIME FROM 1ST MOT (SECS)	SPACECRAFT GIMBAL ANGLES		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)
	200.000	23.31942	-0.07335	-179.99979
IGM EN	200.524	23.31940	-0.07350	-179.99979
IGM ON	201.250	23.31936	-0.07361	-179.99979
	210.000	21.70365	0.34361	179.99919
	220.000	21.04944	0.32180	179.99964
TSMC1	222.250	20.89055	0.31420	179.99957
	230.000	20.31754	0.29992	179.99947
	240.000	19.56527	0.36248	179.99935
	250.000	18.82293	0.38377	179.99931
	260.000	18.07030	0.38758	179.99930
	270.000	17.26501	0.38349	179.99929
	280.000	16.45988	0.37185	179.99931
	290.000	15.66325	0.35815	179.99934
	300.000	14.86501	0.34210	179.99936
	310.000	14.05410	0.32307	179.99937
	320.000	13.22235	0.30499	179.99940
	330.000	12.37430	0.28645	179.99944
	340.000	11.51534	0.26793	179.99947
	350.000	10.64637	0.24923	179.99949
	360.000	9.77147	0.15371	179.99944
	370.000	8.85753	0.18766	179.99939
	380.000	7.94230	0.18728	179.99939
	390.000	7.01685	0.17696	179.99941
	400.000	6.08102	0.16494	179.99943
	410.000	5.13484	0.14891	179.99946
	420.000	4.17823	0.13189	179.99949
	430.000	3.21329	0.11300	179.99953
	440.000	2.24213	0.09546	179.99957
	450.000	1.26483	0.07823	179.99960
	460.000	0.28211	0.06095	179.99964
	470.000	3.20141	-0.08652	179.99275
	480.000	2.37347	-0.12960	179.99946
	490.000	0.17968	-0.11965	-179.99917
	500.000	-0.04615	-0.14991	179.99733
	510.000	-1.33841	-0.13159	179.99983
	520.000	-2.88513	-0.10654	-179.99998
	530.000	-3.99837	-0.10302	179.99982
	540.000	-5.04562	-0.10370	179.99978
TB4	548.429	-5.94320	-0.10728	179.99975
S4B UT	549.129	-6.01839	-0.10774	179.99979

TABLE 5-XI
(CONTINUED)

SPACECRAFT GIMBAL ANGLES

EVENT	TIME FROM 1ST MOT (SECS)	SPACECRAFT GIMBAL ANGLES		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)
S2 RT	549.229	-6.02896	-0.10780	179.99981
	549.304	-6.03687	-0.10786	179.99983
	549.304	-6.03687	-0.10786	179.99983
S2 SFP	549.304	-6.03687	-0.10786	179.99983
	550.000	-6.10963	-0.10927	-179.99995
S4B IGN	552.429	-6.34284	-0.11472	-179.99451
S4B 90T	554.929	-6.39615	-0.11419	-179.94443
IGN 3S	556.500	-6.09310	-0.10361	-179.82971
S4B UTT	556.929	-6.02630	-0.10267	-179.80117
	560.000	-7.75338	-0.33619	179.89654
S4B UCJ	561.229	-9.05321	-0.40770	179.74935
TSMC2	563.500	-10.13322	-0.38526	179.84521
	570.000	-10.01829	-0.15857	-179.46838
	580.000	-11.65399	0.07636	-179.19893
	590.000	-12.28489	0.14319	-179.23783
	600.000	-13.13949	0.17001	-179.13925
	610.000	-13.89888	0.15771	-179.23090
	620.000	-14.64630	0.12785	-179.19899
	630.000	-15.43549	0.09189	-179.26355
	640.000	-16.05277	0.04097	-179.22065
	650.000	-16.71650	-0.00604	-179.22023
	660.000	-18.11253	0.00125	-179.24288
	670.000	-17.99290	-0.01816	-179.20279
	680.000	-17.91793	-0.05787	-179.23489
S4BGCS1	685.654	-17.91618	-0.05949	-179.13184
TB5	685.864	-17.91657	-0.05867	-179.13100
S4B LUT	686.164	-17.91753	-0.05672	-179.13567
	690.000	-17.93090	-0.03055	-179.19556
	695.654	-17.94939	0.00592	-179.28385
PO INS	695.654	-17.94939	0.00592	-179.28385
	695.750	-17.94969	0.00651	-179.28535
	700.000	-17.96206	0.03145	-179.35170
	700.750	-17.96411	0.03563	-179.36341
	705.864	-17.97702	0.06244	-179.44325
	705.864	-17.97702	0.06244	-179.44325
ORB GID	706.750	-17.97702	0.06244	180.00000
LH2VTO	744.864	-29.37702	0.30209	179.99968
S4BLUCD	772.864	-31.40561	0.28460	180.00000
ORB NAV	794.750	-32.90235	0.27017	180.00000
	900.000	-39.97802	0.19947	180.00000

TABLE 5-XI SPACECRAFT GIMBAL ANGLES
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SFCS)	SPACECRAFT GIMBAL ANGLES		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)
	1002.750	-47.05409	0.12533	180.00000
	1100.000	-53.58633	0.05470	180.00000
	1300.000	-67.19701	-0.09551	180.00000
	1306.750	-67.74150	-0.10153	180.00000
	1500.000	-80.81068	-0.24353	180.00000
	1602.750	-87.89108	-0.31705	180.00000
	1700.000	-94.42763	-0.38162	180.00000
	1900.000	-108.04780	-0.50241	180.00000
	1906.750	-108.59267	-0.50678	180.00000
	2100.000	-121.67080	-0.59925	180.00000
	2202.750	-128.75565	-0.63825	180.00000
	2300.000	-135.29591	-0.66659	180.00000
	2500.000	-148.92221	-0.70031	180.00000
	2506.750	-149.46727	-0.70092	180.00000
	2700.000	-162.54848	-0.69797	180.00000
	2802.750	-169.63373	-0.68222	180.00000
	2900.000	-176.17354	-0.65895	180.00000
	3100.000	170.20358	-0.58460	180.00000
	3106.750	169.65872	-0.58093	180.00000
	3300.000	156.58368	-0.47814	180.00000
	3402.750	149.50271	-0.41168	180.00000
	3500.000	142.96733	-0.34455	180.00000
	3700.000	129.35491	-0.19037	180.00000
	3706.750	128.81050	-0.18389	180.00000
	3900.000	115.74655	-0.02335	180.00000
	4002.750	108.67180	0.06576	180.00000
	4100.000	102.14222	0.14795	180.00000
	4300.000	88.54175	0.31454	180.00000
	4306.750	87.99781	0.32098	180.00000
	4500.000	74.94487	0.46751	180.00000
	4602.750	67.87579	0.53886	180.00000
	4700.000	61.35123	0.59851	180.00000
	4900.000	47.76043	0.70017	180.00000
	4906.750	47.21685	0.70354	180.00000
	5100.000	34.17203	0.76655	180.00000
	5202.750	27.10684	0.78565	180.00000
	5300.000	20.58553	0.79345	180.00000
	5500.000	7.00032	0.77870	180.00000
	5506.750	6.45692	0.77724	180.00000
	5700.000	-6.58433	0.72229	180.00000

TABLE 5-XI
(CONTINUED)

SPACECRAFT GIMBAL ANGLES

EVENT	TIME FROM 1ST MOT (SECS)	SPACECRAFT GIMBAL ANGLES		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)
	5802.750	-13.64838	0.67714	180.00000
	5900.000	-20.16921	0.62643	180.00000
	6100.000	-33.75517	0.49547	180.00000
	6106.750	-34.29865	0.48959	180.00000
	6300.000	-47.34309	0.33573	180.00000
	6402.750	-54.40983	0.24388	180.00000
	6500.000	-60.93373	0.15518	180.00000
	6700.000	-74.52772	-0.03691	180.00000
	6706.750	-75.07156	-0.04469	180.00000
	6900.000	-88.12548	-0.23046	180.00000
	7002.750	-95.19785	-0.32825	180.00000
	7100.000	-101.72711	-0.41511	180.00000
	7300.000	-115.33240	-0.58075	180.00000
	7306.750	-115.87668	-0.58684	180.00000
	7500.000	-128.94081	-0.71807	180.00000
	7602.750	-136.01815	-0.77559	180.00000
	7700.000	-142.55152	-0.81914	180.00000
	7900.000	-156.16347	-0.87780	180.00000
	7906.750	-156.70796	-0.87920	180.00000
	8100.000	-169.77549	-0.89011	180.00000
	8202.750	-176.85337	-0.87759	180.00000
	8300.000	176.61362	-0.85456	180.00000
	8500.000	163.00493	-0.77222	180.00000
	8506.750	162.46065	-0.76800	180.00000
	8700.000	149.39934	-0.64674	180.00000
	8802.750	142.32588	-0.56637	180.00000
	8900.000	135.79748	-0.48418	180.00000
	9100.000	122.19968	-0.29272	180.00000
	9106.750	121.65586	-0.28460	180.00000
	9300.000	108.60603	-0.08225	180.00000
	9402.750	101.53893	0.03105	180.00000
	9500.000	95.01637	0.13614	180.00000
	9700.000	81.43037	0.35074	180.00000
	9706.750	80.88700	0.35907	180.00000
1ST OPP	9900.000	67.84756	0.54985	180.00000
	10002.750	60.78560	0.64355	180.00000
	10100.000	54.26745	0.72242	180.00000
	10300.000	40.68950	0.85865	180.00000
	10306.750	40.14642	0.86322	180.00000
	10500.000	27.11319	0.95055	180.00000

TABLE 5-XI
(CONTINUED) SPACECRAFT GIMBAL ANGLES

EVENT	TIME FROM 1ST MOT (SFCS)	SPACECRAFT GIMBAL ANGLES		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)
	10602.750	20.05399	0.97982	180.00000
	10700.000	13.53800	0.99241	180.00000
	10900.000	-0.03663	0.98112	180.00000
	10906.750	-0.57961	0.97955	180.00000
	11100.000	-13.61126	0.91642	180.00000
	11202.750	-20.67028	0.86243	180.00000
	11300.000	-27.18654	0.80094	180.00000
	11500.000	-40.76314	0.64010	180.00000
	11506.750	-41.30625	0.63283	180.00000
	11700.000	-54.34179	0.44191	180.00000
	11802.750	-61.40372	0.32738	180.00000
	11900.000	-67.92316	0.21652	180.00000
	12100.000	-81.50784	-0.02423	180.00000
	12106.750	-82.05131	-0.03400	180.00000
	12300.000	-95.09623	-0.26745	180.00000
	12402.750	-102.16372	-0.39049	180.00000
	12500.000	-108.68846	-0.49988	180.00000
	12700.000	-122.28434	-0.70862	180.00000
	12706.750	-122.82824	-0.71630	180.00000
	12900.000	-135.88332	-0.88183	180.00000
	13002.750	-142.95574	-0.95443	180.00000
	13100.000	-149.48454	-1.00943	180.00000
	13300.000	-163.08686	-1.08369	180.00000
	13306.750	-163.63096	-1.08547	180.00000
	13500.000	-176.68899	-1.09969	180.00000
	13602.750	176.23842	-1.08427	180.00000
	13700.000	169.71039	-1.05566	180.00000
	13900.000	156.11250	-0.95311	180.00000
	13906.750	155.56865	-0.94785	180.00000
	14100.000	142.51827	-0.79683	180.00000
	14202.750	135.45094	-0.69680	180.00000
	14300.000	128.92832	-0.59460	180.00000
	14500.000	115.34291	-0.35688	180.00000
	14506.750	114.79959	-0.34680	180.00000
	14700.000	101.76192	-0.09620	180.00000
2ND OPP	14802.750	94.70143	0.04381	180.00000
	14900.000	88.18495	0.17344	180.00000
	15100.000	74.61138	0.43739	180.00000
	15106.750	74.06849	0.44763	180.00000
	15300.000	61.04048	0.68110	180.00000

TABLE 5-XII-A

MACH NUMBER, DYNAMIC PRESSURE, ANGLE OF ATTACK,
AND THE PRODUCT OF DYNAMIC PRESSURE AND ANGLE
OF ATTACK (METRIC UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	MACH	DYNAMIC PRESSURE (N/(M)SQ)	ANGLE OF ATTACK (DEG)	Q*ALPHA PRODUCT (N*DEG/(M)SQ)
GRR	-17.250	0.00	1.4	90.00	125.
1ST MOT	0.0	0.00	1.4	89.93	125.
TBI	0.398	0.00	1.5	75.95	112.
	10.000	0.07	326.9	4.65	1520.
TIL INIT	11.375	0.08	438.9	4.76	2089.
	20.000	0.16	1660.7	2.41	4007.
	30.000	0.27	4538.3	1.15	5219.
	40.000	0.42	9348.6	0.51	4806.
	50.000	0.61	16100.3	0.33	5286.
	60.000	0.86	24077.3	0.61	14689.
MACH 1	64.750	1.00	27746.8	0.65	18056.
	70.000	1.19	31112.2	0.62	19220.
	80.000	1.64	34260.8	0.50	17086.
MAX Q	80.125	1.64	34259.6	0.49	16901.
	90.000	2.19	30040.2	0.24	7081.
	100.000	2.72	20187.0	0.07	1362.
	110.000	3.33	12272.6	0.30	3694.
	120.000	3.97	6666.3	0.01	84.
	130.000	4.66	3343.4	0.02	53.
	134.000	4.96	2504.7	0.21	514.
CECO	134.000	4.96	2504.7	0.21	514.
	134.125	4.97	2481.7	0.21	531.
	140.000	5.40	1571.9	0.17	265.
	150.000	6.51	714.2	0.13	91.
MAX F/M	159.125	7.92	300.8	0.25	74.
TB3	159.924	8.05	275.6	0.23	63.
	160.000	8.07	273.3	0.22	61.
S2 UI	160.424	8.11	258.9	0.19	49.
SIC RI	160.624	8.12	251.8	0.17	44.
	160.694	8.13	249.3	0.17	42.
	160.694	8.13	249.3	0.17	42.
SIC SEP	160.694	8.13	249.1	0.17	42.
S2 IGN	162.324	8.20	196.9	0.04	7.
S2 90T	164.324	8.30	147.5	0.21	31.
S2 UTT	164.924	8.33	135.4	0.37	50.
	170.000	8.67	64.9	2.05	133.
	180.000	9.09	13.5	3.94	53.
	190.000	8.77	2.8	5.81	16.
INT J	190.624	8.75	2.5	5.92	15.
LET J	196.124	8.49	1.2	6.91	8.

TABLE 5-XII-A

MACH NUMBER, DYNAMIC PRESSURE, ANGLE OF ATTACK,
AND THE PRODUCT OF DYNAMIC PRESSURE AND ANGLE
OF ATTACK (METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	MACH	DYNAMIC PRESSURE (N/(M)SQ)	ANGLE OF ATTACK (DEG)	Q*ALPHA PRODUCT (N*DEG/(M)SQ)
	200.000	8.27	0.7	7.59	5.
IGM FN	200.524	8.24	0.7	7.68	5.
IGM ON	201.250	8.21	0.6	7.80	5.
	210.000	7.65	0.2	7.70	2.
	220.000	6.99	0.1	8.71	1.
TSMC1	222.250	6.74	0.1	8.91	1.
	230.000	6.10	0.0	9.57	0.
	240.000	5.59	0.0	10.34	0.
	250.000	5.25	0.0	11.06	0.
	260.000	5.03	0.0	11.71	0.
	270.000	4.89	0.0	12.24	0.
	280.000	4.84	0.0	12.71	0.
	290.000	4.83	0.0	13.13	0.
	300.000	4.87	0.0	13.50	0.
	310.000	4.93	0.0	13.79	0.
	320.000	5.01	0.0	14.02	0.
	330.000	5.11	0.0	14.18	0.
	340.000	5.23	0.0	14.28	0.
	350.000	5.35	0.0	14.33	0.
	360.000	5.48	0.0	14.32	0.
	370.000	5.62	0.0	14.24	0.
	380.000	5.77	0.0	14.13	0.
	390.000	5.93	0.0	13.96	0.
	400.000	6.10	0.0	13.75	0.
	410.000	6.28	0.0	13.50	0.
	420.000	6.47	0.0	13.21	0.
	430.000	6.67	0.0	12.89	0.
	440.000	6.88	0.0	12.53	0.
	450.000	7.10	0.0	12.14	0.
	460.000	7.33	0.0	11.72	0.
	470.000	7.52	0.0	15.23	0.
	480.000	7.72	0.0	14.90	0.
	490.000	7.91	0.0	13.23	0.
	500.000	8.07	0.0	13.59	0.
	510.000	8.23	0.0	12.87	0.
	520.000	8.40	0.0	11.89	0.
	530.000	8.57	0.0	11.34	0.
	540.000	8.75	0.0	10.84	0.
TR4	548.429	8.91	0.0	10.41	0.
S48 UI	549.129	8.91	0.0	10.38	0.
S2 RI	549.229	8.91	0.0	10.38	0.
S2 SEP	549.304	8.91	0.0	10.37	0.

TABLE 5-XII-B

MACH NUMBER, DYNAMIC PRESSURE, ANGLE OF ATTACK,
AND THE PRODUCT OF DYNAMIC PRESSURE AND ANGLE
OF ATTACK(ENGLISH UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	MACH	DYNAMIC PRESSURE (LB/(FT)SQ)	ANGLE OF ATTACK (DEG)	Q*ALPHA PRODUCT (LB*DEG/(FT)SQ)
GRR	-17.250	0.00	0.0	90.00	3.
1ST MOT	0.0	0.00	0.0	89.93	3.
TBI	0.398	0.00	0.0	75.95	2.
	10.000	0.07	6.8	4.65	32.
TIL INIT	11.375	0.08	9.2	4.76	44.
	20.000	0.16	34.7	2.41	84.
	30.000	0.27	94.8	1.15	109.
	40.000	0.42	195.2	0.51	100.
	50.000	0.61	336.3	0.33	110.
	60.000	0.86	502.9	0.61	307.
MACH 1	64.750	1.00	579.5	0.65	377.
	70.000	1.19	649.8	0.62	401.
	80.000	1.64	715.6	0.50	357.
MAX Q	80.125	1.64	715.5	0.49	353.
	90.000	2.19	627.4	0.24	148.
	100.000	2.72	421.6	0.07	28.
	110.000	3.33	256.3	0.30	77.
	120.000	3.97	139.2	0.01	2.
	130.000	4.66	69.8	0.02	1.
	134.000	4.96	52.3	0.21	11.
CECO	134.000	4.96	52.3	0.21	11.
	134.125	4.97	51.8	0.21	11.
	140.000	5.40	32.8	0.17	6.
	150.000	6.51	14.9	0.13	2.
MAX F/M	159.125	7.92	6.3	0.25	2.
TB3	159.924	8.05	5.8	0.23	1.
	160.000	8.07	5.7	0.22	1.
S2 UI	160.424	8.11	5.4	0.19	1.
SIC RI	160.624	8.12	5.3	0.17	1.
	160.694	8.13	5.2	0.17	1.
	160.694	8.13	5.2	0.17	1.
SIC SEP	160.694	8.13	5.2	0.17	1.
S2 IGN	162.324	8.20	4.1	0.04	0.
S2 90T	164.324	8.30	3.1	0.21	1.
S2 UTT	164.924	8.33	2.8	0.37	1.
	170.000	8.67	1.4	2.05	3.
	180.000	9.09	0.3	3.94	1.
	190.000	8.77	0.1	5.81	0.
INT J	190.624	8.75	0.1	5.92	0.
LET J	196.124	8.49	0.0	6.91	0.

TABLE 5-XII-B MACH NUMBER, DYNAMIC PRESSURE, ANGLE OF ATTACK,
AND THE PRODUCT OF DYNAMIC PRESSURE AND ANGLE
OF ATTACK(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	MACH	DYNAMIC PRESSURE (LB/(FT)SQ)	ANGLE OF ATTACK (DEG)	Q*ALPHA PRODUCT (LB*DEG/(FT)SQ)
	200.000	8.27	0.0	7.59	0.
IGM FN	200.524	8.24	0.0	7.68	0.
IGM ON	201.250	8.21	0.0	7.80	0.
	210.000	7.65	0.0	7.70	0.
	220.000	6.99	0.0	8.71	0.
TSMC1	222.250	6.74	0.0	8.91	0.
	230.000	6.10	0.0	9.57	0.
	240.000	5.59	0.0	10.34	0.
	250.000	5.25	0.0	11.06	0.
	260.000	5.03	0.0	11.71	0.
	270.000	4.89	0.0	12.24	0.
	280.000	4.84	0.0	12.71	0.
	290.000	4.83	0.0	13.13	0.
	300.000	4.87	0.0	13.50	0.
	310.000	4.93	0.0	13.79	0.
	320.000	5.01	0.0	14.02	0.
	330.000	5.11	0.0	14.18	0.
	340.000	5.23	0.0	14.28	0.
	350.000	5.35	0.0	14.33	0.
	360.000	5.48	0.0	14.32	0.
	370.000	5.62	0.0	14.24	0.
	380.000	5.77	0.0	14.13	0.
	390.000	5.93	0.0	13.96	0.
	400.000	6.10	0.0	13.75	0.
	410.000	6.28	0.0	13.50	0.
	420.000	6.47	0.0	13.21	0.
	430.000	6.67	0.0	12.89	0.
	440.000	6.88	0.0	12.53	0.
	450.000	7.10	0.0	12.14	0.
	460.000	7.33	0.0	11.72	0.
	470.000	7.52	0.0	15.23	0.
	480.000	7.72	0.0	14.90	0.
	490.000	7.91	0.0	13.23	0.
	500.000	8.07	0.0	13.59	0.
	510.000	8.23	0.0	12.87	0.
	520.000	8.40	0.0	11.89	0.
	530.000	8.57	0.0	11.34	0.
	540.000	8.75	0.0	10.84	0.
TR4	548.429	8.91	0.0	10.41	0.
S4B UT	549.129	8.91	0.0	10.38	0.
S2 RI	549.229	8.91	0.0	10.38	0.
S2 SEP	549.304	8.91	0.0	10.37	0.

TABLE 5-XIII-A

NORMAL-FORCE ANGLE, NORMAL FORCE, AXIAL
FORCE, AND AERODYNAMIC HEATING INDICATOR
(METRIC UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	NORMAL- FORCE ANGLE (DEG)	NORMAL FORCE (NEWTONS)	AXIAL FORCE (NEWTONS)	AERODYNAMIC HEATING INDICATOR (N*M/RAD*(M)SQ)
GRR	-17.250	-78.	0.	-0.	0.
1ST MOT	0.0	-78.	1408.	3400436.	0.
TRI	0.398	-78.	1403.	3252141.	45.
	10.000	-118.	10003.	26492.	12041.
TILINIT	11.375	-128.	13759.	29700.	21080.
	20.000	-142.	26785.	62761.	259632.
	30.000	-149.	35237.	136006.	1714813.
	40.000	165.	32452.	257715.	6889383.
	50.000	-137.	37190.	441383.	20802852.
	60.000	-100.	114181.	733418.	51683489.
	64.750	-96.	143187.	1166231.	75240048.
MACH 1	70.000	-94.	138313.	1477975.	109347126.
	80.000	-91.	110749.	1131272.	199001074.
MAX Q	80.125	-91.	109335.	1125887.	200317471.
	90.000	-87.	42182.	765507.	314486584.
	100.000	78.	8117.	405335.	427192709.
	110.000	93.	17924.	193160.	518345841.
	120.000	-123.	303.	96011.	583703593.
	130.000	-101.	184.	39950.	625483800.
	134.000	97.	1772.	25090.	637070132.
CECO	134.000	97.	1772.	25090.	637070132.
	134.125	96.	1829.	24609.	637394112.
	140.000	89.	899.	5535.	650031819.
	150.000	96.	295.	-11460.	663237451.
MAX F/M	159.125	94.	234.	-18273.	669461222.
TB3	159.924	95.	199.	-18638.	669809990.
	160.000	95.	194.	-2363.	669841724.
S2 UI	160.424	96.	157.	-2366.	670014236.
SIC RI	160.624	96.	139.	-2332.	670092311.
	160.694	97.	133.	-2317.	670119116.
	160.694	97.	133.	-2317.	670119116.
SIC SFP	160.694	97.	201.	2517.	670119116.
S2 IGN	162.324	133.	35.	1963.	670671295.
S2 90T	164.324	-102.	148.	1497.	671191608.
S2 UTT	164.924	-97.	236.	-13689.	671320965.
	170.000	-91.	605.	-14154.	672073784.
	180.000	-91.	218.	-14702.	672603249.
	190.000	-90.	65.	-14854.	672714127.
INT J	190.624	-90.	60.	-14853.	672716931.
LET J	196.124	-90.	33.	-7764.	672733530.

TABLE 5-XIII-A

 NORMAL-FORCE ANGLE, NORMAL FORCE, AXIAL
 FORCE, AND AERODYNAMIC HEATING INDICATOR
 (METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	NORMAL- FORCE ANGLE (DEG)	NORMAL FORCE (NEWTONS)	AXIAL FORCE (NEWTONS)	AERODYNAMIC HEATING INDICATOR (N*M/RAD*(M)SQ)
	200.000	-90.	22.	-7772.	672739750.
IGM EN	200.524	-90.	21.	-7773.	672740386.
IGM ON	201.250	-90.	20.	-7774.	672741205.
	210.000	-87.	7.	-7781.	672747208.
	220.000	-88.	3.	-7783.	672749864.
TSMC1	222.250	-88.	3.	-7783.	672750209.
	230.000	-88.	2.	-7784.	672751019.
	240.000	-88.	1.	-7784.	672751629.
	250.000	-88.	1.	-7784.	672752021.
	260.000	-89.	1.	-7784.	672752305.
	270.000	-89.	1.	-7784.	672752527.
	280.000	-89.	0.	-7784.	672752714.
	290.000	-89.	0.	-7784.	672752880.
	300.000	-89.	0.	-7784.	672753031.
	310.000	-89.	0.	-7784.	672753175.
	320.000	-90.	0.	-7784.	672753314.
	330.000	-90.	0.	-7784.	672753451.
	340.000	-90.	0.	-7784.	672753588.
	350.000	-90.	0.	-7784.	672753727.
	360.000	-90.	0.	-7784.	672753868.
	370.000	-90.	0.	-7784.	672754014.
	380.000	-90.	0.	-7784.	672754166.
	390.000	-90.	0.	-7784.	672754326.
	400.000	-91.	0.	-7784.	672754494.
	410.000	-91.	0.	-7784.	672754673.
	420.000	-91.	0.	-7784.	672754864.
	430.000	-91.	0.	-7784.	672755069.
	440.000	-91.	0.	-7784.	672755291.
	450.000	-91.	0.	-7784.	672755531.
	460.000	-91.	0.	-7784.	672755792.
	470.000	-92.	1.	-7784.	672756078.
	480.000	-92.	1.	-7784.	672756397.
	490.000	-92.	1.	-4003.	672756733.
	500.000	-92.	1.	-4003.	672757085.
	510.000	-92.	1.	-4003.	672757457.
	520.000	-92.	0.	-4003.	672757846.
	530.000	-92.	0.	-4003.	672758253.
	540.000	-92.	0.	-4003.	672758682.
TR4	548.429	-93.	0.	-4003.	672759059.
S4R UT	549.129	-93.	0.	0.	672759091.
S2 RI	549.229	-93.	0.	0.	672759096.
S2 SEP	549.304	-93.	0.	0.	672759099.

TABLE 5-XIII-B

 NORMAL-FORCE ANGLE, NORMAL FORCE, AXIAL
 FORCE, AND AERODYNAMIC HEATING INDICATOR
 (ENGLISH UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	NORMAL- FORCE ANGLE (DEG)	NORMAL FORCE (POUNDS)	AXIAL FORCE (POUNDS)	AERODYNAMIC HEATING INDICATOR (FT*LB/RAD*(FT)SQ)
GRR	-17.250	-78.	0.	-0.	0.
1ST MOT	0.0	-78.	316.	764448.	0.
TBI	0.398	-78.	315.	731110.	3.
	10.000	-118.	2249.	5956.	825.
TILINIT	11.375	-128.	3093.	6677.	1444.
	20.000	-142.	6021.	14109.	17790.
	30.000	-149.	7922.	30575.	117502.
	40.000	165.	7295.	57937.	472073.
	50.000	-137.	8361.	99227.	1425448.
	60.000	-100.	25669.	164879.	3541444.
MACH 1	64.750	-96.	32190.	262179.	5155581.
	70.000	-94.	31094.	332262.	7492658.
	80.000	-91.	24897.	254320.	13635905.
MAX Q	80.125	-91.	24580.	253109.	13726107.
	90.000	-87.	9483.	172093.	21549176.
	100.000	78.	1825.	91123.	29271999.
	110.000	93.	4030.	43424.	35517972.
	120.000	-123.	68.	21584.	39996401.
	130.000	-101.	41.	8981.	42859254.
	134.000	97.	398.	5640.	43653170.
CECO	134.000	97.	398.	5640.	43653170.
	134.125	96.	411.	5532.	43675370.
	140.000	89.	202.	1244.	44541328.
	150.000	96.	66.	-2576.	45446201.
MAX F/M	159.125	94.	53.	-4108.	45872665.
TB3	159.924	95.	45.	-4190.	45896563.
	160.000	95.	44.	-531.	45898738.
S2 UT	160.424	96.	35.	-532.	45910558.
SIC RI	160.624	96.	31.	-524.	45915908.
	160.694	97.	30.	-521.	45917745.
	160.694	97.	30.	-521.	45917745.
SIC SEP	160.694	97.	45.	566.	45917745.
S2 IGN	162.324	133.	8.	441.	45955581.
S2 90T	164.324	-102.	33.	336.	45991234.
S2 UTT	164.924	-97.	53.	-3077.	46000098.
	170.000	-91.	136.	-3182.	46051682.
	180.000	-91.	49.	-3305.	46087962.
	190.000	-90.	15.	-3339.	46095560.
INT J	190.624	-90.	14.	-3339.	46095752.
LET J	196.124	-90.	7.	-1745.	46096889.

TABLE 5-XIII-B

NORMAL-FORCE ANGLE, NORMAL FORCE, AXIAL
FORCE, AND AERODYNAMIC HEATING INDICATOR
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	NORMAL- FORCE ANGLE (DEG)	NORMAL FORCE (POUNDS)	AXIAL FORCE (POUNDS)	AERODYNAMIC HEATING INDICATOR (FT*LB/RAD*(FT) ²)
	200.000	-90.	5.	-1747.	46097315.
IGM FN	200.524	-90.	5.	-1747.	46097359.
IGM ON	201.250	-90.	4.	-1748.	46097415.
	210.000	-87.	2.	-1749.	46097826.
	220.000	-88.	1.	-1750.	46098008.
TSMC1	222.250	-88.	1.	-1750.	46098032.
	230.000	-88.	0.	-1750.	46098088.
	240.000	-88.	0.	-1750.	46098129.
	250.000	-88.	0.	-1750.	46098156.
	260.000	-89.	0.	-1750.	46098176.
	270.000	-89.	0.	-1750.	46098191.
	280.000	-89.	0.	-1750.	46098204.
	290.000	-89.	0.	-1750.	46098215.
	300.000	-89.	0.	-1750.	46098225.
	310.000	-89.	0.	-1750.	46098235.
	320.000	-90.	0.	-1750.	46098245.
	330.000	-90.	0.	-1750.	46098254.
	340.000	-90.	0.	-1750.	46098264.
	350.000	-90.	0.	-1750.	46098273.
	360.000	-90.	0.	-1750.	46098283.
	370.000	-90.	0.	-1750.	46098293.
	380.000	-90.	0.	-1750.	46098303.
	390.000	-90.	0.	-1750.	46098314.
	400.000	-91.	0.	-1750.	46098326.
	410.000	-91.	0.	-1750.	46098338.
	420.000	-91.	0.	-1750.	46098351.
	430.000	-91.	0.	-1750.	46098365.
	440.000	-91.	0.	-1750.	46098380.
	450.000	-91.	0.	-1750.	46098397.
	460.000	-91.	0.	-1750.	46098415.
	470.000	-92.	0.	-1750.	46098434.
	480.000	-92.	0.	-1750.	46098456.
	490.000	-92.	0.	-900.	46098479.
	500.000	-92.	0.	-900.	46098503.
	510.000	-92.	0.	-900.	46098529.
	520.000	-92.	0.	-900.	46098555.
	530.000	-92.	0.	-900.	46098583.
	540.000	-92.	0.	-900.	46098613.
TR4	548.429	-93.	0.	-900.	46098639.
S48 UT	549.129	-93.	0.	0.	46098641.
S2 RI	549.229	-93.	0.	0.	46098641.
S2 SEP	549.304	-93.	0.	0.	46098641.

TABLE 5-XIV

COMMANDED ATTITUDE CONTROL SIGNALS

EVENT	TIME FROM 1ST MOT (SEC)	COMMANDED CONTROL SIGNALS		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)
GRR	-17.250	0.0	0.0	0.0
1ST MOT	0.0	-0.030	0.0	-0.000
TR1	0.398	-0.030	-0.002	-0.000
	10.000	-0.057	0.248	-0.000
TIL INIT	11.375	0.030	0.111	-0.000
	20.000	0.032	0.002	-0.000
	30.000	0.045	-0.029	0.000
	40.000	0.010	-0.029	0.000
	50.000	0.021	-0.025	0.000
	60.000	0.019	-0.019	0.000
MACH 1	64.750	0.013	-0.018	0.000
	70.000	0.035	-0.022	0.000
	80.000	0.105	-0.021	0.000
MAX Q	80.125	0.105	-0.021	0.000
	90.000	0.044	-0.019	0.000
	100.000	0.001	-0.020	-0.000
	110.000	-0.054	-0.025	-0.000
	120.000	-0.004	-0.023	-0.000
	130.000	-0.006	-0.024	-0.000
	134.000	-0.020	-0.026	-0.000
CFCD	134.000	-0.020	-0.026	-0.000
	134.125	-0.021	-0.026	-0.000
	140.000	-0.004	-0.019	-0.000
	150.000	-0.004	-0.021	-0.000
MAX F/M	159.125	-0.032	-0.021	-0.000
TR3	159.924	-0.039	-0.021	-0.000
	160.000	-0.039	-0.021	-0.000
S2 UI	160.424	-0.038	-0.021	-0.000
SIC RI	160.624	-0.039	-0.021	-0.000
	160.694	-0.040	-0.021	-0.000
	160.694	-0.040	-0.021	-0.000
SIC SEP	160.694	-0.492	-0.075	-0.000
S2 IGN	162.324	-0.712	-0.092	-0.000
S2 90T	164.324	-0.659	-0.110	-0.002
S2 UTT	164.924	-0.450	-0.103	-0.002
	170.000	0.139	-0.075	0.000
	180.000	0.028	-0.081	0.000
	190.000	0.021	-0.083	-0.000
INT J	190.624	0.022	-0.082	-0.000
LFT J	196.124	0.026	-0.079	-0.000

TABLE 5-XIV
(CONTINUED)

COMMANDED ATTITUDE CONTROL SIGNALS

EVENT	TIME FROM 1ST MOT (SFC)	COMMANDED CONTROL SIGNALS		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)
	200.000	0.026	-0.083	-0.000
IGM EN	200.524	0.026	-0.083	-0.000
IGM ON	201.250	0.149	-0.115	-0.000
	210.000	0.079	-0.091	0.000
	220.000	0.030	-0.084	-0.000
TSMC I	222.250	0.023	-0.066	-0.000
	230.000	0.027	-0.086	-0.000
	240.000	0.028	-0.088	-0.000
	250.000	0.028	-0.089	-0.000
	260.000	0.028	-0.091	-0.000
	270.000	0.026	-0.092	-0.000
	280.000	0.027	-0.095	-0.000
	290.000	0.026	-0.096	-0.000
	300.000	0.027	-0.097	-0.000
	310.000	0.026	-0.099	-0.000
	320.000	0.026	-0.101	-0.000
	330.000	0.025	-0.103	-0.000
	340.000	0.025	-0.104	-0.000
	350.000	0.025	-0.106	-0.000
	360.000	0.024	-0.110	-0.000
	370.000	0.023	-0.109	-0.000
	380.000	0.022	-0.111	-0.000
	390.000	0.022	-0.113	-0.000
	400.000	0.021	-0.114	-0.000
	410.000	0.021	-0.116	-0.000
	420.000	0.020	-0.118	-0.000
	430.000	0.020	-0.120	-0.000
	440.000	0.019	-0.121	-0.000
	450.000	0.019	-0.122	-0.000
	460.000	0.018	-0.119	-0.000
	470.000	0.133	-0.103	0.001
	480.000	0.023	-0.099	0.000
	490.000	-0.040	-0.109	-0.000
	500.000	0.032	-0.110	0.001
	510.000	-0.013	-0.109	-0.000
	520.000	-0.014	-0.109	-0.000
	530.000	-0.011	-0.110	-0.000
	540.000	-0.010	-0.110	0.000
TR4	548.429	-0.010	-0.111	0.000
S4B UT	549.129	-0.041	-0.111	-0.000

TABLE 5-XIV
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	COMMANDED CONTROL SIGNALS			
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)	
S2 RI	549.229	-0.045	-0.111	-0.000	
	549.304	-0.049	-0.111	-0.000	
	549.304	-0.049	-0.111	-0.000	
S2 SFP	549.304	-0.048	-0.204	-0.002	
	550.000	-0.105	-0.207	-0.004	
S4B IGN	552.429	-0.278	-0.211	-0.029	
S4B 90T	554.929	-0.100	-0.203	-0.348	
IGM 3S	556.500	0.296	-0.179	-0.544	
S4B UTT	556.929	0.568	-0.141	-0.468	
	560.000	0.317	-0.256	0.983	
S4B UCJ	561.229	-0.399	-0.268	0.580	
	563.500	-0.228	-0.213	-0.559	
TSMC2	570.000	0.263	-0.206	-0.668	
	580.000	0.122	-0.199	-0.963	
	590.000	0.127	-0.202	-0.781	
	600.000	0.120	-0.203	-0.726	
	610.000	0.126	-0.205	-0.795	
	620.000	0.135	-0.208	-0.694	
	630.000	0.124	-0.208	-0.800	
	640.000	0.129	-0.210	-0.709	
	650.000	0.138	-0.214	-0.848	
	660.000	0.167	-0.214	-0.872	
	670.000	0.130	-0.215	-0.714	
	680.000	0.134	-0.221	-0.819	
	S4BGCS1	685.654	0.130	-0.218	-1.000
		685.864	0.145	-0.236	-0.791
	TR5	685.864	0.143	-0.233	-0.787
686.164		0.143	-0.233	-0.787	
S4B LUT	690.000	0.129	-0.206	-0.727	
	695.654	0.113	-0.172	-0.638	
PO INS	695.654	0.113	-0.172	-0.638	
	695.750	0.113	-0.172	-0.637	
	700.000	0.102	-0.149	-0.570	
	700.750	0.101	-0.146	-0.559	
	705.864	0.090	-0.122	-0.479	
	705.864	0.090	-0.122	-0.479	
	706.750	0.090	-0.122	-0.479	
ORB GID	706.750	0.090	-0.122	-0.479	

(COMMANDED CONTROL SIGNALS
ARE ZERO FOR THIS PERIOD
OF FLIGHT)

3-D SIMULATION

TABLE 5-XV

VEHICLE BODY ROTATION RATES

EVENT	TIME FROM 1ST MOT (SEC)	BODY ROTATION RATES		
		X (DEG/SEC)	Y (DEG/SEC)	Z (DEG/SEC)
GRR	-17.250	0.0	-0.0	-0.0
1ST MOT	0.0	0.002	-0.004	-0.0
TBI	0.398	0.000	0.006	-0.005
	10.000	0.001	0.032	-0.155
TILINIT	11.375	-0.001	0.097	-0.455
	20.000	1.000	-0.185	0.007
	30.000	-0.005	-0.423	0.004
	40.000	0.000	-0.577	0.001
	50.000	0.000	-0.621	0.001
	60.000	0.000	-0.636	0.001
MACH 1	64.750	0.000	-0.629	-0.001
	70.000	0.000	-0.618	-0.001
	80.000	0.000	-0.662	0.001
MAX Q	80.125	0.000	-0.664	0.001
	90.000	0.001	-0.720	-0.000
	100.000	-0.000	-0.479	-0.000
	110.000	0.000	-0.462	-0.006
	120.000	0.000	-0.329	0.001
	130.000	0.000	-0.298	-0.000
	134.000	0.000	-0.321	-0.006
CFCO	134.000	0.000	-0.321	-0.006
	134.125	0.000	-0.317	-0.006
	140.000	0.000	-0.242	0.002
	150.000	0.000	-0.249	-0.001
MAX F/M	159.125	0.001	-0.225	-0.000
TB3	159.924	0.000	-0.150	-0.000
	160.000	0.000	-0.143	-0.000
S2 UT	160.424	0.000	-0.121	-0.000
SIC RI	160.624	0.000	-0.119	-0.000
	160.694	0.000	-0.119	-0.000
	160.694	0.000	-0.119	-0.000
SIC SEP	160.694	0.000	-0.119	-0.000
S2 IGN	162.324	0.000	-0.120	-0.006
S2 90T	164.324	0.007	0.014	-0.006
S2 UTT	164.924	0.003	0.103	-0.001
	170.000	0.001	0.024	0.003
	180.000	0.000	0.001	-0.000
	190.000	0.000	-0.000	-0.000
INT J	190.624	0.000	0.000	0.000
LET J	196.124	0.000	-0.000	-0.000

TABLE 5-XV VEHICLE BODY ROTATION RATES
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	BODY ROTATION RATES		
		X (DEG/SEC)	Y (DEG/SEC)	Z (DEG/SEC)
	200.000	0.000	-0.000	-0.000
IGM EN	200.524	-0.000	-0.000	-0.000
IGM ON	201.250	-0.000	-0.000	-0.000
	210.000	-0.001	-0.016	-0.012
	220.000	-0.000	-0.071	-0.001
TSMC1	222.250	-0.000	-0.068	-0.012
	230.000	-0.000	-0.078	0.012
	240.000	-0.000	-0.074	0.003
	250.000	-0.000	-0.074	0.001
	260.000	-0.001	-0.076	-0.000
	270.000	-0.001	-0.083	-0.001
	280.000	-0.001	-0.079	-0.002
	290.000	-0.000	-0.080	-0.001
	300.000	-0.000	-0.080	-0.002
	310.000	-0.000	-0.082	-0.002
	320.000	-0.000	-0.084	-0.002
	330.000	-0.000	-0.085	-0.002
	340.000	-0.000	-0.086	-0.002
	350.000	-0.000	-0.088	-0.002
	360.000	-0.000	-0.092	0.008
	370.000	-0.000	-0.091	0.000
	380.000	-0.000	-0.092	-0.001
	390.000	-0.000	-0.093	-0.002
	400.000	-0.000	-0.094	-0.001
	410.000	-0.000	-0.095	-0.002
	420.000	-0.000	-0.096	-0.002
	430.000	-0.000	-0.097	-0.002
	440.000	-0.000	-0.097	-0.002
	450.000	-0.000	-0.098	-0.002
	460.000	-0.000	-0.098	0.004
	470.000	-0.000	0.260	-0.021
	480.000	0.001	-0.209	0.002
	490.000	0.002	-0.224	-0.002
	500.000	-0.002	0.046	-0.005
	510.000	0.001	-0.185	0.004
	520.000	0.000	-0.125	0.001
	530.000	0.000	-0.104	0.000
	540.000	0.000	-0.106	-0.000
TR4	548.429	0.000	-0.109	-0.001
S4B UI	549.129	0.000	-0.106	-0.001

TABLE 5-XV
(CONTINUED)

VEHICLE BODY ROTATION RATES

EVENT	TIME FROM 1ST MOT (SEC)	BODY ROTATION RATES		
		X (DEG/SEC)	Y (DEG/SEC)	Z (DEG/SEC)
S2 RI	549.229	0.000	-0.106	-0.001
	549.304	0.000	-0.105	-0.001
	549.304	0.000	-0.105	-0.001
S2 SEP	549.304	0.000	-0.105	-0.001
	550.000	0.001	-0.103	-0.003
S4B IGN	552.429	0.005	-0.087	-0.002
S4B 90T	554.929	0.058	0.141	0.005
TGM 3S	556.500	0.075	0.192	0.006
S4B UTT	556.929	0.054	0.104	-0.005
	560.000	-0.175	-1.102	-0.089
S4B UCJ	561.229	-0.065	-0.914	-0.033
TSMC2	563.500	0.143	-0.088	0.033
	570.000	0.027	-0.200	0.035
	580.000	0.032	-0.057	0.011
	590.000	0.004	-0.069	0.005
	600.000	-0.027	-0.092	0.003
	610.000	0.005	-0.075	-0.001
	620.000	-0.022	-0.082	-0.002
	630.000	0.013	-0.058	-0.005
	640.000	-0.014	-0.065	-0.004
	650.000	0.013	-0.071	-0.003
	660.000	0.023	0.071	-0.003
	670.000	-0.017	0.011	-0.003
	680.000	0.011	0.005	-0.004
	S4BGCS1	685.654	0.026	0.000
TR5	685.864	-0.016	-0.003	0.006
S4B LUT	686.164	-0.016	-0.003	0.007
	690.000	-0.016	-0.003	0.007
	695.654	-0.016	-0.003	0.006
PD INS	695.654	-0.016	-0.003	0.006
	695.750	-0.016	-0.003	0.006
	700.000	-0.016	-0.003	0.006
	700.750	-0.016	-0.003	0.006
	705.864	-0.016	-0.002	0.005
	705.864	-0.016	-0.002	0.005
	706.750	-0.016	-0.002	0.005
ORB GID	706.750	-0.016	-0.002	0.005

(BODY ROTATION RATES ARE
NOT CALCULATED DURING THIS
PERIOD OF FLIGHT)

3-D SIMULATION

TABLE 5-XVI-A

VEHICLE POSITION - INERTIAL COORDINATES
(METRIC UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
GRR	-17.250	6373326.	17578.	-3720.
1ST MOT	0.0	6373322.	19035.	3175.
TBI	0.398	6373322.	19069.	3335.
	10.000	6373426.	19883.	7173.
TILINIT	11.375	6373460.	20002.	7722.
	20.000	6373801.	20745.	11171.
	30.000	6374517.	21602.	15196.
	40.000	6375657.	22454.	19325.
	50.000	6377302.	23301.	23699.
	60.000	6379531.	24143.	28503.
MACH 1	64.750	6380813.	24542.	30995.
	70.000	6382404.	24981.	33946.
	80.000	6385960.	25814.	40260.
MAX Q	80.125	6386009.	25824.	40346.
	90.000	6390252.	26643.	47727.
	100.000	6395291.	27468.	56693.
	110.000	6401072.	28288.	67510.
	120.000	6407598.	29102.	80529.
	130.000	6414899.	29909.	96114.
	134.000	6418048.	30229.	103157.
CFCO	134.000	6418048.	30229.	103157.
	134.125	6418149.	30239.	103385.
	140.000	6422964.	30707.	114569.
	150.000	6431546.	31498.	135781.
MAX F/M	159.125	6439830.	32212.	157818.
TR3	159.924	6440577.	32274.	159881.
	160.000	6440648.	32280.	160078.
S2 UI	160.424	6441046.	32313.	161182.
SIC RI	160.624	6441233.	32329.	161703.
	160.694	6441298.	32334.	161886.
	160.694	6441298.	32334.	161886.
SIC SFP	160.694	6441302.	32334.	161894.
S2 IGN	162.324	6442813.	32461.	166144.
S2 90T	164.324	6444633.	32616.	171360.
S2 UTT	164.924	6445173.	32662.	172928.
	170.000	6449638.	33055.	186274.
	180.000	6457944.	33825.	213079.
	190.000	6465614.	34589.	240590.
INT J	190.624	6466072.	34637.	242331.
LFT J	196.124	6470003.	35054.	257795.

TABLE 5-XVI-A

VEHICLE POSITION - INERTIAL COORDINATES
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
	200.000	6472661.	35348.	268826.
IGM FN	200.524	6473013.	35387.	270327.
IGM DN	201.250	6473498.	35442.	272408.
	210.000	6479093.	36101.	297808.
	220.000	6484901.	36854.	327557.
TSMC1	222.250	6486122.	37024.	334358.
	230.000	6490085.	37607.	358088.
	240.000	6494642.	38359.	389420.
	250.000	6498571.	39112.	421572.
	260.000	6501868.	39866.	454561.
	270.000	6504531.	40620.	488410.
	280.000	6506556.	41375.	523140.
	290.000	6507938.	42131.	558776.
	300.000	6508672.	42887.	595341.
	310.000	6508752.	43643.	632859.
	320.000	6508173.	44399.	671359.
	330.000	6506927.	45154.	710866.
	340.000	6505006.	45908.	751411.
	350.000	6502400.	46660.	793023.
	360.000	6499101.	47411.	835736.
	370.000	6495096.	48158.	879584.
	380.000	6490374.	48901.	924604.
	390.000	6484921.	49641.	970833.
	400.000	6478722.	50378.	1018314.
	410.000	6471761.	51110.	1067090.
	420.000	6464020.	51838.	1117208.
	430.000	6455479.	52561.	1168718.
	440.000	6446118.	53278.	1221675.
	450.000	6435912.	53988.	1276137.
	460.000	6424836.	54692.	1332166.
	470.000	6412869.	55389.	1389634.
	480.000	6400064.	56075.	1448410.
	490.000	6386419.	56748.	1508526.
	500.000	6371882.	57409.	1569753.
	510.000	6356440.	58058.	1632010.
	520.000	6340071.	58695.	1695325.
	530.000	6322741.	59319.	1759724.
	540.000	6304424.	59931.	1825237.
TR4	548.429	6288200.	60438.	1881344.
S4B UI	549.129	6286820.	60479.	1886039.

TABLE 5-XVI-A

VEHICLE POSITION - INERTIAL COORDINATES
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
S2 RI	549.229	6286622.	60485.	1886710.
	549.304	6286474.	60490.	1887213.
	549.304	6286474.	60490.	1887213.
S2 SEP	549.304	6286473.	60490.	1887219.
	550.000	6285095.	60531.	1891890.
	552.429	6280253.	60675.	1908167.
S4B IGN	554.929	6275215.	60823.	1924911.
S4B 90T	556.500	6272018.	60916.	1935439.
IGM 3S	556.929	6271142.	60941.	1938312.
S4B UTT	560.000	6264814.	61121.	1958915.
	561.229	6262258.	61193.	1967164.
	563.500	6257493.	61325.	1982425.
S4B UGJ	570.000	6243579.	61700.	2026175.
	580.000	6221362.	62267.	2093709.
	590.000	6198154.	62825.	2161511.
TSMC2	600.000	6173949.	63375.	2229579.
	610.000	6148740.	63917.	2297910.
	620.000	6122522.	64451.	2366498.
S4B GCS1	630.000	6095298.	64976.	2435343.
	640.000	6067032.	65492.	2504440.
	650.000	6037749.	65999.	2573786.
T85	660.000	6007430.	66494.	2643379.
	670.000	5976064.	66979.	2713214.
	680.000	5943655.	67454.	2783290.
S4B LUI	685.654	5924869.	67717.	2823019.
	685.864	5924165.	67727.	2824497.
	686.164	5923159.	67740.	2826606.
PD INS	690.000	5910222.	67917.	2853554.
	695.654	5890928.	68175.	2893167.
	695.654	5890928.	68175.	2893167.
ORB GID	695.750	5890599.	68179.	2893838.
	700.000	5875919.	68371.	2923526.
	700.750	5873313.	68405.	2928757.
LH2VTO	705.864	5855417.	68634.	2964368.
	705.864	5855417.	68634.	2964368.
	706.750	5852296.	68673.	2970525.
S4BLUCD	744.864	5711893.	70305.	3232243.
	772.864	5601274.	71423.	3420325.
	794.750	5510489.	72249.	3564718.
ORB NAV	900.000	5023056.	75610.	4223808.

TABLE 5-XVI-A VEHICLE POSITION - INERTIAL COORDINATES
(CONTINUED)
(METRIC UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
	1002.750	4471495.	77877.	4803762.
	1100.000	3888010.	79064.	5287006.
	1300.000	2534413.	78486.	6053320.
	1306.750	2485787.	78395.	6073441.
	1500.000	1038218.	73830.	6479541.
	1602.750	241297.	69899.	6557600.
	1700.000	-516512.	65264.	6541526.
	1900.000	-2042317.	53158.	6235620.
	1906.750	-2092280.	52694.	6219022.
	2100.000	-3453293.	38079.	5578920.
	2202.750	-4107254.	29409.	5116430.
	2300.000	-4669972.	20759.	4608343.
	2500.000	-5623858.	2061.	3378533.
	2506.750	-5650785.	1417.	3333289.
	2700.000	-6261313.	-17060.	1958747.
	2802.750	-6453340.	-26725.	1181198.
	2900.000	-6546575.	-35612.	428893.
	3100.000	-6463736.	-52609.	-1125002.
	3106.750	-6454516.	-53145.	-1176828.
	3300.000	-6017581.	-67133.	-2615642.
	3402.750	-5654522.	-73364.	-3329322.
	3500.000	-5233283.	-78376.	-3959351.
	3700.000	-4154962.	-85685.	-5080747.
	3706.750	-4114115.	-85857.	-5113930.
	3900.000	-2843212.	-88604.	-5916942.
	4002.750	-2102130.	-88311.	-6219654.
	4100.000	-1371708.	-86899.	-6421069.
	4300.000	176922.	-80575.	-6564910.
	4306.750	229509.	-80284.	-6563326.
	4500.000	1715740.	-69884.	-6340495.
	4602.750	2474199.	-62844.	-6085346.
	4700.000	3158402.	-55314.	-5760548.
	4900.000	4424030.	-37566.	-4857749.
	4906.750	4462783.	-36921.	-4822201.
	5100.000	5441757.	-17526.	-3682862.
	5202.750	5849035.	-6669.	-2994448.
	5300.000	6154688.	3782.	-2301833.
	5500.000	6523036.	25249.	-792062.
	5506.750	6529156.	25963.	-739848.
	5700.000	6526292.	45739.	761942.

TABLE 5-XVI-A

VEHICLE POSITION - INERTIAL COORDINATES
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
	5802.750	6385141.	55521.	1549151.
	5900.000	6164316.	64143.	2273254.
	6100.000	5457322.	79445.	3657345.
	6106.750	5427857.	79897.	3700894.
	6300.000	4444759.	90774.	4836742.
	6402.750	3823561.	94819.	5340963.
	6500.000	3183166.	97451.	5745329.
	6700.000	1743073.	99036.	6332045.
	6706.750	1692288.	98998.	6345785.
	6900.000	205116.	95350.	6563789.
	7002.750	-595050.	91428.	6539694.
	7100.000	-1344454.	86494.	6427346.
	7300.000	-2818626.	72852.	5930203.
	7306.750	-2866064.	72315.	5907405.
	7500.000	-4134561.	55071.	5100174.
	7602.750	-4724526.	44608.	4558808.
	7700.000	-5218310.	34038.	3983848.
	7900.000	-6009011.	10828.	2643942.
	7906.750	-6030009.	10020.	2595682.
	8100.000	-6462329.	-13345.	1155727.
	8202.750	-6554976.	-25719.	360510.
	8300.000	-6552923.	-37192.	-397249.
	8500.000	-6275831.	-59422.	-1927874.
	8506.750	-6260193.	-60130.	-1978116.
	8700.000	-5646702.	-78809.	-3350359.
	8802.750	-5197385.	-87300.	-4012780.
	8900.000	-4700888.	-94257.	-4585024.
	9100.000	-3491454.	-104867.	-5562739.
	9106.750	-3446803.	-105132.	-5590560.
	9300.000	-2086218.	-109983.	-6228782.
	9402.750	-1313492.	-110343.	-6436874.
	9500.000	-563953.	-109238.	-6545902.
	9700.000	990021.	-102575.	-6496421.
	9706.750	1041988.	-102249.	-6488331.
1ST OPP	9900.000	2488639.	-90259.	-6083227.
	10002.750	3209432.	-81910.	-5736329.
	10100.000	3847993.	-72867.	-5329604.
	10300.000	4992054.	-51261.	-4277891.
	10306.750	5026113.	-50471.	-4237850.
	10500.000	5856920.	-26546.	-2987064.

TABLE 5-XVI-A

VEHICLE POSITION - INERTIAL COORDINATES
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
	10602.750	6176268.	-13054.	-2254054.
	10700.000	6394365.	-12.	-1529393.
	10900.000	6574474.	26930.	13624.
	10906.750	6574143.	27829.	66175.
	11100.000	6387256.	52826.	1555800.
	11202.750	6150844.	65257.	2319574.
	11300.000	5843162.	76254.	3011026.
	11500.000	4972498.	95904.	4298015.
	11506.750	4937942.	96487.	4337631.
	11700.000	3823775.	110646.	5344792.
	11802.750	3145850.	116014.	5769430.
	11900.000	2461066.	119600.	6092695.
	12100.000	960493.	122183.	6499682.
	12106.750	908422.	122155.	6507142.
	12300.000	-593984.	118152.	6542741.
	12402.750	-1385164.	113532.	6421678.
	12500.000	-2115260.	107621.	6219259.
	12700.000	-3518002.	91063.	5547227.
	12706.750	-3562319.	90408.	5518857.
	12900.000	-4723495.	69290.	4564266.
	13002.750	-5243533.	56428.	3955716.
	13100.000	-5664113.	43414.	3325501.
	13300.000	-6287144.	14790.	1900423.
	13306.750	-6302164.	13794.	1850000.
	13500.000	-6557747.	-15056.	368946.
	13602.750	-6554012.	-30340.	-431363.
	13700.000	-6460872.	-44509.	-1183115.
	13900.000	-6002060.	-71952.	-2669864.
	13906.750	-5980511.	-72825.	-2716849.
	14100.000	-5207093.	-95853.	-4005175.
	14202.750	-4681805.	-106302.	-4608795.
	14300.000	-4120533.	-114851.	-5117318.
	14500.000	-2803233.	-127837.	-5943122.
	14506.750	-2755591.	-128159.	-5965402.
	14700.000	-1328939.	-134010.	-6436446.
2ND OPP	14802.750	-537140.	-134376.	-6550850.
	14900.000	219827.	-132936.	-6569762.
	15100.000	1756395.	-124571.	-6335715.
	15106.750	1807014.	-124165.	-6321506.
	15300.000	3194822.	-109272.	-5747526.

TABLE 5-XVI-B

VEHICLE POSITION - INERTIAL COORDINATES
(ENGLISH UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
GRR	-17.250	20909861.	57672.	-12205.
1ST MOT	0.0	20909849.	62452.	10418.
TBI	0.398	20909848.	62562.	10940.
	10.000	20910191.	65233.	23533.
TILINIT	11.375	20910302.	65622.	25336.
	20.000	20911420.	68062.	36650.
	30.000	20913771.	70874.	49856.
	40.000	20917509.	73669.	63401.
	50.000	20922908.	76447.	77754.
	60.000	20930220.	79210.	93514.
MACH 1	64.750	20934427.	80517.	101690.
	70.000	20939645.	81958.	111371.
	80.000	20951311.	84692.	132087.
MAX Q	80.125	20951472.	84726.	132368.
	90.000	20965393.	87412.	156586.
	100.000	20981926.	90118.	185999.
	110.000	21000893.	92809.	221490.
	120.000	21022303.	95479.	264203.
	130.000	21046257.	98125.	315334.
	134.000	21056589.	99177.	338442.
CFCD	134.000	21056589.	99177.	338442.
	134.125	21056919.	99210.	339191.
	140.000	21072718.	100745.	375882.
	150.000	21100872.	103340.	445477.
MAX F/M	159.125	21128051.	105682.	517774.
TB3	159.924	21130502.	105886.	524544.
	160.000	21130735.	105906.	525191.
S2 UI	160.424	21132040.	106014.	528813.
SIC RI	160.624	21132654.	106065.	530523.
	160.694	21132869.	106083.	531122.
	160.694	21132869.	106083.	531122.
SIC SEP	160.694	21132980.	106083.	531150.
S2 IGN	162.324	21137837.	106498.	545091.
S2 90T	164.324	21143809.	107007.	562206.
S2 UTT	164.924	21145579.	107160.	567349.
	170.000	21160229.	108449.	611134.
	180.000	21187480.	110975.	699077.
	190.000	21212645.	113482.	789337.
INT J	190.624	21214148.	113638.	795049.
LFT J	196.124	21227044.	115008.	845785.

TABLE 5-XVI-B

VEHICLE POSITION - INERTIAL COORDINATES
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
	200.000	21235764.	115970.	881976.
IGM FN	200.524	21236920.	116100.	886899.
IGM ON	201.250	21238512.	116280.	893727.
	210.000	21256865.	118442.	977062.
	220.000	21275921.	120913.	1074662.
TSMC1	222.250	21279927.	121469.	1096974.
	230.000	21292929.	123383.	1174831.
	240.000	21307882.	125851.	1277626.
	250.000	21320771.	128321.	1383109.
	260.000	21331589.	130793.	1491342.
	270.000	21340326.	133268.	1602394.
	280.000	21346969.	135745.	1716339.
	290.000	21351502.	138224.	1833254.
	300.000	21353910.	140705.	1953217.
	310.000	21354174.	143185.	2076310.
	320.000	21352274.	145665.	2202620.
	330.000	21348185.	148142.	2332237.
	340.000	21341882.	150616.	2465258.
	350.000	21333334.	153085.	2601782.
	360.000	21322509.	155547.	2741917.
	370.000	21309371.	157997.	2885775.
	380.000	21293879.	160437.	3033476.
	390.000	21275989.	162865.	3185148.
	400.000	21255651.	165281.	3340925.
	410.000	21232813.	167683.	3500951.
	420.000	21207415.	170071.	3665380.
	430.000	21179394.	172443.	3834378.
	440.000	21148680.	174795.	4008121.
	450.000	21115196.	177127.	4186801.
	460.000	21078859.	179436.	4370623.
	470.000	21039598.	181721.	4559167.
	480.000	20997585.	183972.	4752000.
	490.000	20952817.	186180.	4949232.
	500.000	20905124.	188350.	5150108.
	510.000	20854461.	190479.	5354364.
	520.000	20800758.	192567.	5562089.
	530.000	20743902.	194616.	5773372.
	540.000	20683807.	196625.	5988312.
TR4	548.429	20630577.	198287.	6172388.
S4R UI	549.129	20626048.	198423.	6187793.

TABLE 5-XVI-B

VEHICLE POSITION - INERTIAL COORDINATES
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS			
		X (FEET)	Y (FEET)	Z (FEET)	
S2 RI	549.229	20625400.	198443.	6189993.	
	549.304	20624914.	198457.	6191644.	
	549.304	20624914.	198457.	6191644.	
S2 SEP	549.304	20624912.	198458.	6191664.	
	550.000	20620389.	198593.	6206987.	
S4B IGN	552.429	20604506.	199066.	6260391.	
S4B 90T	554.929	20587975.	199551.	6315324.	
IGM 3S	556.500	20577487.	199855.	6349867.	
S4B UTT	556.929	20574613.	199938.	6359292.	
	560.000	20553852.	200529.	6426886.	
S4B UCJ	561.229	20545466.	200764.	6453949.	
	563.500	20529833.	201198.	6504018.	
TSMC2	570.000	20484182.	202426.	6647556.	
	580.000	20411292.	204287.	6869124.	
	590.000	20335150.	206119.	7091573.	
	600.000	20255737.	207924.	7314893.	
	610.000	20173032.	209703.	7539074.	
	620.000	20087015.	211454.	7764102.	
	630.000	19997665.	213177.	7989970.	
	640.000	19904961.	214870.	8216666.	
	650.000	19808887.	216531.	8444180.	
	660.000	19709415.	218157.	8672503.	
	670.000	19606510.	219749.	8901620.	
	680.000	19500181.	221305.	9131529.	
	S4B GCS1	685.654	19438547.	222168.	9261875.
		685.864	19436237.	222200.	9266721.
	TB5	685.864	19432935.	222245.	9273643.
	S4B LUT	686.164	19390491.	222824.	9362053.
690.000		19327193.	223670.	9492019.	
PO INS	695.654	19327193.	223670.	9492019.	
	695.654	19327193.	223670.	9492019.	
	695.750	19326112.	223685.	9494218.	
	700.000	19277949.	224315.	9591621.	
	700.750	19269399.	224425.	9608784.	
	705.864	19210687.	225176.	9725617.	
	705.864	19210687.	225176.	9725617.	
	706.750	19200445.	225305.	9745817.	
	LH2VTO	744.864	18739807.	230658.	10604470.
	S4BLUCO	772.864	18376882.	234327.	11221540.
ORB NAV	794.750	18079033.	237037.	11695268.	
	900.000	16479842.	248064.	13857636.	

TABLE 5-XVI-B

VEHICLE POSITION - INERTIAL COORDINATES
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
	1002.750	14670260.	255503.	15760373.
	1100.000	12755939.	259396.	17345822.
	1300.000	8315004.	257499.	19859974.
	1306.750	8155469.	257200.	19925987.
	1500.000	3406228.	242225.	21258337.
	1602.750	791656.	229327.	21514437.
	1700.000	-1694592.	214119.	21461701.
	1900.000	-6700517.	174404.	20458071.
	1906.750	-6864435.	172881.	20403615.
	2100.000	-11329701.	124932.	18303544.
	2202.750	-13475242.	96486.	16786187.
	2300.000	-15321430.	68106.	15119234.
	2500.000	-18450977.	6762.	11084427.
	2506.750	-18539319.	4649.	10935987.
	2700.000	-20542365.	-55972.	6426335.
	2802.750	-21172376.	-87681.	3875321.
	2900.000	-21478265.	-116836.	1407129.
	3100.000	-21206482.	-172603.	-3690952.
	3106.750	-21176233.	-174360.	-3860985.
	3300.000	-19742720.	-220254.	-8581502.
	3402.750	-18551583.	-240696.	-10922974.
	3500.000	-17169563.	-257138.	-12989997.
	3700.000	-13631766.	-281118.	-16669116.
	3706.750	-13497752.	-281683.	-16777984.
	3900.000	-9328125.	-290695.	-19412540.
	4002.750	-6896754.	-289734.	-20405688.
	4100.000	-4500354.	-285101.	-21066498.
	4300.000	580452.	-264355.	-21538418.
	4306.750	752983.	-263398.	-21533221.
	4500.000	5629068.	-229280.	-20802148.
	4602.750	8117451.	-206180.	-19965045.
	4700.000	10362212.	-181475.	-18899434.
	4900.000	14514534.	-123247.	-15937497.
	4906.750	14641676.	-121133.	-15820869.
	5100.000	17853535.	-57501.	-12082881.
	5202.750	19189747.	-21881.	-9824305.
	5300.000	20192545.	12407.	-7551947.
	5500.000	21401035.	82839.	-2598628.
	5506.750	21421116.	85181.	-2427324.
	5700.000	21411718.	150061.	2499809.

TABLE 5-XVI-B.

VEHICLE POSITION - INERTIAL COORDINATES
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
	5802.750	20948626.	182156.	5082515.
	5900.000	20224135.	210443.	7458183.
	6100.000	17904600.	260647.	11999162.
	6106.750	17807930.	262128.	12142042.
	6300.000	14582544.	297814.	15868576.
	6402.750	12544492.	311086.	17522846.
	6500.000	10443458.	319722.	18849504.
	6700.000	5718742.	324921.	20774426.
	6706.750	5552126.	324796.	20819505.
	6900.000	672952.	312827.	21534741.
	7002.750	-1952263.	299961.	21455691.
	7100.000	-4410939.	283773.	21087094.
	7300.000	-9247460.	239015.	19456046.
	7306.750	-9403096.	237253.	19381249.
	7500.000	-13564833.	180680.	16732853.
	7602.750	-15500412.	146351.	14956719.
	7700.000	-17120439.	111672.	13070367.
	7900.000	-19714603.	35524.	8674351.
	7906.750	-19783493.	32875.	8516016.
	8100.000	-21201865.	-43782.	3791756.
	8202.750	-21505827.	-84380.	1182777.
	8300.000	-21499091.	-122021.	-1303310.
	8500.000	-20589998.	-194955.	-6325046.
	8506.750	-20538690.	-197276.	-6489882.
	8700.000	-18525926.	-258560.	-10991991.
	8802.750	-17051790.	-286416.	-13165290.
	8900.000	-15422859.	-309243.	-15042729.
	9100.000	-11454902.	-344051.	-18250456.
	9106.750	-11308409.	-344921.	-18341734.
	9300.000	-6844546.	-360836.	-20435635.
	9402.750	-4309358.	-362018.	-21118354.
	9500.000	-1850240.	-358391.	-21476056.
	9700.000	3248101.	-336531.	-21313717.
1ST OPP	9706.750	3418595.	-335462.	-21287175.
	9900.000	8164826.	-296126.	-19958094.
	10002.750	10529631.	-268734.	-18819977.
	10100.000	12624650.	-239066.	-17485577.
	10300.000	16378129.	-168179.	-14035074.
	10306.750	16489873.	-165587.	-13903709.
	10500.000	19215617.	-87092.	-9800079.

TABLE 5-XVI-B

VEHICLE POSITION - INERTIAL COORDINATES
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
	10602.750	20263346.	-42828.	-7395189.
	10700.000	20978889.	-39.	-5017695.
	10900.000	21569798.	88354.	44698.
	10906.750	21568710.	91304.	217111.
	11100.000	20955565.	173314.	5104331.
	11202.750	20179934.	214097.	7610149.
	11300.000	19170478.	250179.	9873693.
	11500.000	16313969.	314646.	14101097.
	11506.750	16200597.	316560.	14231071.
	11700.000	12545195.	363013.	17535406.
	11802.750	10321029.	380622.	18928577.
	11900.000	8074364.	392389.	19989158.
	12100.000	3151223.	400863.	21324417.
	12106.750	2980387.	400772.	21348890.
	12300.000	-1948767.	387638.	21465687.
	12402.750	-4544502.	372480.	21068497.
	12500.000	-6939829.	353087.	20404391.
	12700.000	-11542002.	298762.	18199563.
	12706.750	-11687399.	296613.	18106487.
	12900.000	-15497032.	227329.	14974627.
	13002.750	-17203192.	185132.	12978069.
	13100.000	-18583047.	142435.	10910436.
	13300.000	-20627112.	48525.	6234984.
	13306.750	-20676390.	45256.	6069552.
	13500.000	-21514917.	-49397.	1210454.
	13602.750	-21502664.	-99540.	-1415233.
	13700.000	-21197087.	-146028.	-3881611.
	13900.000	-19691799.	-236063.	-8756116.
	13906.750	-19621098.	-238926.	-8913548.
	14100.000	-17083638.	-314477.	-13140337.
	14202.750	-15360251.	-348761.	-15120719.
	14300.000	-13518809.	-376809.	-16789101.
	14500.000	-9196957.	-419411.	-19498433.
	14506.750	-9040652.	-420471.	-19571528.
	14700.000	-4360036.	-439666.	-21116947.
2ND OPP	14802.750	-1762272.	-440865.	-21492291.
	14900.000	721216.	-436142.	-21554338.
	15100.000	5762450.	-408698.	-20786468.
	15106.750	5928525.	-407365.	-20739849.
	15300.000	10481698.	-358504.	-18856713.

TABLE 5-XVII-A VEHICLE VELOCITY - INERTIAL COORDINATES
(METRIC UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
GRR	-17.250	0.000	84.589	399.712
1ST MOT	0.0	-0.451	84.348	399.763
TBI	0.398	-0.079	84.343	399.767
	10.000	22.861	85.982	399.685
TILINIT	11.375	26.614	86.356	399.663
	20.000	53.267	85.936	400.398
	30.000	91.393	85.457	405.834
	40.000	137.881	84.942	422.365
	50.000	192.471	84.435	455.604
	60.000	254.338	83.973	508.647
MACH 1	64.750	285.513	83.776	541.475
	70.000	320.495	83.551	583.632
	80.000	391.686	83.103	683.794
MAX Q	80.125	392.613	83.098	685.231
	90.000	466.762	82.692	815.411
	100.000	540.789	82.267	983.442
	110.000	615.191	81.756	1185.757
	120.000	690.478	81.025	1423.696
	130.000	770.441	80.275	1699.857
	134.000	804.030	79.936	1822.786
CECO	134.000	804.030	79.936	1822.786
	134.125	805.073	79.924	1826.726
	140.000	833.405	79.455	1980.498
	150.000	883.314	78.665	2267.997
MAX F/M	159.125	932.687	77.835	2567.819
TR3	159.924	937.001	77.760	2595.618
	160.000	937.374	77.753	2598.180
S2 UI	160.424	936.570	77.725	2605.749
SIC RI	160.624	935.026	77.716	2606.585
	160.694	934.401	77.713	2606.680
	160.694	934.401	77.713	2606.680
SIC SEP	160.694	934.401	77.713	2606.680
S2 IGN	162.324	919.152	77.654	2607.218
S2 90T	164.324	901.757	77.570	2611.094
S2 UTT	164.924	897.281	77.538	2614.063
	170.000	862.854	77.260	2645.893
	180.000	798.616	76.706	2715.490
	190.000	735.617	76.131	2787.044
INT J	190.624	731.726	76.094	2791.572
LET J	196.124	697.658	75.773	2831.810

TABLE 5-XVII-A VEHICLE VELOCITY - INERTIAL COORDINATES
(METRIC UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
	200.000	673.913	75.542	2860.591
IGM FN	200.524	670.713	75.511	2864.497
IGM ON	201.250	666.286	75.467	2869.913
	210.000	611.998	75.322	2936.247
	220.000	549.634	75.308	3013.707
TSMC1	222.250	535.579	75.306	3031.369
	230.000	487.110	75.238	3092.862
	240.000	424.350	75.246	3173.824
	250.000	361.343	75.309	3256.674
	260.000	298.059	75.391	3341.514
	270.000	234.455	75.472	3428.562
	280.000	170.397	75.542	3517.897
	290.000	105.868	75.588	3609.595
	300.000	40.812	75.609	3703.735
	310.000	-24.833	75.596	3800.431
	320.000	-91.150	75.550	3899.827
	330.000	-158.236	75.466	4002.070
	340.000	-226.180	75.343	4107.307
	350.000	-295.075	75.177	4215.691
	360.000	-365.000	74.853	4327.422
	370.000	-436.106	74.508	4442.706
	380.000	-508.514	74.179	4561.743
	390.000	-582.342	73.830	4684.768
	400.000	-657.726	73.445	4812.037
	410.000	-734.811	73.020	4943.839
	420.000	-813.761	72.542	5080.498
	430.000	-894.751	72.004	5222.372
	440.000	-977.970	71.403	5369.848
	450.000	-1063.625	70.738	5523.372
	460.000	-1151.953	70.001	5682.605
	470.000	-1239.814	69.218	5811.407
	480.000	-1321.720	67.954	5944.393
	490.000	-1408.368	66.711	6071.974
	500.000	-1498.993	65.526	6173.714
	510.000	-1589.907	64.267	6278.066
	520.000	-1684.442	63.054	6385.136
	530.000	-1781.905	61.845	6495.062
	540.000	-1881.915	60.612	6608.004
TR4	548.429	-1968.284	59.549	6705.573
S4R UI	549.129	-1974.894	59.484	6707.571

TABLE 5-XVII-A VEHICLE VELOCITY - INERTIAL COORDINATES
(METRIC UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
S2 RI	549.229	-1975.790	59.476	6707.400
	549.304	-1976.462	59.470	6707.263
	549.304	-1976.462	59.470	6707.263
S2 SEP	549.304	-1976.462	59.470	6707.263
	550.000	-1982.646	59.419	6705.518
S4B IGN	552.429	-2004.205	59.239	6699.428
S4B 90T	554.929	-2026.955	59.025	6698.001
IGM 3S	556.500	-2041.789	58.863	6702.362
S4B UTT	556.929	-2045.814	58.821	6703.574
	560.000	-2074.710	58.489	6712.225
S4B UOJ	561.229	-2086.581	58.321	6715.638
TSMC2	563.500	-2108.880	58.009	6721.886
	570.000	-2172.432	57.227	6739.769
	580.000	-2271.164	56.266	6766.877
	590.000	-2370.570	55.423	6793.541
	600.000	-2470.554	54.613	6819.986
	610.000	-2571.213	53.802	6845.991
	620.000	-2672.473	52.957	6871.701
	630.000	-2774.420	52.067	6897.135
	640.000	-2876.887	51.117	6922.199
	650.000	-2979.898	50.101	6947.004
	660.000	-3084.270	49.048	6971.386
	670.000	-3188.763	47.979	6995.560
	680.000	-3293.040	46.866	7019.713
	685.654	-3351.909	46.214	7033.368
	S4BGCS1	685.864	-3354.045	46.189
TR5	686.164	-3356.595	46.163	7032.662
S4B LUI	690.000	-3388.664	45.843	7017.485
	695.654	-3435.726	45.370	6994.600
	695.654	-3435.726	45.370	6994.600
PO INS	695.750	-3436.523	45.362	6994.209
	700.000	-3471.794	45.005	6976.796
	700.750	-3478.009	44.942	6973.705
	705.864	-3520.316	44.510	6952.477
	705.864	-3520.316	44.510	6952.477
	706.750	-3527.631	44.435	6948.775
	ORR GIO	744.864	-3838.584	41.167
LH2VTO	772.864	-4062.089	38.710	6651.030
S4BLUCO	794.750	-4233.630	36.758	6543.271
ORR NAV	900.000	-5016.725	27.020	5964.687

TABLE 5-XVII-A VEHICLE VELOCITY - INERTIAL COORDINATES
(METRIC UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
	1002.750	-5705.952	17.050	5309.932
	1100.000	-6280.415	7.313	4617.192
	1300.000	-7191.907	-13.134	3009.730
	1306.750	-7215.854	-13.825	2951.972
	1500.000	-7699.595	-33.281	1232.243
	1602.750	-7792.977	-43.170	285.226
	1700.000	-7774.406	-52.074	-615.459
	1900.000	-7411.653	-68.506	-2429.277
	1906.750	-7391.946	-69.009	-2488.676
	2100.000	-6631.498	-81.670	-4106.785
	2202.750	-6081.825	-86.909	-4884.255
	2300.000	-5477.885	-90.811	-5553.190
	2500.000	-4016.023	-95.368	-6686.858
	2506.750	-3962.243	-95.437	-6718.851
	2700.000	-2328.560	-95.014	-7444.032
	2802.750	-1404.585	-92.888	-7671.930
	2900.000	-510.736	-89.674	-7782.412
	3100.000	1335.116	-79.533	-7683.380
	3106.750	1396.670	-79.111	-7672.408
	3300.000	3105.333	-65.031	-7152.895
	3402.750	3952.707	-56.097	-6721.472
	3500.000	4700.671	-46.846	-6221.026
	3700.000	6031.755	-25.862	-4940.228
	3706.750	6071.137	-25.118	-4891.716
	3900.000	7024.002	-3.132	-3382.448
	4002.750	7383.046	8.848	-2502.454
	4100.000	7621.794	20.179	-1635.169
	4300.000	7791.645	42.846	203.439
	4306.750	7789.731	43.586	265.868
	4500.000	7524.172	63.656	2030.045
	4602.750	7220.728	73.247	2930.169
	4700.000	6834.670	81.465	3742.036
	4900.000	5762.220	95.271	5243.403
	4906.750	5720.005	95.657	5289.364
	5100.000	4367.375	104.266	6450.198
	5202.750	3550.386	106.822	6932.980
	5300.000	2728.592	107.885	7295.225
	5500.000	937.704	105.838	7731.670
	5506.750	875.777	105.669	7738.920
	5700.000	-905.257	98.129	7735.527

TABLE 5-XVII-A VEHICLE VELOCITY - INERTIAL COORDINATES
(METRIC UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MDT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
	5802.750	-1838.806	92.054	7568.333
	5900.000	-2697.559	85.062	7306.763
	6100.000	-4339.329	67.230	6469.222
	6106.750	-4390.997	66.554	6434.312
	6300.000	-5738.923	45.488	5269.342
	6402.750	-6337.591	33.143	4533.005
	6500.000	-6817.910	20.918	3773.734
	6700.000	-7515.450	-5.221	2065.681
	6706.750	-7531.803	-6.114	2005.431
	6900.000	-7791.835	-31.558	240.678
	7002.750	-7763.835	-44.704	-709.132
	7100.000	-7630.939	-56.678	-1598.837
	7300.000	-7041.349	-79.202	-3349.288
	7306.750	-7014.295	-79.901	-3405.621
	7500.000	-6056.026	-97.861	-4911.957
	7602.750	-5413.205	-105.583	-5612.484
	7700.000	-4730.454	-111.574	-6198.736
	7900.000	-3139.403	-119.509	-7137.235
	7906.750	-3082.100	-119.669	-7162.150
	8100.000	-1372.542	-121.135	-7674.896
	8202.750	-428.604	-119.440	-7784.576
	8300.000	470.752	-116.255	-7781.861
	8500.000	2287.047	-105.021	-7452.498
	8506.750	2346.658	-104.536	-7433.924
	8700.000	3974.619	-87.928	-6705.577
	8802.750	4760.357	-77.125	-6172.315
	8900.000	5439.057	-65.800	-5583.140
	9100.000	6598.445	-39.745	-4148.153
	9106.750	6631.430	-38.813	-4095.178
	9300.000	7387.902	-11.107	-2481.056
	9402.750	7634.344	4.124	-1564.413
	9500.000	7763.243	18.607	-675.331
	9700.000	7703.531	47.800	1167.720
	9706.750	7693.899	48.757	1229.347
1ST OPP	9900.000	7212.329	74.874	2944.703
	10002.750	6800.343	87.463	3799.182
	10100.000	6317.498	98.323	4556.044
	10300.000	5069.557	116.813	5911.660
	10306.750	5022.060	117.337	5952.009
	10500.000	3538.696	129.260	6936.038

TABLE 5-XVII-A VEHICLE VELOCITY - INERTIAL COORDINATES
(METRIC UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
	10602.750	2669.666	133.041	7314.171
	10700.000	1810.692	134.896	7572.374
	10900.000	-17.971	133.306	7785.575
	10906.750	-80.245	133.125	7785.184
	11100.000	-1845.453	124.462	7564.031
	11202.750	-2750.580	117.199	7284.255
	11300.000	-3570.098	108.723	6920.110
	11500.000	-5095.893	86.828	5889.463
	11506.750	-5142.873	85.993	5848.550
	11700.000	-6337.644	59.857	4529.146
	11802.750	-6841.707	44.467	3726.064
	11900.000	-7225.659	29.190	2914.653
	12100.000	-7709.715	-3.564	1135.926
	12106.750	-7718.608	-4.686	1074.188
	12300.000	-7762.054	-36.652	-707.532
	12402.750	-7618.953	-53.190	-1646.051
	12500.000	-7379.185	-68.263	-2512.220
	12700.000	-6582.265	-96.637	-4176.568
	12706.750	-6548.612	-97.518	-4229.151
	12900.000	-5415.989	-120.160	-5606.837
	13002.750	-4693.854	-129.900	-6223.743
	13100.000	-3946.011	-137.462	-6722.575
	13300.000	-2255.101	-147.499	-7461.227
	13306.750	-2195.277	-147.702	-7479.026
	13500.000	-438.321	-149.611	-7781.624
	13602.750	510.902	-147.522	-7776.892
	13700.000	1402.420	-143.567	-7666.168
	13900.000	3164.092	-129.577	-7121.662
	13906.750	3220.982	-128.972	-7096.098
	14100.000	4748.237	-108.290	-6173.819
	14202.750	5463.695	-94.847	-5555.965
	14300.000	6066.367	-80.765	-4890.511
	14500.000	7044.835	-48.418	-3328.864
	14506.750	7071.226	-47.261	-3272.398
	14700.000	7628.946	-12.952	-1581.300
2ND OPP	14802.750	7764.123	5.866	-642.824
	14900.000	7786.076	23.728	254.298
	15100.000	7507.580	59.623	2075.089
	15106.750	7490.700	60.797	2135.064
	15300.000	6809.320	92.747	3779.115

TABLE 5-XVII-B VEHICLE VELOCITY - INERTIAL COORDINATES
 (ENGLISH UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
GRR	-17.250	0.000	277.524	1311.391
1ST MOT	0.0	-1.480	276.733	1311.557
TBI	0.398	-0.259	276.717	1311.570
	10.000	75.002	282.095	1311.303
TILINIT	11.375	87.316	283.321	1311.232
	20.000	174.760	281.944	1313.642
	30.000	299.845	280.370	1331.477
	40.000	452.366	278.680	1385.713
	50.000	631.465	277.018	1494.762
	60.000	834.442	275.504	1668.788
MACH 1	64.750	936.721	274.855	1776.493
	70.000	1051.493	274.118	1914.805
	80.000	1285.058	272.648	2243.420
MAX Q	80.125	1288.100	272.630	2248.133
	90.000	1531.371	271.301	2675.234
	100.000	1774.242	269.904	3226.516
	110.000	2018.342	268.228	3890.278
	120.000	2265.346	265.832	4670.918
	130.000	2527.695	263.368	5576.960
	134.000	2637.893	262.257	5980.270
CECO	134.000	2637.893	262.257	5980.270
	134.125	2641.317	262.218	5993.196
	140.000	2734.269	260.678	6497.696
	150.000	2898.011	258.086	7440.937
MAX F/M	159.125	3059.996	255.366	8424.603
TB3	159.924	3074.150	255.117	8515.806
	160.000	3075.372	255.094	8524.213
S2 UI	160.424	3072.736	255.002	8549.044
SIC RI	160.624	3067.670	254.974	8551.790
	160.694	3065.620	254.965	8552.098
	160.694	3065.620	254.965	8552.098
SIC SEP	160.694	3065.620	254.965	8552.098
S2 IGN	162.324	3015.590	254.771	8553.866
S2 90T	164.324	2958.519	254.495	8566.580
S2 UTT	164.924	2943.836	254.390	8576.322
	170.000	2830.887	253.479	8680.752
	180.000	2620.132	251.661	8909.089
	190.000	2413.442	249.772	9143.845
INT J	190.624	2400.675	249.652	9158.701
LFT J	196.124	2288.905	248.600	9290.714

TABLE 5-XVII-B VEHICLE VELOCITY - INERTIAL COORDINATES
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
	200.000	2211.001	247.842	9385.141
IGM EN	200.524	2200.502	247.739	9397.957
IGM ON	201.250	2185.977	247.595	9415.724
	210.000	2007.866	247.118	9633.355
	220.000	1803.260	247.073	9887.490
TSMC1	222.250	1757.149	247.068	9945.435
	230.000	1598.129	246.843	10147.185
	240.000	1392.225	246.871	10412.810
	250.000	1185.510	247.076	10684.625
	260.000	977.883	247.345	10962.972
	270.000	769.209	247.612	11248.563
	280.000	559.044	247.842	11541.657
	290.000	347.336	247.992	11842.503
	300.000	133.899	248.061	12151.361
	310.000	-81.472	248.019	12468.605
	320.000	-299.050	247.867	12794.707
	330.000	-519.146	247.591	13130.152
	340.000	-742.062	247.188	13475.415
	350.000	-968.095	246.645	13831.008
	360.000	-1197.505	245.581	14197.579
	370.000	-1430.794	244.450	14575.807
	380.000	-1668.354	243.370	14966.349
	390.000	-1910.571	242.226	15369.975
	400.000	-2157.892	240.960	15787.523
	410.000	-2410.798	239.566	16219.943
	420.000	-2669.819	237.998	16668.302
	430.000	-2935.533	236.233	17133.766
	440.000	-3209.562	234.262	17617.613
	450.000	-3489.585	232.081	18121.300
	460.000	-3779.373	229.661	18643.718
	470.000	-4067.632	227.094	19066.296
	480.000	-4336.350	222.947	19502.601
	490.000	-4620.629	218.868	19921.175
	500.000	-4917.957	214.981	20254.967
	510.000	-5216.230	210.849	20597.330
	520.000	-5526.386	206.871	20948.608
	530.000	-5846.145	202.903	21309.257
	540.000	-6174.262	198.857	21679.802
TR4	548.429	-6457.624	195.372	21999.913
S4B UI	549.129	-6479.310	195.156	22006.467

TABLE 5-XVII-B VEHICLE VELOCITY - INERTIAL COORDINATES
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS			
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)	
S2 RI	549.229	-6482.251	195.131	22005.905	
	549.304	-6484.454	195.112	22005.456	
	549.304	-6484.454	195.112	22005.456	
S2 SEP	549.304	-6484.454	195.112	22005.456	
	550.000	-6504.742	194.944	21999.730	
S4B IGN	552.429	-6575.476	194.354	21979.751	
S4B 90T	554.929	-6650.114	193.653	21975.070	
IGM 3S	556.500	-6698.783	193.122	21989.378	
S4B UTT	556.929	-6711.988	192.982	21993.354	
	560.000	-6806.792	191.894	22021.736	
S4B UCJ	561.229	-6845.737	191.341	22032.932	
	563.500	-6918.898	190.317	22053.431	
TSMC2	570.000	-7127.402	187.754	22112.103	
	580.000	-7451.324	184.600	22201.039	
	590.000	-7777.461	181.835	22288.519	
	600.000	-8105.492	179.178	22375.284	
	610.000	-8435.737	176.516	22460.600	
	620.000	-8767.958	173.742	22544.952	
	630.000	-9102.427	170.824	22628.397	
	640.000	-9438.607	167.705	22710.628	
	650.000	-9776.569	164.373	22792.009	
	660.000	-10118.997	160.919	22872.002	
	670.000	-10461.821	157.410	22951.312	
	680.000	-10803.937	153.761	23030.554	
	S4BGCS1	685.654	-10997.077	151.619	23075.354
	TR5	685.864	-11004.083	151.539	23076.510
	S4B LUI	686.164	-11012.451	151.455	23073.039
690.000		-11117.663	150.403	23023.246	
PO INS	695.654	-11272.068	148.851	22948.163	
	695.654	-11272.068	148.851	22948.163	
	695.750	-11274.680	148.824	22946.881	
	700.000	-11390.400	147.653	22889.751	
	700.750	-11410.791	147.446	22879.609	
	705.864	-11549.594	146.031	22809.966	
	705.864	-11549.594	146.031	22809.966	
ORB GID	706.750	-11573.593	145.785	22797.817	
LH2VTO	744.864	-12593.780	135.063	22251.390	
S4BLUCO	772.864	-13327.064	127.002	21820.963	
ORB NAV	794.750	-13889.862	120.596	21467.423	
	900.000	-16459.071	88.647	19569.183	

TABLE 5-XVII-B VEHICLE VELOCITY - INERTIAL COORDINATES
(ENGLISH UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
	1002.750	-18720.316	55.940	17421.035
	1100.000	-20605.036	23.993	15148.266
	1300.000	-23595.494	-43.092	9874.442
	1306.750	-23674.060	-45.358	9684.949
	1500.000	-25261.139	-109.189	4042.791
	1602.750	-25567.510	-141.634	935.781
	1700.000	-25506.580	-170.846	-2019.224
	1900.000	-24316.448	-224.758	-7970.068
	1906.750	-24251.791	-226.406	-8164.946
	2100.000	-21756.883	-267.948	-13473.704
	2202.750	-19953.493	-285.135	-16024.459
	2300.000	-17972.063	-297.935	-18219.127
	2500.000	-13175.928	-312.887	-21938.510
	2506.750	-12999.486	-313.114	-22043.476
	2700.000	-7639.633	-311.726	-24422.678
	2802.750	-4608.218	-304.750	-25170.373
	2900.000	-1675.642	-294.206	-25532.848
	3100.000	4380.302	-260.934	-25207.941
	3106.750	4582.252	-259.551	-25171.942
	3300.000	10188.102	-213.356	-23467.504
	3402.750	12968.198	-184.045	-22052.073
	3500.000	15422.151	-153.693	-20410.190
	3700.000	19789.222	-84.851	-16208.098
	3706.750	19918.429	-82.407	-16048.936
	3900.000	23044.627	-10.276	-11097.271
	4002.750	24222.591	29.028	-8210.151
	4100.000	25005.886	66.202	-5364.729
	4300.000	25563.140	140.572	667.452
	4306.750	25556.859	142.997	872.271
	4500.000	24685.605	208.844	6660.251
	4602.750	23690.052	240.312	9613.416
	4700.000	22423.459	267.274	12277.022
	4900.000	18904.922	312.570	17202.766
	4906.750	18766.421	313.836	17353.556
	5100.000	14328.658	342.081	21162.067
	5202.750	11648.249	350.466	22745.997
	5300.000	8952.074	353.954	23934.465
	5500.000	3076.457	347.236	25366.370
	5506.750	2873.284	346.682	25390.158
	5700.000	-2970.003	321.944	25379.027

TABLE 5-XVII-B VEHICLE VELOCITY - INERTIAL COORDINATES
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
	5802.750	-6032.827	302.014	24830.490
	5900.000	-8850.259	279.074	23972.319
	6100.000	-14236.644	220.570	21224.480
	6106.750	-14406.157	218.353	21109.947
	6300.000	-18828.487	149.238	17287.868
	6402.750	-20792.620	108.735	14872.063
	6500.000	-22368.470	68.630	12381.017
	6700.000	-24656.988	-17.128	6777.168
	6706.750	-24710.639	-20.060	6579.499
	6900.000	-25563.764	-103.536	789.625
	7002.750	-25471.898	-146.667	-2326.549
	7100.000	-25035.890	-185.952	-5245.527
	7300.000	-23101.540	-259.849	-10988.478
	7306.750	-23012.779	-262.144	-11173.296
	7500.000	-19868.853	-321.067	-16115.345
	7602.750	-17759.859	-346.401	-18413.662
	7700.000	-15519.863	-366.056	-20337.059
	7900.000	-10299.877	-392.090	-23416.126
	7906.750	-10111.876	-392.615	-23497.868
	8100.000	-4503.089	-397.426	-25180.106
	8202.750	-1406.182	-391.862	-25539.949
	8300.000	1544.463	-381.416	-25531.038
	8500.000	7503.434	-344.556	-24450.452
	8506.750	7699.009	-342.965	-24389.513
	8700.000	13040.088	-288.479	-21999.926
	8802.750	15617.969	-253.035	-20250.378
	8900.000	17844.675	-215.880	-18317.388
	9100.000	21648.443	-130.398	-13609.425
	9106.750	21756.662	-127.338	-13435.624
	9300.000	24238.525	-36.439	-8139.948
	9402.750	25047.061	13.531	-5132.588
	9500.000	25469.956	61.047	-2215.652
	9700.000	25274.053	156.823	3831.101
	9706.750	25242.449	159.963	4033.290
1ST OPP	9900.000	23662.497	245.650	9661.100
	10002.750	22310.836	286.952	12464.509
	10100.000	20726.701	322.583	14947.650
	10300.000	16632.406	383.244	19395.211
	10306.750	16476.574	384.963	19527.588
	10500.000	11609.895	424.083	22756.031

TABLE 5-XVII-B VEHICLE VELOCITY - INERTIAL COORDINATES
(ENGLISH UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
	10602.750	8758.747	436.487	23996.625
	10700.000	5940.589	442.571	24843.745
	10900.000	-58.959	437.355	25543.227
	10906.750	-263.272	436.761	25541.941
	11100.000	-6054.635	408.339	24816.373
	11202.750	-9024.214	384.512	23898.475
	11300.000	-11712.920	356.704	22703.773
	11500.000	-16718.808	284.867	19322.385
	11506.750	-16872.942	282.129	19188.158
	11700.000	-20792.794	196.382	14859.401
	11802.750	-22446.546	145.889	12224.620
	11900.000	-23706.231	95.769	9562.510
	12100.000	-25294.339	-11.694	3726.792
	12106.750	-25323.518	-15.373	3524.239
	12300.000	-25466.057	-120.250	-2321.300
	12402.750	-24996.565	-174.508	-5400.429
	12500.000	-24209.925	-223.961	-8242.193
	12700.000	-21595.359	-317.050	-13702.651
	12706.750	-21484.946	-319.942	-13875.167
	12900.000	-17768.994	-394.225	-18395.135
	13002.750	-15399.782	-426.182	-20419.104
	13100.000	-12946.232	-450.992	-22055.693
	13300.000	-7398.626	-483.921	-24479.092
	13306.750	-7202.353	-484.587	-24537.488
	13500.000	-1438.062	-490.851	-25530.264
	13602.750	1676.187	-483.996	-25514.739
	13700.000	4601.115	-471.019	-25151.470
	13900.000	10380.879	-425.120	-23365.034
	13906.750	10567.527	-423.137	-23281.161
	14100.000	15578.205	-355.282	-20271.716
	14202.750	17925.508	-311.176	-18228.231
	14300.000	19902.779	-264.977	-16044.985
	14500.000	23112.976	-158.851	-10921.469
	14506.750	23199.561	-155.057	-10736.181
	14700.000	25029.351	-42.494	-5187.992
2ND OPP	14802.750	25472.846	19.244	-2109.002
	14900.000	25544.868	77.848	834.312
	15100.000	24631.167	195.614	6808.035
	15106.750	24575.786	199.466	7004.803
	15300.000	22340.290	304.287	12398.671

TABLE 5-XVIII-A VEHICLE POSITION - EARTH-FIXED COORDINATES
(METRIC UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
GRR	-17.250	62.	0.	-0.
1ST MOT	0.0	62.	0.	-0.
TBI	0.398	62.	0.	-0.
	10.000	172.	5.	-1.
TIL INIT	11.375	207.	8.	-1.
	20.000	555.	26.	-1.
	30.000	1282.	42.	23.
	40.000	2436.	55.	148.
	50.000	4099.	64.	515.
	60.000	6351.	69.	1306.
MACH 1	64.750	7647.	71.	1890.
	70.000	9254.	73.	2729.
	80.000	12850.	76.	5016.
MAX Q	80.125	12900.	77.	5052.
	90.000	17195.	81.	8447.
	100.000	22306.	88.	13363.
	110.000	28181.	102.	20120.
	120.000	34831.	123.	29064.
	130.000	42294.	154.	40557.
	134.000	45521.	170.	45959.
CECO	134.000	45521.	170.	45959.
	134.125	45624.	171.	46136.
	140.000	50567.	199.	54904.
	150.000	59405.	260.	71992.
MAX F/M	159.125	67974.	333.	90249.
TB3	159.924	68748.	340.	91981.
	160.000	68822.	341.	92146.
	160.424	69234.	345.	93074.
S2 UI	160.424	69429.	347.	93513.
SIC RI	160.624	69496.	347.	93666.
	160.694	69496.	347.	93666.
	160.694	69496.	347.	93666.
SIC SEP	160.694	69500.	347.	93675.
S2 IGN	162.324	71068.	363.	97247.
S2 90T	164.324	72960.	382.	101633.
S2 UTT	164.924	73522.	388.	102952.
	170.000	78177.	441.	114189.
	180.000	86886.	556.	136837.
	190.000	94999.	687.	160189.
INT J	190.624	95486.	696.	161670.
LET J	196.124	99680.	776.	174846.

TABLE 5-XVIII-A VEHICLE POSITION - EARTH-FIXED COORDINATES
(CONTINUED)
(METRIC UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
	200.000	102531.	835.	184264.
IGM EN	200.524	102910.	844.	185546.
IGM ON	201.250	103432.	855.	187325.
	210.000	109491.	1003.	209083.
	220.000	115873.	1195.	234669.
TSMC1	222.250	117229.	1242.	240533.
	230.000	121678.	1413.	261039.
	240.000	126904.	1659.	288212.
	250.000	131553.	1934.	316207.
	260.000	135623.	2240.	345046.
	270.000	139113.	2578.	374749.
	280.000	142021.	2950.	405341.
	290.000	144344.	3358.	436846.
	300.000	146081.	3801.	469290.
	310.000	147228.	4282.	502698.
	320.000	147780.	4801.	537099.
	330.000	147733.	5361.	572521.
	340.000	147082.	5962.	608994.
	350.000	145820.	6606.	646551.
	360.000	143939.	7294.	685225.
	370.000	141433.	8026.	725054.
	380.000	138292.	8804.	766073.
	390.000	134505.	9632.	808324.
	400.000	130060.	10510.	851850.
	410.000	124946.	11441.	896696.
	420.000	119148.	12427.	942910.
	430.000	112651.	13470.	990545.
	440.000	105436.	14571.	1039658.
	450.000	97487.	15734.	1090307.
	460.000	88782.	16961.	1142558.
	470.000	79297.	18251.	1196284.
	480.000	69086.	19600.	1251355.
	490.000	58150.	21009.	1307805.
	500.000	46432.	22476.	1365407.
	510.000	33919.	24001.	1424082.
	520.000	20592.	25586.	1483860.
	530.000	6419.	27233.	1544771.
	540.000	-8622.	28946.	1606847.
TB4	548.429	-21991.	30441.	1660098.
S4R UI	549.129	-23130.	30568.	1664557.

TABLE 5-XVIII-A VEHICLE POSITION - FARTH-FIXED COORDINATES
(METRIC UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
S2 RI	549.229	-23293.	30586.	1665195.
	549.304	-23416.	30599.	1665672.
	549.304	-23416.	30599.	1665672.
S2 SFP	549.304	-23416.	30599.	1665678.
	550.000	-24554.	30725.	1670115.
	552.429	-28555.	31166.	1685579.
S4B 90T	554.929	-32723.	31623.	1701488.
IGM 3S	556.500	-35370.	31912.	1711494.
S4B UTT	556.929	-36095.	31991.	1714224.
	560.000	-41341.	32560.	1733810.
S4B UCJ	561.229	-43461.	32789.	1741653.
	563.500	-47417.	33214.	1756166.
TSMC2	570.000	-58990.	34446.	1797794.
	580.000	-77527.	36385.	1862111.
	590.000	-96960.	38381.	1926755.
	600.000	-117296.	40435.	1991728.
	610.000	-138539.	42548.	2057026.
	620.000	-160696.	44720.	2122649.
	630.000	-183772.	46952.	2188596.
	640.000	-207774.	49243.	2254865.
	650.000	-232706.	51594.	2321456.
	660.000	-258575.	54004.	2388367.
	670.000	-285393.	56476.	2455596.
	680.000	-313156.	59008.	2523146.
S4BGCS1	685.654	-329270.	60466.	2561482.
TR5	685.864	-329874.	60521.	2562907.
S4B LUT	686.164	-330738.	60599.	2564944.
	690.000	-341846.	61599.	2590962.
	695.654	-358422.	63087.	2629224.
PO INS	695.654	-358422.	63087.	2629224.
	695.750	-358706.	63112.	2629872.
	700.000	-371329.	64240.	2658561.
	700.750	-373571.	64440.	2663617.
	705.864	-388972.	65810.	2698046.
	705.864	-388972.	65810.	2698046.
ORB GID	706.750	-391660.	66049.	2704000.
LH2VTO	744.864	-512891.	76651.	2957565.
S4BLUCO	772.864	-608825.	84852.	3140397.
ORB NAV	794.750	-687796.	91496.	3281139.
	900.000	-1114764.	126137.	3928625.

TABLE 5-XVIII-A VEHICLE POSITION - EARTH-FIXED COORDINATES
(METRIC UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
	1002.750	-1602630.	163727.	4507567.
	1100.000	-2123120.	202016.	5000055.
	1300.000	-3345656.	285630.	5818679.
	1306.750	-3389950.	288499.	5841367.
	1500.000	-4720824.	369278.	6343088.
	1602.750	-5464301.	409487.	6489829.
	1700.000	-6179328.	444386.	6546777.
	1900.000	-7647597.	502193.	6419541.
	1906.750	-7696440.	503742.	6409505.
	2100.000	-9051523.	534474.	5968047.
	2202.750	-9724451.	538794.	5616941.
	2300.000	-10320242.	534261.	5215507.
	2500.000	-11389759.	496503.	4200476.
	2506.750	-11421710.	494535.	4162220.
	2700.000	-12206210.	418600.	2974832.
	2802.750	-12513324.	362927.	2283288.
	2900.000	-12728578.	300793.	1601060.
	3100.000	-12930725.	146348.	149014.
	3106.750	-12931796.	140562.	99509.
	3300.000	-12802664.	-38463.	-1307673.
	3402.750	-12609975.	-142370.	-2033746.
	3500.000	-12351008.	-244596.	-2695335.
	3700.000	-11598610.	-460678.	-3943997.
	3706.750	-11568379.	-467994.	-3982946.
	3900.000	-10583406.	-673638.	-4990898.
	4002.750	-9975854.	-772288.	-5432734.
	4100.000	-9356512.	-869490.	-5783657.
	4300.000	-7979666.	-1034224.	-6282912.
	4306.750	-7931385.	-1039081.	-6294308.
	4500.000	-6522117.	-1154752.	-6464294.
	4602.750	-5765735.	-1195726.	-6430557.
	4700.000	-5057129.	-1219843.	-6319635.
	4900.000	-3658274.	-1220983.	-5857323.
	4906.750	-3613062.	-1219834.	-5836423.
	5100.000	-2395715.	-1153092.	-5101789.
	5202.750	-1821044.	-1090841.	-4611837.
	5300.000	-1332693.	-1015058.	-4092169.
	5500.000	-522379.	-810035.	-2880227.
	5506.750	-499959.	-802023.	-2836501.
	5700.000	-5274.	-545487.	-1527665.

TABLE 5-XVIII-A VEHICLE POSITION - EARTH-FIXED COORDINATES
(METRIC UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
	5802.750	137334.	-390042.	-800249.
	5900.000	192771.	-232964.	-102975.
	6100.000	61801.	112371.	1322011.
	6106.750	51671.	124391.	1369256.
	6300.000	-391746.	472473.	2675702.
	6402.750	-743457.	656750.	3321106.
	6500.000	-1145328.	827346.	3890317.
	6700.000	-2161364.	1156148.	4905268.
	6706.750	-2199667.	1166545.	4935410.
	6900.000	-3389047.	1438409.	5670204.
	7002.750	-4082358.	1559085.	5953168.
	7100.000	-4766836.	1655289.	6147556.
	7300.000	-6225531.	1790807.	6314440.
	7306.750	-6275311.	1793806.	6314526.
	7500.000	-7691768.	1832944.	6163794.
	7602.750	-8423849.	1815741.	5965255.
	7700.000	-9091757.	1774556.	5704686.
	7900.000	-10355042.	1614015.	4961755.
	7906.750	-10394517.	1606847.	4932152.
	8100.000	-11418085.	1355540.	3973847.
	8202.750	-11868475.	1187720.	3387247.
	8300.000	-12227465.	1009188.	2791923.
	8500.000	-12742551.	590498.	1476376.
	8506.750	-12754451.	575333.	1430422.
	8700.000	-12937512.	119799.	93907.
	8802.750	-12909358.	-134500.	-619694.
	8900.000	-12802586.	-378773.	-1285867.
	9100.000	-12344559.	-878519.	-2593921.
	9106.750	-12323691.	-895077.	-2636031.
	9300.000	-11586436.	-1351613.	-3765273.
	9402.750	-11092120.	-1575313.	-4294728.
	9500.000	-10566303.	-1770656.	-4742220.
	9700.000	-9335426.	-2110267.	-5477192.
1ST OPP	9706.750	-9290914.	-2120072.	-5497322.
	9900.000	-7955674.	-2348613.	-5935083.
	10002.750	-7211331.	-2425949.	-6055160.
	10100.000	-6496393.	-2468782.	-6094925.
	10300.000	-5030891.	-2459911.	-5950826.
	10306.750	-4982198.	-2457292.	-5940728.
	10500.000	-3632734.	-2317987.	-5512110.

TABLE 5-XVIII-A VEHICLE POSITION - EARTH-FIXED COORDINATES
(METRIC UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SFC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
	10602.750	-2963702.	-2194113.	-5179406.
	10700.000	-2372050.	-2046289.	-4802689.
	10900.000	-1312034.	-1655409.	-3859709.
	10906.750	-1280421.	-1640326.	-3824354.
	11100.000	-505828.	-1162878.	-2731572.
	11202.750	-204079.	-877822.	-2098350.
	11300.000	6100.	-592401.	-1475440.
	11500.000	197950.	27265.	-154362.
	11506.750	198678.	48662.	-109419.
	11700.000	59894.	663751.	1165858.
	11802.750	-137790.	986133.	1822396.
	11900.000	-401388.	1282746.	2419902.
	12100.000	-1162966.	1849849.	3546156.
	12106.750	-1193497.	1867689.	3581265.
	12300.000	-2186736.	2332487.	4489745.
	12402.750	-2798356.	2538001.	4888243.
	12500.000	-3421278.	2701806.	5205240.
	12700.000	-4804422.	2934405.	5658885.
	12706.750	-4852886.	2939653.	5669345.
	12900.000	-6266403.	3013808.	5830212.
	13002.750	-7024163.	2991943.	5805842.
	13100.000	-7733428.	2931578.	5712962.
	13300.000	-9131454.	2687982.	5315249.
	13306.750	-9176583.	2677028.	5297155.
	13500.000	-10389960.	2292173.	4658993.
	13602.750	-10961230.	2035108.	4232091.
	13700.000	-11445527.	1761905.	3778664.
	13900.000	-12245019.	1122683.	2719422.
	13906.750	-12267019.	1099572.	2681165.
	14100.000	-12748247.	406582.	1534770.
	14202.750	-12882722.	20704.	896516.
	14300.000	-12929967.	-349392.	283844.
	14500.000	-12781156.	-1105216.	-971536.
	14506.750	-12770411.	-1130237.	-1013250.
	14700.000	-12309469.	-1819977.	-2169918.
2ND OPP	14802.750	-11948781.	-2158210.	-2744284.
	14900.000	-11538870.	-2454103.	-3253217.
	15100.000	-10508429.	-2971567.	-4169539.
	15106.750	-10469703.	-2986617.	-4197013.
	15300.000	-9270336.	-3341949.	-4875667.

TABLE 5-XVIII-B VEHICLE POSITION - EARTH-FIXED COORDINATES
(ENGLISH UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
GRR	-17.250	202.	1.	-0.
1ST MOT	0.0	202.	1.	-0.
TBI	0.398	202.	1.	-0.
	10.000	563.	16.	-2.
TIL INIT	11.375	678.	25.	-3.
	20.000	1820.	84.	-5.
	30.000	4207.	139.	75.
	40.000	7992.	180.	485.
	50.000	13450.	209.	1689.
	60.000	20838.	228.	4285.
MACH 1	64.750	25088.	234.	6200.
	70.000	30362.	240.	8955.
	80.000	42158.	251.	16458.
MAX 0	80.125	42321.	251.	16573.
	90.000	56414.	265.	27712.
	100.000	73181.	290.	43843.
	110.000	92457.	334.	66010.
	120.000	114276.	403.	95353.
	130.000	138761.	505.	133061.
	134.000	149346.	558.	150785.
CFCO	134.000	149346.	558.	150785.
	134.125	149685.	560.	151365.
	140.000	165902.	652.	180130.
	150.000	194897.	852.	236193.
MAX F/M	159.125	223010.	1092.	296093.
TB3	159.924	225552.	1116.	301774.
	160.000	225794.	1119.	302317.
S2 UI	160.424	227147.	1132.	305362.
SIC RI	160.624	227784.	1138.	306800.
	160.694	228007.	1140.	307303.
	160.694	228007.	1140.	307303.
SIC SFP	160.694	228019.	1140.	307331.
S2 IGN	162.324	233164.	1191.	319052.
S2 90T	164.324	239371.	1255.	333442.
S2 UTT	164.924	241213.	1274.	337768.
	170.000	256485.	1447.	374636.
	180.000	285058.	1824.	448941.
	190.000	311677.	2254.	525555.
INT J	190.624	313275.	2283.	530415.
IFT J	196.124	327033.	2545.	573641.

TABLE 5-XVIII-B VEHICLE POSITION - EARTH-FIXED COORDINATES
(ENGLISH UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
	200.000	336387.	2740.	604540.
IGM EN	200.524	337630.	2768.	608747.
IGM ON	201.250	339344.	2805.	614584.
	210.000	359222.	3290.	685968.
	220.000	380160.	3920.	769911.
TSMC1	222.250	384611.	4074.	789151.
	230.000	399204.	4637.	856427.
	240.000	416353.	5443.	945577.
	250.000	431605.	6345.	1037425.
	260.000	444957.	7349.	1132039.
	270.000	456406.	8459.	1229491.
	280.000	465947.	9680.	1329859.
	290.000	473571.	11016.	1433223.
	300.000	479269.	12470.	1539665.
	310.000	483030.	14048.	1649273.
	320.000	484842.	15753.	1762135.
	330.000	484688.	17589.	1878348.
	340.000	482552.	19561.	1998011.
	350.000	478411.	21673.	2121230.
	360.000	472242.	23929.	2248115.
	370.000	464020.	26331.	2378784.
	380.000	453714.	28886.	2513363.
	390.000	441289.	31601.	2651983.
	400.000	426707.	34483.	2794784.
	410.000	409929.	37537.	2941916.
	420.000	390906.	40772.	3093538.
	430.000	369588.	44192.	3249821.
	440.000	345920.	47807.	3410950.
	450.000	319839.	51622.	3577121.
	460.000	291278.	55646.	3748548.
	470.000	260162.	59878.	3924818.
	480.000	226660.	64305.	4105497.
	490.000	190780.	68926.	4290699.
	500.000	152337.	73739.	4479681.
	510.000	111283.	78742.	4672185.
	520.000	67558.	83943.	4868307.
	530.000	21060.	89349.	5068146.
	540.000	-28288.	94967.	5271808.
TB4	548.429	-72149.	99873.	5446514.
S4R UI	549.129	-75886.	100287.	5461146.

TABLE 5-XVIII-R VEHICLE POSITION - EARTH-FIXED COORDINATES
(ENGLISH UNITS)
(CONTINUED)

EVFNT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
S2 RI	549.229	-76421.	100347.	5463237.
	549.304	-76823.	100391.	5464804.
	549.304	-76823.	100391.	5464804.
S2 SEP	549.304	-76824.	100391.	5464824.
	550.000	-80559.	100805.	5479380.
S4B IGN	552.429	-93683.	102252.	5530114.
S4B 90T	554.929	-107358.	103750.	5582309.
IGM 3S	556.500	-116043.	104698.	5615137.
S4B UTT	556.929	-118423.	104957.	5624095.
	560.000	-135632.	106823.	5688352.
S4B UCJ	561.229	-142589.	107575.	5714084.
TSMC2	563.500	-155568.	108970.	5761701.
	570.000	-193537.	113011.	5898275.
	580.000	-254353.	119374.	6109287.
	590.000	-318112.	125923.	6321376.
	600.000	-384829.	132662.	6534540.
	610.000	-454525.	139594.	6748774.
	620.000	-527218.	146720.	6964072.
	630.000	-602928.	154041.	7180434.
	640.000	-681674.	161558.	7397852.
	650.000	-763471.	169270.	7616324.
	660.000	-848345.	177180.	7835849.
	670.000	-936328.	185287.	8056419.
	680.000	-1027413.	193594.	8278038.
S4B GCS1	685.654	-1080283.	198380.	8403811.
TA5	685.864	-1082265.	198559.	8408489.
S4B LUT	686.164	-1085100.	198814.	8415171.
	690.000	-1121540.	202097.	8500531.
	695.654	-1175927.	206977.	8626064.
PD INS	695.654	-1175927.	206977.	8626064.
	695.750	-1176855.	207060.	8628189.
	700.000	-1218271.	210761.	8722312.
	700.750	-1225626.	211417.	8738902.
	705.864	-1276154.	215913.	8851856.
	705.864	-1276154.	215913.	8851856.
ORB GID	706.750	-1284972.	216695.	8871391.
LH2VTO	744.864	-1682712.	251481.	9703298.
S4BLUCO	772.864	-1997457.	278385.	10303140.
ORB NAV	794.750	-2256548.	300185.	10764891.
	900.000	-3657362.	413834.	12889189.

TABLE 5-XVIII-B VEHICLE POSITION - EARTH-FIXED COORDINATES
(ENGLISH UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MNT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
	1002.750	-5257972.	537162.	14788605.
	1100.000	-6965617.	662782.	16404381.
	1300.000	-10976560.	937107.	19090153.
	1306.750	-11121885.	946520.	19164589.
	1500.000	-15488268.	1211540.	20810656.
	1602.750	-17927498.	1343462.	21288808.
	1700.000	-20273386.	1457959.	21478926.
	1900.000	-25090542.	1647615.	21061486.
	1906.750	-25250788.	1652697.	21028558.
	2100.000	-29696599.	1753523.	19580207.
	2202.750	-31904365.	1767696.	18428285.
	2300.000	-33859062.	1752826.	17111244.
	2500.000	-37367977.	1628946.	13781091.
	2506.750	-37472801.	1622490.	13655577.
	2700.000	-40046622.	1373361.	9759947.
	2802.750	-41054212.	1190706.	7491101.
	2900.000	-41760425.	986855.	5252822.
	3100.000	-42423639.	480145.	488891.
	3106.750	-42427152.	461162.	326471.
	3300.000	-42003491.	-126191.	-4290266.
	3402.750	-41371308.	-467092.	-6672394.
	3500.000	-40521679.	-802481.	-8842964.
	3700.000	-38053182.	-1511412.	-12939622.
	3706.750	-37953998.	-1535412.	-13067407.
	3900.000	-34722459.	-2210100.	-16374337.
	4002.750	-32729179.	-2550156.	-17823932.
	4100.000	-30697218.	-2852657.	-18975254.
	4300.000	-26180006.	-3393122.	-20613228.
	4306.750	-26021604.	-3409060.	-20650617.
	4500.000	-21398021.	-3788555.	-21208313.
	4602.750	-18916452.	-3922986.	-21097628.
	4700.000	-16591630.	-4002109.	-20733711.
	4900.000	-12002210.	-4005848.	-19216939.
	4906.750	-11853877.	-4002082.	-19148371.
	5100.000	-7859959.	-3783109.	-16738151.
	5202.750	-5974553.	-3578874.	-15130700.
	5300.000	-4372352.	-3330242.	-13425751.
	5500.000	-1713843.	-2657595.	-9449564.
	5506.750	-1640284.	-2631310.	-9306106.
	5700.000	-17302.	-1789654.	-5012025.

TABLE 5-XVIII-R VEHICLE POSITION - EARTH-FIXED COORDINATES
(ENGLISH UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
	5802.750	450569.	-1279666.	-2625488.
	5900.000	632451.	-764319.	-337844.
	6100.000	202760.	368670.	4337306.
	6106.750	169524.	408108.	4492309.
	6300.000	-1285255.	1550108.	8778549.
	6402.750	-2439163.	2154691.	10896018.
	6500.000	-3757638.	2714390.	12763506.
	6700.000	-7091091.	3793138.	16093399.
	6706.750	-7216755.	3827248.	16192290.
	6900.000	-11118920.	4719189.	18603031.
	7002.750	-13393564.	5115110.	19531390.
	7100.000	-15639225.	5430738.	20169147.
	7300.000	-20424969.	5875351.	20716665.
	7306.750	-20588290.	5885191.	20716949.
	7500.000	-25235460.	6013597.	20222422.
	7602.750	-27637301.	5957155.	19571048.
	7700.000	-29828599.	5822035.	18716161.
	7900.000	-33973236.	5295324.	16278723.
	7906.750	-34102745.	5271809.	16181600.
	8100.000	-37460908.	4447309.	13037556.
	8202.750	-38938566.	3896720.	11113015.
	8300.000	-40116354.	3310985.	9159853.
	8500.000	-41806271.	1937328.	4843752.
	8506.750	-41845313.	1887576.	4692984.
	8700.000	-42445907.	393040.	308093.
	8802.750	-42353538.	-441272.	-2033118.
	8900.000	-42003234.	-1242694.	-4218724.
	9100.000	-40500520.	-2882280.	-8510239.
	9106.750	-40432058.	-2936605.	-8648395.
	9300.000	-38013242.	-4434425.	-12353259.
	9402.750	-36391470.	-5168348.	-14090315.
	9500.000	-34666350.	-5809237.	-15558466.
	9700.000	-30628038.	-6923447.	-17969791.
	9706.750	-30482002.	-6955617.	-18035835.
1ST OPP	9900.000	-26101292.	-7705424.	-19472057.
	10002.750	-23659223.	-7959149.	-19866010.
	10100.000	-21313624.	-8099680.	-19996475.
	10300.000	-16505548.	-8070573.	-19523709.
	10306.750	-16345792.	-8061982.	-19490579.
	10500.000	-11918419.	-7604946.	-18084351.

TABLE 5-XVIII-B VEHICLE POSITION - EARTH-FIXED COORDINATES
(ENGLISH UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
	10602.750	-9723433.	-7198535.	-16992801.
	10700.000	-7782316.	-6713548.	-15756854.
	10900.000	-4304574.	-5431131.	-12663088.
	10906.750	-4200857.	-5381647.	-12547092.
	11100.000	-1659539.	-3815215.	-8961850.
	11202.750	-669551.	-2879993.	-6884350.
	11300.000	20014.	-1943574.	-4840684.
	11500.000	649443.	89454.	-506438.
	11506.750	651832.	159652.	-358986.
	11700.000	196503.	2177662.	3824992.
	11802.750	-452067.	3235345.	5978988.
	11900.000	-1316889.	4208485.	7939311.
	12100.000	-3815504.	6069057.	11634370.
	12106.750	-3915674.	6127590.	11749556.
	12300.000	-7174331.	7652517.	14730133.
	12402.750	-9180960.	8326774.	16037544.
	12500.000	-11224664.	8864194.	17077558.
	12700.000	-15762538.	9627313.	18565894.
	12706.750	-15921541.	9644532.	18600214.
	12900.000	-20559065.	9887822.	19127994.
	13002.750	-23045154.	9816085.	19048039.
	13100.000	-25372140.	9618037.	18743315.
	13300.000	-29953837.	8818837.	17438481.
	13306.750	-30106899.	8782902.	17379118.
	13500.000	-34087795.	7520271.	15285411.
	13602.750	-35962039.	6676863.	13884813.
	13700.000	-37550941.	5780529.	12397193.
	13900.000	-40173948.	3683342.	8921988.
	13906.750	-40246125.	3607518.	8796473.
	14100.000	-41824957.	1333929.	5035335.
	14202.750	-42266147.	67928.	2941326.
	14300.000	-42421153.	-1146300.	931248.
	14500.000	-41932927.	-3626037.	-3187454.
	14506.750	-41897673.	-3708128.	-3324311.
	14700.000	-40385397.	-5971054.	-7119152.
2ND OPP	14802.750	-39202038.	-7080742.	-9003556.
	14900.000	-37857185.	-8051518.	-10673283.
	15100.000	-34476474.	-9749234.	-13679591.
	15106.750	-34349419.	-9798612.	-13769727.
	15300.000	-30414488.	-10964400.	-15996282.

TABLE 5-XIX-A

VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(METRIC UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
GRR	-17.250	0.0	0.0	0.0
1ST MOT	0.0	0.0	0.0	0.0
TBI	0.398	0.383	0.000	0.002
	10.000	23.574	1.764	-0.154
TIL INIT	11.375	27.363	2.154	-0.193
	20.000	54.243	1.835	0.417
	30.000	92.649	1.464	5.631
	40.000	139.469	1.065	21.835
	50.000	194.496	0.707	54.622
	60.000	256.964	0.456	107.074
MACH 1	64.750	288.500	0.389	139.571
	70.000	323.948	0.339	181.326
	80.000	396.265	0.331	280.595
MAX Q	80.125	397.209	0.332	282.020
	90.000	472.876	0.553	411.156
	100.000	548.962	1.023	577.993
	110.000	626.021	1.711	778.967
	120.000	704.660	2.535	1015.413
	130.000	788.786	3.749	1289.887
	134.000	824.304	4.332	1412.081
CFCO	134.000	824.304	4.332	1412.081
	134.125	825.410	4.350	1415.997
	140.000	856.480	5.214	1568.852
	150.000	911.714	7.044	1854.692
MAX F/M	159.125	966.841	9.075	2152.863
TB3	159.924	971.700	9.273	2180.512
	160.000	972.124	9.291	2183.061
S2 UT	160.424	971.532	9.372	2190.585
SIC RI	160.624	970.058	9.400	2191.414
	160.694	969.455	9.410	2191.506
	160.694	969.455	9.410	2191.506
SIC SEP	160.694	969.456	9.410	2191.506
S2 IGN	162.324	954.704	9.622	2192.014
S2 90T	164.324	937.957	9.889	2195.843
S2 UTT	164.924	933.696	9.973	2198.791
	170.000	901.183	10.720	2230.419
	180.000	840.890	12.292	2299.664
	190.000	781.995	13.952	2370.964
INT J	190.624	778.365	14.059	2375.479
LFT J	196.124	746.628	15.019	2415.621

TABLE 5-XIX-A

VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
	200.000	724.557	15.711	2444.351
IGM FN	200.524	721.585	15.805	2448.252
IGM ON	201.250	717.474	15.937	2453.659
	210.000	667.079	17.955	2519.956
	220.000	609.324	20.526	2597.481
TSMC1	222.250	596.330	21.123	2615.173
	230.000	551.583	23.162	2676.813
	240.000	493.786	26.001	2758.064
	250.000	435.929	29.022	2841.316
	260.000	377.938	32.194	2926.673
	270.000	319.929	35.503	3014.353
	280.000	261.626	38.943	3104.438
	290.000	203.069	42.504	3197.006
	300.000	144.210	46.192	3292.137
	310.000	84.994	50.003	3389.943
	320.000	25.349	53.942	3490.585
	330.000	-34.810	58.012	3594.200
	340.000	-95.565	62.219	3700.941
	350.000	-156.995	66.566	3810.967
	360.000	-219.167	70.944	3924.481
	370.000	-282.219	75.502	4041.694
	380.000	-346.256	80.283	4162.812
	390.000	-411.381	85.263	4288.075
	400.000	-477.712	90.436	4417.744
	410.000	-545.378	95.811	4552.117
	420.000	-614.519	101.387	4691.526
	430.000	-685.289	107.173	4836.336
	440.000	-757.852	113.180	4986.946
	450.000	-832.388	119.426	5143.810
	460.000	-909.126	125.908	5306.603
	470.000	-986.032	132.024	5439.117
	480.000	-1056.606	137.859	5575.779
	490.000	-1131.335	143.827	5707.327
	500.000	-1211.640	149.580	5813.324
	510.000	-1291.446	155.453	5922.096
	520.000	-1374.575	161.598	6033.858
	530.000	-1460.320	167.973	6148.734
	540.000	-1548.289	174.559	6266.878
TB4	548.429	-1624.250	180.274	6369.035
54B UI	549.129	-1630.206	180.652	6371.404

TABLE 5-XIX-A

VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
S2 RT	549.229	-1631.025	180.698	6371.285
	549.304	-1631.639	180.733	6371.187
	549.304	-1631.639	180.733	6371.187
S2 SEP	549.304	-1631.638	180.733	6371.187
	550.000	-1637.304	181.047	6369.800
S4B IGN	552.429	-1657.058	182.141	6364.969
S4B ROT	554.929	-1677.777	183.340	6364.864
IGN 3S	556.500	-1691.145	184.176	6370.076
S4B UTT	556.929	-1694.769	184.406	6371.520
	560.000	-1720.790	186.033	6381.845
S4B UCI	561.229	-1731.511	186.652	6385.943
	TSMC2	563.500	-1751.684	187.798
	570.000	-1809.132	191.210	6415.085
	580.000	-1898.435	196.758	6448.092
	590.000	-1988.367	202.490	6480.851
	600.000	-2078.825	208.327	6513.588
	610.000	-2169.913	214.230	6546.084
	620.000	-2261.555	220.167	6578.488
	630.000	-2353.833	226.131	6610.820
	640.000	-2446.589	232.102	6642.984
	650.000	-2539.840	238.077	6675.092
	660.000	-2634.410	244.089	6707.016
	670.000	-2729.052	250.151	6738.921
	680.000	-2823.421	256.240	6770.978
S4B GCS I	685.654	-2876.662	259.689	6789.180
TR5	685.864	-2878.595	259.813	6789.700
S4B LUT	686.164	-2880.926	259.957	6789.862
	690.000	-2910.260	261.754	6776.486
	695.654	-2953.333	264.387	6757.761
PO INS	695.654	-2953.333	264.387	6757.761
	695.750	-2954.062	264.432	6757.441
	700.000	-2986.358	266.403	6743.182
	700.750	-2992.051	266.750	6740.650
	705.864	-3030.808	269.110	6723.255
	705.864	-3030.808	269.110	6723.255
	706.750	-3037.511	269.517	6720.219
ORB GIO	744.864	-3322.993	286.732	6583.305
LH2VTO	772.864	-3528.889	298.946	6475.014
S4BLUCO	772.864	-3528.889	298.946	6475.014
ORB NAV	794.750	-3687.355	308.212	6385.793
	900.000	-4416.590	348.915	5903.567

TABLE 5-XIX-A

VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
	1002.750	-5069.029	391.476	5352.793
	1100.000	-5624.491	404.633	4765.369
	1300.000	-6549.329	425.042	3386.179
	1306.750	-6575.007	425.036	3336.222
	1500.000	-7144.317	404.231	1835.707
	1602.750	-7311.134	376.490	997.936
	1700.000	-7379.099	339.480	192.627
	1900.000	-7241.519	231.667	-1459.402
	1906.750	-7230.406	227.319	-1514.311
	2100.000	-6738.384	85.281	-3036.093
	2202.750	-6345.355	-2.439	-3790.340
	2300.000	-5895.202	-91.662	-4457.007
	2500.000	-4754.355	-288.122	-5649.843
	2506.750	-4711.831	-294.940	-5685.369
	2700.000	-3375.303	-490.719	-6554.257
	2802.750	-2595.957	-592.389	-6391.326
	2900.000	-1826.483	-684.626	-7124.949
	3100.000	-186.630	-854.580	-7333.837
	3106.750	-130.668	-859.722	-7334.408
	3300.000	1461.699	-985.958	-7171.334
	3402.750	2284.747	-1034.148	-6945.709
	3500.000	3035.721	-1065.842	-6646.673
	3700.000	4456.486	-1084.021	-5787.371
	3706.750	4500.893	-1083.468	-5753.011
	3900.000	5652.744	-1033.850	-4637.768
	4002.750	6159.936	-980.528	-3952.998
	4100.000	6564.483	-912.912	-3256.858
	4300.000	7145.976	-723.438	-1715.279
	4306.750	7159.446	-715.917	-1661.362
	4500.000	7368.150	-472.410	-91.704
	4602.750	7338.279	-323.096	747.412
	4700.000	7220.107	-171.347	1531.258
	4900.000	6709.679	164.229	3071.392
	4906.750	6686.389	175.943	3120.989
	5100.000	5862.941	515.633	4451.163
	5202.750	5310.517	695.599	5074.774
	5300.000	4722.755	862.079	5601.673
	5500.000	3346.465	1181.910	6466.061
	5506.750	3296.684	1191.986	6489.699
	5700.000	1802.943	1453.908	7002.191

TABLE 5-XIX-A VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(METRIC UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
	5802.750	969.794	1568.603	7140.980
	5900.000	169.170	1658.618	7184.551
	6100.000	-1473.481	1779.616	7005.347
	6106.750	-1523.101	1782.081	6993.061
	6300.000	-3043.116	1804.650	6474.793
	6402.750	-3795.306	1777.655	6073.971
	6500.000	-4461.237	1726.611	5620.611
	6700.000	-5656.577	1544.246	4486.726
	6706.750	-5692.282	1536.313	4444.229
	6900.000	-6568.707	1262.553	3131.166
	7002.750	-6911.437	1082.655	2370.765
	7100.000	-7151.221	892.832	1623.188
	7300.000	-7374.278	452.254	39.739
	7306.750	-7375.345	436.399	-14.069
	7500.000	-7226.288	-36.889	-1539.591
	7602.750	-7007.624	-298.644	-2321.271
	7700.000	-6714.589	-548.377	-3031.844
	7900.000	-5865.046	-1053.521	-4364.920
	7906.750	-5830.943	-1070.109	-4406.301
	8100.000	-4720.637	-1522.819	-5471.465
	8202.750	-4036.358	-1740.586	-5933.622
	8300.000	-3339.136	-1927.692	-6297.183
	8500.000	-1790.097	-2242.189	-6802.422
	8506.750	-1735.798	-2250.955	-6813.560
	8700.000	-151.333	-2444.583	-6963.960
	8802.750	698.736	-2499.467	-6910.706
	8900.000	1494.921	-2518.765	-6775.968
	9100.000	3066.083	-2455.375	-6250.147
	9106.750	3116.849	-2450.792	-6226.799
	9300.000	4483.244	-2252.596	-5415.050
	9402.750	5127.804	-2095.898	-4879.514
	9500.000	5675.146	-1916.553	-4314.584
	9700.000	6581.807	-1461.249	-3005.739
	9706.750	6606.846	-1444.035	-2958.701
1ST OPP	9900.000	7157.631	-908.026	-1555.615
	10002.750	7314.709	-594.532	-779.529
	10100.000	7373.778	-284.546	-37.888
	10300.000	7219.624	376.643	1471.055
	10306.750	7208.904	399.199	1520.929
	10500.000	6703.211	1039.861	2896.066

TABLE 5-XIX-A

VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(METRIC UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
	10602.750	6304.884	1369.362	3572.386
	10700.000	5850.706	1668.262	4167.025
	10900.000	4704.948	2225.870	5222.229
	10906.750	4661.804	2243.052	5253.446
	11100.000	3323.225	2679.591	6011.265
	11202.750	2543.692	2862.825	6300.532
	11300.000	1774.445	3001.089	6497.249
	11500.000	135.820	3168.462	6658.423
	11506.750	79.910	3171.232	6658.082
	11700.000	-1510.794	3167.649	6489.076
	11802.750	-2332.861	3099.773	6276.358
	11900.000	-3082.826	2993.470	5999.767
	12100.000	-4501.045	2650.253	5216.815
	12106.750	-4545.349	2635.859	5185.713
	12300.000	-5693.592	2151.940	4181.027
	12402.750	-6198.192	1842.811	3567.507
	12500.000	-6599.753	1521.628	2945.657
	12700.000	-7173.248	790.535	1573.660
	12706.750	-7186.402	764.533	1525.780
	12900.000	-7384.753	-3.592	134.388
	13002.750	-7348.385	-422.434	-607.716
	13100.000	-7223.481	-818.505	-1300.079
	13300.000	-6697.707	-1609.798	-2658.682
	13306.750	-6673.869	-1635.565	-2702.406
	13500.000	-5834.239	-2333.386	-3874.995
	13602.750	-5272.994	-2665.172	-4425.077
	13700.000	-4676.926	-2947.976	-4890.464
	13900.000	-3284.339	-3417.388	-5657.145
	13906.750	-3234.039	-3430.332	-5678.225
	14100.000	-1726.793	-3712.624	-6139.846
	14202.750	-887.838	-3789.633	-6269.998
	14300.000	-82.852	-3813.585	-6317.639
	14500.000	1564.553	-3710.373	-6184.703
	14506.750	1619.223	-3703.308	-6174.864
	14700.000	3132.248	-3404.077	-5750.472
2ND OPP	14802.750	3880.573	-3171.316	-5417.538
	14900.000	4541.016	-2906.983	-5039.065
	15100.000	5719.677	-2242.155	-4087.976
	15106.750	5754.701	-2217.153	-4052.245
	15300.000	6608.785	-1442.360	-2946.077

TABLE 5-XIX-B

VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(ENGLISH UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
GRB	-17.250	0.0	0.0	0.0
1ST MOT	0.0	0.0	0.0	0.0
TBI	0.398	1.256	0.002	0.008
	10.000	77.341	5.787	-0.510
TILINIT	11.375	89.774	7.068	-0.632
	20.000	177.964	6.020	1.367
	30.000	303.965	4.803	18.473
	40.000	457.575	3.495	71.637
	50.000	638.110	2.320	179.207
	60.000	843.058	1.495	351.292
MACH 1	64.750	946.521	1.276	457.909
	70.000	1062.820	1.112	594.900
	80.000	1300.083	1.085	920.589
MAX Q	80.125	1303.179	1.089	925.261
	90.000	1551.430	1.813	1348.937
	100.000	1801.056	3.357	1896.303
	110.000	2053.874	5.615	2555.667
	120.000	2311.878	8.318	3331.407
	130.000	2587.880	12.300	4231.912
	134.000	2704.409	14.212	4632.811
CECO	134.000	2704.409	14.212	4632.811
	134.125	2708.039	14.271	4645.660
	140.000	2809.974	17.106	5147.151
	150.000	2991.187	23.109	6084.946
MAX F/M	159.125	3172.050	29.775	7063.198
TB3	159.924	3187.993	30.422	7153.912
	160.000	3189.384	30.483	7162.273
S2 UI	160.424	3187.441	30.747	7186.959
SIC RI	160.624	3182.604	30.841	7189.679
	160.694	3180.627	30.872	7189.982
	160.694	3180.627	30.872	7189.982
SIC SEP	160.694	3180.629	30.873	7189.981
S2 IGN	162.324	3132.231	31.568	7191.649
S2 90T	164.324	3077.285	32.445	7204.210
S2 UTT	164.924	3063.308	32.719	7213.881
	170.000	2956.636	35.170	7317.648
	180.000	2758.827	40.330	7544.829
	190.000	2565.599	45.776	7778.752
INT J	190.624	2553.690	46.125	7793.566
LFT J	196.124	2449.568	49.274	7925.265

TABLE 5-XIX-B VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(ENGLISH UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
	200.000	2377.155	51.544	8019.524
IGM FN	200.524	2367.405	51.855	8032.327
IGM ON	201.250	2353.918	52.285	8050.064
	210.000	2188.578	58.907	8267.574
	220.000	1999.093	67.343	8521.919
TSMCI	222.250	1956.462	69.301	8579.963
	230.000	1809.654	75.991	8782.194
	240.000	1620.033	85.305	9048.768
	250.000	1430.215	95.216	9321.903
	260.000	1240.118	105.624	9601.945
	270.000	1049.636	116.480	9889.610
	280.000	858.353	127.765	10185.165
	290.000	666.237	139.450	10488.265
	300.000	473.129	151.550	10800.975
	310.000	278.853	164.051	11121.877
	320.000	83.167	176.975	11452.052
	330.000	-114.207	190.328	11791.995
	340.000	-313.535	204.130	12142.194
	350.000	-515.077	218.391	12503.172
	360.000	-719.052	232.756	12875.594
	370.000	-925.915	247.709	13260.152
	380.000	-1136.012	263.395	13657.521
	390.000	-1349.675	279.735	14068.486
	400.000	-1567.298	296.706	14493.911
	410.000	-1789.298	314.340	14934.766
	420.000	-2016.138	332.636	15392.145
	430.000	-2248.323	351.616	15867.244
	440.000	-2486.391	371.326	16361.371
	450.000	-2730.931	391.818	16876.017
	460.000	-2982.698	413.084	17410.116
	470.000	-3235.013	433.148	17844.871
	480.000	-3466.556	452.295	18293.239
	490.000	-3713.369	471.873	18724.826
	500.000	-3975.196	490.749	19072.586
	510.000	-4237.028	510.016	19429.449
	520.000	-4509.761	530.176	19796.122
	530.000	-4791.077	551.093	20173.012
	540.000	-5079.689	572.700	20560.624
TR4	548.429	-5328.905	591.451	20895.785
S48 UI	549.129	-5348.443	592.691	20903.557

TABLE 5-XIX-B VEHICLE VELOCITY - EARTH-FIXED COORDINATES.
(ENGLISH UNITS)
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
S2 RI	549.229	-5351.131	592.843	20903.165
	549.304	-5353.145	592.957	20902.843
	549.304	-5353.145	592.957	20902.843
S2 SFP	549.304	-5353.144	592.957	20902.843
	550.000	-5371.732	593.987	20898.295
S4B IGN	552.429	-5436.541	597.576	20882.445
S4B 90T	554.929	-5504.518	601.510	20882.100
IGM 3S	556.500	-5548.377	604.253	20899.200
S4B UTT	556.929	-5560.266	605.008	20903.937
	560.000	-5645.636	610.345	20937.811
S4B UCJ	561.229	-5680.809	612.374	20951.258
TSMC2	563.500	-5746.994	616.136	20975.982
	570.000	-5935.472	627.330	21046.868
	580.000	-6228.462	645.530	21155.153
	590.000	-6523.515	664.339	21262.636
	600.000	-6820.291	683.488	21370.039
	610.000	-7119.136	702.853	21476.654
	620.000	-7419.799	722.332	21582.965
	630.000	-7722.549	741.900	21689.043
	640.000	-8026.867	761.488	21794.568
	650.000	-8332.908	781.092	21899.909
	660.000	-8643.078	800.317	22004.647
	670.000	-8953.582	820.707	22109.320
	680.000	-9263.192	840.682	22214.495
	685.654	-9437.869	851.999	22274.211
	S4B GCS1	685.864	-9444.210	852.406
TR5	686.164	-9451.856	852.876	22273.169
S4B LUI	690.000	-9548.099	858.774	22232.564
	695.654	-9689.414	867.413	22171.131
PD INS	695.654	-9689.414	867.413	22171.131
	695.750	-9691.806	867.559	22170.082
	700.000	-9797.764	874.025	22123.302
	700.750	-9816.439	875.163	22114.994
	705.864	-9943.596	882.906	22057.923
	705.864	-9943.596	882.906	22057.923
ORB GTD	706.750	-9965.588	884.243	22047.963
LH2VTO	744.864	-10902.208	940.722	21598.770
S4BLUCO	772.864	-11577.721	980.794	21243.483
ORB NAV	794.750	-12097.620	1011.194	20950.763
	900.000	-14490.124	1144.735	19368.658

TABLE 5-XIX-B

VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
	1002.750	-16630.674	1251.563	17561.655
	1100.000	-18453.022	1327.536	15634.414
	1300.000	-21487.300	1394.495	11109.512
	1306.750	-21571.545	1394.476	10945.611
	1500.000	-23439.360	1326.218	6022.662
	1602.750	-23986.662	1235.203	3274.070
	1700.000	-24209.644	1113.810	631.979
	1900.000	-23758.263	760.061	-4788.063
	1906.750	-23721.804	745.798	-4968.212
	2100.000	-22107.559	279.793	-9960.934
	2202.750	-20818.093	-8.001	-12435.498
	2300.000	-19341.215	-300.728	-14622.725
	2500.000	-15599.917	-945.281	-18536.230
	2506.750	-15458.764	-967.650	-18652.784
	2700.000	-11073.829	-1609.970	-21503.469
	2802.750	-8516.920	-1943.532	-22609.338
	2900.000	-5992.399	-2246.149	-23375.815
	3100.000	-612.302	-2803.741	-24061.144
	3106.750	-428.699	-2820.610	-24063.018
	3300.000	4795.601	-3234.769	-23528.000
	3402.750	7495.889	-3392.874	-22787.760
	3500.000	9959.716	-3496.857	-21806.688
	3700.000	14621.018	-3556.500	-18987.437
	3706.750	14766.708	-3554.686	-18874.708
	3900.000	18545.748	-3391.895	-15215.775
	4002.750	20209.764	-3216.956	-12969.154
	4100.000	21537.019	-2995.120	-10685.229
	4300.000	23444.804	-2373.486	-5627.555
	4306.750	23488.997	-2348.810	-5450.663
	4500.000	24173.719	-1549.901	-300.866
	4602.750	24075.719	-1060.025	2452.138
	4700.000	23688.016	-562.164	5023.813
	4900.000	22013.383	538.809	10076.745
	4906.750	21936.971	577.241	10239.466
	5100.000	19235.372	1691.710	14603.552
	5202.750	17422.956	2282.149	16649.521
	5300.000	15494.604	2828.345	18378.192
	5500.000	10979.215	3877.658	21214.112
	5506.750	10815.891	3910.714	21291.664
	5700.000	5915.167	4770.039	22973.069

TABLE 5-XIX-R

VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
	5802.750	3181.739	5146.335	23428.413
	5900.000	555.019	5441.662	23571.363
	6100.000	-4834.255	5838.635	22983.422
	6106.750	-5013.456	5846.721	22943.115
	6300.000	-9983.977	5920.768	21242.761
	6402.750	-12451.791	5832.200	19927.725
	6500.000	-14636.605	5664.736	18440.326
	6700.000	-18558.324	5066.425	14720.231
	6706.750	-18675.466	5040.396	14580.804
	6900.000	-21550.875	4142.250	10272.854
	7002.750	-22675.319	3552.018	7778.100
	7100.000	-23462.010	2929.239	5325.421
	7300.000	-24193.825	1483.773	130.377
	7306.750	-24197.324	1431.757	-46.159
	7500.000	-23708.295	-121.026	-5047.872
	7602.750	-22990.891	-979.802	-7615.720
	7700.000	-22029.490	-1799.136	-9946.994
	7900.000	-19242.277	-3456.432	-14320.602
	7906.750	-19130.391	-3510.856	-14456.368
	8100.000	-15487.655	-4996.125	-17951.001
	8202.750	-13242.644	-5710.584	-19467.263
	8300.000	-10955.170	-6324.447	-20660.050
	8500.000	-5873.023	-7356.262	-22317.658
	8506.750	-5694.875	-7385.022	-22354.199
	8700.000	-496.514	-8020.285	-22847.638
	8802.750	2292.442	-8200.352	-22672.921
	8900.000	4904.598	-8263.665	-22230.866
	9100.000	10059.326	-8055.692	-20505.733
	9106.750	10225.882	-8040.655	-20429.132
	9300.000	14708.807	-7390.408	-17765.912
	9402.750	16823.505	-6876.305	-16008.905
	9500.000	18619.247	-6287.905	-14155.459
	9700.000	21593.856	-4794.126	-9861.350
	9706.750	21676.005	-4737.649	-9707.025
1ST OPP	9900.000	23483.042	-2979.088	-5103.724
	10002.750	23998.389	-1950.565	-2557.509
	10100.000	24192.186	-933.549	-124.303
	10300.000	23686.431	1235.705	4826.295
	10306.750	23648.307	1309.709	4989.926
	10500.000	21992.163	3411.617	9501.530

TABLE 5-XIX-B

VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(ENGLISH UNITS)

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
	10602.750	20685.316	4492.659	11720.425
	10700.000	19195.231	5473.299	13671.341
	10900.000	15436.181	7302.724	17133.299
	10906.750	15294.632	7359.094	17235.716
	11100.000	10902.971	8791.311	19721.999
	11202.750	8345.447	9392.471	20671.036
	11300.000	5821.669	9846.092	21316.433
	11500.000	445.603	10395.218	21845.219
	11506.750	262.174	10404.304	21844.101
	11700.000	-4956.673	10392.549	21289.620
	11802.750	-7653.742	10169.858	20591.725
	11900.000	-10114.257	9821.097	19684.275
	12100.000	-14767.209	8695.057	17115.536
	12106.750	-14912.563	8647.831	17013.493
	12300.000	-18679.762	7060.169	13717.281
	12402.750	-20335.276	6045.967	11704.420
	12500.000	-21652.734	4992.218	9664.228
	12700.000	-23534.280	2593.618	5162.927
	12706.750	-23577.435	2508.312	5005.839
	12900.000	-24228.192	-11.783	440.904
	13002.750	-24108.874	-1385.938	-1993.819
	13100.000	-23699.084	-2685.383	-4265.350
	13300.000	-21974.103	-5281.489	-8722.709
	13306.750	-21895.897	-5366.028	-8866.163
	13500.000	-19141.205	-7655.465	-12713.237
	13602.750	-17299.848	-8744.001	-14517.969
	13700.000	-15344.247	-9671.836	-16044.830
	13900.000	-10775.392	-11211.903	-18560.187
	13906.750	-10610.365	-11254.369	-18629.347
	14100.000	-5665.333	-12180.523	-20143.853
	14202.750	-2912.853	-12433.179	-20570.860
	14300.000	-271.824	-12511.761	-20727.163
	14500.000	5133.049	-12173.139	-20291.020
	14506.750	5312.413	-12149.962	-20258.741
	14700.000	10276.403	-11168.230	-18866.379
	14802.750	12731.540	-10404.580	-17774.074
	14900.000	14898.346	-9537.347	-16532.366
	15100.000	18765.345	-7356.152	-13411.994
	15106.750	18880.252	-7274.125	-13294.767
	15300.000	21682.365	-4732.153	-9665.608

ND OPP

TABLE 5-XX-A

 THRUST, MASS, AND INERTIAL ACCELERATION
 (METRIC UNITS)
 FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (NEWTONS)	MASS (KG)	INERTIAL ACCELERATION (M/(SEC)SQ)	
1ST OPP	9706.750	4.8301390 01	1.3518500 05	9.2419	
	9710.000	4.8281770 01	1.3518470 05	9.2418	
	9810.000	4.7678080 01	1.3517690 05	9.2407	
FM NAV	9907.625	4.7088730 01	1.3516940 05	9.2394	
	9910.000	4.7074390 01	1.3516920 05	9.2394	
	9912.000	4.7062320 01	1.3516900 05	9.2393	
	9912.000	4.7062320 01	1.3516900 05	9.2393	
TR6	9912.000	4.7062320 01	1.3516900 05	9.2393	
D2H2I	9954.000	1.1996420 02	1.3516590 05	9.2387	
LH2VTCO	9954.200	1.2003550 02	1.3516580 05	9.2387	
	10010.000	9.3441430 01	1.3516530 05	9.2379	
	10110.000	1.2966640 02	1.3516400 05	9.2364	
	10210.000	1.5332120 02	1.3516230 05	9.2347	
	10310.000	1.5332120 02	1.3516050 05	9.2331	
	S4B LUT	10408.300	1.5453640 02	1.3515870 05	9.2315
	D2H2CO	10408.800	6.2275100 02	1.3515860 05	9.2315
		10410.000	6.2275100 02	1.3515820 05	9.2315
		10480.000	6.2275100 02	1.3514120 05	9.2304
		10481.000	6.2275100 02	1.3514100 05	9.2304
10481.000		6.2275100 02	1.3514100 05	9.2304	
10482.000		6.2275100 02	1.3514080 05	9.2303	
LTI		10482.000	6.2275100 02	1.3514080 05	9.2303
S4BLUCO		10485.000	3.7133840 03	1.3513720 05	9.2302
		10490.000	2.0719810 03	1.3513130 05	9.2299
S4B RET		10490.000	2.0719810 03	1.3513130 05	9.2299
S4B 90T	10492.500	7.8024390 05	1.3492010 05	10.8194	
IGM ON	10496.500	7.9663460 05	1.3416510 05	10.8896	
	10500.000	7.9711720 05	1.3350370 05	11.0948	
TSMC3	10506.500	7.9784730 05	1.3227440 05	11.3583	
	10510.000	7.9829090 05	1.3161260 05	11.3583	
	10520.000	7.9623050 05	1.2972410 05	11.4092	
	10530.000	7.9624110 05	1.2783630 05	11.4532	
	10540.000	7.9613030 05	1.2594860 05	11.4917	
	10550.000	7.9599610 05	1.2406130 05	11.5278	
	10560.000	7.9587490 05	1.2217440 05	11.5629	
	10570.000	7.9576440 05	1.2028770 05	11.5973	
	10580.000	7.9564650 05	1.1840130 05	11.6318	
	10590.000	7.9555310 05	1.1651510 05	11.6663	
	MRS	10592.500	7.9553460 05	1.1604360 05	11.6753
		10600.000	9.1607740 05	1.1441030 05	12.3813
		10610.000	9.1577960 05	1.1223100 05	12.4211

TABLE 5-XX-A

 THRUST, MASS, AND INERTIAL ACCELERATION
 (METRIC UNITS)
 FIRST OPPORTUNITY

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (NEWTONS)	MASS (KG)	INERTIAL ACCELERATION (M/(SEC)SQ)	
T&D MAN	11734.375	6.1636370-39	6.2626980 04	3.8863	
	11740.000	6.1636370-39	6.2626980 04	3.8641	
	11833.049	6.1636370-39	6.2626980 04	3.5204	
	11840.000	6.1636370-39	6.2626980 04	3.4964	
	11940.000	6.1636370-39	6.2626980 04	3.1743	
	12040.000	6.1636370-39	6.2626980 04	2.8922	
	12140.000	6.1636370-39	6.2626980 04	2.6448	
	12240.000	6.1636370-39	6.2626980 04	2.4271	
	CSM SEP	12333.259	6.1636370-39	3.2599610 04	2.2473
		12340.000	6.1636370-39	3.2599610 04	2.2351
12440.000		6.1636370-39	3.2599610 04	2.0652	
12540.000		6.1636370-39	3.2599610 04	1.9142	
12640.000		6.1636370-39	3.2599610 04	1.7797	
12740.000		6.1636370-39	3.2599610 04	1.6593	
12840.000		6.1636370-39	3.2599610 04	1.5513	
12900.000		6.1636370-39	3.2599610 04	1.4917	

TABLE 5-XX-B

 THRUST, MASS, AND INERTIAL ACCELERATION
 (ENGLISH UNITS)
 FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (POUNDS)	MASS (POUNDS)	INERTIAL ACCELERATION (FT/SEC/SEC)
1ST OPP	9706.750	1.085858D 01	2.980319D 05	30.3211
	9710.000	1.085417D 01	2.980313D 05	30.3210
	9810.000	1.071846D 01	2.980141D 05	30.3172
FM NAV	9907.625	1.058597D 01	2.979975D 05	30.3130
	9910.000	1.058274D 01	2.979971D 05	30.3129
	9912.000	1.058003D 01	2.979967D 05	30.3128
TR6	9912.000	1.058003D 01	2.979967D 05	30.3128
O2H2I	9954.000	2.696903D 01	2.979897D 05	30.3108
LH2VTCO	9954.200	2.698505D 01	2.979897D 05	30.3108
	10010.000	2.100647D 01	2.979885D 05	30.3081
	10110.000	2.915017D 01	2.979856D 05	30.3030
	10210.000	3.446799D 01	2.979818D 05	30.2977
	10310.000	3.446799D 01	2.979778D 05	30.2923
S48 LUI	10408.300	3.474116D 01	2.979739D 05	30.2871
O2H2CO	10408.800	1.400000D 02	2.979736D 05	30.2870
	10410.000	1.400000D 02	2.979729D 05	30.2870
	10480.000	1.400000D 02	2.979354D 05	30.2834
	10481.000	1.400000D 02	2.979349D 05	30.2833
	10481.000	1.400000D 02	2.979349D 05	30.2833
	10482.000	1.400000D 02	2.979344D 05	30.2832
LTI	10482.000	1.400000D 02	2.979344D 05	30.2832
S48LUCC	10485.000	8.348019D 02	2.979266D 05	30.2828
	10490.000	4.657998D 02	2.979135D 05	30.2818
S48 REI	10490.000	4.657998D 02	2.979135D 05	30.2818
S48 90T	10492.500	1.754058D 05	2.974479D 05	35.4968
IGM ON	10496.500	1.790906D 05	2.957833D 05	35.7270
	10500.000	1.791991D 05	2.943252D 05	36.4001
TSMC3	10506.500	1.793632D 05	2.916152D 05	37.2649
	10510.000	1.794629D 05	2.901562D 05	37.2646
	10520.000	1.789997D 05	2.859928D 05	37.4316
	10530.000	1.790021D 05	2.818308D 05	37.5762
	10540.000	1.789772D 05	2.776692D 05	37.7023
	10550.000	1.789470D 05	2.735084D 05	37.8207
	10560.000	1.789198D 05	2.693484D 05	37.9361
	10570.000	1.788950D 05	2.651889D 05	38.0489
	10580.000	1.788685D 05	2.610301D 05	38.1620
	10590.000	1.788474D 05	2.568719D 05	38.2754
	MRS	10592.500	1.788433D 05	2.558324D 05
10600.000		2.059424D 05	2.522315D 05	40.6210
10610.000		2.058754D 05	2.474270D 05	40.7515

TABLE 5-XX-B

 THRUST, MASS, AND INERTIAL ACCELERATION
 (ENGLISH UNITS)
 FIRST OPPORTUNITY

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (POUNDS)	MASS (POUNDS)	INERTIAL ACCELERATION (FT/SEC/SEC)
	10620.000	2.058172D 05	2.426241D 05	40.9987
	10630.000	2.057678D 05	2.378225D 05	41.2375
	10640.000	2.064969D 05	2.330099D 05	41.5332
	10650.000	2.060322D 05	2.281949D 05	41.7211
	10660.000	2.060310D 05	2.233873D 05	41.9774
	10670.000	2.059953D 05	2.185802D 05	42.2433
	10680.000	2.059612D 05	2.137739D 05	42.5278
	10690.000	2.059249D 05	2.089685D 05	42.8338
	10700.000	2.058900D 05	2.041640D 05	43.1651
	10710.000	2.058546D 05	1.993603D 05	43.5268
	10720.000	2.058198D 05	1.945574D 05	43.9199
	10730.000	2.057837D 05	1.897555D 05	44.3524
	10740.000	2.057393D 05	1.849545D 05	44.8277
	10750.000	2.056887D 05	1.801541D 05	45.3538
	10760.000	2.064099D 05	1.753419D 05	46.0488
	10770.000	2.057419D 05	1.705278D 05	46.6173
	10780.000	2.057259D 05	1.657230D 05	47.3657
	10790.000	2.056724D 05	1.609187D 05	48.1971
	10800.000	2.056048D 05	1.561157D 05	49.1437
	10810.000	2.054952D 05	1.513146D 05	50.9730
	10820.000	2.052955D 05	1.465171D 05	51.5958
	10830.000	2.050622D 05	1.417247D 05	52.3573
S4BGCS2	10833.049	2.049588D 05	1.402641D 05	52.5912
TR7	10833.259	4.632065D 04	1.401515D 05	29.9549
	10840.000	4.388580D 01	1.400802D 05	29.0990
	10843.049	4.334141D 01	1.400599D 05	29.0627
TLI	10843.049	4.334141D 01	1.400599D 05	29.0627
	10843.375	4.328325D 01	1.400577D 05	29.0587
	10853.259	4.151856D 01	1.399925D 05	28.9367
	10853.259	4.151856D 01	1.399925D 05	28.9367
ORB GIO	10853.375	4.149789D 01	1.399917D 05	28.9353
ORB NAV	10854.375	4.131936D 01	1.399852D 05	28.9226
	10940.000	3.180088D 00	1.394646D 05	27.6275
	11040.000	2.893213D 00	1.391285D 05	25.7150
	11140.000	2.606338D 00	1.389546D 05	23.5798
	11240.000	2.319463D 00	1.387878D 05	21.4021
	11340.000	2.032588D 00	1.386281D 05	19.3068
	11440.000	1.745713D 00	1.384756D 05	17.3662
	11540.000	1.458838D 00	1.383302D 05	15.6127
	11640.000	1.171963D 00	1.381919D 05	14.0528

TABLE 5-XX-B THRUST, MASS, AND INERTIAL ACCELERATION
 (CONTINUED) (ENGLISH UNITS)
 FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (POUNDS)	MASS (POUNDS)	INERTIAL ACCELERATION (FT/SEC/SEC)
T&D MAN	11734.375	1.385641D-39	1.380688D 05	12.7503
	11740.000	1.385641D-39	1.380688D 05	12.6776
	11833.049	1.385641D-39	1.380688D 05	11.5499
	11840.000	1.385641D-39	1.380688D 05	11.4711
	11940.000	1.385641D-39	1.380688D 05	10.4145
	12040.000	1.385641D-39	1.380688D 05	9.4890
	12140.000	1.385641D-39	1.380688D 05	8.6770
CSM SEP	12240.000	1.385641D-39	1.380688D 05	7.9629
	12333.259	1.385641D-39	7.186985D 04	7.3731
	12340.000	1.385641D-39	7.186985D 04	7.3330
	12440.000	1.385641D-39	7.186985D 04	6.7755
	12540.000	1.385641D-39	7.186985D 04	6.2803
	12640.000	1.385641D-39	7.186985D 04	5.8389
	12740.000	1.385641D-39	7.186985D 04	5.4441
	12840.000	1.385641D-39	7.186985D 04	5.0896
	12900.000	1.385641D-39	7.186985D 04	4.8942

TABLE 5-XXI-A ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(METRIC UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (METERS)	VFLOCITY (M/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (M/(SEC) ²)
1ST OPP	9706.750	194271.	7381.71	0.0420	9.2419
	9710.000	194282.	7381.69	0.0419	9.2418
	9810.000	194647.	7381.28	0.0380	9.2407
FM NAV	9907.625	195100.	7380.75	0.0337	9.2394
	9910.000	195112.	7380.73	0.0336	9.2394
	9912.000	195122.	7380.72	0.0335	9.2393
TB6	9912.000	195122.	7380.72	0.0335	9.2393
02H2T	9954.000	195346.	7380.45	0.0315	9.2387
LH2VTCO	9954.200	195347.	7380.45	0.0315	9.2387
	10010.000	195669.	7380.08	0.0288	9.2379
	10110.000	196306.	7379.34	0.0239	9.2364
	10210.000	197006.	7378.55	0.0190	9.2347
	10310.000	197747.	7377.70	0.0143	9.2331
S4B LUT	10408.300	198490.	7376.85	0.0100	9.2315
02H2CO	10408.800	198493.	7376.85	0.0100	9.2315
	10410.000	198503.	7376.84	0.0099	9.2315
	10480.000	199025.	7376.48	0.0073	9.2304
	10481.000	199032.	7376.48	0.0072	9.2304
	10481.000	199032.	7376.48	0.0072	9.2304
	10482.000	199039.	7376.47	0.0072	9.2303
LTI	10482.000	199039.	7376.47	0.0072	9.2303
S4BLUCO	10485.000	199061.	7376.51	0.0071	9.2303
	10490.000	199098.	7376.58	0.0069	9.2302
S4B REI	10490.000	199098.	7376.58	0.0069	9.2302
S4B 90T	10492.500	199117.	7383.12	0.0078	9.2302
IGM ON	10496.500	199147.	7406.73	0.0115	9.2301
	10500.000	199176.	7427.52	0.0150	9.2301
TSMC3	10506.500	199227.	7466.36	0.0031	9.2299
	10510.000	199250.	7487.46	-0.0009	9.2299
	10520.000	199310.	7548.18	-0.0058	9.2298
	10530.000	199372.	7609.81	0.0007	9.2297
	10540.000	199451.	7672.34	0.0193	9.2295
	10550.000	199564.	7735.77	0.0503	9.2292
	10560.000	199728.	7800.12	0.0942	9.2288
	10570.000	199963.	7865.39	0.1510	9.2282
	10580.000	200286.	7931.60	0.2210	9.2274
	10590.000	200719.	7998.75	0.3044	9.2262
MRS	10592.500	200846.	8015.69	0.3273	9.2259
	10600.000	201280.	8074.70	0.3998	9.2247
	10610.000	201992.	8154.64	0.5109	9.2228

TABLE 5-XXI-A ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(METRIC UNITS)
(CONTINUED) FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SFC)	ALTITUDE (METERS)	VELOCITY (M/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (M/(SEC) ²)
	10620.000	202883.	8235.96	0.6392	9.2203
	10630.000	203978.	8318.67	0.7826	9.2173
	10640.000	205304.	8403.03	0.9421	9.2136
	10650.000	206890.	8488.96	1.1184	9.2093
	10660.000	208767.	8576.32	1.3114	9.2041
	10670.000	210966.	8665.28	1.5212	9.1980
	10680.000	213518.	8755.90	1.7479	9.1909
	10690.000	216457.	8848.24	1.9914	9.1828
	10700.000	219817.	8942.37	2.2517	9.1735
	10710.000	223633.	9038.36	2.5287	9.1629
	10720.000	227941.	9136.29	2.8225	9.1510
	10730.000	232778.	9236.28	3.1327	9.1376
	10740.000	238182.	9338.41	3.4592	9.1228
	10750.000	244192.	9442.81	3.8017	9.1062
	10760.000	250847.	9549.91	4.1597	9.0880
	10770.000	258187.	9659.58	4.5329	9.0679
	10780.000	266254.	9771.71	4.9204	9.0459
	10790.000	275087.	9886.72	5.3212	9.0220
	10800.000	284725.	10004.80	5.7341	8.9959
	10810.000	295206.	10126.10	6.1487	8.9677
	10820.000	306541.	10250.83	6.5672	8.9373
	10830.000	318785.	10379.34	7.0086	8.9047
S4BGCS2	10833.049	322708.	10419.30	7.1478	8.8942
TR7	10833.259	322982.	10421.74	7.1575	8.8935
	10840.000	331961.	10414.81	7.4763	8.8697
	10843.049	336147.	10411.27	7.6202	8.8587
TLI	10843.049	336147.	10411.27	7.6202	8.8587
	10843.375	336599.	10410.88	7.6356	8.8575
	10853.259	350727.	10398.94	8.1011	8.8203
	10853.259	350727.	10398.94	8.1011	8.8203
ORB GID	10853.375	350897.	10398.80	8.1065	8.8199
ORB NAV	10854.375	352372.	10397.56	8.1535	8.8160
	10940.000	508398.	10268.03	12.0970	8.4208
	11040.000	759652.	10067.98	16.4621	7.8379
	11140.000	1075457.	9830.70	20.5219	7.1871
	11240.000	1445012.	9571.13	24.2580	6.5234
	11340.000	1858056.	9301.54	27.6747	5.8847
	11440.000	2305472.	9031.09	30.7913	5.2932
	11540.000	2779524.	8766.08	33.6346	4.7588
	11640.000	3273841.	8510.48	36.2337	4.2833

TABLE 5-XXI-A ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(METRIC UNITS)
(CONTINUED) FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (METERS)	VELOCITY (M/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (M/(SEC) ²)	
T&D MAN	11734.375	3754300.	8279.93	38.4887	3.8863	
	11740.000	3783283.	8266.54	38.6175	3.8641	
	11833.049	4267292.	8051.01	40.6656	3.5204	
	11840.000	4303753.	8035.37	40.8126	3.4964	
	11940.000	4832015.	7817.25	42.8427	3.1743	
	12040.000	5365520.	7612.01	44.7287	2.8922	
	12140.000	5902272.	7419.17	46.4886	2.6448	
	12240.000	6440704.	7238.08	48.1377	2.4271	
	CSM SEP	12333.259	6943273.	7079.17	49.5875	2.2473
		12340.000	6979592.	7068.04	49.6897	2.2351
12440.000		7517981.	6908.30	51.1543	2.0652	
12540.000		8055123.	6758.15	52.5424	1.9142	
12640.000		8590440.	6616.89	53.8617	1.7797	
12740.000		9123483.	6483.89	55.1189	1.6593	
12840.000		9653906.	6358.53	56.3199	1.5513	
12900.000		9970791.	6286.76	57.0155	1.4917	

TABLE 5-XXI-B ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(ENGLISH UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (FEET)	VELOCITY (FT/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (FT/SEC/SEC)	
1ST OPP	9706.750	637373.	24218.19	0.0420	30.3211	
	9710.000	637407.	24218.16	0.0419	30.3210	
	9810.000	638607.	24216.80	0.0380	30.3172	
FM NAV	9907.625	640090.	24215.06	0.0337	30.3130	
	9910.000	640130.	24215.01	0.0336	30.3129	
	9912.000	640164.	24214.97	0.0335	30.3128	
TR6	9912.000	640164.	24214.97	0.0335	30.3128	
02H2I	9954.000	640898.	24214.09	0.0315	30.3108	
LH2VTCO	9954.200	640902.	24214.08	0.0315	30.3108	
	10010.000	641957.	24212.85	0.0288	30.3081	
	10110.000	644048.	24210.45	0.0239	30.3030	
	10210.000	646346.	24207.84	0.0190	30.2977	
	10310.000	648777.	24205.06	0.0143	30.2923	
	S4B LUI	10408.300	651213.	24202.26	0.0100	30.2871
	02H2CO	10408.800	651225.	24202.25	0.0100	30.2870
10410.000		651255.	24202.23	0.0099	30.2870	
10480.000		652968.	24201.06	0.0073	30.2834	
10481.000		652992.	24201.04	0.0072	30.2833	
10481.000		652992.	24201.04	0.0072	30.2833	
10482.000		653016.	24201.02	0.0072	30.2833	
LTI		10482.000	653016.	24201.02	0.0072	30.2833
S4BLUCO	10485.000	653088.	24201.16	0.0071	30.2831	
	10490.000	653209.	24201.37	0.0069	30.2829	
S4B REI	10490.000	653209.	24201.37	0.0069	30.2829	
S4B 90T	10492.500	653269.	24222.82	0.0078	30.2827	
IGM ON	10496.500	653370.	24300.28	0.0115	30.2825	
	10500.000	653465.	24368.51	0.0150	30.2823	
TSMC3	10506.500	653631.	24495.94	0.0031	30.2820	
	10510.000	653708.	24565.15	-0.0009	30.2818	
	10520.000	653905.	24764.39	-0.0058	30.2814	
	10530.000	654108.	24966.57	0.0007	30.2811	
	10540.000	654367.	25171.71	0.0193	30.2805	
	10550.000	654737.	25379.82	0.0503	30.2797	
	10560.000	655276.	25590.94	0.0942	30.2783	
	10570.000	656045.	25805.09	0.1510	30.2764	
	10580.000	657106.	26022.31	0.2210	30.2736	
	10590.000	658526.	26242.62	0.3044	30.2698	
MRS	10592.500	658944.	26298.19	0.3273	30.2686	
	10600.000	660368.	26491.78	0.3998	30.2648	
	10610.000	662704.	26754.06	0.5109	30.2584	

TABLE 5-XXI-B ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
 FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
 (ENGLISH UNITS)
 (CONTINUED) FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (FEET)	VELOCITY (FT/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (FT/SEC/SEC)
	10620.000	665626.	27020.87	0.6392	30.2504
	10630.000	669218.	27292.23	0.7826	30.2405
	10640.000	673569.	27568.99	0.9421	30.2285
	10650.000	678774.	27850.90	1.1184	30.2141
	10660.000	684932.	28137.52	1.3114	30.1971
	10670.000	692146.	28429.40	1.5212	30.1771
	10680.000	700519.	28726.71	1.7479	30.1539
	10690.000	710161.	29029.66	1.9914	30.1272
	10700.000	721184.	29338.47	2.2517	30.0966
	10710.000	733703.	29653.40	2.5287	30.0620
	10720.000	747837.	29974.72	2.8225	30.0229
	10730.000	763706.	30302.75	3.1327	29.9791
	10740.000	781436.	30637.84	3.4592	29.9303
	10750.000	801154.	30980.33	3.8017	29.8761
	10760.000	822988.	31331.72	4.1597	29.8163
	10770.000	847072.	31691.53	4.5329	29.7504
	10780.000	873537.	32059.41	4.9204	29.6783
	10790.000	902515.	32436.75	5.3212	29.5996
	10800.000	934138.	32824.16	5.7341	29.5141
	10810.000	968523.	33222.12	6.1487	29.4215
	10820.000	1005713.	33631.34	6.5672	29.3219
	10830.000	1045881.	34052.94	7.0086	29.2148
S4BGCS2	10833.049	1058754.	34184.07	7.1478	29.1806
TB7	10833.259	1059651.	34192.06	7.1575	29.1782
	10840.000	1089110.	34169.32	7.4763	29.1001
	10843.049	1102845.	34157.69	7.6202	29.0639
TLI	10843.049	1102845.	34157.69	7.6202	29.0639
	10843.375	1104328.	34156.44	7.6356	29.0599
	10853.259	1150679.	34117.27	8.1011	28.9380
	10853.259	1150679.	34117.27	8.1011	28.9380
ORB GID	10853.375	1151237.	34116.80	8.1065	28.9366
ORB NAV	10854.375	1156077.	34112.72	8.1535	28.9239
	10940.000	1667972.	33687.78	12.0970	27.6275
	11040.000	2492296.	33031.42	16.4621	25.7150
	11140.000	3528401.	32252.97	20.5219	23.5798
	11240.000	4740854.	31401.34	24.2580	21.4021
	11340.000	6095984.	30516.85	27.6747	19.3068
	11440.000	7563886.	29629.57	30.7913	17.3662
	11540.000	9119174.	28760.11	33.6346	15.6127
	11640.000	10740949.	27921.51	36.2337	14.0528

TABLE 5-XXI-B ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(ENGLISH UNITS)
(CONTINUED) FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (FEET)	VELOCITY (FT/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (FT/SEC/SEC)	
T&D MAN	11734.375	12317258.	27165.13	38.4887	12.7503	
	11740.000	12412346.	27121.21	38.6175	12.6776	
	11833.049	14000301.	26414.09	40.6656	11.5499	
	11840.000	14119926.	26362.75	40.8126	11.4711	
	11940.000	15853067.	25647.16	42.8427	10.4145	
	12040.000	17603414.	24973.80	44.7287	9.4890	
	12140.000	19364409.	24341.11	46.4886	8.6770	
	12240.000	21130918.	23746.99	48.1377	7.9629	
	CSM SEP	12333.259	22779769.	23225.62	49.5875	7.3731
		12340.000	22898925.	23189.10	49.6892	7.3330
12440.000		24665291.	22665.02	51.1543	6.7755	
12540.000		26427570.	22172.40	52.5424	6.2803	
12640.000		28183859.	21708.96	53.8617	5.8389	
12740.000		29932687.	21272.60	55.1189	5.4441	
12840.000		31672921.	20861.33	56.3199	5.0896	
12900.000		32712568.	20625.85	57.0155	4.8942	

TABLE 5-XXII PITCH AND YAW REFERENCE ANGLES (LOCAL HORIZONTAL COORDINATES) AND RANGE (METRIC AND ENGLISH UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	PITCH (DEG)	YAW (DEG)	RANGE (KM)	RANGE (NMI)
1ST OPP	9706.750	0.005	-0.000	12950.	6993.
	9710.000	0.226	0.000	12927.	6980.
	9810.000	0.497	0.000	12212.	6594.
FM NAV	9907.625	0.004	-0.000	11513.	6217.
	9910.000	0.047	-0.000	11496.	6208.
	9912.000	0.064	-0.000	11482.	6200.
TR6	9912.000	0.064	-0.000	11482.	6200.
02H2I	9954.000	0.004	-0.000	11182.	6038.
LH2VTCO	9954.200	0.018	-0.000	11180.	6037.
	10010.000	0.004	-0.000	10781.	5821.
	10110.000	0.021	-0.000	10066.	5435.
	10210.000	0.038	-0.000	9350.	5049.
	10310.000	0.054	-0.000	8635.	4662.
S4B LUI	10408.300	0.015	-0.000	7932.	4283.
02H2CO	10408.800	0.049	-0.000	7928.	4281.
	10410.000	0.011	-0.000	7919.	4276.
	10480.000	0.011	-0.000	7419.	4006.
	10481.000	0.020	-0.000	7412.	4002.
	10481.000	0.020	-0.000	7412.	4002.
	10482.000	0.085	0.005	7404.	3998.
LTI	10482.000	0.085	0.005	7404.	3998.
S4BLUCO	10485.000	0.284	0.017	7383.	3986.
	10490.000	0.622	0.024	7347.	3967.
S4B REI	10490.000	0.622	0.024	7347.	3967.
S4B 90T	10492.500	0.685	-0.024	7329.	3957.
IGM ON	10496.500	0.579	-0.142	7301.	3942.
	10500.000	-1.539	-1.844	7275.	3928.
TSMC3	10506.500	-4.053	-1.924	7228.	3903.
	10510.000	-3.807	-1.838	7203.	3889.
	10520.000	-3.867	-1.345	7130.	3850.
	10530.000	-3.754	-0.970	7057.	3810.
	10540.000	-3.566	-0.656	6983.	3770.
	10550.000	-3.335	-0.380	6908.	3730.
	10560.000	-3.073	-0.124	6833.	3689.
	10570.000	-2.784	0.117	6757.	3648.
	10580.000	-2.479	0.350	6680.	3607.
	10590.000	-2.154	0.576	6603.	3565.
MRS	10592.500	-2.071	0.632	6583.	3555.
	10600.000	-1.766	0.854	6525.	3523.
	10610.000	-1.188	0.627	6446.	3481.

TABLE 5-XXII PITCH AND YAW REFERENCE ANGLES (LOCAL HORIZONTAL COORDINATES) AND RANGE (METRIC AND ENGLISH UNITS)
(CONTINUED) FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	PITCH (DEG)	YAW (DEG)	RANGE (KM)	RANGE (NMI)
	10620.000	-0.896	1.176	6367.	3438.
	10630.000	-0.550	1.588	6287.	3394.
	10640.000	-0.114	1.777	6206.	3351.
	10650.000	0.351	1.922	6124.	3307.
	10660.000	0.796	2.151	6041.	3262.
	10670.000	1.253	2.345	5958.	3217.
	10680.000	1.712	2.532	5873.	3171.
	10690.000	2.170	2.717	5788.	3125.
	10700.000	2.623	2.902	5702.	3079.
	10710.000	3.066	3.082	5615.	3032.
	10720.000	3.499	3.259	5528.	2985.
	10730.000	3.913	3.432	5439.	2937.
	10740.000	4.304	3.601	5350.	2889.
	10750.000	4.665	3.769	5259.	2840.
	10760.000	4.987	3.892	5168.	2791.
	10770.000	5.265	4.045	5076.	2741.
	10780.000	5.461	4.264	4983.	2691.
	10790.000	5.589	4.409	4889.	2640.
	10800.000	5.603	4.544	4794.	2589.
	10810.000	3.773	4.949	4699.	2537.
	10820.000	4.828	4.846	4602.	2485.
	10830.000	5.736	4.739	4504.	2432.
S4BGCS2	10833.049	6.033	4.705	4474.	2416.
TB7	10833.259	6.052	4.703	4472.	2415.
	10840.000	6.670	4.704	4406.	2379.
	10843.049	6.950	4.702	4376.	2363.
TLI	10843.049	6.950	4.702	4376.	2363.
	10843.375	6.980	4.701	4373.	2361.
	10853.259	7.894	4.683	4276.	2309.
	10853.259	7.894	4.683	4276.	2309.
ORR GID	10853.375	7.905	4.683	4275.	2308.
ORR NAV	10854.375	7.631	4.091	4265.	2303.
	10940.000	0.493	-0.000	3449.	1862.
	11040.000	0.133	-0.000	2552.	1378.
	11140.000	0.421	-0.000	1727.	933.
	11240.000	0.111	-0.000	981.	530.
	11340.000	0.345	-0.000	326.	176.
	11440.000	0.090	-0.000	336.	182.
	11540.000	0.279	-0.000	858.	463.
	11640.000	0.073	-0.000	1335.	721.

TABLE 5-XXII PITCH AND YAW REFERENCE ANGLES (LOCAL HORIZONTAL
 COORDINATES) AND RANGE (METRIC AND ENGLISH UNITS)
 (CONTINUED) FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	PITCH (DEG)	YAW (DEG)	RANGE (KM)	RANGE (NMI)
T&D MAN	11734.375	0.324	-0.000	1740.	940.
	11740.000	0.550	-0.000	1763.	952.
	11833.049	66.095	43.031	2121.	1145.
	11840.000	72.531	43.343	2146.	1159.
	11940.000	125.675	38.851	2490.	1345.
	12040.000	130.622	40.002	2800.	1512.
	12140.000	133.486	40.002	3079.	1663.
	12240.000	136.111	40.002	3332.	1799.
	12333.259	138.366	40.003	3546.	1915.
CSM SFP	12340.000	138.523	40.003	3561.	1923.
	12440.000	140.748	40.003	3769.	2035.
	12540.000	142.808	40.003	3959.	2138.
	12640.000	144.720	40.003	4132.	2231.
	12740.000	146.500	40.004	4291.	2317.
	12840.000	148.162	40.004	4437.	2396.
	12900.000	149.107	40.004	4518.	2440.

TABLE 5-XXIII-A INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
AND INERTIAL HEADING ANGLE
(METRIC UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VFLOCITY (M/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
1ST OPP	9706.750	7791.6458	0.0398	60.0999
	9710.000	7791.6302	0.0397	60.0828
	9810.000	7791.1358	0.0360	59.7368
FM NAV	9907.625	7790.6325	0.0319	59.7390
	9910.000	7790.6200	0.0318	59.7433
	9912.000	7790.6095	0.0317	59.7470
TR6	9912.000	7790.6095	0.0317	59.7470
02H2I	9954.000	7790.3880	0.0299	59.8576
LH2VTCO	9954.200	7790.3870	0.0299	59.8583
	10010.000	7790.1049	0.0273	60.1019
	10110.000	7789.6172	0.0227	60.8151
	10210.000	7789.1597	0.0180	61.8873
S4B LUT 02H2CO	10310.000	7788.7247	0.0136	63.3237
	10408.300	7788.3255	0.0095	65.0953
	10408.800	7788.3256	0.0095	65.1052
	10410.000	7788.3251	0.0094	65.1291
	10480.000	7788.3083	0.0069	66.6137
	10481.000	7788.3082	0.0068	66.6362
	10481.000	7788.3082	0.0068	66.6362
	10482.000	7788.3081	0.0068	66.6587
LTI	10482.000	7788.3081	0.0068	66.6587
S4BLUCO	10485.000	7788.3662	0.0067	66.7266
	10490.000	7788.4531	0.0066	66.8406
S4B REI	10490.000	7788.4531	0.0066	66.8406
S4B 90T	10492.500	7795.0051	0.0074	66.8977
IGM ON	10496.500	7818.6384	0.0109	66.9892
	10500.000	7839.4525	0.0142	67.0688
TSMC3	10506.500	7878.2941	0.0029	67.2091
	10510.000	7899.3940	-0.0009	67.2870
	10520.000	7960.1422	-0.0055	67.5154
	10530.000	8021.7974	0.0007	67.7528
	10540.000	8084.3649	0.0183	67.9986
	10550.000	8147.8470	0.0478	68.2525
	10560.000	8212.2527	0.0894	68.5145
	10570.000	8277.5924	0.1435	68.7845
	10580.000	8343.8757	0.2101	69.0627
	10590.000	8411.1144	0.2895	69.3491
MRS	10592.500	8428.0750	0.3113	69.4220
	10600.000	8487.1596	0.3804	69.6444
	10610.000	8567.2126	0.4863	69.9478

TABLE 5-XXIII-A INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
AND INERTIAL HEADING ANGLE
(METRIC UNITS)
FIRST OPPORTUNITY
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (M/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
	10620.000	8648.6552	0.6087	70.2592
	10630.000	8731.5081	0.7456	70.5829
	10640.000	8816.0256	0.8979	70.9170
	10650.000	8902.1249	1.0665	71.2601
	10660.000	8989.6747	1.2511	71.6130
	10670.000	9078.8439	1.4519	71.9759
	10680.000	9169.6846	1.6690	72.3489
	10690.000	9262.2601	1.9023	72.7321
	10700.000	9356.6400	2.1519	73.1257
	10710.000	9452.9023	2.4178	73.5297
	10720.000	9551.1324	2.6998	73.9444
	10730.000	9651.4258	2.9978	74.3698
	10740.000	9753.8865	3.3117	74.8061
	10750.000	9858.6259	3.6411	75.2535
	10760.000	9966.0944	3.9857	75.7120
	10770.000	10076.1475	4.3452	76.1813
	10780.000	10188.6847	4.7186	76.6623
	10790.000	10304.1240	5.1051	77.1552
	10800.000	10422.6530	5.5035	77.6595
	10810.000	10544.4297	5.9039	78.1766
	10820.000	10669.6677	6.3083	78.7060
	10830.000	10798.6858	6.7351	79.2441
S4BGCS2	10833.049	10838.8113	6.8698	79.4099
T87	10833.259	10841.2586	6.8792	79.4213
	10840.000	10834.6193	7.1850	79.7498
	10843.049	10831.2098	7.3231	79.8986
TLI	10843.049	10831.2098	7.3231	79.8986
	10843.375	10830.8420	7.3379	79.9146
	10853.259	10819.3570	7.7843	80.3983
	10853.259	10819.3570	7.7843	80.3983
ORB GID	10853.375	10819.2188	7.7895	80.4039
ORB NAV	10854.375	10818.0214	7.8345	80.4530
	10940.000	10693.3680	11.6090	84.6786
	11040.000	10500.8262	15.7654	89.5063
	11140.000	10272.6106	19.6020	93.9844
	11240.000	10023.1767	23.0987	97.9670
	11340.000	9764.3983	26.2593	101.4049
	11440.000	9505.0903	29.1033	104.3168
	11540.000	9251.2605	31.6579	106.7565
	11640.000	9006.6677	33.9533	108.7907

TABLE 5-XXIII-A INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
AND INERTIAL HEADING ANGLE
(METRIC UNITS)
(CONTINUED) FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (M/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)	
T&D MAN	11734.375	8786.2179	35.9089	110.3980	
	11740.000	8773.4192	36.0195	110.4854	
	11833.049	8567.4303	37.7607	111.8091	
	11840.000	8552.4792	37.8843	111.8994	
	11940.000	8344.0742	39.5726	113.0830	
	12040.000	8147.9585	41.1065	114.0777	
	12140.000	7963.6133	42.5051	114.9172	
	12240.000	7790.3737	43.7849	115.6290	
	CSM SEP	12333.259	7638.1781	44.8839	116.1970
		12340.000	7627.5110	44.9601	116.2349
12440.000		7474.2844	46.0430	116.7530	
12540.000		7329.9708	47.0441	117.1975	
12640.000		7193.8833	47.9724	117.5802	
12740.000		7065.3793	48.8357	117.9108	
12840.000		6943.8644	49.6409	118.1971	
12900.000		6874.0812	50.0986	118.3504	

TABLE 5-XXIII-B

 INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
 AND INERTIAL HEADING ANGLE
 (ENGLISH UNITS)
 FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (FT/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)	
1ST OPP	9706.750	25563.1425	0.0398	60.0999	
	9710.000	25563.0912	0.0397	60.0828	
	9810.000	25561.4693	0.0360	59.7368	
FM NAV	9907.625	25559.8179	0.0319	59.7390	
	9910.000	25559.7770	0.0318	59.7433	
	9912.000	25559.7426	0.0317	59.7470	
TR6	9912.000	25559.7426	0.0317	59.7470	
Q2H2I	9954.000	25559.0157	0.0299	59.8576	
LH2VTCO	9954.200	25559.0125	0.0299	59.8583	
	10010.000	25558.0870	0.0273	60.1019	
	10110.000	25556.4868	0.0227	60.8151	
	10210.000	25554.9860	0.0180	61.8873	
	10310.000	25553.5586	0.0136	63.3237	
	S4B LUI	10408.300	25552.2490	0.0095	65.0953
	Q2H2CO	10408.800	25552.2494	0.0095	65.1052
10410.000		25552.2479	0.0094	65.1291	
10480.000		25552.1925	0.0069	66.6137	
10481.000		25552.1922	0.0068	66.6362	
10481.000		25552.1922	0.0068	66.6362	
10482.000		25552.1920	0.0068	66.6587	
LTI		10482.000	25552.1920	0.0068	66.6587
S4BLUCO	10485.000	25552.3826	0.0067	66.7266	
	10490.000	25552.6677	0.0066	66.8406	
S4B REI	10490.000	25552.6677	0.0066	66.8406	
S4B 90T	10492.500	25574.1637	0.0074	66.8977	
IGM ON	10496.500	25651.7007	0.0109	66.9892	
	10500.000	25719.9885	0.0142	67.0688	
TSMC3	10506.500	25847.4217	0.0029	67.2091	
	10510.000	25916.6469	-0.0009	67.2870	
	10520.000	26115.9520	-0.0055	67.5154	
	10530.000	26318.2329	0.0007	67.7528	
	10540.000	26523.5068	0.0183	67.9986	
	10550.000	26731.7815	0.0478	68.2525	
	10560.000	26943.0864	0.0894	68.5145	
	10570.000	27157.4553	0.1435	68.7845	
	10580.000	27374.9202	0.2101	69.0627	
	10590.000	27595.5196	0.2895	69.3491	
	MRS	10592.500	27651.1648	0.3113	69.4220
10600.000		27845.0117	0.3804	69.6444	
10610.000		28107.6530	0.4863	69.9478	

TABLE 5-XXIII-B INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
AND INERTIAL HEADING ANGLE
(ENGLISH UNITS)
FIRST OPPORTUNITY
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (FT/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
	10620.000	28374.8530	0.6087	70.2592
	10630.000	28646.6802	0.7456	70.5829
	10640.000	28923.9686	0.8979	70.9170
	10650.000	29206.4465	1.0665	71.2601
	10660.000	29493.6833	1.2511	71.6130
	10670.000	29786.2333	1.4519	71.9759
	10680.000	30084.2672	1.6690	72.3489
	10690.000	30387.9926	1.9023	72.7321
	10700.000	30697.6379	2.1519	73.1257
	10710.000	31013.4590	2.4178	73.5297
	10720.000	31335.7363	2.6998	73.9444
	10730.000	31664.7830	2.9978	74.3698
	10740.000	32000.9399	3.3117	74.8061
	10750.000	32344.5731	3.6411	75.2535
	10760.000	32697.1602	3.9857	75.7120
	10770.000	33058.2268	4.3452	76.1813
	10780.000	33427.4433	4.7186	76.6623
	10790.000	33806.1812	5.1051	77.1552
	10800.000	34195.0557	5.5035	77.6595
	10810.000	34594.5858	5.9039	78.1766
	10820.000	35005.4715	6.3083	78.7060
	10830.000	35428.7592	6.7351	79.2441
S4BGCS?	10833.049	35560.4044	6.8698	79.4099
TB7	10833.255	35568.4339	6.8792	79.4213
	10840.000	35546.6512	7.1850	79.7498
	10843.049	35535.4652	7.3231	79.8986
TLI	10843.049	35535.4652	7.3231	79.8986
	10843.375	35534.2585	7.3379	79.9146
	10853.259	35496.5782	7.7843	80.3983
	10853.259	35496.5782	7.7843	80.3983
ORB GID	10853.375	35496.1247	7.7895	80.4039
ORB NAV	10854.375	35492.1961	7.8345	80.4530
	10940.000	35083.2284	11.6090	84.6786
	11040.000	34451.5295	15.7654	89.5063
	11140.000	33702.7906	19.6020	93.9844
	11240.000	32884.4379	23.0987	97.9670
	11340.000	32035.4274	26.2593	101.4049
	11440.000	31184.6796	29.1033	104.3168
	11540.000	30351.9044	31.6579	106.7565
	11640.000	29549.4346	33.9533	108.7907

TABLE 5-XXIII-R

 INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
 AND INERTIAL HEADING ANGLE
 (ENGLISH UNITS)
 FIRST OPPORTUNITY

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (FT/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
T&D MAN	11734.375	28826.1742	35.9089	110.3980
	11740.000	28784.1837	36.0195	110.4854
	11833.049	28108.3672	37.7607	111.8091
	11840.000	28059.3151	37.8843	111.8994
	11940.000	27375.5715	39.5726	113.0830
	12040.000	26732.1474	41.1065	114.0777
	12140.000	26127.3402	42.5051	114.9172
	12240.000	25558.9687	43.7849	115.6290
CSM SEP	12333.259	25059.6394	44.8839	116.1970
	12340.000	25024.6425	44.9601	116.2349
	12440.000	24521.9303	46.0430	116.7530
	12540.000	24048.4607	47.0441	117.1975
	12640.000	23601.9793	47.9724	117.5802
	12740.000	23180.3782	48.8357	117.9108
	12840.000	22781.7074	49.6409	118.1971
	12900.000	22552.7598	50.0986	118.3504

TABLE 5-XXIV-A GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (METRIC UNITS)
FIRST OPPORTUNITY

FVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (METERS)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)	
1ST OPP	9706.750	6572262.	-5.2024	162.0920	
	9710.000	6572280.	-5.0916	162.2705	
	9810.000	6572795.	-1.6612	167.7387	
FM NAV	9907.625	6573246.	1.7046	173.0564	
	9910.000	6573256.	1.7864	173.1859	
	9912.000	6573265.	1.8553	173.2949	
TR6	9912.000	6573265.	1.8553	173.2949	
O2H2I	9954.000	6573441.	3.2994	175.5868	
LH2VTCO	9954.200	6573442.	3.3062	175.5977	
	10010.000	6573658.	5.2146	178.6540	
	10110.000	6573998.	8.5864	-175.8153	
	10210.000	6574275.	11.8642	-170.1813	
	10310.000	6574490.	15.0089	-164.4055	
	S4B LUI	10408.300	6574643.	17.9307	-158.5553
		10408.800	6574644.	17.9451	-158.5251
10410.000		6574646.	17.9796	-158.4524	
10480.000		6574723.	19.9328	-154.1635	
10481.000		6574724.	19.9599	-154.1015	
10481.000		6574724.	19.9599	-154.1015	
10482.000		6574725.	19.9869	-154.0394	
LTI	10482.000	6574725.	19.9869	-154.0394	
S4BLUCO	10485.000	6574727.	20.0679	-153.8531	
	10490.000	6574732.	20.2023	-153.5420	
S4B REI	10490.000	6574732.	20.2023	-153.5420	
S4B 90T	10492.500	6574734.	20.2693	-153.3863	
IGM ON	10496.500	6574739.	20.3765	-153.1362	
	10500.000	6574745.	20.4701	-152.9164	
TSMC3	10506.500	6574753.	20.6439	-152.5058	
	10510.000	6574754.	20.7374	-152.2834	
	10520.000	6574748.	21.0043	-151.6430	
	10530.000	6574744.	21.2705	-150.9949	
	10540.000	6574755.	21.5361	-150.3390	
	10550.000	6574801.	21.8009	-149.6752	
	10560.000	6574897.	22.0647	-149.0032	
	10570.000	6575064.	22.3275	-148.3229	
	10580.000	6575318.	22.5892	-147.6342	
	10590.000	6575682.	22.8495	-146.9369	
MRS	10592.500	6575793.	22.9143	-146.7612	
	10600.000	6576175.	23.1085	-146.2305	
	10610.000	6576817.	23.3662	-145.5144	

TABLE 5-XXIV-A GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
 (CONTINUED) LONGITUDE (METRIC UNITS)
 FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (METERS)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
	10620.000	6577638.	23.6225	-144.7882
	10630.000	6578664.	23.8772	-144.0517
	10640.000	6579920.	24.1302	-143.3048
	10650.000	6581437.	24.3812	-142.5472
	10660.000	6583244.	24.6301	-141.7788
	10670.000	6585373.	24.8766	-140.9994
	10680.000	6587856.	25.1206	-140.2088
	10690.000	6590726.	25.3619	-139.4069
	10700.000	6594017.	25.6001	-138.5934
	10710.000	6597764.	25.8352	-137.7683
	10720.000	6602005.	26.0668	-136.9314
	10730.000	6606775.	26.2947	-136.0825
	10740.000	6612112.	26.5187	-135.2214
	10750.000	6618057.	26.7384	-134.3482
	10760.000	6624648.	26.9536	-133.4626
	10770.000	6631925.	27.1641	-132.5646
	10780.000	6639929.	27.3694	-131.6539
	10790.000	6648701.	27.5693	-130.7306
	10800.000	6658280.	27.7636	-129.7946
	10810.000	6668703.	27.9518	-128.8457
	10820.000	6679983.	28.1336	-127.8839
	10830.000	6692172.	28.3087	-126.9091
S4BGCS2	10833.049	6696079.	28.3607	-126.6092
TB7	10833.259	6696351.	28.3643	-126.5886
	10840.000	6705296.	28.4765	-125.9244
	10843.049	6709467.	28.5261	-125.6241
TLI	10843.049	6709467.	28.5261	-125.6241
	10843.375	6709917.	28.5313	-125.5920
	10853.259	6723996.	28.6862	-124.6193
	10853.259	6723996.	28.6862	-124.6193
ORB GID	10853.375	6724166.	28.6880	-124.6080
ORB NAV	10854.375	6725636.	28.7032	-124.5096
	10940.000	6881347.	29.6951	-116.1869
	11040.000	7132464.	30.1197	-106.9058
	11140.000	7448346.	29.8750	-98.3503
	11240.000	7818140.	29.1257	-90.6646
	11340.000	8231524.	28.0338	-83.8808
	11440.000	8679333.	26.7348	-77.9541
	11540.000	9153796.	25.3307	-72.8005
	11640.000	9648517.	23.8924	-68.3225

TABLE 5-XXIV-A GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
 (CONTINUED) LONGITUDE (METRIC UNITS)
 FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SFC)	GEOCENTRIC RADIUS (METERS)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)	
T&D MAN	11734.375	10129338.	22.5457	-64.6303	
	11740.000	10158342.	22.4664	-64.4249	
	11833.049	10642681.	21.1757	-61.2440	
	11840.000	10679166.	21.0812	-61.0219	
	11940.000	11207750.	19.7531	-58.0390	
	12040.000	11741545.	18.4904	-55.4134	
	12140.000	12278556.	17.2961	-53.0926	
	12240.000	12817219.	16.1699	-51.0329	
	CSM SEP	12333.259	13319979.	15.1792	-49.3154
		12340.000	13356311.	15.1098	-49.1981
12440.000		13894881.	14.1124	-47.5580	
12540.000		14432183.	13.1740	-46.0873	
12640.000		14967641.	12.2907	-44.7649	
12740.000		15500808.	11.4587	-43.5730	
12840.000		16031341.	10.6740	-42.4964	
12900.000		16348285.	10.2244	-41.9003	

TABLE 5-XXIV-B GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (ENGLISH UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (FEET)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
1ST OPP	9706.750	21562540.	-5.2024	162.0920
	9710.000	21562598.	-5.0916	162.2705
	9810.000	21564287.	-1.6612	167.7387
FM NAV	9907.625	21565767.	1.7046	173.0564
	9910.000	21565801.	1.7864	173.1859
	9912.000	21565829.	1.8553	173.2949
TR6	9912.000	21565829.	1.8553	173.2949
02H2I	9954.000	21566407.	3.2994	175.5868
LH2VTC0	9954.200	21566409.	3.3062	175.5977
	10010.000	21567121.	5.2146	178.6540
	10110.000	21568236.	8.5864	-175.8153
	10210.000	21569143.	11.8642	-170.1813
	10310.000	21569848.	15.0089	-164.4055
S4R LUI	10408.300	21570352.	17.9307	-158.5553
	02H2C0	10408.800	21570354.	17.9451
	10410.000	21570359.	17.9796	-158.4524
	10480.000	21570612.	19.9328	-154.1635
	10481.000	21570615.	19.9599	-154.1015
	10481.000	21570615.	19.9599	-154.1015
	10482.000	21570619.	19.9869	-154.0394
LTI	10482.000	21570619.	19.9869	-154.0394
S4BLUC0	10485.000	21570628.	20.0679	-153.8531
	10490.000	21570642.	20.2023	-153.5420
S4B REI	10490.000	21570642.	20.2023	-153.5420
S4B 90T	10492.500	21570650.	20.2693	-153.3863
IGM ON	10496.500	21570666.	20.3765	-153.1362
	10500.000	21570686.	20.4701	-152.9164
TSMC3	10506.500	21570713.	20.6439	-152.5058
	10510.000	21570714.	20.7374	-152.2834
	10520.000	21570696.	21.0043	-151.6430
	10530.000	21570681.	21.2705	-150.9949
	10540.000	21570720.	21.5361	-150.3390
	10550.000	21570869.	21.8009	-149.6752
	10560.000	21571186.	22.0647	-149.0032
	10570.000	21571731.	22.3275	-148.3229
	10580.000	21572567.	22.5892	-147.6342
	10590.000	21573761.	22.8495	-146.9369
MRS	10592.500	21574123.	22.9143	-146.7612
	10600.000	21575376.	23.1085	-146.2305
	10610.000	21577485.	23.3662	-145.5144

TABLE 5-XXIV-B GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
 (CONTINUED) LONGITUDE (ENGLISH UNITS)
 FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (FEET)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
	10620.000	21580178.	23.6225	-144.7882
	10630.000	21583542.	23.8772	-144.0517
	10640.000	21587664.	24.1302	-143.3048
	10650.000	21592640.	24.3812	-142.5472
	10660.000	21598570.	24.6301	-141.7788
	10670.000	21605555.	24.8766	-140.9994
	10680.000	21613700.	25.1206	-140.2098
	10690.000	21623116.	25.3619	-139.4069
	10700.000	21633913.	25.6001	-138.5934
	10710.000	21646208.	25.8352	-137.7583
	10720.000	21660120.	26.0668	-136.9314
	10730.000	21675770.	26.2947	-136.0825
	10740.000	21693282.	26.5187	-135.2214
	10750.000	21712785.	26.7384	-134.3482
	10760.000	21734408.	26.9536	-133.4626
	10770.000	21758284.	27.1641	-132.5646
	10780.000	21784545.	27.3694	-131.6539
	10790.000	21813324.	27.5693	-130.7306
	10800.000	21844752.	27.7636	-129.7946
	10810.000	21878947.	27.9518	-128.8457
	10820.000	21915954.	28.1336	-127.8839
	10830.000	21955943.	28.3087	-126.9091
S4BGCS2	10833.049	21968763.	28.3607	-126.6092
T87	10833.259	21969657.	28.3643	-126.5886
	10840.000	21999001.	28.4765	-125.9244
	10843.049	22012686.	28.5261	-125.6241
TLI	10843.049	22012686.	28.5261	-125.6241
	10843.375	22014163.	28.5313	-125.5920
	10853.259	22060355.	28.6862	-124.6193
	10853.259	22060355.	28.6862	-124.6193
ORB GID	10853.375	22060912.	28.6980	-124.6080
ORB NAV	10854.375	22065736.	28.7032	-124.5096
	10940.000	22576598.	29.6951	-116.1869
	11040.000	23400472.	30.1197	-106.9058
	11140.000	24436832.	29.8750	-98.3503
	11240.000	25650065.	29.1257	-90.6646
	11340.000	27006311.	28.0338	-83.8808
	11440.000	28475503.	26.7348	-77.9541
	11540.000	30032139.	25.3307	-72.8005
	11640.000	31655240.	23.8924	-68.3225

TABLE 5-XXIV-B GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (ENGLISH UNITS)
(CONTINUED) FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (FEET)	GEODETIC LATITUDE (DFG)	LONGITUDE (DFG)	
T&D MAN	11734.375	33232736.	22.5457	-64.6303	
	11740.000	33327892.	22.4664	-64.4249	
	11833.049	34916932.	21.1757	-61.2440	
	11840.000	35036634.	21.0812	-61.0219	
	11940.000	36770833.	19.7531	-58.0390	
	12040.000	38522131.	18.4904	-55.4134	
	12140.000	40283976.	17.2961	-53.0926	
	12240.000	42051242.	16.1699	-51.0329	
	CSM SEP	12333.259	43700720.	15.1792	-49.3154
		12340.000	43819919.	15.1098	-49.1981
12440.000		45586879.	14.1124	-47.5580	
12540.000		47349681.	13.1740	-46.0873	
12640.000		49106433.	12.2907	-44.7649	
12740.000		50855669.	11.4587	-43.5730	
12840.000		52596263.	10.6740	-42.4964	
12900.000		53636106.	10.2244	-41.9003	

TABLE 5-XXV

 COMMANDED AND ACTUAL ATTITUDE ANGLES
 FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT	PITCH	VEHICLE	YAW	VEHICLE	ROLL	VEHICLE
		ATTITUDE COMMAND	PITCH ATTITUDE	ATTITUDE COMMAND	YAW ATTITUDE	ATTITUDE COMMAND	ROLL ATTITUDE
	(SEC)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)
1ST OPP	9706.750	-9.11	-9.11	0.36	0.36	0.0	0.0
	9710.000	-9.11	-9.11	0.36	0.36	0.0	0.0
	9810.000	-15.63	-15.63	0.46	0.46	0.0	0.00
FM NAV	9907.625	-22.76	-22.76	0.56	0.56	0.0	0.00
	9910.000	-22.87	-22.87	0.56	0.56	0.0	0.00
	9912.000	-23.05	-22.99	0.56	0.56	0.0	0.00
TR6	9912.000	-23.05	-22.99	0.56	0.56	0.0	0.00
O2H2I	9954.000	-25.90	-25.90	0.60	0.60	0.0	0.00
LH2VTCO	9954.200	-25.90	-25.90	0.60	0.60	0.0	0.00
	10010.000	-29.71	-29.71	0.65	0.65	0.0	0.00
	10110.000	-36.48	-36.48	0.73	0.73	0.0	0.00
	10210.000	-43.25	-43.25	0.80	0.80	0.0	0.00
	10310.000	-50.02	-50.02	0.86	0.86	0.0	0.00
	10408.300	-56.74	-56.74	0.91	0.91	0.0	0.00
S4B LUI O2H2CO	10408.800	-56.74	-56.74	0.91	0.91	0.0	0.00
	10410.000	-56.85	-56.85	0.92	0.92	0.0	0.00
	10480.000	-61.61	-61.61	0.94	0.94	0.0	0.00
	10481.000	-61.67	-61.67	0.94	0.94	0.0	0.00
	10481.000	-61.67	-61.67	0.94	0.94	0.0	0.00
	10482.000	-61.70	-61.67	0.94	0.95	0.0	-0.02
LTI	10482.000	-61.70	-61.67	0.94	0.95	0.0	-0.02
	10485.000	-61.90	-61.67	0.95	0.96	0.0	-0.06
S4B LUCO	10490.000	-62.24	-61.67	0.95	0.97	0.0	-0.14
	10490.000	-62.24	-61.67	0.95	0.97	0.0	-0.14
S4B REI	10490.000	-62.24	-61.67	0.95	0.97	0.0	-0.14
S4B 90T	10492.500	-62.41	-61.78	0.95	0.92	0.0	-0.21
IGM ON	10496.500	-62.80	-62.16	0.83	0.80	0.0	-0.35
	10500.000	-66.30	-64.52	-0.91	-0.89	0.0	-0.63
TSMC3	10506.500	-67.59	-67.48	-0.72	-0.97	0.0	0.22
	10510.000	-67.81	-67.48	-0.55	-0.89	0.0	0.53
	10520.000	-68.47	-68.23	-0.09	-0.41	0.0	0.76
	10530.000	-69.04	-68.81	0.27	-0.04	0.0	0.84
	10540.000	-69.55	-69.32	0.58	0.26	0.0	0.74
	10550.000	-70.03	-69.80	0.85	0.54	0.0	0.82
	10560.000	-70.47	-70.25	1.10	0.79	0.0	0.76
	10570.000	-70.90	-70.68	1.34	1.03	0.0	0.78
	10580.000	-71.32	-71.09	1.58	1.26	0.0	0.77
	10590.000	-71.73	-71.50	1.81	1.49	0.0	0.76
MRS	10592.500	-71.83	-71.60	1.87	1.55	0.0	0.74
	10600.000	-72.09	-71.85	2.24	1.78	0.0	0.82
	10610.000	-72.24	-72.01	1.91	1.56	0.0	0.63

TABLE 5-XXV
(CONTINUED)

COMMANDED AND ACTUAL ATTITUDE ANGLES
FIRST OPPORTUNITY

EVFNT	TIME FROM 1ST MOT	PITCH ATTITUDE COMMAND	VEHICLE PITCH ATTITUDE	YAW ATTITUDE COMMAND	VEHICLE YAW ATTITUDE	ROLL ATTITUDE COMMAND	VEHICLE ROLL ATTITUDE
	(SEC)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)
	10620.000	-72.71	-72.47	2.47	2.11	0.0	0.75
	10630.000	-73.11	-72.88	2.87	2.54	0.0	0.76
	10640.000	-73.43	-73.21	3.05	2.74	0.0	0.86
	10650.000	-73.74	-73.51	3.24	2.90	0.0	0.74
	10660.000	-74.08	-73.85	3.48	3.15	0.0	0.82
	10670.000	-74.41	-74.18	3.70	3.37	0.0	0.74
	10680.000	-74.74	-74.51	3.91	3.58	0.0	0.80
	10690.000	-75.09	-74.85	4.12	3.79	0.0	0.76
	10700.000	-75.45	-75.21	4.33	4.00	0.0	0.77
	10710.000	-75.83	-75.58	4.55	4.21	0.0	0.77
	10720.000	-76.22	-75.97	4.76	4.42	0.0	0.76
	10730.000	-76.65	-76.39	4.97	4.63	0.0	0.79
	10740.000	-77.10	-76.84	5.17	4.83	0.0	0.75
	10750.000	-77.59	-77.33	5.38	5.04	0.0	0.81
	10760.000	-78.12	-77.86	5.54	5.21	0.0	0.75
	10770.000	-78.71	-78.45	5.75	5.40	0.0	0.84
	10780.000	-79.40	-79.13	6.01	5.67	0.0	0.74
	10790.000	-80.16	-79.88	6.20	5.86	0.0	0.87
	10800.000	-81.05	-80.76	6.39	6.05	0.0	0.75
	10810.000	-83.65	-83.49	6.82	6.50	0.0	0.80
	10820.000	-83.55	-83.34	6.79	6.46	0.0	0.72
	10830.000	-83.55	-83.35	6.73	6.41	0.0	0.78
S48GCS2	10833.049	-83.54	-83.33	6.73	6.40	0.0	0.73
TB7	10833.259	-83.54	-83.33	6.73	6.40	0.0	0.73
	10840.000	-83.54	-83.33	6.73	6.40	0.0	0.66
	10843.049	-83.54	-83.33	6.73	6.40	0.0	0.63
TLI	10843.049	-83.54	-83.33	6.73	6.40	0.0	0.63
	10843.375	-83.54	-83.33	6.73	6.40	0.0	0.63
	10853.259	-83.54	-83.32	6.73	6.38	0.0	0.53
	10853.259	-83.54	-83.32	6.73	6.38	0.0	0.53
ORB GID	10853.375	-91.22	-83.32	1.66	6.38	0.0	0.0
ORB NAV	10854.375	-91.31	-83.69	1.66	5.79	0.0	-0.23
	10940.000	-98.48	-98.48	1.61	1.61	0.0	0.00
	11040.000	-107.27	-107.27	1.51	1.51	0.0	-0.00
	11140.000	-114.76	-114.76	1.40	1.40	0.0	-0.00
	11240.000	-122.17	-122.17	1.27	1.27	0.0	-0.00
	11340.000	-128.36	-128.36	1.14	1.14	0.0	-0.00
	11440.000	-134.40	-134.40	1.00	1.00	0.0	-0.00
	11540.000	-139.41	-139.41	0.88	0.88	0.0	-0.00
	11640.000	-144.30	-144.30	0.75	0.75	0.0	-0.00

TABLE 5-XXV COMMANDED AND ACTUAL ATTITUDE ANGLES
 (CONTINUED) FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT	PITCH ATTITUDE COMMAND	VEHICLE PITCH ATTITUDE	YAW ATTITUDE COMMAND	VEHICLE YAW ATTITUDE	ROLL ATTITUDE COMMAND	VEHICLE ROLL ATTITUDE
	(SEC)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)
T&D MAN	11734.375	-27.18	-148.03	41.05	0.65	180.00	0.00
	11740.000	-27.18	-148.03	41.05	0.65	180.00	0.00
	11833.049	-27.18	-86.20	41.05	44.74	180.00	-51.11
	11840.000	-27.18	-79.84	41.05	45.07	180.00	-55.02
	11940.000	-27.18	-29.06	41.05	39.94	180.00	-123.45
	12040.000	-27.18	-27.18	41.05	41.05	180.00	-180.00
	12140.000	-27.18	-27.18	41.05	41.05	180.00	-180.00
	12240.000	-27.18	-27.18	41.05	41.05	180.00	-180.00
CSM SFP	12333.259	-27.18	-27.18	41.05	41.05	180.00	-180.00
	12340.000	-27.18	-27.18	41.05	41.05	180.00	-180.00
	12440.000	-27.18	-27.18	41.05	41.05	180.00	-180.00
	12540.000	-27.18	-27.18	41.05	41.05	180.00	-180.00
	12640.000	-27.18	-27.18	41.05	41.05	180.00	-180.00
	12740.000	-27.18	-27.18	41.05	41.05	180.00	-180.00
	12840.000	-27.18	-27.18	41.05	41.05	180.00	-180.00
	12900.000	-27.18	-27.18	41.05	41.05	180.00	-180.00

TABLE 5-XXVI

SPACECRAFT GIMBAL ANGLES
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SECS)	SPACECRAFT GIMBAL ANGLES		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)
1ST OPP	9706.750	80.88700	0.35907	180.00000
	9710.000	80.88700	0.35907	180.00000
	9810.000	74.36694	0.45693	180.00000
FM NAV	9907.625	67.24489	0.55815	180.00000
	9910.000	67.12605	0.55978	180.00000
	9912.000	67.00722	0.56140	180.00000
TR6	9912.000	67.00722	0.56140	180.00000
Q2H2I	9954.000	64.09581	0.60061	180.00000
LH2VTCO	9954.200	64.09581	0.60061	180.00000
	10010.000	60.29332	0.64976	180.00000
	10110.000	53.52057	0.73089	180.00000
	10210.000	46.74831	0.80283	180.00000
	10310.000	39.97645	0.86454	180.00000
S4B LUI	10408.300	33.26434	0.91470	180.00000
Q2H2CO	10408.800	33.26434	0.91470	180.00000
	10410.000	33.14554	0.91549	180.00000
	10480.000	28.39371	0.94381	180.00000
	10481.000	28.33431	0.94413	180.00000
	10481.000	28.33431	0.94413	180.00000
	10482.000	28.33205	0.94904	179.98442
LTI	10482.000	28.33205	0.94904	179.98442
S4BLUCO	10485.000	28.32685	0.96114	179.93767
	10490.000	28.32558	0.96886	179.85960
S4B RFI	10490.000	28.32558	0.96886	179.85960
S4B 90T	10492.500	28.21859	0.92189	179.78909
IGM ON	10496.500	27.84002	0.80427	179.64565
	10500.000	25.47746	-0.89031	179.37271
TSMC3	10506.500	22.51881	-0.97269	-179.77724
	10510.000	22.52487	-0.89271	-179.47367
	10520.000	21.77494	-0.41041	-179.23548
	10530.000	21.19304	-0.04413	-179.15551
	10540.000	20.67927	0.26369	-179.25943
	10550.000	20.20418	0.53584	-179.18479
	10560.000	19.75364	0.78925	-179.23884
	10570.000	19.32399	1.02969	-179.21791
	10580.000	18.90613	1.26387	-179.22523
	10590.000	18.50137	1.49392	-179.23994
MRS	10592.500	18.40079	1.55107	-179.25813
	10600.000	18.15316	1.77680	-179.18283
	10610.000	17.98823	1.55636	-179.36503

TABLE 5-XXVI SPACECRAFT GIMBAL ANGLES
(CONTINUED) FIRST OPPORTUNITY

EVFNT	TIME FROM 1ST MOT (SECS)	SPACECRAFT GIMBAL ANGLES		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)
	10620.000	17.53046	2.11281	-179.25067
	10630.000	17.12031	2.53717	-179.24255
	10640.000	16.79205	2.74138	-179.14191
	10650.000	16.48656	2.90348	-179.26470
	10660.000	16.15260	3.15126	-179.17910
	10670.000	15.82337	3.36651	-179.25719
	10680.000	15.48932	3.57670	-179.20400
	10690.000	15.14621	3.78800	-179.24389
	10700.000	14.79055	3.99993	-179.22765
	10710.000	14.41635	4.20996	-179.23125
	10720.000	14.02529	4.41929	-179.24047
	10730.000	13.60670	4.62697	-179.20902
	10740.000	13.15812	4.83295	-179.25269
	10750.000	12.67001	5.04036	-179.18788
	10760.000	12.13556	5.20514	-179.25228
	10770.000	11.54858	5.40162	-179.15745
	10780.000	10.87158	5.66720	-179.25500
	10790.000	10.11772	5.86104	-179.13005
	10800.000	9.24142	6.04766	-179.24785
	10810.000	6.50702	6.50417	-179.19659
	10820.000	6.65753	6.46170	-179.27786
	10830.000	6.65249	6.41424	-179.21998
S4BGCS2	10833.049	6.66866	6.39796	-179.26563
TR7	10833.259	6.66859	6.39799	-179.26776
	10840.000	6.66670	6.39874	-179.33589
	10843.049	6.66723	6.39695	-179.36687
TLI	10843.049	6.66723	6.39695	-179.36687
	10843.375	6.66734	6.39666	-179.37019
	10853.259	6.67652	6.37928	-179.47143
	10853.259	6.67652	6.37928	-179.47143
ORB GID	10853.375	6.67652	6.37928	180.00000
ORB NAV	10854.375	6.31171	5.78608	179.77445
	10940.000	-8.47546	1.61219	180.00000
	11040.000	-17.26622	1.51451	180.00000
	11140.000	-24.76450	1.40279	180.00000
	11240.000	-32.17493	1.26854	180.00000
	11340.000	-38.36359	1.13981	180.00000
	11440.000	-44.40193	1.00110	180.00000
	11540.000	-49.41277	0.87725	180.00000
	11640.000	-54.29521	0.74991	180.00000

TABLE 5-XXVI
----- (CONTINUED)SPACECRAFT GIMBAL ANGLES
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SECS)	SPACECRAFT GIMBAL ANGLES			
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)	
T&D MAN	11734.375	-58.03191	0.64857	180.00000	
	11740.000	-58.03191	0.64857	180.00000	
	11833.049	3.79522	44.74470	128.88650	
	11840.000	10.16045	45.06628	124.97948	
	11940.000	60.93781	39.94462	56.55097	
	12040.000	62.82042	41.05166	0.00000	
	12140.000	62.82042	41.05166	0.00000	
	12240.000	62.82042	41.05166	0.00000	
	CSM SEP	12333.259	62.82042	41.05166	0.00000
		12340.000	62.82042	41.05166	0.00000
12440.000		62.82042	41.05166	0.00000	
12540.000		62.82042	41.05166	0.00000	
12640.000		62.82042	41.05166	0.00000	
12740.000		62.82042	41.05166	0.00000	
12840.000		62.82042	41.05166	0.00000	
12900.000		62.82042	41.05166	0.00000	

EVENT	TIME FROM 1ST MOT (SEC)	COMMANDED ATTITUDE CONTROL SIGNALS FIRST OPPORTUNITY		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)

(COMMANDED CONTROL SIGNALS
ARE ZERO FOR THIS PERIOD
OF FLIGHT)

3-D SIMULATION

LTI	10482.000	0.021	0.029	0.093
S4BLUCO	10485.000	0.224	0.031	0.137
	10490.000	0.569	0.023	0.209
S4B RET	10490.000	0.569	0.023	0.209
S4B 90T	10492.500	0.140	-0.226	0.428
IGM ON	10496.500	0.375	-0.066	0.590
	10500.000	0.347	-0.599	0.826
TSMC3	10506.500	0.195	-0.151	-0.787
	10510.000	0.177	-0.247	-0.874
	10520.000	0.141	-0.224	-0.760
	10530.000	0.138	-0.226	-0.718
	10540.000	0.140	-0.227	-0.764
	10550.000	0.141	-0.229	-0.715
	10560.000	0.141	-0.230	-0.809
	10570.000	0.143	-0.232	-0.706
	10580.000	0.144	-0.233	-0.846
	10590.000	0.145	-0.235	-0.707
MRS	10592.500	0.144	-0.235	-0.726
	10600.000	0.154	-0.297	-0.952
	10610.000	0.157	-0.253	-0.620

TABLE 5-XXVII
(CONTINUED)COMMANDED ATTITUDE CONTROL SIGNALS
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	COMMANDED CONTROL SIGNALS		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)
	10620.000	0.147	-0.238	-0.881
	10630.000	0.148	-0.239	-0.757
	10640.000	0.149	-0.242	-0.726
	10650.000	0.151	-0.247	-0.755
	10660.000	0.151	-0.245	-0.714
	10670.000	0.153	-0.247	-0.781
	10680.000	0.154	-0.249	-0.708
	10690.000	0.155	-0.250	-0.813
	10700.000	0.157	-0.251	-0.703
	10710.000	0.157	-0.253	-0.844
	10720.000	0.159	-0.254	-0.707
	10730.000	0.160	-0.255	-0.883
	10740.000	0.161	-0.258	-0.710
	10750.000	0.162	-0.259	-0.918
	10760.000	0.164	-0.261	-0.720
	10770.000	0.166	-0.262	-0.960
	10780.000	0.167	-0.262	-0.729
	10790.000	0.169	-0.264	-0.992
	10800.000	0.170	-0.265	-0.738
	10810.000	0.166	-0.264	-0.750
	10820.000	0.167	-0.266	-0.774
	10830.000	0.166	-0.266	-0.709
S4BGCS2	10833.049	0.168	-0.268	-0.708
TB7	10833.259	0.168	-0.268	-0.706
	10840.000	0.167	-0.267	-0.637
	10843.049	0.167	-0.269	-0.606
TLI	10843.049	0.208	-0.336	-0.606
	10843.375	0.208	-0.336	-0.603
	10853.259	0.223	-0.362	-0.503
	10853.259	0.223	-0.362	-0.503
ORB GID	10853.375	0.223	-0.362	-0.503

(COMMANDED CONTROL SIGNALS
ARE ZERO FOR THE REMAINDER
OF THE SIMULATED FLIGHT)

TABLE 5-XXVIII VEHICLE BODY ROTATION RATES
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	BODY ROTATION RATES		
		X (DEG/SEC)	Y (DEG/SEC)	Z (DEG/SEC)

(BODY ROTATION RATES ARE
NOT CALCULATED DURING THIS
PERIOD OF FLIGHT)

3-D SIMULATION

LTI	10482.000	-0.016	-0.002	0.005
S4BLUCO	10485.000	-0.016	-0.001	0.003
	10490.000	-0.016	0.000	0.000
S4B RFI	10490.000	-0.016	0.000	0.000
S4B 90T	10492.500	-0.045	-0.098	-0.040
IGM ON	10496.500	-0.047	-0.148	-0.047
	10500.000	-0.037	-1.127	-0.640
TSMC3	10506.500	0.113	0.112	0.052
	10510.000	0.070	-0.091	0.034
	10520.000	-0.001	-0.060	0.041
	10530.000	-0.025	-0.054	0.034
	10540.000	0.004	-0.049	0.029
	10550.000	-0.021	-0.045	0.027
	10560.000	0.009	-0.043	0.025
	10570.000	-0.016	-0.042	0.024
	10580.000	0.013	-0.041	0.024
	10590.000	-0.012	-0.040	0.023
MRS	10592.500	-0.005	-0.040	0.024
	10600.000	0.025	-0.042	0.081
	10610.000	-0.004	-0.030	0.033

TABLE 5-XXVIII VEHICLE BODY ROTATION RATES
(CONTINUED) FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	BODY ROTATION RATES		
		X (DEG/SEC)	Y (DEG/SEC)	Z (DEG/SEC)
	10620.000	0.024	-0.046	0.057
	10630.000	-0.002	-0.035	0.030
	10640.000	-0.029	-0.030	0.013
	10650.000	0.002	-0.032	0.024
	10660.000	-0.024	-0.032	0.023
	10670.000	0.005	-0.033	0.021
	10680.000	-0.021	-0.033	0.021
	10690.000	0.008	-0.035	0.021
	10700.000	-0.017	-0.036	0.021
	10710.000	0.011	-0.038	0.022
	10720.000	-0.014	-0.040	0.021
	10730.000	0.014	-0.043	0.021
	10740.000	-0.012	-0.046	0.021
	10750.000	0.016	-0.050	0.021
	10760.000	-0.010	-0.054	0.015
	10770.000	0.018	-0.062	0.026
	10780.000	-0.009	-0.070	0.023
	10790.000	0.018	-0.080	0.019
	10800.000	-0.009	-0.094	0.020
	10810.000	-0.014	0.062	-0.008
	10820.000	0.006	-0.003	-0.004
	10830.000	-0.019	0.007	-0.008
S4BGCS?	10833.049	-0.010	-0.000	0.000
TB7	10833.259	-0.010	-0.000	0.000
	10840.000	-0.010	-0.000	-0.000
	10843.049	-0.010	0.000	-0.001
TLI	10843.049	-0.010	0.000	-0.001
	10843.375	-0.010	0.000	-0.001
	10853.259	-0.010	0.001	-0.003
	10853.259	-0.010	0.001	-0.003
ORB GTD	10853.375	-0.010	0.001	-0.003

(BODY ROTATION RATES ARE
NOT CALCULATED DURING THE
REMAINDER OF THE SIMULATED
FLIGHT)

TABLE 5-XXIX-A		VEHICLE POSITION - INERTIAL COORDINATES (METRIC UNITS) FIRST OPPORTUNITY			
EVENT	TIME FROM 1ST MOT (SFC)	VEHICLE POSITION COMPONENTS			
		X (METERS)	Y (METERS)	Z (METERS)	
1ST OPP	9706.750	1041988.	-102249.	-6488331.	
	9710.000	1066985.	-102090.	-6484287.	
	9810.000	1826607.	-96471.	-6313148.	
FM NAV	9907.625	2543531.	-89684.	-6060526.	
	9910.000	2560586.	-89504.	-6053353.	
	9912.000	2574932.	-89351.	-6047276.	
TR6	9912.000	2574932.	-89351.	-6047276.	
02H2I	9954.000	2872740.	-86032.	-5911860.	
LH2VTCO	9954.200	2874142.	-86016.	-5911179.	
	10010.000	3258615.	-81273.	-5708573.	
	10110.000	3910900.	-71879.	-5283668.	
	10210.000	4508293.	-61440.	-4734622.	
	10310.000	5042423.	-50089.	-4218457.	
	10408.300	5498558.	-38184.	-3604211.	
	10408.800	5500692.	-38122.	-3600955.	
S4B LUI	10410.000	5505807.	-37973.	-3593134.	
	10480.000	5784572.	-29120.	-3124877.	
	10481.000	5788271.	-28992.	-3118024.	
	10481.000	5788271.	-28992.	-3118024.	
	10482.000	5791961.	-28863.	-3111167.	
	10482.000	5791961.	-28863.	-3111167.	
	10485.000	5802983.	-28478.	-3090569.	
S4BLUCO	10490.000	5821191.	-27835.	-3056151.	
	10490.000	5821191.	-27835.	-3056151.	
S4B RFI	10490.000	5821191.	-27835.	-3056151.	
S4B 90T	10492.500	5830220.	-27512.	-3038899.	
IGM ON	10496.500	5844592.	-26995.	-3011180.	
	10500.000	5857097.	-26542.	-2986802.	
TSMC3	10506.500	5880133.	-25702.	-2941217.	
	10510.000	5892433.	-25251.	-2916501.	
	10520.000	5927174.	-23968.	-2845232.	
	10530.000	5961312.	-22687.	-2772994.	
	10540.000	5994940.	-21405.	-2699786.	
	10550.000	6027750.	-20119.	-2625610.	
	10560.000	6060038.	-18826.	-2550463.	
	10570.000	6091696.	-17523.	-2474347.	
	10580.000	6122720.	-16207.	-2397259.	
	10590.000	6153103.	-14876.	-2319201.	
	MRS	10592.500	6160599.	-14541.	-2299535.
		10600.000	6182851.	-13526.	-2240143.
		10610.000	6211982.	-12153.	-2160015.

TABLE 5-XXIX-A

VEHICLE POSITION - INERTIAL COORDINATES
(METRIC UNITS)
FIRST OPPORTUNITY

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
	10620.000	6240494.	-10756.	-2078808.
	10630.000	6268384.	-9329.	-1996519.
	10640.000	6295648.	-7867.	-1913139.
	10650.000	6322283.	-6364.	-1828662.
	10660.000	6348287.	-4819.	-1743081.
	10670.000	6373657.	-3225.	-1656390.
	10680.000	6398390.	-1580.	-1568581.
	10690.000	6422485.	121.	-1479645.
	10700.000	6445940.	1883.	-1389572.
	10710.000	6468753.	3710.	-1298353.
	10720.000	6490921.	5608.	-1205977.
	10730.000	6512443.	7582.	-1112430.
	10740.000	6533317.	9636.	-1017699.
	10750.000	6553539.	11778.	-921771.
	10760.000	6573108.	14013.	-824626.
	10770.000	6592020.	16346.	-726245.
	10780.000	6610270.	18785.	-626610.
	10790.000	6627851.	21337.	-525700.
	10800.000	6644755.	24009.	-423492.
	10810.000	6660969.	26810.	-319959.
	10820.000	6676453.	29751.	-215068.
	10830.000	6691207.	32837.	-108793.
S4BGC52	10833.049	6695561.	33808.	-76107.
T87	10833.259	6695858.	33875.	-73851.
	10840.000	6705199.	36038.	-1425.
	10843.049	6709291.	37015.	31338.
TLI	10843.049	6709291.	37015.	31338.
	10843.375	6709724.	37120.	34838.
	10853.259	6722396.	40286.	141036.
	10853.259	6722396.	40286.	141036.
ORB GID	10853.375	6722539.	40323.	142280.
ORB NAV	10854.375	6723773.	40644.	153023.
	10940.000	6797189.	67859.	1070771.
	11040.000	6806241.	98958.	2130102.
	11140.000	6740610.	129066.	3166289.
	11240.000	6609943.	158009.	4172170.
	11340.000	6424061.	185699.	5143437.
	11440.000	6192156.	212111.	6078078.
	11540.000	5922382.	237269.	6975749.
	11640.000	5621715.	261222.	7837216.

TABLE 5-XXIX-A VEHICLE POSITION - INERTIAL COORDINATES
(CONTINUED) (METRIC UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MDT (SEC)	VEHICLE POSITION COMPONENTS			
		X (METERS)	Y (METERS)	Z (METERS)	
T&D MAN	11734.375	5314900.	282784.	8618315.	
	11740.000	5296001.	284038.	8663926.	
	11833.049	4974675.	304311.	9403545.	
	11840.000	4950062.	305790.	9457693.	
	11940.000	4587852.	326553.	10220501.	
	12040.000	4212595.	346400.	10954357.	
	12140.000	3826917.	365401.	11661223.	
	12240.000	3432961.	383621.	12342962.	
	CSM SFP	12333.259	3059647.	399961.	12957640.
		12340.000	3032476.	401119.	13001317.
12440.000		2626893.	417949.	13637905.	
12540.000		2217388.	434160.	14254213.	
12640.000		1804926.	449797.	14851606.	
12740.000		1390305.	464901.	15431331.	
12840.000		974186.	479509.	15994528.	
12900.000		724027.	488050.	16324951.	

TABLE 5-XXIX-B VEHICLE POSITION - INERTIAL COORDINATES
(ENGLISH UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
1ST OPP	9706.750	3418595.	-335462.	-21287175.
	9710.000	3500607.	-334940.	-21273908.
	9810.000	5992804.	-316505.	-20712426.
FM NAV	9907.625	8344917.	-294240.	-19883614.
	9910.000	8400872.	-293648.	-19860083.
	9912.000	8447941.	-293148.	-19840145.
TR6	9912.000	8447941.	-293148.	-19840145.
	9954.000	9425001.	-282259.	-19395865.
	9954.200	9429600.	-282205.	-19393633.
O2H2I LH2VTCO	10010.000	10690995.	-266643.	-18728915.
	10110.000	12831037.	-235822.	-17334869.
	10210.000	14790989.	-201573.	-15697578.
S4B LUI	10310.000	16543381.	-164333.	-13840081.
	10408.300	18039888.	-125276.	-11824840.
	10408.800	18046890.	-125072.	-11814156.
O2H2CO	10410.000	18063671.	-124582.	-11788497.
	10480.000	18978255.	-95539.	-10252221.
	10481.000	18990389.	-95118.	-10229738.
LTI	10481.000	18990389.	-95118.	-10229738.
	10482.000	19002496.	-94696.	-10207240.
	10482.000	19002496.	-94696.	-10207240.
S4BLUCO	10485.000	19038659.	-93432.	-10139661.
	10490.000	19098395.	-91321.	-10026743.
	10490.000	19098395.	-91321.	-10026743.
S4B RET	10492.500	19128019.	-90264.	-9970140.
	10496.500	19175171.	-88567.	-9879200.
	10500.000	19216197.	-87079.	-9799220.
TSMC3	10506.500	19291775.	-84323.	-9649661.
	10510.000	19332130.	-82844.	-9568573.
	10520.000	19446110.	-78634.	-9334749.
MRS	10530.000	19558111.	-74433.	-9097748.
	10540.000	19668110.	-70228.	-8857567.
	10550.000	19776084.	-66008.	-8614205.
MRS	10560.000	19882014.	-61765.	-8367662.
	10570.000	19985880.	-57490.	-8117935.
	10580.000	20087663.	-53173.	-7865024.
MRS	10590.000	20187347.	-48806.	-7608927.
	10592.500	20211938.	-47705.	-7544405.
	10600.000	20284945.	-44377.	-7349551.
	10610.000	20380517.	-39871.	-7086663.

TABLE 5-XXIX-B. VEHICLE POSITION - INERTIAL COORDINATES
(ENGLISH UNITS)
(CONTINUED) FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
	10620.000	20474062.	-35288.	-6820237.
	10630.000	20565565.	-30608.	-6550258.
	10640.000	20655013.	-25810.	-6276703.
	10650.000	20742399.	-20881.	-5999547.
	10660.000	20827713.	-15810.	-5718771.
	10670.000	20910947.	-10582.	-5434351.
	10680.000	20992094.	-5185.	-5146263.
	10690.000	21071146.	396.	-4854477.
	10700.000	21148097.	6177.	-4558964.
	10710.000	21222941.	12172.	-4259689.
	10720.000	21295672.	18399.	-3956616.
	10730.000	21366283.	24874.	-3649704.
	10740.000	21434766.	31616.	-3338909.
	10750.000	21501113.	38642.	-3024182.
	10760.000	21565316.	45973.	-2705466.
	10770.000	21627362.	53629.	-2382694.
	10780.000	21687237.	61630.	-2055808.
	10790.000	21744918.	70002.	-1724739.
	10800.000	21800379.	78769.	-1389410.
	10810.000	21853573.	87958.	-1049733.
	10820.000	21904375.	97607.	-705605.
	10830.000	21952778.	107734.	-356933.
S4BGCS?	10833.049	21967064.	110918.	-249696.
TR7	10833.259	21968040.	111139.	-242295.
	10840.000	21998683.	118234.	-4676.
	10843.049	22012111.	121441.	102815.
TLI	10843.049	22012111.	121441.	102815.
	10843.375	22013529.	121784.	114298.
	10853.259	22055106.	132173.	462716.
	10853.259	22055106.	132173.	462716.
ORB GID	10853.375	22055576.	132295.	466796.
ORB NAV	10854.375	22059621.	133345.	502044.
	10940.000	22300490.	222634.	3513029.
	11040.000	22330186.	324665.	6988524.
	11140.000	22114861.	423444.	10388089.
	11240.000	21686164.	518402.	13688221.
	11340.000	21076315.	609248.	16874792.
	11440.000	20315474.	695904.	19941202.
	11540.000	19430386.	778442.	22886317.
	11640.000	18443948.	857029.	25712652.

TABLE 5-XXIX-B
(CONTINUED)

VEHICLE POSITION - INERTIAL COORDINATES
(ENGLISH UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
T&D MAN	11734.375	17437335.	927768.	28275313.
	11740.000	17375330.	931883.	28424952.
	11833.049	16321112.	998394.	30851526.
	11840.000	16240362.	1003247.	31029178.
	11940.000	15052009.	1071366.	33531826.
	12040.000	13820849.	1136483.	35939492.
	12140.000	12555503.	1198823.	38258606.
CSM SFP	12240.000	11262996.	1258600.	40495281.
	12333.259	10038211.	1312208.	42511944.
	12340.000	9949069.	1316007.	42655240.
	12440.000	8618417.	1371223.	44743783.
	12540.000	7274894.	1424409.	46765792.
	12640.000	5921672.	1475713.	48725741.
	12740.000	4561368.	1525267.	50627725.
	12840.000	3196148.	1573193.	52475486.
	12900.000	2375416.	1601213.	53559550.

TABLE 5-XXX-A VEHICLE VELOCITY - INERTIAL COORDINATES
(METRIC UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS			
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)	
1ST OPP	9706.750	7693.899	48.757	1229.347	
	9710.000	7689.085	49.217	1258.991	
	9810.000	7485.536	63.052	2159.761	
FM NAV	9907.625	7185.362	75.844	3009.781	
	9910.000	7176.842	76.145	3030.001	
	9912.000	7169.623	76.398	3047.009	
TR6	9912.000	7169.623	76.398	3047.009	
O2H2I	9954.000	7008.784	81.622	3400.063	
LH2VTCO	9954.200	7007.976	81.647	3401.725	
	10010.000	6767.401	88.310	3857.490	
	10110.000	6263.031	99.376	4630.626	
	10210.000	5670.861	109.184	5338.578	
	10310.000	4999.238	117.589	5971.434	
	S4B LUI	10408.300	4270.761	124.364	6511.770
	O2H2CO	10408.800	4266.900	124.395	6514.300
10410.000		4257.628	124.468	6520.362	
10480.000		3702.534	128.321	6850.732	
10481.000		3694.411	128.370	6855.115	
10481.000		3694.411	128.370	6855.115	
10482.000		3686.282	128.419	6859.488	
LTI		10482.000	3686.282	128.419	6859.488
S4BLUCO		10485.000	3661.894	128.566	6872.602
	10490.000	3621.140	128.807	6894.255	
S4B REI	10490.000	3621.140	128.807	6894.255	
S4B 90T	10492.500	3603.824	129.014	6910.710	
IGM ON	10496.500	3582.208	129.465	6948.534	
	10500.000	3563.079	129.703	6981.737	
TSMC3	10506.500	3524.721	128.879	7044.661	
	10510.000	3503.997	128.611	7078.551	
	10520.000	3444.072	128.124	7175.362	
	10530.000	3383.385	128.060	7272.245	
	10540.000	3322.008	128.338	7369.176	
	10550.000	3259.994	128.915	7466.139	
	10560.000	3197.377	129.773	7563.137	
	10570.000	3134.187	130.900	7660.174	
	10580.000	3070.450	132.297	7757.261	
	10590.000	3006.186	133.967	7854.409	
	MRS	10592.500	2990.040	134.427	7878.708
10600.000		2943.918	136.111	7959.064	
10610.000		2882.180	138.487	8066.659	

TABLE 5-XXX-A

 VEHICLE VELOCITY - INERTIAL COORDINATES
 (METRIC UNITS)
 FIRST OPPORTUNITY

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
	10620.000	2820.211	141.017	8174.702
	10630.000	2757.742	144.355	8283.312
	10640.000	2694.980	148.202	8392.701
	10650.000	2631.985	152.341	8502.781
	10660.000	2568.706	156.975	8613.442
	10670.000	2505.189	161.845	8724.863
	10680.000	2441.456	167.240	8837.106
	10690.000	2377.521	173.079	8950.246
	10700.000	2313.390	179.386	9064.368
	10710.000	2249.067	186.180	9179.564
	10720.000	2184.548	193.486	9295.937
	10730.000	2119.821	201.324	9413.599
	10740.000	2054.859	209.718	9532.674
	10750.000	1989.620	218.698	9653.294
	10760.000	1924.096	228.308	9775.928
	10770.000	1858.182	238.475	9900.456
	10780.000	1791.664	249.392	10026.816
	10790.000	1724.425	261.083	10155.450
	10800.000	1656.240	273.503	10286.582
	10810.000	1585.257	286.941	10420.635
	10820.000	1511.740	301.316	10557.730
	10830.000	1439.035	316.028	10697.706
S4BGCS2	10833.049	1417.047	320.574	10740.998
TR7	10833.259	1415.497	320.853	10743.664
	10840.000	1355.713	320.688	10744.681
	10843.049	1328.685	320.574	10744.624
TLI	10843.049	1328.685	320.574	10744.624
	10843.375	1325.799	320.562	10744.610
	10853.259	1238.445	320.167	10743.474
	10853.259	1238.445	320.167	10743.474
ORB GID	10853.375	1237.424	320.162	10743.453
ORB NAV	10854.375	1228.609	320.120	10743.260
	10940.000	493.328	315.131	10677.333
	11040.000	-298.285	306.401	10492.116
	11140.000	-998.054	295.469	10219.741
	11240.000	-1598.785	283.252	9890.790
	11340.000	-2103.467	270.507	9531.303
	11440.000	-2521.014	257.786	9161.047
	11540.000	-2862.861	245.453	8793.725
	11640.000	-3140.747	233.725	8438.077

TABLE 5-XXX-A VEHICLE VELOCITY - INERTIAL COORDINATES
(CONTINUED) (METRIC UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS			
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)	
T&D MAN	11734.375	-3354.126	223.310	8117.733	
	11740.000	-3365.530	222.710	8099.166	
	11833.049	-3535.321	213.137	7801.086	
	11840.000	-3546.675	212.448	7779.516	
	11940.000	-3692.173	202.932	7479.990	
	12040.000	-3808.616	194.132	7200.416	
	12140.000	-3901.382	186.003	6940.011	
	12240.000	-3974.833	178.493	6697.669	
	CSM SEP	12333.259	-4029.042	172.002	6486.833
		12340.000	-4032.493	171.551	6472.132
12440.000		-4077.213	165.127	6262.108	
12540.000		-4111.298	159.172	6066.330	
12640.000		-4136.619	153.643	5883.599	
12740.000		-4154.697	148.501	5712.795	
12840.000		-4166.775	143.710	5552.890	
12900.000		-4171.574	140.990	5461.784	

TABLE 5-XXX-B VEHICLE VELOCITY - INERTIAL COORDINATES
(ENGLISH UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SFC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
1ST OPP	9706.750	25242.449	159.963	4033.290
	9710.000	25226.655	161.472	4130.547
FM NAV	9810.000	24558.847	206.864	7085.829
	9907.625	23574.021	248.831	9874.609
	9910.000	23546.069	249.818	9940.947
TR6	9912.000	23522.386	250.648	9996.749
	9912.000	23522.386	250.648	9996.749
02H2I	9954.000	22994.698	267.789	11155.063
LH2VTCN	9954.200	22992.048	267.870	11160.515
	10010.000	22202.758	289.732	12655.806
	10110.000	20548.003	326.038	15192.343
	10210.000	18605.188	358.215	17515.021
	10310.000	16401.699	385.792	19591.320
	10408.300	14011.682	408.019	21364.075
S4B LUI	10408.800	13999.016	408.119	21372.376
02H2C0	10410.000	13968.597	408.359	21392.263
	10480.000	12147.421	421.001	22476.153
	10481.000	12120.770	421.162	22490.533
	10481.000	12120.770	421.162	22490.533
	10482.000	12094.102	421.322	22504.882
	10482.000	12094.102	421.322	22504.882
LTI	10482.000	12094.102	421.322	22504.882
S4RLUC0	10485.000	12014.088	421.804	22547.905
	10490.000	11880.380	422.594	22618.948
S4B RET	10490.000	11880.380	422.594	22618.948
S4B 90T	10492.500	11823.571	423.274	22672.932
IGM ON	10496.500	11752.652	424.755	22797.028
	10500.000	11689.893	425.534	22905.963
TSMC3	10506.500	11564.046	422.830	23112.405
	10510.000	11496.054	421.953	23223.593
	10520.000	11299.448	420.354	23541.214
	10530.000	11100.344	420.145	23859.070
	10540.000	10898.976	421.057	24177.085
	10550.000	10695.517	422.949	24495.207
	10560.000	10490.081	425.763	24813.440
	10570.000	10282.767	429.463	25131.805
	10580.000	10073.655	434.044	25450.331
	10590.000	9862.815	439.524	25769.059
MRS	10592.500	9809.843	441.034	25848.779
	10600.000	9658.523	446.559	26112.415
	10610.000	9455.972	454.354	26465.417

TABLE 5-XXX-B VEHICLE VELOCITY - INERTIAL COORDINATES
(CONTINUED) (ENGLISH UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
	10620.000	9252.661	462.654	26819.890
	10630.000	9047.709	473.607	27176.220
	10640.000	8841.797	486.227	27535.108
	10650.000	8635.120	499.806	27896.262
	10660.000	8427.513	514.680	28259.326
	10670.000	8219.125	530.987	28624.879
	10680.000	8010.026	548.688	28993.129
	10690.000	7800.267	567.846	29364.323
	10700.000	7589.863	588.538	29738.739
	10710.000	7378.829	610.827	30116.680
	10720.000	7167.152	634.797	30498.481
	10730.000	6954.792	660.511	30884.512
	10740.000	6741.663	688.051	31275.177
	10750.000	6527.625	717.514	31670.912
	10760.000	6312.649	749.042	32073.255
	10770.000	6096.398	782.398	32481.812
	10780.000	5878.162	818.215	32896.378
	10790.000	5657.562	856.570	33318.406
	10800.000	5433.859	897.319	33748.627
	10810.000	5200.973	941.406	34188.434
	10820.000	4959.777	988.569	34638.221
	10830.000	4721.243	1036.837	35097.462
S4BGCS2	10833.049	4649.104	1051.751	35239.495
TB7	10833.259	4644.018	1052.667	35248.241
	10840.000	4447.876	1052.125	35251.579
	10843.049	4359.202	1051.752	35251.389
TLI	10843.049	4359.202	1051.752	35251.389
	10843.375	4349.736	1051.712	35251.344
	10853.259	4063.140	1050.416	35247.618
	10853.259	4063.140	1050.416	35247.618
ORB GID	10853.375	4059.791	1050.400	35247.548
ORB NAV	10854.375	4030.869	1050.262	35246.915
	10940.000	1618.529	1033.894	35030.620
	11040.000	-978.626	1005.254	34422.952
	11140.000	-3274.455	969.385	33529.335
	11240.000	-5245.359	929.304	32450.098
	11340.000	-6901.137	887.490	31270.678
	11440.000	-8271.043	845.755	30055.928
	11540.000	-9392.588	805.293	28850.804
	11640.000	-10304.289	766.814	27683.979

TABLE 5-XXX-B

 VEHICLE VELOCITY - INERTIAL COORDINATES
 (ENGLISH UNITS)
 FIRST OPPORTUNITY

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS			
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)	
T&D MAN	11734.375	-11004.350	732.644	26632.984	
	11740.000	-11041.764	730.677	26572.068	
	11833.049	-11598.822	699.268	25594.114	
	11840.000	-11636.073	697.008	25523.345	
	11940.000	-12113.428	665.789	24540.650	
	12040.000	-12495.458	636.917	23623.411	
	12140.000	-12799.810	610.246	22769.066	
	12240.000	-13040.790	585.607	21973.979	
	CSM SFP	12333.259	-13218.642	564.312	21282.260
		12340.000	-13229.965	562.832	21234.029
12440.000		-13376.684	541.754	20544.973	
12540.000		-13488.512	522.217	19902.658	
12640.000		-13571.585	504.079	19303.145	
12740.000		-13630.897	487.209	18742.764	
12840.000		-13670.523	471.489	18218.142	
12900.000		-13686.266	462.564	17919.239	

TABLE 5-XXXI-A VEHICLE POSITION - EARTH-FIXED COORDINATES
(METRIC UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
1ST OPP	9706.750	-9290914.	-2120072.	-5497322.
	9710.000	-9269422.	-2124752.	-5506901.
	9810.000	-8590685.	-2255099.	-5765004.
FM NAV	9907.625	-7901040.	-2355450.	-5946727.
	9910.000	-7883999.	-2357545.	-5950265.
	9912.000	-7869641.	-2359295.	-5953211.
TR6	9912.000	-7869641.	-2359295.	-5953211.
02H2I	9954.000	-7566489.	-2393275.	-6008135.
LH2VTCO	9954.200	-7565038.	-2393424.	-6008365.
	10010.000	-7158272.	-2430177.	-6060612.
	10110.000	-6422645.	-2471466.	-6094923.
	10210.000	-5686381.	-2480294.	-6053037.
	10310.000	-4958750.	-2455977.	-5935747.
S4B LUI	10408.300	-4260778.	-2399538.	-5748636.
02H2CO	10408.800	-4257286.	-2399169.	-5747506.
	10410.000	-4248909.	-2398279.	-5744788.
	10480.000	-3767392.	-2338129.	-5568663.
	10481.000	-3760623.	-2337153.	-5565900.
	10481.000	-3760623.	-2337153.	-5565900.
	10482.000	-3753856.	-2336174.	-5563130.
	10482.000	-3753856.	-2336174.	-5563130.
LTI	10482.000	-3753856.	-2336174.	-5563130.
S4BLUCO	10485.000	-3733578.	-2333216.	-5554779.
	10490.000	-3699846.	-2328220.	-5540725.
S4B REI	10490.000	-3699846.	-2328220.	-5540725.
S4B 90T	10492.500	-3683007.	-2325691.	-5533631.
IGM ON	10496.500	-3656049.	-2321592.	-5522169.
	10500.000	-3632433.	-2317950.	-5512022.
TSMC3	10506.500	-3588516.	-2311055.	-5492872.
	10510.000	-3564837.	-2307269.	-5482393.
	10520.000	-3497064.	-2296167.	-5451811.
	10530.000	-3429120.	-2284638.	-5420274.
	10540.000	-3361007.	-2272676.	-5387778.
	10550.000	-3292728.	-2260275.	-5354322.
	10560.000	-3224286.	-2247429.	-5319904.
	10570.000	-3155683.	-2234134.	-5284523.
	10580.000	-3086920.	-2220384.	-5248175.
	10590.000	-3018001.	-2206175.	-5210860.
MRS	10592.500	-3000746.	-2202551.	-5201380.
	10600.000	-2948901.	-2191495.	-5172562.
	10610.000	-2879559.	-2176323.	-5133241.

TABLE 5-XXXI-A
(CONTINUED)

VEHICLE POSITION - EARTH-FIXED COORDINATES
(METRIC UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
	10620.000	-2809969.	-2160655.	-5092894.
	10630.000	-2740130.	-2144482.	-5051518.
	10640.000	-2670037.	-2127795.	-5009108.
	10650.000	-2599685.	-2110585.	-4965660.
	10660.000	-2529071.	-2092846.	-4921170.
	10670.000	-2458190.	-2074570.	-4875636.
	10680.000	-2387036.	-2055750.	-4829052.
	10690.000	-2315603.	-2036378.	-4781413.
	10700.000	-2243885.	-2016444.	-4732715.
	10710.000	-2171873.	-1995941.	-4682952.
	10720.000	-2099562.	-1974858.	-4632117.
	10730.000	-2026940.	-1953185.	-4580204.
	10740.000	-1954001.	-1930913.	-4527206.
	10750.000	-1880732.	-1908030.	-4473112.
	10760.000	-1807124.	-1884522.	-4417914.
	10770.000	-1733164.	-1860377.	-4361596.
	10780.000	-1658841.	-1835582.	-4304149.
	10790.000	-1584145.	-1810120.	-4245557.
	10800.000	-1509064.	-1783974.	-4185802.
	10810.000	-1433590.	-1757124.	-4124863.
	10820.000	-1357730.	-1729540.	-4062700.
	10830.000	-1281464.	-1701206.	-3999295.
S4BGCS2	10833.049	-1258124.	-1692416.	-3979712.
TR7	10833.259	-1256515.	-1691808.	-3978359.
	10840.000	-1204999.	-1672230.	-3934827.
	10843.049	-1181784.	-1663337.	-3915075.
TLI	10843.049	-1181784.	-1663337.	-3915075.
	10843.375	-1179307.	-1662385.	-3912963.
	10853.259	-1104454.	-1633395.	-3848669.
	10853.259	-1104454.	-1633395.	-3848669.
ORB GID	10853.375	-1103581.	-1633054.	-3847914.
ORB NAV	10854.375	-1096041.	-1630107.	-3841387.
	10940.000	-473114.	-1369485.	-3269431.
	11040.000	196475.	-1047111.	-2575161.
	11140.000	804064.	-709957.	-1862943.
	11240.000	1352729.	-362371.	-1142344.
	11340.000	1847283.	-7964.	-421117.
	11440.000	2293375.	350442.	294845.
	11540.000	2696817.	710737.	1001294.
	11640.000	3063179.	1071408.	1695325.

TABLE 5-XXXI-A VEHICLE POSITION - EARTH-FIXED COORDINATES
(CONTINUED) (METRIC UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM LST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
T&D MAN	11734.375	3379523.	1411188.	2337229.
	11740.000	3397564.	1431406.	2375063.
	11833.049	3683988.	1765161.	2993730.
	11840.000	3704524.	1790034.	3039394.
	11940.000	3988050.	2146849.	3687751.
	12040.000	4251605.	2501592.	4319948.
	12140.000	4498176.	2854135.	4936061.
	12240.000	4730332.	3204439.	5536337.
CSM SFP	12333.259	4935798.	3529130.	6082193.
	12340.000	4950280.	3552525.	6121134.
	12440.000	5159918.	3898456.	6690878.
	12540.000	5360880.	4242319.	7246029.
	12640.000	5554573.	4584219.	7787063.
	12740.000	5742217.	4924267.	8314456.
	12840.000	5924865.	5262577.	8828677.
	12900.000	6032443.	5464778.	9131077.

TABLE 5-XXXI-B

 VEHICLE POSITION - EARTH-FIXED COORDINATES
 (ENGLISH UNITS)
 FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
1ST OPP	9706.750	-30482002.	-6955618.	-18035835.
	9710.000	-30411491.	-6970970.	-18067262.
	9810.000	-28184662.	-7398619.	-18914055.
FM NAV	9907.625	-25922046.	-7727856.	-19510259.
	9910.000	-25866139.	-7734727.	-19521866.
	9912.000	-25819032.	-7740470.	-19531532.
TR6	9912.000	-25819032.	-7740470.	-19531532.
02H2I	9954.000	-24824438.	-7851954.	-19711729.
LH2VTCO	9954.200	-24819679.	-7852443.	-19712483.
	10010.000	-23485144.	-7973021.	-19883996.
	10110.000	-21071669.	-8108484.	-19996468.
	10210.000	-18656105.	-8137448.	-19859047.
	10310.000	-16268864.	-8057668.	-19474236.
S4R LUI	10408.300	-13978930.	-7872502.	-18860355.
02H2CO	10408.800	-13967475.	-7871290.	-18856648.
	10410.000	-13939990.	-7868370.	-18847729.
	10480.000	-12360210.	-7671028.	-18269891.
	10481.000	-12338000.	-7667825.	-18260827.
	10481.000	-12338000.	-7667825.	-18260827.
	10482.000	-12315802.	-7664612.	-18251739.
ITI	10482.000	-12315802.	-7664612.	-18251739.
S4BLUCO	10485.000	-12249270.	-7654907.	-18224342.
	10490.000	-12138601.	-7638517.	-18178230.
S4R RFI	10490.000	-12138601.	-7638517.	-18178230.
S4B 90T	10492.500	-12083357.	-7630219.	-18154959.
IGM ON	10496.500	-11994910.	-7616771.	-18117353.
	10500.000	-11917432.	-7604824.	-18084061.
TSMC3	10506.500	-11773345.	-7582200.	-18021233.
	10510.000	-11695658.	-7569779.	-17986855.
	10520.000	-11473308.	-7533356.	-17886520.
	10530.000	-11250394.	-7495532.	-17783050.
	10540.000	-11026926.	-7456286.	-17676437.
	10550.000	-10802914.	-7415599.	-17566674.
	10560.000	-10578366.	-7373455.	-17453755.
	10570.000	-10353290.	-7329836.	-17337673.
	10580.000	-10127692.	-7284725.	-17218422.
	10590.000	-9901577.	-7238108.	-17095998.
MRS	10592.500	-9844968.	-7226216.	-17064895.
	10600.000	-9674871.	-7189946.	-16970346.
	10610.000	-9447372.	-7140167.	-16841343.

TABLE 5-XXXI-B VEHICLE POSITION - EARTH-FIXED COORDINATES
(CONTINUED) (ENGLISH UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
	10620.000	-9219060.	-7088764.	-16708971.
	10630.000	-8989927.	-7035704.	-16573220.
	10640.000	-8759964.	-6980954.	-16434080.
	10650.000	-8529151.	-6924490.	-16291535.
	10660.000	-8297477.	-6866291.	-16145572.
	10670.000	-8064927.	-6806332.	-15996181.
	10680.000	-7831482.	-6744587.	-15843345.
	10690.000	-7597122.	-6681029.	-15687051.
	10700.000	-7361826.	-6615630.	-15527280.
	10710.000	-7125569.	-6548362.	-15364015.
	10720.000	-6888326.	-6479192.	-15197235.
	10730.000	-6650067.	-6408089.	-15026918.
	10740.000	-6410763.	-6335017.	-14853037.
	10750.000	-6170382.	-6259940.	-14675565.
	10760.000	-5928886.	-6182815.	-14494467.
	10770.000	-5686233.	-6103600.	-14309699.
	10780.000	-5442391.	-6022251.	-14121223.
	10790.000	-5197324.	-5938713.	-13928992.
	10800.000	-4950997.	-5852932.	-13732947.
	10810.000	-4703378.	-5764843.	-13533015.
	10820.000	-4454494.	-5674344.	-13329067.
	10830.000	-4204278.	-5581386.	-13121045.
S4BGCS2	10833.049	-4127702.	-5552546.	-13056797.
T87	10833.259	-4122423.	-5550552.	-13052358.
	10840.000	-3953409.	-5486318.	-12909538.
	10843.049	-3877244.	-5457141.	-12844734.
TLI	10843.049	-3877244.	-5457141.	-12844734.
	10843.375	-3869118.	-5454020.	-12837804.
	10853.259	-3623537.	-5358906.	-12626867.
	10853.259	-3623537.	-5358906.	-12626867.
ORB GID	10853.375	-3620672.	-5357788.	-12624389.
ORB NAV	10854.375	-3595936.	-5348121.	-12602977.
	10940.000	-1552211.	-4493060.	-10726479.
	11040.000	644604.	-3435405.	-8448690.
	11140.000	2638007.	-2329256.	-6112016.
	11240.000	4438086.	-1188882.	-3747849.
	11340.000	6060641.	-26127.	-1381617.
	11440.000	7524196.	1149743.	967339.
	11540.000	8847826.	2331813.	3285086.
	11640.000	10049800.	3515117.	5562090.

TABLE 5-XXXI-B VEHICLE POSITION - EARTH-FIXED COORDINATES
(CONTINUED) (ENGLISH UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS			
		X (FEET)	Y (FEET)	Z (FEET)	
T&D MAN	11734.375	11087673.	4629281.	7668074.	
	11740.000	11146863.	4696215.	7792201.	
	11833.049	12086576.	5791212.	9821950.	
	11840.000	12153949.	5872815.	9971765.	
	11940.000	13084153.	7043467.	12098920.	
	12040.000	13949835.	8207323.	14173058.	
	12140.000	14757795.	9363960.	16104426.	
	12240.000	15519462.	10513250.	18163835.	
	CSM SEP	12332.259	16193562.	11578510.	19954701.
		12340.000	16241077.	11655265.	20082462.
12440.000		16928866.	12790209.	21951700.	
12540.000		17588188.	13918371.	23773061.	
12640.000		18223666.	15040090.	25548106.	
12740.000		18839294.	16155731.	27279399.	
12840.000		19438533.	17265674.	28965477.	
12900.000		19791479.	17929060.	29957600.	

TABLE 5-XXXII-A VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(METRIC UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
1ST OPP	9706.750	6606.846	-1444.035	-2958.702
	9710.000	6618.767	-1435.707	-2935.997
	9810.000	6941.706	-1167.457	-2221.052
FM NAV	9907.625	7172.592	-885.350	-1498.510
	9910.000	7177.145	-878.267	-1480.704
	9912.000	7180.939	-872.294	-1465.702
TR6	9912.000	7180.939	-872.294	-1465.702
O2H2I	9954.000	7252.217	-745.327	-1149.320
LH2VTCO	9954.200	7252.519	-744.715	-1147.808
	10010.000	7322.149	-571.819	-724.365
	10110.000	7374.937	-252.097	38.399
	10210.000	7334.870	76.672	797.994
	10310.000	7202.471	410.063	1544.913
	10408.300	6983.976	737.879	2257.766
	10408.800	6982.647	739.539	2261.324
S4B LUI O2H2CO	10410.000	6979.447	743.524	2269.859
	10480.000	6771.106	974.546	2759.504
	10481.000	6767.824	977.822	2766.374
	10481.000	6767.824	977.822	2766.374
	10482.000	6764.534	981.098	2773.241
	10482.000	6764.534	981.098	2773.241
	10485.000	6754.664	990.929	2793.841
LTI S4BLUCO	10490.000	6738.036	1007.297	2828.095
	10490.000	6738.036	1007.297	2828.095
	10492.500	6735.627	1016.456	2847.549
S4B 90T IGM ON	10496.500	6743.704	1033.085	2883.535
	10500.000	6750.692	1047.583	2915.272
	10506.500	6762.282	1074.416	2977.202
TSMC3	10510.000	6768.511	1089.065	3010.516
	10520.000	6785.878	1131.408	3105.940
	10530.000	6802.904	1174.447	3201.620
	10540.000	6819.628	1218.083	3297.529
	10550.000	6836.084	1262.260	3393.641
	10560.000	6852.300	1306.954	3489.944
	10570.000	6868.304	1352.149	3586.431
	10580.000	6884.121	1397.841	3683.094
	10590.000	6899.777	1444.034	3779.928
	10592.500	6903.669	1455.661	3804.163
MRS	10600.000	6921.899	1492.460	3880.796
	10610.000	6946.496	1541.929	3983.311

TABLE 5-XXXII-A
(CONTINUED)VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(METRIC UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
	10620.000	6971.416	1591.831	4086.132
	10630.000	6996.530	1642.873	4189.249
	10640.000	7022.134	1694.788	4292.810
	10650.000	7048.217	1747.336	4396.796
	10660.000	7074.675	1800.594	4501.117
	10670.000	7101.656	1854.641	4605.857
	10680.000	7129.216	1909.480	4711.050
	10690.000	7157.418	1965.146	4816.734
	10700.000	7186.321	2021.687	4922.953
	10710.000	7215.989	2079.146	5029.764
	10720.000	7246.484	2137.578	5137.228
	10730.000	7277.872	2197.037	5245.422
	10740.000	7310.213	2257.590	5354.439
	10750.000	7343.561	2319.314	5464.382
	10760.000	7378.208	2382.391	5575.572
	10770.000	7414.004	2446.744	5688.007
	10780.000	7450.746	2512.590	5801.688
	10790.000	7488.630	2580.109	5916.987
	10800.000	7527.630	2649.386	6034.206
	10810.000	7566.591	2721.278	6154.616
	10820.000	7605.806	2795.684	6278.173
	10830.000	7647.755	2871.166	6403.037
S4BGCS2	10833.049	7661.130	2894.396	6441.386
T87	10833.259	7661.923	2895.881	6443.835
	10840.000	7622.476	2912.782	6471.617
	10843.049	7604.373	2920.246	6483.835
TLI	10843.049	7604.373	2920.246	6483.835
	10843.375	7602.436	2921.040	6485.134
	10853.259	7543.414	2944.915	6523.988
	10853.259	7543.414	2944.915	6523.988
ORB GIO	10853.375	7542.720	2945.192	6524.437
ORB NAV	10854.375	7536.721	2947.581	6528.305
	10940.000	7009.705	3133.894	6817.277
	11040.000	6382.736	3305.418	7049.755
	11140.000	5774.352	3430.377	7178.588
	11240.000	5207.111	3515.321	7220.459
	11340.000	4693.506	3568.138	7194.302
	11440.000	4238.085	3596.476	7117.908
	11540.000	3840.080	3606.924	7006.287
	11640.000	3495.672	3604.769	6871.253

TABLE 5-XXXII-A VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(CONTINUED) (METRIC UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS			
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)	
T&D MAN	11734.375	3215.077	3594.829	6730.362	
	11740.000	3199.610	3594.055	6721.683	
	11833.049	2962.582	3579.037	6575.137	
	11840.000	2946.234	3577.774	6564.020	
	11940.000	2730.050	3558.096	6402.830	
	12040.000	2546.020	3536.560	6241.257	
	12140.000	2389.673	3514.240	6081.422	
	12240.000	2257.116	3491.874	5924.703	
	CSM SFP	12333.259	2151.979	3471.413	5782.119
		12340.000	2145.004	3469.957	5771.959
12440.000		2050.475	3448.811	5623.686	
12540.000		1971.097	3428.636	5480.125	
12640.000		1904.799	3409.547	5341.347	
12740.000		1849.822	3391.598	5207.304	
12840.000		1804.667	3374.802	5077.876	
12900.000		1781.749	3365.272	5002.364	

TABLE 5-XXXII-B

 VEHICLE VELOCITY - EARTH-FIXED COORDINATES
 (ENGLISH UNITS)
 FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS			
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)	
1ST OPP	9706.750	21676.005	-4737.648	-9707.026	
	9710.000	21715.114	-4710.325	-9632.535	
	9810.000	22774.625	-3830.238	-7286.915	
FM NAV	9907.625	23532.126	-2904.693	-4916.372	
	9910.000	23547.062	-2881.453	-4857.952	
	9912.000	23559.510	-2861.858	-4808.733	
TR6	9912.000	23559.510	-2861.858	-4808.733	
02H2I	9954.000	23793.361	-2445.298	-3770.736	
LH2VTCO	9954.200	23794.349	-2443.292	-3765.775	
	10010.000	24022.799	-1876.048	-2376.525	
	10110.000	24195.987	-827.088	125.982	
	10210.000	24064.534	251.548	2618.092	
	10310.000	23630.155	1345.352	5068.612	
	S4B LUI	10408.300	22913.308	2420.863	7407.370
		02H2CO	10408.800	22908.947	2426.310
		10410.000	22899.450	2439.382	7447.043
		10480.000	22214.916	3197.329	9053.490
		10481.000	22204.148	3208.078	9076.031
	10481.000	22204.148	3208.078	9076.031	
	10482.000	22193.352	3218.825	9098.560	
LTI	10482.000	22193.352	3218.825	9098.560	
S4BLUCO	10485.000	22160.971	3251.080	9166.144	
	10490.000	22106.416	3304.781	9278.526	
S4B REI	10490.000	22106.416	3304.781	9278.526	
S4B 90T	10492.500	22098.514	3334.830	9342.352	
TGM ON	10496.500	22125.012	3389.385	9460.415	
	10500.000	22147.940	3436.953	9564.540	
TSMC3	10506.500	22185.966	3524.988	9767.724	
	10510.000	22206.402	3573.047	9877.021	
	10520.000	22263.381	3711.967	10190.093	
	10530.000	22319.238	3853.173	10504.002	
	10540.000	22374.109	3996.336	10818.663	
	10550.000	22428.097	4141.274	11133.992	
	10560.000	22481.299	4287.906	11449.948	
	10570.000	22533.805	4436.184	11766.506	
	10580.000	22585.699	4586.093	12083.641	
	10590.000	22637.064	4737.645	12401.338	
MRS	10592.500	22649.834	4775.790	12480.850	
	10600.000	22709.643	4896.524	12732.270	
	10610.000	22790.341	5058.824	13068.605	

TABLE 5-XXXII-R VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(CONTINUED) (ENGLISH UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
	10620.000	22872.098	5222.544	13405.944
	10630.000	22954.495	5390.003	13744.256
	10640.000	23038.498	5560.327	14084.023
	10650.000	23124.073	5732.730	14425.183
	10660.000	23210.876	5907.461	14767.444
	10670.000	23299.395	6084.780	15111.078
	10680.000	23389.816	6264.697	15456.201
	10690.000	23482.343	6447.330	15802.932
	10700.000	23577.169	6632.831	16151.422
	10710.000	23674.503	6821.344	16501.850
	10720.000	23774.554	7013.050	16854.421
	10730.000	23877.534	7208.126	17209.391
	10740.000	23983.639	7406.791	17567.056
	10750.000	24093.046	7609.299	17927.762
	10760.000	24206.719	7816.243	18292.559
	10770.000	24324.159	8027.376	18661.439
	10780.000	24444.704	8243.405	19034.409
	10790.000	24568.996	8464.926	19412.687
	10800.000	24696.948	8692.212	19797.265
	10810.000	24824.774	8928.076	20192.309
	10820.000	24953.431	9172.191	20597.682
	10830.000	25091.061	9419.836	21007.338
S4BGCS2	10833.049	25134.941	9496.049	21133.156
TR7	10833.259	25137.215	9500.921	21141.193
	10840.000	25008.122	9556.371	21232.340
	10843.049	24948.731	9580.858	21272.425
TLI	10843.049	24948.731	9580.858	21272.425
	10843.375	24942.377	9583.466	21276.687
	10853.259	24748.733	9661.795	21404.161
	10853.259	24748.733	9661.795	21404.161
ORB GID	10853.375	24746.456	9662.704	21405.633
ORB NAV	10854.375	24726.776	9670.541	21418.325
	10940.000	22997.720	10281.805	22366.395
	11040.000	20940.735	10844.549	23129.117
	11140.000	18944.726	11254.518	23551.796
	11240.000	17083.697	11533.205	23689.168
	11340.000	15398.641	11706.491	23603.352
	11440.000	13904.478	11799.461	23352.718
	11540.000	12598.688	11833.740	22986.505
	11640.000	11468.741	11826.671	22543.480

TABLE 5-XXXII-B VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(CONTINUED) (ENGLISH UNITS)
FIRST OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS			
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)	
T&D MAN	11734.375	10548.154	11794.060	22081.240	
	11740.000	10497.408	11791.519	22052.765	
	11833.049	9719.756	11742.247	21571.971	
	11840.000	9666.122	11738.105	21535.500	
	11940.000	8956.857	11673.545	21006.659	
	12040.000	8353.085	11602.887	20476.566	
	12140.000	7840.134	11529.659	19952.171	
	12240.000	7405.238	11456.279	19438.000	
	CSM SEP	12333.259	7060.297	11389.149	18970.206
		12340.000	7037.413	11384.372	18936.874
12440.000		6727.280	11314.995	18450.414	
12540.000		6466.852	11248.806	17979.414	
12640.000		6249.340	11186.178	17524.103	
12740.000		6068.970	11127.290	17084.331	
12840.000		5920.824	11072.185	16659.697	
12900.000		5845.633	11040.919	16411.956	

TABLE 5-XXXIII-A THRUST, MASS, AND INERTIAL ACCELERATION
(METRIC UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SFC)	THRUST (NEWTONS)	MASS (KG)	INERTIAL ACCELERATION (M/(SEC)SQ)	
2ND OPP	14802.750	3.7874270 01	1.3479860 05	9.2350	
	14810.000	3.7832350 01	1.3479800 05	9.2349	
	14910.000	3.7254080 01	1.3479040 05	9.2341	
	15010.000	3.6675810 01	1.3478290 05	9.2331	
	15110.000	3.6281630 01	1.3477530 05	9.2320	
	15210.000	3.5985090 01	1.3476770 05	9.2307	
	FM NAV	15227.625	3.5932820 01	1.3476640 05	9.2304
15233.750		3.5914660 01	1.3476590 05	9.2304	
TR6	15233.750	3.5914660 01	1.3476590 05	9.2304	
02H2I	15275.750	1.0894560 02	1.3476270 05	9.2298	
LH2VTCO	15275.950	1.0901740 02	1.3476270 05	9.2298	
	15310.000	8.5562500 01	1.3476240 05	9.2293	
	15410.000	1.2178750 02	1.3476120 05	9.2277	
	15510.000	1.5332120 02	1.3475950 05	9.2261	
	15610.000	1.5332120 02	1.3475770 05	9.2245	
	15710.000	1.5332120 02	1.3475590 05	9.2230	
	S4B LUI	15730.050	1.5453640 02	1.3475560 05	9.2226
02H2CO		15730.550	6.2275100 02	1.3475540 05	9.2226
		15800.000	6.2275100 02	1.3473850 05	9.2216
15802.750		6.2275100 02	1.3473790 05	9.2216	
15802.750		6.2275100 02	1.3473790 05	9.2216	
15803.750	6.2275100 02	1.3473760 05	9.2215		
LTI	15803.750	6.2275100 02	1.3473760 05	9.2215	
S4BLUCO	15806.750	3.7092830 03	1.3473410 05	9.2214	
	15810.000	3.1116390 03	1.3473030 05	9.2213	
S4B REI	15811.750	2.0692310 03	1.3472820 05	9.2211	
S4B 90T	15814.250	7.7920860 05	1.3451720 05	10.8163	
IGM ON	15818.250	9.1621990 05	1.3370450 05	11.3949	
	15820.000	9.1636170 05	1.3333780 05	11.4403	
	15820.250	9.1638510 05	1.3328320 05	11.4630	
TSMC3	15828.250	9.1698660 05	1.3153780 05	11.9309	
	15830.000	9.1713030 05	1.3115610 05	11.9274	
	15840.000	9.1502920 05	1.2897750 05	11.9942	
	15850.000	9.1477570 05	1.2680070 05	12.0564	
	15860.000	9.1444380 05	1.2462480 05	12.1152	
	15870.000	9.1409410 05	1.2244950 05	12.1720	
	15880.000	9.1681270 05	1.2027030 05	12.2446	
	15890.000	9.1766390 05	1.1808830 05	12.3075	
	15900.000	9.1515640 05	1.1591030 05	12.3552	
	15910.000	9.1489780 05	1.1373330 05	12.4167	

TABLE 5-XXXIII-A THRUST, MASS, AND INERTIAL ACCELERATION
(CONTINUED) (METRIC UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (NEWTONS)	MASS (KG)	INERTIAL ACCELERATION (M/(SEC)SQ)
	15920.000	9.1459390 05	1.1155690 05	12.4789
	15930.000	9.1430750 05	1.0938130 05	12.5431
	15940.000	9.1676700 05	1.0720580 05	12.6283
	15950.000	9.1754430 05	1.0502410 05	12.7050
	15960.000	9.1528580 05	1.0284420 05	12.7674
	15970.000	9.1523330 05	1.0066650 05	12.8499
	15980.000	9.1508510 05	9.8489080 04	12.9354
	15990.000	9.1492790 05	9.6311980 04	13.0267
	16000.000	9.1476590 05	9.4135340 04	13.1245
	16010.000	9.1461140 05	9.1959060 04	13.2305
	16020.000	9.1445110 05	8.9783180 04	13.3451
	16030.000	9.1429410 05	8.7607720 04	13.4704
	16040.000	9.1412980 05	8.5432630 04	13.6071
	16050.000	9.1391630 05	8.3258010 04	13.7571
	16060.000	9.1692760 05	8.1079500 04	13.9529
	16070.000	9.1478360 05	7.8897290 04	14.1197
	16080.000	9.1479980 05	7.6720280 04	14.3324
	16090.000	9.1386970 05	7.4544270 04	14.5560
	16100.000	9.1359890 05	7.2368440 04	14.8152
	16110.000	9.1328670 05	7.0193060 04	15.1114
	16120.000	9.1264730 05	6.8018630 04	15.6236
	16130.000	9.1173650 05	6.5845970 04	15.8347
	16140.000	9.1053990 05	6.3675330 04	16.0679
S4BGCS2	16140.857	9.1051130 05	6.3489200 04	16.0903
TR7	16141.067	2.0577540 05	6.3438370 04	9.1561
	16150.857	1.9279220 02	6.3396900 04	8.8656
TLI	16150.857	1.9279220 02	6.3396900 04	8.8656
	16151.125	1.5257950 02	6.3396090 04	8.8646
	16161.067	1.8468380 02	6.3366340 04	8.8280
	16161.067	1.8468380 02	6.3366340 04	8.8280
ORB GID	16161.125	1.8463780 02	6.3366160 04	8.8278
ORB NAV	16162.125	1.8284360 02	6.3363200 04	8.8240
	16240.000	1.3129620 02	6.3146390 04	9.4749
	16340.000	1.2969290 01	6.2980940 04	7.9046
	16440.000	1.1693210 01	6.2901800 04	7.2594
	16540.000	1.0417120 01	6.2825890 04	6.5956
	16640.000	9.1410380 00	6.2753210 04	5.9534
	16740.000	7.8649540 00	6.2683770 04	5.3564
	16840.000	6.5888700 00	6.2617550 04	4.8157
	16940.000	5.3127870 00	6.2554570 04	4.3339

TABLE 5-XXXIII-B THRUST, MASS, AND INERTIAL ACCELERATION
(ENGLISH UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (POUNDS)	MASS (POUNDS)	INERTIAL ACCELERATION (FT/SEC/SEC)	
2ND OPP	14802.750	8.5144750 00	2.9718000 05	30.2986	
	14810.000	8.5050500 00	2.9717880 05	30.2984	
	14910.000	8.3750500 00	2.9716210 05	30.2956	
	15010.000	8.2450500 00	2.9714540 05	30.2924	
	15110.000	8.1564360 00	2.9712870 05	30.2886	
	15210.000	8.0897690 00	2.9711200 05	30.2844	
	FM NAV	15227.625	8.0780190 00	2.9710900 05	30.2836
15233.750		8.0739360 00	2.9710800 05	30.2833	
TR6	15233.750	8.0739360 00	2.9710800 05	30.2833	
02H2I	15275.750	2.4491930 01	2.9710100 05	30.2814	
1H2VTCO	15275.950	2.4508090 01	2.9710090 05	30.2813	
	15310.000	1.9235220 01	2.9710020 05	30.2797	
	15410.000	2.7378910 01	2.9709750 05	30.2747	
	15510.000	3.4467990 01	2.9709390 05	30.2695	
	15610.000	3.4467990 01	2.9708990 05	30.2642	
	15710.000	3.4467990 01	2.9708590 05	30.2590	
	S4B LUI	15730.050	3.4741160 01	2.9708510 05	30.2580
		02H2CO	15730.550	1.4000000 02	2.9708490 05
15800.000			1.4000000 02	2.9704760 05	30.2546
15802.750			1.4000000 02	2.9704620 05	30.2544
15802.750			1.4000000 02	2.9704620 05	30.2544
15803.750			1.4000000 02	2.9704560 05	30.2544
LTI	15803.750	1.4000000 02	2.9704560 05	30.2544	
S4BLUCO	15806.750	8.3387990 02	2.9703780 05	30.2539	
	15810.000	6.9952430 02	2.9702940 05	30.2535	
S4B RFI	15811.750	4.6518170 02	2.9702480 05	30.2530	
S4B 90T	15814.250	1.7517310 05	2.9655960 05	35.4866	
IGM ON	15818.250	2.0597440 05	2.9476800 05	37.3849	
	15820.000	2.0600630 05	2.9395940 05	37.5339	
	15820.250	2.0601160 05	2.9383920 05	37.6082	
	TSMC3	15828.250	2.0614680 05	2.8999130 05	39.1435
		15830.000	2.0617910 05	2.8914970 05	39.1318
15840.000		2.0570670 05	2.8434680 05	39.3509	
15850.000		2.0564980 05	2.7954770 05	39.5552	
15860.000		2.0557520 05	2.7475050 05	39.7479	
15870.000		2.0549650 05	2.6995490 05	39.9343	
15880.000		2.0610770 05	2.6515070 05	40.1725	
15890.000		2.0629910 05	2.6034010 05	40.3790	
15900.000		2.0573530 05	2.5553850 05	40.5355	
15910.000		2.0567720 05	2.5073890 05	40.7373	

TABLE 5-XXXIII-8 THRUST, MASS, AND INERTIAL ACCELERATION
(ENGLISH UNITS)
(CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (POUNDS)	MASS (POUNDS)	INERTIAL ACCELERATION (FT/SEC/SEC)
	15920.000	2.0560890 05	2.4594100 05	40.9413
	15930.000	2.0554450 05	2.4114450 05	41.1519
	15940.000	2.0609740 05	2.3634840 05	41.4313
	15950.000	2.0627220 05	2.3153850 05	41.6832
	15960.000	2.0576440 05	2.2673270 05	41.8877
	15970.000	2.0575260 05	2.2193170 05	42.1583
	15980.000	2.0571930 05	2.1713120 05	42.4390
	15990.000	2.0568400 05	2.1233160 05	42.7385
	16000.000	2.0564760 05	2.0753290 05	43.0592
	16010.000	2.0561280 05	2.0273500 05	43.4071
	16020.000	2.0557680 05	1.9793800 05	43.7832
	16030.000	2.0554150 05	1.9314200 05	44.1941
	16040.000	2.0550460 05	1.8834670 05	44.6426
	16050.000	2.0545650 05	1.8355250 05	45.1343
	16060.000	2.0613350 05	1.7874970 05	45.7773
	16070.000	2.0565150 05	1.7393880 05	46.3243
	16080.000	2.0565520 05	1.6913930 05	47.0222
	16090.000	2.0544610 05	1.6434200 05	47.7558
	16100.000	2.0538520 05	1.5954510 05	48.6064
	16110.000	2.0531500 05	1.5474920 05	49.5781
	16120.000	2.0517130 05	1.4995540 05	51.2584
	16130.000	2.0496650 05	1.4516550 05	51.9511
	16140.000	2.0469750 05	1.4038010 05	52.7162
S4BGCS2	16140.857	2.0469110 05	1.3996970 05	52.7899
TB7	16141.067	4.6260140 04	1.3985770 05	30.0396
	16150.857	4.3341410 01	1.3976620 05	29.0866
TLI	16150.857	4.3341410 01	1.3976620 05	29.0866
	16151.125	4.3293580 01	1.3976450 05	29.0834
	16161.067	4.1518560 01	1.3969890 05	28.9632
	16161.067	4.1518560 01	1.3969890 05	28.9632
ORB GTD	16161.125	4.1508230 01	1.3969850 05	28.9625
ORB NAV	16162.125	4.1329700 01	1.3969190 05	28.9501
	16240.000	2.9516560 01	1.3921400 05	27.8047
	16340.000	2.9156120 00	1.3884920 05	25.9339
	16440.000	2.6287370 00	1.3867470 05	23.8168
	16540.000	2.3418620 00	1.3850740 05	21.6392
	16640.000	2.0549870 00	1.3834710 05	19.5322
	16740.000	1.7681120 00	1.3819410 05	17.5735
	16840.000	1.4812370 00	1.3804810 05	15.7994
	16940.000	1.1943620 00	1.3790920 05	14.2187

TABLE 5-XXXIII-B THRUST, MASS, AND INERTIAL ACCELERATION
(CONTINUED) (ENGLISH UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	THRUST (POUNDS)	MASS (POUNDS)	INERTIAL ACCELERATION (FT/SEC/SEC)
	17040.000	9.074869D-01	1.377775D 05	12.8240
T&D MAN	17042.125	1.385641D-39	1.377770D 05	12.7963
	17140.000	1.385641D-39	1.377770D 05	11.5998
	17140.857	1.385641D-39	1.377770D 05	11.5900
	17240.000	1.385641D-39	1.377770D 05	10.5275
	17340.000	1.385641D-39	1.377770D 05	9.5883
	17440.000	1.385641D-39	1.377770D 05	8.7644
	17540.000	1.385641D-39	1.377770D 05	8.0401
	17640.000	1.385641D-39	1.377770D 05	7.4013
CSM SEP	17641.067	1.385641D-39	7.157805D 04	7.3949
	17740.000	1.385641D-39	7.157805D 04	6.8361
	17840.000	1.385641D-39	7.157805D 04	6.3343
	17940.000	1.385641D-39	7.157805D 04	5.8872
	18040.000	1.385641D-39	7.157805D 04	5.4875
	18100.000	1.385641D-39	7.157805D 04	5.2676

TABLE 5-XXXIV-A ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(METRIC UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (METERS)	VELOCITY (M/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (M/(SEC) ²)	
2ND OPP	14802.750	196926.	7380.10	0.0470	9.2350	
	14810.000	196935.	7380.09	0.0469	9.2350	
	14910.000	197111.	7379.92	0.0443	9.2341	
	15010.000	197377.	7379.63	0.0409	9.2331	
	15110.000	197741.	7379.21	0.0370	9.2320	
	15210.000	198201.	7378.66	0.0325	9.2307	
	FM NAV	15227.625	198292.	7378.55	0.0317	9.2304
15233.750		198325.	7378.51	0.0314	9.2304	
TR6	15233.750	198325.	7378.51	0.0314	9.2304	
O2H2I	15275.750	198555.	7378.23	0.0294	9.2298	
LH2VTCO	15275.950	198556.	7378.23	0.0294	9.2298	
	15310.000	198753.	7378.00	0.0277	9.2293	
	15410.000	199384.	7377.27	0.0227	9.2277	
	15510.000	200075.	7376.48	0.0178	9.2261	
	15610.000	200805.	7375.65	0.0130	9.2245	
	15710.000	201546.	7374.80	0.0086	9.2230	
	S4B LUI	15730.050	201693.	7374.63	0.0078	9.2226
		O2H2CO	15730.550	201697.	7374.63	0.0078
	15800.000	202200.	7374.29	0.0052	9.2216	
	15802.750	202219.	7374.28	0.0051	9.2216	
	15802.750	202219.	7374.28	0.0051	9.2216	
	15803.750	202226.	7374.27	0.0050	9.2215	
LTI	15803.750	202226.	7374.27	0.0050	9.2215	
S4BLUCO	15806.750	202248.	7374.32	0.0049	9.2215	
	15810.000	202271.	7374.36	0.0048	9.2214	
S4B REI	15811.750	202283.	7374.38	0.0048	9.2214	
S4B 90T	15814.250	202301.	7380.93	0.0057	9.2214	
IGM ON	15818.250	202331.	7405.88	0.0096	9.2213	
	15820.000	202344.	7417.87	0.0122	9.2213	
	15820.250	202347.	7419.59	0.0125	9.2213	
	TSMC3	15828.250	202407.	7474.79	-0.0008	9.2212
	15830.000	202418.	7486.97	-0.0036	9.2211	
	15840.000	202472.	7557.13	-0.0123	9.2210	
	15850.000	202523.	7628.45	-0.0075	9.2210	
	15860.000	202591.	7700.98	0.0115	9.2208	
	15870.000	202695.	7774.73	0.0452	9.2206	
	15880.000	202856.	7849.90	0.0939	9.2202	
	15890.000	203096.	7926.48	0.1582	9.2196	
	15900.000	203438.	8004.23	0.2382	9.2187	
	15910.000	203906.	8083.32	0.3338	9.2174	

TABLE 5-XXXIV-A ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(METRIC UNITS)
(CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (METERS)	VELOCITY (M/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (M/(SEC) ²)
	15920.000	204525.	8163.77	0.4453	9.2157
	15930.000	205321.	8245.61	0.5730	9.2136
	15940.000	206321.	8328.88	0.7169	9.2108
	15950.000	207553.	8413.93	0.8771	9.2074
	15960.000	209045.	8500.44	1.0541	9.2033
	15970.000	210829.	8588.46	1.2474	9.1984
	15980.000	212933.	8678.12	1.4574	9.1926
	15990.000	215391.	8769.48	1.6840	9.1857
	16000.000	218236.	8862.59	1.9274	9.1779
	16010.000	221501.	8957.54	2.1875	9.1688
	16020.000	225222.	9054.40	2.4642	9.1586
	16030.000	229434.	9153.26	2.7574	9.1469
	16040.000	234175.	9254.22	3.0670	9.1338
	16050.000	239482.	9357.39	3.3929	9.1192
	16060.000	245395.	9463.10	3.7347	9.1030
	16070.000	251953.	9571.51	4.0921	9.0850
	16080.000	259196.	9682.27	4.4643	9.0652
	16090.000	267165.	9795.77	4.8506	9.0435
	16100.000	275900.	9912.18	5.2503	9.0193
	16110.000	285440.	10031.74	5.6619	8.9940
	16120.000	295819.	10154.59	6.0709	8.9661
	16130.000	307052.	10280.99	6.4918	8.9360
	16140.000	319200.	10411.22	6.9357	8.9036
S4BGCS2	16140.857	320286.	10422.56	6.9748	8.9007
IR7	16141.067	320553.	10425.00	6.9845	8.9000
	16150.857	333420.	10414.77	7.4475	8.8659
TLI	16150.857	333420.	10414.77	7.4475	8.8659
	16151.125	333783.	10414.47	7.4601	8.8650
	16161.067	347689.	10402.71	7.9286	8.8284
	16161.067	347689.	10402.71	7.9286	8.8284
ORB GID	16161.125	347773.	10402.64	7.9314	8.8281
ORB NAV	16162.125	349217.	10401.42	7.9784	8.8244
	16240.000	486450.	10287.22	11.5761	8.4749
	16340.000	729538.	10092.63	15.9707	7.9046
	16440.000	1038361.	9859.05	20.0644	7.2594
	16540.000	1402132.	9601.58	23.8354	6.5956
	16640.000	1810499.	9332.85	27.2858	5.9534
	16740.000	2254208.	9062.35	30.4337	5.3564
	16840.000	2725367.	8796.68	33.3050	4.8157
	16940.000	3217460.	8540.04	35.9289	4.3339

TABLE 5-XXXIV-A ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(METRIC UNITS)
(CONTINUED) SECOND OPPORTUNITY

FVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (METERS)	VELOCITY (M/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (M/(SEC) ²)
	17040.000	3725216.	8294.86	38.3343	3.9087
T&D MAN	17042.125	3736143.	8289.78	38.3833	3.9003
	17140.000	4244431.	8062.33	40.5481	3.5356
	17140.857	4248921.	8060.40	40.5663	3.5326
	17240.000	4771779.	7842.85	42.5942	3.2088
	17340.000	5304641.	7636.28	44.4940	2.9225
	17440.000	5840961.	7442.15	46.2656	2.6714
	17540.000	6379131.	7259.84	47.9248	2.4506
	17640.000	6917889.	7088.65	49.4849	2.2559
CSM SFP	17641.067	6923638.	7086.88	49.5010	2.2540
	17740.000	7456252.	6927.85	50.9572	2.0836
	17840.000	7993451.	6776.71	52.3514	1.9307
	17940.000	8528889.	6634.54	53.6758	1.7944
	18040.000	9062103.	6500.68	54.9373	1.6726
	18100.000	9380812.	6424.11	55.6665	1.6056

TABLE 5-XXXIV-B ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(ENGLISH UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (FEET)	VELOCITY (FT/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (FT/SEC/SEC)	
2ND OPP	14802.750	646082.	24212.91	0.0470	30.2986	
	14810.000	646113.	24212.89	0.0469	30.2984	
	14910.000	646691.	24212.34	0.0443	30.2956	
	15010.000	647564.	24211.39	0.0409	30.2924	
	15110.000	648755.	24210.02	0.0370	30.2886	
	15210.000	650267.	24208.22	0.0325	30.2844	
	FM NAV	15227.625	650565.	24207.85	0.0317	30.2836
		15233.750	650671.	24207.73	0.0314	30.2833
	TR6	15233.750	650671.	24207.73	0.0314	30.2833
	02H2I	15275.750	651426.	24206.81	0.0294	30.2814
LH2VTCC	15275.950	651430.	24206.80	0.0294	30.2813	
	15310.000	652078.	24206.04	0.0277	30.2797	
	15410.000	654147.	24203.64	0.0227	30.2747	
	15510.000	656415.	24201.06	0.0178	30.2695	
	15610.000	658808.	24198.33	0.0130	30.2642	
	15710.000	661240.	24195.54	0.0086	30.2590	
	S4B LUT	15730.050	661724.	24194.98	0.0078	30.2580
		02H2CO	15730.550	661736.	24194.97	0.0078
		15800.000	663385.	24193.87	0.0052	30.2546
		15802.750	663449.	24193.83	0.0051	30.2544
	15802.750	663449.	24193.83	0.0051	30.2544	
	15803.750	663473.	24193.81	0.0050	30.2544	
LTI	15803.750	663473.	24193.81	0.0050	30.2544	
S4BLUCO	15806.750	663542.	24193.96	0.0049	30.2543	
	15810.000	663618.	24194.11	0.0048	30.2541	
S4B REI	15811.750	663659.	24194.17	0.0048	30.2540	
S4B 90T	15814.250	663717.	24215.66	0.0057	30.2539	
IGM ON	15818.250	663814.	24297.52	0.0096	30.2537	
	15820.000	663860.	24336.85	0.0122	30.2536	
	15820.250	663866.	24342.48	0.0125	30.2536	
	TSMC3	15828.250	664065.	24523.59	-0.0008	30.2532
	15830.000	664101.	24563.54	-0.0036	30.2531	
	15840.000	664278.	24793.74	-0.0123	30.2528	
	15850.000	664447.	25027.74	-0.0075	30.2525	
	15860.000	664670.	25265.69	0.0115	30.2520	
	15870.000	665010.	25507.66	0.0452	30.2513	
	15880.000	665538.	25754.27	0.0939	30.2500	
	15890.000	666324.	26005.52	0.1582	30.2479	
	15900.000	667446.	26260.60	0.2382	30.2450	
	15910.000	668983.	26520.07	0.3338	30.2409	

TABLE 5-XXXIV-B ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(ENGLISH UNITS)
(CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (FEET)	VELOCITY (FT/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (FT/SEC/SEC)
	15920.000	671015.	26784.01	0.4453	30.2354
	15930.000	673627.	27052.52	0.5730	30.2282
	15940.000	676907.	27325.73	0.7169	30.2192
	15950.000	680948.	27604.76	0.8771	30.2081
	15960.000	685845.	27888.58	1.0541	30.1946
	15970.000	691695.	28177.36	1.2474	30.1784
	15980.000	698600.	28471.52	1.4574	30.1593
	15990.000	706665.	28771.25	1.6840	30.1370
	16000.000	715997.	29076.74	1.9274	30.1111
	16010.000	726709.	29388.25	2.1875	30.0815
	16020.000	738916.	29706.03	2.4642	30.0477
	16030.000	752736.	30030.38	2.7574	30.0096
	16040.000	768290.	30361.62	3.0670	29.9667
	16050.000	785703.	30700.10	3.3929	29.9188
	16060.000	805101.	31046.91	3.7347	29.8655
	16070.000	826617.	31402.61	4.0921	29.8065
	16080.000	850382.	31765.99	4.4643	29.7416
	16090.000	876526.	32138.34	4.8506	29.6704
	16100.000	905183.	32520.27	5.2503	29.5926
	16110.000	936484.	32912.53	5.6619	29.5080
	16120.000	970534.	33315.58	6.0709	29.4164
	16130.000	1007389.	33730.29	6.4918	29.3176
	16140.000	1047245.	34157.53	6.9357	29.2114
S4RGCS2	16140.857	1050808.	34194.75	6.9748	29.2019
T87	16141.067	1051684.	34202.76	6.9845	29.1996
	16150.857	1093897.	34169.21	7.4475	29.0877
TLI	16150.857	1093897.	34169.21	7.4475	29.0877
	16151.125	1095089.	34168.20	7.4601	29.0846
	16161.067	1140712.	34129.63	7.9286	28.9644
	16161.067	1140712.	34129.63	7.9286	28.9644
ORB GID	16161.125	1140986.	34129.40	7.9314	28.9637
ORB NAV	16162.125	1145725.	34125.40	7.9784	28.9513
	16240.000	1595963.	33750.72	11.5761	27.8048
	16340.000	2393498.	33112.30	15.9707	25.9339
	16440.000	3406698.	32345.95	20.0644	23.8168
	16540.000	4600171.	31501.25	23.8354	21.6392
	16640.000	5939959.	30619.58	27.2858	19.5322
	16740.000	7395696.	29732.13	30.4337	17.5735
	16840.000	8941493.	28860.50	33.3050	15.7994
	16940.000	10555971.	28018.49	35.9289	14.2187

TABLE 5-XXXIV-B ALTITUDE, EARTH-FIXED VELOCITY, EARTH-FIXED
FLIGHT-PATH ANGLE, AND GRAVITATIONAL ACCELERATION
(ENGLISH UNITS)
(CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	ALTITUDE (FEET)	VELOCITY (FT/SEC)	FLIGHT- PATH ANGLE (DEGREES)	GRAVITATIONAL ACCELERATION (FT/SEC/SEC)
	17040.000	12221838.	27214.09	38.3343	12.8240
T&D MAN	17042.125	12257689.	27197.44	38.3833	12.7963
	17140.000	13925300.	26451.23	40.5481	11.5998
	17140.857	13940030.	26444.87	40.5663	11.5900
	17240.000	15655443.	25731.15	42.5942	10.5275
	17340.000	17403677.	25053.40	44.4940	9.5883
	17440.000	19163259.	24416.49	46.2656	8.7644
	17540.000	20928907.	23818.38	47.9248	8.0401
	17640.000	22696486.	23256.74	49.4849	7.4013
CSM SEP	17641.067	22715347.	23250.93	49.5010	7.3949
	17740.000	24462768.	22729.17	50.9572	6.8361
	17840.000	26225232.	22233.30	52.3514	6.3343
	17940.000	27981918.	21766.86	53.6758	5.8872
	18040.000	29731308.	21327.70	54.9373	5.4875
	18100.000	30776942.	21076.48	55.6665	5.2676

TABLE 5-XXXV PITCH AND YAW REFERENCE ANGLES (LOCAL HORIZONTAL COORDINATES) AND RANGE (METRIC AND ENGLISH UNITS) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	PITCH (DEG)	YAW (DEG)	RANGE (KM)	RANGE (NMI)	
2ND OPP	14802.750	0.013	0.000	16476.	8896.	
	14810.000	0.505	0.000	16425.	8869.	
	14910.000	0.234	0.000	15713.	8484.	
	15010.000	0.505	0.000	15000.	8099.	
	15110.000	0.233	0.000	14287.	7714.	
	15210.000	0.504	-0.000	13573.	7329.	
FM NAV	15227.625	0.012	-0.000	13447.	7261.	
	15233.750	0.072	-0.000	13403.	7237.	
TR6	15233.750	0.072	-0.000	13403.	7237.	
02H2I	15275.750	0.012	-0.000	13103.	7075.	
LH2VTC0	15275.950	0.026	-0.000	13102.	7074.	
	15310.000	0.021	-0.000	12859.	6943.	
	15410.000	0.037	-0.000	12144.	6557.	
	15510.000	0.054	-0.000	11430.	6172.	
	15610.000	0.011	-0.000	10716.	5786.	
	15710.000	0.028	-0.000	10003.	5401.	
	S4B LUI	15730.050	0.023	-0.000	9859.	5324.
		02H2CO	15730.550	0.057	-0.000	9856.
	15800.000	0.019	-0.000	9360.	5054.	
	15802.750	0.027	-0.000	9341.	5044.	
	15802.750	0.027	-0.000	9341.	5044.	
	15803.750	0.093	0.005	9334.	5040.	
LTI	15803.750	0.093	0.005	9334.	5040.	
S4BLUC0	15806.750	0.291	0.016	9312.	5028.	
	15810.000	0.510	0.023	9289.	5016.	
S4B RET	15811.750	0.629	0.024	9277.	5009.	
S4B 90T	15814.250	0.692	-0.024	9259.	4999.	
IGM ON	15818.250	0.584	-0.143	9230.	4984.	
	15820.000	-0.027	-0.333	9218.	4977.	
	15820.250	-0.205	-0.377	9216.	4976.	
TSMC3	15828.250	-4.097	-0.642	9158.	4945.	
	15830.000	-3.932	-0.626	9146.	4938.	
	15840.000	-3.891	-0.360	9073.	4899.	
	15850.000	-3.737	-0.207	8999.	4859.	
	15860.000	-3.518	-0.121	8925.	4819.	
	15870.000	-3.253	-0.070	8850.	4779.	
	15880.000	-2.944	-0.040	8775.	4738.	
	15890.000	-2.603	-0.020	8699.	4697.	
	15900.000	-2.269	-0.009	8622.	4655.	
	15910.000	-1.911	-0.001	8544.	4613.	

TABLE 5-XXXV PITCH AND YAW REFERENCE ANGLES (LOCAL HORIZONTAL
COORDINATES) AND RANGE (METRIC AND ENGLISH UNITS)
(CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MDT (SEC)	PITCH (DEG)	YAW (DEG)	RANGE (KM)	RANGE (NMI)
	15920.000	-1.529	0.006	8466.	4571.
	15930.000	-1.129	0.011	8386.	4528.
	15940.000	-0.722	0.015	8306.	4485.
	15950.000	-0.287	0.021	8225.	4441.
	15960.000	0.139	0.026	8144.	4397.
	15970.000	0.561	0.028	8061.	4353.
	15980.000	0.998	0.034	7978.	4308.
	15990.000	1.440	0.039	7894.	4262.
	16000.000	1.881	0.043	7809.	4217.
	16010.000	2.316	0.049	7723.	4170.
	16020.000	2.744	0.054	7637.	4124.
	16030.000	3.161	0.060	7549.	4076.
	16040.000	3.562	0.068	7461.	4029.
	16050.000	3.941	0.075	7372.	3980.
	16060.000	4.294	0.083	7282.	3932.
	16070.000	4.610	0.091	7191.	3883.
	16080.000	4.840	0.100	7099.	3833.
	16090.000	5.041	0.110	7006.	3783.
	16100.000	5.163	0.122	6912.	3732.
	16110.000	5.162	0.136	6818.	3681.
	16120.000	3.702	0.207	6722.	3630.
	16130.000	4.647	0.192	6626.	3578.
	16140.000	5.580	0.163	6529.	3525.
S4BGCS2	16140.857	5.660	0.162	6520.	3521.
TR7	16141.067	5.679	0.163	6518.	3519.
	16150.857	6.582	0.180	6422.	3468.
TLI	16150.857	6.582	0.180	6422.	3468.
	16151.125	6.606	0.180	6420.	3466.
	16161.067	7.530	0.181	6323.	3414.
	16161.067	7.530	0.181	6323.	3414.
ORB GID	16161.125	7.535	0.181	6323.	3414.
ORB NAV	16162.125	7.321	-0.063	6313.	3409.
	16240.000	0.525	-0.000	5573.	3009.
	16340.000	0.162	-0.000	4677.	2526.
	16440.000	0.450	-0.000	3856.	2082.
	16540.000	0.135	-0.000	3117.	1683.
	16640.000	0.370	-0.000	2461.	1329.
	16740.000	0.110	-0.000	1891.	1021.
	16840.000	0.300	-0.000	1413.	763.
	16940.000	0.090	-0.000	1048.	566.

TABLE 5-XXXV PITCH AND YAW REFERENCE ANGLES (LOCAL HORIZONTAL
COORDINATES) AND RANGE (METRIC AND ENGLISH UNITS)
(CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	PITCH (DEG)	YAW (DEG)	RANGE (KM)	RANGE (NMI)
	17040.000	0.244	-0.000	836.	451.
T&D MAN	17042.125	0.330	-0.000	834.	450.
	17140.000	65.264	43.021	817.	441.
	17140.857	65.296	43.021	817.	441.
	17240.000	125.246	38.666	949.	512.
	17340.000	130.431	40.002	1150.	621.
	17440.000	133.326	40.002	1369.	739.
	17540.000	135.976	40.002	1586.	856.
	17640.000	138.412	40.003	1793.	968.
CSM SEP	17641.067	138.437	40.003	1795.	969.
	17740.000	140.658	40.003	1986.	1073.
	17840.000	142.736	40.003	2167.	1170.
	17940.000	144.664	40.003	2334.	1260.
	18040.000	146.459	40.004	2488.	1344.
	18100.000	147.477	40.004	2575.	1391.

EVENT	TIME FROM 1ST MOT (SFC)	INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE AND INERTIAL HEADING ANGLE (METRIC UNITS) SECOND OPPORTUNITY			
		INERTIAL VELOCITY (M/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)	
2ND OPP	14802.750	7790.6911	0.0446	61.8498	
	14810.000	7790.6601	0.0444	61.7607	
	14910.000	7790.2182	0.0420	60.7255	
	15010.000	7789.7497	0.0388	60.0489	
	15110.000	7789.2567	0.0350	59.7265	
	15210.000	7788.7436	0.0308	59.7558	
	FM NAV	15227.625	7788.6515	0.0300	59.7974
		15233.750	7788.6195	0.0297	59.8144
	TR6	15233.750	7788.6195	0.0297	59.8144
	02H2I	15275.750	7788.3986	0.0278	59.9667
LH2VTCO	15275.950	7788.3976	0.0278	59.9676	
	15310.000	7788.2286	0.0262	60.1369	
	15410.000	7787.7492	0.0215	60.8724	
	15510.000	7787.3033	0.0168	61.9666	
	15610.000	7786.8859	0.0124	63.4248	
	15710.000	7786.4994	0.0082	65.2518	
	S4B LUI	15730.050	7786.4268	0.0074	65.6628
		02H2CO	15730.550	7786.4270	0.0074
		15800.000	7786.4322	0.0049	67.2129
		15802.750	7786.4329	0.0048	67.2775
	15802.750	7786.4329	0.0048	67.2775	
	15803.750	7786.4331	0.0048	67.3011	
LTI	15803.750	7786.4331	0.0048	67.3011	
S4BLUCO	15806.750	7786.4923	0.0047	67.3720	
	15810.000	7786.5548	0.0046	67.4492	
S4B RFI	15811.750	7786.5811	0.0045	67.4910	
S4B 90T	15814.250	7793.1447	0.0054	67.5507	
IGM ON	15818.250	7818.1194	0.0091	67.6461	
	15820.000	7830.1175	0.0115	67.6880	
	15820.250	7831.8345	0.0118	67.6940	
TSMC3	15828.250	7887.0703	-0.0007	67.8841	
	15830.000	7899.2549	-0.0034	67.9263	
	15840.000	7969.4678	-0.0116	68.1721	
	15850.000	8040.8403	-0.0071	68.4258	
	15860.000	8113.4230	0.0109	68.6867	
	15870.000	8187.2332	0.0429	68.9544	
	15880.000	8262.4616	0.0893	69.2289	
	15890.000	8339.1094	0.1504	69.5102	
	15900.000	8416.9294	0.2265	69.7984	
	15910.000	8496.0923	0.3176	70.0935	

TABLE 5-XXXVI-A INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
AND INERTIAL HEADING ANGLE
(METRIC UNITS)
(CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (M/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
	15920.000	8576.6243	0.4239	70.3955
	15930.000	8658.5578	0.5456	70.7048
	15940.000	8741.9333	0.6830	71.0213
	15950.000	8827.0913	0.8361	71.3451
	15960.000	8913.7195	1.0052	71.6765
	15970.000	9001.8720	1.1901	72.0156
	15980.000	9091.6756	1.3911	72.3674
	15990.000	9183.1863	1.6082	72.7171
	16000.000	9276.4698	1.8414	73.0799
	16010.000	9371.5997	2.0908	73.4507
	16020.000	9468.6568	2.3563	73.8298
	16030.000	9567.7309	2.6379	74.2172
	16040.000	9668.9206	2.9354	74.6131
	16050.000	9772.3325	3.2487	75.0175
	16060.000	9878.3002	3.5775	75.4305
	16070.000	9986.9946	3.9216	75.8523
	16080.000	10098.0497	4.2801	76.2828
	16090.000	10211.8559	4.6525	76.7223
	16100.000	10328.6010	5.0380	77.1706
	16110.000	10448.5141	5.4354	77.6281
	16120.000	10571.7500	5.8305	78.0950
	16130.000	10698.5622	6.2374	78.5711
	16140.000	10829.2058	6.6667	79.0560
S4BGCS2	16140.857	10840.5885	6.7046	79.0980
TR7	16141.067	10843.0373	6.7140	79.1083
	16150.857	10833.2278	7.1583	79.5906
TLI	16150.857	10833.2278	7.1583	79.5906
	16151.125	10832.9319	7.1704	79.6038
	16161.067	10821.6215	7.6199	80.0958
	16161.067	10821.6215	7.6199	80.0958
ORB GID	16161.125	10821.5538	7.6225	80.0986
ORB NAV	16162.125	10820.3807	7.6676	80.1487
	16240.000	10710.4686	11.1127	84.0402
	16340.000	10523.1616	15.3009	88.9585
	16440.000	10298.4495	19.1740	93.5470
	16540.000	10050.9838	22.7084	97.6440
	16640.000	9792.9598	25.9057	101.1893
	16740.000	9533.5300	28.7838	104.1957
	16840.000	9278.9942	31.3695	106.7155
	16940.000	9033.3374	33.6927	108.8161

TABLE 5-XXXVI-A

 INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
 AND INERTIAL HEADING ANGLE
 (METRIC UNITS)
 SECOND OPPORTUNITY

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (M/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
	17040.000	8798.3297	35.7834	110.5650
T&D MAN	17042.125	8793.9769	35.8255	110.5998
	17140.000	8576.5454	37.6698	112.0233
	17140.857	8574.6943	37.6851	112.0347
	17240.000	8366.7831	39.3770	113.2429
	17340.000	8169.3422	40.9275	114.2670
	17440.000	7983.7295	42.3407	115.1307
	17540.000	7809.2940	43.6334	115.8623
	17640.000	7645.3130	44.8199	116.4847
CSM SEP	17641.067	7643.6169	44.8321	116.4909
	17740.000	7491.0462	45.9129	117.0165
	17840.000	7345.7687	46.9229	117.4725
	17940.000	7208.7895	47.8592	117.8650
	18040.000	7079.4617	48.7297	118.2038
	18100.000	7005.2862	49.2233	118.3848

TABLE 5-XXXVI-B INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
AND INERTIAL HEADING ANGLE
(ENGLISH UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST OPP (SEC)	INERTIAL VELOCITY (FT/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
2ND OPP	14802.750	25560.0103	0.0446	61.8498
	14810.000	25559.9085	0.0444	61.7607
	14910.000	25558.4586	0.0420	60.7255
	15010.000	25556.9217	0.0388	60.0489
	15110.000	25555.3041	0.0350	59.7265
	15210.000	25553.6206	0.0308	59.7558
	FM NAV	15227.625	25553.3187	0.0300
15233.750		25553.2135	0.0297	59.8144
TB6	15233.750	25553.2135	0.0297	59.8144
02H2T	15275.750	25552.4887	0.0278	59.9667
LH2VTCC	15275.950	25552.4856	0.0278	59.9676
	15310.000	25551.9310	0.0262	60.1369
	15410.000	25550.3582	0.0215	60.8724
	15510.000	25548.8952	0.0168	61.9666
	15610.000	25547.5259	0.0124	63.4248
	15710.000	25546.2578	0.0082	65.2518
	S4R LUI	15730.050	25546.0196	0.0074
02H2CC		15730.550	25546.0205	0.0074
	15800.000	25546.0374	0.0049	67.2120
	15802.750	25546.0396	0.0048	67.2775
	15802.750	25546.0396	0.0048	67.2775
	15803.750	25546.0404	0.0048	67.3011
LTI	15803.750	25546.0404	0.0048	67.3011
S4BLUCC	15806.750	25546.2347	0.0047	67.3720
	15810.000	25546.4396	0.0046	67.4492
S4R REI	15811.750	25546.5258	0.0045	67.4910
S4R 90T	15814.250	25568.0601	0.0054	67.5507
IGM ON	15818.250	25649.9979	0.0091	67.6461
	15820.000	25689.3619	0.0115	67.6880
	15820.250	25694.9951	0.0118	67.6940
TSMC3	15828.250	25876.2150	-0.0007	67.8341
	15830.000	25916.1906	-0.0034	67.9263
	15840.000	26146.5479	-0.0116	68.1721
	15850.000	26380.7098	-0.0071	68.4258
	15860.000	26618.8418	0.0109	68.6867
	15870.000	26861.0012	0.0429	68.9544
	15880.000	27107.8136	0.0893	69.2289
	15890.000	27359.2827	0.1504	69.5102
	15900.000	27614.5977	0.2265	69.7984
	15910.000	27874.3184	0.3176	70.0935

TABLE 5-XXXVI-9

 INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
 AND INERTIAL HEADING ANGLE
 (ENGLISH UNITS)
 SECOND OPPORTUNITY

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (FT/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
	15920.000	28138.5311	0.4239	70.3955
	15930.000	28407.3417	0.5456	70.7048
	15940.000	28680.8835	0.6830	71.0213
	15950.000	28960.2734	0.8361	71.3451
	15960.000	29244.4864	1.0052	71.6765
	15970.000	29533.7009	1.1901	72.0156
	15980.000	29828.3321	1.3911	72.3624
	15990.000	30128.5641	1.6082	72.7171
	16000.000	30434.6124	1.8414	73.0799
	16010.000	30746.7180	2.0908	73.4507
	16020.000	31065.1471	2.3563	73.8298
	16030.000	31390.1932	2.6379	74.2172
	16040.000	31722.1804	2.9354	74.6131
	16050.000	32061.4582	3.2487	75.0175
	16060.000	32409.1213	3.5775	75.4305
	16070.000	32765.7302	3.9216	75.8523
	16080.000	33130.0942	4.2801	76.2828
	16090.000	33503.4641	4.6525	76.7223
	16100.000	33886.4862	5.0380	77.1706
	16110.000	34279.9020	5.4354	77.6281
	16120.000	34684.2191	5.8305	78.0950
	16130.000	35100.2698	6.2374	78.5711
	16140.000	35528.9905	6.6667	79.0560
S4BGCS2	16140.857	35566.2353	6.7046	79.0980
IB7	16141.067	35574.2694	6.7140	79.1083
	16150.857	35542.0858	7.1583	79.5906
TIY	16150.857	35542.0858	7.1583	79.5906
	16151.125	35541.1151	7.1704	79.6038
	16161.067	35504.0076	7.6199	80.0958
	16161.067	35504.0076	7.6199	80.0958
ORB GIC	16161.125	35503.7855	7.6225	80.0986
ORB NAV	16162.125	35499.9366	7.6676	80.1482
	16240.000	35139.3326	11.1127	84.0402
	16340.000	34524.8085	15.3009	88.9585
	16440.000	33787.5641	19.1740	93.5470
	16540.000	32975.6686	22.7084	97.6440
	16640.000	32129.1331	25.9057	101.1893
	16740.000	31277.9857	28.7838	104.1957
	16840.000	30442.8945	31.3695	106.7155
	16940.000	29636.9338	33.6927	108.8161

TABLE 5-XXXVI-B INERTIAL VELOCITY, INERTIAL FLIGHT-PATH ANGLE
AND INERTIAL HEADING ANGLE
(ENGLISH UNITS)
SECOND OPPORTUNITY
(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	INERTIAL VELOCITY (FT/SEC)	INERTIAL FLIGHT- PATH ANGLE (DEGREES)	INERTIAL HEADING ANGLE (DEGREES)
	17040.000	28867.5515	35.7834	110.5650
T&D MAN	17042.125	28851.6303	35.8255	110.5988
	17140.000	28138.2723	37.6698	112.0233
	17140.857	28132.1990	37.6851	112.0347
	17240.000	27450.0759	39.3770	113.2429
	17340.000	26802.3037	40.9275	114.2670
	17440.000	26193.3382	42.3407	115.1307
	17540.000	25621.0434	43.6334	115.8623
	17640.000	25083.0479	44.8199	116.4847
CSM SEP	17641.067	25077.4829	44.8321	116.4909
	17740.000	24576.9232	45.9129	117.0165
	17840.000	24100.2909	46.9229	117.4725
	17940.000	23650.8843	47.8592	117.8650
	18040.000	23226.5803	48.7297	118.2038
	18100.000	22983.2224	49.2233	118.3848

TABLE 5-XXXVII-A GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (METRIC UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (METERS)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)	
2ND OPP	14802.750	6574208.	-11.7679	128.4867	
	14910.000	6574252.	-11.5339	128.8993	
	14910.000	6574840.	-8.2445	134.5212	
	15010.000	6575390.	-4.8658	140.0425	
	15110.000	6575892.	-1.4355	145.5039	
	15210.000	6576340.	2.0095	150.9470	
	FM NAV	15227.625	6576413.	2.6155	151.9076
		15233.750	6576438.	2.8259	152.2417
	T86	15233.750	6576438.	2.8259	152.2417
	02H2I	15275.750	6576602.	4.2650	154.5362
LH2VTC0	15275.950	6576603.	4.2719	154.5471	
	15310.000	6576728.	5.4328	156.4138	
	15410.000	6577053.	8.7974	161.9457	
	15510.000	6577313.	12.0657	167.5833	
	15610.000	6577512.	15.1985	173.3650	
	15710.000	6577651.	18.1550	179.3256	
	S4R LUI	15730.050	6577672.	18.7229	-179.4551
		02H2CO	15730.550	18.7369	-179.4246
		15800.000	6577730.	20.6301	-175.1324
		15802.750	6577732.	20.7026	-174.9602
	15802.750	6577732.	20.7026	-174.9602	
	15803.750	6577732.	20.7289	-174.8975	
LTI	15803.750	6577732.	20.7289	-174.8975	
	S4BLUC0	15806.750	20.8077	-174.7094	
	15810.000	6577736.	20.8927	-174.5054	
S4R RET	15811.750	6577737.	20.9384	-174.3954	
S4R 90T	15814.250	6577739.	21.0036	-174.2382	
IGM ON	15818.250	6577743.	21.1077	-173.9857	
	15820.000	6577745.	21.1533	-173.8748	
	15820.250	6577746.	21.1598	-173.8590	
	TSMC3	15828.250	6577754.	21.3678	-173.3488
		15830.000	6577753.	21.4133	-173.2365
	15840.000	6577742.	21.6729	-172.5897	
	15850.000	6577727.	21.9319	-171.9343	
	15860.000	6577728.	22.1904	-171.2701	
	15870.000	6577765.	22.4480	-170.5970	
	15880.000	6577858.	22.7049	-169.9147	
15890.000	6578030.	22.9608	-169.2230		
15900.000	6578303.	23.2157	-168.5218		
15910.000	6578703.	23.4693	-167.8108		

TABLE 5-XXXVII-A GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
 LONGITUDE (METRIC UNITS)
 (CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (METERS)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
	15920.000	6579254.	23.7217	-167.0899
	15930.000	6579981.	23.9727	-166.3589
	15940.000	6580912.	24.2221	-165.6176
	15950.000	6582075.	24.4697	-164.8658
	15960.000	6583493.	24.7156	-164.1033
	15970.000	6585212.	24.9594	-163.3300
	15980.000	6587248.	25.2010	-162.5456
	15990.000	6589637.	25.4403	-161.7501
	16000.000	6592414.	25.6770	-160.9433
	16010.000	6595611.	25.9111	-160.1249
	16020.000	6599264.	26.1422	-159.2949
	16030.000	6603409.	26.3701	-158.4530
	16040.000	6608083.	26.5948	-157.5992
	16050.000	6613324.	26.8159	-156.7334
	16060.000	6619172.	27.0332	-155.8553
	16070.000	6625666.	27.2465	-154.9648
	16080.000	6632846.	27.4556	-154.0618
	16090.000	6640752.	27.6602	-153.1463
	16100.000	6649425.	27.8600	-152.2191
	16110.000	6658906.	28.0548	-151.2771
	16120.000	6669226.	28.2443	-150.3232
	16130.000	6680402.	28.4283	-149.3563
	16140.000	6692495.	28.6065	-148.3763
S48GCS2	16140.357	6693576.	28.6215	-148.2917
TB7	16141.067	6693842.	28.6251	-148.2710
	16150.857	6706656.	28.7919	-147.3041
TLI	16150.857	6706656.	28.7919	-147.3041
	16151.125	6707018.	28.7963	-147.2776
	16161.067	6720873.	28.9571	-146.2956
	16161.067	6720873.	28.9571	-146.2966
ORB GIC	16161.125	6720956.	28.9580	-146.2909
ORB NAV	16162.125	6722396.	28.9737	-146.1923
	16240.000	6859322.	29.9361	-138.5839
	16340.000	7102243.	30.4523	-129.2062
	16440.000	7411123.	30.2734	-120.5302
	16540.000	7775121.	29.5636	-112.7180
	16640.000	8183826.	28.4894	-105.8141
	16740.000	8627932.	27.1917	-99.7806
	16840.000	9099510.	25.7778	-94.5355
	16940.000	9592017.	24.3227	-89.9809

TABLE 5-XXXVII-A GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
 (CONTINUED) LONGITUDE (METRIC UNITS)
 SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (METERS)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
	17040.000	10100167.	22.8761	-86.0200
T&D MAN	17042.125	10111102.	22.8457	-85.9416
	17140.000	10619747.	21.4685	-82.5648
	17140.857	10624240.	21.4566	-82.5371
	17240.000	11147427.	20.1175	-79.5390
	17340.000	11690589.	18.8323	-76.8781
	17440.000	12217177.	17.6163	-74.5281
	17540.000	12755585.	16.4694	-72.4441
	17640.000	13294555.	15.3897	-70.5891
CSM SEP	17641.067	13300306.	15.3786	-70.5704
	17740.000	13833105.	14.3740	-68.9320
	17840.000	14370470.	13.4186	-67.4470
	17940.000	14906054.	12.5193	-66.1125
	18040.000	15439397.	11.6723	-64.9102
	18100.000	15758176.	11.1876	-64.2459

TABLE 5-XXXVII-B GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
LONGITUDE (ENGLISH UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (FEET)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
2ND OPP	14802.750	21568926.	-11.7679	128.4867
	14810.000	21569069.	-11.5339	128.8993
	14910.000	21570999.	-8.2445	134.5212
	15010.000	21572802.	-4.8658	140.0425
	15110.000	21574450.	-1.4355	145.5039
	15210.000	21575920.	2.0095	150.9470
FM NAV	15227.625	21576159.	2.6155	151.9076
	15233.750	21576240.	2.8259	152.2417
TR6	15233.750	21576240.	2.8259	152.2417
02H2I	15275.750	21576780.	4.2650	154.5362
LH2VTCO	15275.950	21576782.	4.2719	154.5471
	15310.000	21577193.	5.4328	156.4138
	15410.000	21578257.	8.7974	161.9457
	15510.000	21579112.	12.0657	167.5833
	15610.000	21579762.	15.1985	173.3650
	15710.000	21580219.	18.1550	179.3256
	15730.050	21580288.	18.7229	-179.4551
	15730.550	21580290.	18.7369	-179.4246
S4R LUI 02H2CO	15800.000	21580478.	20.6301	-175.1324
	15802.750	21580484.	20.7026	-174.9602
	15802.750	21580484.	20.7026	-174.9602
	15803.750	21580486.	20.7289	-174.8975
	15803.750	21580486.	20.7289	-174.8975
	15806.750	21580493.	20.8077	-174.7094
LTI S4BLUCO	15810.000	21580499.	20.8927	-174.5054
	15811.750	21580503.	20.9384	-174.3954
S4R 90T	15814.250	21580508.	21.0036	-174.2382
IGM ON	15818.250	21580521.	21.1077	-173.9857
	15820.000	21580529.	21.1533	-173.8748
	15820.250	21580530.	21.1598	-173.8590
	15828.250	21580557.	21.3678	-173.3488
TSMC3	15830.000	21580556.	21.4133	-173.2365
	15840.000	21580517.	21.6729	-172.5897
	15850.000	21580469.	21.9319	-171.9343
	15860.000	21580472.	22.1904	-171.2701
	15870.000	21580593.	22.4480	-170.5970
	15880.000	21580898.	22.7049	-169.9147
	15890.000	21581462.	22.9608	-169.2230
	15900.000	21582361.	23.2157	-168.5218
	15910.000	21583672.	23.4693	-167.8108

TABLE 5-XXVIT-B GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
 (CONTINUED) LONGITUDE (ENGLISH UNITS)
 SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (FEET)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
	15920.000	21585478.	23.7217	-167.0899
	15930.000	21587865.	23.9727	-166.3539
	15940.000	21590919.	24.2221	-165.6176
	15950.000	21594733.	24.4697	-164.8658
	15960.000	21599403.	24.7156	-164.1033
	15970.000	21605027.	24.9594	-163.3300
	15980.000	21611706.	25.2010	-162.5456
	15990.000	21619545.	25.4403	-161.7501
	16000.000	21628653.	25.6770	-160.9433
	16010.000	21639142.	25.9111	-160.1249
	16020.000	21651127.	26.1422	-159.2949
	16030.000	21664726.	26.3701	-158.4530
	16040.000	21680062.	26.5948	-157.5992
	16050.000	21697258.	26.8159	-156.7334
	16060.000	21716443.	27.0332	-155.8553
	16070.000	21737748.	27.2465	-154.9648
	16080.000	21761305.	27.4556	-154.0613
	16090.000	21787244.	27.6602	-153.1463
	16100.000	21815700.	27.8600	-152.2181
	16110.000	21846804.	28.0548	-151.2771
	16120.000	21880662.	28.2443	-150.3232
	16130.000	21917330.	28.4283	-149.3563
	16140.000	21957003.	28.6065	-148.3763
S4RGCS2	16140.857	21960551.	28.6215	-148.2917
TR7	16141.067	21961423.	28.6251	-148.2710
	16150.857	22003464.	28.7919	-147.3041
TLI	16150.857	22003464.	28.7919	-147.3041
	16151.125	22004652.	28.7963	-147.2776
	16161.067	22050110.	28.9571	-146.2966
	16161.067	22050110.	28.9571	-146.2966
ORB GIC	16161.125	22050382.	28.9580	-146.2909
ORB NAV	16162.125	22055105.	28.9737	-146.1923
	16240.000	22504337.	29.9361	-133.5839
	16340.000	23301321.	30.4523	-129.2062
	16440.000	24314708.	30.2734	-120.5302
	16540.000	25508927.	29.5636	-112.7180
	16640.000	26849823.	28.4894	-105.8141
	16740.000	28306864.	27.1917	-99.7806
	16840.000	29854035.	25.7778	-94.5355
	16940.000	31469871.	24.3227	-89.9809

TABLE 5-XXXVII-B GEOCENTRIC RADIUS, GEODETIC LATITUDE, AND
 LONGITUDE (ENGLISH UNITS)
 (CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	GEOCENTRIC RADIUS (FEET)	GEODETIC LATITUDE (DEG)	LONGITUDE (DEG)
	17040.000	33137029.	22.8761	-86.0200
T&D MAN	17042.125	33172907.	22.8457	-85.9416
	17140.000	34841689.	21.4685	-82.5648
	17140.857	34856429.	21.4566	-82.5371
	17240.000	36572924.	20.1175	-79.5390
	17340.000	38322141.	18.8323	-76.8781
	17440.000	40082603.	17.6163	-74.5281
	17540.000	41849034.	16.4694	-72.4441
	17640.000	43617307.	15.3897	-70.5891
CSM SFP	17641.067	43636175.	15.3786	-70.5704
	17740.000	45384203.	14.3740	-68.9320
	17840.000	47147210.	13.4185	-67.4470
	17940.000	48904375.	12.5193	-66.1125
	18040.000	50654188.	11.6723	-64.9107
	18100.000	51700051.	11.1876	-64.2459

TABLE 5-XXXVIII
 COMMANDED AND ACTUAL ATTITUDE ANGLES
 SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT	PITCH	VEHICLE	YAW	VEHICLE	ROLL	VEHICLE
		ATTITUDE COMMAND	PITCH ATTITUDE	ATTITUDE COMMAND	YAW ATTITUDE	ATTITUDE COMMAND	ROLL ATTITUDE
	(SEC)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)
2ND OPP	14802.750	4.70	4.70	0.04	0.04	0.0	0.0
	14810.000	4.70	4.70	0.04	0.04	0.0	0.0
	14910.000	-2.36	-2.36	0.18	0.18	0.0	0.00
	15010.000	-8.87	-8.87	0.31	0.31	0.0	0.00
	15110.000	-15.93	-15.93	0.45	0.45	0.0	-0.00
	15210.000	-22.45	-22.45	0.57	0.57	0.0	0.00
FM NAV	15227.625	-24.13	-24.13	0.60	0.60	0.0	-0.00
	15233.750	-24.55	-24.49	0.60	0.60	0.0	0.00
IB6	15233.750	-24.55	-24.49	0.60	0.60	0.0	0.00
02H2I	15275.750	-27.40	-27.40	0.65	0.65	0.0	0.00
LH2VTCO	15275.950	-27.40	-27.40	0.65	0.65	0.0	0.00
	15310.000	-29.71	-29.71	0.69	0.69	0.0	0.00
	15410.000	-36.48	-36.48	0.80	0.80	0.0	0.00
	15510.000	-43.25	-43.25	0.90	0.90	0.0	0.00
	15610.000	-50.08	-50.08	0.99	0.99	0.0	0.00
	15710.000	-56.84	-56.84	1.06	1.06	0.0	0.00
S4R LUI	15730.050	-58.21	-58.21	1.08	1.08	0.0	-0.00
02H2CO	15730.550	-58.21	-58.21	1.08	1.08	0.0	-0.00
	15800.000	-62.96	-62.96	1.12	1.12	0.0	0.00
	15802.750	-63.13	-63.13	1.12	1.12	0.0	0.00
	15802.750	-63.13	-63.13	1.12	1.12	0.0	-0.00
	15803.750	-63.17	-63.14	1.12	1.12	0.0	-0.02
LTI	15803.750	-63.17	-63.14	1.12	1.12	0.0	-0.02
S4BLUCO	15806.750	-63.37	-63.14	1.12	1.14	0.0	-0.06
	15810.000	-63.59	-63.14	1.12	1.14	0.0	-0.11
S4R RFI	15811.750	-63.71	-63.14	1.12	1.14	0.0	-0.14
S4R 90T	15814.250	-63.98	-63.25	1.12	1.10	0.0	-0.21
IGM ON	15818.250	-64.27	-63.63	1.10	0.98	0.0	-0.35
	15820.000	-66.02	-64.36	0.76	0.79	0.0	-0.50
	15820.250	-66.27	-64.56	0.74	0.75	0.0	-0.52
TSMC3	15828.250	-69.14	-69.00	0.78	0.50	0.0	0.09
	15830.000	-69.23	-68.95	0.83	0.52	0.0	0.33
	15840.000	-69.85	-69.60	1.08	0.73	0.0	0.77
	15850.000	-70.38	-70.15	1.22	0.93	0.0	0.87
	15860.000	-70.86	-70.63	1.31	1.02	0.0	0.74
	15870.000	-71.30	-71.08	1.36	1.07	0.0	0.85
	15880.000	-71.70	-71.48	1.39	1.10	0.0	0.75
	15890.000	-72.09	-71.86	1.41	1.12	0.0	0.81
	15900.000	-72.49	-72.26	1.42	1.13	0.0	0.75
	15910.000	-72.86	-72.64	1.43	1.14	0.0	0.79

TABLE 5-XXXVIII COMMANDED AND ACTUAL ATTITUDE ANGLES
(CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT	PITCH	VEHICLE	YAW	VEHICLE	ROLL	VEHICLE
		ATTITUDE COMMAND	PITCH ATTITUDE	ATTITUDE COMMAND	YAW ATTITUDE	ATTITUDE COMMAND	ROLL ATTITUDE
	(SEC)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)
	15920.000	-73.22	-73.00	1.44	1.15	0.0	0.77
	15930.000	-73.58	-73.35	1.44	1.15	0.0	0.77
	15940.000	-73.93	-73.70	1.45	1.16	0.0	0.79
	15950.000	-74.26	-74.03	1.46	1.16	0.0	0.75
	15960.000	-74.61	-74.38	1.46	1.16	0.0	0.82
	15970.000	-74.97	-74.73	1.47	1.17	0.0	0.75
	15980.000	-75.32	-75.08	1.47	1.17	0.0	0.85
	15990.000	-75.67	-75.44	1.48	1.18	0.0	0.74
	16000.000	-76.04	-75.80	1.49	1.18	0.0	0.86
	16010.000	-76.41	-76.17	1.49	1.19	0.0	0.74
	16020.000	-76.81	-76.56	1.50	1.19	0.0	0.83
	16030.000	-77.22	-76.97	1.51	1.20	0.0	0.75
	16040.000	-77.65	-77.40	1.52	1.20	0.0	0.80
	16050.000	-78.12	-77.87	1.53	1.21	0.0	0.75
	16060.000	-78.62	-78.36	1.53	1.22	0.0	0.79
	16070.000	-79.18	-78.90	1.54	1.22	0.0	0.76
	16080.000	-79.80	-79.54	1.55	1.23	0.0	0.78
	16090.000	-80.48	-80.21	1.57	1.24	0.0	0.77
	16100.000	-81.25	-80.97	1.58	1.25	0.0	0.77
	16110.000	-82.16	-81.87	1.60	1.27	0.0	0.76
	16120.000	-84.41	-84.23	1.66	1.34	0.0	0.73
	16130.000	-84.40	-84.19	1.65	1.32	0.0	0.86
	16140.000	-84.38	-84.17	1.62	1.29	0.0	0.74
S4RGCS2	16140.857	-84.38	-84.17	1.62	1.29	0.0	0.74
TR7	16141.067	-84.38	-84.17	1.62	1.29	0.0	0.74
	16150.857	-84.38	-84.17	1.62	1.31	0.0	0.58
TLI	16150.857	-84.38	-84.17	1.62	1.31	0.0	0.58
	16151.125	-84.38	-84.17	1.62	1.31	0.0	0.57
	16161.067	-84.38	-84.16	1.62	1.31	0.0	0.41
	16161.067	-84.38	-84.16	1.62	1.31	0.0	0.41
ORB GID	16161.125	-91.68	-84.16	1.12	1.31	0.0	0.0
ORB NAV	16162.125	-91.77	-84.46	1.12	1.07	0.0	0.01
	16240.000	-98.24	-98.24	1.10	1.10	0.0	0.00
	16340.000	-107.10	-107.10	1.05	1.05	0.0	-0.00
	16440.000	-114.67	-114.67	0.98	0.98	0.0	-0.00
	16540.000	-122.16	-122.16	0.90	0.90	0.0	-0.00
	16640.000	-128.43	-128.43	0.82	0.82	0.0	-0.00
	16740.000	-134.54	-134.54	0.73	0.73	0.0	-0.00
	16840.000	-139.61	-139.61	0.65	0.65	0.0	-0.00
	16940.000	-144.56	-144.56	0.57	0.57	0.0	-0.00

TABLE 5-XXXVIII COMMANDED AND ACTUAL ATTITUDE ANGLES
(CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST NOT	PITCH ATTITUDE COMMAND	VEHICLE PITCH ATTITUDE	YAW ATTITUDE COMMAND	VEHICLE YAW ATTITUDE	ROLL ATTITUDE COMMAND	VEHICLE ROLL ATTITUDE
	(SEC)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)	(DEG)
	17040.000	-148.67	-148.67	0.50	0.50	0.0	-0.00
TED MAN	17042.125	-28.17	-148.67	40.65	0.50	180.00	-0.00
	17140.000	-28.17	-87.56	40.65	44.18	180.00	-50.87
	17140.857	-28.17	-87.56	40.65	44.18	180.00	-50.87
	17240.000	-28.17	-30.24	40.65	39.35	180.00	-115.07
	17340.000	-28.17	-28.17	40.65	40.65	180.00	-180.00
	17440.000	-28.17	-28.17	40.65	40.65	180.00	-180.00
	17540.000	-28.17	-28.17	40.65	40.65	180.00	-180.00
	17640.000	-28.17	-28.17	40.65	40.65	180.00	-180.00
GSM SEP	17641.067	-28.17	-28.17	40.65	40.65	180.00	-180.00
	17740.000	-28.17	-28.17	40.65	40.65	180.00	-180.00
	17840.000	-28.17	-28.17	40.65	40.65	180.00	-180.00
	17940.000	-28.17	-28.17	40.65	40.65	180.00	-180.00
	18040.000	-28.17	-28.17	40.65	40.65	180.00	-180.00
	18100.000	-28.17	-28.17	40.65	40.65	180.00	-180.00

TABLE 5-XXXIX

SPACECRAFT GIMBAL ANGLES
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SECS)	SPACECRAFT GIMBAL ANGLES			
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)	
2ND OPP	14802.750	94.70143	0.04381	180.00000	
	14810.000	94.70143	0.04381	180.00000	
	14910.000	87.64195	0.18421	180.00000	
	15010.000	81.12631	0.31234	180.00000	
	15110.000	74.06849	0.44763	180.00000	
	15210.000	67.55422	0.56754	180.00000	
	FM NAV	15227.625	65.86637	0.59764	180.00000
	15233.750	65.51014	0.60393	180.00000	
TR6	15233.750	65.51014	0.60393	180.00000	
02H2I	15275.750	62.60102	0.65454	180.00000	
LH2VTCO	15275.950	62.60102	0.65454	180.00000	
	15310.000	60.28566	0.69376	180.00000	
	15410.000	53.51797	0.80237	180.00000	
	15510.000	46.75062	0.90080	180.00000	
	15610.000	39.92417	0.98834	180.00000	
	15710.000	33.15726	1.06221	180.00000	
	S4B LUI	15730.050	31.79202	1.07545	180.00000
02H2CO	15730.550	31.79202	1.07545	180.00000	
	15800.000	27.04334	1.11696	180.00000	
	15802.750	26.86526	1.11838	180.00000	
	15802.750	26.86526	1.11838	180.00000	
	15803.750	26.86300	1.12329	179.98443	
	LTI	15803.750	26.86300	1.12329	179.98443
	S4BLUCO	15806.750	26.85780	1.13539	179.93769
	15810.000	26.85606	1.14204	179.88698	
S4B REI	15811.750	26.85657	1.14307	179.85963	
S4B 90T	15814.250	26.74969	1.09640	179.78951	
IGM ON	15818.250	26.36919	0.97889	179.64681	
	15820.000	25.63711	0.79342	179.50373	
	15820.250	25.44209	0.75070	179.48324	
	TSMC3	15828.250	21.00061	0.50488	-179.90862
	15830.000	21.04562	0.52016	-179.66553	
	15840.000	20.39635	0.78285	-179.23310	
	15850.000	19.85376	0.93464	-179.13184	
	15860.000	19.36949	1.02080	-179.26199	
	15870.000	18.92491	1.07147	-179.15117	
	15880.000	18.51751	1.10086	-179.25025	
	15890.000	18.13550	1.12105	-179.19297	
	15900.000	17.74003	1.13218	-179.25331	
	15910.000	17.36062	1.13962	-179.21311	

TABLE 5-XXXIX
(CONTINUED)SPACECRAFT GIMBAL ANGLES
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SECS)	SPACECRAFT GIMBAL ANGLES		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)
	15920.000	16.99982	1.14634	-179.22778
	15930.000	16.64892	1.15080	-179.23153
	15940.000	16.29901	1.15507	-179.20557
	15950.000	15.96956	1.16051	-179.24777
	15960.000	15.62301	1.16473	-179.18222
	15970.000	15.26525	1.16673	-179.25346
	15980.000	14.91592	1.17219	-179.14996
	15990.000	14.56312	1.17638	-179.26290
	16000.000	14.20172	1.18055	-179.14047
	16010.000	13.82739	1.18579	-179.25652
	16020.000	13.43839	1.19032	-179.16904
	16030.000	13.02944	1.19587	-179.25328
	16040.000	12.59740	1.20266	-179.19647
	16050.000	12.13431	1.20933	-179.25216
	16060.000	11.63797	1.21686	-179.20932
	16070.000	11.09634	1.22472	-179.24017
	16080.000	10.46104	1.23306	-179.21657
	16090.000	9.78790	1.24298	-179.23055
	16100.000	9.02715	1.25427	-179.22839
	16110.000	8.13492	1.26820	-179.23602
	16120.000	5.77498	1.33853	-179.27352
	16130.000	5.81220	1.32356	-179.14031
	16140.000	5.82918	1.29374	-179.26153
S4BGCS2	16140.857	5.82976	1.29329	-179.25823
TR7	16141.067	5.82976	1.29377	-179.26060
	16150.857	5.83156	1.31183	-179.42186
TLI	16150.857	5.83156	1.31183	-179.42186
	16151.125	5.83174	1.31211	-179.42628
	16161.067	5.84412	1.31366	-179.59031
	16161.067	5.84412	1.31366	-179.59031
ORB GID	16161.125	5.84412	1.31366	180.00000
ORB NAV	16162.125	5.53846	1.06964	-179.99483
	16240.000	-8.24374	1.09854	180.00000
	16340.000	-17.10152	1.04633	180.00000
	16440.000	-24.67160	0.98171	180.00000
	16540.000	-32.16328	0.90066	180.00000
	16640.000	-38.42538	0.82078	180.00000
	16740.000	-44.53835	0.73306	180.00000
	16840.000	-49.61208	0.65364	180.00000
	16940.000	-54.55563	0.57111	180.00000

TABLE 5-XXXIX SPACECRAFT GIMBAL ANGLES
(CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SECS)	SPACECRAFT GIMBAL ANGLES		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)
	17040.000	-58.66563	0.49907	180.00000
T&D MAN	17042.125	-58.66563	0.49907	180.00000
	17140.000	2.44494	44.17698	129.12931
	17140.957	2.44494	44.17698	129.12931
	17240.000	59.75552	39.35112	64.92519
	17340.000	61.82502	40.65277	0.00000
	17440.000	61.82502	40.65277	0.00000
	17540.000	61.82502	40.65277	0.00000
	17640.000	61.82502	40.65277	0.00000
CSM SEP	17641.067	61.82502	40.65277	0.00000
	17740.000	61.82502	40.65277	0.00000
	17840.000	61.82502	40.65277	0.00000
	17940.000	61.82502	40.65277	0.00000
	18040.000	61.82502	40.65277	0.00000
	18100.000	61.82502	40.65277	0.00000

TABLE 5-XL

COMMANDED ATTITUDE CONTROL SIGNALS
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	COMMANDED CONTROL SIGNALS		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)

(COMMANDED CONTROL SIGNALS
ARE ZERO FOR THIS PERIOD
OF FLIGHT)

3-D SIMULATION

LTI	15803.750	0.021	0.029	0.093
S4BLUCD	15806.750	0.224	0.030	0.136
	15810.000	0.449	0.026	0.182
S4R RFI	15811.750	0.569	0.022	0.208
S4R 90T	15814.250	0.140	-0.226	0.425
IGM ON	15818.250	0.366	-0.146	0.590
	15820.000	0.629	-0.135	0.944
	15820.250	0.591	-0.162	0.808
TSMC3	15828.250	0.183	-0.217	-0.359
	15830.000	0.199	-0.238	-0.749
	15840.000	0.139	-0.224	-0.743
	15850.000	0.139	-0.225	-0.993
	15860.000	0.139	-0.226	-0.739
	15870.000	0.140	-0.228	-0.726
	15880.000	0.141	-0.231	-0.778
	15890.000	0.142	-0.232	-0.707
	15900.000	0.144	-0.233	-0.790
	15910.000	0.145	-0.235	-0.708

TABLE 5-XI
(CONTINUED) COMMANDED ATTITUDE CONTROL SIGNALS
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	COMMANDED CONTROL SIGNALS		
		PITCH (DEGREES)	YAW (DEGREES)	ROLL (DEGREES)
	15920.000	0.146	-0.236	-0.840
	15930.000	0.148	-0.238	-0.710
	15940.000	0.148	-0.240	-0.382
	15950.000	0.150	-0.241	-0.716
	15960.000	0.151	-0.242	-0.923
	15970.000	0.151	-0.245	-0.727
	15980.000	0.153	-0.246	-0.976
	15990.000	0.154	-0.247	-0.736
	16000.000	0.156	-0.249	-0.731
	16010.000	0.156	-0.250	-0.760
	16020.000	0.158	-0.252	-0.718
	16030.000	0.158	-0.254	-0.778
	16040.000	0.159	-0.255	-0.706
	16050.000	0.161	-0.256	-0.793
	16060.000	0.162	-0.257	-0.707
	16070.000	0.164	-0.259	-0.815
	16080.000	0.165	-0.261	-0.706
	16090.000	0.166	-0.261	-0.831
	16100.000	0.169	-0.263	-0.698
	16110.000	0.170	-0.264	-0.824
	16120.000	0.171	-0.265	-0.746
	16130.000	0.166	-0.267	-0.729
	16140.000	0.168	-0.268	-0.757
S4BGCS2	16140.857	0.167	-0.267	-0.772
TR7	16141.067	0.168	-0.265	-0.663
	16150.857	0.170	-0.251	-0.501
TI I	16150.857	0.212	-0.306	-0.501
	16151.125	0.213	-0.306	-0.497
	16161.067	0.231	-0.313	-0.333
	16161.067	0.231	-0.313	-0.333
ORB GID	16161.125	0.231	-0.313	-0.333

(COMMANDED CONTROL SIGNALS
ARE ZERO FOR THE REMAINDER
OF THE SIMULATED FLIGHT)

TARIF 5-XLI

VEHICLE BODY ROTATION RATES
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	BODY ROTATION RATES		Z (DEG/SEC)
		X (DEG/SEC)	Y (DEG/SEC)	

(BODY ROTATION RATES ARE
NOT CALCULATED DURING THIS
PERIOD OF FLIGHT)

3-D SIMULATION

LTI	15803.750	-0.016	-0.002	0.005
S4BLUCO	15806.750	-0.016	-0.001	0.003
	15810.000	-0.016	0.000	0.001
S4B RFI	15811.750	-0.016	0.000	0.000
S4B 90T	15814.250	-0.045	-0.098	-0.040
IGM ON	15818.250	-0.049	-0.156	-0.050
	15820.000	-0.094	-0.734	-0.170
	15820.250	-0.063	-0.820	-0.185
TSMC3	15828.250	0.153	0.072	0.006
	15830.000	0.082	-0.023	0.017
	15840.000	-0.005	-0.057	0.020
	15850.000	0.024	-0.050	0.012
	15860.000	-0.001	-0.046	0.007
	15870.000	-0.026	-0.043	0.005
	15880.000	0.005	-0.038	0.003
	15890.000	-0.021	-0.038	0.002
	15900.000	0.008	-0.040	0.001
	15910.000	-0.017	-0.036	0.001

TABLE 5-XLI
(CONTINUED)VEHICLE BODY ROTATION RATES
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	BODY ROTATION RATES		
		X (DEG/SEC)	Y (DEG/SEC)	Z (DEG/SEC)
	15920.000	0.012	-0.036	0.001
	15930.000	-0.013	-0.035	0.001
	15940.000	0.017	-0.035	0.001
	15950.000	-0.008	-0.033	0.001
	15960.000	0.020	-0.036	0.001
	15970.000	-0.005	-0.035	0.001
	15980.000	0.024	-0.035	0.001
	15990.000	-0.001	-0.036	0.001
	16000.000	-0.027	-0.037	0.001
	16010.000	0.002	-0.038	0.001
	16020.000	-0.024	-0.040	0.001
	16030.000	0.005	-0.042	0.001
	16040.000	-0.021	-0.044	0.001
	16050.000	0.008	-0.048	0.001
	16060.000	-0.018	-0.050	0.002
	16070.000	0.010	-0.058	0.001
	16080.000	-0.017	-0.063	0.002
	16090.000	0.011	-0.071	0.002
	16100.000	-0.016	-0.082	0.002
	16110.000	0.011	-0.097	0.003
	16120.000	0.003	0.029	-0.002
	16130.000	-0.027	-0.003	-0.002
	16140.000	0.003	0.002	-0.001
S48GCS2	16140.857	0.005	-0.000	-0.000
T87	16141.067	-0.016	0.000	0.003
	16150.957	-0.016	0.001	0.001
TLI	16150.857	-0.016	0.001	0.001
	16151.125	-0.016	0.001	0.001
	16161.067	-0.016	0.002	-0.001
	16161.067	-0.016	0.002	-0.001
ORB GTD	16161.125	-0.016	0.002	-0.001

(BODY ROTATION RATES ARE
NOT CALCULATED DURING THE
REMAINDER OF THE SIMULATED
FLIGHT)

TABLE 5-XLII-A

 VEHICLE POSITION - INERTIAL COORDINATES
 (METRIC UNITS)
 SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS			
		X (METERS)	Y (METERS)	Z (METERS)	
2ND OPP	14802.750	-537140.	-134376.	-6550850.	
	14810.000	-480831.	-134328.	-6555269.	
	14910.000	297670.	-132690.	-6566758.	
	15010.000	1072019.	-129224.	-6486126.	
	15110.000	1831346.	-123966.	-6314520.	
FM NAV	15210.000	2564999.	-116976.	-6054366.	
	15227.625	2690863.	-115570.	-5999593.	
TR6	15233.750	2734331.	-115070.	-5979944.	
	15233.750	2734331.	-115070.	-5979944.	
02H2I	15275.750	3028400.	-111475.	-5836786.	
1H2VIC0	15275.950	3029783.	-111457.	-5836069.	
	15310.000	3262689.	-108337.	-5709332.	
	15410.000	3914641.	-98156.	-5284276.	
	15510.000	4511725.	-86563.	-4785174.	
	15610.000	5045535.	-73706.	-4219040.	
	15710.000	5508753.	-59754.	-3593823.	
	S4B LUI	15730.050	5592520.	-56941.	-3462117.
	02H2CO	15730.550	5594569.	-56768.	-3458807.
		15800.000	5859795.	-46412.	-2987838.
		15802.750	5869493.	-45994.	-2968752.
15802.750		5869493.	-45994.	-2968752.	
15803.750		5873004.	-45842.	-2961803.	
LTI	15803.750	5873004.	-45842.	-2961803.	
S4BLUC0	15806.750	5883438.	-45385.	-2940934.	
	15810.000	5894762.	-44890.	-2918283.	
S4B RFI	15811.750	5900797.	-44623.	-2905068.	
S4B 90T	15814.250	5909375.	-44241.	-2888594.	
IGM DN	15818.250	5923024.	-43628.	-2860521.	
	15820.000	5928969.	-43359.	-2843180.	
	15820.250	5929917.	-43320.	-2846425.	
	15828.250	5956764.	-42086.	-2789631.	
TSMC3	15830.000	5962609.	-41815.	-2777118.	
	15840.000	5995665.	-40260.	-2705007.	
	15850.000	6028130.	-38692.	-2631852.	
	15860.000	6059996.	-37109.	-2557651.	
	15870.000	6091257.	-35510.	-2482400.	
	15880.000	6121909.	-33894.	-2406095.	
	15890.000	6151946.	-32260.	-2328731.	
	15900.000	6181365.	-30609.	-2250305.	
	15910.000	6210159.	-28940.	-2170812.	

TABLE 5-XLII-A VEHICLE POSITION - INERTIAL COORDINATES
(CONTINUED) (METRIC UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
	15920.000	6238325.	-27254.	-2090248.
	15930.000	6265859.	-25550.	-2003609.
	15940.000	6292757.	-23827.	-1925888.
	15950.000	6319016.	-22087.	-1842079.
	15960.000	6344633.	-20329.	-1757174.
	15970.000	6369606.	-18552.	-1671168.
	15980.000	6393930.	-16758.	-1584051.
	15990.000	6417603.	-14944.	-1495817.
	16000.000	6440623.	-13113.	-1406456.
	16010.000	6462987.	-11262.	-1315959.
	16020.000	6484693.	-9393.	-1224313.
	16030.000	6505739.	-7505.	-1131508.
	16040.000	6526121.	-5597.	-1037530.
	16050.000	6545338.	-3670.	-942366.
	16060.000	6564885.	-1722.	-845999.
	16070.000	6583261.	245.	-748410.
	16080.000	6600961.	2233.	-649579.
	16090.000	6617978.	4242.	-549488.
	16100.000	6634306.	6273.	-448114.
	16110.000	6649935.	8326.	-345434.
	16120.000	6664847.	10402.	-241420.
	16130.000	6679005.	12502.	-136039.
	16140.000	6692415.	14628.	-29263.
S48GCS2	16140.857	6693529.	14811.	-20045.
TR7	16141.067	6693802.	14856.	-17785.
	16150.857	6706063.	16951.	87592.
TLI	16150.857	6706063.	16951.	87592.
	16151.125	6706386.	17009.	90476.
	16161.067	6717944.	19136.	197479.
	16161.067	6717944.	19136.	197479.
ORB GTD	16161.125	6718009.	19149.	198101.
ORB NAV	16162.125	6719123.	19362.	208863.
	16240.000	6779158.	35948.	1045001.
	16340.000	6782393.	56932.	2106597.
	16440.000	6710265.	77377.	3145013.
	16540.000	6572421.	97145.	4152872.
	16640.000	6378764.	116153.	5125708.
	16740.000	6138609.	134369.	6061406.
	16840.000	5860235.	151789.	6959575.
	16940.000	5550743.	168436.	7820975.

TABLE 5-XLII-A
(CONTINUED)

VEHICLE POSITION - INERTIAL COORDINATES
(METRIC UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
	17040.000	5216079.	184344.	8647075.
T&D MAN	17042.125	5208732.	184675.	8664260.
	17140.000	4861148.	199557.	9439727.
	17140.857	4858030.	199684.	9446382.
	17240.000	4489966.	214118.	10200355.
	17340.000	4105806.	228073.	10932817.
	17440.000	3711328.	241464.	11637318.
	17540.000	3308699.	254334.	12316362.
	17640.000	2899684.	266720.	12971734.
CSM SFP	17641.067	2895291.	266849.	12978606.
	17740.000	2485726.	278657.	13605084.
	17840.000	2068004.	290176.	14217931.
	17940.000	1647488.	301309.	14811665.
	18040.000	1224977.	312080.	15387560.
	18100.000	970791.	318380.	15725021.

TABLE 5-XLII-R

 VEHICLE POSITION - INERTIAL COORDINATES
 (ENGLISH UNITS)
 SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS				
		X (FEET)	Y (FEET)	Z (FEET)		
2ND OPP	14802.750	-1762272.	-440865.	-21492291.		
	14810.000	-1577530.	-440710.	-21506788.		
	14910.000	975609.	-435334.	-21544482.		
	15010.000	3517121.	-423964.	-21279941.		
	15110.000	6008352.	-406714.	-20716930.		
	15210.000	8415350.	-383779.	-19863406.		
FM NAV	15227.625	8828290.	-379167.	-19683703.		
	15233.750	8970902.	-377525.	-19619239.		
TR6	15233.750	8970902.	-377525.	-19619239.		
02H2I	15275.750	9935695.	-365732.	-19149559.		
LH2VTCO	15275.950	9940232.	-365673.	-19147208.		
	15310.000	10704361.	-355435.	-18731406.		
	15410.000	12843311.	-322034.	-17336864.		
	15510.000	14802248.	-283999.	-15699391.		
	15610.000	16553755.	-241819.	-13841996.		
	15710.000	18073336.	-196044.	-11790756.		
	S4R LUI	15730.050	18348164.	-186486.	-11358651.	
		02H2CO	15730.550	18354886.	-186246.	-11347792.
		15800.000	19225050.	-152270.	-9802617.	
		15802.750	19256868.	-150899.	-9739998.	
15802.750		19256868.	-150899.	-9739998.		
LTI	15803.750	19268387.	-150400.	-9717202.		
	15803.750	19268387.	-150400.	-9717202.		
	S4BLUCO	15806.750	19302783.	-148902.	-9648733.	
S4R REI	15810.000	19339771.	-147277.	-9574419.		
	15811.750	19359569.	-146400.	-9534345.		
	S4R 90T	15814.250	19387715.	-145147.	-9477013.	
	IGM ON	15818.250	19432494.	-143135.	-9384911.	
		15820.000	19451997.	-142253.	-9344453.	
	TSMC3	15820.250	19454779.	-142126.	-9338665.	
		15828.250	19543188.	-138076.	-9152332.	
		15830.000	19562365.	-137188.	-9111281.	
15840.000		19670817.	-132088.	-8874695.		
15850.000		19777329.	-126944.	-8634686.		
15860.000		19881876.	-121750.	-8391243.		
15870.000		19984440.	-116502.	-8144357.		
15880.000		20085003.	-111200.	-7894013.		
15890.000		20183551.	-105840.	-7640195.		
15900.000		20280067.	-100424.	-7382890.		
	15910.000	20374537.	-94949.	-7122087.		

TABLE 5-XLII-B
(CONTINUED)VEHICLE POSITION - INERTIAL COORDINATES
(ENGLISH UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
	15920.000	20466946.	-89416.	-6857770.
	15930.000	20557280.	-83824.	-6589924.
	15940.000	20645528.	-78174.	-6318531.
	15950.000	20731680.	-72465.	-6043567.
	15960.000	20815726.	-66696.	-5765008.
	15970.000	20897656.	-60868.	-5482834.
	15980.000	20977460.	-54979.	-5197019.
	15990.000	21055128.	-49030.	-4907537.
	16000.000	21130653.	-43021.	-4614358.
	16010.000	21204027.	-36950.	-4317449.
	16020.000	21275241.	-30817.	-4016775.
	16030.000	21344288.	-24621.	-3712297.
	16040.000	21411159.	-18362.	-3403971.
	16050.000	21475845.	-12039.	-3091753.
	16060.000	21538337.	-5651.	-2775588.
	16070.000	21598626.	804.	-2455412.
	16080.000	21656696.	7327.	-2131164.
	16090.000	21712526.	13918.	-1802781.
	16100.000	21766095.	20581.	-1470192.
	16110.000	21817372.	27316.	-1133315.
	16120.000	21866294.	34126.	-792059.
	16130.000	21912747.	41018.	-446321.
	16140.000	21956741.	47992.	-96006.
S4BGCS2	16140.857	21960399.	48593.	-65763.
TR7	16141.067	21961292.	48741.	-58349.
	16150.857	22001517.	55615.	287377.
TLI	16150.857	22001517.	55615.	287377.
	16151.125	22002579.	55803.	296836.
	16161.067	22040500.	62781.	647896.
	16161.067	22040500.	62781.	647896.
ORB GID	16161.125	22040712.	62821.	649939.
ORB NAV	16162.125	22044366.	63523.	685245.
	16240.000	22241331.	117941.	3428481.
	16340.000	22251947.	186784.	6911407.
	16440.000	22015305.	253861.	10318283.
	16540.000	21563061.	318716.	13624910.
	16640.000	20927705.	381081.	16816527.
	16740.000	20139792.	440842.	19886502.
	16840.000	19226493.	497995.	22833251.
	16940.000	18211101.	552611.	25659368.

TABLE 5-XLII-B VEHICLE POSITION - INERTIAL COORDINATES
(ENGLISH UNITS)
(CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
	17040.000	17113119.	604804.	28369668.
T&D MAN	17042.125	17089014.	605888.	28426049.
	17140.000	15948648.	654714.	30970232.
	17140.857	15938419.	655132.	30992067.
	17240.000	14730860.	702486.	33467701.
	17340.000	13470491.	748270.	35868823.
	17440.000	12176273.	792206.	38180176.
	17540.000	10855312.	834429.	40408013.
	17640.000	9513400.	875065.	42558184.
CSM SEP	17641.067	9498985.	875490.	42580730.
	17740.000	8155268.	914227.	44636103.
	17840.000	6784790.	952022.	46646754.
	17940.000	5405146.	988545.	48594702.
	18040.000	4018953.	1023884.	50484121.
	18100.000	3185009.	1044553.	51591278.

TABLE 5-XLIII-A

VEHICLE VELOCITY - INERTIAL COORDINATES

(METRIC UNITS)

SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS			
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)	
2ND OPP	14802.750	7764.123	5.866	-642.824	
	14810.000	7769.328	7.199	-576.086	
	14910.000	7782.464	25.559	346.557	
	15010.000	7686.362	43.696	1264.175	
	15110.000	7482.401	61.361	2163.892	
	15210.000	7173.487	78.307	3033.065	
	FM NAV	15227.625	7108.468	81.201	3182.165
		15233.750	7085.146	82.200	3233.657
	TR6	15233.750	7085.146	82.200	3233.657
	Q2H2I	15275.750	6915.242	88.942	3581.993
LH2VTCO	15275.950	6914.391	88.974	3583.631	
	15310.000	6764.010	94.296	3859.575	
	15410.000	6259.792	109.102	4631.646	
	15510.000	5667.940	122.514	5338.683	
	15610.000	4996.787	134.337	5970.734	
	15710.000	4255.773	144.399	6518.982	
	S4B LUI	15730.050	4099.695	146.191	6618.124
		15730.550	4095.774	146.235	6620.551
Q2H2CO	15800.000	3537.835	151.830	6934.637	
	15802.750	3515.226	152.032	6946.122	
	15802.750	3515.226	152.032	6946.122	
	15803.750	3506.995	152.105	6950.280	
	15803.750	3506.995	152.105	6950.280	
LTI	15803.750	3506.995	152.105	6950.280	
S4BIUCO	15806.750	3482.301	152.324	6962.747	
	15810.000	3455.498	152.559	6976.152	
S4B RET	15811.750	3441.041	152.684	6983.321	
S4B 90T	15814.250	3423.332	152.971	6999.322	
IGM ON	15818.250	3401.383	153.607	7037.755	
	15820.000	3392.225	153.889	7055.485	
	15820.250	3390.903	153.925	7058.025	
	15828.250	3345.142	154.697	7140.866	
TSMC3	15830.000	3334.945	154.876	7159.077	
	15840.000	3276.165	156.079	7263.250	
	15850.000	3216.639	157.526	7367.736	
	15860.000	3156.477	159.110	7472.548	
	15870.000	3095.733	160.773	7577.689	
	15880.000	3034.512	162.484	7683.333	
	15890.000	2972.860	164.227	7789.472	
	15900.000	2910.706	165.987	7895.881	
	15910.000	2848.093	167.757	8002.738	

TABLE 5-XLIII-A VEHICLE VELOCITY - INERTIAL COORDINATES
(METRIC UNITS)
(CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MBT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
	15920.000	2785.065	169.536	8110.065
	15930.000	2721.653	171.323	8217.900
	15940.000	2657.881	173.116	8326.200
	15950.000	2593.861	174.923	8435.569
	15960.000	2529.525	176.739	8545.447
	15970.000	2464.860	178.563	8655.997
	15980.000	2399.912	180.397	8767.351
	15990.000	2334.704	182.244	8879.575
	16000.000	2269.248	184.107	8992.748
	16010.000	2203.550	185.985	9106.956
	16020.000	2137.612	187.883	9222.298
	16030.000	2071.427	189.800	9338.878
	16040.000	2004.980	191.743	9456.813
	16050.000	1938.246	193.715	9576.229
	16060.000	1871.227	195.721	9697.475
	16070.000	1803.876	197.771	9820.742
	16080.000	1735.942	199.854	9945.711
	16090.000	1667.368	201.986	10072.789
	16100.000	1598.006	204.167	10202.190
	16110.000	1527.609	206.413	10334.179
	16120.000	1453.550	208.810	10469.264
	16130.000	1378.285	211.305	10607.305
	16140.000	1303.754	213.803	10748.312
S4BGCS2	16140.857	1297.407	214.015	10760.543
T87	16141.067	1295.816	214.061	10763.201
	16150.857	1208.927	213.973	10763.435
TLI	16150.857	1208.927	213.973	10763.435
	16151.125	1206.553	213.970	10763.404
	16161.067	1118.621	213.840	10761.526
	16161.067	1118.621	213.840	10761.526
ORB GID	16161.125	1118.110	213.840	10761.511
ORB NAV	16162.125	1109.288	213.825	10761.245
	16240.000	438.311	211.904	10699.398
	16340.000	-359.767	207.425	10514.964
	16440.000	-1066.508	201.245	10241.100
	16540.000	-1673.724	193.976	9908.743
	16640.000	-2183.815	186.146	9544.546
	16740.000	-2605.477	178.156	9168.857
	16840.000	-2950.167	170.286	8795.865
	16940.000	-3229.779	162.711	8434.645

TABLE 5-XLIII-A VEHICLE VELOCITY - INERTIAL COORDINATES
(CONTINUED) (METRIC UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
	17040.000	-3455.364	155.531	8090.468
T&D MAN	17042.125	-3459.645	155.383	8083.362
	17140.000	-3636.587	148.792	7765.966
	17140.857	-3637.974	148.736	7763.273
	17240.000	-3781.614	142.505	7462.047
	17340.000	-3897.190	136.662	7179.542
	17440.000	-3999.781	131.242	6914.647
	17540.000	-4060.867	126.216	6669.220
	17640.000	-4117.033	121.556	6440.968
CSM SEP	17641.067	-4117.557	121.509	6439.621
	17740.000	-4160.178	117.232	6229.559
	17840.000	-4192.648	113.214	6030.638
	17940.000	-4216.340	109.476	5846.121
	18040.000	-4232.797	105.991	5673.709
	18100.000	-4239.731	104.014	5575.652

TABLE 5-XLIII-B VEHICLE VELOCITY - INERTIAL COORDINATES
(ENGLISH UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS			
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)	
2ND OPP	14802.750	25472.846	19.244	-2109.002	
	14810.000	25489.921	23.617	-1890.048	
	14910.000	25533.019	83.853	1136.976	
	15010.000	25217.722	143.360	4147.555	
	15110.000	24543.560	201.317	7099.383	
FM NAV	15210.000	23535.061	256.914	9951.002	
	15227.625	23321.746	266.409	10440.175	
	15233.750	23245.230	269.685	10609.112	
TR6	15233.750	23245.230	269.685	10609.112	
02H2I	15275.750	22687.800	291.805	11751.947	
LH2VTCO	15275.950	22685.011	291.908	11757.321	
	15310.000	22191.635	309.371	12662.417	
	15410.000	20537.375	357.947	15195.688	
	15510.000	18595.605	401.947	17515.364	
	15610.000	16393.659	440.738	19589.021	
S4B LUT	15710.000	13962.509	473.751	21387.735	
	15730.050	13450.443	479.630	21713.007	
	02H2CO	15730.550	13437.579	479.773	21720.963
	15800.000	11607.070	498.131	22751.435	
	15802.750	11532.894	498.792	22789.114	
LTI	15802.750	11532.894	498.792	22789.114	
	15803.750	11505.891	499.032	22802.755	
	15803.750	11505.891	499.032	22802.755	
	15806.750	11424.871	499.750	22843.658	
	S4BLUCO	15810.000	11336.934	500.521	22887.638
S4B REI	15811.750	11289.504	500.932	22911.153	
	S4B 90T	15814.250	11231.405	501.872	22963.653
	IGM ON	15818.250	11159.393	503.961	23089.746
15820.000		11129.348	504.886	23147.916	
15820.250		11125.009	505.004	23156.250	
TSMC3	15828.250	10974.874	507.538	23428.040	
	15830.000	10941.420	508.123	23487.786	
	15840.000	10748.571	512.070	23829.561	
	15850.000	10553.277	516.818	24172.362	
	15860.000	10355.895	522.015	24516.233	
	15870.000	10156.604	527.470	24861.186	
	15880.000	9955.743	533.084	25207.786	
	15890.000	9753.479	538.804	25556.011	
	15900.000	9549.559	544.578	25905.122	
	15910.000	9344.136	550.383	26255.701	

TABLE 5-XLIII-B VEHICLE VELOCITY - INERTIAL COORDINATES
(CONTINUED) (ENGLISH UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
	15920.000	9137.352	556.221	26607.825
	15930.000	8929.306	562.083	26961.614
	15940.000	8720.082	567.966	27317.223
	15950.000	8510.042	573.894	27675.752
	15960.000	8299.966	579.853	28036.243
	15970.000	8086.812	585.837	28398.939
	15980.000	7873.728	591.854	28764.275
	15990.000	7659.791	597.913	29132.464
	16000.000	7445.040	604.026	29503.765
	16010.000	7229.495	610.188	29877.466
	16020.000	7013.164	616.413	30256.882
	16030.000	6796.019	622.704	30639.364
	16040.000	6578.020	629.079	31026.290
	16050.000	6359.076	635.549	31418.073
	16060.000	6139.196	642.131	31815.862
	16070.000	5918.228	648.854	32220.283
	16080.000	5695.347	655.690	32630.286
	16090.000	5470.368	662.682	33047.209
	16100.000	5242.303	669.839	33471.753
	16110.000	5011.342	677.208	33904.786
	16120.000	4768.365	685.074	34347.979
	16130.000	4521.931	693.258	34800.869
	16140.000	4277.408	701.453	35263.491
S48CCS2	16140.857	4256.584	702.150	35303.620
TR7	16141.067	4251.366	702.300	35312.339
	16150.357	3966.296	702.011	35313.107
TLI	16150.857	3966.296	702.011	35313.107
	16151.125	3958.506	702.001	35313.004
	16161.067	3670.016	701.576	35306.845
	16161.067	3670.016	701.576	35306.845
ORB GID	16161.125	3668.341	701.573	35306.796
ORB NAV	16162.125	3639.398	701.526	35305.922
	16240.000	1438.028	695.224	35103.012
	16340.000	-1180.338	680.528	34497.914
	16440.000	-3499.043	660.254	33599.408
	16540.000	-5491.220	636.406	32509.017
	16640.000	-7164.746	610.715	31314.129
	16740.000	-8548.152	584.502	30081.553
	16840.000	-9679.027	558.682	28857.826
	16940.000	-10596.386	533.830	27672.721

TABLE 5-XI III-R VEHICLE VELOCITY - INERTIAL COORDINATES
(ENGLISH UNITS)
(CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
	17040.000	-11336.496	510.273	26543.531
T&D MAN	17042.125	-11350.541	509.788	26520.217
	17140.000	-11931.061	488.162	25478.890
	17140.857	-11935.609	487.979	25470.056
	17240.000	-12406.869	467.537	24481.783
	17340.000	-12786.023	448.367	23551.647
	17440.000	-13086.552	430.583	22685.849
	17540.000	-13323.056	414.096	21890.644
	17640.000	-13507.326	398.807	21131.786
CSM SEP	17641.067	-13509.047	398.650	21124.033
	17740.000	-13648.879	384.619	20434.904
	17840.000	-13755.407	371.437	19785.723
	17940.000	-13833.137	359.172	19180.189
	18040.000	-13887.130	347.741	18614.530
	18100.000	-13909.880	341.252	18292.821

TABLE 5-XLIV-A

 VEHICLE POSITION - EARTH-FIXED COORDINATES
 (METRIC UNITS)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS			
		X (METERS)	Y (METERS)	Z (METERS)	
2ND OPP	14802.750	-11948781.	-2158210.	-2744284.	
	14810.000	-11920462.	-2181136.	-2783466.	
	14910.000	-11493135.	-2483026.	-3303397.	
	15010.000	-11001222.	-2755243.	-3780848.	
	15110.000	-10450973.	-2993803.	-4210154.	
	15210.000	-9849376.	-3195141.	-4586268.	
FM NAV	15227.625	-9738587.	-3226527.	-4646705.	
	15233.750	-9699776.	-3237138.	-4667285.	
TR6	15233.750	-9699776.	-3237138.	-4667285.	
02H2T	15275.750	-9429509.	-3305722.	-4802441.	
LH2VTCO	15275.950	-9428205.	-3306031.	-4803059.	
	15310.000	-9204067.	-3356159.	-4904822.	
	15410.000	-8523229.	-3474278.	-5162178.	
	15510.000	-7815490.	-3547474.	-5355465.	
	15610.000	-7089814.	-3574315.	-5482612.	
	15710.000	-6355386.	-3553977.	-5542364.	
	S4B LUT	15730.050	-6207900.	-3544193.	-5546181.
		02H2CO	15730.550	-6204223.	-3543925.
LTI	15800.000	-5694588.	-3495164.	-5538150.	
	15802.750	-5674475.	-3492765.	-5537157.	
	15802.750	-5674475.	-3492765.	-5537157.	
	15803.750	-5667163.	-3491884.	-5536784.	
	15803.750	-5667163.	-3491884.	-5536784.	
	S4BLUCO	15806.750	-5645233.	-3489212.	-5535623.
S4B REI	15810.000	-5621485.	-3486269.	-5534296.	
	15811.750	-5608702.	-3484664.	-5533552.	
S4B 90T	15814.250	-5590441.	-3482346.	-5532454.	
IGM ON	15818.250	-5561170.	-3478567.	-5530606.	
	15820.000	-5548336.	-3476885.	-5529762.	
	15820.250	-5546501.	-3476643.	-5529640.	
	TSMC3	15828.250	-5487600.	-3468720.	-5525481.
TSMC3	15830.000	-5474667.	-3466937.	-5524507.	
	15840.000	-5400434.	-3456396.	-5518491.	
	15850.000	-5325635.	-3445256.	-5511712.	
	15860.000	-5250272.	-3433510.	-5504165.	
	15870.000	-5174342.	-3421154.	-5495848.	
	15880.000	-5097843.	-3408182.	-5486755.	
	15890.000	-5020772.	-3394590.	-5476885.	
	15900.000	-4943126.	-3380375.	-5466232.	
	15910.000	-4864902.	-3365531.	-5454796.	

TABLE 5-XLIV-A VEHICLE POSITION - EARTH-FIXED COORDINATES
(METRIC UNITS)
(CONTINUED) SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
	15920.000	-4786099.	-3350055.	-5442571.
	15930.000	-4706711.	-3333942.	-5429555.
	15940.000	-4626734.	-3317189.	-5415745.
	15950.000	-4546163.	-3299792.	-5401137.
	15960.000	-4464990.	-3281745.	-5385728.
	15970.000	-4383210.	-3263044.	-5369515.
	15980.000	-4300817.	-3243685.	-5352494.
	15990.000	-4217803.	-3223663.	-5334663.
	16000.000	-4134160.	-3202973.	-5316016.
	16010.000	-4049879.	-3181610.	-5296550.
	16020.000	-3964949.	-3159568.	-5276261.
	16030.000	-3879362.	-3136841.	-5255145.
	16040.000	-3793104.	-3113423.	-5233195.
	16050.000	-3706164.	-3089306.	-5210407.
	16060.000	-3618528.	-3064484.	-5186774.
	16070.000	-3530178.	-3038947.	-5162288.
	16080.000	-3441099.	-3012685.	-5136940.
	16090.000	-3351276.	-2985689.	-5110720.
	16100.000	-3260692.	-2957946.	-5083616.
	16110.000	-3169330.	-2929444.	-5055615.
	16120.000	-3077173.	-2900163.	-5026694.
	16130.000	-2984212.	-2870075.	-4996816.
	16140.000	-2890418.	-2839171.	-4965976.
S4BGCS2	16140.857	-2882339.	-2836484.	-4963288.
TR7	16141.067	-2880358.	-2835824.	-4962628.
	16150.857	-2788223.	-2804902.	-4931615.
TLI	16150.857	-2788223.	-2804902.	-4931615.
	16151.125	-2785708.	-2804051.	-4930760.
	16161.067	-2692568.	-2772279.	-4898752.
	16161.067	-2692568.	-2772279.	-4898752.
ORB GID	16161.125	-2692027.	-2772093.	-4898565.
ORB NAV	16162.125	-2682683.	-2768878.	-4895317.
	16240.000	-1968927.	-2507887.	-4627746.
	16340.000	-1095953.	-2145609.	-4246377.
	16440.000	-275265.	-1758938.	-3831227.
	16540.000	492536.	-1354103.	-3391422.
	16640.000	1209203.	-936513.	-2935117.
	16740.000	1877982.	-510587.	-2469149.
	16840.000	2502902.	-79776.	-1998997.
	16940.000	3088252.	353315.	-1528903.

TABLE 5-XLIV-A
(CONTINUED)VEHICLE POSITION - EARTH-FIXED COORDINATES
(METRIC UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SFC)	VEHICLE POSITION COMPONENTS		
		X (METERS)	Y (METERS)	Z (METERS)
	17040.000	3638253.	786770.	-1062070.
T&D MAN	17042.125	3649587.	795975.	-1052204.
	17140.000	4156875.	1219217.	-600868.
	17140.857	4161196.	1222916.	-596944.
	17240.000	4647744.	1649689.	-147014.
	17340.000	5114116.	2077530.	298270.
	17440.000	5558881.	2502307.	734139.
	17540.000	5984587.	2923751.	1160028.
	17640.000	6393475.	3341713.	1575578.
CSM SFP	17641.067	6397755.	3346154.	1579956.
	17740.000	6787509.	3756126.	1980588.
	17840.000	7168413.	4166985.	2374965.
	17940.000	7537699.	4574327.	2758702.
	18040.000	7896698.	4978216.	3131849.
	18100.000	8107651.	5218925.	3350691.

TABLE 5-XLIV-B

VEHICLE POSITION - EARTH-FIXED COORDINATES

(ENGLISH UNITS)

SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS			
		X (FEET)	Y (FEET)	Z (FEET)	
2ND OPP	14802.750	-39202038.	-7080742.	-9003555.	
	14810.000	-39109127.	-7155959.	-9132107.	
	14910.000	-37707135.	-8146410.	-10837916.	
	15010.000	-36093247.	-9039510.	-12404358.	
	15110.000	-34287969.	-9822189.	-13812843.	
	15210.000	-32314227.	-10482745.	-15046813.	
	FM NAV	15227.625	-31950746.	-10585720.	-15245096.
		15233.750	-31823412.	-10620533.	-15312615.
TR6	15233.750	-31823412.	-10620533.	-15312615.	
02H2I	15275.750	-30936708.	-10845544.	-15756040.	
LH2VTCO	15275.950	-30932431.	-10846557.	-15758069.	
	15310.000	-30197071.	-11011019.	-16091937.	
	15410.000	-27963350.	-11398549.	-16936280.	
	15510.000	-25641372.	-11638696.	-17570425.	
	15610.000	-23260545.	-11726754.	-17987573.	
	15710.000	-20851005.	-11660030.	-18183610.	
	S4B LUI	15730.050	-20367125.	-11627931.	-18196133.
		02H2CO	15730.550	-20355061.	-11627051.
	15800.000	-18683031.	-11467074.	-18169783.	
	15802.750	-18617045.	-11459203.	-18166527.	
	15802.750	-18617045.	-11459203.	-18166527.	
	15803.750	-18593056.	-11456312.	-18165301.	
LTI	15803.750	-18593056.	-11456312.	-18165301.	
S4BLUCO	15806.750	-18521106.	-11447545.	-18161492.	
	15810.000	-18443192.	-11437892.	-18157140.	
S4B REI	15811.750	-18401252.	-11432626.	-18154699.	
S4B 90T	15814.250	-18341341.	-11425020.	-18151095.	
IGM ON	15818.250	-18245307.	-11412620.	-18145032.	
	15820.000	-18203202.	-11407103.	-18142263.	
	15820.250	-18197183.	-11406310.	-18141862.	
	TSMC3	15828.250	-18003938.	-11380315.	-18128219.
		15830.000	-17961507.	-11374464.	-18125022.
	15840.000	-17717958.	-11339881.	-18105286.	
	15850.000	-17472557.	-11303332.	-18083045.	
	15860.000	-17225301.	-11264797.	-18058286.	
15870.000	-16976186.	-11224258.	-18030996.		
15880.000	-16725206.	-11181700.	-18001165.		
15890.000	-16472348.	-11137108.	-17968781.		
15900.000	-16217603.	-11090468.	-17933834.		
15910.000	-15960965.	-11041768.	-17896312.		

TABLE 5-XLIV-B

 VEHICLE POSITION - FARTH-FIXED COORDINATES
 (ENGLISH UNITS)
 SECOND OPPORTUNITY

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
	15920.000	-15702423.	-10990993.	-17856204.
	15930.000	-15441964.	-10938131.	-17813502.
	15940.000	-15179574.	-10883168.	-17769193.
	15950.000	-14915233.	-10826089.	-17720267.
	15960.000	-14648917.	-10766879.	-17669712.
	15970.000	-14380611.	-10705525.	-17616520.
	15980.000	-14110292.	-10642011.	-17560577.
	15990.000	-13837936.	-10576322.	-17502174.
	16000.000	-13563516.	-10508442.	-17440996.
	16010.000	-13287003.	-10438352.	-17377132.
	16020.000	-13008364.	-10366036.	-17310568.
	16030.000	-12727565.	-10291472.	-17241288.
	16040.000	-12444568.	-10214641.	-17169275.
	16050.000	-12159332.	-10135519.	-17094512.
	16060.000	-11871811.	-10054082.	-17016975.
	16070.000	-11581948.	-9970298.	-16936639.
	16080.000	-11289693.	-9884137.	-16853476.
	16090.000	-10994999.	-9795567.	-16767453.
	16100.000	-10697809.	-9704548.	-16678530.
	16110.000	-10398064.	-9611037.	-16586663.
	16120.000	-10095713.	-9514970.	-16491777.
	16130.000	-9790722.	-9416256.	-16393753.
	16140.000	-9482998.	-9314865.	-16292573.
S4BGCS2	16140.857	-9456491.	-9306048.	-16283753.
TB7	16141.067	-9449994.	-9303885.	-16281589.
	16150.857	-9147713.	-9202436.	-16179841.
TI I	16150.857	-9147713.	-9202436.	-16179841.
	16151.125	-9139460.	-9199643.	-16177034.
	16161.067	-8833885.	-9095405.	-16072023.
	16161.067	-8833885.	-9095405.	-16072023.
ORB GID	16161.125	-8832110.	-9094795.	-16071407.
ORB NAV	16162.125	-8801453.	-9084244.	-16060753.
	16240.000	-6459734.	-8227975.	-15182892.
	16340.000	-3595647.	-7039398.	-13931684.
	16440.000	-903101.	-5770793.	-12569642.
	16540.000	1615933.	-4442595.	-11126713.
	16640.000	3967201.	-3072549.	-9629648.
	16740.000	6161360.	-1675154.	-8100883.
	16840.000	8211622.	-261732.	-6558388.
	16940.000	10132060.	1159169.	-5016085.

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TABLE 5-XLIV-B VEHICLE POSITION - EARTH-FIXED COORDINATES
(CONTINUED) (ENGLISH UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE POSITION COMPONENTS		
		X (FEET)	Y (FEET)	Z (FEET)
T&D MAN	17040.000	11936526.	2581268.	-3484481.
	17042.125	11973710.	2611465.	-3452112.
	17140.000	13638042.	4000055.	-1971350.
	17140.357	13652216.	4012191.	-1959478.
	17240.000	15248505.	5412366.	-482329.
	17340.000	16778597.	6816043.	978577.
	17440.000	18237799.	8209668.	2408593.
	17540.000	19634473.	9592359.	3805865.
	17640.000	20975968.	10963624.	5169220.
	CSM SEP	17641.067	20990010.	10978194.
17740.000		22268730.	12323248.	6497992.
17840.000		23518415.	13671212.	7791881.
17940.000		24729985.	15007635.	9050860.
18040.000		25907801.	16332729.	10275095.
18100.000		26599906.	17122459.	10993081.

TABLE 5-XLV-A

 VEHICLE VELOCITY - EARTH-FIXED COORDINATES
 (METRIC UNITS)
 SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
2ND OPP	14802.750	3880.573	-3171.316	-5417.532
	14810.000	3931.521	-3153.052	-5391.292
	14910.000	4605.962	-2877.490	-4996.830
	15010.000	5221.863	-2560.197	-4542.738
	15110.000	5771.445	-2205.060	-4034.964
	15210.000	6247.747	-1816.523	-3480.029
FM NAV	15227.625	6323.633	-1744.946	-3377.954
	15233.750	6349.422	-1719.870	-3342.062
TR6	15233.750	6349.422	-1719.870	-3342.062
Q2H2I	15275.750	6518.048	-1545.228	-3092.841
LH2VTCO	15275.950	6518.916	-1544.385	-3091.630
	15310.000	6644.779	-1399.532	-2984.983
	15410.000	6957.582	-959.469	-2257.342
	15510.000	7182.239	-502.071	-1604.947
	15610.000	7315.956	-33.361	-935.896
	15710.000	7357.098	440.431	-258.439
S4B LUT	15730.050	7354.146	535.478	-122.329
	15730.550	7354.026	537.848	-119.935
Q2H2CO	15800.000	7314.824	865.968	351.605
	15802.750	7312.351	878.905	370.182
	15802.750	7312.351	878.905	370.182
	15803.750	7311.434	883.609	376.936
	15803.750	7311.434	883.609	376.936
	15806.750	7308.687	897.722	397.196
LTI	15806.750	7308.687	897.722	397.196
	15810.000	7305.615	913.003	419.136
S4B REI	15811.750	7303.913	921.227	430.946
S4B 90T	15814.250	7307.896	933.848	448.042
IGM ON	15818.250	7328.475	956.004	476.042
	15820.000	7338.494	965.836	488.343
TSMC3	15820.250	7339.925	967.246	490.116
	15828.250	7385.227	1014.003	550.176
	15830.000	7395.124	1024.352	563.470
	15840.000	7451.589	1083.931	639.659
	15850.000	7508.072	1144.195	716.229
	15860.000	7564.652	1205.012	793.162
	15870.000	7621.369	1266.314	870.449
	15880.000	7678.426	1328.092	948.101
	15890.000	7735.846	1390.311	1026.089
	15900.000	7793.403	1452.910	1104.378
	15910.000	7851.272	1515.927	1183.013

TABLE 5-XLV-A
(CONTINUED)VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(METRIC UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
	15920.000	7909.497	1579.353	1261.970
	15930.000	7968.127	1643.186	1341.243
	15940.000	8027.217	1707.431	1420.831
	15950.000	8087.107	1772.165	1500.788
	15960.000	8147.519	1837.312	1581.040
	15970.000	8208.508	1902.901	1661.629
	15980.000	8270.213	1968.961	1742.572
	15990.000	8332.700	2035.509	1823.874
	16000.000	8396.045	2102.569	1905.556
	16010.000	8460.325	2170.169	1987.648
	16020.000	8525.625	2238.344	2070.182
	16030.000	8592.031	2307.136	2153.203
	16040.000	8659.637	2376.595	2236.763
	16050.000	8728.535	2446.779	2320.928
	16060.000	8799.023	2517.814	2405.831
	16070.000	8871.242	2589.791	2491.575
	16080.000	8944.791	2662.701	2578.215
	16090.000	9019.987	2736.718	2665.947
	16100.000	9096.936	2811.983	2754.960
	16110.000	9175.735	2888.704	2845.531
	16120.000	9255.434	2968.239	2939.754
	16130.000	9337.217	3049.464	3035.779
	16140.000	9422.124	3131.484	3132.218
S4BGCS2	16140.857	9429.557	3138.549	3140.502
TR7	16141.067	9431.073	3140.173	3142.424
	16150.857	9390.556	3176.580	3192.855
TLI	16150.857	9390.556	3176.580	3192.855
	16151.125	9389.419	3177.562	3194.219
	16161.067	9346.770	3213.719	3244.422
	16161.067	9346.770	3213.719	3244.422
ORB GID	16161.125	9346.520	3213.928	3244.712
ORB NAV	16162.125	9342.183	3217.531	3249.717
	16240.000	8981.592	3478.810	3613.278
	16340.000	8471.708	3755.635	3998.312
	16440.000	7941.193	3967.325	4289.354
	16540.000	7417.902	4120.332	4493.101
	16640.000	6920.961	4224.108	4621.606
	16740.000	6461.430	4288.682	4688.641
	16840.000	6044.172	4323.222	4707.368
	16940.000	5669.884	4335.426	4689.212

TABLE 5-XLV-A

 VEHICLE VELOCITY - EARTH-FIXED COORDINATES
 (METRIC UNITS)
 SECOND OPPORTUNITY

(CONTINUED)

EVFNT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (M/SEC)	Y (M/SEC)	Z (M/SEC)
	17040.000	5336.769	4331.421	4643.525
T&D MAN	17042.125	5330.116	4331.196	4642.313
	17140.000	5041.719	4315.914	4577.693
	17140.857	5039.345	4315.742	4577.049
	17240.000	4781.091	4292.452	4497.375
	17340.000	4551.161	4263.655	4406.914
	17440.000	4348.375	4231.441	4309.535
	17540.000	4169.476	4197.199	4207.647
	17640.000	4011.545	4161.926	4103.035
CSM SEP	17641.067	4009.963	4161.547	4101.909
	17740.000	3872.003	4126.334	3997.009
	17840.000	3748.593	4090.919	3890.531
	17940.000	3639.350	4056.026	3784.294
	18040.000	3542.565	4021.886	3678.799
	18100.000	3489.849	4001.829	3616.008

TABLE 5-XLV-B

 VEHICLE VELOCITY - EARTH-FIXED COORDINATES
 (ENGLISH UNITS)
 SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
2ND OPP	14802.750	12731.540	-10404.578	-17774.074
	14810.000	12898.690	-10344.658	-17683.292
	14910.000	15111.422	-9440.584	-16393.830
	15010.000	17132.114	-8399.598	-14903.995
	15110.000	18935.187	-7234.450	-13238.072
	15210.000	20497.857	-5959.722	-11417.413
FM NAV	15227.625	20746.826	-5724.888	-11082.197
	15233.750	20831.435	-5642.617	-10964.770
TR6	15233.750	20831.435	-5642.617	-10964.770
O2H2I	15275.750	21384.671	-5069.645	-10147.115
LH2VTCO	15275.950	21387.192	-5066.881	-10143.172
	15310.000	21800.456	-4591.641	-9465.167
	15410.000	22826.713	-3147.865	-7405.976
	15510.000	23563.778	-1647.214	-5265.574
	15610.000	24002.479	-109.451	-3070.525
	15710.000	24137.461	1444.983	-847.893
S4B LUI O2H2CO	15730.050	24127.774	1756.818	-401.339
	15730.550	24127.383	1764.592	-390.205
	15800.000	23998.765	2841.103	1153.559
	15802.750	23990.652	2883.548	1214.509
	15802.750	23990.652	2883.548	1214.509
	15803.750	23987.645	2898.978	1236.668
LTI	15803.750	23987.645	2898.978	1236.668
	15806.750	23978.631	2945.281	1303.137
S4BLUCO	15810.000	23968.552	2995.416	1375.119
	15811.750	23962.968	3022.397	1413.865
S4B 90T	15814.250	23976.038	3063.804	1469.953
IGM ON	15818.250	24043.554	3136.495	1561.816
	15820.000	24076.425	3168.754	1602.176
	15820.250	24081.118	3173.378	1607.993
TSMC3	15828.250	24229.747	3326.782	1805.040
	15830.000	24262.219	3360.735	1848.654
	15840.000	24447.472	3556.205	2098.619
	15850.000	24632.782	3753.920	2349.833
	15860.000	24818.413	3953.453	2602.238
	15870.000	25004.490	4154.575	2855.804
	15880.000	25191.686	4357.258	3110.569
	15890.000	25380.071	4561.388	3366.433
	15900.000	25568.907	4766.766	3623.287
	15910.000	25758.766	4973.514	3881.276

TABLE 5-XLV-B

 VEHICLE VELOCITY - EARTH-FIXED COORDINATES
 (ENGLISH UNITS)
 SECOND OPPORTUNITY

(CONTINUED)

EVENT	TIME FROM 1ST MOT (SFC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
	15920.000	25949.795	5181.605	4140.321
	15930.000	26142.151	5391.029	4400.403
	15940.000	26336.013	5601.808	4661.520
	15950.000	26532.504	5814.190	4923.844
	15960.000	26730.705	6027.925	5187.140
	15970.000	26930.802	6243.112	5451.538
	15980.000	27133.243	6459.847	5717.000
	15990.000	27338.255	6678.179	5983.839
	16000.000	27546.078	6898.192	6251.826
	16010.000	27756.972	7119.975	6521.156
	16020.000	27971.211	7343.647	6791.935
	16030.000	28189.079	7569.343	7064.315
	16040.000	28410.882	7797.228	7338.462
	16050.000	28636.924	8027.491	7614.592
	16060.000	28868.187	8260.544	7893.146
	16070.000	29105.124	8496.691	8174.460
	16080.000	29346.426	8735.894	8458.712
	16090.000	29593.132	8978.733	8746.546
	16100.000	29845.590	9225.665	9038.534
	16110.000	30104.119	9477.375	9335.731
	16120.000	30365.597	9738.318	9644.861
	16130.000	30633.914	10004.802	9959.904
	16140.000	30912.480	10273.897	10276.307
S4BGCS2	16140.857	30936.865	10297.078	10303.485
TB7	16141.067	30941.840	10302.403	10309.791
	16150.857	30808.912	10421.850	10475.248
TLI	16150.857	30808.912	10421.850	10475.248
	16151.125	30805.181	10425.073	10479.721
	16161.067	30665.257	10543.697	10644.430
	16161.067	30665.257	10543.697	10644.430
ORB GID	16161.125	30664.434	10544.382	10645.381
ORB NAV	16162.125	30650.206	10556.204	10661.802
	16240.000	29467.165	11413.418	11854.586
	16340.000	27794.318	12321.638	13117.821
	16440.000	26053.784	13016.160	14072.683
	16540.000	24336.948	13518.149	14741.144
	16640.000	22706.566	13858.621	15162.749
	16740.000	21198.918	14070.477	15382.679
	16840.000	19829.960	14183.799	15444.121
	16940.000	18601.983	14223.839	15384.554

TABLE 5-XLV-B
(CONTINUED)

VEHICLE VELOCITY - EARTH-FIXED COORDINATES
(ENGLISH UNITS)
SECOND OPPORTUNITY

EVENT	TIME FROM 1ST MOT (SEC)	VEHICLE VELOCITY COMPONENTS		
		X (FT/SEC)	Y (FT/SEC)	Z (FT/SEC)
T&D MAN	17040.000	17509.085	14210.697	15234.663
	17042.125	17487.256	14209.962	15230.686
	17140.000	16541.074	14159.822	15018.644
	17140.857	16533.283	14159.259	15016.564
	17240.000	15685.996	14082.847	14755.167
	17340.000	14931.630	13988.370	14458.379
	17440.000	14266.323	13882.681	14138.894
	17540.000	13679.384	13770.338	13804.618
	17640.000	13161.237	13654.614	13461.400
	CSM SFP	17641.067	13156.047	13653.370
17740.000		12703.421	13537.840	13113.548
17840.000		12298.534	13421.649	12764.203
17940.000		11940.123	13307.171	12415.663
18040.000		11622.587	13195.164	12069.549
18100.000		11449.634	13129.359	11863.543

TABLE 5-XLVI

ALTITUDE AND RANGE FOR EXPENDED S-IC STAGE
DESCENT

	TIME SEC	ALTITUDE		RANGE		
		M	FT	KM	NMT	
SIC SEP	160.694	70180.510	230251.017	92.699	50.053	
	163.700	73141.111	239964.273	99.148	53.536	
	175.000	83568.225	274173.965	123.310	66.582	
	190.000	95718.833	314038.165	155.235	83.820	
	205.000	105952.453	347613.035	187.027	100.986	
	220.000	114275.427	374919.380	218.709	119.093	
	235.000	120692.437	395972.562	250.304	135.153	
	250.000	125207.041	410784.254	281.835	152.179	
	265.000	127821.731	419362.633	313.324	169.181	
	277.931	128552.004	421758.544	340.453	183.830	
	APEX	278.037	128552.161	421759.059	340.675	183.950
		280.000	128537.948	421712.427	344.792	186.173
		295.000	127356.087	417834.932	376.262	203.165
		310.000	124275.501	407728.020	407.756	220.171
		325.000	119294.494	391386.134	439.295	237.201
		340.000	112410.324	368800.276	470.902	254.267
		355.000	103619.204	339958.018	502.599	271.382
370.000		92916.369	304843.729	534.408	288.557	
385.000		80297.045	263441.748	566.349	305.804	
400.000		65767.540	215772.769	598.416	323.119	
415.000		49440.126	162205.139	630.391	340.384	
430.000		32341.918	106108.654	660.445	356.612	
445.000		20251.682	66442.526	679.295	366.790	
460.000		15290.327	50165.115	685.182	369.969	
475.000		12384.043	40630.063	687.007	370.954	
490.000		9706.745	31846.276	687.771	371.367	
505.000		7247.402	23777.567	688.075	371.531	
520.000	5031.710	16508.235	688.184	371.590		
535.000	3029.021	9937.732	688.222	371.610		
550.000	1211.420	3974.473	688.234	371.617		
SPLASH	560.797	0.000	0.000	688.237	371.619	

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TABLE 5-XLVII GEODETIC LATITUDE, LONGITUDE, INERTIAL PATH ANGLE, AND EARTH-FIXED PATH ANGLE FOR EXPENDED S-IC STAGE DESCENT

	TIME SEC	LATITUDE DEG	LONGITUDE DEG	THETA I DEG	THETA E DEG
SIC SEP	160.694	28.7942	-79.6916	21.1603	24.6634
	163.700	28.8055	-79.6269	20.6577	24.1132
	175.000	28.8476	-79.3841	18.7754	21.9930
	190.000	28.9023	-79.0629	16.2073	19.0647
	205.000	28.9558	-78.7426	13.5655	16.0168
	220.000	29.0081	-78.4231	10.8591	12.8623
	235.000	29.0591	-78.1041	8.0993	9.6179
	250.000	29.1091	-77.7853	5.2984	6.3036
	265.000	29.1579	-77.4666	2.4701	2.9420
	277.931	29.1991	-77.1917	0.0209	0.0249
-APEX	278.037	29.1995	-77.1894	0.0008	0.0010
	280.000	29.2057	-77.1477	-0.3711	0.4422
	295.000	29.2523	-76.8284	-3.2105	3.8232
	310.000	29.2980	-76.5086	-6.0332	7.1754
	325.000	29.3426	-76.1879	-8.8249	10.4747
	340.000	29.3863	-75.8662	-11.5723	13.6988
	355.000	29.4289	-75.5433	-14.2633	16.8286
	370.000	29.4706	-75.2188	-16.8871	19.8484
	385.000	29.5113	-74.8927	-19.4345	22.7465
	400.000	29.5511	-74.5650	-21.8945	25.5175
	415.000	29.5896	-74.2380	-24.2301	28.1800
	430.000	29.6247	-73.9303	-26.0614	30.9264
	445.000	29.6462	-73.7371	-24.5104	35.6372
	460.000	29.6527	-73.6768	-20.2130	48.7088
	475.000	29.6548	-73.6581	-20.9259	67.5050
	490.000	29.6556	-73.6503	-21.5178	79.5957
	505.000	29.6559	-73.6473	-20.4736	85.6417
	520.000	29.6560	-73.6462	-18.9252	88.3190
	535.000	29.6561	-73.6458	-17.3756	89.3659
	550.000	29.6561	-73.6457	-15.9349	89.7110
SPLASH	560.797	29.6561	-73.6457	-15.0642	89.7837

TABLE 5-XLVIII INERTIAL VELOCITY AND EARTH-FIXED VELOCITY
FOR EXPENDED S-1C STAGE DESCENT

TIME SEC	ABSOLUTE VALUE OF TOTAL INERTIAL VELOCITY		ABSOLUTE VALUE OF TOTAL EARTH-FIXED VELOCITY		
	M/SEC	FT/SEC	M/SEC	FT/SEC	
SIC SEP	160.694	2770.185	9088.532	2396.379	7862.136
	163.700	2750.784	9024.883	2375.364	7793.189
	175.000	2712.332	8898.725	2331.118	7648.024
	190.000	2668.881	8756.170	2280.577	7482.207
	205.000	2632.134	8635.609	2237.550	7341.044
	220.000	2601.983	8536.690	2202.066	7224.625
	235.000	2578.560	8459.844	2174.379	7133.789
	250.000	2561.991	8405.481	2154.720	7069.292
	265.000	2552.368	8373.910	2143.264	7031.705
	277.931	2549.691	8365.129	2140.053	7021.171
APEX	278.037	2549.691	8365.128	2140.052	7021.169
	280.000	2549.747	8365.313	2140.114	7021.373
	295.000	2554.145	8379.741	2145.301	7038.391
	310.000	2565.535	8417.109	2158.777	7082.600
	325.000	2583.850	8477.197	2180.417	7153.598
	340.000	2608.984	8559.659	2210.030	7250.753
	355.000	2640.794	8664.023	2247.361	7373.233
	370.000	2679.067	8789.591	2292.072	7519.923
	385.000	2723.090	8934.023	2343.312	7688.032
	400.000	2767.795	9080.691	2395.870	7860.467
	415.000	2776.624	9109.658	2413.024	7916.746
	430.000	2448.534	8033.247	2093.108	6867.152
	445.000	1219.419	4000.717	868.248	2848.581
	460.000	637.121	2090.292	292.977	961.209
	475.000	515.024	1689.713	199.095	653.200
	490.000	469.283	1539.641	175.006	574.167
	505.000	444.898	1459.640	156.066	512.028
	520.000	432.315	1418.356	140.275	460.218
	535.000	425.508	1396.023	127.079	416.926
	550.000	421.278	1382.147	115.662	379.467
SPLASH	560.797	419.198	1375.320	108.951	357.451

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TABLE 5-XLIX INERTIAL ACCELERATION FOR EXPENDED S-IC STAGE DESCENT

	TIME SEC	ABSOLUTE VALUE OF TOTAL INERTIAL ACCELERATION M/SEC ²	FT/SEC ²
SIC SEP	160.694	8.750	28.707
	163.700	9.744	31.968
	175.000	9.590	31.463
	190.000	9.532	31.273
	205.000	9.500	31.168
	220.000	9.476	31.088
	235.000	9.457	31.026
	250.000	9.444	30.983
	265.000	9.436	30.958
	277.931	9.434	30.951
APEX	278.037	9.434	30.951
	280.000	9.434	30.951
	295.000	9.437	30.963
	310.000	9.446	30.992
	325.000	9.461	31.040
	340.000	9.481	31.105
	355.000	9.506	31.189
	370.000	9.535	31.282
	385.000	9.533	31.276
	400.000	9.238	30.307
	415.000	8.976	29.449
	430.000	56.178	184.312
	445.000	69.428	227.781
	460.000	18.041	59.189
	475.000	4.350	14.272
	490.000	2.211	7.254
	505.000	1.357	4.451
	520.000	0.970	3.183
	535.000	0.815	2.674
	550.000	0.657	2.155
SPLASH	560.797	0.537	1.763

TABLE 5-L-A

EARTH-FIXED POSITION COMPONENTS FOR EXPENDED
S-1C STAGE DESCENT (METRIC UNITS)

	TIME SEC	XF M	YF M	ZF M
SIC SEP	160.694	69494.210	844.758	95504.492
	163.700	72356.514	873.502	102068.517
	175.000	82356.023	991.817	126699.143
	190.000	93797.632	1174.520	159323.925
	205.000	103162.090	1387.203	191874.905
	220.000	110456.937	1630.575	224347.245
	235.000	115687.914	1905.317	256734.623
	250.000	118859.474	2212.087	289030.566
	265.000	119974.841	2551.522	321228.573
	277.931	119287.573	2870.833	348902.485
APEX	278.037	119275.634	2873.554	349128.980
	280.000	119036.029	2924.235	353322.114
	295.000	116043.848	3330.819	385304.610
	310.000	110997.905	3771.845	417169.414
	325.000	103896.609	4247.861	448909.785
	340.000	94737.165	4759.395	480518.857
	355.000	83515.578	5306.951	511989.581
	370.000	70226.747	5891.002	543314.477
	385.000	54865.652	6511.947	574483.225
	400.000	37440.759	7169.589	605459.229
	415.000	18087.345	7859.035	636005.310
	430.000	-1977.597	8537.941	664372.508
	445.000	-15984.608	8981.854	681929.386
	460.000	-21547.652	9125.831	687270.075
	475.000	-24633.560	9171.271	688777.804
	490.000	-27377.688	9189.697	689251.418
	505.000	-29855.597	9195.977	689290.265
	520.000	-32070.345	9197.015	689161.958
	535.000	-34065.473	9196.094	688984.033
	550.000	-35873.910	9194.567	688801.282
SPLASH	560.797	-37078.728	9193.384	688674.933

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TABLE 5-L-B

EARTH-FIXED POSITION COMPONENTS FOR EXPENDED
S-IC STAGE DESCENT (ENGLISH UNITS)

	TIME SEC	XE FT	YE FT	ZF FT
SIC SEP	160.694	227999.375	2771.516	313334.948
	163.700	237390.138	2865.820	334870.463
	175.000	270196.924	3253.992	415679.601
	190.000	307735.014	3853.414	522716.290
	205.000	338458.299	4551.191	629510.841
	220.000	362391.526	5349.655	736047.392
	235.000	379553.524	6251.040	842305.194
	250.000	389958.904	7257.505	948263.012
	265.000	393618.245	8371.135	1053899.517
	277.931	391363.428	9418.744	1144693.191
APEX	278.037	391324.259	9427.669	1145436.283
	280.000	390538.153	9593.947	1159193.285
	295.000	380721.284	10927.883	1264122.733
	310.000	364166.355	12374.818	1368666.054
	325.000	340868.140	13936.553	1472801.130
	340.000	310817.469	15614.814	1576505.433
	355.000	274001.240	17411.255	1679755.842
	370.000	230402.714	19327.434	1782527.808
	385.000	180005.420	21364.655	1884787.480
	400.000	122837.137	23522.274	1986414.790
	415.000	59341.682	25784.234	2086631.593
	430.000	-6488.178	28011.618	2179699.827
	445.000	-52442.941	29468.026	2237301.130
	460.000	-70694.397	29940.392	2254823.078
	475.000	-80818.767	30089.471	2259769.695
	490.000	-89821.811	30149.923	2261323.548
	505.000	-97951.433	30170.528	2261450.996
	520.000	-105217.666	30173.934	2261030.042
	535.000	-111763.363	30170.912	2260446.299
	550.000	-117696.553	30165.903	2259846.722
SPLASH	560.797	-121649.370	30162.020	2259432.190

TABLE 5-11-A

EARTH-FIXED VELOCITY COMPONENTS FOR EXPENDED
S-JC STAGE DESCENT (METRIC UNITS)

	TIME SEC	XEDOT M/SEC	YEDOT M/SEC	ZEDOT M/SEC
SIC SEP	160.694	969.456	9.410	2191.506
	163.700	937.838	9.749	2182.365
	175.000	832.250	11.198	2177.463
	190.000	693.436	13.171	2172.557
	205.000	555.239	15.194	2167.512
	220.000	417.471	17.263	2162.062
	235.000	280.042	19.377	2156.183
	250.000	142.868	21.533	2149.871
	265.000	5.870	23.732	2143.124
	277.931	-112.157	25.659	2136.958
APEX	278.037	-113.125	25.675	2136.906
	280.000	-131.035	25.970	2135.941
	295.000	-267.926	28.247	2128.318
	310.000	-404.884	30.562	2120.248
	325.000	-541.987	32.913	2111.725
	340.000	-679.317	35.298	2102.740
	355.000	-816.952	37.715	2093.275
	370.000	-954.955	40.163	2083.277
	385.000	-1093.167	42.630	2072.265
	400.000	-1229.196	45.021	2056.027
	415.000	-1342.955	46.610	2004.241
	430.000	-1254.813	41.295	1674.766
	445.000	-577.747	16.968	647.900
	460.000	-239.519	4.794	168.650
	475.000	-191.046	1.879	56.009
	490.000	-174.525	0.720	12.952
	505.000	-155.989	0.192	-4.914
	520.000	-139.845	-0.019	-10.975
	535.000	-126.483	-0.090	-12.291
	550.000	-115.043	-0.108	-11.948
SPLASH	560.797	-108.348	-0.110	-11.447

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TABLE 5-LT-B

EARTH-FIXED VELOCITY COMPONENTS FOR EXPENDED
S-IC STAGE DESCENT (ENGLISH UNITS)

	TIME SEC	XEDOT FT/SEC	YEDOT FT/SEC	ZEDOT FT/SEC
SIC SEP	160.694	3180.629	30.872	7189.981
	163.700	3076.897	31.986	7159.991
	175.000	2730.478	36.738	7143.907
	190.000	2275.053	43.213	7127.811
	205.000	1821.649	49.849	7111.261
	220.000	1369.656	56.637	7093.380
	235.000	918.773	63.571	7074.091
	250.000	468.729	70.647	7053.382
	265.000	19.257	77.859	7031.248
	277.931	-367.970	84.183	7011.017
APEX	278.037	-371.143	84.235	7010.847
	280.000	-429.906	85.204	7007.681
	295.000	-879.024	92.675	6982.669
	310.000	-1328.358	100.269	6956.194
	325.000	-1778.172	107.981	6928.232
	340.000	-2228.730	115.805	6898.752
	355.000	-2680.289	123.737	6867.700
	370.000	-3133.055	131.769	6834.899
	385.000	-3586.506	139.862	6798.768
	400.000	-4032.795	147.705	6745.494
	415.000	-4406.021	152.921	6575.595
	430.000	-4116.840	135.482	5494.639
	445.000	-1895.497	55.670	2125.655
	460.000	-785.825	15.728	553.313
	475.000	-626.790	6.165	183.755
	490.000	-572.587	2.363	42.494
	505.000	-511.774	0.629	-16.123
	520.000	-458.808	-0.061	-36.009
535.000	-414.972	-0.296	-40.324	
550.000	-377.437	-0.356	-39.200	
SPLASH	560.797	-355.472	-0.361	-37.557

TABLE 5-LII-A INERTIAL POSITION COMPONENTS FOR EXPENDED
S-IC STAGE DESCENT (METRIC UNITS)

	TIME SEC	XI M	YI M	ZI M	
SIC SEP	160.694	6441301.971	32333.998	161894.477	
	163.700	6444057.807	32567.444	169706.472	
	175.000	6453633.304	33442.092	199028.857	
	190.000	6464453.766	34595.818	237879.594	
	205.000	6473130.715	35740.885	276648.903	
	220.000	6479672.022	36876.957	315326.137	
	235.000	6484083.802	38003.695	353899.163	
	250.000	6486370.926	39120.760	392355.702	
	265.000	6486537.067	40227.811	430683.439	
	277.931	6484979.852	41173.882	463612.487	
	APEX	278.037	6484960.586	41181.604	463881.932
		280.000	6484584.727	41324.500	468870.023
		295.000	6480515.238	42410.476	506903.040
		310.000	6474328.769	43485.386	544769.988
		325.000	6466024.326	44548.865	582458.243
		340.000	6455599.751	45600.546	619955.025
		355.000	6443051.731	46640.052	657247.335
370.000		6428375.891	47666.996	694321.702	
385.000		6411568.051	48680.973	731161.801	
400.000		6392638.252	49681.466	767725.370	
415.000		6371728.887	50667.094	803773.062	
430.000		6350107.012	51629.560	837584.817	
445.000		6334796.168	52527.537	860724.667	
460.000		6328253.670	53354.680	871875.731	
475.000		6324290.162	54154.100	879259.931	
490.000		6320692.803	54941.126	885614.849	
505.000		6317369.306	55720.956	891538.240	
520.000	6314308.789	56496.257	897298.322		
535.000	6311464.113	57268.137	903011.842		
550.000	6308800.898	58037.020	908723.028		
SPLASH	560.797	6306977.282	58588.662	912840.326	

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TABLE 5-LIT-B INERTIAL POSITION COMPONENTS FOR EXPENDED
S-IC STAGE DESCENT (ENGLISH UNITS)

	TIME SEC	XI FT	YI FT	ZI FT
SIC SEP	160.694	21132880.451	106082.671	531149.857
	163.700	21141921.906	106848.570	556779.764
	175.000	21173337.581	109718.151	652981.813
	190.000	21208837.781	113503.340	780444.861
	205.000	21237305.463	117260.121	907640.755
	220.000	21258766.442	120987.390	1034534.569
	235.000	21273240.789	124684.038	1161086.492
	250.000	21280744.475	128348.951	1287256.237
	265.000	21281289.559	131981.006	1413003.405
	277.931	21276180.585	135084.914	1521038.341
APEX	278.037	21276117.377	135110.249	1521922.346
	280.000	21274884.244	135579.067	1538287.474
	295.000	21261532.901	139141.983	1663067.715
	310.000	21241236.086	142668.588	1787303.108
	325.000	21213990.537	146157.694	1910952.237
	340.000	21179789.177	149608.090	2033973.175
	355.000	21138621.131	153018.542	2156323.275
	370.000	21090472.052	156387.782	2277958.337
	385.000	21035328.220	159714.479	2398824.804
	400.000	20973222.578	162996.935	2518784.018
	415.000	20904622.302	166230.623	2637050.723
	430.000	20833684.392	169388.320	2747981.679
	445.000	20783451.962	172334.437	2823899.823
	460.000	20761987.075	175048.163	2860484.677
	475.000	20748983.438	177670.932	2884711.057
	490.000	20737181.080	180253.038	2905560.525
	505.000	20726277.218	182811.535	2924994.220
	520.000	20716236.154	185355.174	2943892.127
	535.000	20706903.226	187887.588	2962637.273
	550.000	20698165.644	190410.171	2981374.760
SPLASH	560.797	20692182.653	192220.019	2994882.954

TABLE 5-LIII-A INERTIAL VELOCITY COMPONENTS FOR EXPENDED
S-IC STAGE DESCENT (METRIC UNITS)

	TIME SEC	XIDOT M/SEC	YIDOT M/SEC	ZIDOT M/SEC	
SIC SEP	160.694	934.401	77.713	2606.679	
	163.700	901.982	77.606	2597.541	
	175.000	793.057	77.196	2592.652	
	190.000	649.811	76.630	2587.431	
	205.000	507.200	76.042	2581.684	
	220.000	365.042	75.431	2575.145	
	235.000	223.249	74.797	2567.789	
	250.000	81.741	74.141	2559.613	
	265.000	-59.561	73.462	2550.615	
	277.931	-181.271	72.858	2542.196	
	APEX	278.037	-182.268	72.853	2542.124
		280.000	-200.736	72.759	2540.792
		295.000	-341.861	72.034	2530.138
		310.000	-483.013	71.284	2518.648
		325.000	-624.270	70.509	2506.311
		340.000	-765.710	69.710	2493.116
		355.000	-907.409	68.886	2479.044
370.000		-1049.424	68.035	2464.038	
385.000		-1191.583	67.156	2447.619	
400.000		-1331.378	66.231	2425.641	
415.000		-1447.876	65.126	2368.344	
430.000		-1354.505	62.713	2038.799	
445.000		-650.916	56.921	1029.587	
460.000		-299.773	53.912	559.601	
475.000		-248.463	52.805	448.026	
490.000		-231.034	52.187	405.125	
505.000		-212.309	51.819	387.523	
520.000	-196.331	51.566	381.695		
535.000	-183.285	51.356	380.560		
550.000	-172.216	51.162	381.051		
SPLASH	560.797	-165.798	51.021	381.621	

TABLE 5-LIII-B INERTIAL VELOCITY COMPONENTS FOR EXPENDED
S-IC STAGE DESCENT (ENGLISH UNITS)

	TIME SEC	XIDOT FT/SEC	YIDOT FT/SEC	ZIDOT FT/SEC	
SIC SEP	160.694	3065.620	254.966	8552.098	
	163.700	2959.257	254.614	8522.117	
	175.000	2601.894	253.268	8506.075	
	190.000	2131.927	251.411	8488.946	
	205.000	1664.041	249.481	8470.093	
	220.000	1197.645	247.476	8448.638	
	235.000	732.446	245.398	8424.504	
	250.000	268.180	243.245	8397.680	
	265.000	-195.411	241.017	8368.159	
	277.931	-594.721	239.034	8340.537	
	APEX	278.037	-597.993	239.018	8340.302
		280.000	-658.583	238.712	8335.931
		295.000	-1121.590	236.330	8300.979
		310.000	-1584.688	233.870	8263.280
325.000		-2048.130	231.330	8222.805	
340.000		-2512.172	228.709	8179.514	
355.000		-2977.062	226.004	8133.346	
370.000		-3442.993	223.213	8084.113	
385.000		-3909.393	220.329	8030.247	
400.000		-4368.037	217.293	7958.139	
415.000		-4750.248	213.670	7770.158	
430.000		-4443.914	205.751	6688.973	
445.000		-2135.550	186.749	3377.912	
460.000		-983.508	176.877	1835.960	
475.000		-815.169	173.246	1469.903	
490.000		-757.984	171.216	1329.150	
505.000	-696.552	170.010	1271.401		
520.000	-644.130	169.179	1252.281		
535.000	-601.329	168.492	1248.557		
550.000	-565.013	167.854	1250.166		
SPLASH	560.797	-543.957	167.391	1252.037	

TABLE 5-LIV

ALTITUDE AND RANGE FOR EXPENDED S-II STAGE
DESCENT

	TIME SEC	ALTITUDE		RANGE	
		M	FT	KM	NMT
S2 SEP	549.304	191184.346	627245.230	1635.391	883.041
	552.350	191278.764	627554.999	1654.801	893.521
	562.922	191460.362	628150.794	1722.107	929.864
	563.722	191465.625	628168.061	1727.199	932.613
	564.522	191469.696	628181.415	1732.292	935.363
	565.322	191472.573	628190.857	1737.384	938.113
APEX	566.122	191474.259	628196.385	1742.476	940.862
	569.000	191470.458	628183.915	1760.797	950.755
	589.000	191017.662	626698.366	1888.124	1019.506
	609.000	189819.468	622767.284	2015.485	1088.275
	629.000	187876.138	616391.529	2142.909	1157.079
	649.000	185188.107	607572.527	2270.429	1225.934
	669.000	181755.978	596312.264	2398.075	1294.858
	689.000	177580.534	582613.300	2525.879	1363.866
	709.000	172662.729	566478.769	2653.870	1432.976
	729.000	167003.699	547912.396	2782.081	1502.204
	749.000	160604.759	526918.501	2910.543	1571.568
	769.000	153467.414	503502.013	3039.287	1641.084
	789.000	145593.355	477668.488	3168.346	1710.770
	809.000	136984.472	449424.120	3297.751	1780.644
	829.000	127642.854	418775.768	3427.535	1850.722
	849.000	117570.807	385730.992	3557.730	1921.021
	869.000	106770.901	350298.231	3688.369	1991.560
	889.000	95246.337	312487.983	3819.476	2062.353
	909.000	83004.902	272325.795	3951.018	2133.380
	929.000	70096.166	229974.296	4082.428	2204.336
	949.000	56818.221	186411.487	4210.016	2273.227
	969.000	44345.197	145489.493	4319.609	2332.403
	989.000	34905.208	114518.399	4387.577	2369.103
	1009.000	28737.084	94281.773	4416.213	2384.565
	1029.000	23995.146	78724.232	4427.034	2390.408
	1049.000	19854.422	65139.179	4430.990	2392.544
	1069.000	16018.866	52555.335	4432.396	2393.304
	1089.000	12774.239	41910.233	4432.809	2393.526
	1109.000	10064.831	33021.100	4432.907	2393.579
	1129.000	7712.129	25302.259	4432.930	2393.592
	1149.000	5629.134	18468.287	4432.937	2393.595
	1169.000	3754.237	12317.049	4432.941	2393.597
	1189.000	2046.234	6713.367	4432.944	2393.599
	1209.000	473.797	1554.453	4432.946	2393.601
SPLASH	1215.328	0.001	0.003	4432.947	2393.601

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TABLE 5-LV

GEODETIC LATITUDE, LONGITUDE, INERTIAL PATH ANGLE, AND EARTH-FIXED PATH ANGLE FOR EXPENDED S-II STAGE DESCENT

	TIME SEC	LATITUDE DEG	LONGITUDE DEG	THETA I DEG	THETA E DEG
S2 SEP	549.304	30.3744	-63.8585	0.2955	0.3140
	552.350	30.3804	-63.6567	0.2170	0.2307
	562.922	30.3987	-62.9567	0.0561	0.0597
	563.722	30.4000	-62.9037	0.0439	0.0467
	564.522	30.4011	-62.8507	0.0318	0.0338
	565.322	30.4023	-62.7978	0.0196	0.0208
APEX	566.122	30.4034	-62.7448	0.0074	0.0079
	569.000	30.4073	-62.5542	-0.0364	0.0387
	589.000	30.4258	-61.2291	-0.3407	0.3622
	609.000	30.4291	-59.9034	-0.6448	0.6854
	629.000	30.4172	-58.5771	-0.9485	1.0082
	649.000	30.3901	-57.2503	-1.2516	1.3303
	669.000	30.3478	-55.9233	-1.5540	1.6516
	689.000	30.2903	-54.5961	-1.8553	1.9717
	709.000	30.2176	-53.2687	-2.1556	2.2905
	729.000	30.1295	-51.9414	-2.4544	2.6077
	749.000	30.0262	-50.6142	-2.7518	2.9232
	769.000	29.9076	-49.2872	-3.0474	3.2368
	789.000	29.7736	-47.9606	-3.3412	3.5481
	809.000	29.6243	-46.6343	-3.6328	3.8571
	829.000	29.4597	-45.3086	-3.9222	4.1634
	849.000	29.2796	-43.9834	-4.2091	4.4670
	869.000	29.0842	-42.6589	-4.4934	4.7675
	889.000	28.8733	-41.3351	-4.7750	5.0651
	909.000	28.6471	-40.0128	-5.0547	5.3608
	929.000	28.4068	-38.6981	-5.3416	5.6672
	949.000	28.1598	-37.4277	-5.6953	6.0660
	969.000	27.9371	-36.3417	-6.3743	6.9241
	989.000	27.7939	-35.6706	-8.0617	9.4897
	1009.000	27.7323	-35.3885	-11.6861	16.9900
	1029.000	27.7087	-35.2821	-16.7695	34.4910
	1049.000	27.7001	-35.2433	-20.9204	60.2170
	1069.000	27.6970	-35.2295	-21.6119	78.1773
	1089.000	27.6961	-35.2255	-19.2176	86.2986
	1109.000	27.6959	-35.2246	-16.8375	89.0122
	1129.000	27.6959	-35.2245	-14.9479	89.6851
	1149.000	27.6958	-35.2245	-13.4299	89.8060
	1169.000	27.6958	-35.2245	-12.2141	89.8248
	1189.000	27.6958	-35.2246	-11.2168	89.8291
	1209.000	27.6958	-35.2246	-10.4060	89.8312
SPLASH	1215.328	27.6958	-35.2246	-10.1863	89.8318

TABLE 5-LVI INERTIAL VELOCITY AND EARTH-FIXED VELOCITY
FOR EXPENDED S-II STAGE DESCENT

	TIME SEC	ABSOLUTE VALUE OF TOTAL		ABSOLUTE VALUE OF TOTAL	
		INERTIAL VELOCITY M/SEC	FT/SEC	EARTH-FIXED VELOCITY M/SEC	FT/SEC
S2 SEP	549.304	6992.661	22941.802	6579.280	21585.564
	552.350	6971.094	22871.044	6557.702	21514.771
	562.922	6970.857	22870.265	6557.446	21513.930
	563.722	6970.850	22870.243	6557.438	21513.905
APEX	564.522	6970.845	22870.226	6557.433	21513.886
	565.322	6970.841	22870.214	6557.428	21513.873
	566.122	6970.839	22870.207	6557.426	21513.865
	569.000	6970.845	22870.226	6557.431	21513.882
	589.000	6971.440	22872.210	6558.067	21515.968
	609.000	6973.040	22877.428	6559.752	21521.497
	629.000	6975.617	22885.883	6562.487	21530.470
	649.000	6979.181	22897.574	6566.271	21542.885
	669.000	6983.730	22912.501	6571.105	21558.742
	689.000	6989.267	22930.665	6576.987	21578.041
	709.000	6995.790	22952.065	6583.918	21600.781
	729.000	7003.299	22976.703	6591.898	21626.962
	749.000	7011.796	23004.579	6600.926	21656.580
	769.000	7021.279	23035.692	6611.001	21689.636
	789.000	7031.749	23070.042	6622.123	21726.126
	809.000	7043.204	23107.625	6634.290	21766.044
	829.000	7055.641	23148.427	6647.497	21809.375
	849.000	7069.040	23192.387	6661.725	21856.054
	869.000	7083.298	23239.167	6676.870	21905.742
	889.000	7097.654	23286.267	6692.169	21955.934
	909.000	7104.288	23308.030	6699.800	21980.972
	929.000	7041.586	23107.315	6638.151	21778.711
	949.000	6606.145	21673.706	6203.823	20353.750
	969.000	5073.275	16644.603	4672.178	15328.666
	989.000	2672.657	8768.561	2273.356	7458.517
	1009.000	1282.127	4206.453	888.740	2915.813
	1029.000	759.321	2491.212	386.881	1269.294
	1049.000	562.641	1845.934	231.477	759.441
1069.000	483.240	1585.434	181.844	596.600	
1089.000	446.995	1466.520	147.439	483.725	
1109.000	433.352	1421.757	125.543	411.886	
1129.000	427.551	1402.725	110.284	361.825	
1149.000	424.255	1391.914	98.536	323.281	
1169.000	422.024	1384.592	89.286	292.932	
1189.000	420.367	1379.158	81.771	268.278	
1209.000	419.115	1375.050	75.702	248.365	
SPLASH	1215.328	418.789	1373.978	74.063	242.988

TABLE 5-LVII INERTIAL ACCELERATION FOR EXPENDED S-II STAGE DESCENT

	TIME SEC	ABSOLUTE VALUE OF TOTAL INERTIAL ACCELERATION	
		M/SEC ²	FT/SEC ²
S2 SEP	549.304	16.319	53.537
	552.350	9.255	30.363
	562.922	9.254	30.362
	563.722	9.254	30.362
	564.522	9.254	30.362
	565.322	9.254	30.361
APEX	566.122	9.254	30.361
	569.000	9.254	30.361
	589.000	9.255	30.366
	609.000	9.259	30.377
	629.000	9.264	30.395
	649.000	9.272	30.420
	669.000	9.282	30.452
	689.000	9.293	30.490
	709.000	9.307	30.536
	729.000	9.324	30.589
	749.000	9.342	30.649
	769.000	9.362	30.716
	789.000	9.385	30.790
	809.000	9.410	30.871
	829.000	9.437	30.960
	849.000	9.466	31.055
	869.000	9.496	31.155
	889.000	9.521	31.237
	909.000	9.532	31.272
	929.000	12.467	40.902
	949.000	43.449	142.550
	969.000	113.469	372.273
	989.000	103.626	339.981
	1009.000	41.440	135.957
	1029.000	16.363	53.684
	1049.000	5.763	18.907
	1069.000	2.848	9.345
	1089.000	1.512	4.959
	1109.000	0.843	2.765
	1129.000	0.647	2.123
	1149.000	0.489	1.606
	1169.000	0.389	1.277
	1189.000	0.312	1.024
	1209.000	0.243	0.799
SPLASH	1215.328	0.222	0.730

TABLE 5-LVIII-A EARTH-FIXED POSITION COMPONENTS FOR EXPENDED
S-II STAGE DESCENT (METRIC UNITS)

	TIME SEC	XE M	YE M	ZE M
S2 SEP	549.304	-23421.902	31096.505	1667508.246
	552.350	-28426.225	31648.117	1686857.170
	562.922	-46375.487	33593.470	1753793.374
	563.722	-47770.440	33742.683	1758847.801
	564.522	-49170.572	33892.179	1763900.772
APEX	565.322	-50575.880	34041.959	1768952.285
	566.122	-51986.366	34192.023	1774002.338
	569.000	-57103.683	34734.253	1792158.825
	589.000	-94513.122	38603.476	1917800.333
	609.000	-135138.365	42647.973	2042458.050
	629.000	-178960.978	46865.739	2166069.140
	649.000	-225962.053	51254.556	2288570.818
	669.000	-276122.188	55811.991	2409900.317
	689.000	-329421.474	60535.393	2529994.851
	709.000	-385839.469	65421.894	2648791.575
	729.000	-445355.182	70468.404	2766227.557
	749.000	-507947.044	75671.609	2882239.736
	769.000	-573592.881	81027.970	2996764.892
	789.000	-642269.886	86533.719	3109739.609
	809.000	-713954.577	92184.855	3221100.231
	829.000	-788622.753	97977.140	3330782.809
	849.000	-866249.366	103906.092	3438722.956
	869.000	-946808.003	109966.941	3544855.191
	889.000	-1030267.423	116154.370	3649108.711
	909.000	-1116556.711	122459.940	3751366.507
	929.000	-1205243.634	128848.634	3851106.324
	949.000	-1293734.007	135129.373	3945510.831
	969.000	-1371940.701	140579.202	4024333.646
	989.000	-1422368.667	143974.231	4071370.302
	1009.000	-1445431.486	145382.298	4089603.676
	1029.000	-1456016.911	145870.631	4094919.901
	1049.000	-1461736.615	145997.520	4095316.818
1069.000	-1465585.064	145988.938	4093944.111	
1089.000	-1468341.395	145937.294	4092184.376	
1109.000	-1470485.638	145879.991	4090526.272	
1129.000	-1472307.092	145826.617	4089037.944	
1149.000	-1473911.330	145778.673	4087710.156	
1169.000	-1475353.764	145735.448	4086513.175	
1189.000	-1476667.480	145696.092	4085422.360	
1209.000	-1477876.803	145659.887	4084417.975	
SPLASH	1215.328	-1478241.171	145648.983	4084115.319

TABLE 5-LVIII-B EARTH-FIXED POSITION COMPONENTS FOR EXPENDED S-II STAGE DESCENT (ENGLISH UNITS)

	TIME SEC	XE FT	YF FT	ZE FT
S2 SEP	549.304	-76843.509	102022.655	5470827.571
	552.350	-93261.895	103832.405	5534308.292
	562.922	-152150.547	110214.796	5753915.259
	563.722	-156727.166	110704.339	5770498.027
	564.522	-161320.773	111194.813	5787076.015
	565.322	-165931.366	111686.218	5803649.219
APEX	566.122	-170558.944	112178.553	5820217.635
	569.000	-187348.041	113957.522	5879786.163
	589.000	-310082.422	126651.824	6291995.835
	609.000	-443367.339	139921.171	6700977.845
	629.000	-587142.316	153758.987	7106526.038
	649.000	-741345.317	168157.993	7508434.430
	669.000	-905912.689	183110.206	7906497.092
	689.000	-1080779.111	198606.933	8300508.029
	709.000	-1265877.522	214638.761	8690261.061
	729.000	-1461139.048	231195.551	9075549.714
	749.000	-1666492.925	248266.435	9456167.098
	769.000	-1881866.405	265839.798	9831905.799
	789.000	-2107184.661	283903.278	10202557.756
	809.000	-2342370.657	302443.749	10567914.128
	829.000	-2587344.986	321447.310	10927765.105
	849.000	-2842025.474	340899.253	11281899.444
	869.000	-3106325.463	360783.927	11630102.314
	889.000	-3380142.460	381083.890	11972141.423
	909.000	-3663243.796	401771.457	12307632.879
	929.000	-3954211.391	422731.737	12634863.247
	949.000	-4244534.138	443337.838	12944589.322
	969.000	-4501117.780	461217.852	13203194.356
	989.000	-4666563.961	472356.400	13357514.095
	1009.000	-4742229.276	476976.042	13417334.873
	1029.000	-4776958.361	478578.186	13434776.559
	1049.000	-4795723.795	478994.488	13436078.780
	1069.000	-4808349.941	478966.332	13431575.148
	1089.000	-4817393.020	478796.895	13425801.738
	1109.000	-4824427.939	478608.893	13420361.764
	1129.000	-4830403.839	478433.781	13415478.797
	1149.000	-4835667.087	478276.486	13411122.538
	1169.000	-4840399.482	478134.670	13407195.436
	1189.000	-4844709.573	478005.551	13403616.645
	1209.000	-4848677.168	477886.768	13400321.419
SPLASH	1215.328	-4849872.599	477850.992	13399328.454

TABLE 5-LIX-A EARTH-FIXED VELOCITY COMPONENTS FOR EXPENDED
S-II STAGE DESCENT (METRIC UNITS)

	TIME SEC	XEDOT M/SEC	YEDOT M/SEC	ZEDOT M/SEC
S2 SEP	549.304	-1631.638	180.733	6371.187
	552.350	-1654.863	181.649	6342.861
	562.922	-1740.600	186.354	6319.468
	563.722	-1747.077	186.709	6317.662
	564.522	-1753.553	187.064	6315.852
	565.322	-1760.027	187.419	6314.036
APEX	566.122	-1766.500	187.774	6312.215
	569.000	-1789.775	189.049	6305.622
	589.000	-1951.019	197.859	6258.005
	609.000	-2111.352	206.574	6207.243
	629.000	-2270.752	215.184	6153.342
	649.000	-2429.194	223.677	6096.302
	669.000	-2586.654	232.044	6036.124
	689.000	-2743.105	240.272	5972.805
	709.000	-2898.520	248.352	5906.343
	729.000	-3052.872	256.271	5836.730
	749.000	-3206.130	264.020	5763.961
	769.000	-3358.264	271.585	5688.026
	789.000	-3509.241	278.956	5608.915
	809.000	-3659.027	286.122	5526.614
	829.000	-3807.583	293.069	5441.107
	849.000	-3954.860	299.786	5352.363
	869.000	-4100.756	306.255	5260.285
	889.000	-4244.746	312.428	5164.266
	909.000	-4381.691	317.917	5058.363
	929.000	-4470.187	319.702	4896.966
	949.000	-4299.787	302.681	4461.797
	969.000	-3344.787	229.927	3254.040
	989.000	-1712.881	111.034	1490.590
	1009.000	-742.337	40.334	486.998
	1029.000	-372.304	12.677	104.431
	1049.000	-227.911	1.858	-40.434
	1069.000	-160.547	-1.997	-85.368
	1089.000	-119.086	-2.874	-86.883
	1109.000	-97.774	-2.796	-78.698
	1129.000	-85.047	-2.530	-70.165
	1149.000	-75.828	-2.272	-62.884
	1169.000	-68.679	-2.058	-57.016
	1189.000	-62.891	-1.883	-52.228
	1209.000	-58.218	-1.742	-48.357
SPLASH	1215.328	-56.957	-1.704	-47.311

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TABLE 5-LIX-B EARTH-FIXED VELOCITY COMPONENTS FOR EXPENDED S-II STAGE DESCENT (ENGLISH UNITS)

	TIME SEC	XEDOT FT/SEC	YEDOT FT/SEC	ZEDOT FT/SEC
S2 SEP	549.304	-5353.144	592.957	20902.843
	552.350	-5429.340	595.962	20809.913
	562.922	-5710.629	611.398	20733.164
	563.722	-5731.880	612.563	20727.239
	564.522	-5753.125	613.727	20721.298
	565.322	-5774.367	614.891	20715.340
APEX	566.122	-5795.603	616.055	20709.366
	569.000	-5871.967	620.238	20687.736
	589.000	-6400.980	649.143	20531.511
	609.000	-6927.008	677.737	20364.972
	629.000	-7449.973	705.984	20188.131
	649.000	-7969.797	733.850	20000.992
	669.000	-8486.396	761.299	19803.557
	689.000	-8999.687	788.295	19595.818
	709.000	-9509.580	814.803	19377.764
	729.000	-10015.983	840.786	19149.377
	749.000	-10518.799	866.206	18910.633
	769.000	-11017.926	891.027	18661.503
	789.000	-11513.258	915.211	18401.952
	809.000	-12004.680	938.720	18131.937
	829.000	-12492.069	961.514	17851.402
	849.000	-12975.263	983.550	17560.248
	869.000	-13453.924	1004.775	17258.154
	889.000	-13926.332	1025.027	16943.129
	909.000	-14375.627	1043.036	16595.679
	929.000	-14665.967	1048.890	16066.161
	949.000	-14106.914	993.048	14638.442
	969.000	-10973.710	754.355	10675.985
	989.000	-5619.688	364.286	4890.386
	1009.000	-2435.489	132.331	1597.763
	1029.000	-1221.470	41.593	342.622
	1049.000	-747.740	6.095	-132.656
	1069.000	-526.730	-6.553	-280.079
	1089.000	-390.702	-9.429	-285.049
	1109.000	-320.780	-9.173	-258.197
	1129.000	-279.027	-8.301	-230.202
	1149.000	-248.778	-7.453	-206.312
	1169.000	-225.326	-6.752	-187.061
	1189.000	-206.334	-6.179	-171.351
	1209.000	-191.004	-5.717	-158.650
SPLASH	1215.328	-186.865	-5.592	-155.221

TABIE 5-LX-A INERTIAL POSITION COMPONENTS FOR EXPENDED
S-II STAGE DESCENT (METRIC UNITS)

	TIME SEC	XI M	YI M	ZI M
S2 SEP	549.304	6286473.176	60489.850	1887219.130
	552.350	6280416.799	60670.658	1907589.486
	562.922	6258765.565	61292.939	1978033.534
	563.722	6257087.199	61339.687	1983350.964
	564.522	6255403.191	61386.387	1988666.593
	565.322	6253713.543	61433.040	1993980.420
APEX	566.122	6252018.255	61479.645	1999292.443
	569.000	6245872.482	61646.923	2018388.558
	589.000	6201151.912	62792.259	2150433.688
	609.000	6152933.723	63907.126	2281265.802
	629.000	6101243.191	64990.881	2410810.454
	649.000	6046106.408	66042.884	2538993.381
	669.000	5987550.300	67062.500	2665740.471
	689.000	5925602.646	68049.096	2790977.728
	709.000	5860292.100	69002.046	2914631.245
	729.000	5791648.214	69920.723	3036627.171
	749.000	5719701.464	70804.508	3156891.684
	769.000	5644483.281	71652.781	3275350.960
	789.000	5566026.084	72464.926	3391931.141
	809.000	5484363.319	73240.331	3506558.306
	829.000	5399529.515	73978.383	3619158.417
	849.000	5311560.411	74678.473	3729657.189
	869.000	5220493.521	75339.976	3837979.471
	889.000	5126371.837	75962.176	3944045.224
	909.000	5029281.038	76543.447	4047730.700
	929.000	4929692.323	77073.726	4148528.841
	949.000	4830377.643	77492.646	4243771.298
	969.000	4742064.630	77567.332	4323838.882
	989.000	4683302.805	76904.838	4373673.610
	1009.000	4653601.321	75546.354	4396336.145
	1029.000	4637156.225	73862.498	4406836.356
	1049.000	4625879.395	72047.699	4412708.828
	1069.000	4616584.294	70181.371	4416917.081
	1089.000	4608403.217	68296.438	4420796.118
	1109.000	4600823.695	66405.870	4424804.666
	1129.000	4593551.667	64512.698	4428992.449
	1149.000	4586481.793	62617.185	4433343.756
	1169.000	4579560.385	60718.886	4437825.571
	1189.000	4572755.803	58817.360	4442411.371
	1209.000	4566044.898	56912.252	4447080.043
SPLASH	1215.328	4563937.731	56308.666	4448571.444

TABLE 5-IX-B INERTIAL POSITION COMPONENTS FOR EXPENDED
S-II STAGE DESCENT (ENGLISH UNITS)

	TIME SEC	XI FT	YI FT	ZI FT
S2 SEP	549.304	20624911.962	198457.513	6191663.802
	552.350	20605041.961	199050.714	6258495.681
	562.922	20534007.728	201092.320	6489611.323
	563.722	20528501.276	201245.692	6507056.958
	564.522	20522976.318	201398.908	6524496.687
	565.322	20517432.853	201551.968	6541930.502
APEX	566.122	20511870.884	201704.872	6559358.399
	569.000	20491707.585	202253.684	6622009.695
	589.000	20344986.557	206011.347	7055228.626
	609.000	20186790.400	209669.048	7484467.843
	629.000	20017202.040	213224.675	7909483.104
	649.000	19836307.082	216676.129	8330030.765
	669.000	19644193.867	220021.325	8745867.674
	689.000	19440953.534	223258.190	9156751.063
	709.000	19226680.089	226384.665	9562438.454
	729.000	19001470.488	229398.699	9962687.555
	749.000	18765424.721	232298.254	10357256.166
	769.000	18518645.907	235081.301	10745902.082
	789.000	18261240.407	237745.819	11128382.991
	809.000	17993317.949	240289.798	11504456.367
	829.000	17714991.819	242711.231	11873879.302
	849.000	17426379.274	245008.113	12236408.082
	869.000	17127603.391	247178.398	12591796.146
	889.000	16818805.213	249219.738	12939780.899
	909.000	16500265.849	251126.795	13279956.344
	929.000	16173531.218	252866.556	13610658.905
	949.000	15847695.656	254240.965	13923134.157
	969.000	15557954.801	254485.997	14185823.083
	989.000	15365166.659	252312.459	14349322.846
	1009.000	15267720.845	247855.491	14423674.994
	1029.000	15213767.121	242331.030	14458124.506
	1049.000	15176769.645	236376.963	14477391.147
	1069.000	15146273.907	230253.842	14491197.749
	1089.000	15119433.103	224069.677	14503924.251
	1109.000	15094565.907	217867.026	14517075.653
	1129.000	15070707.546	211655.833	14530815.100
	1149.000	15047512.420	205436.959	14545091.040
	1169.000	15024804.390	199208.942	14559795.158
	1189.000	15002479.646	192970.340	14574840.434
	1209.000	14980462.240	186719.987	14590157.600
SPLASH	1215.328	14973548.963	184739.717	14595050.646

TABLE 5-LXI-A

INERTIAL VELOCITY COMPONENTS FOR EXPENDED
S-II STAGE DESCENT (METRIC UNITS)

	TIME SEC	XIDOT M/SEC	YIDOT M/SEC	ZIDOT M/SEC
S2 SEP	549.304	-1976.462	59.470	6707.263
	552.350	-2001.154	59.248	6677.427
	562.922	-2094.605	58.469	6648.462
	563.722	-2101.663	58.410	6646.228
	564.522	-2108.718	58.351	6643.988
	565.322	-2115.772	58.291	6641.742
APEX	566.122	-2122.823	58.232	6639.490
	569.000	-2148.177	58.018	6631.339
	589.000	-2323.676	56.510	6572.552
	609.000	-2497.932	54.971	6510.039
	629.000	-2670.904	53.399	6443.808
	649.000	-2842.550	51.796	6373.867
	669.000	-3012.829	50.161	6300.225
	689.000	-3181.697	48.494	6222.885
	709.000	-3349.111	46.796	6141.851
	729.000	-3515.024	45.067	6057.126
	749.000	-3679.389	43.307	5968.710
	769.000	-3842.159	41.516	5876.602
	789.000	-4003.282	39.694	5780.800
	809.000	-4162.707	37.842	5681.300
	829.000	-4320.376	35.959	5578.093
	849.000	-4476.223	34.045	5471.160
	869.000	-4630.121	32.099	5360.416
	889.000	-4781.494	30.111	5245.293
	909.000	-4924.841	27.959	5120.162
	929.000	-5016.033	24.677	4941.936
	949.000	-4831.302	15.383	4505.491
	969.000	-3813.220	-11.911	3346.242
	989.000	-2079.321	-53.691	1678.284
	1009.000	-1048.779	-78.510	733.313
	1029.000	-655.404	-88.416	373.091
	1049.000	-502.001	-92.419	236.681
	1069.000	-431.868	-93.955	195.406
	1089.000	-390.489	-94.437	195.971
	1109.000	-369.915	-94.601	204.957
	1129.000	-357.966	-94.714	213.750
	1149.000	-349.457	-94.841	221.083
	1169.000	-342.936	-94.992	226.882
	1189.000	-337.711	-95.163	231.525
	1209.000	-333.547	-95.350	235.186
SPLASH	1215.328	-332.434	-95.412	236.152

TABLE 5-LXI-B INERTIAL VELOCITY COMPONENTS FOR EXPENDED S-II STAGE DESCENT (ENGLISH UNITS)

	TIME SEC	XIDOT FT/SEC	YIDOT FT/SEC	ZIDOT FT/SEC
S2 SEP	549.304	-6484.454	195.112	22005.456
	552.350	-6565.465	194.382	21907.568
	562.922	-6872.065	191.828	21812.541
	563.722	-6895.219	191.634	21805.211
	564.522	-6918.367	191.439	21797.862
	565.322	-6941.508	191.244	21790.493
APEX	566.122	-6964.643	191.050	21783.104
	569.000	-7047.824	190.347	21756.360
	589.000	-7623.610	185.402	21563.492
	609.000	-8195.315	180.351	21358.395
	629.000	-8762.808	175.194	21141.101
	649.000	-9325.952	169.934	20911.639
	669.000	-9884.610	164.569	20670.029
	689.000	-10438.640	159.101	20416.289
	709.000	-10987.897	153.530	20150.431
	729.000	-11532.230	147.857	19872.461
	749.000	-12071.487	142.082	19582.382
	769.000	-12605.508	136.206	19280.190
	789.000	-13134.128	130.229	18965.879
	809.000	-13657.174	124.152	18639.434
	829.000	-14174.463	117.975	18300.829
	849.000	-14685.771	111.697	17949.999
	869.000	-15190.687	105.313	17586.667
	889.000	-15687.317	98.788	17208.967
	909.000	-16157.615	91.728	16798.432
	929.000	-16456.801	80.962	16213.702
	949.000	-15850.727	50.468	14781.793
	969.000	-12510.563	-39.077	10978.484
	989.000	-6821.920	-176.151	5506.182
	1009.000	-3440.875	-257.580	2405.884
	1029.000	-2150.276	-290.078	1224.053
	1049.000	-1646.986	-303.213	776.511
	1069.000	-1416.891	-308.251	641.094
	1089.000	-1281.133	-309.834	642.949
	1109.000	-1213.631	-310.371	672.430
	1129.000	-1174.429	-310.742	701.281
	1149.000	-1146.512	-311.159	725.338
	1169.000	-1125.118	-311.655	744.363
	1189.000	-1107.977	-312.215	759.596
	1209.000	-1094.313	-312.828	771.608
SPLASH	1215.328	-1090.664	-313.032	774.777

TABLE 5-LXII. APOLLO REFERENCE MISSION PROGRAM
FORMAT DEFINITION

The following format key identifies the printed parameters in Table 5-LXIII. All units are in kilometers, km/sec, and degrees.

T time from First Motion, in both total hours and total seconds

GEOCENTRIC REFERENCE is printed along with the following values:

X DX	}	inertial geocentric cartesian coordinates.	}	inertial geocentric polar coordinates	
Y DY					
Z DZ					
R	}	radius vector magnitude	}	inertial geocentric polar coordinates	
DEC					declination
RA					right ascension
V					velocity vector magnitude
PTH					flight-path angle
AZ	azimuth				
ALT	}	altitude	}	rotational geodetic polar coordinates	
LAT					latitude
LON					longitude
VE					velocity
PTE					flight-path angle
AZE					azimuth

PLANETARY COORDS is printed along with the following values:

XM DXM	}	geocentric inertial position and velocity of the moon.	}	moon relative to the earth	
YM DYM					
ZM DZM					
RM	}	radius vector magnitude	}	moon relative to the earth	
DEM					declination
RAM					right ascension
LOM					longitude
VM					velocity vector magnitude
GHA					Greenwich hour angle

TABLE 5-LXII. APOLLO REFERENCE MISSION PROGRAM
 FORMAT DEFINITION (Continued)

XS	}	sun cartesian position coordinates relative to the earth	
YS			
ZS			
RAS	right ascension	}	geocentric solar position
LOS	longitude		
DES	declination		

KEPLERIAN OSCULATING ELEMENTS is printed along with the following values relative to the earth-moon plane:

SMA	semimajor axis
ECC	eccentricity
INC	inclination of vehicle plane to earth equatorial plane
RAN	right ascension of ascending node
APF	argument of perifocus vector
RP	radius at periapsis
VH	excess hyperbolic velocity (hyperbola only)
RNMP	right ascension of ascending node
APMP	argument of pericenter vector
INMP	inclination of vehicle
APO	apogee distance
TFP	time from periapsis
TA	true anomaly
EA	eccentric anomaly
MA	mean anomaly
SLR	semilatus rectum
PER	period
MTA	maximum true anomaly (360° in ellipse, calculated value in hyperbola)

2-BODY AND XI TERMS is printed along with the following values:

XTB	DXTB	}	two-body cartesian coordinates
YTB	DYTB		
ZTB	DZTB		

TABLE 5-LXII. APOLLO REFERENCE MISSION PROGRAM
FORMAT DEFINITION (Continued)

XI	}	ξ - total perturbation to position
YI		
ZI		
DXI	}	$\dot{\xi}$ - total perturbation to velocity
DYI		
DZI		
DDXI	}	$\ddot{\xi}$ - total perturbation to acceleration
DDYI		
DDZI		
RTB		two-body radius vector magnitude
RDTB		two-body velocity vector magnitude
ACC		vector magnitude of $\ddot{\xi}$ - terms

PERTURBATION ACCELERATIONS is printed along with the following values:

SPX	}	noncentral body accelerations
SPY		
SPZ		
ENX	}	Encke accelerations
ENY		
ENZ		
DGX	}	atmospheric drag accelerations
DGY		
DGZ		
ATX	}	accelerations due to thrust
ATY		
ATZ		
OBX	}	central-body nonspherical potential accelerations
OBY		
OBZ		

TABLE 5-LXII. APOLLO REFERENCE MISSION PROGRAM
FORMAT DEFINITION (Continued)

SELENOCENTRIC REFERENCE is printed along with the following values:

X	DX	}	inertial selenocentric cartesian coordinates
Y	DY		
Z	DZ		
R	radius vector magnitude	}	inertial selenocentric polar coordinates
DEC	declination		
RA	right ascension		
V	velocity vector magnitude		
PTH	flight-path angle		
AZ	azimuth		

SELENOGRAPHIC REFERENCE is printed along with the following values:

X	DX	}	selenographic cartesian coordinates
Y	DY		
Z	DZ		
ALT	altitude	}	rotational selenographic polar coordinates
LAT	latitude		
LON	longitude		
VR	velocity		
PTR	flight-path angle		
AZR	azimuth		
LTS	latitude	}	selenographic subsolar point
LNS	longitude		
LTE	latitude	}	selenographic subearth point
LNE	longitude		
DSMP	declination	}	sun direction in earth-moon plane
RSMP	right ascension		
LIN	inclination of flight plane		
LAN	longitude of ascending node		
LAP	argument of periapsis		

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY

I 0.3259548611111111D 01 0.117343750000000D 05

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-6.7218805D 03	Y 6.5152152D 03	Z 3.8693386D 03
DX-8.7422793D 00	DY-8.1572333D-01	DZ-3.2368566D-01
R 1.0129338D 04	DEC 2.2457203D 01	RA 1.3589446D 02
V 8.7862179D 00	PTH 3.5908896D 01	AZ 1.1039694D 02
ALT 3.7542997D 03	LAT 2.2542749D 01	LON 2.9536882D 02
VE 8.2799193D 00	PTE 3.8455984D 01	AZE 1.1256349D 02
C3-1.5050902D 00	RTM 3.8290198D 05	RDOT 5.1531003D 00

PLANETARY COORDS (PACSS NO. 4)

XM-3.8039122D 05	YM-6.3924848D 04	ZM-4.1112294D 04
DXM 2.3754331D-01	DYM-8.6979114D-01	DZM-4.7160371D-01
RM 3.8790990D 05	DEM-6.0838696D 00	RAM-1.7046056D 02
LOM 3.4901379D 02	VM 1.0175331D 00	GHA 2.0052565D 02
XS-1.4847106D 08	YS 2.2549478D 07	ZS 9.7781768D 06
RAS 1.7136403D 02	LOS-2.9161614D 01	DES 3.7254099D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA 2.6483674D 05	ECC 9.7507818D-01	INC 2.9977632D 01
RAN 1.6664423D 00	APF 7.2184031D 01	RP 6.6002143D 03
VH-8.5237179D-02	RNMP 4.0356864D 01	APMP 7.0685322D 00
INMP 2.1017790D 00	APD 5.2307328D 05	TFP 2.9680739D 00
TA 7.2885460D 01	EA 9.4832690D 00	MA 2.7850244D-01
SLR 1.3035939D 04	PER 3.7676829D 02	MTA 3.6000000D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-6.7218805D 03	YTB 6.5152152D 03	ZTB 3.8693386D 03
DXTB-8.7422793D 00	DYTB-8.1572333D-01	DZTB-3.2368566D-01
XI 0.0	YI 0.0	ZI 0.0
DXI 0.0	DYI 0.0	DZI 0.0
DDXI 4.3312855D-07	DDYI-4.4457074D-07	DDZI-2.1708862D-06
RTB 1.0129338D 04	RDTB 8.7862179D 00	ACC 2.2578730D-06

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-1.3271211D-09	SPY-8.9859276D-10	SPZ-5.6622629D-10
ENX 0.0	ENY 0.0	ENZ 0.0
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX 4.3445567D-07	OBY-4.4367215D-07	OBZ-2.1703200D-06

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.425954861111111D 01 0.153343750000000D 05

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-2.8183431D 04	Y-1.1329429D 03	Z-1.8271522D 02
DX-4.3954970D 00	DY-2.3922238D 00	DZ-1.3062281D 00
R 2.8206785D 04	DEC-3.7114772D-01	RA-1.7769801D 02
V 5.1719783D 00	PTH 6.0386439D 01	AZ 1.1998105D 02
ALT 2.1828621D 04	LAT-3.7171030D-01	LDN 3.2673527D 02
VE 4.6768931D 00	PTE 7.4031073D 01	AZE 1.7299525D 02
C3-1.5135699D 00	RTM 3.5999893D 05	RDOT 4.4964042D 00

PLANETARY COORDS (PACSS NO. 4)

XM-3.7951921D 05	YM-6.7053127D 04	ZM-4.2808172D 04
DXM 2.4690688D-01	DYM-8.6812821D-01	DZM-4.7054300D-01
RM 3.8776732D 05	DEM-6.3381751D 00	RAM-1.6998043D 02
LOM 3.3445285D 02	VM 1.0178508D 00	GHA 2.1556671D 02
XS-1.4848677D 08	YS 2.2452717D 07	ZS 9.7362139D 06
RAS 1.7140143D 02	LOS-4.4165282D 01	DES 3.7094415D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA 2.6335302D 05	ECC 9.7493299D-01	INC 2.9983137D 01
RAN 1.6586815D 00	APF 7.2189556D 01	RP 6.6014739D 03
VH-1.4431076D-01	RNMP 3.9633209D 01	APMP 7.2574813D 00
INMP 2.1023298D 00	APD 5.2010457D 05	TFP 2.9680169D 00
TA 1.2347802D 02	EA 2.3673088D 01	MA 1.2444950D 00
SLR 1.3037469D 04	PER 3.7360651D 02	MTA 3.6000000D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-2.8183439D 04	YTB-1.1329429D 03	ZTB-1.8271479D 02
DXTB-4.3955219D 00	DYTB-2.3922237D 00	DZTB-1.3062270D 00
XI 7.5294401D-03	YI-8.7831761D-05	ZI-4.2741029D-04
DXI 2.4905063D-05	DYI-9.4450316D-08	DZI-1.0721947D-06
DDXI 3.5123423D-08	DDYI 8.1968144D-10	DDZI 1.3909799D-10
RTB 2.8206793D 04	RDTB 5.1719992D 00	ACC 3.5133262D-08

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-7.0949003D-09	SPY-7.6305122D-10	SPZ-6.6366478D-10
ENX 2.6646910D-10	ENY 1.7647754D-11	ENZ 1.0185995D-11
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX 4.1951855D-08	OBY 1.5650849D-09	OBZ 7.9257677D-10

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.552560138000000D 01 0.198921649680000D 05

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-4.4639831D 04	Y-1.1615842D 04	Z-5.9535311D 03
DX-3.0559896D 00	DY-2.1939800D 00	DZ-1.2142615D 00
R 4.6508998D 04	DEC-7.3545065D 00	RA-1.6541438D 02
V 3.9531066D 00	PTH 6.6915197D 01	AZ 1.1914865D 02
ALT 4.0131183D 04	LAT-7.3611898D 00	LON 3.1997612D 02
VE 4.2230603D 00	PTE 5.9444973D 01	AZE-1.1057674D 02
C3-1.5138552D 00	RTM 3.4120594D 05	RDOT 3.6365637D 00

PLANETARY COORDS (PACSS NO. 4)

XM-3.7836687D 05	YM-7.1004863D 04	ZM-4.4949632D 04
DXM 2.5874533D-01	DYM-8.6590815D-01	DZM-4.6913763D-01
RM 3.8758696D 05	DEM-6.6597507D 00	RAM-1.6937141D 02
LOM 3.1601909D 02	VM 1.0182515D 00	GHA 2.3460950D 02
XS-1.4850656D 08	YS 2.2330196D 07	ZS 9.6830796D 06
RAS 1.7144878D 02	LOS-6.3160718D 01	DES 3.6892218D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA 2.6330339D 05	ECC 9.7492847D-01	INC 2.9982974D 01
RAN 1.6586287D 00	APF 7.2189369D 01	RP 6.6014196D 03
VH-1.8705124D-01	RNMP 3.8951043D 01	APMP 7.2539357D 00
INMP 2.1021983D 00	APD 5.2000537D 05	TFP 2.9680133D 00
TA 1.3757738D 02	EA 3.2377603D 01	MA 2.4651391D 00
SLR 1.3037332D 04	PER 3.7350091D 02	MTA 3.6000000D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-4.4640089D 04	YTB-1.1615861D 04	ZTB-5.9535497D 03
DXTB-3.0560476D 00	DYTB-2.1939884D 00	DZTB-1.2142712D 00
XI 2.5803926D-01	YI 1.8450784D-02	ZI 1.8560245D-02
DXI 5.7944077D-05	DYI 8.4454083D-06	DZI 9.6528788D-06
DDXI-5.5362180D-09	DDYI 1.7904504D-09	DDZI 1.9435971D-09
RTB 4.6509252D 04	RDTB 3.9531590D 00	ACC 6.1345735D-09

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-1.2427609D-08	SPY-1.7075252D-10	SPZ-4.8051004D-10
ENX 1.8828590D-09	ENY 6.8287377D-10	ENZ 3.1392802D-10
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX 5.0085322D-09	OBY 1.2783291D-09	OBZ 2.1101791D-09

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TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.552560138000000D 01 0.198921649680000D 05
DELTA V APPLIED
GEOCENTRIC REFERENCE (PACSS NO. 4)
X-4.4639831D 04 Y-1.1615842D 04 Z-5.9535311D 03
DX-3.0476883D 00 DY-2.1644660D 00 DZ-1.1973791D 00
R 4.6508998D 04 DEC-7.3545065D 00 RA-1.6541438D 02
V 3.9251795D 00 PTH 6.7222058D 01 AZ 1.1914865D 02
ALT 4.0131183D 04 LAT-7.3611898D 00 LON 3.1997612D 02
VE 4.2180925D 00 PTE 5.9093463D 01 AZE-1.0996521D 02
C3-1.7338728D 00 RTM 3.4120594D 05 RDOT 3.6190637D 00

PLANETARY COORDS (PACSS NO. 4)
XM-3.7836687D 05 YM-7.1004863D 04 ZM-4.4949632D 04
DXM 2.5874533D-01 DYM-8.6590815D-01 DZM-4.6913763D-01
RM 3.8758696D 05 DEM-6.6597507D 00 RAM-1.6937141D 02
LOM 3.1601909D 02 VM 1.0182515D 00 GHA 2.3460950D 02
XS-1.4850656D 08 YS 2.2330196D 07 ZS 9.6830796D 06
RAS 1.7144878D 02 LOS-6.3160718D 01 DES 3.6892218D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)
SMA 2.2989184D 05 ECC 9.7236085D-01 INC 2.9982974D 01
RAN 1.6586287D 00 APF 7.1462188D 01 RP 6.3540157D 03
VH-2.1497833D-01 RNMP 3.8951043D 01 APMP 6.1279142D 00
INMP 2.1021983D 00 APO 4.5342966D 05 TFP 2.9692480D 00
TA 1.3870340D 02 EA 3.4878546D 01 MA 3.0201678D 00
SLR 1.2532412D 04 PER 3.0471393D 02 MTA 3.6000000D 02

2-BODY AND XI TERMS (PACSS NO. 4)
XTB-4.4640089D 04 YTB-1.1615861D 04 ZTB-5.9535497D 03
DXTB-3.0560476D 00 DYT8-2.1939884D 00 DZTB-1.2142712D 00
XI 2.5803926D-01 YI 1.8450784D-02 ZI 1.8560245D-02
DXI 5.7944077D-05 DYI 8.4454083D-06 DZI 9.6528788D-06
DDXI-5.5362180D-09 DDYI 1.7904504D-09 DDZI 1.9435971D-09
RTB 4.6509252D 04 RDTB 3.9531590D 00 ACC 6.1345735D-09

PERTURBATION ACCELERATIONS (PACSS NO. 4)
SPX-1.2427609D-08 SPY-1.7075252D-10 SPZ-4.8051004D-10
ENX 1.8828590D-09 ENY 6.8287377D-10 ENZ 3.1392802D-10
DGX 0.0 DGY 0.0 DGZ 0.0
ATX 0.0 ATY 0.0 ATZ 0.0
OBX 5.0085322D-09 OBY 1.2783291D-09 OBZ 2.1101791D-09

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.525954861111111D 01 0.189343750000000D 05

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-4.1627102D 04	Y-9.4930730D 03	Z-4.7796148D 03
DX-3.2401708D 00	DY-2.2389329D 00	DZ-1.2371117D 00
R 4.2962528D 04	DEC-6.3874226D 00	RA-1.6715338D 02
V 4.1281924D 00	PTH 6.6017463D 01	AZ 1.1935675D 02
ALT 3.6584627D 04	LAT-6.3937237D 00	LON 3.2223884D 02
VE 4.1986734D 00	PTE 6.3942494D 01	AZE-1.1647349D 02
C3-1.5138815D 00	RTM 3.4470261D 05	RDOT 3.7718030D 00

PLANETARY COORDS (PACSS NO. 4)

XM-3.7861351D 05	YM-7.0175276D 04	ZM-4.4500152D 04
DXM 2.5625915D-01	DYM-8.6638532D-01	DZM-4.6943875D-01
RM 3.8762485D 05	DEM-6.5922115D 00	RAM-1.6949950D 02
LOM 3.1989272D 02	VM 1.0181675D 00	GHA 2.3060778D 02
XS-1.4850242D 08	YS 2.2355945D 07	ZS 9.6942461D 06
RAS 1.7143883D 02	LDS-5.9168951D 01	DES 3.6934711D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA 2.6329881D 05	ECC 9.7492792D-01	INC 2.9983004D 01
RAN 1.6586432D 00	APF 7.2189390D 01	RP 6.6014485D 03
VH-1.7945823D-01	RNMP 3.9094576D 01	APMP 7.2545207D 00
INMP 2.1022241D 00	APD 5.1999617D 05	TFP 2.9680103D 00
TA 1.3559842D 02	EA 3.0868133D 01	MA 2.2087639D 00
SLR 1.3037385D 04	PER 3.7349116D 02	MTA 3.6000000D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-4.1627302D 04	YTB-9.4930842D 03	ZTB-4.7796250D 03
DXTB-3.2402326D 00	DYTB-2.2389396D 00	DZTB-1.2371193D 00
XI 2.0044724D-01	YI 1.1196992D-02	ZI 1.0257613D-02
DXI 6.1817667D-05	DYI 6.6860299D-06	DZI 7.6287385D-06
DDXI-2.4054593D-09	DDYI 1.8874425D-09	DDZI 2.2904400D-09
RTB 4.2962725D 04	RDTB 4.1282469D 00	ACC 3.8203127D-09

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-1.1384492D-08	SPY-3.0317419D-10	SPZ-5.2606877D-10
ENX 1.8829417D-09	ENY 6.0289520D-10	ENZ 2.8032545D-10
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX 7.0960908D-09	OBY 1.5877215D-09	OBZ 2.5361833D-09

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.625954861111111D 01 0.225343750000000D 05

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-5.2151300D 04	Y-1.7181327D 04	Z-9.0377739D 03
DX-2.6625904D 00	DY-2.0510752D 00	DZ-1.1384149D 00
R 5.5647438D 04	DEC-9.3468857D 00	RA-1.6176545D 02
V 3.5485611D 00	PTH 6.9027472D 01	AZ 1.1861841D 02
ALT 4.9269837D 04	LAT-9.3539357D 00	LON 3.1258570D 02
VE 4.4380084D 00	PTE 4.8299318D 01	AZE-1.0188322D 02
C3-1.7337358D 00	RTM 3.3240573D 05	ROOT 3.3134765D 00

PLANETARY COORDS (PACSS NO. 4)

XM-3.7767416D 05	YM-7.3291006D 04	ZM-4.6188079D 04
DXM 2.6559924D-01	DYM-8.6456245D-01	DZM-4.6829097D-01
RM 3.8748249D 05	DEM-6.8459593D 00	RAM-1.6901775D 02
LOM 3.0533340D 02	VM 1.0184830D 00	GHA 2.4564885D 02
XS-1.4851798D 08	YS 2.2259161D 07	ZS 9.6522734D 06
RAS 1.7147623D 02	LQS-7.4172620D 01	DES 3.6774989D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA 2.2991000D 05	ECC 9.7236357D-01	INC 2.9982930D 01
RAN 1.6586021D 00	APF 7.1462085D 01	RP 6.3538914D 03
VH-2.3641204D-01	RNMP 3.8554299D 01	APMP 6.1269243D 00
INMP 2.1021560D 00	APD 4.5346611D 05	TFP 2.9692661D 00
TA 1.4282695D 02	EA 3.8784946D 01	MA 3.8867975D 00
SLR 1.2532184D 04	PER 3.0475004D 02	MTA 3.6000000D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-5.2151266D 04	YTB-1.7181330D 04	ZTB-9.0377786D 03
DXTB-2.6625628D 00	DYTB-2.0510777D 00	DZTB-1.1384181D 00
XI-3.3280036D-02	YI 3.4879091D-03	ZI 4.7007304D-03
DXI-2.7636039D-05	DYI 2.5272527D-06	DZI 3.2324756D-06
DDXI-1.3029703D-08	DDYI 8.4807121D-10	DDZI 8.8714178D-10
RTB 5.5647409D 04	RDTB 3.5485428D 00	ACC 1.3087375D-08

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-1.5170238D-08	SPY 1.9225705D-10	SPZ-3.5186861D-10
ENX-1.1388778D-10	ENY-7.0950473D-11	ENZ-4.3951128D-11
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX 2.2544231D-09	OBY 7.2676463D-10	OBZ 1.2829615D-09

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.725954861111111D 01 0.261343750000000D 05

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-6.1055630D 04	Y-2.4324967D 04	Z-1.3008896D 04
DX-2.3078381D 00	DY-1.9221179D 00	DZ-1.0699683D 00
R 6.6997950D 04	DEC-1.1196158D 01	RA-1.5827734D 02
V 3.1883359D 00	PTH 7.0678819D 01	AZ 1.1799618D 02
ALT 6.0620590D 04	LAT-1.1203117D 01	LON 3.0103275D 02
VE 4.9199788D 00	PTE 3.7701837D 01	AZE-9.7302884D 01
C3-1.7334809D 00	RTM 3.2180641D 05	RDOT 3.0087647D 00

PLANETARY COORDS (PACSS NO. 4)

XM-3.7670121D 05	YM-7.6400030D 04	ZM-4.7871795D 04
DXM 2.7492626D-01	DYM-8.6265960D-01	DZM-4.6709966D-01
RM 3.8734026D 05	DEM-7.0993989D 00	RAM-1.6853516D 02
LQM 2.9077493D 02	VM 1.0187974D 00	GHA 2.6068991D 02
XS-1.4853347D 08	YS 2.2162366D 07	ZS 9.6102960D 06
RAS 1.7151363D 02	LOS-8.9176290D 01	DES 3.6615247D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA 2.2994381D 05	ECC 9.7236893D-01	INC 2.9982948D 01
RAN 1.6586169D 00	APF 7.1461760D 01	RP 6.3535929D 03
VH-2.6115199D-01	RNMP 3.8012219D 01	APMP 6.1265976D 00
INMP 2.1021686D 00	APD 4.5353402D 05	TFP 2.9693168D 00
TA 1.4672597D 02	EA 4.3216616D 01	MA 5.0669161D 00
SLR 1.2531629D 04	PER 3.0481726D 02	MTA 3.6000000D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-6.1055401D 04	YTB-2.4324984D 04	ZTB-1.3008917D 04
DXTB-2.3077539D 00	DYTB-1.9221233D 00	DZTB-1.0699737D 00
XI-2.2913553D-01	YI 1.7790020D-02	ZI 2.0745957D-02
DXI-8.4233860D-05	DYI 5.3690601D-06	DZI 5.3732206D-06
DDXI-1.8162611D-08	DDYI 7.6262784D-10	DDZI 3.6754695D-10
RTB 6.6997752D 04	RDTB 3.1882800D 00	ACC 1.8182330D-08

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-1.8720186D-08	SPY 6.9446163D-10	SPZ-1.6597488D-10
ENX-4.1495252D-10	ENY-3.0989767D-10	ENZ-1.8061929D-10
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX 9.7252773D-10	OBY 3.7806388D-10	OBZ 7.1414112D-10

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.825954861111111D 01 0.297343750000000D 05

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-6.8892822D 04	Y-3.1048599D 04	Z-1.6755620D 04
DX-2.0590973D 00	DY-1.8165587D 00	DZ-1.0132469D 00
R 7.7401468D 04	DEC-1.2502181D 01	RA-1.5573987D 02
V 2.9268476D 00	PTH 7.1822167D 01	AZ 1.1747514D 02
ALT 7.1024304D 04	LAT-1.2508864D 01	LON 2.8852914D 02
VE 5.4774754D 00	PTE 3.0509677D 01	AZE-9.5117534D 01
C3-1.7331923D 00	RTM 3.1233104D 05	RDOT 2.7807768D 00

PLANETARY COORDS (PACSS NO. 4)

XM-3.7569471D 05	YM-7.9502059D 04	ZM-4.9551144D 04
DXM 2.8423936D-01	DYM-8.6067677D-01	DZM-4.6586485D-01
RM 3.8719815D 05	DEM-7.3525105D 00	RAM-1.6805171D 02
LOM 2.7621731D 02	VM 1.0191107D 00	GHA 2.7573098D 02
XS-1.4854889D 08	YS 2.2065561D 07	ZS 9.5683137D 06
RAS 1.7155102D 02	LOS-1.0417996D 02	DES 3.6455487D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA 2.2998209D 05	ECC 9.7237562D-01	INC 2.9983040D 01
RAN 1.6587012D 00	APF 7.1461167D 01	RP 6.3531124D 03
VH-2.8245595D-01	RNMP 3.7468811D 01	APMP 6.1269416D 00
INMP 2.1022563D 00	APD 4.5361107D 05	TFP 2.9694047D 00
TA 1.4953255D 02	EA 4.6976865D 01	MA 6.2462877D 00
SLR 1.2530724D 04	PER 3.0489339D 02	MTA 3.6000000D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-6.8892162D 04	YTB-3.1048641D 04	ZTB-1.6755662D 04
DXTB-2.0589400D 00	DYTB-1.8165669D 00	DZTB-1.0132531D 00
XI-6.5945257D-01	YI 4.2103273D-02	ZI 4.1830943D-02
DXI-1.5735263D-04	DYI 8.1624126D-06	DZI 6.1900471D-06
DDXI-2.2372935D-08	DDYI 8.0178181D-10	DDZI 1.1430724D-10
RTB 7.7400907D 04	RDTB 2.9267441D 00	ACC 2.2387589D-08

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-2.2152897D-08	SPY 1.1980345D-09	SPZ 2.4895338D-11
ENX-7.2084069D-10	ENY-6.1653922D-10	ENZ-3.4914706D-10
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX 5.0080272D-10	OBY 2.2028658D-10	OBZ 4.3855896D-10

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.925954861111111D 01 0.33334375000000D 05

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-7.5954059D 04	Y-3.7424756D 04	Z-2.0314918D 04
DX-1.8717976D 00	DY-1.7282027D 00	DZ-9.6542178D-01
R 8.7076560D 04	DEC-1.3491405D 01	RA-1.5376920D 02
V 2.7243990D 00	PTH 7.2668769D 01	AZ 1.1703206D 02
ALT 8.0699558D 04	LAT-1.3497782D 01	LON 2.7545875D 02
VE 6.0514015D 00	PTE 2.5453359D 01	AZE-9.3867734D 01
C3-1.7328855D 00	RTM 3.0367430D 05	RDOT 2.6007073D 00

PLANETARY COORDS (PACSS NO. 4)

XM-3.7465470D 05	YM-8.2596806D 04	ZM-5.1225969D 04
DXM 2.9353763D-01	DYM-8.5861396D-01	DZM-4.6458656D-01
RM 3.8705617D 05	DEM-7.6052744D 00	RAM-1.6756738D 02
LOM 2.6166057D 02	VM 1.0194229D 00	GHA 2.9077205D 02
XS-1.4856423D 08	YS 2.1968744D 07	ZS 9.5263267D 06
RAS 1.7158842D 02	LOS-1.1918363D 02	DES 3.6295708D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA 2.3002281D 05	ECC 9.7238354D-01	INC 2.9983198D 01
RAN 1.6588617D 00	APF 7.1460278D 01	RP 6.3524168D 03
VH-3.0136296D-01	RNMP 3.6924316D 01	APMP 6.1276677D 00
INMP 2.1024159D 00	APD 4.5369321D 05	TFP 2.9695388D 00
TA 1.5169364D 02	EA 5.0275757D 01	MA 7.4248978D 00
SLR 1.2529402D 04	PER 3.0497437D 02	MTA 3.6000000D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-7.5952680D 04	YTB-3.7424833D 04	ZTB-2.0314982D 04
DXTB-1.8715526D 00	DYTB-1.7282139D 00	DZTB-9.6542811D-01
XI-1.3793630D 00	YI 7.6862939D-02	ZI 6.4522027D-02
DXI-2.4491222D-04	DYI 1.1204062D-05	DZI 6.3361223D-06
DDXI-2.6234295D-08	DDYI 8.9399849D-10	DDZI-1.9802322D-11
RTB 8.7075405D 04	RDTB 2.7242401D 00	ACC 2.6249531D-08

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-2.5531780D-08	SPY 1.6996716D-09	SPZ 2.1693038D-10
ENX-9.9208710D-10	ENY-9.4557276D-10	ENZ-5.2704107D-10
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX 2.8957175D-10	OBY 1.3989966D-10	OBZ 2.9030836D-10

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.102595486111111D 02 0.369343750000000D 05

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-8.2416634D 04	Y-4.3506995D 04	Z-2.3714720D 04
DX-1.7238552D 00	DY-1.6526721D 00	DZ-9.2433685D-01
R 9.6165212D 04	DEC-1.4276641D 01	RA-1.5217083D 02
V 2.5607422D 00	PTH 7.3323990D 01	AZ 1.1664874D 02
ALT 8.9788346D 04	LAT-1.4282724D 01	LDN 2.6201605D 02
VE 6.6192938D 00	PTE 2.1752338D 01	AZE-9.3070604D 01
C3-1.7325659D 00	RTM 2.9564724D 05	RDOT 2.4530444D 00

PLANETARY COORDS (PACSS NO. 4)

XM-3.7358126D 05	YM-8.5683983D 04	ZM-5.2896115D 04
DXM 3.0282020D-01	DYM-8.5647120D-01	DZM-4.6326480D-01
RM 3.8691433D 05	DEM-7.8576705D 00	RAM-1.6708216D 02
LOM 2.4710473D 02	VM 1.0197339D 00	GHA 3.0581312D 02
XS-1.4857949D 08	YS 2.1871916D 07	ZS 9.4843349D 06
RAS 1.7162581D 02	LDS-1.3418730D 02	DES 3.6135910D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA 2.3006524D 05	ECC 9.7239272D-01	INC 2.9983419D 01
RAN 1.6591044D 00	APF 7.1459071D 01	RP 6.3514755D 03
VH-3.1848800D-01	RNMP 3.6378860D 01	APMP 6.1286231D 00
INMP 2.1026475D 00	APD 4.5377901D 05	TFP 2.9697286D 00
TA 1.5343414D 02	EA 5.3235110D 01	MA 8.6027204D 00
SLR 1.2527604D 04	PER 3.0505876D 02	MTA 3.6000000D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-8.2414195D 04	YTB-4.3507119D 04	ZTB-2.3714807D 04
DXTB-1.7235092D 00	DYTB-1.6526868D 00	DZTB-9.2434297D-01
XI-2.4391086D 00	YI 1.2323696D-01	ZI 8.7018471D-02
DXI-3.4605957D-04	DYI 1.4630720D-05	DZI 6.1170411D-06
DDXI-2.9942514D-08	DDYI 1.0128908D-09	DDZI-9.4980416D-11
RTB 9.6163199D 04	RDTB 2.5605209D 00	ACC 2.9959792D-08

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-2.8897567D-08	SPY 2.1979393D-09	SPZ 4.0810265D-10
ENX-1.2267678D-09	ENY-1.2799908D-09	ENZ-7.0659047D-10
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX 1.8182128D-10	OBY 9.4942222D-11	OBZ 2.0350741D-10

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.11259548611111110 02 0.4053437500000000 05

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-8.8398050D 04	Y-4.9335734D 04	Z-2.6976376D 04
DX-1.6029254D 00	DY-1.5869529D 00	DZ-8.8845981D-01
R 1.0476619D 05	DEC-1.4921253D 01	RA-1.5083373D 02
V 2.4242835D 00	PTH 7.3847108D 01	AZ 1.1631203D 02
ALT 9.8389441D 04	LAT-1.4927065D 01	LON 2.4831209D 02
VE 7.1726011D 00	PTE 1.8944581D 01	AZE-9.2523651D 01
C3-1.7322359D 00	RTM 2.8812298D 05	RDOT 2.3285794D 00

PLANETARY COORDS (PACSS NO. 4)

XM-3.7247442D 05	YM-8.8763303D 04	ZM-5.4561423D 04
DXM 3.1208619D-01	DYM-8.5424851D-01	DZM-4.6189960D-01
RM 3.8677263D 05	DEM-8.1096788D 00	RAM-1.6659601D 02
LDM 2.3254980D 02	VM 1.0200439D 00	GHA 3.2085418D 02
XS-1.4859468D 08	YS 2.1775077D 07	ZS 9.4423384D 06
RAS 1.7166321D 02	LOS-1.4919097D 02	DES 3.5976093D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA 2.3010908D 05	ECC 9.7240327D-01	INC 2.9983702D 01
RAN 1.6594355D 00	APF 7.1457528D 01	RP 6.3502590D 03
VH-3.3422813D-01	RNMP 3.5832511D 01	APMP 6.1297174D 00
INMP 2.1029533D 00	APQ 4.5386789D 05	TFP 2.9699842D 00
TA 1.5488159D 02	EA 5.5932473D 01	MA 9.7797242D 00
SLR 1.2525272D 04	PER 3.0514594D 02	MTA 3.6000000D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-8.8394163D 04	YTB-4.9335916D 04	ZTB-2.6976484D 04
DXTB-1.6024650D 00	DYTB-1.5869714D 00	DZTB-8.8846550D-01
XI-3.8868433D 00	YI 1.8275348D-01	ZI 1.0831710D-01
DXI-4.6042446D-04	DYI 1.8514133D-05	DZI 5.6893217D-06
DDXI-3.3588167D-08	DDYI 1.1463173D-09	DDZI-1.3887748D-10
RTB 1.0476302D 05	RDTB 2.4239933D 00	ACC 3.3608009D-08

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-3.2279342D-08	SPY 2.6921240D-09	SPZ 5.9716185D-10
ENX-1.4303614D-09	ENY-1.6136782D-09	ENZ-8.8525425D-10
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX 1.2153669D-10	OBY 6.7871472D-11	OBZ 1.4921492D-10

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.122595486111111D 02 0.441343750000000D 05

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-9.3980996D 04	Y-5.4942268D 04	Z-3.0116555D 04
DX-1.5014963D 00	DY-1.5289293D 00	DZ-8.5669593D-01
R 1.1295170D 05	DEC-1.5463958D 01	RA-1.4968900D 02
V 2.3078223D 00	PTH 7.4274404D 01	AZ 1.1601243D 02
ALT 1.0657506D 05	LAT-1.5469526D 01	LON 2.3441575D 02
VE 7.7083929D 00	PTE 1.6749526D 01	AZE-9.2128139D 01
C3-1.7318965D 00	RTM 2.8101129D 05	RDOT 2.2214423D 00

PLANETARY COORDS (PACSS NO. 4)

XM-3.7133426D 05	YM-9.1834476D 04	ZM-5.6221739D 04
DXM 3.2133471D-01	DYM-8.5194592D-01	DZM-4.6049100D-01
RM 3.8663107D 05	DEM-8.3612790D 00	RAM-1.6610894D 02
LOM 2.1799581D 02	VM 1.0203528D 00	GHA 3.3589525D 02
XS-1.4860979D 08	YS 2.1678228D 07	ZS 9.4003372D 06
RAS 1.7170060D 02	LOS-1.6419465D 02	DES 3.5816258D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA 2.3015417D 05	ECC 9.7241528D-01	INC 2.9984048D 01
RAN 1.6598620D 00	APF 7.1455635D 01	RP 6.3487388D 03
VH-3.4885612D-01	RNMP 3.5285311D 01	APMP 6.1308913D 00
INMP 2.1033364D 00	APD 4.5395960D 05	TFP 2.9703164D 00
TA 1.5611467D 02	EA 5.8420564D 01	MA 1.0955875D 01
SLR 1.2522349D 04	PER 3.0523565D 02	MTA 3.6000000D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-9.3975227D 04	YTB-5.4942525D 04	ZTB-3.0116683D 04
DXTB-1.5009084D 00	DYTB-1.5289522D 00	DZTB-8.5670106D-01
XI-5.7698701D 00	YI 2.5713456D-01	ZI 1.2783393D-01
DXI-5.8788215D-04	DYI 2.2893449D-05	DZI 5.1373010D-06
DDXI-3.7223121D-08	DDYI 1.2875194D-09	DDZI-1.6577413D-10
RTB 1.1294706D 05	RDTB 2.3074570D 00	ACC 3.7245750D-08

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-3.5699659D-08	SPY 3.1818106D-09	SPZ 7.8323370D-10
ENX-1.6088546D-09	ENY-1.9448307D-09	ENZ-1.0624293D-09
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX 8.5392858D-11	OBY 5.0539510D-11	OBZ 1.1342148D-10

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.132595486100000D 02 0.477343749960000D 05

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-9.9226322D 04	Y-6.0351414D 04	Z-3.3148556D 04
DX-1.4146996D 00	DY-1.4770762D 00	DZ-8.2824688D-01
R 1.2077658D 05	DEC-1.5929942D 01	RA-1.4869120D 02
V 2.2066087D 00	PTH 7.4629512D 01	AZ 1.1574295D 02
ALT 1.1440003D 05	LAT-1.5935291D 01	LON 2.2037248D 02
VE 8.2261077D 00	PTE 1.4990145D 01	AZE-9.1830593D 01
C3-1.7315482D 00	RTM 2.7424517D 05	ROOT 2.1276829D 00

PLANETARY COORDS (PACSS NO. 4)

XM-3.7016083D 05	YM-9.4897216D 04	ZM-5.7876906D 04
DXM 3.3056486D-01	DYM-8.4956346D-01	DZM-4.5903903D-01
RM 3.8648966D 05	DEM-8.6124508D 00	RAM-1.6562090D 02
LOM 2.0344278D 02	VM 1.0206606D 00	GHA 3.5093632D 02
XS-1.4862483D 08	YS 2.1581367D 07	ZS 9.3583313D 06
RAS 1.7173800D 02	LOS-1.7919832D 02	DES 3.5656405D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA 2.3020047D 05	ECC 9.7242887D-01	INC 2.9984458D 01
RAN 1.6603911D 00	APF 7.1453376D 01	RP 6.3468868D 03
VH-3.6256823D-01	RNMP 3.4737288D 01	APMP 6.1321027D 00
INMP 2.1038007D 00	APD 4.5405405D 05	TFP 2.9707363D 00
TA 1.5718499D 02	EA 6.0737012D 01	MA 1.2131136D 01
SLR 1.2518783D 04	PER 3.0532775D 02	MTA 3.6000000D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-9.9218187D 04	YTB-6.0351762D 04	ZTB-3.3148701D 04
DXTB-1.4139712D 00	DYTB-1.4771040D 00	DZTB-8.2825139D-01
XI-8.1353348D 00	YI 3.4820552D-01	ZI 1.4521170D-01
DXI-7.2845999D-04	DYI 2.7788340D-05	DZI 4.5062200D-06
DDXI-4.0882024D-08	DDYI 1.4321500D-09	DDZI-1.8384882D-10
RTB 1.2077011D 05	RDTB 2.2061621D 00	ACC 4.0907514D-08

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-3.9177225D-08	SPY 3.6667061D-09	SPZ 9.6563600D-10
ENX-1.7673006D-09	ENY-2.2733935D-09	ENZ-1.2382627D-09
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX 6.2501953D-11	OBY 3.8837338D-11	OBZ 8.8777915D-11

D5-15551(I)-7

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.740938295580976D 02 0.266737786409151D 06
POINT OF CLOSEST APPROACH TO MOON
SELENOCENTRIC REFERENCE (PACSS NO. 4)

X-1.9408542D 03	Y 2.6894048D 03	Z 1.4545460D 03
DX-1.6467165D 00	DY-8.9660673D-01	DZ-5.3947979D-01
R 3.6215352D 03	DEC 2.3680615D 01	RA 1.2581673D 02
V 1.9510554D 00	PTH-1.7065620D-12	AZ 1.0757353D 02
C3 1.0990484D 00	RDDT-5.8247653D-14	

SELENOGRAPHIC REFERENCE (PACSS NO. 4)

X 1.3776948D 03	Y 3.3323004D 03	Z 3.3652368D 02
DX-1.7810127D 00	DY 7.5365166D-01	DZ-1.7146424D-01
ALT 1.8834452D 03	LAT 5.3317839D 00	LON 6.7538010D 01
VR 1.9414935D 00	PTR 7.4492052D-08	AZR 9.5088790D 01
LTS-3.1167358D-02	LNS 1.1830910D 02	LTE 5.8290147D 00
LNE-4.8002248D 00	DSMP 2.1866121D-01	RSMP 1.2292038D 02
LIN 7.3483351D 00	LAN-6.6102455D 01	LAP 1.3340452D 02

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-2.4272186D 05	Y-2.5165938D 05	Z-1.4148476D 05
DX-8.2432784D-01	DY-1.4577801D 00	DZ-8.3288575D-01
R 3.7717938D 05	DEC-2.2031276D 01	RA-1.3396431D 02
V 1.8703845D 00	PTH 7.6091648D 01	AZ 1.1136853D 02
ALT 3.7080422D 05	LAT-2.2033532D 01	LON 4.0086881D 01
VE 2.5143457D 01	PTE 4.1408065D 00	AZE-9.0374105D 01

PLANETARY COORDS (PACSS NO. 4)

XM-2.4078100D 05	YM-2.5434879D 05	ZM-1.4293930D 05
DXM 8.2238864D-01	DYM-5.6117342D-01	DZM-2.9340595D-01
RM 3.7828619D 05	DEM-2.2201203D 01	RAM-1.3343035D 02
LOM 4.0620843D 01	VM 1.0379430D 00	GHA 1.8594881D 02
XS-1.4939749D 08	YS 1.5670594D 07	ZS 6.7950322D 06
RAS 1.7401203D 02	LOS-1.1936781D 01	DES 2.5899945D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA-4.4609302D 03	ECC 1.8118341D 00	INC 2.9183982D 01
RAN-2.4407019D 00	APF 1.0855679D 02	RP 3.6215352D 03
VH 1.0483551D 00	RNMP-8.7287741D 01	APMP 1.5922966D 02
INMP 6.2434710D-01	APD-1.2543396D 04	TFP 7.4093830D 01
TA-2.6484595D-12	EA-1.3994441D-12	MA-1.1789575D-12
SLR 1.0183156D 04	PER 7.4266745D 00	MTA 1.2349931D 02

.T=	0.6686170080098991D 04	B.R=	-0.8493988170411028D 03	
R=	0.5550722188757177D 04		0.3727559894123113D 04	0.8491932125901728D 00
R=	0.1221471205371322D-01		-0.1829927286305679D-01	-0.9997579373738010D 00
S=	-0.5550439071356922D 00		0.8315300322258132D 00	-0.2200142217838960D-00
T=	0.8317313633039064D 00		0.5551782950518011D 00	0.0

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T	0.872813295580976D 02	0.314212786409151D 06	
GEOCENTRIC REFERENCE (PACSS NO. 4)			
X	-2.2947574D 05	Y-3.2235068D 05	Z-1.8064194D 05
DX	4.2612248D-01	DY-1.3707455D 00	DZ-7.5592530D-01
R	4.3497194D 05	DEC-2.4537934D 01	RA-1.2544639D 02
V	1.6223275D 00	PTH 4.2929442D 01	AZ 1.0595541D 02
ALT	4.2859746D 05	LAT-2.4540060D 01	LON 2.1025073D 02
VE	2.7735879D 01	PTE 2.2832215D 00	AZE-9.0674999D 01
C3	7.9916998D-01	RTM 5.8353234D 04	RDOT 1.1049627D 00
PLANETARY COORDS (PACSS NO. 4)			
XM	-1.9983468D 05	YM-2.7875836D 05	ZM-1.5561761D 05
DXM	9.0033964D-01	DYM-4.6548013D-01	DZM-2.3982790D-01
RM	3.7663904D 05	DEM-2.4404402D 01	RAM-1.2563576D 02
LDM	2.1006136D 02	VM 1.0415376D 00	GHA 2.4302882D 01
XS	-1.4952799D 08	YS 1.4385148D 07	ZS 6.2375955D 06
RAS	1.7450484D 02	LNS 1.5020196D 02	DES 2.3777568D 00
KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)			
SMA	-4.9877149D 05	ECC 1.5306177D 00	INC 2.8997406D 01
RAN	-9.0156147D-01	APF 1.5925370D 02	RP 2.6465700D 05
VH	8.9396308D-01	RNMP-9.2314254D 00	APMP-2.3991807D 02
INMP	5.0410260D-01	APO-1.2622000D 06	TFP 2.1912372D 01
TA	6.9351623D 01	EA 3.7593879D 01	MA 2.4166550D 01
SLR	6.6974569D 05	PER 9.7377676D 02	MTA 1.3079322D 02
2-BODY AND XI TERMS (PACSS NO. 4)			
XTB	-2.9623910D 04	YTB-4.3570027D 04	ZTB-2.5012023D 04
DXTB	-4.7067112D-01	DYTB-9.0060651D-01	DZTB-5.1352572D-01
XI	-1.7150649D 01	YI-2.2293058D 01	ZI-1.2306679D 01
DXI	-3.5460427D-03	DYI-4.6588382D-03	DZI-2.5716749D-03
DDXI	-3.8178552D-07	DDYI-5.1752331D-07	DDZI-2.8560957D-07
RTB	5.8322591D 04	ROTB 1.1385658D 00	ACC 7.0367847D-07
PERTURBATION ACCELERATIONS (PACSS NO. 4)			
SPX	-3.8105626D-07	SPY-5.1637833D-07	SPZ-2.8494030D-07
ENX	-7.2957373D-10	ENY-1.1453735D-09	ENZ-6.6963346D-10
DGX	0.0	DGY 0.0	DGZ 0.0
ATX	0.0	ATY 0.0	ATZ 0.0
OBX	3.1911781D-13	OBY 3.9687069D-13	OBZ 3.6000376D-13

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.980938295580976D 02 0.353137786409151D 06

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-2.1177410D 05	Y-3.7398820D 05	Z-2.0909671D 05
DX 4.7810284D-01	DY-1.2880756D 00	DZ-7.0934174D-01
R 4.7795071D 05	DEC-2.5943584D 01	RA-1.1952109D 02
V 1.5462492D 00	PTH 4.5686374D 01	AZ 1.0341279D 02
ALT 4.7157663D 05	LAT-2.5945599D 01	LON 5.3544493D 01
VE 3.0310953D 01	PTE 2.0918391D 00	AZE-9.0473884D 01
C3 7.2291886D-01	RTM 1.0267431D 05	RDOT 1.1063825D 00

PLANETARY COORDS (PACSS NO. 4)

XM-1.6371788D 05	YM-2.9523383D 05	ZM-1.6403716D 05
DXM 9.5370430D-01	DYM-3.8008360D-01	DZM-1.9227843D-01
RM 3.7533285D 05	DEM-2.5915461D 01	RAM-1.1900996D 02
LOM 5.4055622D 01	VM 1.0445030D 00	GHA 1.8693442D 02
XS-1.4962515D 08	YS 1.3330296D 07	ZS 5.7801617D 06
RAS 1.7490889D 02	LOS-1.2025531D 01	DES 2.2035711D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA-5.5138027D 05	ECC 1.4875325D 00	INC 2.8990734D 01
RAN-9.2670243D-01	APF 1.6014072D 02	RP 2.6881579D 05
VH 8.5024636D-01	RNMP-1.5741308D 01	APMP-2.3913826D 02
INMP 4.9070292D-01	APD-1.3715763D 06	TFP 2.0958321D 01
TA 7.4438140D 01	EA 4.0092890D 01	MA 2.4534264D 01
SLR 6.6868799D 05	PER 1.1318368D 03	MTA 1.3224129D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-2.1177424D 05	YTB-3.7398846D 05	ZTB-2.0909686D 05
DXTB 4.7785044D-01	DYTB-1.2885311D 00	DZTB-7.0960140D-01
XI 1.4260210D-01	YI 2.5718115D-01	ZI 1.4659195D-01
DXI 2.5240190D-04	DYI 4.5554651D-04	DZI 2.5965269D-04
DDXI 2.2140873D-07	DDYI 4.0051928D-07	DDZI 2.2827098D-07
RTB 4.7795104D 05	RDTB 1.5466698D 00	ACC 5.1141486D-07

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX 2.2140764D-07	SPY 4.0051739D-07	SPZ 2.2826949D-07
ENX 1.0738412D-12	ENY 1.8768504D-12	ENZ 1.0391169D-12
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX 6.8263863D-15	OBY 1.5376225D-14	OBZ 4.4821648D-13

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.122093829558098D 03 0.439537786409151D 06

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-1.6770835D 05	Y-4.7965881D 05	Z-2.6723639D 05
DX 5.3371824D-01	DY-1.1665436D 00	DZ-6.4133623D-01
R 5.7412016D 05	DEC-2.7740721D 01	RA-1.0927172D 02
V 1.4342215D 00	PTH 5.1167070D 01	AZ 9.8765632D 01
ALT 5.6774662D 05	LAT-2.7742478D 01	LON 6.2808259D 01
VF 3.6182294D 01	PTE 1.7694507D 00	AZE-9.0217075D 01
C3 6.6842064D-01	RTM 2.0550305D 05	RDOT 1.1172266D 00

PLANETARY COORDS (PACSS NO. 4)

XM-7.7455922D 04	YM-3.1927887D 05	ZM-1.7577997D 05
DXM 1.0338903D 00	DYM-1.7309045D-01	DZM-7.7824459D-02
RM 3.7260839D 05	DEM-2.8148295D 01	RAM-1.0363631D 02
LOM 6.8443660D 01	VM 1.0511641D 00	GHA 1.8792003D 02
XS-1.4980908D 08	YS 1.0986309D 07	ZS 4.7637153D 06
RAS 1.7580570D 02	LOS-1.2114327D 01	DES 1.8164358D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA-5.9633587D 05	ECC 1.4565491D 00	INC 2.8987498D 01
RAN-9.4352166D-01	APF 1.6065097D 02	RP 2.7225659D 05
VH 8.1756996D-01	RNMP-2.9933517D 01	APMP-2.3855422D 02
INMP 4.8271934D-01	APQ-1.4649283D 06	TFP 1.9908887D 01
TA 8.3498129D 01	EA 4.6482526D 01	MA 2.8896553D 01
SLR 6.6881168D 05	PER 1.2730439D 03	MTA 1.3335797D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-1.6780248D 05	YTB-4.7987487D 05	ZTB-2.6735865D 05
DXTB 5.3020536D-01	DYTB-1.1749340D 00	DZTB-6.4607881D-01
XI 9.4137326D 01	YI 2.1605555D 02	ZI 1.2225072D 02
DXI 3.5128823D-03	DYI 8.3904238D-03	DZI 4.7425799D-03
DDXI 5.0832573D-08	DDYI 1.4165645D-07	DDZI 7.9776994D-08
RTB 5.7438507D 05	RDTB 1.4418757D 00	ACC 1.7033751D-07

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX 5.0542048D-08	SPY 1.4071365D-07	SPZ 7.9255451D-08
ENX 2.9053195D-10	ENY 9.4281445D-10	ENZ 5.2132827D-10
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX-6.6653921D-15	ORY-1.8085046D-14	OBZ 2.1466248D-13

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.146093829558098D 03 0.525937786409151D 06

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-1.2043134D 05	Y-5.7656964D 05	Z-3.2048668D 05
DX 5.5738595D-01	DY-1.0809980D 00	DZ-5.9369501D-01
R 6.7055796D 05	DEC-2.8550967D 01	RA-1.0179806D 02
V 1.3534067D 00	PTH 5.5332021D 01	AZ 9.5233973D 01
ALT 6.6418467D 05	LAT-2.8552500D 01	LON 6.9296303D 01
VE 4.2199609D 01	PTE 1.5115047D 00	AZE-9.0095343D 01
C3 6.4283940D-01	RTM 3.1906623D 05	RDOT 1.1131257D 00

PLANETARY COORDS (PACSS NO. 4)

XM 1.3256682D 04	YM-3.2472807D 05	ZM-1.7728544D 05
DXM 1.0558011D 00	DYM 4.8275685D-02	DZM 4.3533440D-02
RM 3.7020830D 05	DEM-2.8612294D 01	RAM-8.7662258D 01
LDM 8.3432109D 01	VM 1.0578004D 00	GHA 1.8890563D 02
XS-1.4994923D 08	YS 8.6393328D 06	ZS 3.7459984D 06
RAS 1.7670255D 02	LOS-1.2203087D 01	DES 1.4286844D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA-6.2006654D 05	ECC 1.4415968D 00	INC 2.8986981D 01
RAN-9.4798372D-01	APF 1.6069187D 02	RP 2.7381939D 05
VH 8.0177266D-01	RNMP-4.4107349D 01	APMP-2.3841392D 02
INMP 4.8076988D-01	APD-1.5139525D 06	TFP 1.9135532D 01
TA 9.0118626D 01	EA 5.2161854D 01	MA 3.3860953D 01
SLR 6.6855655D 05	PER 1.3497844D 03	MTA 1.3392174D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-1.2048148D 05	YTB-5.7676840D 05	ZTB-3.2059796D 05
DXTB 5.5593751D-01	DYTB-1.0873056D 00	DZTB-5.9722201D-01
XI 5.0137045D 01	YI 1.9875812D 02	ZI 1.1127577D 02
DXI 1.4484447D-03	DYI 6.3075158D-03	DZI 3.5270027D-03
DDXI 1.4619131D-08	DDYI 9.3043361D-08	DDZI 5.1827815D-08
RTB 6.7079104D 05	RDTB 1.3594021D 00	ACC 1.0750306D-07

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX 1.4519436D-08	SPY 9.2511562D-08	SPZ 5.1533141D-08
ENX 9.9697871D-11	ENY 5.3181599D-10	ENZ 2.9455922D-10
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX-3.4676339D-15	OBY-1.6642056D-14	OBZ 1.1477382D-13

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.170093829558098D 03 0.612337786409151D 06

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-7.1787381D 04	Y-6.6703448D 05	Z-3.7015238D 05
DX 5.6703511D-01	DY-1.0157785D 00	DZ-5.5747861D-01
R 7.6622530D 05	DEC-2.8887120D 01	RA-9.6142626D 01
V 1.2900066D 00	PTH 5.8547219D 01	AZ 9.2514725D 01
ALT 7.5985211D 05	LAT-2.8888471D 01	LON 7.3966133D 01
VE 4.8261886D 01	PTE 1.3065713D 00	AZE-9.0035040D 01
C3 6.2368372D-01	RTM 4.4519876D 05	RDOT 1.1004666D 00

PLANETARY COORDS (PACSS NO. 4)

XM 1.0319865D 05	YM-3.1090839D 05	ZM-1.6827114D 05
DXM 1.0157782D 00	DYM 2.7059302D-01	DZM 1.6439658D-01
RM 3.6827865D 05	DEM-2.7188059D 01	RAM-7.1637640D 01
LOM 9.8471119D 01	VM 1.0639794D 00	GHA 1.8989124D 02
XS-1.5004560D 08	YS 6.2900762D 06	ZS 2.7273198D 06
RAS 1.7759950D 02	LOS-1.2291737D 01	DES 1.0404146D 00

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA-6.3911112D 05	ECC 1.4297527D 00	INC 2.8986968D 01
RAN-9.4801351D-01	APF 1.6052428D 02	RP 2.7465974D 05
VH 7.8973649D-01	RNMP-5.8368526D 01	APMP-2.3846410D 02
INMP 4.8050313D-01	APD-1.5528820D 06	TFP 1.8358873D 01
TA 9.5177991D 01	EA 5.7045055D 01	MA 3.8673778D 01
SLR 6.6735525D 05	PER 1.4124450D 03	MTA 1.3438062D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-7.1787827D 04	YTB-6.6706574D 05	ZTB-3.7016967D 05
DXTB 5.6702373D-01	DYTB-1.0179845D 00	DZTB-5.5869849D-01
XI 4.4565149D-01	YI 3.1265269D 01	ZI 1.7296221D 01
DXI 1.1380306D-05	DYI 2.2060226D-03	DZI 1.2198811D-03
DDXI-1.7074095D-09	DDYI 7.6674362D-08	DDZI 4.2346076D-08
RTB 7.6626091D 05	RDTB 1.2922664D 00	ACC 8.7607438D-08

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-1.7158826D-09	SPY 7.6619663D-08	SPZ 4.2315601D-08
ENX 8.4742599D-12	ENY 5.4710272D-11	ENZ 3.0407423D-11
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX-1.1586430D-15	OBY-1.1522812D-14	OBZ 6.7145886D-14

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.1940938295580980 03 0.6987377864091510 06

GEOCENTRIC REFERENCE (PACSS NO. 4)

X-2.2650015D 04	Y-7.5247937D 05	Z-4.1703358D 05
DX 5.6954981D-01	DY-9.6395512D-01	DZ-5.2876499D-01
R 8.6061329D 05	DEC-2.8984776D 01	RA-9.1724112D 01
V 1.2382200D 00	PTH 6.1105422D 01	AZ 9.0377393D 01
ALT 8.5424014D 05	LAT-2.8985982D 01	LON 7.7399040D 01
VE 5.4309040D 01	PTE 1.1437693D 00	AZE-9.0004134D 01
C3 6.0686528D-01	RTM 5.8354681D 05	RDOT 1.0840743D 00

PLANETARY COORDS (PACSS NO. 4)

XM 1.8701342D 05	YM-2.7835892D 05	ZM-1.4911957D 05
DXM 9.1447013D-01	DYM 4.7939697D-01	DZM 2.7686714D-01
RM 3.6700729D 05	DEM-2.3973387D 01	RAM-5.6105107D 01
LDM 1.1301805D 02	VM 1.0689867D 00	GHA 1.9087685D 02
XS-1.5009818D 08	YS 3.9392138D 06	ZS 1.7079702D 06
RAS 1.7849666D 02	LOS-1.2380188D 01	DES 6.5171733D-01

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA-6.5682321D 05	ECC 1.4186922D 00	INC 2.8987019D 01
RAN-9.4533992D-01	APF 1.6020697D 02	RP 2.7500678D 05
VH 7.7901558D-01	RNMP-7.2736710D 01	APMP-2.3862511D 02
INMP 4.8113410D-01	APD-1.5886532D 06	TFP 1.7515672D 01
TA 9.9211901D 01	EA 6.1273231D 01	MA 4.3197615D 01
SLR 6.6515675D 05	PER 1.4715659D 03	MTA 1.3481941D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB-2.2631154D 04	YTB-7.5297703D 05	ZTB-4.1730825D 05
DXTB 5.7015487D-01	DYTB-9.7244186D-01	DZTB-5.3344210D-01
XI-1.8861056D 01	YI 4.9765606D 02	ZI 2.7466422D 02
DXI-6.0505654D-04	DYI 8.4867441D-03	DZI 4.6771082D-03
DDXI-1.1940786D-08	DDYI 6.9404222D-08	DDZI 3.8083320D-08
RTB 8.6118102D 05	RDTB 1.2471087D 00	ACC 8.0061649D-08

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-1.1980552D-08	SPY 6.8784801D-08	SPZ 3.7739270D-08
ENX 3.9765291D-11	ENY 6.1942848D-10	ENZ 3.4400849D-10
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
ORX-1.4243411D-16	OBY-7.5633959D-15	OBZ 4.2161964D-14

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.218093829558097D 03 0.785137786409151D 06

GEOCENTRIC REFERENCE (PACSS NO. 4)

X 2.6519501D 04	Y-8.3387642D 05	Z-4.6167411D 05
DX 5.6815244D-01	DY-9.2157185D-01	DZ-5.0532612D-01
R 9.5351778D 05	DEC-2.8958753D 01	RA-8.8178455D 01
V 1.1947579D 00	PTH 6.3198435D 01	AZ 8.8661846D 01
ALT 9.4714462D 05	LAT-2.8959841D 01	LON 7.9959090D 01
VE 6.0308830D 01	PTE 1.0131836D 00	AZE-8.9988027D 01
C3 5.9137764D-01	RTM 7.3245713D 05	RDOT 1.0664092D 00

PLANETARY COORDS (PACSS NO. 4)

XM 2.5960778D 05	YM-2.2887076D 05	ZM-1.2089347D 05
DXM 7.5737837D-01	DYM 6.6040478D-01	DZM 3.7322658D-01
RM 3.6659685D 05	DEM-1.9254952D 01	RAM-4.1399468D 01
LOM 1.2673808D 02	VM 1.0719396D 00	GHA 1.9186246D 02
XS-1.5010696D 08	YS 1.5873929D 06	ZS 6.8822488D 05
RAS 1.7939412D 02	LDS-1.2468340D 01	DES 2.6267869D-01

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA-6.7402481D 05	ECC 1.4078781D 00	INC 2.8986978D 01
RAN-9.4056910D-01	APF 1.5976828D 02	RP 2.7491997D 05
VH 7.6901082D-01	RNMP-8.7186418D 01	APMP-2.3885744D 02
INMP 4.8258713D-01	APD-1.6229696D 06	TFP 1.6598520D 01
TA 1.0254317D 02	EA 6.4981802D 01	MA 4.7418372D 01
SLR 6.6197377D 05	PER 1.5297512D 03	MTA 1.3525841D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB 2.6542977D 04	YTB-8.3396926D 05	ZTB-4.6172488D 05
DXTB 5.6906977D-01	DYTB-9.2502348D-01	DZTB-5.0721272D-01
XI-2.3475571D 01	YI 9.2837015D 01	ZI 5.0769869D 01
DXI-9.1732989D-04	DYI 3.4516256D-03	DZI 1.8865949D-03
DDXI-1.9198062D-08	DDYI 6.3046733D-08	DDZI 3.4405489D-08
RTB 9.5362420D 05	RDTB 1.1986549D 00	ACC 7.4345099D-08

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-1.9204771D-08	SPY 6.2961061D-08	SPZ 3.4357737D-08
ENX 6.7082896D-12	ENY 8.5677027D-11	ENZ 4.7724109D-11
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX 2.3073711D-16	OBY-4.9574989D-15	OBZ 2.7992100D-14

TABLE 5-LXIII S-IVB SPENT-STAGE SLINGSHOT TRAJECTORY
(CONTINUED)

T 0.2500000000000000D 03 0.9000000000000000D 06

GEOCENTRIC REFERENCE (PACSS NO. 4)

X 9.1510636D 04	Y-9.3700042D 05	Z-5.1820974D 05
DX 5.6304647D-01	DY-8.7575688D-01	DZ-4.8003798D-01
R 1.0746559D 06	DEC-2.8829835D 01	RA-8.4421990D 01
V 1.1464763D 00	PTH 6.5470404D 01	AZ 8.6850631D 01
ALT 1.0682827D 06	LAT-2.8830798D 01	LON 3.2381271D 02
VE 6.8184959D 01	PTE 8.7646885D-01	AZE-8.9978009D 01
C3 5.7258310D-01	RTM 9.4246154D 05	RDOT 1.0430033D 00

PLANETARY COORDS (PACSS NO. 4)

XM 3.3131749D 05	YM-1.4208458D 05	ZM-7.2300312D 04
DXM 4.8052643D-01	DYM 8.3684037D-01	DZM 4.6511642D-01
RM 3.6767736D 05	DEM-1.1340581D 01	RAM-2.3211938D 01
LOM 2.5022760D 01	VM 1.0712333D 00	GHA 3.1176530D 02
XS-1.5005086D 08	YS-1.5395366D 06	ZS-6.6758373D 05
RAS-1.7941216D 02	LOS-4.9117746D 02	DES-2.5489666D-01

KEPLERIAN OSCULATING ELEMENTS (PACSS NO. 4)

SMA-6.9614908D 05	ECC 1.3938780D 00	INC 2.8986656D 01
RAN-9.3153695D-01	APF 1.5904442D 02	RP 2.7419781D 05
VH 7.5669221D-01	RNMP-1.0639953D 02	APMP-2.3924915D 02
INMP 4.8605649D-01	APD-1.6664960D 06	TFP 1.5296028D 01
TA 1.0621386D 02	EA 6.9293321D 01	MA 5.2621423D 01
SLR 6.5639612D 05	PER 1.6056850D 03	MTA 1.3584212D 02

2-BODY AND XI TERMS (PACSS NO. 4)

XTB 9.1511825D 04	YTB-9.3700310D 05	ZTB-5.1821120D 05
DXTB 5.6329001D-01	DYTB-8.7630333D-01	DZTB-4.8033441D-01
XI-1.1891193D 00	YI 2.6792210D 00	ZI 1.4535230D 00
DXI-2.4353789D-04	DYI 5.4644951D-04	DZI 2.9643398D-04
DDXI-2.5047264D-08	DDYI 5.5513004D-08	DDZI 3.0106920D-08
RTB 1.0746590D 06	RDTB 1.1471374D 00	ACC 6.7937366D-08

PERTURBATION ACCELERATIONS (PACSS NO. 4)

SPX-2.5047389D-08	SPY 5.5511231D-08	SPZ 3.0105911D-08
ENX 1.2443006D-13	ENY 1.7758664D-12	ENZ 9.9121096D-13
DGX 0.0	DGY 0.0	DGZ 0.0
ATX 0.0	ATY 0.0	ATZ 0.0
OBX 3.2506721D-16	OBY-2.6968020D-15	OBZ 1.7598225D-14