

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES

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AS-204/IM-1 L/V OPERATIONAL
ALTERNATE MISSION TRAJECTORIES

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by

AEROSPACE PHYSICS BRANCH
CHRYSLER CORPORATION SPACE DIVISION

PREPARED BY A. GENTER

Checked by:

R. M. Blackstock
R. M. Blackstock
Preflight Trajectory Unit

APPROVED:

J. A. Zobel
J. A. Zobel, Managing Engineer
Preflight & Range Safety Group

J. G. Swider
J. G. Swider, Manager
Flight Mechanics Section

R. H. Ross
R. H. Ross, Chief Engineer
Aerospace Physics Branch

FOREWORD

This report documents the AS-204/LM-1 Launch Vehicle Operational Alternate Mission Trajectories. The analyses and documentation were performed by the Aerospace Physics Branch, Chrysler Corporation Space Division, within the scope of NAS 8-4016, Modification MSFC-1, Amendment 23, MCRR No. 101, BB Item 3.1.3-11-M01.

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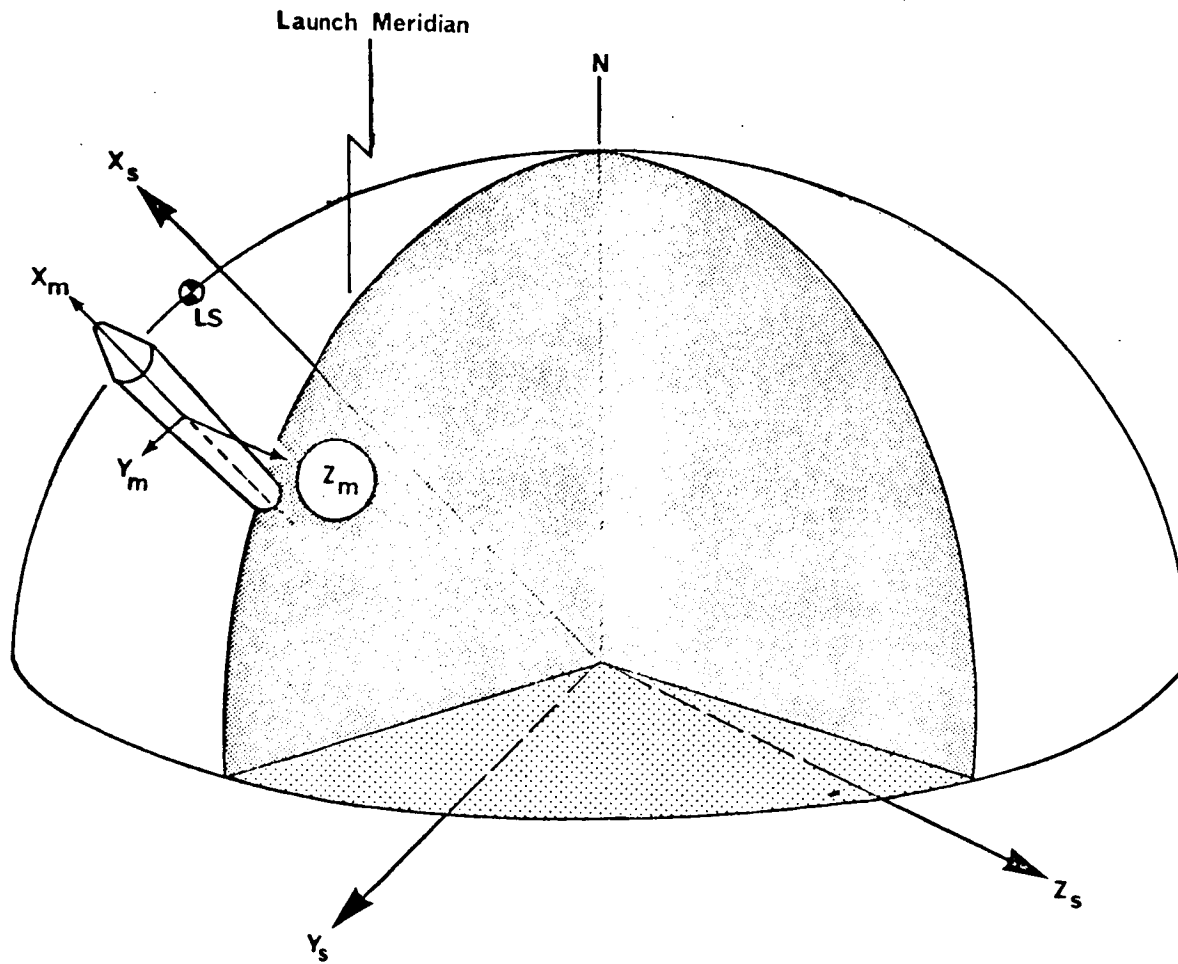
DEFINITIONS AND SYMBOLS

Aerodynamic Heating Indicator	$\int \frac{qV_r}{\pi/2 - \alpha_t } dt$ q = dynamic pressure V_r = relative velocity α_t = total angle of attack
Aerodynamic Load Indicator	Product of dynamic pressure and angle of attack.
Altitude	Vehicle altitude above the referenced ellipsoid measured along the geocentric position vector.
Angle of Attack, Pitch	Angle between the pitch plane relative velocity component and the longitudinal axis of the vehicle, measured positive nose up.
Axial Force	Component of the resultant aerodynamic force along the vehicle longitudinal axis (X axis of PASCs 8a), measured positive toward the tail of the vehicle.
Central Range Angle	Angle between instantaneous space fixed position vector and space fixed position vector at Guidance Reference Release
Descending Node Argument	Angle measured in the equatorial plane between the orbit plane descending node and the space fixed meridian plane defined at Guidance Reference Release.
Drag	Component of the resultant aerodynamic force along the earth fixed velocity vector, measured positive opposite to the velocity vector.
Dynamic Pressure	$\frac{1}{2} \times (\text{Density}) \times (\text{Relative Velocity})^2$
Earth Fixed Position	Position vector components in an earth-fixed pad-centered plumbline coordinate system. The X_e axis is coincident with the reference ellipsoid normal, positive upward. The Z_e axis is parallel to the earth-fixed aiming azimuth and is positive downrange. The Y_e axis completes a right handed system. (PASCs 10)
Earth Fixed Cross Range	Y_e component of PASCs 10 position vector.

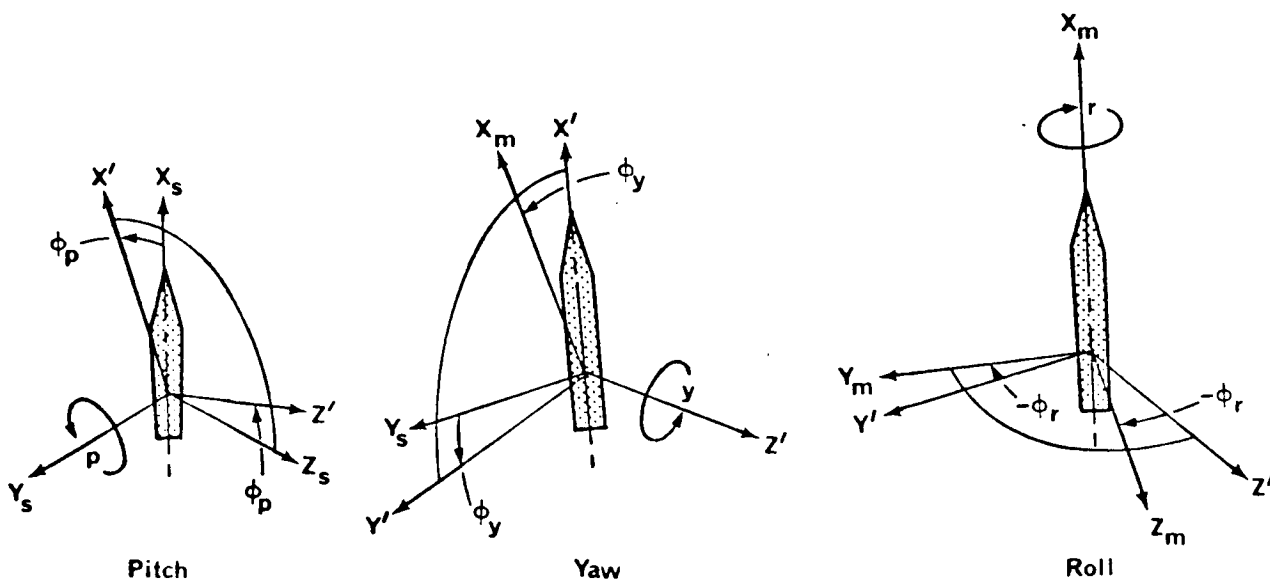
DEFINITIONS AND SYMBOLS (Cont'd)

Earth Fixed Flight Path Angle	Angle between the earth fixed velocity vector and the earth fixed geocentric position vector (PASCs 11), measured positive downrange from the position vector.
Earth Fixed Velocity	Velocity vector components in PASCs 10.
Earth Fixed Velocity Magnitude	$\sqrt{\dot{x}_e^2 + \dot{y}_e^2 + \dot{z}_e^2}$
Flight Azimuth	Angle defining orientation of the space fixed coordinate system downrange axis, Z_s , at Guidance Reference Release, measured positive east of north in plane normal to the space fixed X_s axis at Guidance Reference Release.
Geocentric Declination	Angle between the geocentric radius vector and the true equatorial plane, measured positive north of the equator.
Geodetic Latitude	Angle between the reference ellipsoid normal through the point of interest and the true equatorial plane, measured positive north of the equator.
Ground Range	Surface range measured from launch site to the sub vehicle point.
Inclination	Angle between the instantaneous flight plane and the equatorial plane.
Longitude	Angle between the Greenwich meridian plane and the projection of the geocentric position vector in the equatorial plane, measured positive east of Greenwich.
Longitudinal Acceleration	That part of the total measurable acceleration directed along the longitudinal axis of the vehicle.
Mach Number	$(\text{Relative Velocity}) \div (\text{Local Speed of Sound})$

DEFINITIONS AND SYMBOLS (Cont'd)



$$\bar{X}_m = (-\phi_r)_1 (\phi_y)_3 (\phi_p)_2 \bar{X}_s$$



DEFINITIONS AND SYMBOLS (Cont'd)

Mass

Mass of the vehicle.

Normal Force

Component of the resultant aerodynamic force normal to the vehicle X axis, and in the X-Z plane (PASCS 8a), measured positive toward Position I.

Pitch, Yaw, Roll

Eulerian angle of vehicle attitude measured with respect to the space fixed coordinate system. Vehicle attitude is defined by the ordered rotation of pitch, yaw, and roll, respectively. (See illustration)

Radius

$$\sqrt{X_s^2 + Y_s^2 + Z_s^2}$$

Relative Velocity

Velocity relative to the atmosphere (includes wind velocity).

Space Fixed Position

Position vector components in a spaced fixed, earth centered, plumbline coordinate system defined at Guidance Reference Release. The X_s axis is parallel to the reference ellipsoid normal which passes through the launch site. The Z_s axis is parallel to, and positive in the same direction as the earth-fixed firing azimuth. The Y_s axis completes the right handed system. This is Project Apollo Standard Coordinate System 13. (PASCS 13.)

Space Fixed Cross Range

Y_s component of PASCS 13 position vector.

Space Fixed Flight Path Angle

Angle between the space-fixed velocity vector and the radius vector (PASCS 13), measured positive downrange from radius vector.

Space Fixed Velocity

Velocity vector components in PASCS 13.

Space Fixed Velocity
Magnitude

$$\sqrt{\dot{X}_s^2 + \dot{Y}_s^2 + \dot{Z}_s^2}$$

Time

Instantaneous flight time referenced to first motion.

Weight

Weight of vehicle in pounds.

SUMMARY

This document presents a determination of the performance capability of the SA-204/LM-1 launch vehicle under the conditions imposed by the premature shutdown of a single S-IB engine. The ground rules for the study were those defined by the AS-204/LM-1 Launch Vehicle Operational Flight Trajectory (Revision I) presented in Reference 1.

Vehicle performance degradation due to single S-IB engine failure is presented in Figure II. Under 3-sigma low flight conditions the vehicle has mission capability with an S-IB engine failure after 55.0 seconds of flight. An engine failure at 36.1 seconds of powered flight time would result in a 50% probability of mission success. An engine failure any time during flight would cause no problems from a controllability standpoint. Detailed trajectory data is presented for S-IB stage single engine failures at flight times of 0, 36.1, and 55.0 seconds. Tracking coverage for these three trajectories is also included.

1.0 INTRODUCTION

The objectives of this study are to determine and evaluate the effect of an S-IB stage outboard engine failure on the mission capability of the SA-204/IM-1 Launch Vehicle and to present detailed trajectory data listings for selected times of engine failure. The engine out times considered to be of interest are:

- 1) The earliest engine failure time that will be compatible with launch vehicle controllability and separation criteria;
- 2) The earliest engine failure time that will provide a 50% probability of achieving the prescribed orbital conditions;
- 3) The earliest engine failure time that will provide a 3 sigma probability of achieving the prescribed orbital conditions.

The analysis and study results presented herein are consistent with the AS-204/IM-1 Launch Vehicle Operational Flight Trajectory (Revision I), documented in Reference 1.

2.0 DISCUSSION

2.1 MISSION DESCRIPTION: For the Apollo/Saturn 204 Mission considered herein, the primary objective of the launch vehicle is to insert the S-IVB/IU/Payload configuration into a near earth 85/120 nautical mile elliptical orbit. The payload consists of a Lunar Module (LM), 25° Nose Cone, and Spacecraft/LM Adapter.

The nominal predicted AS-204/IM-1 Launch Vehicle Operational Trajectory considered in this study is documented in Reference 1. The programmed flight sequence of events for the SA-204/IM-1 vehicle is presented in Table 1. Table 2 presents the SA-204/IM-1 vehicle weights breakdown. These data were extracted from and are consistent with Reference 1.

The term "alternate mission" is employed in this study to designate the effects on the above mission of a single S-IB stage engine failure during powered S-IB stage flight and does not imply a preplanned inflight change to the basic mission.

2.2 LAUNCH VEHICLE AND ENVIRONMENT DESCRIPTION: For the purpose of this analysis, the SA-204/IM-1 Launch Vehicle is defined by the subsystem characteristics and data in Reference 1. The atmospheric properties incorporated in the trajectory simulations are as defined by the 1963 Patrick Reference Atmosphere. The Fischer earth model and potential function are utilized. The average mean September and October head/tail wind profiles were included in all trajectory simulations discussed herein.

2.3 GUIDANCE AND CONTROL: Guidance of the SA-204/IM-1 Launch Vehicle into orbit is divided into two distinct guidance modes: 1) Pre-IGM; and 2) IGM. The Pre-IGM Guidance Mode provides pitch, yaw and roll attitude angle commands using prespecified functions of time from liftoff to the time of IGM initiation. The nominal commanded pitch attitude history for the AS-204/IM-1 Mission is depicted in Figure 13A.

For an S-IB stage engine out condition the "Chi Freeze" modification to the Pre-IGM Mode is implemented. The Chi Freeze modification implements a constant pitch attitude command for the Chi Freeze time interval given in Figure I as a function of engine out time. At the end of the Chi Freeze time interval the argument of the S-IB stage tilt program is biased by the value of the Chi Freeze time. For engine failure prior to 30 seconds of flight time, the Chi Freeze interval is the value shown in Figure I but the start of the freeze interval is delayed until 30 seconds of flight time has passed. For an engine failure after 30 seconds of flight time, the Chi Freeze time interval in Figure I is implemented at the time of engine out. For example, the S-IB stage tilt program resulting from the Chi Freeze modification for an engine out at liftoff is depicted in Figure 13A. (See Reference 2).

The IGM is an active closed loop guidance scheme which provides pitch and yaw attitude angle commands from the time of IGM initiation to J-2

cutoff signal. The commanded roll attitude angle is zero. It is noted that the Iterative Guidance Mode is an active guidance mode which will guide the S-IVB stage from a given point in space to the prespecified launch vehicle targeting condition. Thus, assuming successful S-IB/S-IVB separation and launch vehicle performance capability, the desired orbit insertion condition can be achieved.

Pitch, yaw and roll attitude control are maintained by the four swivelable H-1 engines, engines no. 1, 2, 3, and 4, during the S-IB stage of powered flight. The J-2 engine provides pitch and yaw attitude control throughout the S-IVB stage of powered flight. Roll attitude control is maintained by the Auxiliary Propulsion System (APS). Failure of one of the S-IB outboard engines will cause vehicle attitude rates and attitude errors to deviate from the nominal due to Chi Freeze logic and the reduction of control authority.

2.4 FLIGHT SEQUENCE OF EVENTS: The nominal flight sequence of events, for the purpose of this study, is presented in Table 1. Off nominal propulsion system performance produces significant changes in this nominal sequence of events. Of primary interest are the events which establish LVDC time bases and the subsequent events dependent on these time bases. A discussion of pertinent time bases and associated events follows:

- 1) Time Base 2 (TB2): TB2 is nominally established by S-IB stage propellant level sensor actuation or by a back-up LVDC signal initiated 1.75 seconds after the precalculated time, if a sufficient downrange velocity exists. The dependent events pertinent to this study are Inboard Engine Cutoff Signal (IECO), interconnection of thrust OK switches, and fuel depletion probe arming. Interconnection of the thrust OK pressure switches (TOPS), which occurs at TB2 + 5.2 seconds, provides for issuance of the OECO signal if any outboard engine is experiencing low thrust after this time. Thus, if a TOPS switch indicates low pressure prior to TB2 + 5.2 seconds only that engine from which the low pressure indication is received will be cutoff.
- 2) Time Base 3 (TB3): TB3 is nominally established at outboard engine cutoff (OECO) by actuation of propellant depletion probes or by a backup LVDC signal initiated at TB2 + 10 seconds. Pertinent dependent events are ullage rocket firing, S-IB/S-IVB separation signal, J-2 engine start signal, and IGM guidance initiation.
- 3) Time Base 4 (TB4): TB4 is initiated by deactivation of the S-IVB thrust OK switches at S-IVB engine cutoff. For the purposes of this study, TB4 occurs at approximately 0.2 seconds after Guidance Cutoff Signal (GCS). GCS is initiated when the S-IVB stage obtains a predetermined space fixed velocity magnitude. The significant events subsequent to TB4 are the preplanned orbital maneuvers and S-IVB stage venting.

In the event of an S-IB stage engine out condition the LVDC will adjust the back-up time for initiation of TB2 by $8/7$ of the remaining nominal level sensors actuation time plus 1.75 seconds. In addition, the LVDC back-up time for initiation of TB3 is adjusted correspondingly. This will allow initiation of TB2 by level sensors actuation, and subsequent events, at a later flight time.

3.0 RESULTS

3.1 VEHICLE CONTROL: It has been determined that controllability and separation criteria can be met by launch vehicle SA-204/LM-1 whenever a single S-IB control engine failure occurs provided the "Chi Freeze" modification to the Pre-IGM guidance mode is implemented (Reference 2). The Chi Freeze logic programmed for vehicle SA-204/LM-1 is described in Figure I. This figure presents a graph of the Chi Freeze interval as a function of time of S-IB engine failure. The interval of constant attitude command is initiated at the time of engine failure unless the failure occurs prior to 30 seconds flight time. In this case, the initiation of the freeze interval is delayed until 30 seconds flight time has elapsed.

Reference 2 also indicates that a lower control engine failure is the worst possible case from a controllability and separation standpoint. Engine no. 4 was therefore arbitrarily chosen as the failed engine for all trajectories presented in this study. It should be noted, however, that from a performance standpoint, there is some dispersion in vehicle capability caused by the varying performance levels of the individual engines.

3.2 PERFORMANCE CAPABILITY: The SA-204/LM-1 Launch Vehicle nominal weight in orbit is predicted to be 70,205 pounds. This is 3,386 pounds in excess of the nominal propellant depletion weight (Reference 1). The allocation of 1,300 pounds for Flight Performance Reserve (Reference 3) leaves 2,086 pounds of S-IVB propellants to compensate for an S-IB engine failure with a three sigma probability of mission success.

Figure II presents a curve of payload degradation as a function of S-IB stage single engine failure time. An engine failure at 55.0 seconds effects a degradation of 2,086 pounds of payload. Thus, engine failure at this time or later results in at least a three sigma probability of mission success.

Referring again to Figure II, a payload degradation of 3,386 pounds occurs if an S-IB engine fails at 36.1 seconds of flight time. An engine failure at this time would necessitate FPR consumption, and reduce mission success probability to 50%. Engine failure at lift-off, although presenting no control or separation problems, results in essentially a zero probability of attaining the desired orbital insertion conditions.

3.3 LAUNCH VEHICLE ALTERNATE MISSION TRAJECTORIES: The three trajectories outlined in the Introduction to this document are discussed below. Tables and curves relative to each of these trajectories are found elsewhere in this document as indicated in the following paragraphs.

3.3.1 AS-204/LM-1 Alternate Mission Trajectory No. 1: Paragraph 3.1 indicated that the earliest control engine failure that will be compatible with launch vehicle controllability and separation criteria is engine failure at first motion. The trajectory simulation resulting from engine no. 4 failure at 0 seconds flight time is denoted for the

purpose of this document as AS-204/LM-1 Alternate Mission Trajectory Number 1. Data pertaining to this trajectory are presented in Appendix A. The sequence of events for this trajectory is presented in Table 1A. A comparison of significant trajectory parameters at pertinent flight events between the nominal trajectory and A/M trajectory No. 1 is presented in Table 2A. Trajectory listings of AS-204/LM-1 A/M Trajectory No. 1 are presented in Tables 3A and 4A. Corresponding listings in English units are given in Tables 5A and 6A. Figures 1A through 33A present curves of selected parameters from the alternate mission compared to the nominal values obtained from the Revised Operational Trajectory.

The engine failure at liftoff causes time base 2 events to be delayed by 19.6 seconds and time base 3 events to be delayed by 22.1 seconds. The S-IVB stage burned to a propellant depletion shutdown at an extended S-IVB burn time of 8.1 seconds.

Figures 1A through 6A present trajectory parameter histories for the Alternate Mission Trajectory No. 1 as compared to the nominal. It is noted that the prescribed launch vehicle targeting velocity is not achieved by the alternate mission trajectory due to propellant depletion shutdown of the S-IVB stage. At J-2 engine shutdown signal, the vehicle inertial velocity is 7716.23 m/sec. This is 105.26 m/sec less than the target velocity for Guidance Cutoff Signal (GCS), and produces S-IVB/IU/Payload impact approximately 31 minutes after liftoff at 13.4° N. latitude and 8.7° E. longitude.

Maximum engine deflection angle encountered is approximately 1.00 degree. This occurs in the pitch plane of engine no. 3 at 54 seconds and again at 105 seconds flight time (Figure 25A).

The launch vehicle experiences large angles of attack in both pitch and yaw during the early portion of S-IB stage of flight (Figure 7A, 8A). The angle of attack has declined to an acceptable level, however, by the time a significant dynamic pressure is attained (Figure 9A). The aerodynamic load indicator (the product of angle of attack and dynamic pressure) exhibits greater loads in the engine out case than in the nominal. Maximum loads are within accepted tolerances (Figure 10A).

Vehicle attitude error and attitude rate during the period between stage separation and IGM initiation are shown in Figures 28A through 33A for the nominal and A/M No. 1 trajectories. The vehicle attitude rates for pitch, yaw, and roll deviate only slightly from the nominal while the vehicle attitude errors are within limits.

3.3.2 AS-204/LM-1 Alternate Mission Trajectory No. 2: Paragraph 3.2 indicated that the earliest engine failure that will provide a 50% probability of achieving the prescribed orbital conditions is

engine failure at 36.1 seconds flight time. The trajectory simulation resulting from engine number 4 failure at 36.1 seconds is denoted for the purposes of this document as AS-204/LM-1 Alternate Mission Trajectory No. 2. Data pertaining to this trajectory are presented in Appendix B. The sequence of events for this trajectory is presented in Table 1B. A comparison of significant trajectory parameters at pertinent flight events between the nominal trajectory and A/M trajectory No. 2 is presented in Table 2B. Trajectory listings of AS-204/LM-1 A/M Trajectory No. 2 are presented in Tables 3B and 4B. Corresponding listings in English units are given in Tables 5B and 6B. Figures 1B through 33B present curves of selected parameters from the alternate mission as compared to the nominal values obtained from the Revised Operational Trajectory.

The engine failure at 36.1 seconds causes time base 2 events to be delayed by 14.1 seconds and time base 3 events to be delayed by 16.6 seconds. The extended burn time of S-IVB stage is 8.1 seconds.

Figures 1B through 6B present trajectory parameter histories for Alternate Mission Trajectory No. 2 as compared to the nominal. It is noted that the prescribed launch vehicle targeting conditions are achieved by the alternate mission.

Maximum engine deflection angle encountered is approximately 1.5 degrees. This occurs in the pitch plane of engine no. 3 at 38 seconds flight time (Figure 25B).

Vehicle angle of attack, dynamic pressure, and aerodynamic loading indicator in the alternate mission trajectory no. 2 each experience some deviation from the nominal. However, the deviations are within acceptable limits (Figures 7B through 10B).

Vehicle attitude error and attitude rate during the period between separation and IGM initiation are shown in Figures 28B through 33B for the nominal and A/M No. 2 trajectories. Slightly larger excursions in both these parameters are experienced in the alternate mission simulation. However, the excursions are within acceptable limits.

3.3.3 AS-204/LM-1 Alternate Mission Trajectory No. 3: Paragraph 3.2 indicated that the earliest engine failure that will provide a three sigma probability of achieving mission success is engine failure at 55.0 seconds flight time. The trajectory which simulates these conditions is denoted as AS-204/LM-1 Alternate Mission Trajectory No. 3. Data pertaining to this trajectory is presented in Appendix C. The sequence of events for this trajectory is presented in Table 1C. A comparison of significant trajectory parameters at pertinent flight events between the nominal trajectory and A/M trajectory No. 3 is presented in Table 2C. Trajectory listings of AS-204/LM-1 A/M Trajectory

No. 3 are presented in Tables 3C and 4C. Corresponding listings in English units are given in Tables 5C and 6C. Figures 1C through 33C present curves of selected parameters from the alternate mission as compared to the nominal values obtained from the Revised Operational Trajectory.

The engine failure at 55.0 seconds causes time base 2 events to be delayed by 11.2 seconds and time base 3 events to be delayed by 13.7 seconds. The extended burn time of the S-IVB stage is 5.0 seconds.

Figures 1C through 6C present trajectory parameter histories for Alternate Mission Trajectory No. 3 as compared to the nominal. It is noted that the prescribed launch vehicle targeting conditions are achieved by the alternate mission.

Maximum engine deflection angle encountered is approximately 1.8 degrees. This occurs in the pitch plane of engine no. 3 at 57.0 seconds and again at 64 seconds flight time (Figure 25C)

Vehicle angle of attack, dynamic pressure history, and aerodynamic loading indicator differ significantly from the nominal trajectory values (Figures 7C through 10C), but are within acceptable tolerances.

During the period between stage separation and IGM initiation slightly larger excursions in vehicle attitude rates and attitude errors are also noted in the alternate mission simulation. However, these deviations are within acceptable limits (Figures 28C through 33C).

3.3.4 Trajectory Data Tapes. The trajectory data tapes required for distribution by MSFC, R-AERO-FM, are identified below:

Trajectory 1:

Listing (Printout Tape)
CCSD/Slidell Reel No. 6592
MSFC copy transmitted August 7, 1967;

Data tape (B7)
CCSD/Slidell Reel No. 0497
MSFC copy transmitted August 7, 1967.

Trajectory 2:

Listing (Printout Tape)
CCSD/Slidell Reel No. 4016
MSFC copy transmitted August 7, 1967;

Data tape (B7)
CCSD/Slidell Reel No. 6826
MSFC copy transmitted August 7, 1967.

Trajectory 3:

Listing (Printout Tape)

CCSD/Slidell Reel No. 5255

MSFC copy transmitted August 7, 1967;

Data tape (B7)

CCSD/Slidell Reel No. 10038

MSFC copy transmitted August 7, 1967.

3.4 TRACKING SUMMARY: Tracking coverage of each AS-204/IM-1 Launch Vehicle Operational Alternate Mission Trajectory is summarized in Table 3. This table provides a comparison of the tracking coverage for the AS-204/IM-1 nominal and alternate mission trajectories. Tracking station acquisition and loss times for the alternate mission trajectories usually occur later than during nominal flight, due to the lower altitude and reduced velocity profile being flown.

4.0 REFERENCES

1. "AS-204/LM-1 Launch Vehicle Operational Flight Trajectory (Revision I)", TN-AP-67-255, 25 July 1967.
2. "SA-204/LM-1 Launch Vehicle Dynamics Analyses", TN-AP-67-239, 2 June 1967.
3. "AS-204 Launch Vehicle Operational Flight Trajectory Dispersion Analysis", TN-AP-66-72, 26 September 1966.

TABLE 1

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
NOMINAL FLIGHT SEQUENCE OF EVENTS

<u>NOMINAL FLIGHT TIME</u> <u>(HR: MIN: SEC)</u>	<u>TIME</u> <u>(SEC)</u>	<u>PROGRAM</u> <u>TIME (SEC)</u>	<u>EVENT</u>
- 0:0:05.0	- 5.00	---	Guidance Reference Release (GRR).
- 0:0:03.1	- 3.10	---	Initiate S-IB Mainstage Ignition Sequence.
0:0:00.0	0.00	---	First Motion.
0:0:00.2	0.20	(0.0) ₁	Lift-off Signal. Initiate Time Base 1
0:0:10.2	10.20	(10.0) ₁	Initiate Pitch and Roll Maneuvers.
0:0:40.2	40.20	(40.0) ₁	Control Gain Switch Point.
0:1:14.0	74.00	---	Maximum Dynamic Pressure.
0:1:40.2	100.20	(100.0) ₁	Control Gain Switch Point.
0:2:00.2	120.20	(120.0) ₁	Control Gain Switch Point.
0:2:12.5	132.50	(132.3) ₁	Enable S-IB Propellant Level Sensors.
0:2:13.2	133.20	(133.0) ₁	Tilt Arrest.
0:2:16.0	136.04	(0.0) ₂	Level Sensor Activation; Initiate Time Base 2.
0:2:19.1	139.14	(3.1) ₂	Inboard Engine Cutoff (IECO).
0:2:22.1	142.14	(0.0) ₃	Outboard Engine Cutoff (OECO); Initiate Time Base 3.
0:2:23.4	143.44	(1.3) ₃	Separation Signal.
0:2:23.5	143.52	---	S-IB/S-IVB Physical Separation;
		(1.4) ₃	Control Gain Switch Point.

TABLE 1 (Cont'd)
AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
NOMINAL FLIGHT SEQUENCE OF EVENTS

<u>NOMINAL FLIGHT TIME</u> <u>(HR: MIN: SEC)</u>	<u>TIME</u> <u>(SEC)</u>	<u>PROGRAM</u> <u>TIME (SEC)</u>	<u>EVENT</u>
0:2:24.8	144.84	(2.7) ₃	J-2 Engine Start Command.
0:2:27.2	147.19	----	Ullage Burn Out.
0:2:28.1	1 14	----	90% J-2 Thrust Level.
0:2:30.8	1 84	(8.7) ₃	Command PU System Activation.
0:2:35.4	155.44	(13.3) ₃	Jettison Ullage Rocket Motors.
0:2:39.1	159.14	(17.0) ₃	Command Active Guidance Initiation.
0:4:45.8	285.84	(143.7) ₃	Control Gain Switch Point.
0:7:55.8	475.75	----	EMR Shift Sensed by IGM.
0:9:58.2	598.15	----	Guidance Cutoff Signal (GCS).
0:9:58.4	598.15	(0.0) ₄	Initiate Time Base 4. (Reflects an approximate 0.2 second systems delay)
0:10:03.2	608.15	----	Orbital Insertion.
0:10:43.4	643.35	(45.0) ₄	Nose Cone Jettisoned.
0:19:58.4	1 35	(600.0) ₄	SIA Panel Deployment.
0:53:00.0	3235.00	----	IM Separation.
4:30:00.0	16200.00	----	Loss of S-IVB/IU Attitude Control.

TABLE 2

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
NOMINAL VEHICLE WEIGHT BREAKDOWN
(POUNDS)

Spacecraft *	36,342	
Instrument Unit	4,600	
S-IVB Stage Dry	23,427	
S-IVB Residuals	2,450	
Useable Reserve Propellant (Includes FPR)	<u>3,386</u>	
Injection Weight		70,205
J-2 Thrust Decay Propellant and LOX Venting	<u>241</u>	
S-IVB Cutoff Weight		70,446
S-IVB Propellant Consumed	224,976	
S-IVB APS Propellant Consumed	6	
Ullage Cases	<u>215</u>	
S-IVB "90% Thrust" Weight		295,643
S-IVB GH2 Start Tank	4	
S-IVB Buildup Propellant Consumed	390	
Ullage Propellant Consumed	176	
S-IVB Detonation Package	<u>5</u>	
S-IVB Stage Weight at Separation		296,218
S-IVB Aft Frame Hardware	31	
S-IB/S-IVB Interstage	6,654	
S-IB Dry Weight	85,317	
S-IB Residuals and Reserves	10,843	
S-IVB Frost Consumed	100	
S-IB Frost Consumed	1,000	
S-IB Seal Purge Consumed	6	
S-IB Fuel Additive Consumed	27	
S-IB Gearbox Lubricant Consumed	714	
Inboard Engine Thrust Decay Prpt Consumed	2,143	
Outboard Engine Thrust Decay Prpt Consumed		
To Separation	1,653	
S-IB Mainstage Propellant Consumed	<u>880,338</u>	
Vehicle Liftoff Weight		1,285,044
* SIA	3,950	
Lunar Module	31,325	
Nose Cone	<u>1,067</u>	
	36,342	

TABLE 3
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
TRACKING AND TELEMETRY COVERAGE

<u>Tracking Stations</u>	<u>Nominal</u>		<u>Alternate Mission No. 3</u>		<u>Alternate Mission No. 2</u>		<u>Alternate Mission No. 1</u>	
	Acq. (Sec)	Loss (Sec)	Acq. (Sec)	Loss (Sec)	Acq. (Sec)	Loss (Sec)	Acq. (Sec)	Loss (Sec)
<u>GLOTRAC</u>								
Glotrac I	27	468	27	480	27	494	37	500
Bassett Cove	110	491	115	505	118	517	131	525
Atlantic	185	533	201	549	201	560	218	569
Grand Turk	329	469	377	468	359	490	408	481
Bermuda	341	699	367	718	370	727	391	737
<u>TELEMETRY</u>								
Cape Tel 4	25	467	25	479	25	493	34	499
MILA-CIF	20	468	20	480	20	493	29	500
Vero Beach	65	467	66	479	68	493	82	499
New Smyrna	56	465	56	477	57	491	71	497
P. F. Ship	382	722	408	741	412	750	432	761
Grand Bahama	110	492	116	505	118	518	131	526
Grand Turk	328	470	376	469	358	491	406	483
Bermuda	346	701	372	720	375	730	396	740
<u>C-BAND RADAR</u>								
MILA	28	466	28	478	28	492	39	499
Patrick	41	466	41	478	41	492	54	499
Grand Bahama	110	491	115	504	118	517	131	525
Grand Turk	327	471	375	471	357	493	404	485
Bermuda	346	701	372	720	375	730	396	740
P. F. Ship	382	722	408	741	412	750	432	760

Figure I
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
CHI-FREEZE LOGIC

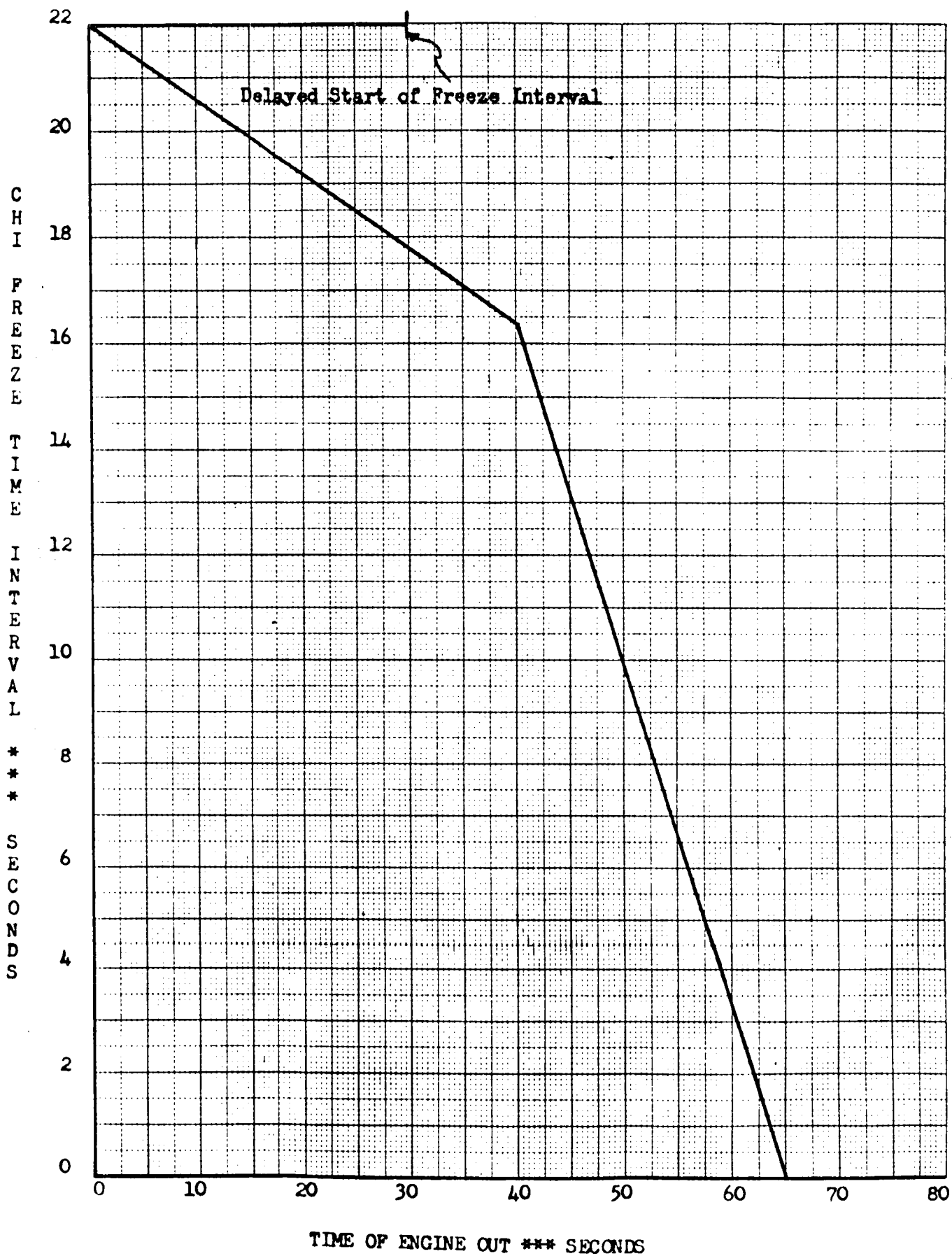
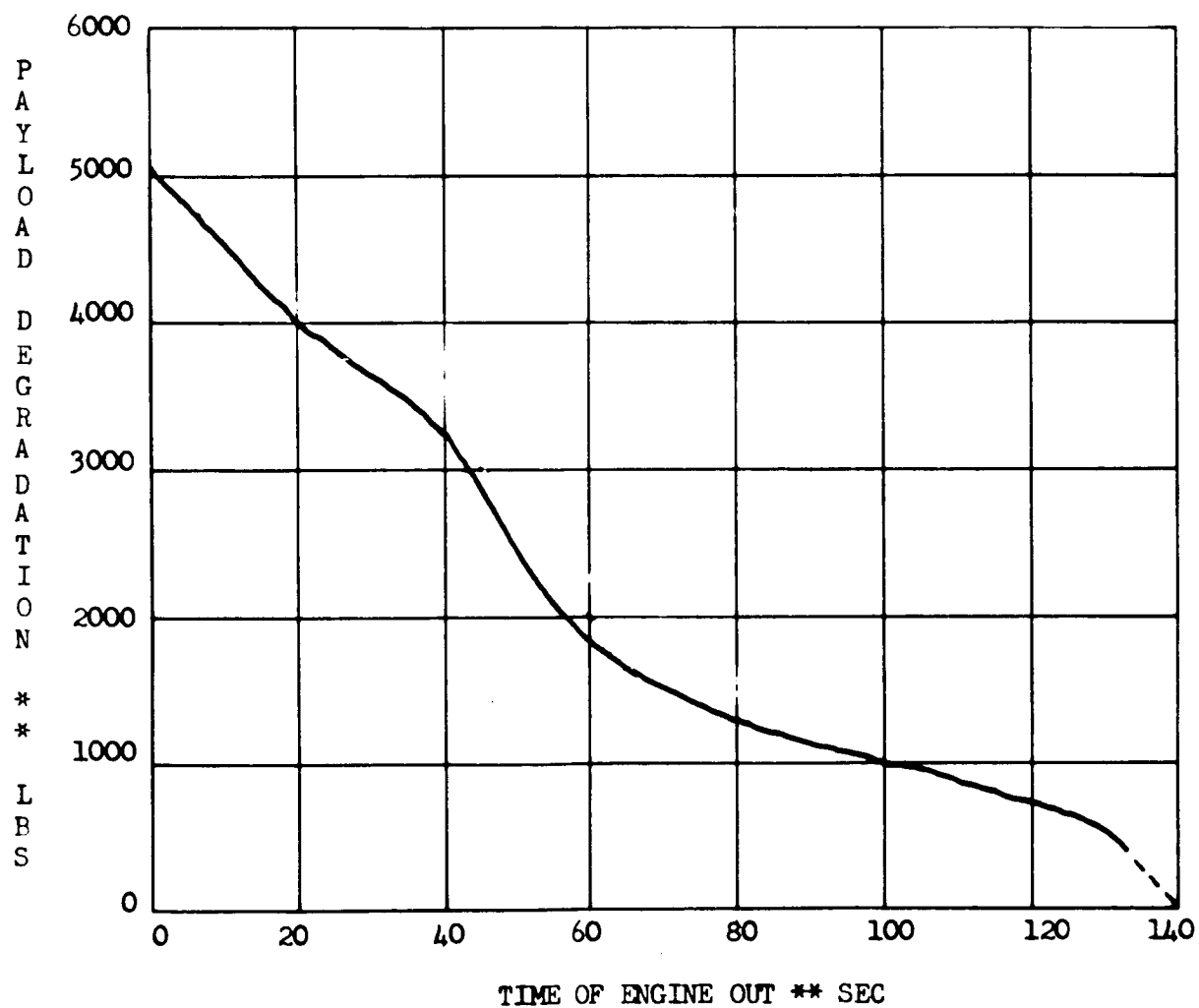


Figure II

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ENGINE OUT PERFORMANCE CAPABILITY



APPENDIX A: "AS-204/LM-1 A/M TRAJECTORY NO.1 DATA DISPLAY"

TABLE 1A

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
FLIGHT SEQUENCE OF EVENTS

<u>NOMINAL FLIGHT</u> <u>(HR: MIN: SEC)</u>	<u>TIME</u> <u>(SEC)</u>	<u>PROGRAM</u> <u>TIME (SEC)</u>	<u>EVENT</u>
-0:0:05.0	- 5.00	---	Guidance Reference Release (GRH).
-0:0:03.1	- 3.10	---	Initiate S-IB Mainstage Ignition Sequence.
0:0:00.0	0.00	---	First Motion. Engine No. 4 Premature Shutdown.
0:0:00.2	0.20	(0.0) ₁	Lift-off Signal. Initiate Time Base 1
0:0:10.2	10.20	(10.0) ₁	Command Pitch and Roll Maneuvers.
0:0:40.2	40.20	(40.0) ₁	Control Gain Switch Point.
0:1:32.0	92.00	---	Maximum Dynamic Pressure.
0:1:40.2	100.20	(100.0) ₁	Control Gain Switch Point.
0:2:00.2	120.20	(120.0) ₁	Control Gain Switch Point.
0:2:12.5	132.50	(132.3) ₁	Enable S-IB Propellant Level Sensors.
0:2:34.3	154.25	(154.05) ₁	Command Tilt Arrest
0:2:35.7	155.65	(0.0) ₂	Level Sensor Activation; Initiate Time Base 2.
0:2:38.8	158.75	(3.1) ₂	Inboard Engine Cutoff (IECO).
0:2:44.3	164.25	(0.0) ₃	Outboard Engine Cutoff (OECO); Initiate Time Base 3.
0:2:45.6	165.55	(1.3) ₃	Separation Signal.
0:2:45.6	165.63	--- (1.4) ₃	S-IB/S-IVB Physical Separation; Control Gain Switch Point.

TABLE 1A (Cont'd)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
FLIGHT SEQUENCE OF EVENTS

<u>NOMINAL FLIGHT</u> <u>(HR: MIN: SEC)</u>	<u>TIME</u> <u>(SEC)</u>	<u>PROGRAM</u> <u>TIME (SEC)</u>	<u>EVENT</u>
0:2:47.0	166.95	(2.7) ₃	J-2 Engine Start Command.
0:2:49.3	169.30	---	Ullage Burn Out.
0:2:50.3	170.25	---	90% J-2 Thrust Level.
0:2:53.0	172.95	(8.7) ₃	Command PU System Activation.
0:2:57.6	177.55	(13.3) ₃	Jettison Ullage Rocket Motors.
0:3:01.3	181.45	(17.0) ₃	Command Active Guidance Initiation.
0:5:08.0	307.95	(143.7) ₃	Control Gain Switch Point.
0:8:18.3	498.25	---	EMR Shift Sensed by IGM.
0:10:28.3	628.34	---	Propellant Depletion Cutoff.
0:31:02.8	1862.76	---	S-IV-B/Payload Impact

TABLE 2A

COMPARISON OF AS-204/LM-1 L/V OPERATIONAL TRAJECTORY (REVISION I)
AND AS-204/LM-1 ALTERNATE MISSION TRAJECTORY NO. 1

FLIGHT EVENT	FINAL OPERATIONAL TRAJECTORY					ALTERNATE MISSION TRAJECTORY # 1				
	FLIGHT TIME (SEC)	ALTITUDE (KI)	RANGE (KM)	SPACE FIXED VELOCITY (M/SEC)	SPACE FIXED PATH ANGLE (DEG)	FLIGHT TIME (SEC)	ALTITUDE (KM)	RANGE (KM)	SPACE FIXED VELOCITY (M/SEC)	SPACE FIXED PATH ANGLE (DEG)
GRR	-5.00	0.03	0.00	408.93	90.000	-5.00	0.03	0.00	408.93	90.000
First Motion	0.00	0.03	0.00	408.93	90.000	0.00	0.03	0.00	408.93	90.000
Maximum Dynamic Pressure	74.00	12.34	3.83	745.54	57.854	92.00	12.59	4.38	710.24	59.007
Tilt Arrest	133.20	52.62	46.36	2091.86	61.285	155.50	52.23	46.86	1986.64	62.753
IECO	139.14	58.82	55.44	2309.91	62.154	158.75	55.24	51.44	2090.49	63.266
OECO	142.14	62.08	60.43	2368.73	62.606	164.25	60.43	59.68	2163.33	64.253
Separation	143.52	63.58	62.77	2369.58	62.854	165.63	61.72	61.80	2162.67	64.540
J-2 Engine Start	144.84	65.00	65.00	2364.15	63.102	166.95	62.94	63.84	2157.57	64.821
Ullage Case Jettison	155.44	75.97	83.12	2374.30	64.990	177.55	72.30	80.30	2170.21	66.895
Initiate IGM	159.25	79.76	89.76	2387.08	65.631	181.75	75.83	86.98	2185.36	67.667
EMR Shift	475.75	177.00	1062.70	5483.43	91.465	498.25	170.80	987.48	5176.71	90.543
Propellant Depletion	-	-	-	-	-	528.34	163.20	1738.57	7716.23	90.078
Guidance Cutoff Signal	598.15	163.19	1796.20	7821.49	90.004	-	-	-	-	-
Orbit Insertion	608.15	163.22	1868.55	7828.60	89.992	-	-	-	-	-

TABLE 3A
AS-204/LM-3 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-14 STAGE FLIGHT DATA

FLIGHT TIME (SEC)	MASS (KG)	THRUST (TOTAL) (N)	DRAW (N)	LONGITUDINAL ACCELERATION (M/SEC ²)	DYNAMIC PRESSURE (N/M ²)	A.H.I. (KG-M/M ² -RAD)	MACH NO.	PITCH ANGLE OF ATTACK (DEG)
1) -5.00	58924.3	0.	---	0.000	0.	0.	0.00	0.000
2) 0.00	58288.6	7007287.	5834.	12.117	0.	0.	0.00	0.000
5.00	57047.9	6234722.	8256.	11.010	21.	11.	0.02	10.488
10.00	55924.9	6256167.	13760.	11.280	100.	195.	0.04	13.919
15.00	54601.1	6292000.	22888.	11.587	268.	1228.	0.06	12.597
20.00	53361.6	6343109.	35248.	11.929	571.	4839.	0.09	10.712
25.00	52137.7	6380875.	45516.	12.269	1065.	14818.	0.13	9.752
30.00	50892.3	6419351.	54150.	12.633	1814.	38414.	0.17	9.323
35.00	49648.9	6459224.	78150.	13.006	2873.	88317.	0.21	10.690
40.00	48402.4	6499174.	103816.	13.389	4243.	183479.	0.27	10.695
45.00	47156.2	6543165.	125241.	13.805	5953.	350352.	0.32	10.029
50.00	45908.2	6587136.	147044.	14.233	8002.	524886.	0.39	9.022
55.00	44656.6	6634615.	164130.	14.682	10367.	1053106.	0.46	7.187
60.00	43410.7	6686164.	173324.	15.166	13055.	1693612.	0.54	4.770
65.00	42162.2	6741850.	185944.	15.695	15983.	2619954.	0.64	3.236
70.00	40913.8	6796258.	211686.	16.229	19025.	3910496.	0.75	2.197
75.00	39663.4	6847495.	314070.	16.603	21939.	5649284.	0.87	1.613
80.00	38408.5	6892788.	582128.	16.960	24222.	7982814.	1.00	1.226
85.00	37153.5	6941445.	615733.	17.153	25664.	10591808.	1.15	0.785
90.00	35898.8	6989024.	554461.	18.049	26394.	13758695.	1.33	0.506
95.00	34644.2	7028801.	520188.	18.449	26458.	15148969.	1.41	0.521
100.00	33393.6	7052755.	451910.	19.113	26258.	17358553.	1.54	0.636
105.00	32147.3	7078440.	365917.	20.183	24887.	21317774.	1.77	1.208
110.00	30903.1	7103447.	277188.	21.334	21959.	25423399.	1.99	1.830
115.00	29659.7	7111048.	204682.	22.469	18232.	29368349.	2.21	1.440
120.00	28418.0	7111339.	144253.	23.636	14773.	33015759.	2.45	1.224
125.00	27178.0	7108108.	103551.	24.810	11663.	36284101.	2.70	0.945
130.00	25940.2	7099148.	72789.	26.041	8976.	39128362.	2.98	0.570
135.00	24704.8	7087066.	50769.	27.336	6651.	41515987.	3.25	0.585
140.00	23473.2	7071420.	32828.	28.725	4821.	43449895.	3.53	0.603
145.00	22243.2	7052246.	16000.	30.238	3410.	44983726.	3.82	0.383
150.00	21017.9	7028594.	6450.	31.865	2374.	46164797.	4.12	-0.145
155.00	19797.0	6994688.	2035.	33.432	1650.	47069967.	4.47	-0.970
160.00	18575.8	695478.	-2412.	35.580	1159.	47760633.	4.92	-2.335
165.00	17345.1	6895029.	-2779.	35.783	1118.	47813113.	4.98	-2.448
170.00	16121.8	6837455.	-5074.	37.140	880.	48172409.	5.35	-1.371
175.00	14922.8	6745419.	-6760.	16.897	783.	48289605.	5.45	-0.918
180.00	13759.8	664539.	-6104.	14.488	508.	48599859.	5.73	0.342
185.00	12568.0	654539.	-5413.	0.591	435.	48571104.	5.76	0.654
190.00	11364.1	641516.	-5370.	0.319	430.	48575076.	5.76	0.674

1) GRR; 2) First Motion; Engine No. 4 Premature Shutdown; 3) Max. Dyn. Pressure; 4) Tilt Arrest; 5) IECO; 6) OEEO;

7) Sep. Signal; 8) Physical Sep.

TABLE 3A (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-IR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	----- SPACE FIXED -----			--- SPACE FIXED POSITION AND VELOCITY VECTOR ---					COMPONENTS ---		
	RADIUS (M)	VELOCITY (M/S)	PATH ANGLE (DEG)	X (M)	Y (M)	Z (M)	DX (M/S)	DY (M/S)	DZ (M/S)		
-5.00	6373353.	408.93	90.000	6373327.	17051.	-5540.	0.00	126.37	388.92		
0.00	6373352.	408.93	90.000	6373327.	17683.	-3596.	-0.13	126.30	388.94		
5.00	6373367.	410.10	89.193	6373341.	18317.	-1649.	5.51	127.47	389.74		
10.00	6373417.	411.45	88.257	6373394.	18957.	302.	12.11	128.73	390.60		
15.00	6373495.	413.16	87.130	6373464.	19604.	2257.	20.15	129.99	391.66		
20.00	6373622.	415.86	85.794	6373589.	20257.	4219.	29.82	131.16	393.51		
25.00	6373803.	420.03	84.267	6373765.	20916.	6194.	41.14	132.15	396.57		
30.00	6374044.	426.10	82.572	6374003.	21578.	8188.	54.12	132.90	401.21		
35.00	6374356.	433.86	80.719	6374309.	22244.	10209.	68.86	133.40	407.05		
40.00	6374747.	441.74	78.665	6374695.	22912.	12257.	85.55	133.69	412.24		
45.00	6375228.	450.12	76.413	6375168.	23581.	14330.	104.31	133.78	416.92		
50.00	6375808.	459.37	73.975	6375741.	24250.	16426.	125.22	133.72	421.26		
55.00	6376500.	470.14	71.380	6376424.	24918.	18543.	148.35	133.60	425.64		
60.00	6377313.	485.62	68.822	6377228.	25586.	20689.	173.50	133.47	433.48		
65.00	6378258.	506.73	66.415	6378163.	26253.	22885.	200.60	133.40	445.79		
70.00	6379344.	533.64	64.242	6379237.	26920.	25155.	229.52	133.36	462.93		
75.00	6380579.	566.07	62.383	6380450.	27587.	27522.	259.69	133.41	484.97		
80.00	6381966.	602.63	60.985	6381833.	28254.	30012.	289.31	133.38	511.54		
85.00	6383501.	643.09	59.982	6383352.	28920.	32645.	318.35	133.04	542.70		
90.00	6385186.	689.71	59.243	6385019.	29584.	35449.	348.89	132.71	579.97		
92.00	6385904.	710.24	59.007	6385730.	29849.	36626.	361.70	132.58	596.69		
95.00	6387032.	743.23	58.710	6386845.	30247.	38456.	381.64	132.65	623.81		
100.00	6389051.	803.82	58.336	6388840.	30911.	41699.	416.93	132.80	674.28		
105.00	6391256.	870.77	58.045	6391018.	31574.	45208.	455.05	132.24	730.53		
110.00	6393662.	945.18	57.943	6393393.	32234.	49017.	494.94	131.91	794.35		
115.00	6395274.	1027.45	58.082	6395959.	32894.	53166.	535.35	132.27	866.93		
120.00	6399096.	1117.26	58.303	6398748.	33557.	57700.	576.33	133.02	947.85		
125.00	6402130.	1214.64	58.856	6401732.	34225.	62659.	617.37	134.29	1037.39		
130.00	6405375.	1319.60	59.406	6404922.	34901.	68087.	658.85	135.89	1135.25		
135.00	6408849.	1432.19	59.982	6408322.	35584.	74025.	701.45	137.40	1241.07		
140.00	6412546.	1552.96	60.580	6411938.	36275.	80512.	745.11	138.86	1355.44		
145.00	6416479.	1682.55	61.213	6415774.	36972.	87595.	780.33	140.19	1479.28		
150.00	6420649.	1821.63	61.899	6419831.	37676.	95323.	833.37	141.33	1613.65		
155.00	6425058.	1971.09	62.659	6424105.	38385.	103752.	875.85	142.22	1760.07		
155.50	6425511.	1986.54	62.753	6424544.	38456.	104635.	879.92	142.29	1775.45		
158.75	6428519.	2090.49	63.265	6427450.	38920.	110576.	907.38	142.62	1877.89		
160.00	6429695.	2112.23	63.486	6428584.	39098.	112935.	908.82	142.84	1901.35		
164.25	6433658.	2163.33	64.253	6432435.	39707.	121149.	901.90	143.82	1961.10		
165.55	6434014.	2162.92	64.524	6433602.	39894.	123702.	891.86	143.83	1965.23		
165.63	6434588.	2162.67	64.540	6433672.	39906.	123858.	891.14	143.83	1965.28		

TABLE 3A (Cont'd.)
AS-20L/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-IR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	POSITION (M)	EARTH FIXED		EARTH FIXED POSITION AND VELOCITY			VECTOR COMPONENTS		
		VELOCITY (M/S)	PATH ANGLE (DEG)	X (M)	Y (M)	Z (M)	DX (M/S)	DY (M/S)	DZ (M/S)
-5.00	34.	0.00	N/A	34.	-0.	0.	-0.00	0.00	-0.00
0.00	34.	0.00	N/A	34.	-0.	-0.	-0.00	0.00	0.00
5.00	49.	5.95	14.128	49.	3.	2.	5.77	1.24	0.78
10.00	95.	12.87	13.490	94.	12.	8.	12.51	2.57	1.60
15.00	180.	21.21	12.670	177.	28.	18.	20.68	3.89	2.62
20.00	310.	31.23	12.416	304.	51.	35.	30.49	5.12	4.41
25.00	495.	43.04	12.884	484.	79.	64.	41.94	6.17	7.41
30.00	743.	56.80	14.084	726.	112.	112.	55.08	6.97	11.97
35.00	1065.	72.57	15.367	1038.	149.	186.	69.98	7.53	17.72
40.00	1470.	90.11	15.516	1429.	187.	288.	86.82	7.88	22.79
45.00	1967.	109.51	15.076	1910.	227.	413.	105.74	8.01	27.33
50.00	2566.	130.91	14.380	2490.	267.	560.	126.81	8.00	31.50
55.00	3278.	154.50	13.698	3182.	307.	728.	150.12	7.90	35.70
60.00	4115.	180.89	14.097	3995.	346.	924.	175.45	7.81	43.32
65.00	5090.	210.34	15.437	4939.	385.	1168.	202.77	7.79	55.38
70.00	6220.	243.04	17.413	6025.	424.	1485.	231.93	7.80	72.23
75.00	7519.	278.82	19.784	7261.	463.	1899.	262.39	7.90	93.95
80.00	8998.	316.18	22.409	8648.	503.	2433.	292.34	7.95	120.17
85.00	10661.	355.50	25.178	10183.	542.	3108.	321.76	7.71	150.97
90.00	12523.	399.71	28.063	11869.	580.	3952.	352.74	7.50	187.84
92.00	13329.	419.05	29.219	12587.	595.	4344.	365.75	7.43	204.39
95.00	14610.	450.04	30.937	13715.	618.	497.	386.01	7.60	231.24
100.00	16951.	507.10	33.685	15733.	657.	6276.	421.91	7.93	281.22
105.00	19581.	570.82	36.161	17938.	696.	7819.	460.72	7.59	336.92
110.00	22531.	641.54	38.558	20343.	733.	9658.	501.39	7.52	400.15
115.00	25836.	719.37	40.964	22953.	772.	11835.	542.73	8.19	472.09
120.00	29520.	804.42	43.289	25772.	816.	14393.	584.76	9.32	552.33
125.00	33646.	896.83	45.536	28801.	856.	17373.	626.99	11.04	641.15
130.00	38223.	996.91	47.647	32043.	927.	20818.	669.82	13.16	738.24
135.00	42999.	1104.98	49.578	35502.	998.	24768.	713.92	15.27	843.25
140.00	48918.	1221.54	51.355	39184.	1080.	29264.	759.26	17.41	956.75
145.00	55123.	1347.10	53.024	42095.	1172.	34351.	805.36	19.51	1079.68
150.00	61962.	1482.25	54.628	47238.	1275.	40079.	851.48	21.53	1213.09
155.00	69482.	1627.72	56.221	51608.	1387.	46502.	896.28	23.43	1358.53
155.50	70273.	1642.86	56.393	52057.	1399.	47185.	900.60	23.61	1373.81
158.75	75604.	1744.24	57.374	56023.	1477.	51819.	929.73	24.68	1475.59
160.00	77724.	1765.01	57.708	56195.	1509.	53676.	931.66	25.12	1498.88
164.25	85056.	1812.90	58.785	60146.	1619.	60177.	926.27	26.84	1558.18
165.55	87382.	1811.48	59.097	61345.	1654.	62206.	916.56	27.02	1562.26
165.63	87520.	1811.17	59.116	61417.	1656.	62330.	915.85	27.02	1562.31

TABLE 3A (Cont'd.)
AS-204/LM-1 I/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-IR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	ALTITUDE (KM)	RANGE (KM)	VELOCITY SPACE FIXED (DEG)	VELOCITY VFCIOR EARTH FIXED (DEG)	LONGITUDE (POS, EAST) (DEG)	GEOCENTRIC DECLINATION (DEG)	GEODETTIC LATITUDE (DEG)
-5.00	0.034	0.000	90.000	N/A	-80.565	28.371	28.532
0.00	0.034	0.000	90.000	N/A	-80.565	28.371	28.532
5.00	0.049	0.003	90.129	N/A	-80.565	28.371	28.532
10.00	0.094	0.014	90.266	N/A	-80.565	28.371	28.532
15.00	0.176	0.033	90.393	N/A	-80.565	28.370	28.532
20.00	0.304	0.061	90.472	120.601	-80.564	28.370	28.532
25.00	0.484	0.101	90.475	111.143	-80.564	28.370	28.531
30.00	0.726	0.157	90.377	101.598	-80.564	28.370	28.531
35.00	1.038	0.237	90.200	94.453	-80.563	28.370	28.531
40.00	1.429	0.342	90.727	90.492	-80.562	28.370	28.531
45.00	1.909	0.470	89.853	87.744	-80.560	28.370	28.531
50.00	2.490	0.620	89.678	85.618	-80.559	28.370	28.531
55.00	3.181	0.789	89.494	83.825	-80.557	28.370	28.531
60.00	3.994	0.985	89.184	81.588	-80.555	28.370	28.531
65.00	4.939	1.229	88.732	79.429	-80.552	28.371	28.532
70.00	6.025	1.544	88.146	77.658	-80.549	28.371	28.532
75.00	7.261	1.954	87.460	76.375	-80.545	28.372	28.533
80.00	8.649	2.483	85.697	75.410	-80.540	28.373	28.534
85.00	10.184	3.154	85.864	74.600	-80.533	28.375	28.536
90.00	11.870	3.993	84.985	74.007	-80.525	28.377	28.538
95.00	12.588	4.383	84.628	73.820	-80.521	28.378	28.539
100.00	13.716	5.032	84.111	73.641	-80.515	28.380	28.540
105.00	15.736	6.304	83.259	73.408	-80.502	28.383	28.544
110.00	17.943	7.839	82.389	73.111	-80.487	28.387	28.548
115.00	20.350	9.668	81.571	72.923	-80.469	28.392	28.552
120.00	22.964	11.834	80.834	72.867	-80.448	28.397	28.558
125.00	25.788	14.376	80.167	72.866	-80.423	28.404	28.565
130.00	28.825	17.337	79.577	72.912	-80.394	28.412	28.573
135.00	32.076	20.758	79.053	72.975	-80.361	28.421	28.582
140.00	35.549	24.678	78.573	73.019	-80.322	28.431	28.592
145.00	39.251	29.135	78.136	73.053	-80.279	28.443	28.603
150.00	43.187	34.174	77.734	73.076	-80.229	28.456	28.617
155.00	47.362	39.840	77.364	73.092	-80.174	28.471	28.631
160.00	51.776	46.189	77.019	73.099	-80.112	28.488	28.648
165.00	52.230	46.864	76.986	73.099	-80.105	28.489	28.650
170.00	55.242	51.438	76.776	73.098	-80.061	28.501	28.662
175.00	56.419	53.271	76.741	73.110	-80.043	28.506	28.666
180.00	60.427	59.682	75.682	73.171	-79.980	28.523	28.683
185.00	61.645	61.682	75.687	73.186	-79.960	28.528	28.688
190.00	63.719	63.804	75.688	73.187	-79.959	28.528	28.689

TABLE 3A (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-1B STAGE FLIGHT DATA

FLIGHT TIME (SEC)	VEHICLE ATTITUDE ANGLE			VEHICLE ATTITUDE RATE			VEHICLE ATTITUDE ERROR		
	PITCH (DEG)	YAW (DEG)	ROLL (DEG)	PITCH (DEG/S)	YAW (DEG/S)	ROLL (DEG/S)	PITCH (DEG)	YAW (DEG)	ROLL (DEG)
-5.00	0.000	0.000	18.000	-0.003	0.001	-0.002	0.000	0.000	0.000
0.00	-0.017	0.006	17.990	-0.003	0.001	-0.002	-0.017	0.006	-0.010
5.00	-0.407	0.270	18.093	0.065	-0.052	0.091	-0.407	0.270	0.093
10.00	-0.374	0.327	17.972	0.006	-0.021	0.023	-0.374	0.327	-0.028
15.00	-0.936	0.336	14.546	-0.101	-0.021	-1.170	-0.261	0.336	1.346
20.00	-1.833	0.336	9.363	-0.230	-0.017	-0.950	-0.138	0.336	1.163
25.00	-3.159	0.208	4.365	-0.306	-0.011	-1.002	-0.030	0.298	1.165
30.00	-4.857	0.249	-0.142	-0.363	0.002	-0.284	0.104	0.249	-0.142
35.00	-5.154	0.184	-0.072	0.040	0.011	-0.199	-0.093	0.184	-0.072
40.00	-5.102	0.144	-0.190	0.010	-0.004	-0.032	-0.041	0.144	-0.199
45.00	-5.125	0.132	-0.465	-0.017	-0.002	-0.007	-0.063	0.132	-0.465
50.00	-5.276	0.142	-0.578	-0.043	0.005	-0.024	-0.215	0.142	-0.578
55.00	-6.282	0.184	-1.003	-0.586	0.012	0.026	-0.043	0.184	-1.003
60.00	-9.071	0.228	-0.304	-0.540	0.015	-0.083	-0.412	0.228	-0.304
65.00	-11.863	0.267	-0.135	-0.565	0.003	0.028	-0.443	0.267	-0.135
70.00	-14.797	0.288	-0.026	-0.582	0.007	0.087	-0.428	0.288	-0.026
75.00	-17.645	0.315	0.019	-0.603	0.001	0.073	-0.207	0.315	0.019
80.00	-20.493	0.186	0.109	-0.577	-0.027	0.018	0.081	0.186	0.109
85.00	-23.507	0.144	0.302	-0.600	-0.013	0.030	0.234	0.144	0.302
90.00	-26.531	0.090	0.472	-0.608	0.005	-0.002	0.371	0.090	0.472
95.00	-29.746	0.111	0.424	-0.602	0.014	-0.048	0.410	0.111	0.424
100.00	-32.457	0.214	0.164	-0.617	0.010	-0.094	0.406	0.214	0.164
105.00	-34.846	-0.035	0.031	-0.537	-0.050	-0.078	0.599	-0.035	0.031
110.00	-37.909	-0.220	-0.953	-0.551	-0.004	-0.127	1.130	-0.220	-0.953
115.00	-40.655	-0.129	-0.510	-0.597	0.029	0.078	0.933	-0.129	-0.510
120.00	-43.266	-0.024	-0.443	-0.524	0.010	0.033	0.663	-0.024	-0.443
125.00	-45.974	0.034	-0.126	-0.527	0.015	0.022	0.455	0.034	-0.126
130.00	-47.837	0.203	0.113	-0.466	0.016	0.033	0.020	0.203	0.113
135.00	-49.709	0.150	0.132	-0.366	-0.014	-0.007	0.005	0.150	0.133
140.00	-51.614	0.108	0.161	-0.362	-0.011	-0.015	0.017	0.108	0.161
145.00	-53.744	0.043	0.167	-0.402	-0.015	0.006	0.093	0.043	0.167
150.00	-56.204	-0.025	0.191	-0.449	-0.016	-0.005	0.197	-0.035	0.191
155.00	-59.175	-0.119	0.170	-0.540	-0.018	-0.003	0.388	-0.119	0.170
158.75	-59.463	-0.219	0.145	-0.643	-0.020	0.018	0.391	-0.219	0.145
160.00	-59.408	-0.319	0.146	-0.464	-0.023	0.241	-0.028	-0.230	0.206
164.25	-59.334	-0.281	0.038	0.094	-0.005	-0.159	0.026	-0.319	0.146
165.55	-59.266	-0.267	0.006	0.035	0.061	-0.070	0.101	-0.281	0.038
165.63	-59.266	-0.201	0.016	0.014	-0.021	0.011	0.151	-0.267	0.006
		-0.291	0.017	0.006	-0.009	0.008	0.168	-0.291	0.016
		-0.291	0.017	0.005	-0.008	0.008	0.169	-0.291	0.017

TABLE 1A
AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	MASS (KG)	THRUST (TOTAL) (N)	DRAW (N)	LONGITUDINAL ACCELERATION (M/SEC ²)	DYNAMIC PRESSURE (N/M ²)	A.H.I. (KG-M/M ² -RAD)	MACH NO.	PITCH ANGLE OF ATTACK (DEG)
1) 165.63	134360.	38915.	3269.	0.265	430.	48681352.	5.76	0.674
2) 166.95	134326.	38364.	2780.	0.265	366.	48741995.	5.78	1.075
3) 169.30	134211.	390884.	2107.	2.822	274.	48827864.	5.83	2.185
4) 170.00	134131.	713895.	1945.	5.308	252.	48848904.	5.85	2.472
5) 170.25	134101.	797977.	1888.	5.937	245.	48856152.	5.86	2.530
6) 170.25	134101.	797977.	1888.	5.937	245.	48856152.	5.86	2.530
7) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
8) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
9) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
10) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
11) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
12) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
13) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
14) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
15) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
16) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
17) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
18) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
19) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
20) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
21) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
22) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
23) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
24) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
25) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
26) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
27) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
28) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
29) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
30) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
31) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
32) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
33) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
34) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
35) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
36) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
37) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
38) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
39) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
40) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
41) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
42) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
43) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
44) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
45) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
46) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
47) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
48) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
49) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
50) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
51) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
52) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
53) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
54) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
55) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
56) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
57) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
58) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
59) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
60) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
61) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
62) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
63) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
64) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
65) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
66) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
67) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
68) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
69) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
70) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
71) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
72) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
73) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
74) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
75) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
76) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
77) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
78) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
79) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
80) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
81) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
82) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
83) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
84) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
85) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
86) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
87) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
88) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
89) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
90) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
91) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
92) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
93) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
94) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
95) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
96) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
97) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
98) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
99) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472
100) 171.55	132542.	875228.	1350.	6.544	178.	48924729.	5.97	2.472

1) Physical Sep.; 2) J-2 Start Command; 3) Ullage Rocket Burnout; 4) 90% Thrust Level; 5) Command P. U. Activation;
6) Ullage Case Jettison; 7) IGM Initiation; 8) EMR Shift Sensed By IGM; 9) Fuel Depletion Cutoff.

TABLE 4A (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	---- SPACE FIXED ----		PATH ANGLE (DEG)	--- SPACE FIXED POSITION AND VELOCITY VECTOR COMPONENTS ---					
	RADIUS (M)	VELOCITY (M/S)		X (M)	Y (M)	Z (M)	DX (M/S)	DY (M/S)	DZ (M/S)
165.63	6424588.	2162.67	64.540	6423672.	39906.	123858.	891.14	143.83	1965.28
166.95	6426208.	2157.57	64.821	6434841.	40096.	126454.	878.61	143.76	1965.33
169.30	6428341.	2149.47	65.320	6436880.	40423.	131073.	856.77	143.61	1966.10
170.00	6438965.	2149.56	65.459	6437475.	40533.	132444.	851.61	143.48	1968.45
170.25	6439100.	2149.95	65.508	6437690.	40570.	132942.	849.93	143.42	1969.61
170.25	6439100.	2149.95	65.508	6437690.	40570.	132942.	849.93	143.42	1969.61
172.95	6441576.	2156.38	66.025	6439962.	40956.	138279.	832.94	142.87	1983.87
177.55	6445549.	2170.21	66.895	6443728.	41612.	147464.	804.94	142.22	2010.38
181.75	6449079.	2185.36	67.667	6447055.	42208.	155956.	780.50	141.60	2036.31
190.00	6455766.	2216.77	69.065	6452303.	43372.	172965.	735.49	140.85	2086.45
210.00	6470778.	2302.04	72.051	6467010.	46183.	215897.	635.12	140.73	2208.21
230.00	6484164.	2402.10	74.800	6478710.	49013.	261342.	534.95	142.47	2337.43
250.00	6495592.	2515.50	77.296	6488410.	51886.	309439.	435.17	144.92	2473.33
270.00	6506331.	2642.38	79.515	6496115.	54815.	360328.	335.21	148.03	2616.85
290.00	6515250.	2782.52	81.493	6501816.	57812.	414166.	234.78	151.84	2768.44
310.00	6522820.	2935.87	83.232	6505490.	60894.	471123.	133.34	156.40	2928.67
330.00	6529110.	3103.09	84.753	6507135.	64061.	531381.	30.08	160.96	3098.77
350.00	6534198.	3284.45	86.059	6506690.	67343.	595143.	-74.97	167.41	3279.33
370.00	6538168.	3480.55	87.168	6504119.	70765.	662629.	-182.71	174.91	3471.35
390.00	6541105.	3692.66	88.099	6499358.	74347.	734084.	-294.07	183.54	3676.35
410.00	6543100.	3921.15	88.862	6492328.	78114.	809773.	-409.64	193.36	3894.90
430.00	6544255.	4168.03	89.471	6482937.	82091.	889984.	-530.57	204.55	4129.06
450.00	6544678.	4435.86	89.938	6471061.	86306.	975056.	-658.22	217.28	4381.36
470.00	6544490.	4726.35	90.272	6456554.	90794.	1065370.	-793.88	231.74	4653.43
490.00	6543829.	5041.68	90.481	6439244.	95589.	1161337.	-938.97	248.11	4947.26
498.25	6543453.	5176.71	90.543	6431238.	97665.	1202670.	-1002.32	255.31	5072.32
510.00	6542821.	5363.60	90.624	6418015.	100725.	1263283.	-1095.75	265.53	5243.76
530.00	6541467.	5685.91	90.746	6395309.	106212.	1371058.	-1267.15	283.37	5535.66
550.00	6539939.	6029.76	90.753	6368165.	112075.	1484827.	-1449.56	303.30	5845.07
570.00	6538376.	6402.51	90.674	6337213.	118358.	1605018.	-1648.55	325.43	6178.06
590.00	6536994.	6809.32	90.515	6302091.	125108.	1732132.	-1867.64	350.01	6538.83
610.00	6535995.	7259.68	90.291	6262326.	132378.	1866810.	-2113.79	377.43	6934.87
628.34	6535566.	7716.23	90.078	6221241.	136551.	1997588.	-2373.92	405.08	7330.80

TABLE 4A (Cont'd.)
AS-204/TM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1.
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	POSITION (M)	EARTH FIXED		EARTH FIXED POSITION AND VELOCITY VECTOR COMPONENTS					
		VELOCITY (M/S)	PATH ANGLE (DEG)	X (M)	Y (M)	Z (M)	DX (M/S)	DY (M/S)	DZ (M/S)
165.63	87520.	1811.17	59.116	61417.	1656.	62330.	915.85	27.02	1562.31
166.95	89826.	1805.03	59.433	62619.	1692.	64394.	903.61	27.11	1562.33
169.30	93937.	1795.10	60.002	64717.	1756.	68065.	882.29	27.24	1563.07
170.00	95151.	1794.67	60.167	65330.	1775.	69156.	877.30	27.21	1565.39
170.25	95591.	1794.89	60.226	65552.	1782.	69552.	875.69	27.19	1566.54
170.25	95591.	1794.89	60.226	65552.	1782.	69552.	875.69	27.19	1566.54
172.95	100297.	1799.44	60.860	67894.	1855.	73800.	859.45	27.02	1580.69
177.55	108347.	1810.17	61.935	71735.	1979.	81130.	832.76	27.06	1607.01
181.75	115740.	1822.65	62.896	75232.	2093.	87929.	809.55	27.09	1632.77
190.00	130419.	1849.38	64.641	81730.	2318.	101608.	767.03	27.65	1682.60
210.00	166941.	1925.43	68.380	96130.	2898.	136455.	672.98	30.95	1803.72
230.00	205006.	2018.04	71.816	108655.	3571.	173807.	579.71	36.54	1932.64
250.00	244890.	2125.64	74.903	119324.	4367.	213807.	487.43	43.28	2068.55
270.00	286875.	2248.10	77.649	128154.	5310.	256604.	395.60	51.15	2212.42
290.00	331252.	2384.91	80.061	135151.	6421.	302359.	304.00	60.23	2364.69
310.00	378318.	2535.82	82.158	140312.	7728.	351251.	212.13	70.59	2525.94
330.00	428369.	2701.29	83.970	143626.	9242.	403468.	119.25	81.53	2697.42
350.00	481717.	2881.38	85.506	145076.	11004.	459220.	25.47	94.98	2879.71
370.00	538678.	3076.60	86.796	144634.	13052.	518734.	-70.05	110.15	3073.83
390.00	595587.	3288.10	87.865	142257.	15423.	582263.	-168.13	127.19	3281.34
410.00	664791.	3516.19	88.731	137889.	18153.	650080.	-269.27	146.21	3502.81
430.00	734653.	3762.80	89.414	131459.	21286.	722482.	-374.52	167.47	3740.37
450.00	805584.	4030.46	89.932	122873.	24869.	799819.	-485.06	191.25	3996.59
470.00	890033.	4320.84	90.298	112014.	28955.	882481.	-602.04	217.85	4273.14
490.00	976479.	4636.10	90.523	98742.	33603.	970892.	-726.71	247.55	4572.09
498.25	1014001.	4771.10	90.589	92523.	35699.	1009140.	-781.19	260.58	4699.49
510.00	1069318.	4957.97	90.675	82874.	38871.	1065393.	-861.85	279.25	4874.49
530.00	1168472.	5280.25	90.802	64169.	44781.	1165850.	-1010.62	312.25	5173.22
550.00	1274187.	5624.09	90.807	42396.	51384.	1272445.	-1168.64	348.61	5490.28
570.00	1386578.	5996.82	90.720	17324.	58750.	1385625.	-1341.17	388.70	5831.99
590.00	1507445.	6403.61	90.548	-11367.	66959.	1505915.	-1531.43	432.98	6202.70
610.00	1636348.	6853.95	90.308	-44097.	76103.	1633982.	-1745.97	482.23	6610.27
628.34	1762721.	7210.45	90.082	-78149.	85398.	1758916.	-1974.40	532.05	7018.65

TABLE 4A (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-IVR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	ALTITUDE (KM)	RANGE (KM)	VELOCITY VECTOR SPACE FIXED (DEG)	VELOCITY VECTOR EARTH FIXED (DEG)	LONGITUDE (POS. EAST) (DEG)	GEOCENTRIC DECLINATION (DEG)	GEODETTIC LATITUDE (DEG)
165.63	61.719	61.804	76.688	73.187	-79.959	28.528	28.689
166.95	62.941	63.837	76.700	73.201	-79.939	28.534	28.694
169.30	65.076	67.453	76.718	73.224	-79.904	28.543	28.703
170.00	65.701	68.526	76.717	73.227	-79.893	28.546	28.706
170.25	65.927	68.916	76.716	73.228	-79.889	28.547	28.707
170.25	65.927	68.916	76.716	73.228	-79.889	28.547	28.707
172.95	68.317	73.097	76.698	73.235	-79.848	28.558	28.718
177.55	72.295	80.304	76.673	73.258	-79.778	28.576	28.736
181.75	75.831	86.983	76.648	73.279	-79.712	28.594	28.754
190.00	82.529	100.405	76.619	73.339	-79.581	28.628	28.788
210.00	97.568	134.516	76.621	73.555	-79.246	28.716	28.876
230.00	110.983	170.978	76.691	73.840	-78.887	28.808	28.968
250.00	122.842	209.944	76.797	74.152	-78.502	28.904	29.064
270.00	133.213	251.576	76.935	74.486	-78.090	29.005	29.166
290.00	142.166	296.048	77.104	74.843	-77.649	29.111	29.271
310.00	149.770	343.554	77.304	75.223	-77.177	29.222	29.382
330.00	156.097	394.299	77.520	75.607	-76.671	29.336	29.497
350.00	161.223	448.514	77.787	76.036	-76.128	29.456	29.617
370.00	165.223	506.445	78.086	76.489	-75.547	29.580	29.741
390.00	168.211	568.371	78.418	76.968	-74.923	29.707	29.869
410.00	170.249	634.590	78.784	77.472	-74.254	29.839	30.001
430.00	171.447	705.429	79.186	78.004	-73.536	29.974	30.137
450.00	171.915	781.269	79.624	78.567	-72.765	30.113	30.276
470.00	171.773	862.538	80.101	79.161	-71.935	30.254	30.417
490.00	171.159	949.698	80.620	79.791	-71.043	30.397	30.561
498.25	170.802	987.481	80.846	80.061	-70.655	30.456	30.620
510.00	170.198	1043.139	81.182	80.454	-70.082	30.541	30.705
530.00	168.911	1142.812	81.785	81.149	-69.054	30.684	30.845
550.00	167.409	1248.971	82.435	81.885	-67.955	30.825	30.991
570.00	165.891	1362.131	83.130	82.662	-66.780	30.962	31.128
590.00	164.552	1482.895	83.873	83.484	-65.522	31.093	31.259
610.00	163.594	1612.030	84.669	84.352	-64.172	31.216	31.383
628.34	163.203	1739.571	85.447	85.194	-62.846	31.320	31.487

TABLE 4. A (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-IVR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	VEHICLE ATTITUDE ANGLE			VEHICLE ATTITUDE RATE			VEHICLE ATTITUDE ERROR		
	PITCH (DEG)	YAW (DEG)	ROLL (DEG)	PITCH (DEG/S)	YAW (DEG/S)	ROLL (DEG/S)	PITCH (DEG)	YAW (DEG)	ROLL (DEG)
165.63	-55.266	-0.291	0.017	0.005	-0.008	0.008	0.169	-0.291	0.017
166.95	-59.196	-0.396	0.033	0.106	-0.149	0.016	0.239	-0.396	0.033
169.30	-59.681	-1.032	0.090	0.266	-0.334	0.044	0.753	-1.032	0.090
170.00	-58.570	-1.207	0.137	0.030	-0.143	0.095	0.865	-1.207	0.137
170.25	-58.575	-1.232	0.163	-0.071	-0.053	0.116	0.859	-1.232	0.163
170.25	-58.575	-1.232	0.163	-0.071	-0.053	0.116	0.859	-1.232	0.163
172.95	-59.303	-0.770	0.343	-0.029	0.203	0.054	0.132	-0.770	0.343
177.55	-59.536	-0.518	0.586	0.014	-0.012	-0.064	-0.101	-0.518	0.586
181.75	-59.542	-0.527	0.431	-0.009	0.004	-0.013	-0.108	-0.527	0.431
190.00	-53.486	0.159	0.115	0.262	0.007	0.043	0.020	-0.518	0.115
210.00	-55.759	1.047	0.290	-0.089	0.027	-0.003	-0.111	-0.553	0.290
230.00	-57.363	1.358	0.270	-0.088	0.011	0.001	-0.091	-0.555	0.270
250.00	-58.973	1.557	0.297	-0.124	0.011	0.005	-0.059	-0.568	0.297
270.00	-60.729	1.748	0.343	-0.086	0.009	0.002	-0.118	-0.585	0.343
290.00	-62.675	1.937	0.403	-0.100	0.010	0.003	-0.107	-0.609	0.403
310.00	-64.500	1.828	0.437	-0.197	-0.208	0.001	-0.251	-0.929	0.437
330.00	-66.472	2.303	0.514	-0.079	0.020	0.002	-0.431	-1.289	0.514
350.00	-68.452	2.534	0.566	-0.102	0.011	0.003	-0.426	-1.320	0.566
370.00	-70.588	2.716	0.622	-0.102	0.007	0.002	-0.438	-1.363	0.622
390.00	-72.696	2.884	0.671	-0.111	0.008	0.003	-0.450	-1.410	0.671
410.00	-74.859	3.055	0.720	-0.111	0.008	0.003	-0.468	-1.457	0.720
430.00	-77.196	3.214	0.776	-0.116	0.010	0.003	-0.484	-1.508	0.776
450.00	-79.570	3.376	0.831	-0.123	0.010	0.003	-0.507	-1.555	0.831
470.00	-81.858	3.528	0.879	-0.103	0.008	0.001	-0.540	-1.605	0.879
490.00	-84.354	3.676	0.931	-0.124	0.009	0.003	-0.544	-1.661	0.931
498.25	-85.258	3.735	0.946	-0.095	0.007	0.001	-0.583	-1.684	0.946
510.00	-86.587	3.852	0.424	-0.193	0.000	-0.107	-0.521	-1.702	0.424
530.00	-88.968	4.002	-0.586	-0.074	0.012	-0.009	-0.669	-1.767	-0.586
550.00	-91.235	4.127	-0.730	-0.138	0.004	-0.006	-0.592	-1.807	-0.730
570.00	-93.813	4.223	-0.859	-0.134	0.004	-0.006	-0.618	-1.855	-0.859
590.00	-96.745	4.267	-0.976	-0.157	0.001	-0.005	-0.604	-1.896	-0.976
610.00	-99.772	4.307	-0.138	-0.146	0.000	0.093	-0.637	-1.935	-0.138
628.34	-102.848	4.240	0.675	0.265	0.006	0.007	-1.204	-1.972	0.675

TABLE 5A
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-1H STAGE FLIGHT DATA

FLIGHT TIME (SEC)	MASS (LB)	THRUST (TOTAL) (LR)	DRAW (LR)	LONGITUDINAL ACCELERATION (FT/SEC ²)	DYNAMIC PRESSURE (LB/FT ²)	A.H.I. (LR-FT/FT ² -RAD)	MACH NO.	PITCH ANGLE OF ATTACK (DEG)
1) -5.00	1299059.	0.	---	0.000	0.	0.	0.00	0.000
2) 0.00	1285045.	1575301.	1323.	39.752	0.	0.	0.00	0.000
5.00	1257691.	1401621.	1856.	36.121	0.	7.	0.02	10.488
10.00	1230771.	1406442.	3093.	37.008	2.	131.	0.04	13.919
15.00	1203749.	1414720.	5145.	38.014	6.	825.	0.06	12.597
20.00	1176597.	1426008.	7924.	39.136	12.	3252.	0.09	10.712
25.00	1149330.	1434478.	10322.	40.254	22.	9957.	0.13	9.752
30.00	1121983.	1443127.	12623.	41.448	38.	25813.	0.17	5.323
35.00	1094571.	1452091.	17569.	42.671	60.	59347.	0.21	10.690
40.00	1067112.	1461072.	23339.	43.927	89.	123292.	0.27	10.695
45.00	1039614.	1470962.	28155.	45.290	124.	235426.	0.32	10.029
50.00	1012102.	1480847.	33057.	46.697	167.	419904.	0.39	9.022
55.00	984574.	1491521.	36898.	48.170	217.	707655.	0.46	7.187
60.00	957042.	1503110.	38965.	49.756	273.	1138055.	0.54	4.770
65.00	929517.	1515628.	41802.	51.492	334.	1759856.	0.64	3.236
70.00	901994.	1527860.	47589.	53.244	397.	2627732.	0.75	2.197
75.00	874428.	1539378.	70606.	54.470	458.	3796144.	0.87	1.613
80.00	846763.	1549560.	130868.	54.332	506.	5297006.	1.00	1.226
85.00	819095.	1560499.	138422.	56.278	536.	7117366.	1.15	0.785
90.00	791432.	1570970.	124648.	59.216	551.	9245416.	1.33	0.506
92.00	780368.	1574789.	116943.	60.527	553.	10179637.	1.41	0.521
95.00	763776.	1580137.	101571.	62.706	548.	11664409.	1.54	0.636
100.00	736203.	1587771.	82486.	66.238	520.	14324882.	1.77	1.208
105.00	708728.	1593410.	62314.	69.092	457.	17083735.	1.99	1.830
110.00	681236.	1596918.	46014.	73.717	381.	19734619.	2.21	1.440
115.00	653865.	1598632.	32429.	77.546	309.	22185565.	2.45	1.224
120.00	626509.	1598693.	23279.	81.398	244.	24381790.	2.70	0.945
125.00	599173.	1597966.	16364.	85.436	187.	26293045.	2.98	0.570
130.00	571883.	1595952.	11301.	89.685	139.	27897455.	3.25	0.585
135.00	544647.	1593236.	7380.	94.241	101.	29196981.	3.53	0.603
140.00	517476.	1589734.	3597.	99.206	71.	30227668.	3.82	0.383
145.00	490378.	1585412.	1495.	104.543	50.	31021311.	4.12	-0.145
150.00	463265.	1580089.	457.	110.342	34.	31629557.	4.47	-0.970
155.00	436453.	1573435.	-543.	116.733	24.	32093663.	4.92	-2.335
155.50	432777.	1572646.	-625.	117.400	23.	32124928.	4.98	-2.448
158.75	416364.	1566003.	-1348.	121.852	18.	32370364.	5.35	-1.371
160.00	413039.	1560944.	-1407.	125.438	16.	32449116.	5.45	-0.918
164.25	401700.	152465.	-1372.	127.533	11.	32657597.	5.73	0.342
165.55	400354.	39238.	-1217.	127.533	9.	32705471.	5.76	0.654
165.00	400272.	36315.	-1207.	127.533	9.	32708141.	5.76	0.674

1) GRR; 2) First Motion; Engine No. 4 Premature Shutdown; 3) Max. Dyn. Pressure; 4) Tilt Arrest; 5) IECO; 6) OECO;

7) Sep. Signal; 8) Physical Sep.

TABLE 5 A (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-IR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	SPACE FIXED		PATH ANGLE		X		Y		Z		VELOCITY VECTOR COMPONENTS		DZ	
	RADIUS (FT)	VELOCITY (FT/S)	DEG	(DEG)	(FT)	(FT)	(FT)	(FT)	(FT)	(FT)	DX (FT/S)	DY (FT/S)	(FT/S)	(FT/S)
-5.00	209C9949.	1341.64	90.000	90.000	20909867.	55942.	-18177.	0.00	414.59	1275.97				
0.00	209C9949.	1341.54	90.000	90.000	20909865.	58015.	-11797.	-0.43	414.37	1276.05				
5.00	209C9997.	1345.46	89.193	89.193	20909911.	60095.	-5411.	18.07	418.22	1278.68				
10.00	20910146.	1349.89	88.257	88.257	23910053.	62196.	989.	39.74	422.35	1281.50				
15.00	20910416.	1355.51	87.130	87.130	20910316.	64318.	7405.	66.12	426.49	1284.97				
20.00	20910834.	1364.38	85.794	85.794	20910724.	66461.	13843.	97.84	430.32	1291.04				
25.00	20911425.	1378.05	84.267	84.267	20911303.	68621.	20322.	134.96	433.58	1301.08				
30.00	20912219.	1397.98	82.572	82.572	20912082.	70795.	26863.	177.57	436.02	1316.32				
35.00	20913242.	1423.41	80.718	80.718	20913088.	72980.	33493.	225.93	437.67	1335.48				
40.00	20914526.	1449.29	78.665	78.665	20914352.	75171.	40213.	280.68	438.63	1352.50				
45.00	20916102.	1476.76	76.413	76.413	20915907.	77365.	47015.	342.23	438.92	1367.86				
50.00	20918007.	1507.11	73.975	73.975	20917786.	79559.	53890.	410.82	438.73	1382.07				
55.00	20920275.	1542.44	71.380	71.380	20920027.	81752.	60835.	486.72	438.31	1396.46				
60.00	20922942.	1593.23	68.822	68.822	20922664.	83942.	67876.	569.23	437.90	1422.18				
65.00	20926042.	1662.48	66.415	66.415	20925730.	86131.	75081.	658.15	437.68	1462.58				
70.00	20925605.	1750.78	64.242	64.242	20929256.	88319.	82528.	753.01	437.55	1518.80				
75.00	20933657.	1857.18	62.388	62.388	20933267.	90507.	90296.	852.02	437.70	1591.10				
80.00	20938209.	1977.13	60.985	60.985	20937773.	92696.	98465.	949.19	437.59	1678.27				
85.00	20943244.	2109.88	59.982	59.982	20942756.	94881.	107104.	1044.47	436.48	1780.50				
90.00	20948773.	2262.82	59.243	59.243	20948226.	97061.	116303.	1144.64	435.39	1902.78				
92.00	20951130.	2330.19	59.007	59.007	20950557.	97931.	120163.	1186.67	434.98	1957.65				
95.00	20954829.	2438.42	58.710	58.710	20954214.	99236.	126167.	1252.10	435.21	2046.64				
100.00	20961452.	2637.20	58.336	58.336	20960761.	101415.	136806.	1367.88	435.70	2212.21				
105.00	20968688.	2856.85	58.045	58.045	20967908.	103589.	148321.	1492.96	433.87	2396.75				
110.00	20976582.	3100.98	57.943	57.943	20975700.	105755.	160816.	1623.81	432.79	2606.15				
115.00	20985151.	3370.91	58.082	58.082	20984149.	107921.	174430.	1756.41	433.94	2844.25				
120.00	20994409.	3665.54	58.393	58.393	20993267.	110096.	189304.	1890.85	436.41	3109.73				
125.00	21004364.	3995.03	58.856	58.856	21003058.	112288.	205575.	2025.48	440.57	3403.50				
130.00	21015023.	4329.39	59.406	59.406	21013524.	114504.	223384.	2161.58	445.83	3724.57				
135.00	21026406.	4698.79	59.982	59.982	21024680.	116745.	242864.	2301.34	450.79	4071.77				
140.00	21038538.	5095.02	60.580	60.580	21036543.	119011.	264148.	2444.57	455.58	4446.99				
145.00	21051439.	5520.18	61.213	61.213	21049128.	121300.	287385.	2589.68	459.93	4853.29				
150.00	21065123.	5976.49	61.899	61.899	21062439.	123610.	312739.	2734.15	463.68	5294.13				
155.00	21079586.	6466.92	62.669	62.669	21076461.	125936.	340392.	2873.51	466.59	5774.31				
158.75	21081074.	6517.85	62.753	62.753	21077901.	126169.	343292.	2886.87	466.82	5824.98				
160.00	21090942.	6858.57	63.266	63.266	21087435.	127690.	362783.	2976.98	467.93	6161.06				
164.25	21094800.	6929.87	63.486	63.486	21091156.	128274.	370523.	2981.69	468.62	6238.03				
165.55	21107932.	7057.55	64.259	64.259	21103789.	130274.	397470.	2959.00	471.86	6434.04				
165.63	21111923.	7096.20	64.524	64.524	21107617.	130887.	405848.	2926.06	471.90	6447.60				
	21112165.	7095.37	64.540	64.540	21107848.	130924.	406357.	2923.69	471.88	6447.77				

TABLE 5A (Cont'd.)
AS-20L/1M-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-IR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	EARTH FIXED POSITION AND VELOCITY VECTOR COMPONENTS		EARTH FIXED POSITION AND VELOCITY VECTOR COMPONENTS		EARTH FIXED POSITION AND VELOCITY VECTOR COMPONENTS		EARTH FIXED POSITION AND VELOCITY VECTOR COMPONENTS		EARTH FIXED POSITION AND VELOCITY VECTOR COMPONENTS	
	POSITION (FT)	VELOCITY (FT/S)	PATH ANGLE (DEG)	X (FT)	Y (FT)	Z (FT)	DX (FT/S)	DY (FT/S)	DZ (FT/S)	
-5.00	113.	0.00	N/A	113.	-0.	0.	-0.00	0.00	-0.00	
0.00	113.	0.00	N/A	113.	-0.	-0.	-0.00	0.00	0.00	
5.00	162.	19.53	14.128	161.	9.	5.	18.93	4.07	2.54	
10.00	313.	42.23	13.490	310.	40.	25.	41.04	8.42	5.26	
15.00	590.	69.58	12.670	580.	93.	58.	67.86	12.76	8.59	
20.00	1017.	102.46	12.416	997.	167.	115.	100.03	16.79	14.48	
25.00	1624.	141.20	12.884	1589.	260.	210.	137.61	20.25	24.30	
30.00	2438.	186.24	14.084	2382.	368.	366.	190.71	22.88	35.27	
35.00	3494.	238.11	15.367	3406.	487.	610.	229.58	24.72	58.12	
40.00	4822.	295.63	15.516	4689.	614.	943.	284.85	25.85	74.77	
45.00	6452.	359.29	15.076	6265.	745.	1355.	346.93	26.29	89.67	
50.00	8420.	429.50	14.380	8170.	876.	1838.	416.06	26.24	103.35	
55.00	10755.	506.90	13.698	10438.	1007.	2388.	492.51	25.93	117.12	
60.00	13499.	593.46	14.097	13106.	1136.	3030.	575.63	25.63	142.12	
65.00	16700.	690.08	15.437	16205.	1264.	3833.	665.24	25.55	181.69	
70.00	20408.	797.37	17.413	19769.	1391.	4873.	760.92	25.58	236.98	
75.00	24670.	914.75	19.784	23822.	1520.	6230.	860.86	25.93	308.23	
80.00	29522.	1037.32	22.409	28374.	1651.	7981.	959.12	26.08	394.27	
85.00	34977.	1166.34	25.178	33410.	1779.	10197.	1055.65	25.28	495.30	
90.00	41086.	1311.37	28.063	38939.	1904.	12967.	1157.29	24.60	616.27	
92.00	43731.	1374.84	29.219	41296.	1953.	14253.	1199.97	24.38	670.57	
95.00	47932.	1476.51	30.937	44995.	2026.	16395.	1266.45	24.93	758.66	
100.00	55615.	1663.71	33.685	51618.	2155.	20590.	1384.20	26.02	922.62	
105.00	64241.	1872.77	36.161	58853.	2283.	25552.	1511.54	24.90	1105.38	
110.00	73922.	2104.79	38.558	66744.	2406.	31686.	1644.99	24.67	1312.84	
115.00	84765.	2360.13	40.964	75306.	2534.	38829.	1780.60	26.88	1548.86	
120.00	96882.	2639.18	43.289	84554.	2677.	47220.	1918.49	30.59	1812.11	
125.00	110388.	2942.36	45.536	94492.	2843.	56997.	2057.04	36.22	2103.50	
130.00	125403.	3270.70	47.647	105127.	3041.	68300.	2197.57	43.18	2422.05	
135.00	142058.	3625.27	49.578	116475.	3274.	81260.	2342.26	50.10	2766.57	
140.00	160492.	4007.66	51.355	128557.	3542.	96012.	2491.00	57.11	3138.95	
145.00	180851.	4419.63	53.024	141389.	3845.	112701.	2642.25	64.00	3542.25	
150.00	203288.	4853.02	54.628	154979.	4182.	131491.	2793.56	70.64	3979.96	
155.00	227959.	5240.28	56.721	169317.	4551.	152566.	2940.55	76.87	4457.11	
155.50	230556.	5399.97	56.383	170791.	4589.	154807.	2954.72	77.46	4507.26	
158.75	248045.	5722.57	57.374	180555.	4847.	170008.	3050.31	80.98	4841.16	
160.00	255005.	5790.73	57.708	184368.	4949.	176102.	3056.64	82.43	4917.59	
164.25	279188.	5947.85	58.785	197330.	5312.	197430.	3038.94	88.05	5112.14	
165.55	286685.	5943.18	59.097	201262.	5427.	204089.	3007.07	88.64	5125.53	
165.63	297140.	5942.15	59.116	201500.	5434.	204494.	3004.76	88.66	5125.69	

TABLE 5A (Cont'd)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-IR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	ALTITUDE (FT)	RANGE (NM)	VELOCITY VECTOR SPACE FIXED (DEG)	AZIMUTH EARTH FIXED (DEG)	LONGITUDE (POS. EAST) (DEG)	GEOCENTRIC DECLINATION (DEG)	GEODETTIC LATITUDE (DEG)
-5.00	112.	0.000	90.000	N/A	-80.565	28.371	28.532
0.00	112.	0.000	90.000	N/A	-80.565	28.371	28.532
5.00	160.	0.002	90.129	N/A	-80.565	28.371	28.532
10.00	308.	0.008	90.266	N/A	-80.565	28.371	28.532
15.00	579.	0.018	90.393	N/A	-80.565	28.370	28.532
20.00	596.	0.033	90.472	120.601	-80.564	28.370	28.532
25.00	1588.	0.055	90.475	111.143	-80.564	28.370	28.531
30.00	2381.	0.085	90.377	101.598	-80.564	28.370	28.531
35.00	3404.	0.128	90.200	94.453	-80.563	28.370	28.531
40.00	4688.	0.185	90.027	90.492	-80.562	28.370	28.531
45.00	6264.	0.254	89.853	87.744	-80.560	28.370	28.531
50.00	8169.	0.335	89.678	85.618	-80.559	28.370	28.531
55.00	10437.	0.426	89.494	83.825	-80.557	28.370	28.531
60.00	13105.	0.532	89.184	81.588	-80.555	28.370	28.531
65.00	16205.	0.664	88.733	79.429	-80.552	28.371	28.532
70.00	15768.	0.834	88.146	77.658	-80.549	28.371	28.532
75.00	23822.	1.055	87.460	76.375	-80.545	28.372	28.533
80.00	28375.	1.341	86.697	75.410	-80.540	28.373	28.534
85.00	33411.	1.703	85.864	74.600	-80.533	28.375	28.536
90.00	38942.	2.156	84.985	74.007	-80.525	28.377	28.538
92.00	41300.	2.367	84.628	73.820	-80.521	28.378	28.539
95.00	45001.	2.717	84.111	73.641	-80.515	28.380	28.540
100.00	51628.	3.404	83.259	73.408	-80.502	28.383	28.544
105.00	58868.	4.233	82.389	73.111	-80.487	28.387	28.548
110.00	66767.	5.221	81.571	72.923	-80.469	28.392	28.552
115.00	75341.	6.390	80.834	72.867	-80.448	28.397	28.558
120.00	84606.	7.762	80.167	72.866	-80.423	28.404	28.565
125.00	94569.	9.361	79.577	72.912	-80.394	28.412	28.573
130.00	105238.	11.209	79.053	72.975	-80.361	28.421	28.582
135.00	116632.	13.325	78.573	73.019	-80.322	28.431	28.592
140.00	128775.	15.732	78.136	73.053	-80.279	28.443	28.603
145.00	141650.	18.452	77.734	73.076	-80.229	28.456	28.617
150.00	155389.	21.512	77.364	73.092	-80.174	28.471	28.631
155.00	169869.	24.940	77.019	73.099	-80.112	28.488	28.648
155.50	171359.	25.304	76.986	73.099	-80.105	28.489	28.650
158.75	181239.	27.774	76.776	73.098	-80.061	28.501	28.662
160.00	185102.	28.764	76.741	73.110	-80.043	28.506	28.666
164.25	198253.	32.226	76.582	73.171	-79.980	28.523	28.683
155.55	202248.	33.306	76.687	73.186	-79.960	28.528	28.688
165.65	202489.	33.371	75.688	73.187	-79.959	28.528	28.689

TABLE 5A (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-1A STAGE FLIGHT DATA

FLIGHT TIME (SEC)	VEHICLE ATTITUDE ANGLE			VEHICLE ATTITUDE RATE			VEHICLE ATTITUDE ERROR		
	PITCH (DEG)	YAW (DEG)	ROLL (DEG)	PITCH (DEG/S)	YAW (DEG/S)	ROLL (DEG/S)	PITCH (DEG)	YAW (DEG)	ROLL (DEG)
-5.00	0.000	0.000	18.000	-0.003	0.001	-0.002	0.000	0.000	0.000
0.00	-0.017	0.006	17.990	-0.003	0.001	-0.002	-0.017	0.006	-0.010
5.00	-0.407	0.270	18.093	0.065	-0.052	0.091	-0.407	0.270	0.093
10.00	-0.374	0.327	17.972	0.006	-0.021	0.023	-0.374	0.327	-0.028
15.00	-0.936	0.336	14.546	-0.101	-0.021	-1.170	-0.261	0.336	1.346
20.00	-1.833	0.336	9.363	-0.230	-0.017	-0.950	-0.138	0.336	1.163
25.00	-3.159	0.298	4.365	-0.306	-0.011	-1.002	-0.030	0.298	1.165
30.00	-4.857	0.249	-0.142	-0.363	0.002	-0.284	0.104	0.249	-0.142
35.00	-5.154	0.184	-0.072	0.040	0.011	-0.199	-0.093	0.184	-0.072
40.00	-5.102	0.144	-0.199	0.010	-0.004	-0.032	-0.041	0.144	-0.199
45.00	-5.125	0.132	-0.465	-0.017	-0.002	-0.007	-0.063	0.132	-0.465
50.00	-5.276	0.142	-0.578	-0.043	0.005	-0.024	-0.215	0.142	-0.578
55.00	-6.282	0.184	-1.003	-0.586	0.012	0.026	-0.043	0.184	-1.003
60.00	-5.071	0.228	-0.304	-0.540	0.015	-0.083	-0.412	0.228	-0.304
65.00	-11.863	0.267	-0.135	-0.565	0.003	0.028	-0.443	0.267	-0.135
70.00	-14.757	0.288	-0.026	-0.582	0.007	0.087	-0.428	0.288	-0.026
75.00	-17.645	0.315	0.019	-0.603	0.001	0.073	-0.207	0.315	0.019
80.00	-20.493	0.186	0.109	-0.577	-0.027	0.018	0.081	0.186	0.109
85.00	-23.507	0.144	0.302	-0.600	-0.013	0.030	0.234	0.144	0.302
90.00	-26.531	0.090	0.472	-0.608	0.005	-0.002	0.371	0.090	0.472
92.00	-27.746	0.111	0.424	-0.602	0.014	-0.048	0.410	0.111	0.424
95.00	-29.612	0.214	0.164	-0.617	0.010	-0.094	0.406	0.214	0.164
100.00	-32.457	-0.035	0.031	-0.537	-0.050	-0.078	0.599	-0.035	0.031
105.00	-34.846	-0.220	-0.953	-0.551	-0.004	0.127	1.130	-0.220	-0.953
110.00	-37.909	-0.129	-0.510	-0.597	0.029	0.078	0.833	-0.129	-0.510
115.00	-40.655	-0.024	-0.443	-0.524	0.010	0.033	0.663	-0.024	-0.443
120.00	-43.266	0.034	-0.126	-0.527	0.015	0.022	0.455	0.034	-0.126
125.00	-45.874	0.203	0.113	-0.466	0.015	0.033	0.020	0.203	0.113
130.00	-47.837	0.150	0.133	-0.366	-0.014	-0.007	0.005	0.150	0.133
135.00	-49.709	0.108	0.161	-0.362	-0.011	-0.015	0.017	0.108	0.161
140.00	-51.614	0.043	0.167	-0.402	-0.015	0.006	0.093	0.043	0.167
145.00	-53.744	-0.035	0.191	-0.449	-0.015	-0.005	0.197	-0.035	0.191
150.00	-56.204	-0.119	0.170	-0.540	-0.018	-0.003	0.388	-0.119	0.170
155.00	-59.179	-0.219	0.145	-0.442	-0.020	0.018	0.391	-0.219	0.145
158.75	-59.463	-0.230	0.206	-0.464	-0.023	0.241	-0.028	-0.230	0.206
160.00	-59.408	-0.219	0.145	0.094	-0.005	-0.159	0.026	-0.219	0.146
164.25	-59.284	-0.281	0.038	0.035	0.061	0.070	0.101	-0.281	0.038
165.55	-59.266	-0.291	0.016	0.014	-0.021	0.011	0.151	-0.291	0.016
165.63	-59.266	-0.291	0.017	0.006	-0.009	0.008	0.168	-0.291	0.017
				0.005	-0.008	0.008	0.169	-0.291	0.017

TABLE 6A
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-IVB STAGE FLIGHT DATA

	FLIGHT TIME (SEC)	MASS (LB)	THRUST (TOTAL) (LB)	DRAW (LB)	LONGITUDINAL ACCELERATION (FT/SEC ²)	DYNAMIC PRESSURE (LB/FT ²)	A.H.I. (LB-FT/FT ² -RAD)	MACH NO.	PITCH ANGLE OF ATTACK (DEG)
1)	165.63	256213.	8749.	735.	0.871	9.	32712358.	5.76	0.674
2)	166.95	256139.	8625.	625.	0.870	8.	32753108.	5.78	1.075
3)	169.30	255886.	85626.	474.	9.260	6.	32810809.	5.83	2.185
	170.00	255708.	160490.	437.	17.414	5.	32824947.	5.85	2.472
4)	170.25	295643.	179392.	425.	19.477	5.	32829818.	5.86	2.530
	170.25	255643.	179392.	425.	19.477	5.	32829818.	5.86	2.530
5)	172.95	294416.	196759.	304.	21.469	4.	32875899.	5.97	2.472
6)	177.55	292205.	220492.	175.	24.259	2.	32924689.	6.16	3.377
7)	181.75	289813.	220714.	105.	24.492	1.	32950925.	6.34	4.387
	190.00	285508.	222397.	49.	25.058	0.	32975657.	6.74	12.307
	210.00	274977.	224293.	4.	26.243	0.	32987318.	6.59	14.029
	230.00	264403.	224588.	1.	27.329	0.	32988253.	6.27	17.208
	250.00	253849.	224348.	0.	28.435	0.	32988397.	5.32	19.051
	270.00	243301.	224151.	0.	29.641	0.	32988415.	4.54	20.234
	290.00	232766.	224584.	0.	31.043	0.	32988415.	4.22	21.090
	310.00	222254.	223776.	0.	32.394	0.	32988415.	4.19	21.993
	330.00	211732.	224133.	0.	34.058	0.	32988415.	4.27	22.323
	350.00	201223.	224036.	0.	35.821	0.	32988415.	4.40	22.390
	370.00	190715.	224189.	0.	37.821	0.	32988415.	4.59	22.084
	390.00	180200.	223895.	0.	39.975	0.	32988415.	4.83	21.642
	410.00	169709.	223352.	0.	42.343	0.	32988415.	5.11	20.992
	430.00	159220.	223559.	0.	45.174	0.	32988415.	5.44	20.034
	450.00	148719.	223638.	0.	48.381	0.	32988415.	5.82	18.923
	470.00	138233.	222735.	0.	51.841	0.	32988415.	6.23	17.758
	490.00	127767.	222110.	0.	55.930	0.	32988415.	6.70	16.380
8)	498.25	123573.	210402.	0.	54.780	0.	32988415.	6.90	15.510
	510.00	118006.	195816.	0.	53.387	0.	32988415.	7.18	15.227
	530.00	109100.	188301.	0.	55.530	0.	32988436.	7.68	13.972
	550.00	100385.	186551.	0.	59.789	0.	32988489.	8.23	12.742
	570.00	91769.	183905.	0.	64.475	0.	32988543.	8.84	11.174
	590.00	83244.	183133.	0.	70.780	0.	32988626.	9.49	9.235
	610.00	74755.	181100.	0.	77.941	0.	32988733.	10.20	7.183
9)	628.34	67060.	180233.	0.	86.470	0.	32988735.	10.89	5.067

1) Physical Sep.; 2) J-2 Start Command; 3) Ullage Rocket Burnout; 4) 90% Thrust Level; 5) Command P. U. Activation;

6) Ullage Case Jettison; 7) ICM Initiation; 8) EMR Shift Sensed By ICM; 9) Fuel Depletion Cutoff.

TABLE 6A (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	SPACE FIXED			SPACE FIXED POSITION AND VELOCITY VECTOR COMPONENTS			---		
	RADIUS (FT)	VELOCITY (FT/S)	PATH ANGLE (DEG)	X (FT)	Y (FT)	Z (FT)	DX (FT/S)	DY (FT/S)	DZ (FT/S)
165.63	21112165.	7095.37	64.540	21107848.	130924.	406357.	2923.69	471.88	6447.77
166.95	21116168.	7078.65	64.821	21111683.	131548.	414875.	2882.57	471.65	6447.92
169.30	21123165.	7052.08	65.320	21118371.	132655.	430028.	2810.91	471.15	6450.47
170.00	21125213.	7052.36	65.459	21120325.	132984.	434528.	2793.98	470.74	6458.16
170.25	21125953.	7053.66	65.508	21121031.	133103.	436161.	2788.48	470.55	6461.97
170.25	21125953.	7053.66	65.508	21121031.	133103.	436161.	2788.48	470.55	6461.97
172.95	21133781.	7074.73	66.025	21128484.	134371.	453670.	2732.75	468.73	6508.77
177.55	21146816.	7120.10	66.895	21140840.	136522.	483805.	2640.89	466.60	6592.74
181.75	21158396.	7169.81	67.667	21151756.	138476.	511667.	2560.68	464.57	6680.81
190.00	21180335.	7272.88	69.065	21172254.	142296.	567471.	2413.04	462.11	6845.32
210.00	21229584.	7552.63	72.051	21217225.	151519.	708323.	2083.72	461.72	7244.80
230.00	21273504.	7880.89	74.800	21255610.	160805.	857422.	1755.08	467.43	7668.75
250.00	21312310.	8252.94	77.286	21287435.	170231.	1015219.	1427.73	475.47	8114.59
270.00	21346231.	8669.24	79.515	21312712.	179839.	1182179.	1099.77	485.67	8585.47
290.00	21375493.	9129.02	81.493	21331418.	189673.	1358812.	770.27	498.17	9082.81
310.00	21400328.	9632.13	83.232	21343500.	199782.	1545679.	437.47	513.12	9609.50
330.00	21420564.	10180.75	84.753	21348868.	210175.	1743375.	98.68	528.09	10166.57
350.00	21437658.	10775.76	86.059	21347409.	220943.	1952570.	-245.96	549.24	10758.94
370.00	21450684.	11419.13	87.168	21338172.	232168.	2173980.	-595.44	573.86	11388.94
390.00	21460318.	12115.02	88.099	21323352.	243921.	2408412.	-964.80	602.16	12061.52
410.00	21468864.	12864.66	88.862	21300290.	256280.	2656735.	-1343.96	634.39	12778.53
430.00	21470853.	13674.64	89.471	21269477.	269327.	2919894.	-1740.73	671.09	13546.79
450.00	21472041.	14553.34	89.939	21230514.	283158.	3199002.	-2159.53	712.87	14374.56
470.00	21471424.	15506.39	90.272	21182221.	297880.	3495308.	-2604.60	760.30	15267.16
490.00	21469256.	16540.95	90.481	21126129.	313612.	3810160.	-3080.60	814.01	16231.16
498.25	21468021.	16983.95	90.543	21059862.	320425.	3945768.	-3288.45	837.63	16641.49
510.00	21465945.	17597.12	90.624	21059435.	330464.	4144628.	-3594.97	871.15	17203.95
530.00	21461571.	18654.55	90.746	20981983.	348464.	4498223.	-4157.31	929.68	18161.63
550.00	21456492.	19782.59	90.753	20892930.	367700.	4871480.	-4755.77	995.09	19176.74
570.00	21451365.	21005.60	90.674	20791382.	388315.	5265807.	-5408.63	1067.67	20269.24
590.00	21446825.	22340.28	90.515	20676152.	410460.	5682848.	-6127.41	1148.31	21452.84
610.00	21443552.	23817.95	90.291	20545688.	434310.	6124704.	-6935.01	1238.28	22752.19
628.34	21442156.	25315.72	90.078	20410894.	457844.	6553765.	-7788.44	1329.01	24051.18

TABLE 6A (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-IVR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	ALTITUDE (FT)	RANGE (NM)	VELOCITY VECTOR SPACE FIXED (DEG)	VELOCITY VECTOR EARTH FIXED (DEG)	LONGITUDE (POS. EAST) (DEG)	GEOCENTRIC DECLINATION (DEG)	GEOCENTRIC LATITUDE (DEG)
165.63	202489.	33.371	76.688	73.187	-79.959	28.528	28.589
166.95	206499.	34.469	76.700	73.201	-79.939	28.534	28.694
168.30	213505.	36.422	76.718	73.224	-79.904	28.543	28.703
170.00	215556.	37.001	76.717	73.227	-79.893	28.546	28.706
170.25	216297.	37.212	76.716	73.228	-79.889	28.547	28.707
170.25	216297.	37.212	76.716	73.228	-79.889	28.547	28.707
172.95	224136.	39.469	76.698	73.235	-79.848	28.559	28.718
177.55	237190.	43.361	76.673	73.254	-79.778	28.576	28.736
181.75	248789.	45.967	76.648	73.279	-79.712	28.594	28.754
190.00	270763.	54.214	76.619	73.329	-79.581	28.628	28.788
210.00	320104.	72.633	75.621	73.555	-79.246	28.716	28.876
230.00	364117.	92.321	75.691	73.840	-78.887	28.808	28.968
250.00	403023.	113.361	76.797	74.152	-78.502	28.904	29.064
270.00	437050.	135.840	76.735	74.486	-78.090	29.005	29.166
290.00	466422.	159.853	77.104	74.843	-77.649	29.111	29.271
310.00	491372.	185.504	77.304	75.223	-77.177	29.222	29.392
330.00	512129.	212.905	77.520	75.607	-76.671	29.336	29.497
350.00	528948.	242.178	77.787	76.036	-76.128	29.456	29.617
370.00	542104.	273.455	78.086	76.489	-75.547	29.580	29.741
390.00	551874.	306.896	78.418	76.968	-74.923	29.707	29.869
410.00	558558.	342.651	78.734	77.472	-74.254	29.839	30.001
430.00	562491.	380.901	79.136	78.004	-73.536	29.974	30.137
450.00	564026.	421.851	79.624	78.567	-72.765	30.113	30.276
470.00	563560.	465.733	80.101	79.161	-71.935	30.254	30.417
490.00	561545.	512.795	80.620	79.791	-71.043	30.397	30.561
498.25	560374.	523.197	80.846	80.061	-70.655	30.456	30.620
510.00	558393.	563.250	81.182	80.454	-70.082	30.541	30.705
530.00	554169.	617.069	81.785	81.149	-69.054	30.684	30.845
550.00	549241.	674.390	82.435	81.885	-67.955	30.825	30.991
570.00	544263.	735.492	83.130	82.662	-66.780	30.962	31.128
590.00	539869.	800.699	83.872	83.484	-65.522	31.093	31.259
610.00	536725.	870.426	84.669	84.352	-64.172	31.216	31.383
628.34	535442.	939.753	85.447	85.104	-62.846	31.320	31.487

TABLE 6A (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 1
S-IV STAGE FLIGHT DATA

FLIGHT TIME (SEC)	VEHICLE ATTITUDE ANGLE			VEHICLE ATTITUDE RATE			VEHICLE ATTITUDE ERROR		
	PITCH (DEG)	YAW (DEG)	ROLL (DEG)	PITCH (DEG/S)	YAW (DEG/S)	ROLL (DEG/S)	PITCH (DEG)	YAW (DEG)	ROLL (DEG)
165.63	-59.266	-0.291	0.017	0.005	-0.008	0.008	0.169	-0.291	0.017
166.95	-59.196	-0.396	0.032	0.106	-0.149	0.016	0.229	-0.396	0.032
169.30	-58.681	-1.032	0.090	0.266	-0.334	0.044	0.753	-1.032	0.090
170.00	-58.570	-1.207	0.137	0.030	-0.143	0.095	0.865	-1.207	0.137
170.25	-58.575	-1.232	0.163	-0.071	-0.053	0.116	0.859	-1.232	0.163
170.25	-58.575	-1.232	0.163	-0.071	-0.053	0.116	0.859	-1.232	0.163
172.95	-59.302	-0.770	0.343	-0.239	0.203	0.054	0.132	-0.770	0.343
177.55	-59.536	-0.518	0.586	0.014	-0.012	-0.064	-0.101	-0.518	0.586
181.75	-59.542	-0.527	0.431	-0.009	0.004	-0.013	-0.108	-0.527	0.431
190.00	-53.486	0.159	0.115	0.262	0.007	0.043	0.020	-0.518	0.115
210.00	-55.759	1.047	0.290	-0.089	0.027	-0.003	-0.111	-0.553	0.290
230.00	-57.362	1.259	0.270	-0.124	0.011	0.001	-0.091	-0.555	0.270
250.00	-58.973	1.557	0.297	-0.102	0.011	0.005	-0.059	-0.568	0.297
270.00	-60.729	1.748	0.343	-0.086	0.009	0.002	-0.118	-0.585	0.343
290.00	-62.675	1.937	0.403	-0.100	0.010	0.003	-0.107	-0.609	0.403
310.00	-64.500	1.828	0.437	-0.197	-0.208	0.001	-0.251	-0.929	0.437
330.00	-66.472	2.303	0.514	-0.079	0.020	0.002	-0.431	-1.289	0.514
350.00	-68.452	2.534	0.566	-0.102	0.011	0.003	-0.426	-1.320	0.566
370.00	-70.588	2.716	0.622	-0.102	0.007	0.002	-0.438	-1.363	0.622
390.00	-72.696	2.884	0.671	-0.111	0.008	0.003	-0.450	-1.410	0.671
410.00	-74.855	3.055	0.720	-0.111	0.008	0.003	-0.468	-1.457	0.720
430.00	-77.196	3.214	0.776	-0.116	0.010	0.003	-0.484	-1.508	0.776
450.00	-79.570	3.376	0.831	-0.123	0.010	0.003	-0.507	-1.555	0.831
470.00	-81.898	3.528	0.879	-0.103	0.008	0.001	-0.540	-1.605	0.879
490.00	-84.354	3.676	0.931	-0.124	0.009	0.003	-0.544	-1.661	0.931
498.25	-85.258	3.735	0.946	-0.095	0.007	0.001	-0.583	-1.684	0.946
510.00	-86.587	3.852	0.424	-0.193	0.000	-0.107	-0.521	-1.702	0.424
530.00	-88.968	4.002	-0.586	-0.074	0.012	-0.009	-0.569	-1.767	-0.586
550.00	-91.235	4.127	-0.730	-0.138	0.004	-0.006	-0.592	-1.807	-0.730
570.00	-93.812	4.223	-0.959	-0.134	0.004	-0.006	-0.618	-1.855	-0.959
590.00	-96.745	4.267	-0.976	-0.157	0.001	-0.005	-0.604	-1.896	-0.976
610.00	-99.772	4.307	-0.139	-0.146	0.000	0.003	-0.637	-1.935	-0.138
628.34	-102.848	4.240	0.675	0.265	0.006	0.007	-1.204	-1.972	0.675

FIGURE 1A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ALTITUDE HISTORY

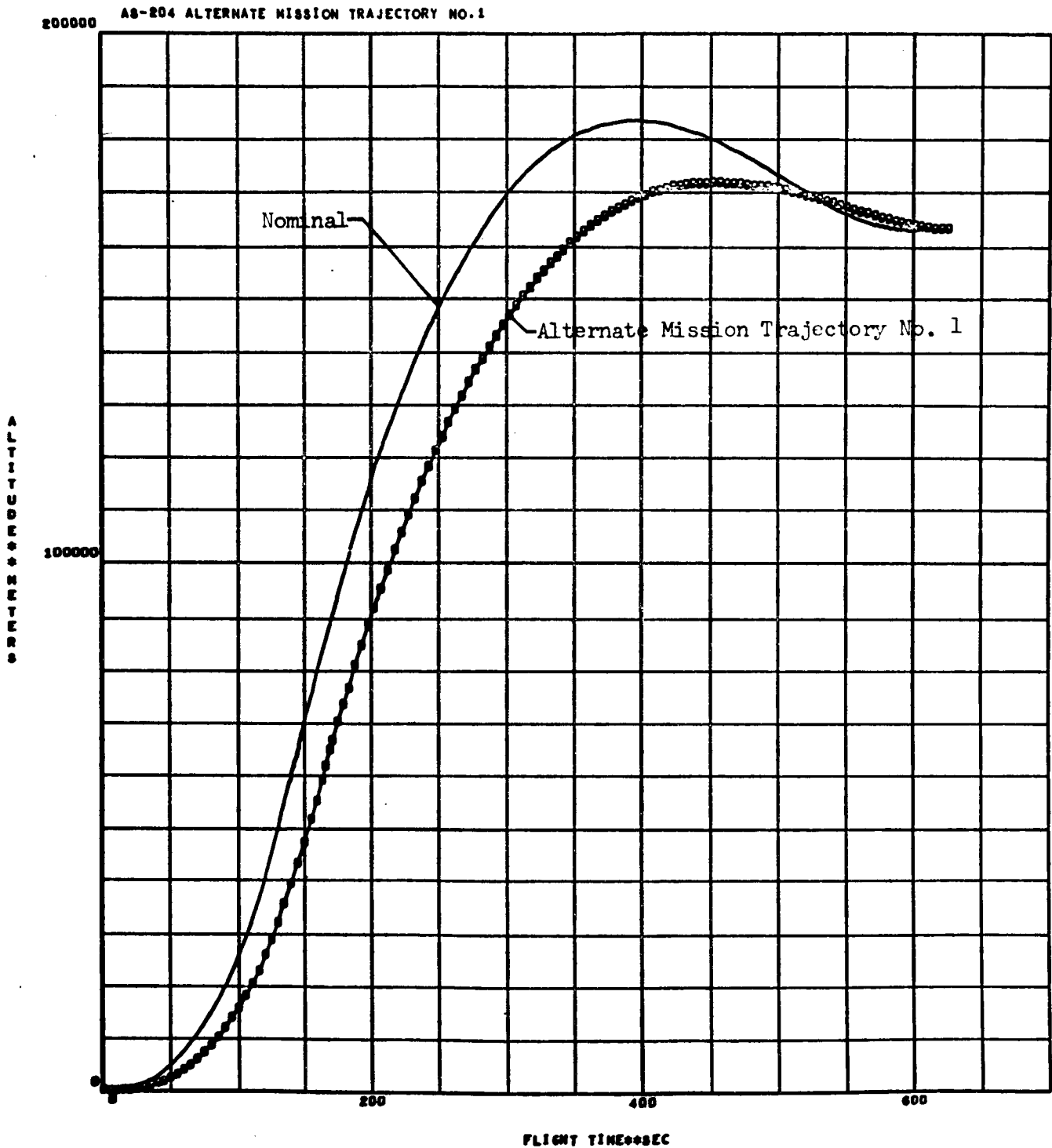


FIGURE 2A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
GROUND RANGE HISTORY

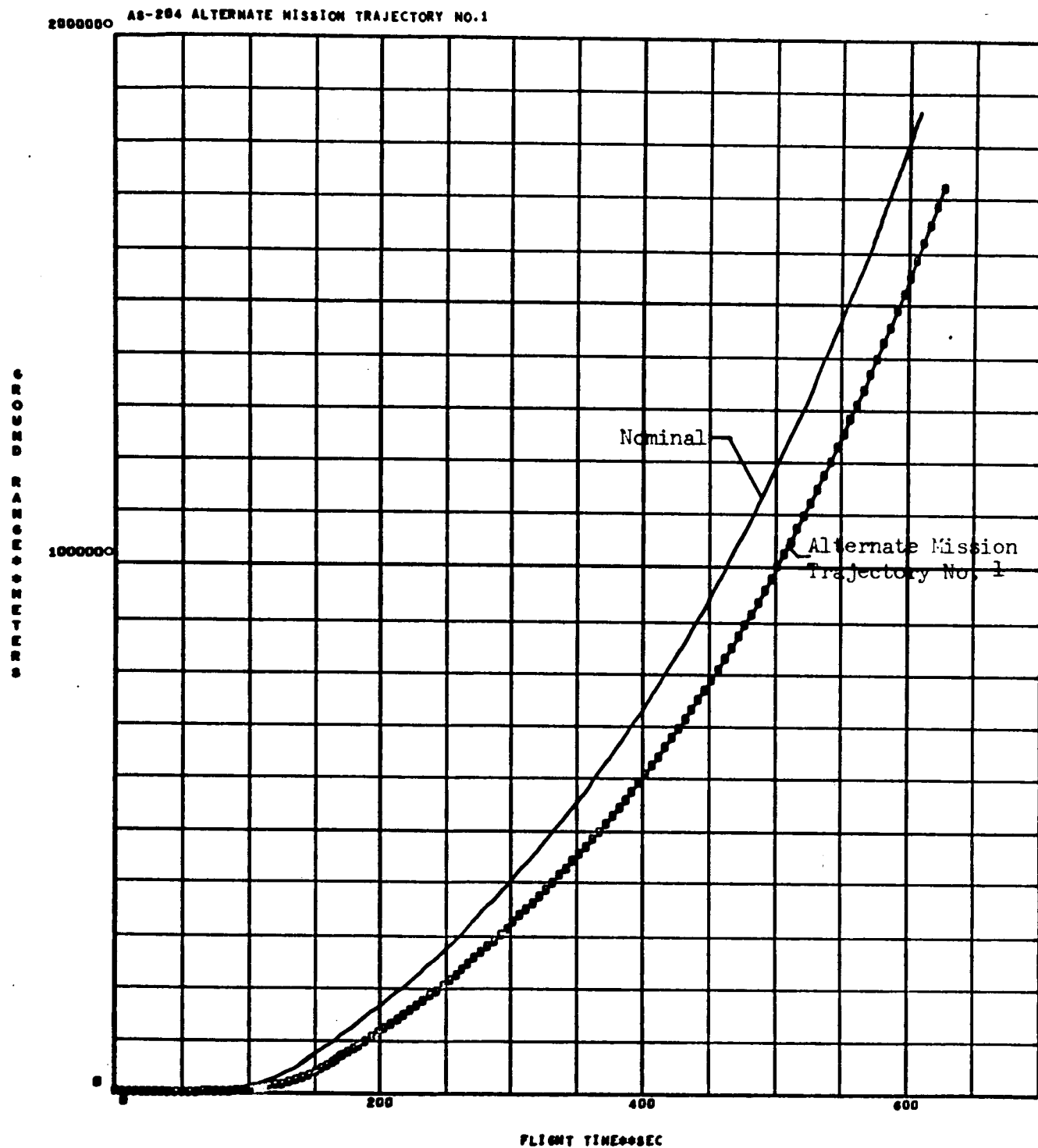


FIGURE 3A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
SPACE FIXED VELOCITY HISTORY

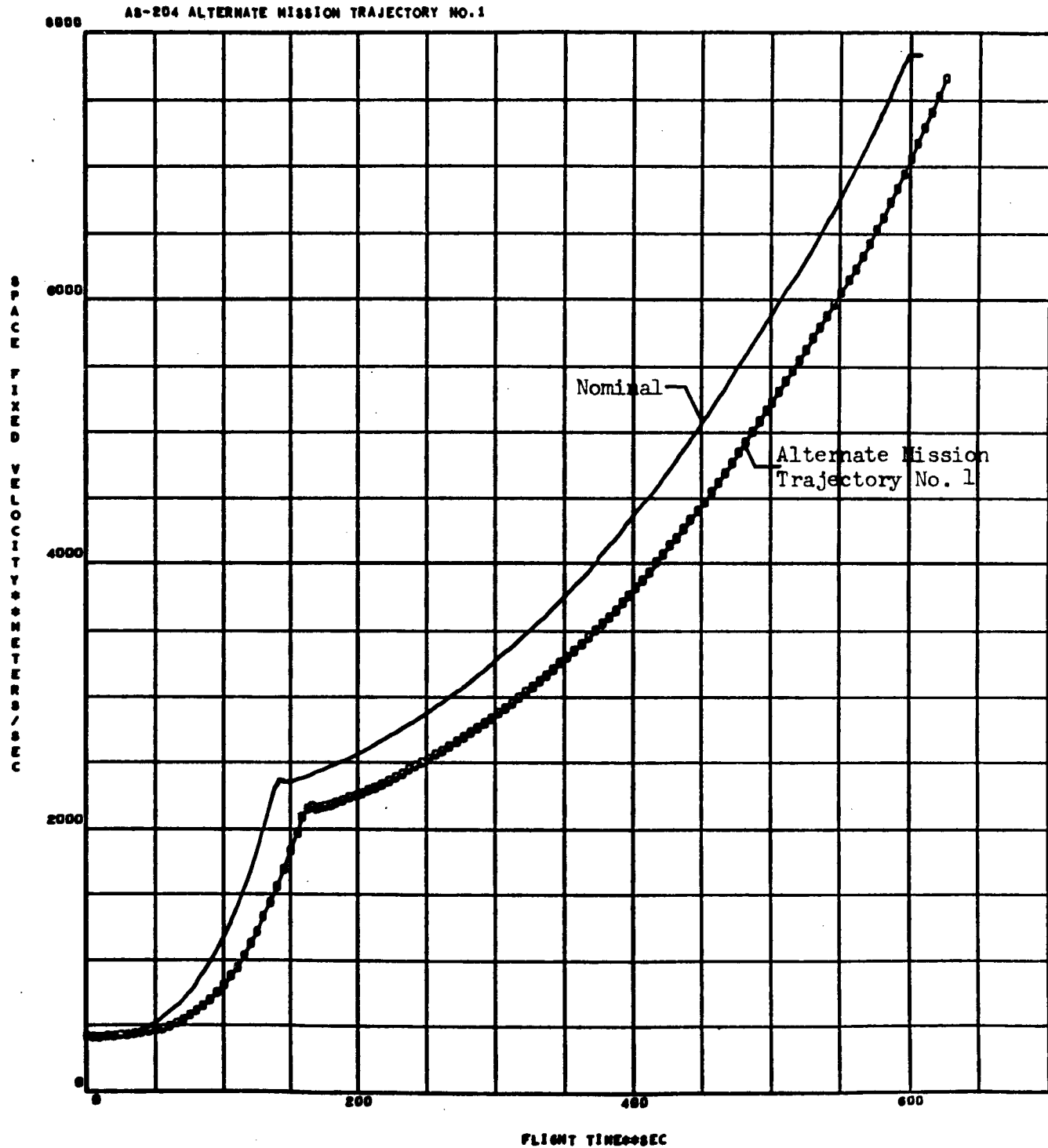


FIGURE 4A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
SPACE FIXED PATH ANGLE HISTORY

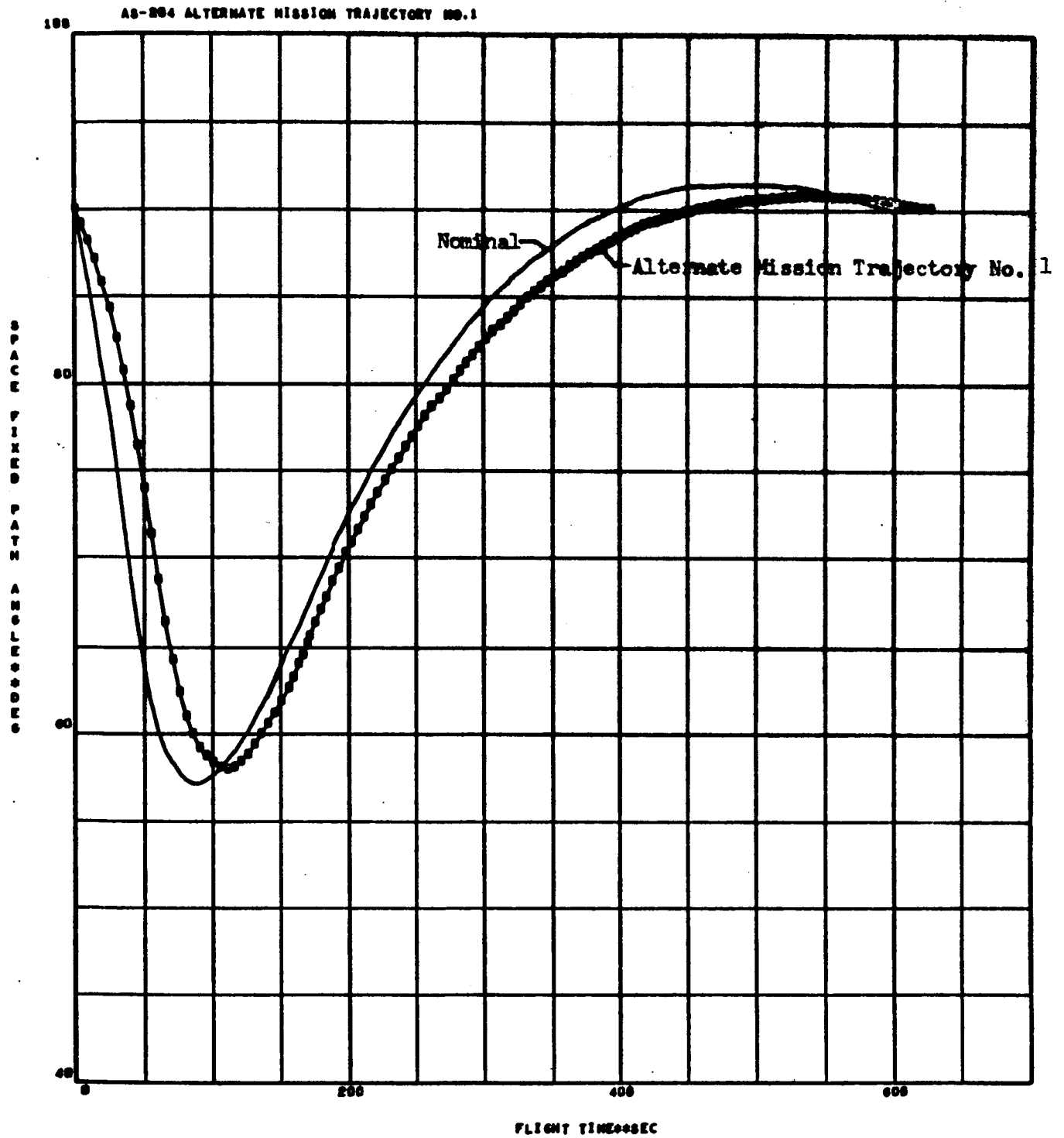


FIGURE 5A

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
SPACE FIXED AZIMUTH HISTORY

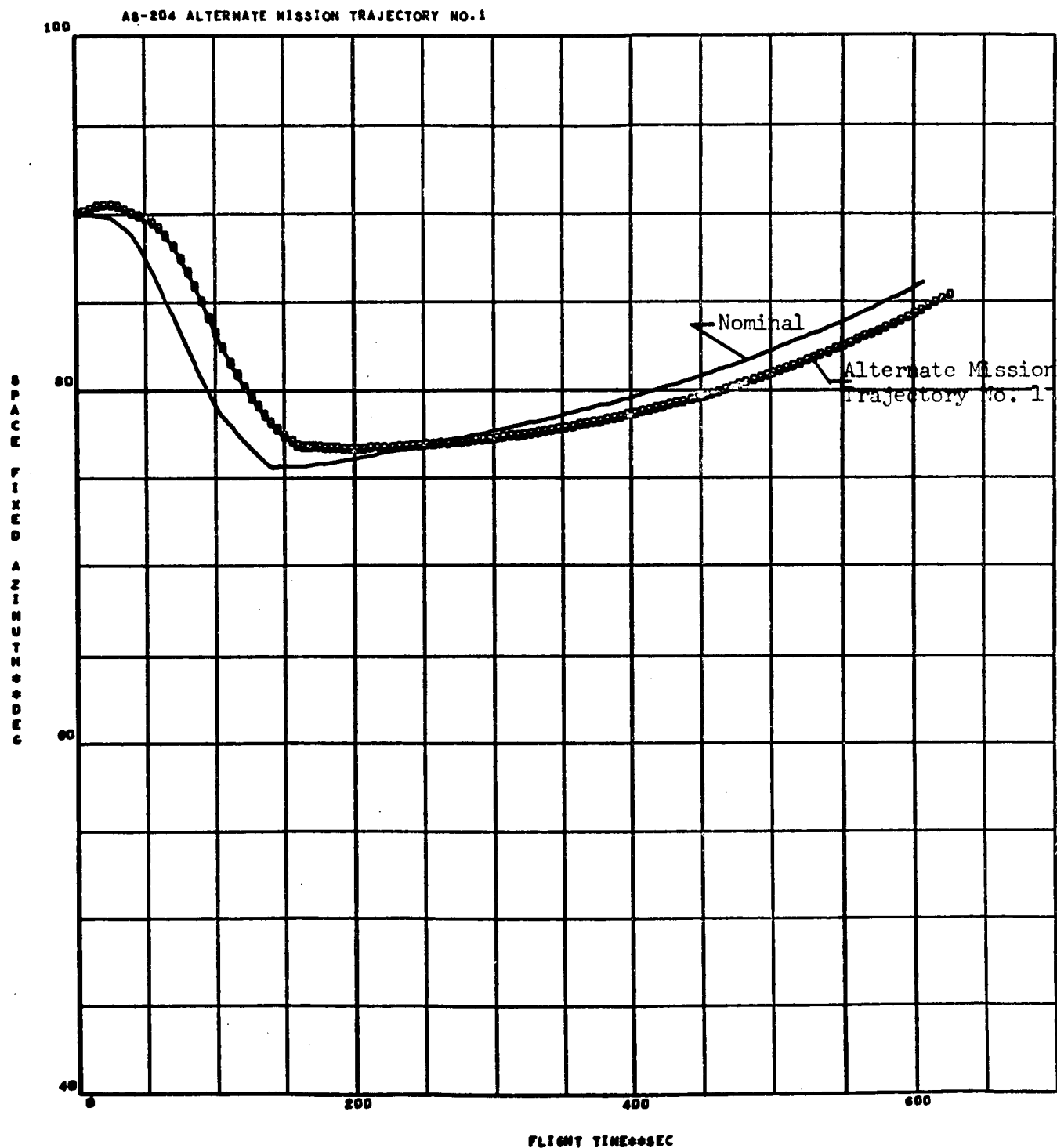


FIGURE 6A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
TRAJECTORY PROFILE

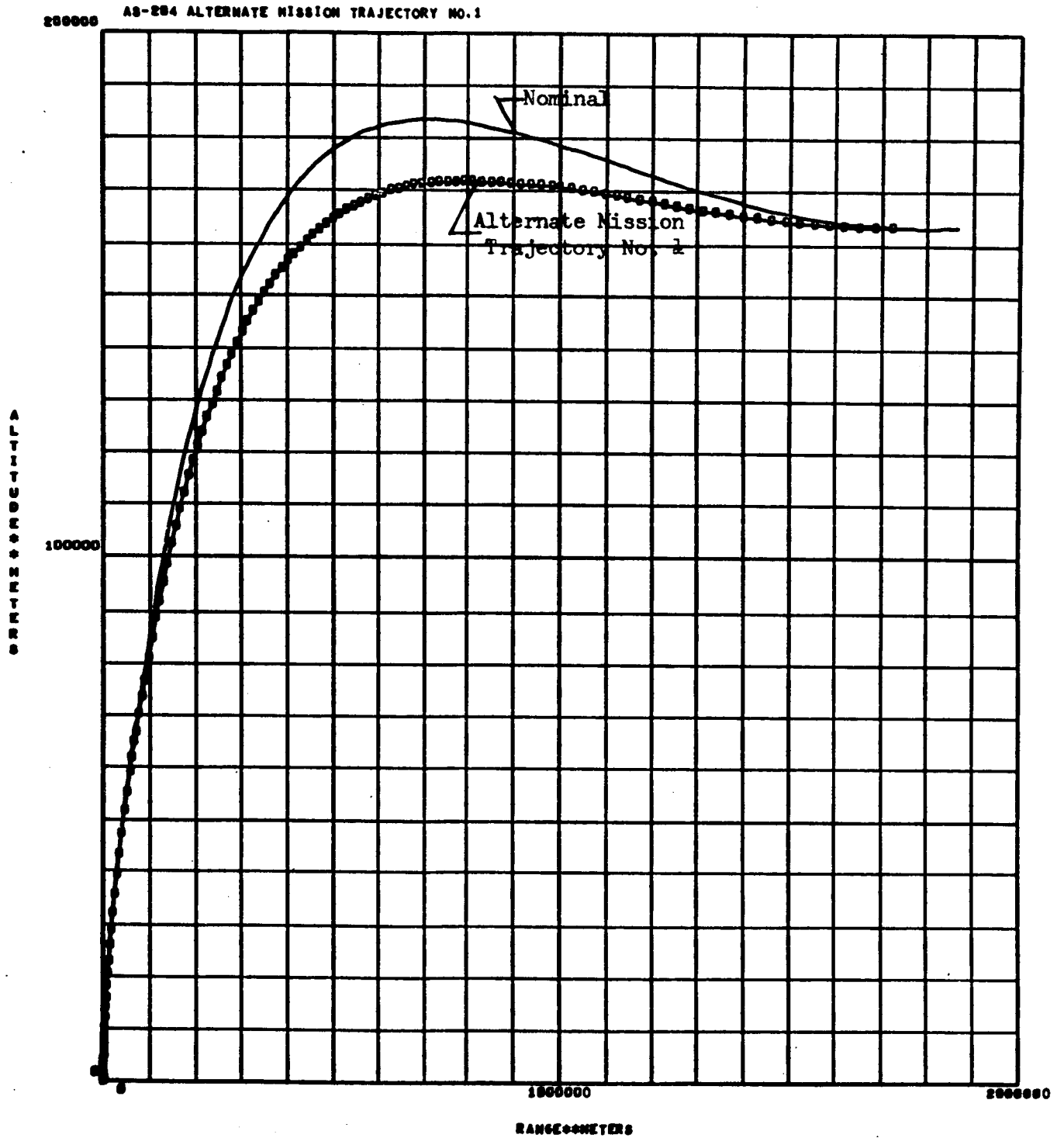


FIGURE 7A

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ANGLE OF ATTACK HISTORY
S-IB STAGE

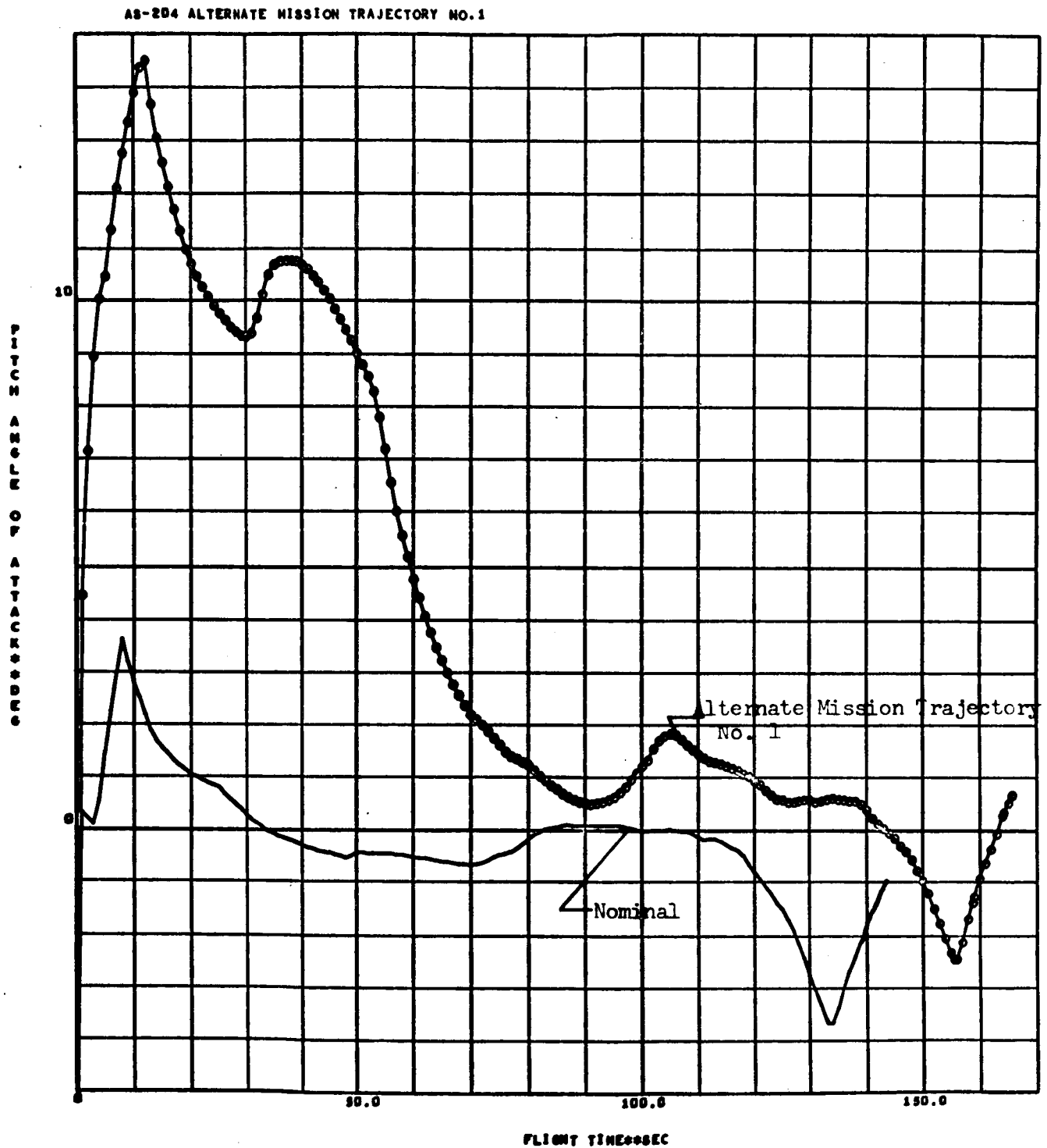


FIGURE 8A

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ANGLE OF ATTACK HISTORY
S-IB STAGE

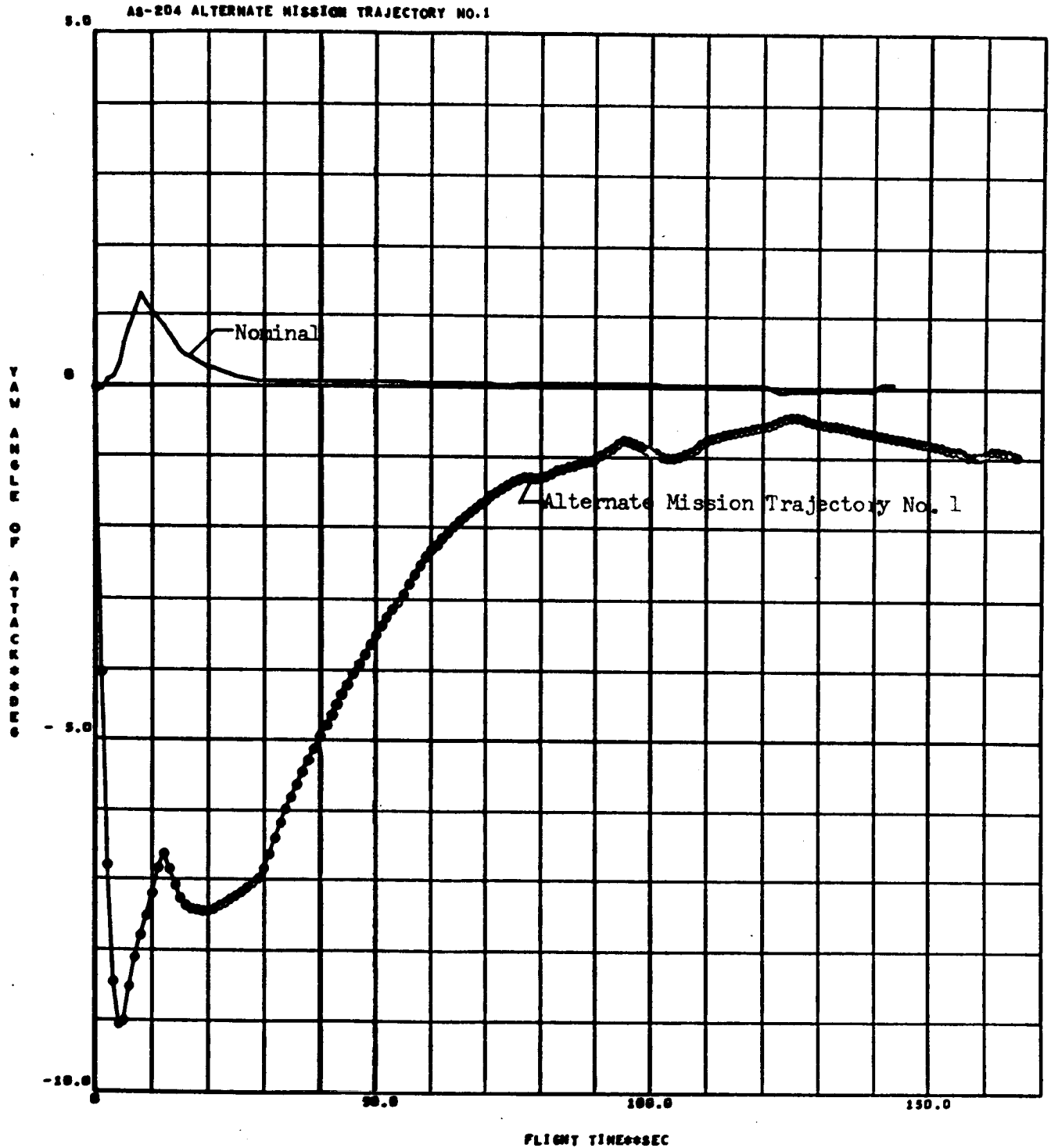


FIGURE 9A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
DYNAMIC PRESSURE HISTORY
S-IB STAGE

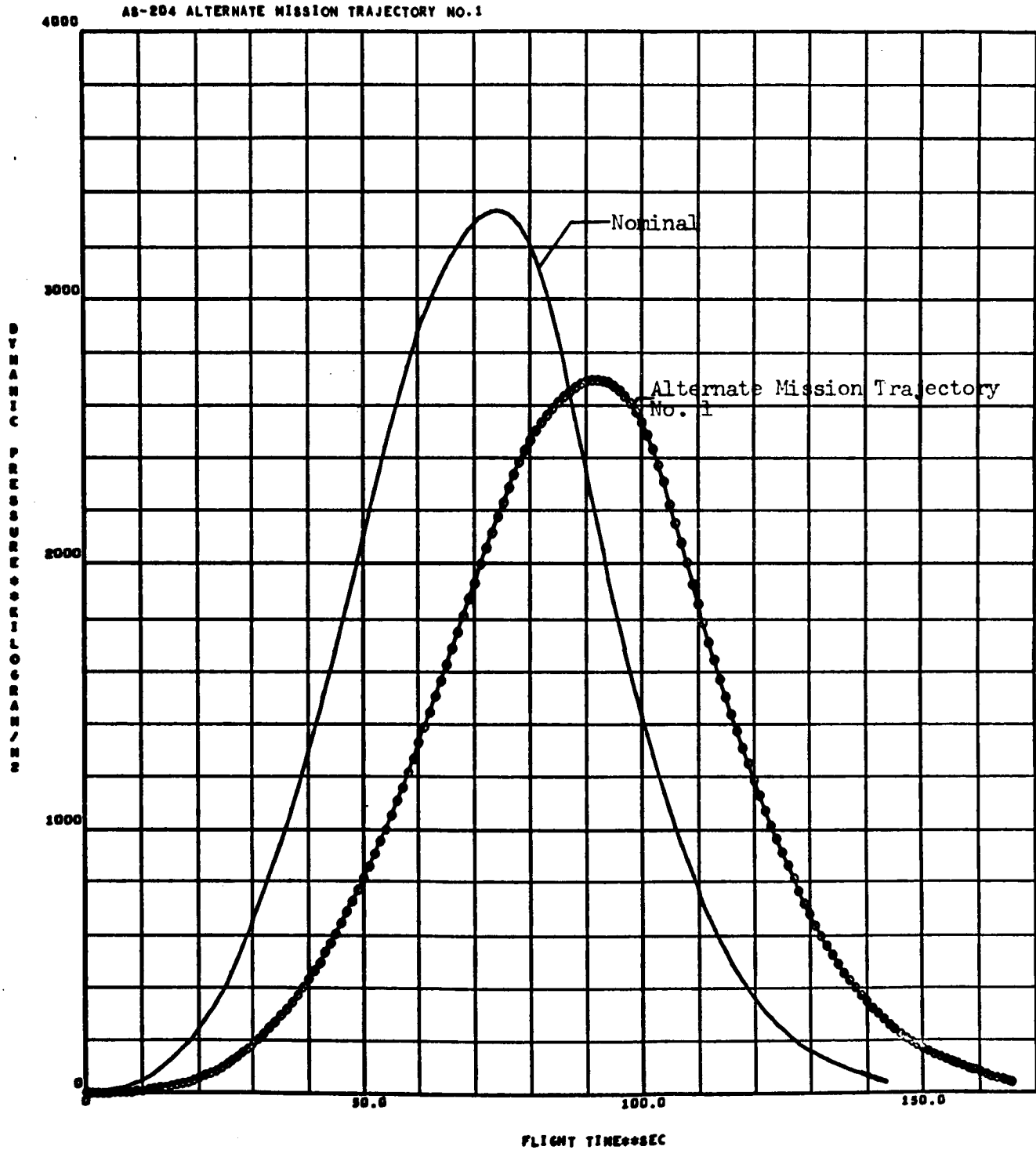


Figure 10A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
AERODYNAMIC LOADING INDICATOR HISTORY
S-1B STAGE

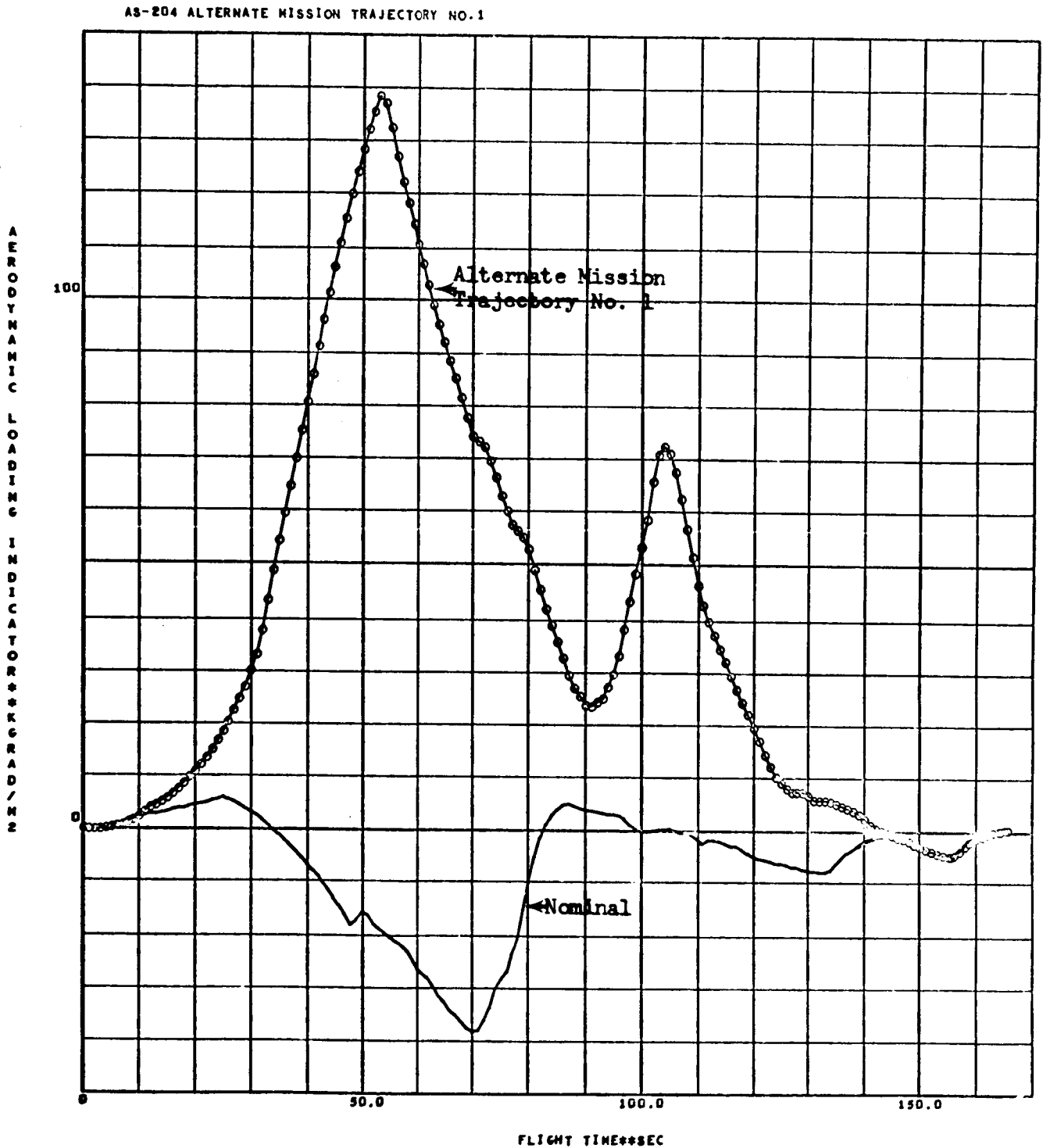


FIGURE 11A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
MACH NUMBER HISTORY
S-IB STAGE

AS-204 ALTERNATE MISSION TRAJECTORY NO.1

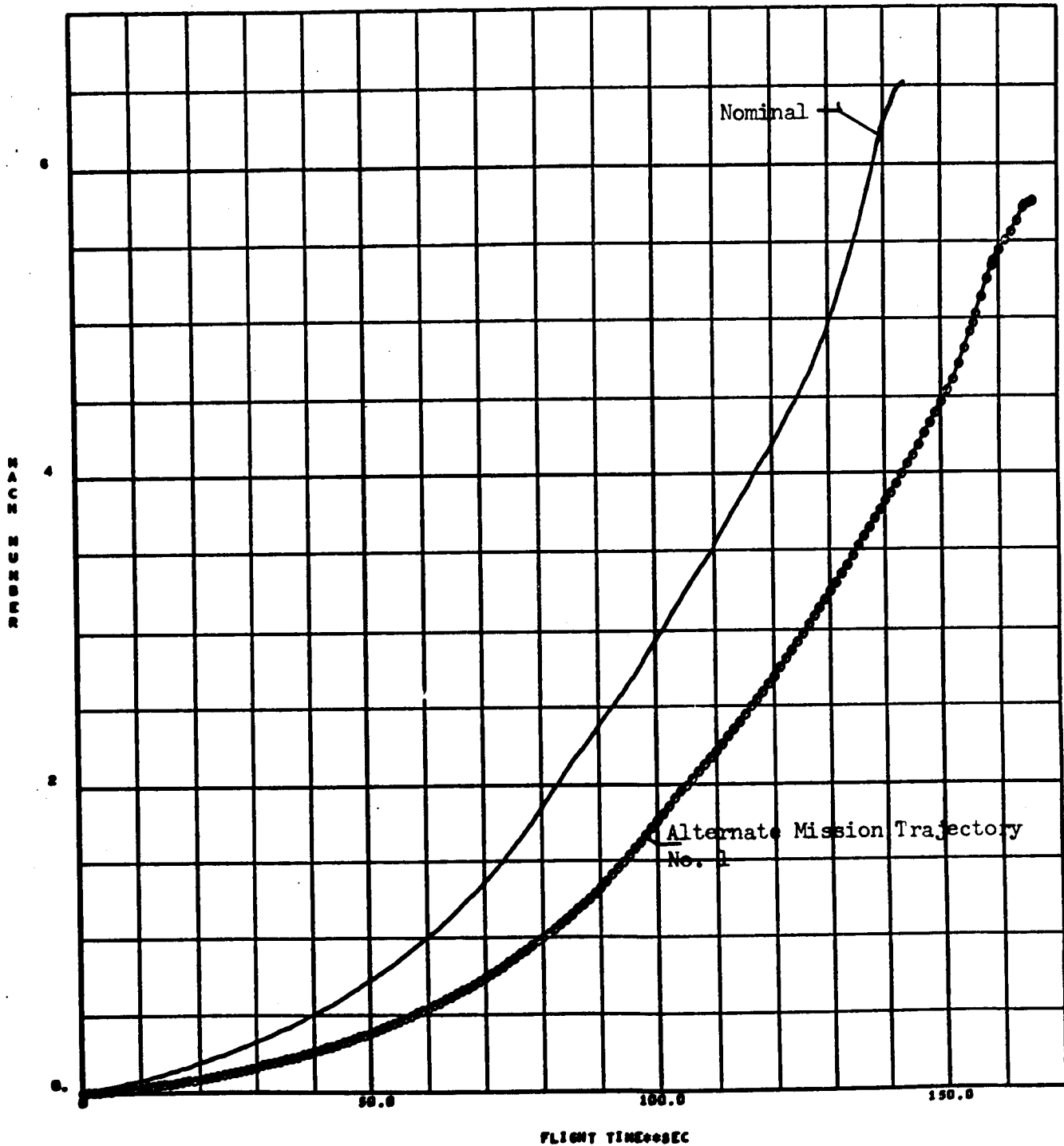


FIGURE 12A

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
LONGITUDINAL ACCELERATION HISTORY
S-IB STAGE

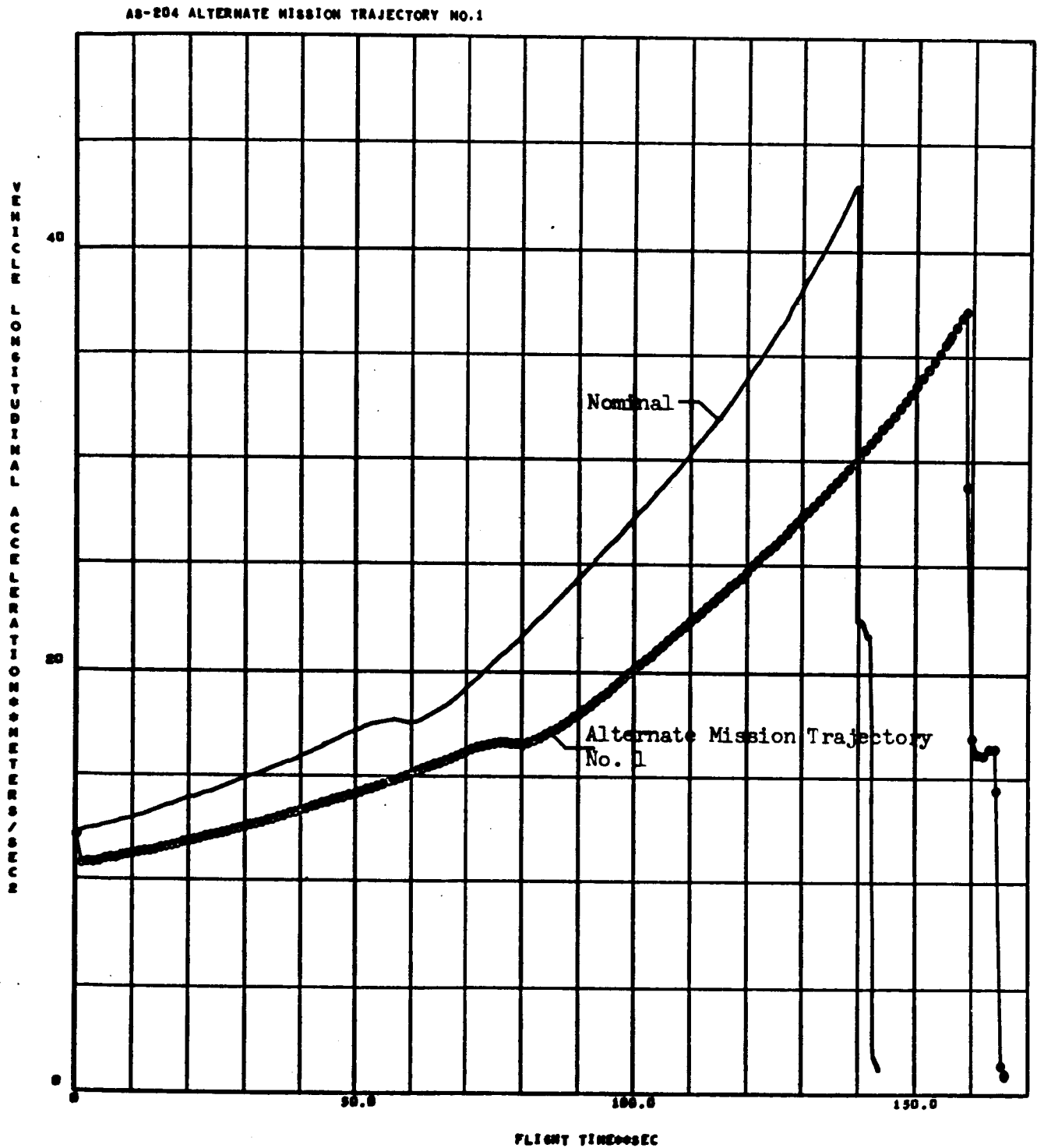


FIGURE 13A

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE COMMAND HISTORY
S-IB STAGE

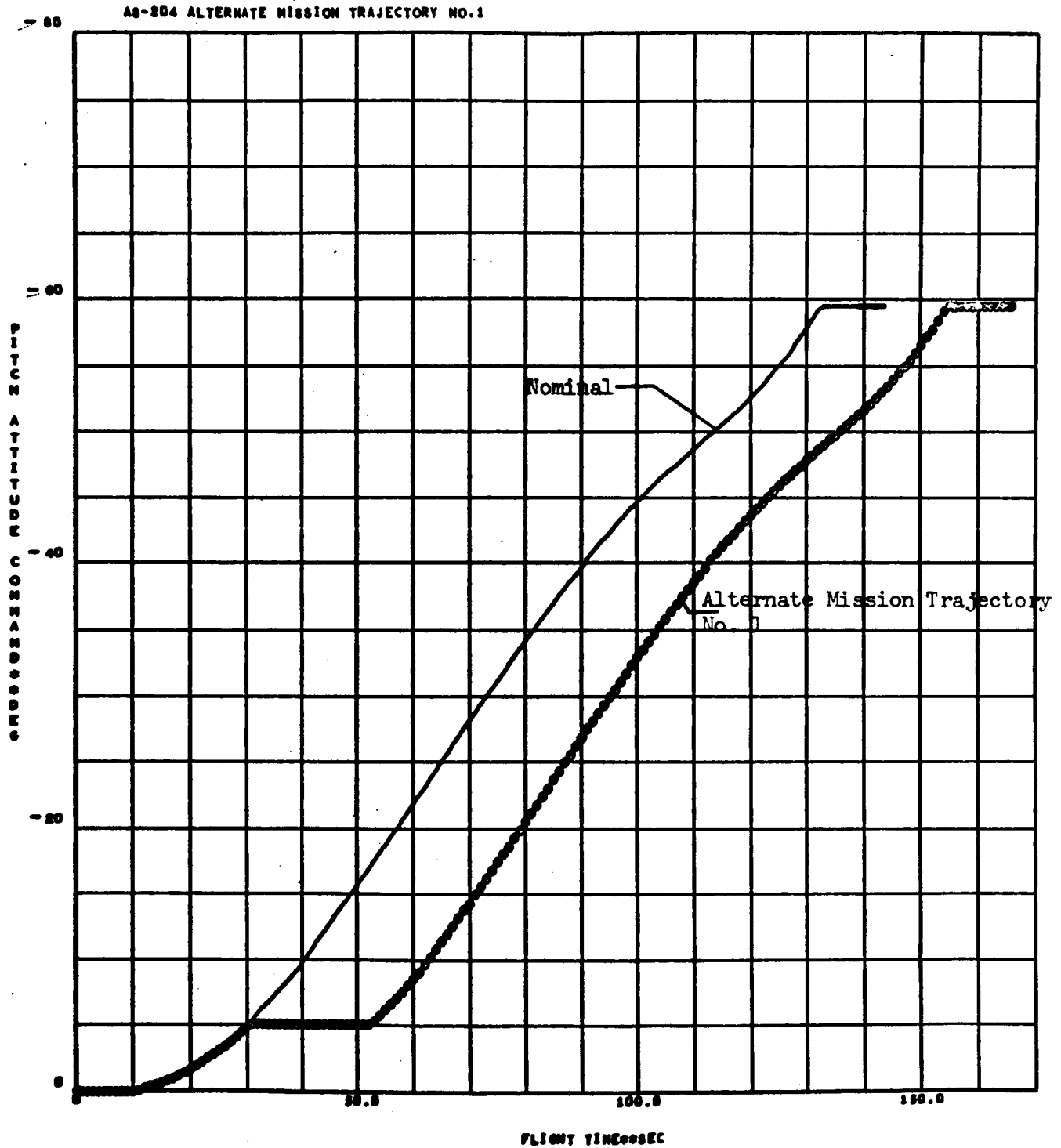


FIGURE 14A

AS-204/DM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE COMMAND RATE HISTORY
S-IB STAGE

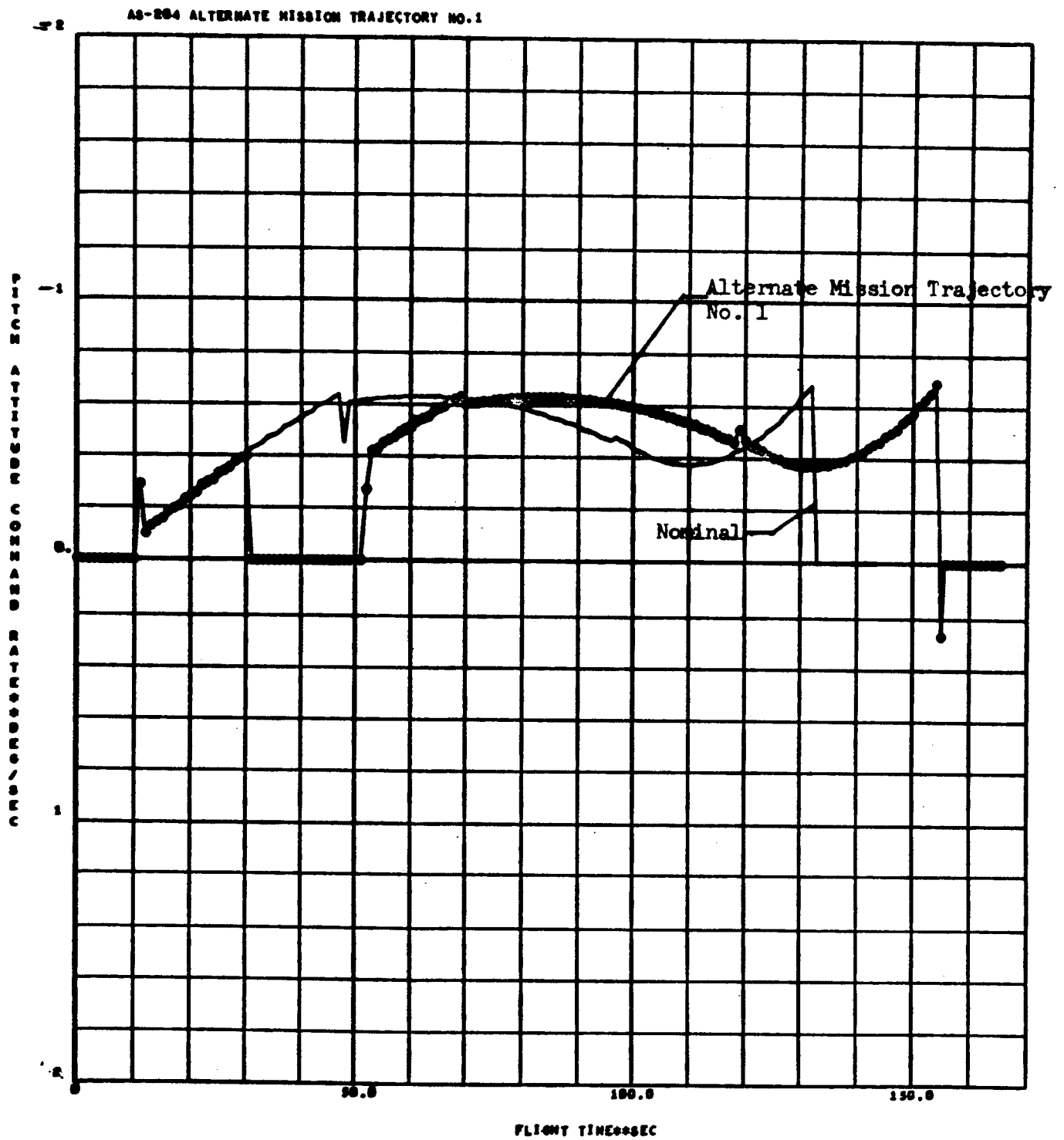


FIGURE 15A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE ERROR HISTORY
S-1B STAGE

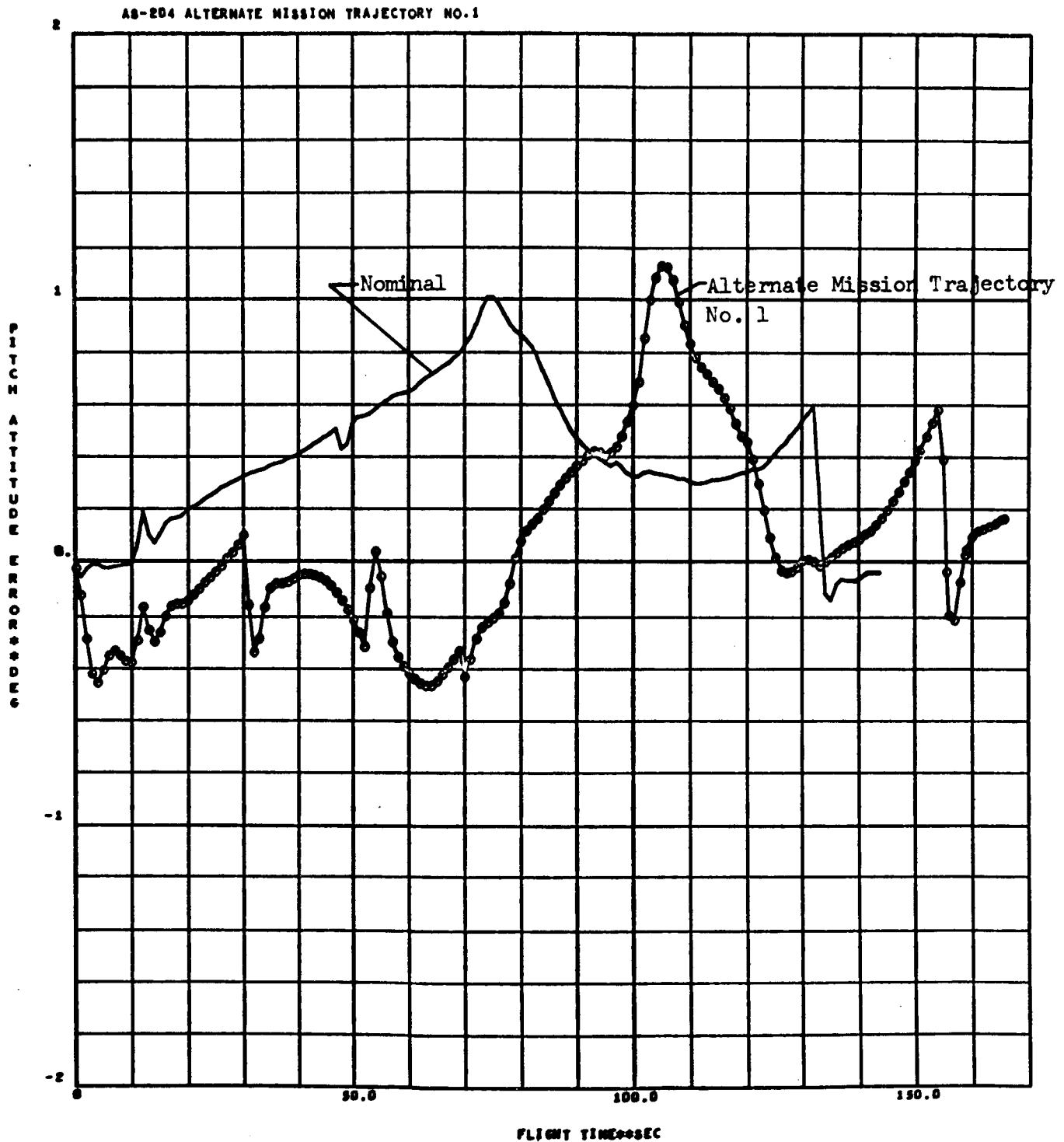


FIGURE 16A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ATTITUDE ERROR HISTORY
S-IB STAGE

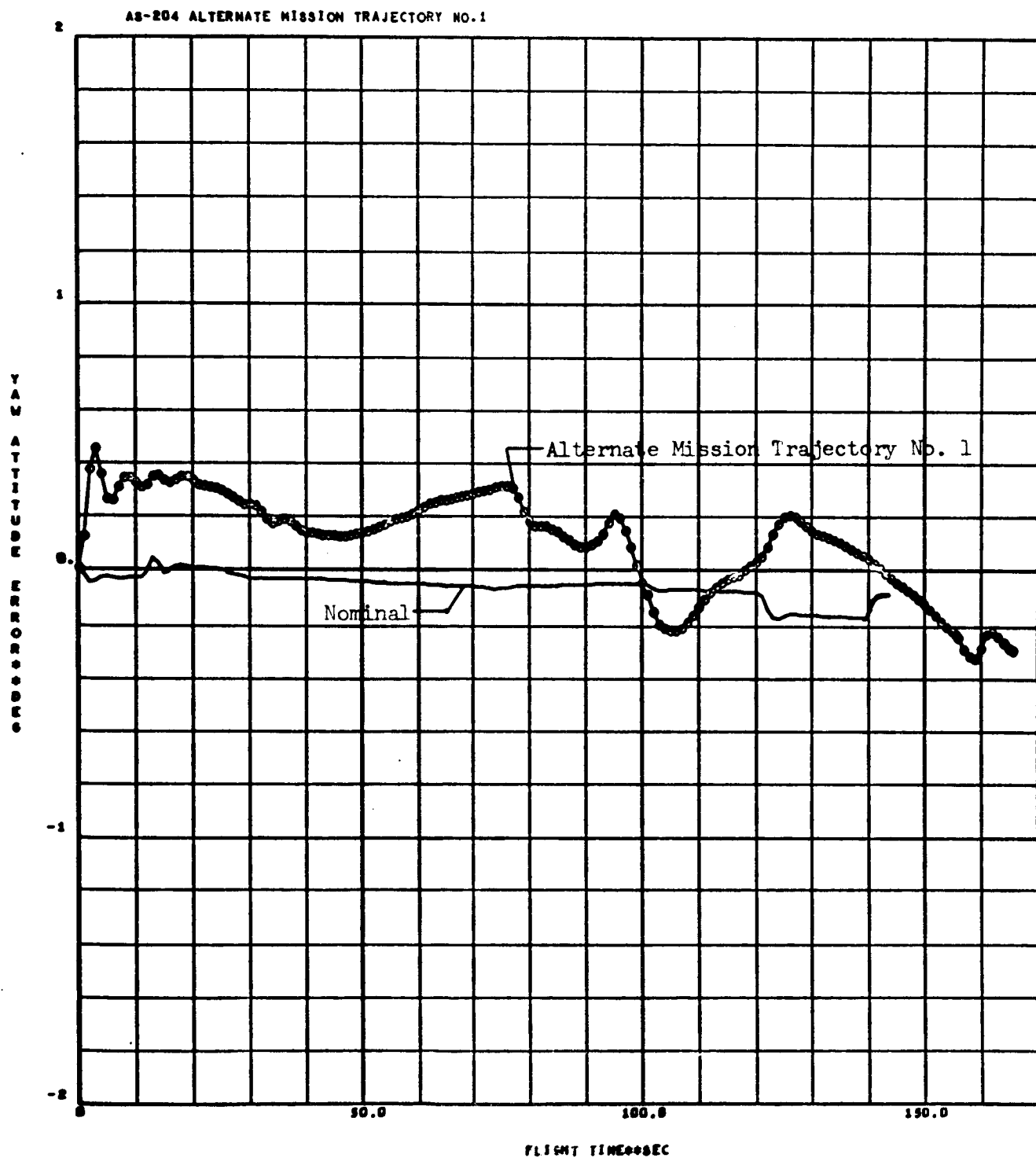


FIGURE 17A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ROLL ATTITUDE ERROR HISTORY
S-1B STAGE

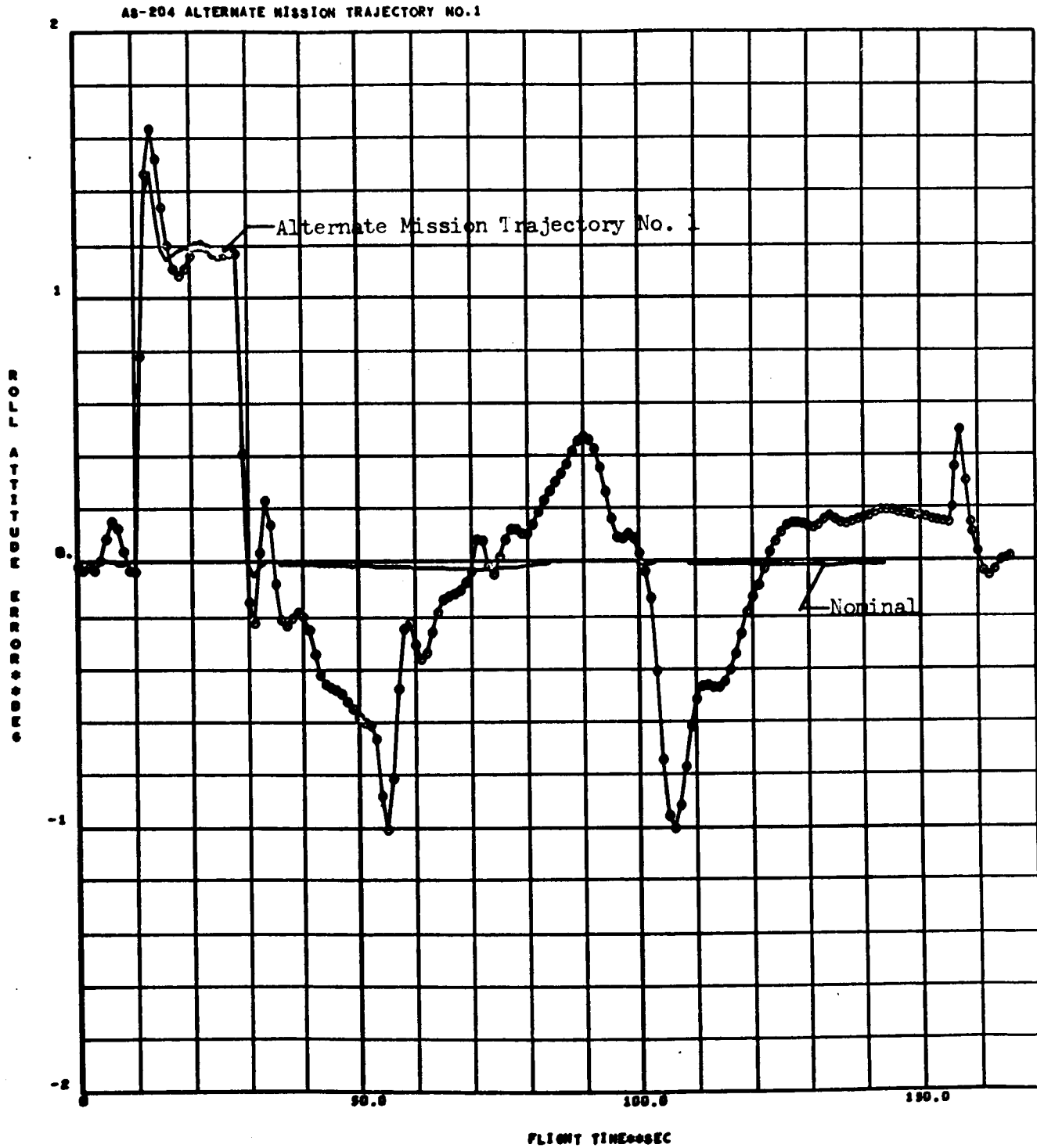


FIGURE 18A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE HISTORY
S-1B STAGE

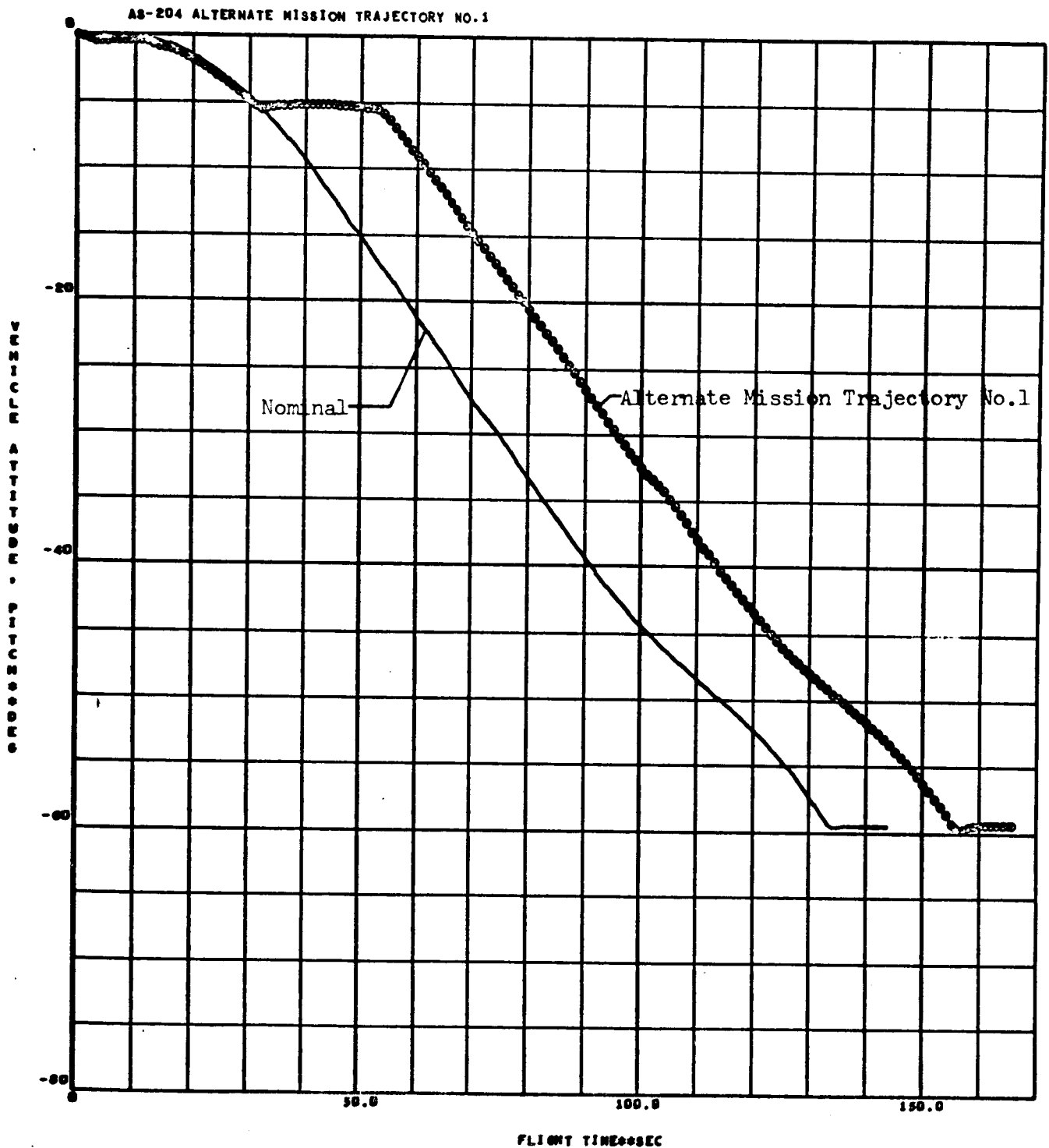


FIGURE 19A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ATTITUDE HISTORY
S-1B STAGE

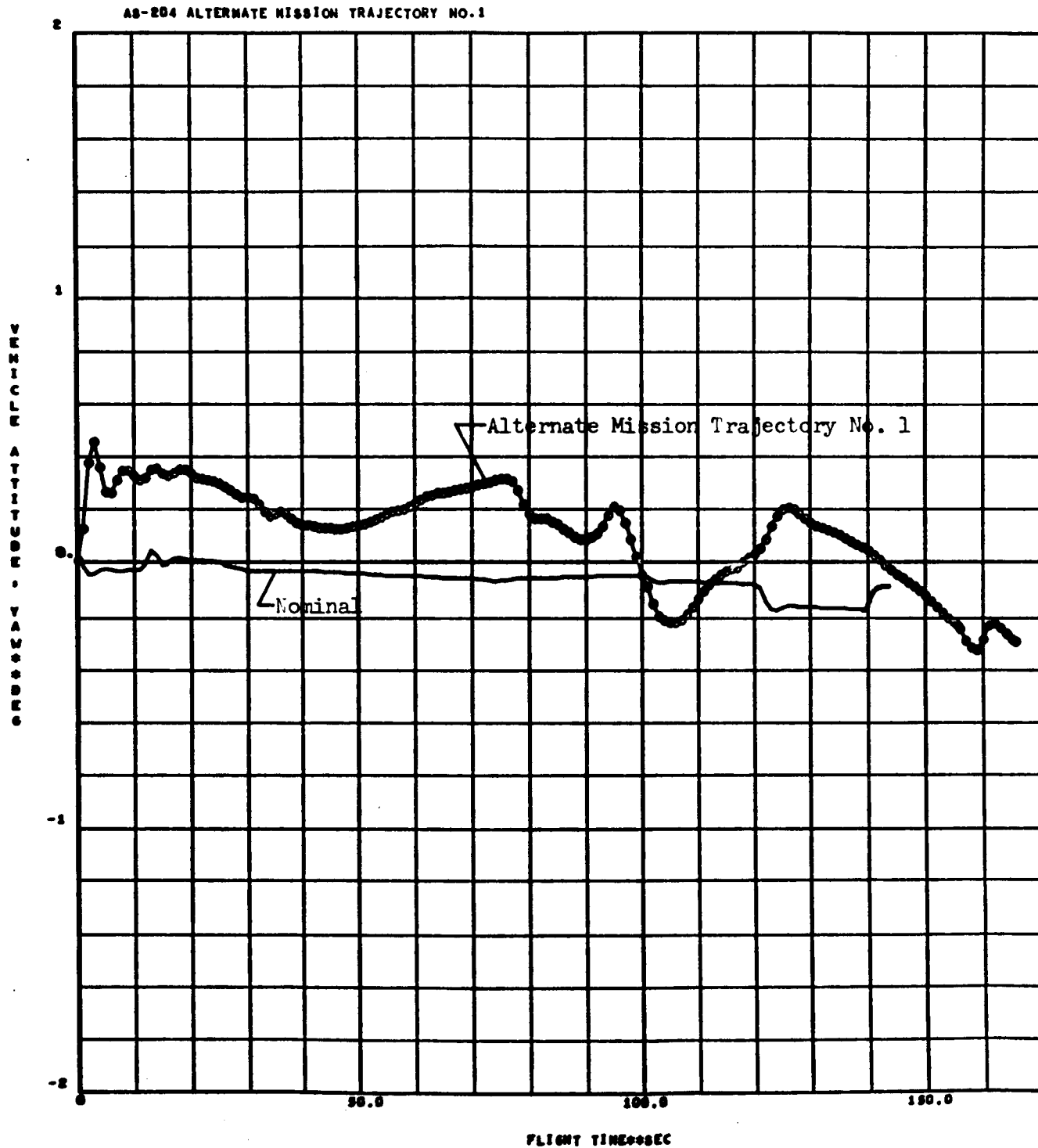


FIGURE 20A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ROLL ATTITUDE HISTORY
S-1B STAGE

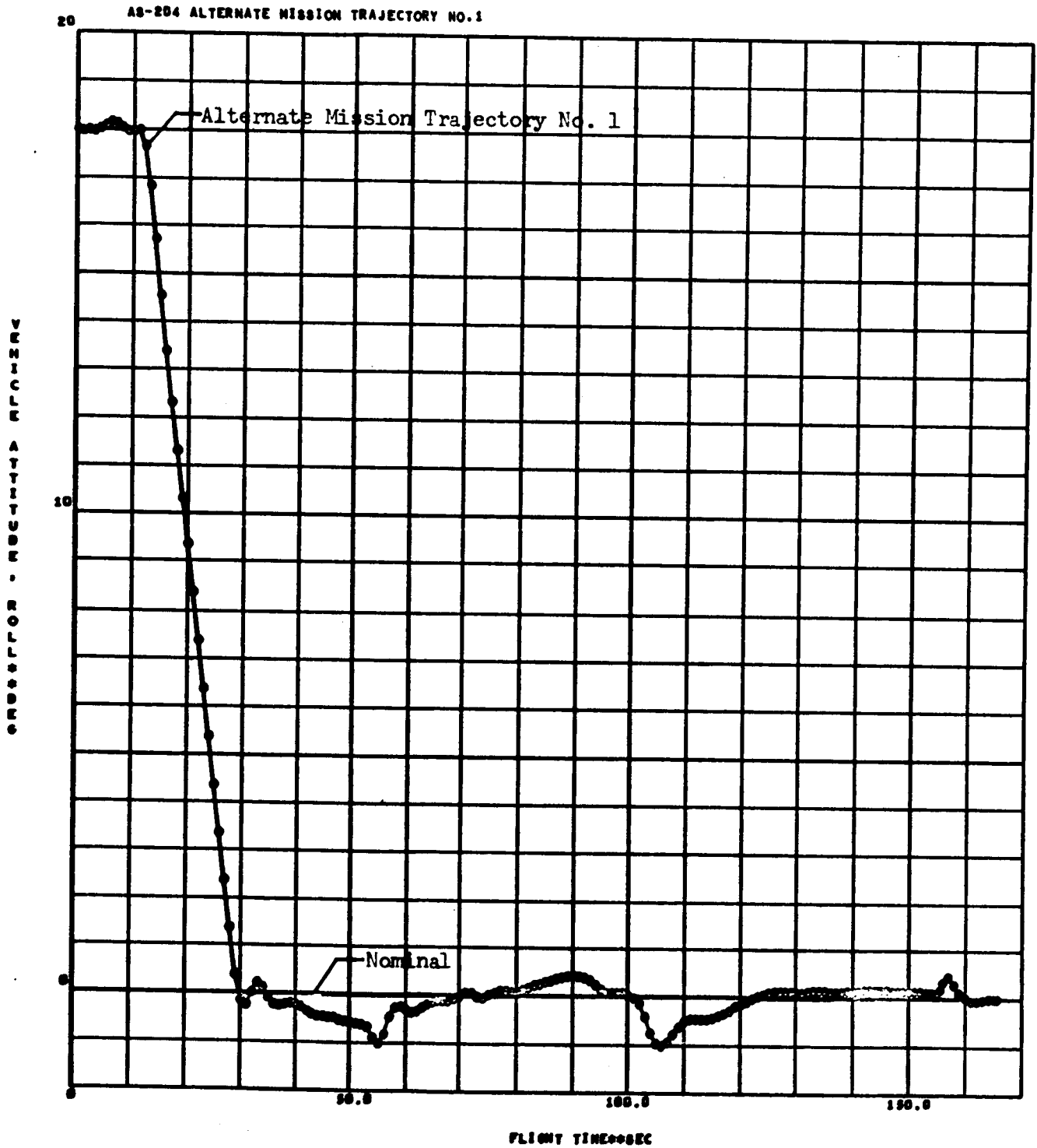


FIGURE 21A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE RATE HISTORY
S-1B STAGE

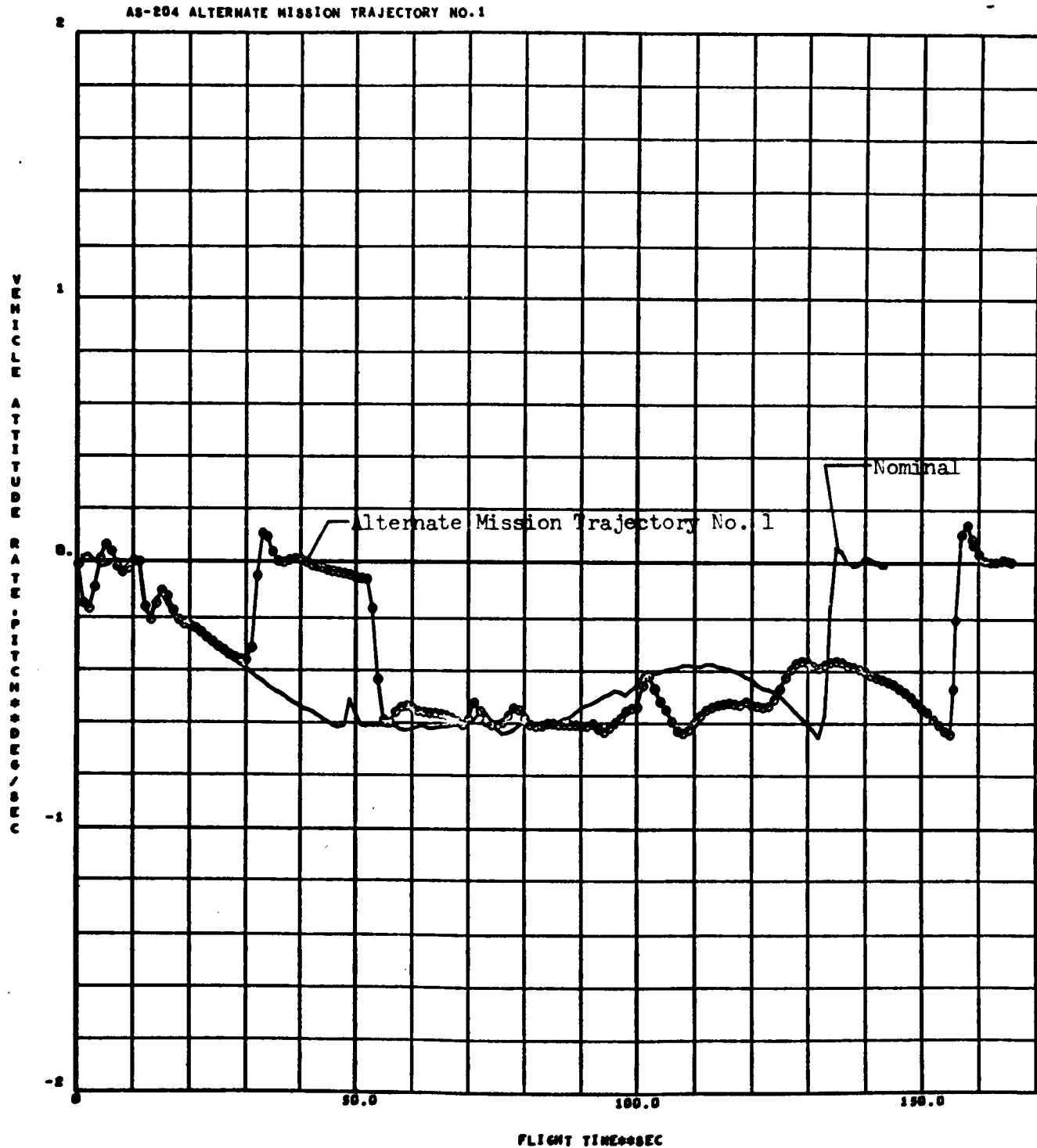


FIGURE 22A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ATTITUDE RATE HISTORY
S-IB STAGE

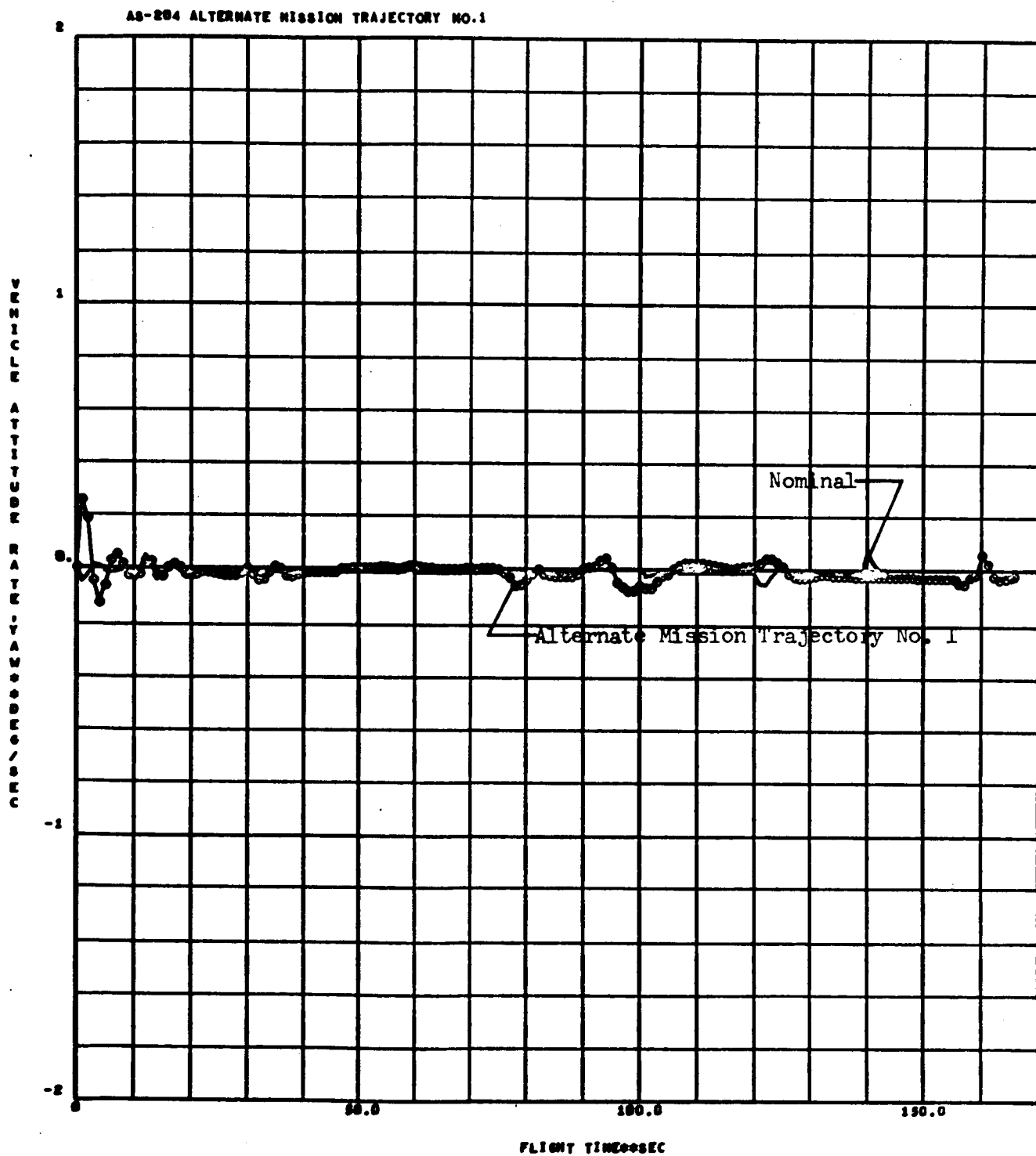


FIGURE 23A

AS-204/1M-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ROLL ATTITUDE RATE HISTORY
S-1B STAGE

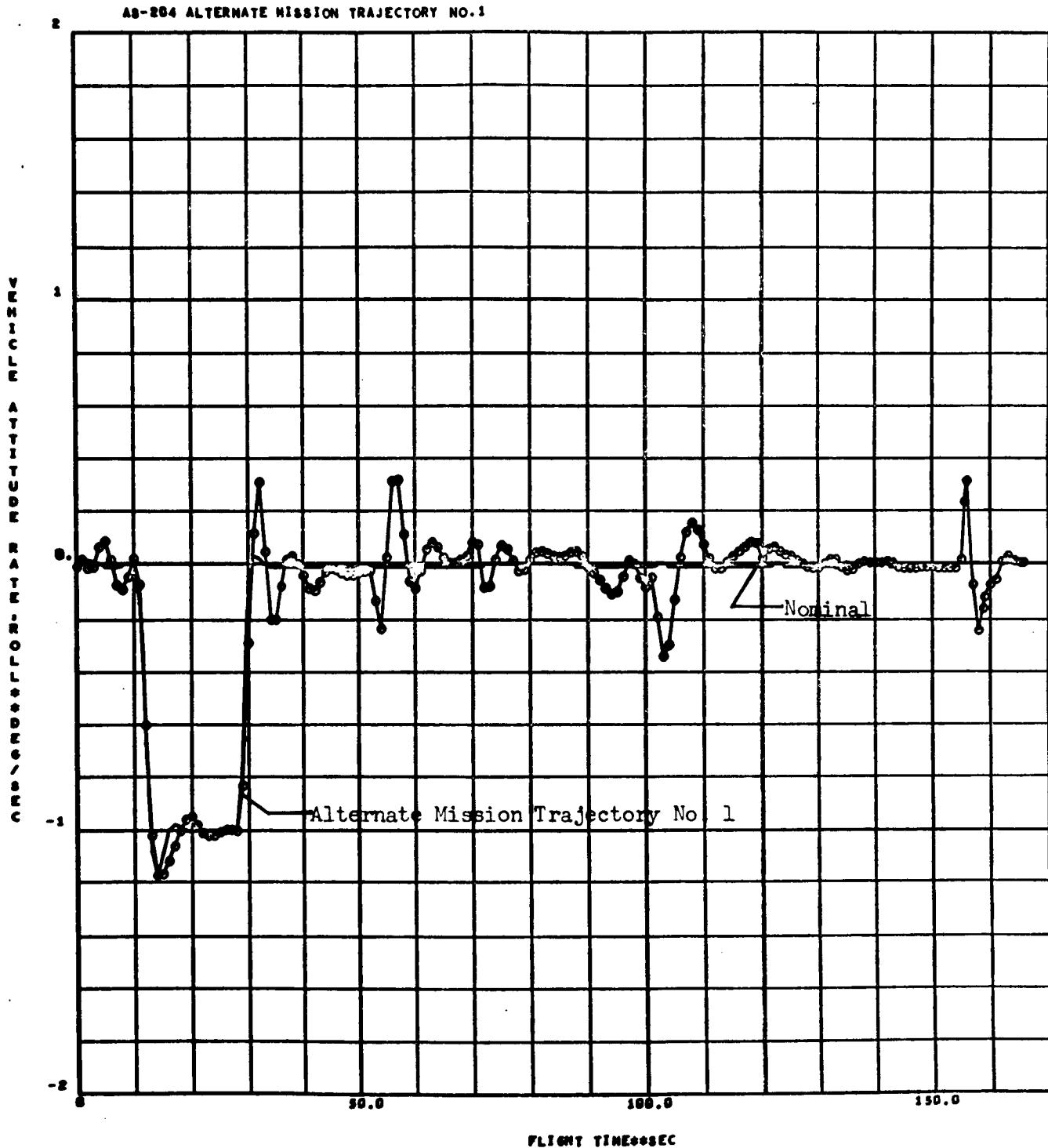


FIGURE 24A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH DEFLECTION HISTORY, ENGINES 1 AND 2
S-1B STAGE

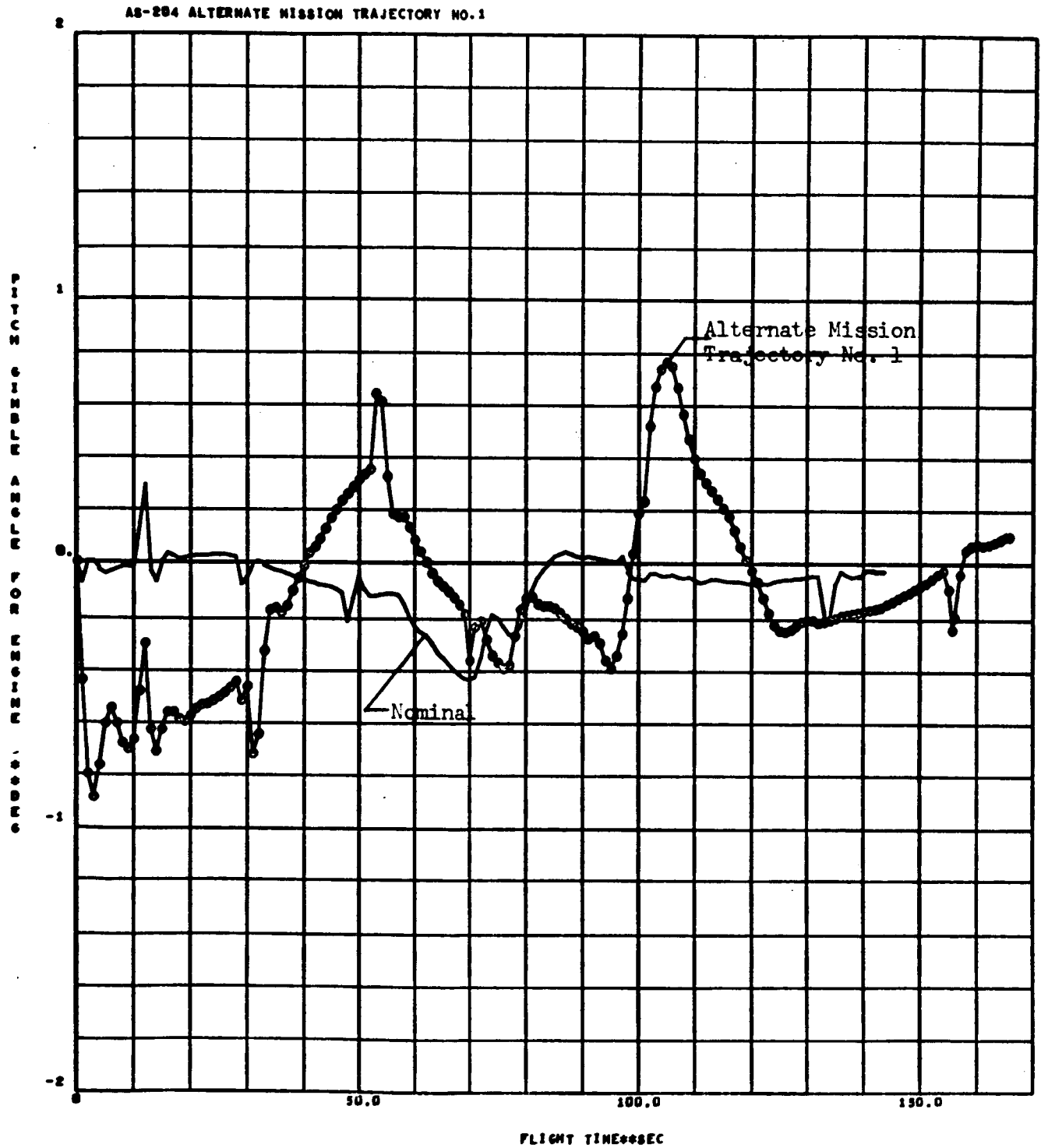


FIGURE 25A

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH DEFLECTION HISTORY, ENGINE 3
S-IB STAGE

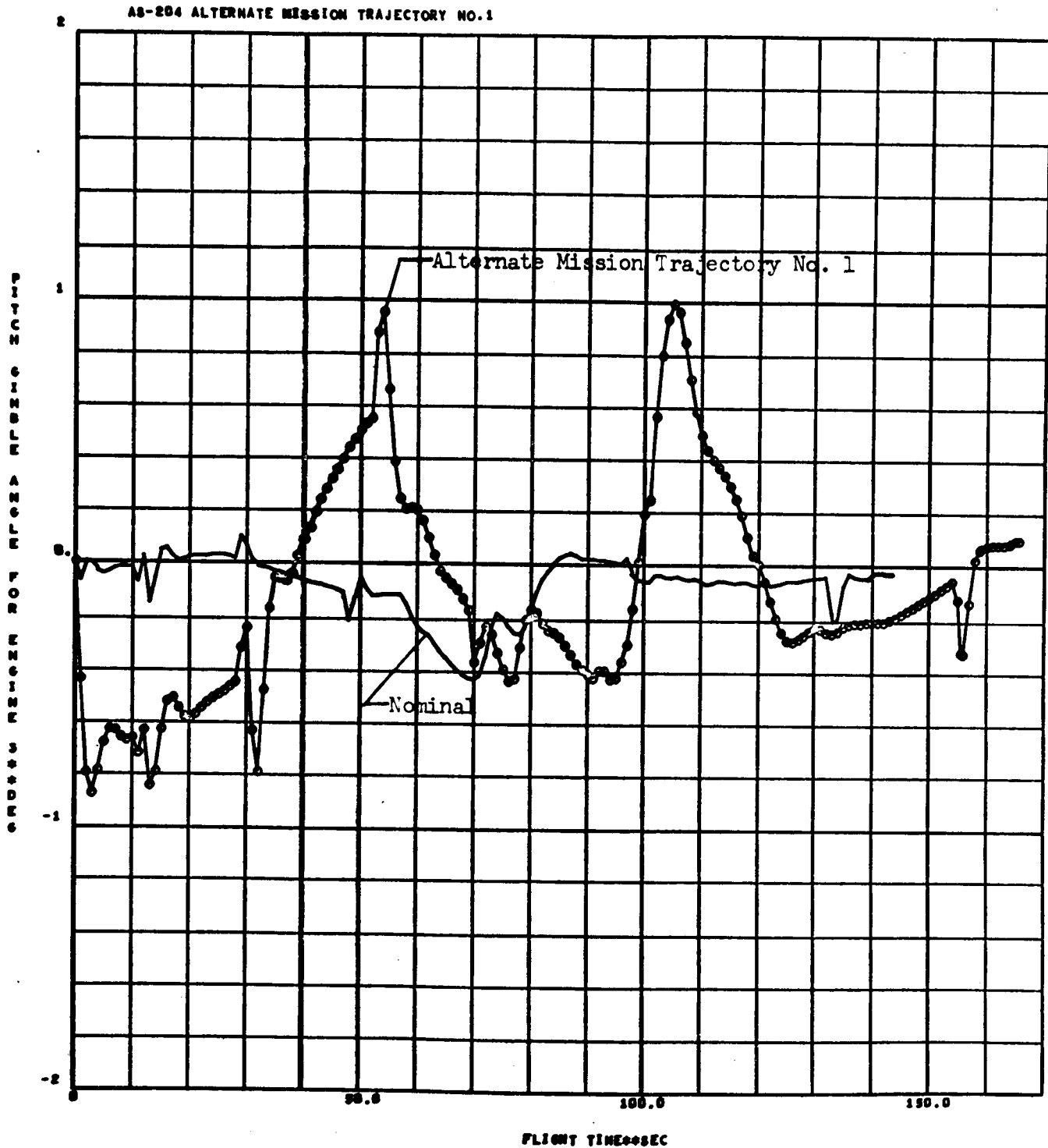


FIGURE 26A

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW DEFLECTION HISTORY, ENGINE 1
S-IB STAGE

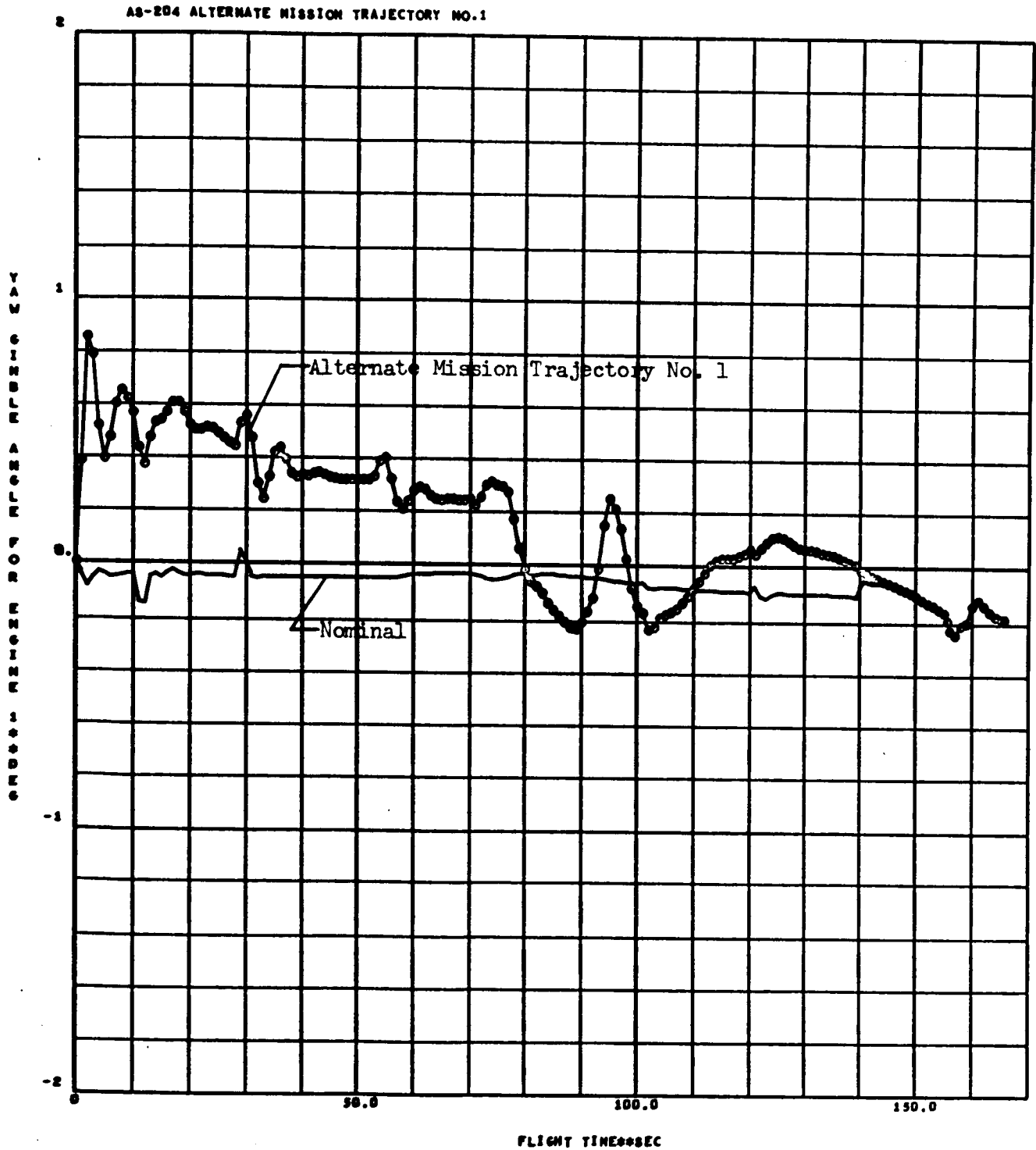


FIGURE 27A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW DEFLECTION HISTORY, ENGINES 2 AND 3
S-1B STAGE

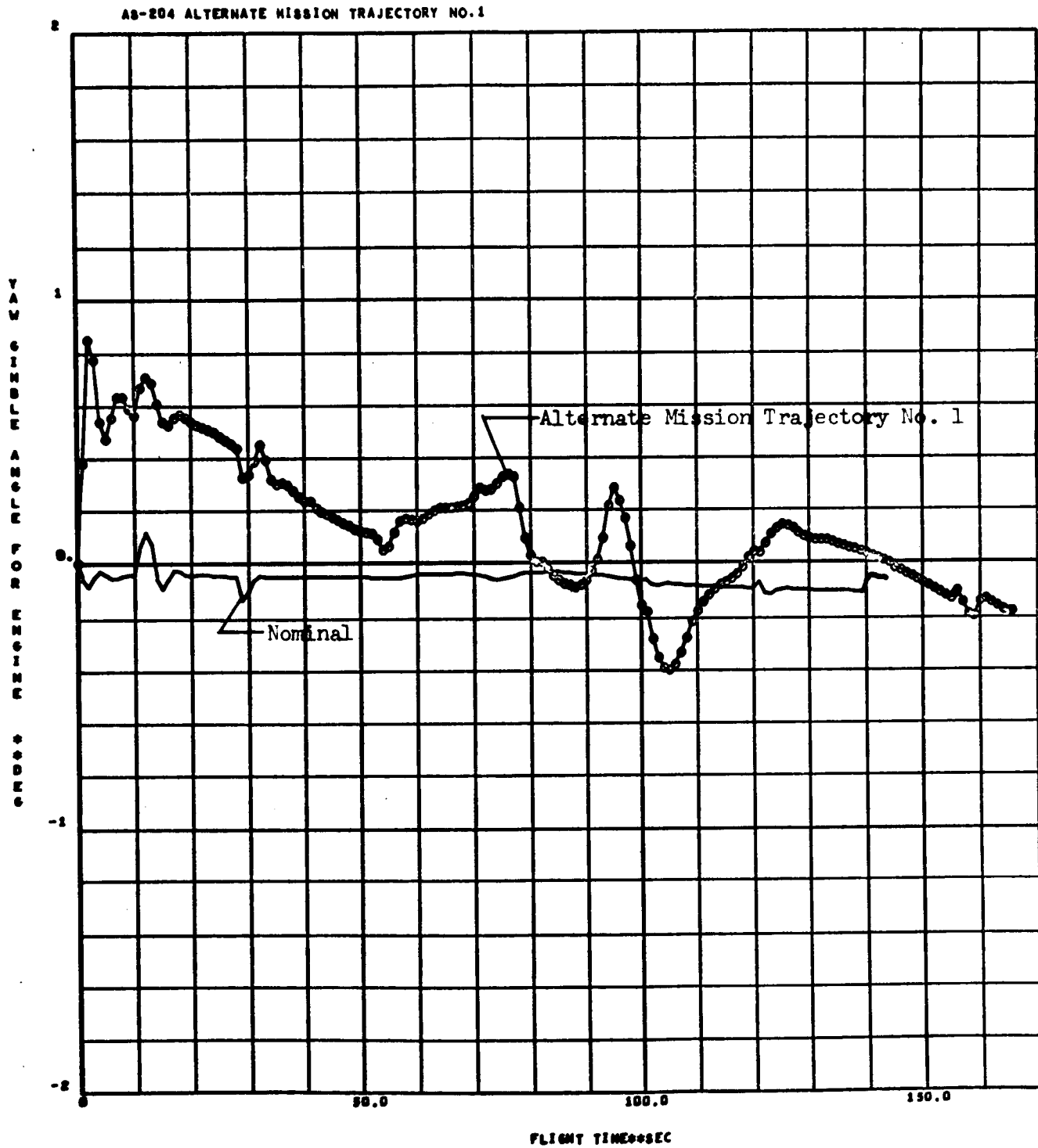


FIGURE 28A

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE ERROR HISTORY
S-EVB STAGE

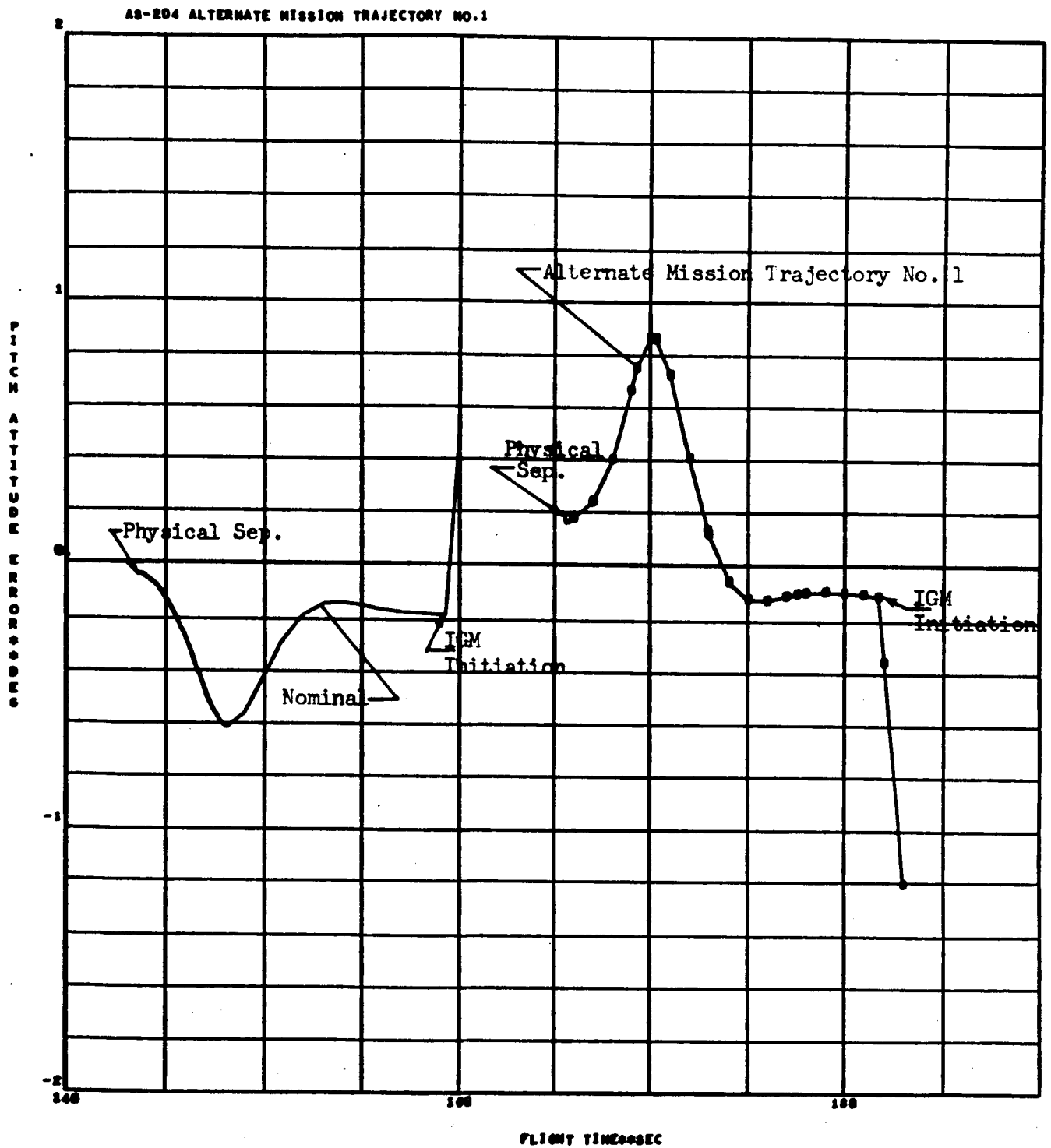


FIGURE 29A

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ATTITUDE ERROR HISTORY
S-IVB STAGE

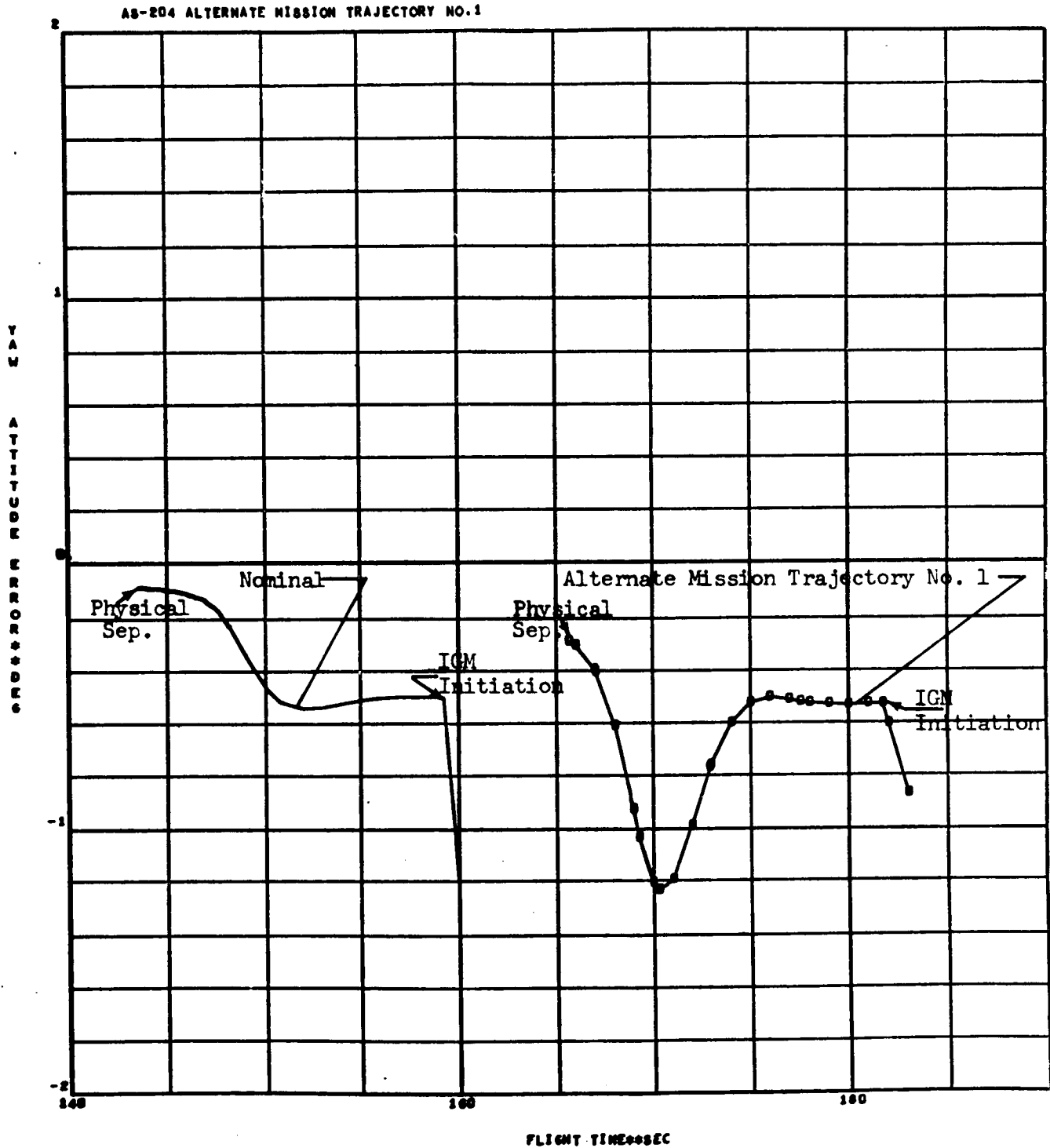


FIGURE 30A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ROLL ATTITUDE ERROR HISTORY
S-IVB STAGE

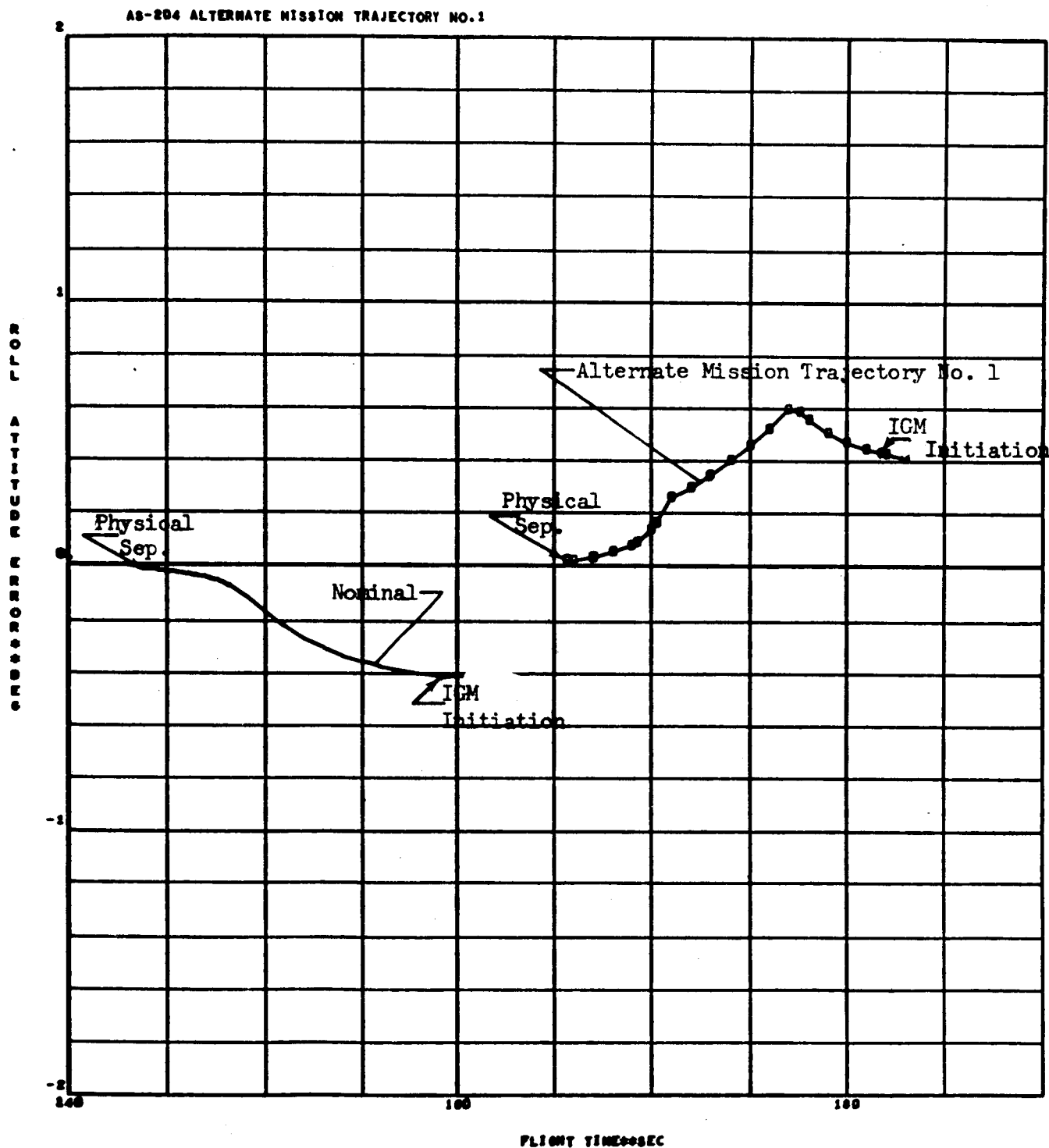


FIGURE 31A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE RATE HISTORY
S-IVB STAGE

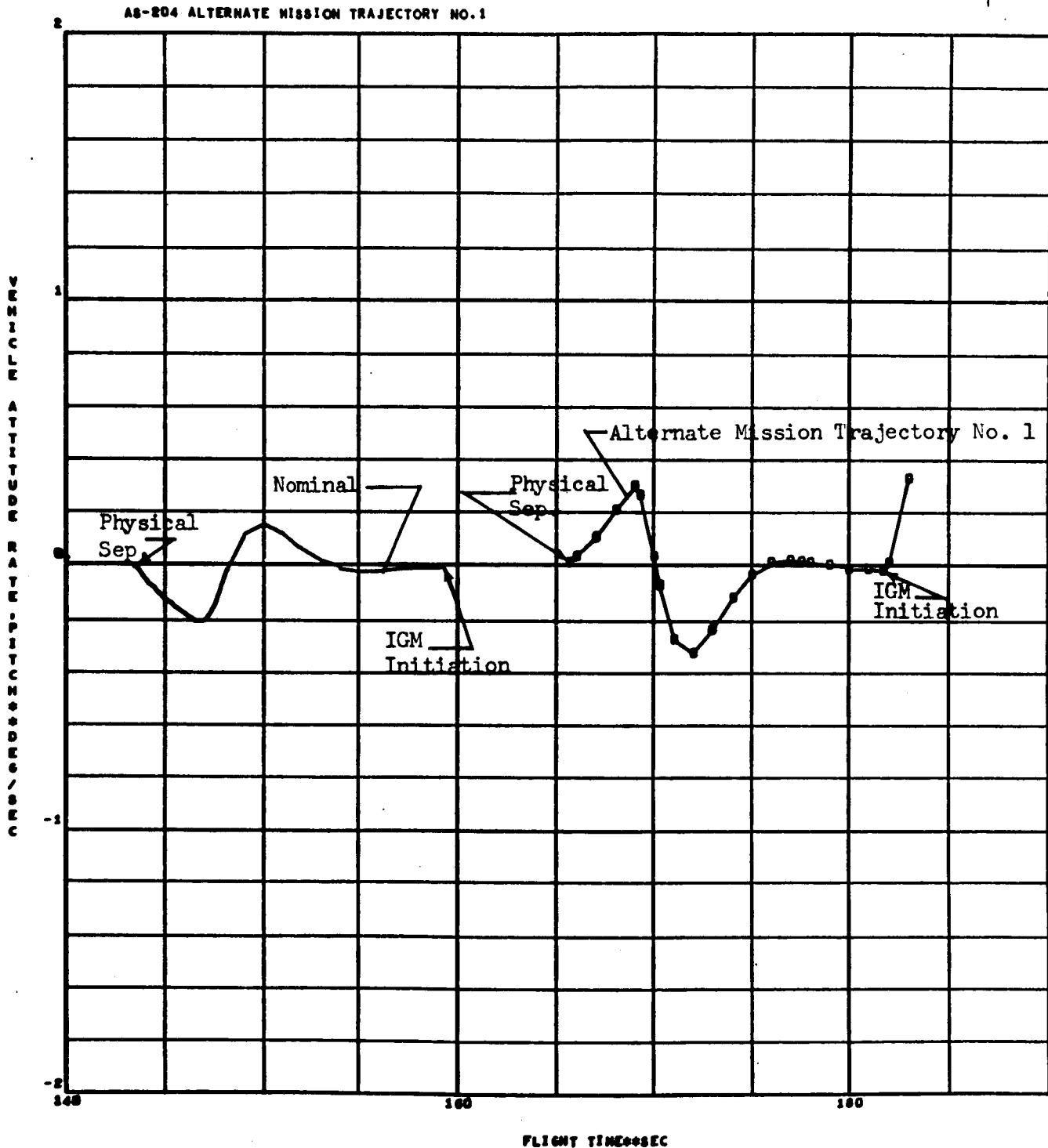


FIGURE 32A

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ATTITUDE RATE HISTORY
S-IVB STAGE

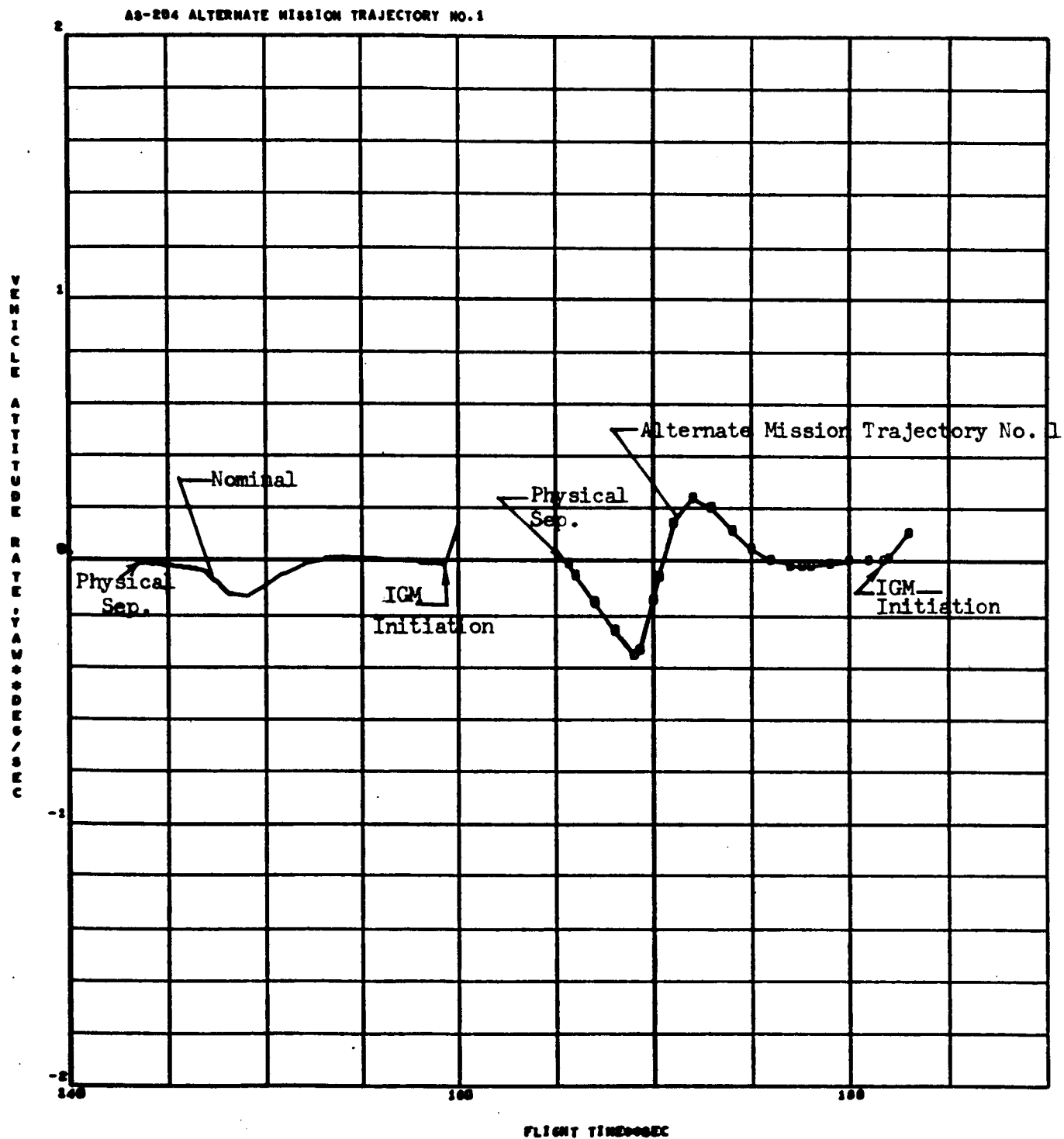
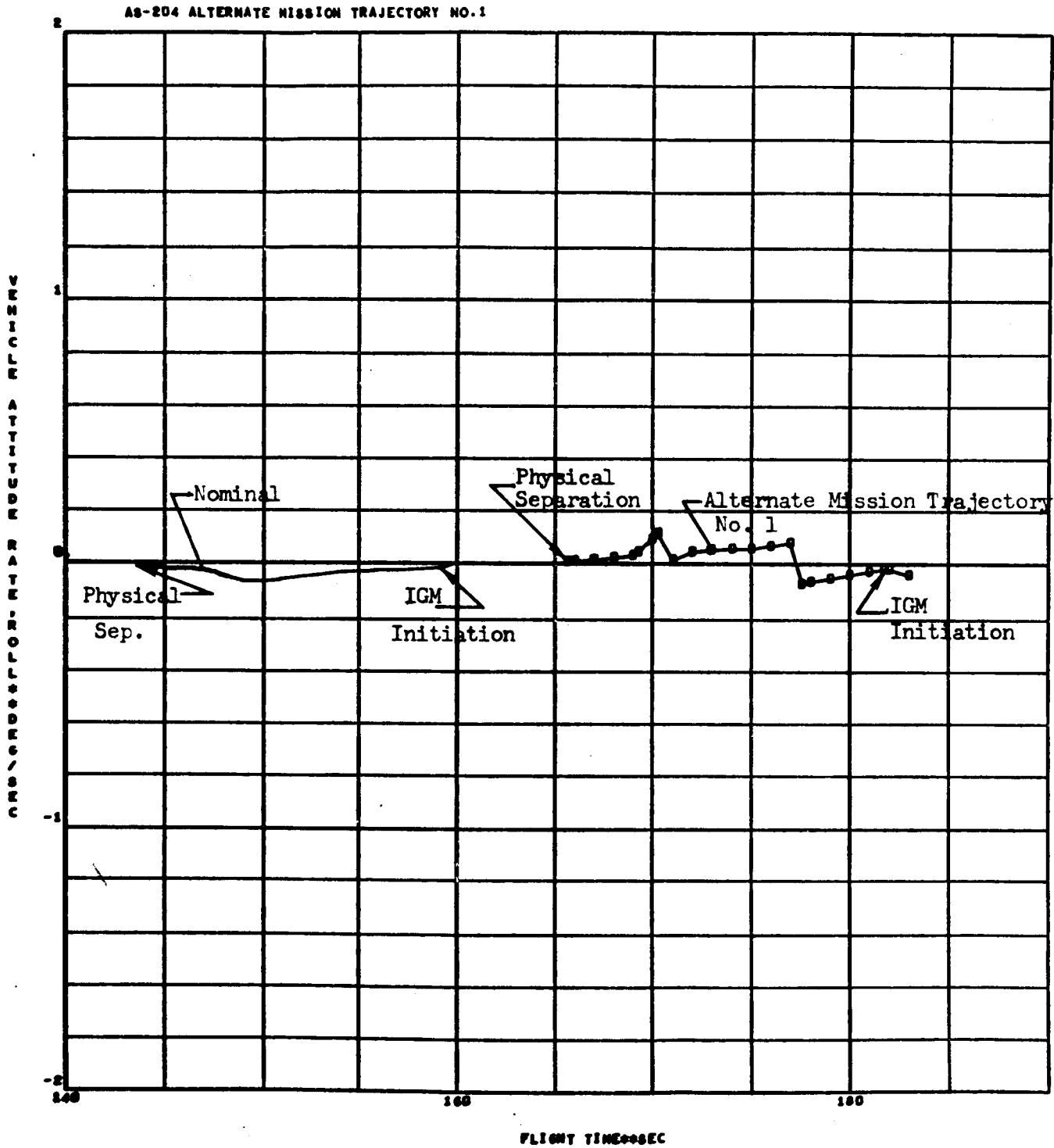


FIGURE 33A.

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ROLL ATTITUDE RATE HISTORY
S-IVB STAGE



APPENDIX B: "AS-204/LM-1 A/M TRAJECTORY NO.2 DATA DISPLAY"

TABLE 1B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
FLIGHT SEQUENCE OF EVENTS

<u>NOMINAL FLIGHT TIME</u> <u>(HR: MIN: SEC)</u>	<u>TIME</u> <u>(SEC)</u>	<u>PROGRAM</u> <u>TIME (SEC)</u>	<u>EVENT</u>
- 0:0:05.0	- 5.00	---	Guidance Reference Release (GRR).
- 0:0:03.1	- 3.10	---	Initiate S-IB Mainstage Ignition Sequence.
0:0:00.0	0.00	---	First Motion.
0:0:00.2	0.20	(0.0) ₁	Lift-off Signal. Initiate Time Base 1
0:0:10.2	10.20	(10.0) ₁	Command Pitch and Roll Maneuvers.
0:0:36.1	36.09	---	Engine No. 4 Premature Shutdown.
0:0:40.2	40.20	(40.0) ₁	Control Gain Switch Point.
0:1:15.0	75.00	---	Maximum Dynamic Pressure.
0:1:40.2	100.20	(100.0) ₁	Control Gain Switch Point.
0:2:00.2	120.20	(120.0) ₁	Control Gain Switch Point.
0:2:12.5	132.50	(132.3) ₁	Enable S-IB Propellant Level Sensors.
0:2:29.3	149.25	(149.1) ₁	Command Tilt Arrest.
0:2:30.1	150.09	(0.0) ₂	Level Sensor Activation; Initiate Time Base 2.
0:2:33.2	153.19	(3.1) ₂	Inboard Engine Cutoff (IECO).
0:2:38.7	158.69	(0.0) ₃	Outboard Engine Cutoff (OECO); Initiate Time Base 3.
0:2:40.0	159.99	(1.3) ₃	Separation Signal.
0:2:40.1	160.07	---	S-IB/S-IVB Physical Separation;
		(1.4) ₃	Control Gain Switch Point.

TABLE 1B (Cont'd)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
FLIGHT SEQUENCE OF EVENTS

<u>NOMINAL FLIGHT TIME</u> <u>(HR: MIN: SEC)</u>	<u>TIME</u> <u>(SEC)</u>	<u>PROGRAM</u> <u>TIME (SEC)</u>	<u>EVENT</u>
0:2:41.4	161.39	(2.7) ₃	J-2 Engine Start Command.
0:2:43.7	163.74	----	Ullage Burn Out.
0:2:44.7	164.69	----	90% J-2 Thrust Level.
0:2:47.4	167.39	(8.7) ₃	Command PU System Activation.
0:2:52.0	171.99	(13.3) ₃	Jettison Ullage Rocket Motors.
0:2:55.7	175.69	(17.0) ₃	Command Active Guidance Initiation.
0:5:02.4	302.39	(143.7) ₃	Control Gain Switch Point.
0:8:12.3	492.25	----	EMR Shift Sensed by IGM.
0:10:22.8	622.75	----	Guidance Cutoff Signal (GCS).
0:10:23.0	622.95	(0.0) ₄	Initiate Time Base 4. (Reflects an approximate 0.2 second systems delay)
0:10:32.8	632.75	----	Orbital Insertion.
0:11:08.0	667.95	(45.0) ₄	Nose Cone Jettisoned.
0:20:23.0	1222.95	(600.0) ₄	SIA Panel Deployment.
0:53:55.0	3235.00	----	LM Separation.
4:30:00.0	16200.00	----	Loss of S-IVB/IU Attitude Control.

TABLE 2B

COMPARISON OF AS-204/LM-1 L/V OPERATIONAL TRAJECTORY (REVISION 1)
AND AS-204/LM-1 ALTERNATE MISSION TRAJECTORY NO. 2

FLIGHT EVENT	FINAL OPERATIONAL TRAJECTORY					ALTERNATE MISSION TRAJECTORY #2				
	FLIGHT TIME (SEC)	ALTITUDE (KI)	RANGE (KM)	SPACE FIXED VELOCITY (M/SEC)	SPACE FIXED PATH ANGLE (DEG)	FLIGHT TIME (SEC)	ALTITUDE (KM)	RANGE (KM)	SPACE FIXED VELOCITY (M/SEC)	SPACE FIXED PATH ANGLE (DEG)
GRR	-5.00	0.03	0.00	408.93	90.000	-5.00	0.03	0.00	408.93	90.000
First Motion	0.00	0.03	0.00	408.93	90.000	0.00	0.03	0.00	408.93	90.000
Max. Dynamic Pressure	74.00	12.34	3.83	745.54	57.854	75.00	11.46	2.46	636.24	57.356
Tilt Arrest	133.20	52.62	46.36	2091.86	61.285	150.25	59.48	48.62	2046.46	61.606
IECO	139.14	58.82	55.44	2309.91	62.154	153.19	62.39	52.83	2140.08	62.104
OECO	142.14	62.08	60.43	2368.73	62.606	158.69	67.91	61.20	2212.01	63.108
Separation	143.52	63.58	62.77	2369.58	62.854	160.07	69.28	63.35	2211.11	63.382
J-2 Engine Start	144.84	65.00	65.00	2364.15	63.102	161.39	70.59	65.41	2205.81	63.652
Ullage Case Jettison	155.44	75.97	83.12	2374.30	64.990	171.99	80.59	82.11	2216.94	65.688
Initiate IGM	159.25	79.76	89.76	2387.08	65.631	175.75	83.99	88.16	2229.92	66.370
EMR Shift	475.75	177.00	1062.70	5483.43	91.465	492.25	175.70	1008.50	5278.83	91.197
Guidance Cutoff Signal	598.15	163.19	1796.20	7821.49	90.004	622.75	163.18	1774.88	7821.49	90.006
Orbit Insertion	608.15	163.22	1868.55	7828.60	89.992	632.75	163.20	1847.23	7829.00	89.995

TABLE 3B
AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-1H STAGE FLIGHT DATA

FLIGHT TIME (SEC)	MASS (KG)	THRUST (TOTAL) (N)	DRAW (N)	LONGITUDINAL ACCELERATION (M/SEC ²)	DYNAMIC PRESSURE (N/M ²)	A.H.I. (KG-M/M ² -RAD)	MACH NO.	PITCH ANGLE OF ATTACK (DEG)
1) -5.00	589243.	0.	---	0.000	0.	0.	0.00	0.000
2) 0.00	582886.	7007287.	5884.	12.117	0.	0.	0.00	0.000
5.00	568924.	7155103.	13100.	12.660	105.	114.	0.04	1.471
10.00	554904.	7186991.	27749.	13.011	476.	2109.	0.08	2.831
15.00	540820.	7253906.	39034.	13.452	1198.	12246.	0.13	1.554
20.00	526649.	7319856.	49118.	13.919	2377.	44603.	0.19	1.054
25.00	512425.	7390204.	70425.	14.380	4088.	125000.	0.25	0.813
30.00	498160.	7444858.	90516.	14.880	6376.	294514.	0.33	0.289
35.00	483867.	7509924.	117100.	15.397	9246.	612913.	0.41	-0.063
36.09	480746.	7525014.	124694.	15.499	9946.	709557.	0.43	-0.120
40.00	470734.	6610751.	142068.	13.849	11576.	1129902.	0.48	1.114
45.00	458236.	6668012.	166349.	14.312	13734.	1837699.	0.55	2.988
50.00	445732.	6725764.	187993.	14.808	16006.	2782590.	0.63	3.784
55.00	432226.	6784398.	208009.	15.327	18289.	4016292.	0.72	3.727
60.00	420725.	6841570.	250503.	15.786	20471.	5589709.	0.82	1.640
65.00	408222.	6891088.	422204.	15.962	22243.	7540172.	0.94	0.666
70.00	395697.	6936939.	573176.	16.198	23227.	9852988.	1.07	0.127
75.00	383132.	6984731.	544912.	16.925	23549.	12486471.	1.22	-0.380
80.00	370564.	7027579.	462346.	17.836	23146.	15405008.	1.39	-0.309
85.00	358000.	7064154.	357254.	18.855	21840.	18548070.	1.58	0.027
90.00	345438.	7091341.	281581.	19.838	19386.	21779809.	1.78	0.140
95.00	332920.	7110059.	204540.	20.870	16103.	24880450.	1.97	0.044
100.00	320443.	7121149.	148680.	21.890	13074.	27733048.	2.17	-0.152
105.00	307584.	7126806.	104366.	22.938	10369.	30288041.	2.39	-0.323
110.00	295535.	7126276.	72899.	24.008	8039.	32517914.	2.63	-0.714
115.00	283100.	7121284.	50889.	25.123	6035.	34407446.	2.87	-0.865
120.00	270685.	7114487.	34662.	26.310	4410.	35949360.	3.11	-0.938
125.00	258292.	7102487.	23306.	27.570	3164.	37183000.	3.37	-1.171
130.00	245924.	7088376.	13737.	28.938	2213.	38142081.	3.62	-1.041
135.00	233586.	7071359.	6288.	30.426	1550.	38879710.	3.91	-1.031
140.00	221282.	7050662.	2441.	32.042	1083.	39444145.	4.26	-1.457
145.00	209017.	7026246.	-511.	33.821	762.	39880150.	4.74	-2.195
150.00	196800.	6995446.	-3127.	35.777	515.	40209533.	5.32	-3.404
150.25	196192.	6994008.	-3263.	35.882	505.	40220031.	5.36	-3.428
6) 153.19	189041.	6965934.	-4628.	37.098	390.	40371209.	5.74	-2.636
7) 158.69	182390.	7635398.	-3821.	14.461	203.	40557619.	6.17	-0.993
8) 159.99	181779.	174538.	-3384.	0.979	169.	40586483.	6.22	-0.661
9) 160.07	181742.	161538.	-3259.	0.907	167.	40588070.	6.22	-0.641

1) GRR; 2) First Motion; 3) Engine No. 4 Premature Shutdown; 4) Max. Dyn. Pressure; 5) Tilt Arrest; 6) IECO; 7) OECO;
8) Sep. Signal; 9) Physical Sep.

TABLE 3B (Cont'd.)
AS-204/IM-1 I/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-IB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	SPACE FIXED		PATH ANGLE		--- SPACE FIXED POSITION AND VELOCITY VECTOR COMPONENTS ---			---		
	RADIUS (M)	VELOCITY (M/S)	DEG	DEG	X (M)	Y (M)	Z (M)	DX (M/S)	DY (M/S)	DZ (M/S)
-5.00	6273353.	408.93	90.000		6373327.	17051.	-5540.	0.00	126.37	388.92
0.00	6273352.	408.93	90.000		6373327.	17683.	-3596.	-0.13	126.30	388.94
5.00	6373385.	409.15	88.130		6373359.	18314.	-1451.	13.09	126.20	388.98
10.00	6373489.	409.86	86.008		6373461.	18945.	294.	28.14	126.10	388.96
15.00	6373673.	411.51	83.627		6373643.	19575.	2239.	45.16	126.03	389.13
20.00	6373950.	415.05	80.968		6373916.	20205.	4187.	64.50	125.95	390.18
25.00	6374329.	421.24	78.094		6374292.	20835.	6143.	86.12	125.87	392.66
30.00	6374823.	420.95	75.078		6374781.	21464.	8117.	110.04	125.76	397.23
35.00	6375442.	445.05	72.023		6375396.	22092.	10120.	136.28	125.63	404.61
36.09	6375595.	448.78	71.364		6375548.	22229.	10562.	142.30	125.61	406.67
40.00	6376187.	461.51	69.899		6376135.	22722.	12168.	157.37	126.59	414.98
45.00	6377031.	477.56	67.924		6376972.	23358.	14267.	178.07	127.66	424.33
50.00	6377986.	494.46	65.773		6377919.	23938.	16411.	201.31	128.40	432.99
55.00	6379064.	512.93	63.489		6378990.	24641.	18597.	227.18	128.91	441.44
60.00	6380278.	536.51	61.382		6380194.	25287.	20832.	254.98	129.28	454.00
65.00	6381635.	565.54	59.658		6381541.	25934.	23145.	283.46	129.59	471.90
70.00	6383134.	598.24	58.356		6383028.	26582.	25559.	311.35	129.63	494.12
75.00	6384776.	636.24	57.356		6384656.	27230.	28096.	340.35	129.63	521.69
80.00	6386570.	680.36	56.566		6386435.	27878.	30785.	371.62	129.62	554.96
85.00	6388529.	730.83	55.934		6388377.	28527.	33654.	405.67	129.92	593.86
90.00	6390667.	788.17	55.515		6390495.	29177.	36735.	441.99	130.11	639.47
95.00	6392595.	852.45	55.335		6392800.	29828.	40061.	479.92	130.25	692.37
100.00	6395518.	923.78	55.389		6395296.	30480.	43671.	518.96	130.56	753.00
105.00	6398243.	1001.92	55.632		6397991.	31134.	47604.	558.86	130.92	821.20
110.00	6401175.	1087.01	56.055		6400885.	31790.	51897.	599.08	131.64	897.42
115.00	6404314.	1178.97	56.606		6403982.	32451.	56591.	639.59	132.89	981.45
120.00	6407665.	1277.87	57.233		6407282.	33119.	61724.	680.61	134.38	1073.15
125.00	6411237.	1383.98	57.917		6410789.	33795.	67336.	722.11	136.19	1172.78
130.00	6415019.	1497.55	58.609		6414505.	34481.	73465.	764.69	138.00	1280.18
135.00	6419034.	1619.07	59.209		6418438.	35175.	80151.	808.52	139.68	1395.77
140.00	6423287.	1749.21	60.001		6422592.	35877.	87438.	853.19	141.16	1520.49
145.00	6427781.	1888.78	60.744		6426970.	36586.	95373.	897.81	142.40	1655.64
150.00	6432517.	2038.67	61.562		6431568.	37301.	104014.	940.99	143.33	1802.83
150.25	6432760.	2046.46	61.606		6431803.	37337.	104466.	943.07	143.37	1810.54
153.19	6435662.	2140.08	62.104		6434613.	37759.	109926.	968.08	143.70	1903.19
158.69	6441176.	2212.01	63.103		6439931.	38557.	120637.	962.63	144.94	1986.29
163.99	6442475.	2211.37	63.366		6441177.	38741.	123224.	952.60	144.96	1990.41
164.07	6442550.	2211.11	63.382		6441252.	38752.	123381.	951.87	144.95	1990.46

TABLE 3B (Cont'd.)
AS-204/DX-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-IR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	EARTH FIXED POSITION		EARTH FIXED POSITION AND VELOCITY		VECTOR COMPONENTS		
	POSITION (M)	VELOCITY (M/S)	PATH ANGLE (DEG)	X (M)	Y (M)	Z (M)	DX (M/S) DY (M/S) DZ (M/S)
-5.00	34.	0.00	N/A	34.	-0.	0.	-0.00 0.00 -0.00
0.00	34.	0.00	N/A	34.	-0.	-0.	0.00 0.00 0.01
5.00	67.	13.35	0.298	67.	-0.	0.	13.35 -0.03 -0.05
10.00	171.	28.53	0.309	171.	-0.	0.	28.53 -0.07 0.05
15.00	355.	45.68	0.291	355.	-1.	-0.	45.68 -0.09 1.02
20.00	632.	65.17	0.983	632.	-1.	2.	65.16 -0.12 3.40
25.00	1011.	84.98	2.303	1011.	-2.	12.	86.91 -0.16 7.83
30.00	1505.	111.25	4.095	1505.	-3.	39.	110.98 -0.23 15.06
35.00	2127.	138.19	6.312	2124.	-4.	95.	137.37 -0.32 17.08
36.09	2280.	144.44	6.845	2278.	-5.	113.	143.43 -0.34 25.25
40.00	2875.	160.63	9.094	2869.	-4.	195.	158.63 0.68 34.43
45.00	3729.	182.79	10.910	3713.	2.	345.	179.51 1.80 42.86
50.00	4699.	207.43	11.984	4668.	13.	538.	202.93 2.57 51.07
55.00	5799.	234.64	12.629	5747.	27.	773.	228.99 3.10 63.35
60.00	7041.	264.72	13.899	6961.	44.	1056.	257.01 3.51 80.95
65.00	8438.	297.00	15.865	8318.	62.	1415.	285.73 3.86 102.84
70.00	9994.	330.35	18.179	9817.	82.	1873.	313.91 3.96 130.04
75.00	11719.	367.08	20.782	11459.	102.	2453.	343.25 4.03 162.91
80.00	13631.	408.79	23.511	13253.	122.	3183.	374.91 4.12 201.37
85.00	15754.	456.27	26.206	15213.	144.	4091.	409.41 4.53 246.49
90.00	18117.	509.82	28.919	17351.	167.	5208.	446.25 4.86 298.86
95.00	20746.	569.53	31.645	19678.	192.	6568.	484.79 5.17 358.91
100.00	23671.	635.60	34.358	22201.	219.	8209.	524.54 5.70 426.49
105.00	26921.	708.13	36.994	24925.	249.	10169.	565.26 6.32 502.05
110.00	30527.	787.31	39.560	27855.	283.	12488.	606.42 7.37 585.37
115.00	34520.	873.29	42.008	30990.	324.	15203.	648.00 9.00 676.32
120.00	38935.	966.41	44.304	34336.	374.	18354.	690.23 10.94 775.15
125.00	43805.	1066.98	46.453	37894.	434.	21979.	733.08 13.27 881.71
130.00	49180.	1175.43	48.424	41669.	507.	26118.	777.16 15.67 996.41
135.00	55092.	1292.26	50.232	45668.	591.	30810.	822.67 18.01 1120.19
140.00	61589.	1418.01	51.920	49897.	686.	36097.	869.21 20.25 1254.35
145.00	68717.	1553.31	53.540	54360.	793.	42029.	915.91 22.36 1400.52
150.00	76525.	1698.92	55.149	59054.	910.	48661.	961.41 24.28 1408.18
150.25	76934.	1706.49	55.231	59295.	916.	49012.	963.61 24.38 1500.21
153.19	81886.	1797.66	56.152	62167.	989.	53288.	990.11 25.36 1582.66
158.69	91595.	1865.22	57.561	67612.	1134.	61781.	986.65 27.53 1586.72
159.99	93931.	1863.57	57.862	68889.	1170.	63843.	976.95 27.71 1586.77
160.07	94073.	1863.24	57.880	68967.	1172.	63968.	976.25 27.72

TABLE 3B (Cont'd)
AS-204/DA-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-IR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	ALTITUDE (KM)	RANGE (KM)	VELOCITY VECTOR SPACE FIXED (DEG)	VELOCITY VECTOR EARTH FIXED (DEG)	LONGITUDE (POS. EAST) (DEG)	GEOCENTRIC DECLINATION (DEG)	GEODETTIC LATITUDE (DEG)
-5.00	0.034	0.000	90.000	N/A	-80.565	28.371	28.532
0.00	0.034	0.000	90.000	N/A	-80.565	28.371	28.532
5.00	0.067	0.000	89.990	N/A	-80.565	28.371	28.532
10.00	0.171	0.001	89.981	N/A	-80.565	28.371	28.532
15.00	0.355	-0.002	89.968	N/A	-80.565	28.371	28.532
20.00	0.631	0.004	89.914	56.743	-80.565	28.371	28.532
25.00	1.010	0.014	89.799	65.594	-80.565	28.371	28.532
30.00	1.504	0.041	89.594	68.224	-80.565	28.371	28.532
35.00	2.124	0.097	89.277	69.419	-80.564	28.371	28.532
36.09	2.277	0.115	89.192	69.605	-80.564	28.371	28.532
40.00	2.868	0.198	88.995	72.580	-80.563	28.371	28.532
45.00	3.713	0.348	88.779	74.185	-80.562	28.372	28.533
50.00	4.668	0.542	88.555	74.696	-80.560	28.372	28.533
55.00	5.746	0.778	88.319	74.786	-80.557	28.373	28.534
60.00	6.961	1.062	87.938	74.545	-80.555	28.373	28.534
65.00	8.318	1.421	87.402	74.189	-80.551	28.374	28.535
70.00	9.817	1.879	86.752	73.742	-80.547	28.375	28.536
75.00	11.459	2.459	86.013	73.380	-80.541	28.377	28.538
80.00	13.254	3.189	85.212	73.107	-80.534	28.379	28.540
85.00	15.214	4.096	84.414	72.994	-80.525	28.381	28.542
90.00	17.353	5.210	83.584	72.874	-80.514	28.384	28.545
95.00	19.681	6.566	82.749	72.772	-80.501	28.388	28.548
100.00	22.206	8.201	81.945	72.722	-80.495	28.392	28.553
105.00	24.923	10.153	81.183	72.692	-80.466	28.397	28.558
110.00	27.866	12.459	80.489	72.713	-80.443	28.403	28.564
115.00	31.008	15.158	79.877	72.780	-80.417	28.411	28.571
120.00	34.362	18.287	79.328	72.854	-80.386	28.419	28.579
125.00	37.931	21.884	78.842	72.937	-80.351	28.428	28.589
130.00	41.722	25.987	78.400	73.003	-80.311	28.439	28.600
135.00	45.741	30.633	77.995	73.051	-80.266	28.451	28.612
140.00	49.998	35.864	77.620	73.083	-80.214	28.465	28.625
145.00	54.497	41.725	77.270	73.103	-80.157	28.480	28.641
150.00	59.238	48.270	76.943	73.112	-80.093	28.498	28.658
150.25	59.481	48.616	76.927	73.113	-80.090	28.498	28.659
153.19	62.387	52.837	76.744	73.113	-80.048	28.509	28.670
158.69	67.908	61.196	75.655	73.186	-79.966	28.531	28.691
159.99	69.205	63.225	75.560	73.201	-79.947	28.537	28.697
160.07	69.284	63.348	76.661	73.201	-79.945	28.537	28.697

TABLE 3B (Cont'd.)
AS-204/IN-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-1B STAGE FLIGHT DATA

FLIGHT TIME (SEC)	VEHICLE ATTITUDE ANGLE			VEHICLE ATTITUDE RATE			VEHICLE ATTITUDE ERROR		
	PITCH (DEG)	YAW (DEG)	ROLL (DEG)	PITCH (DEG/S)	YAW (DEG/S)	ROLL (DEG/S)	PITCH (DEG)	YAW (DEG)	ROLL (DEG)
-5.00	0.000	0.000	18.000	-0.003	0.001	-0.002	0.000	0.000	0.000
0.00	-0.017	0.006	17.990	-0.003	0.001	-0.002	-0.017	0.006	-0.010
5.00	-0.013	-0.015	18.004	-0.007	-0.004	-0.003	-0.013	-0.015	0.004
10.00	-0.003	-0.019	18.001	-0.000	-0.000	0.000	-0.003	-0.019	0.001
15.00	-0.567	-0.001	14.384	-0.117	-0.013	-1.087	0.109	-0.001	1.184
20.00	-1.500	0.012	9.387	-0.229	-0.001	-1.002	0.195	0.012	1.187
25.00	-2.863	0.002	4.385	-0.313	-0.004	-1.000	0.267	0.002	1.185
30.00	-4.638	-0.022	-0.007	-0.394	-0.004	-0.169	0.323	-0.022	-0.007
35.00	-6.800	-0.023	0.000	-0.469	-0.000	-0.001	0.365	-0.023	0.000
36.00	-7.319	-0.023	-0.000	-0.484	-0.000	-0.000	0.374	-0.023	-0.000
40.00	-8.118	0.323	0.160	0.232	-0.093	-0.286	-0.347	0.323	0.160
45.00	-7.861	0.153	-0.368	0.002	-0.028	0.044	-0.090	0.153	-0.368
50.00	-7.959	0.077	-0.568	-0.041	-0.011	-0.010	-0.187	0.077	-0.568
55.00	-8.498	0.037	-0.911	-0.544	-0.002	-0.401	0.160	0.037	-0.911
60.00	-11.718	0.004	0.153	-0.533	0.002	-0.117	-0.299	0.004	0.153
65.00	-14.463	-0.011	0.105	-0.549	-0.027	0.072	-0.012	-0.011	0.105
70.00	-17.065	-0.071	0.276	-0.590	-0.000	0.128	0.373	-0.071	0.276
75.00	-19.952	-0.104	0.778	-0.567	-0.005	0.040	0.622	-0.104	0.778
80.00	-22.790	-0.092	0.740	-0.573	0.012	-0.083	0.951	-0.092	0.740
85.00	-25.847	-0.036	0.186	-0.661	-0.030	0.027	1.054	-0.036	0.186
90.00	-29.128	-0.184	0.464	-0.645	-0.011	0.005	0.891	-0.184	0.464
95.00	-32.335	-0.178	0.464	-0.631	-0.005	0.025	0.721	-0.178	0.464
100.00	-35.417	-0.161	0.535	-0.600	0.009	-0.003	0.559	-0.161	0.535
105.00	-38.269	-0.204	0.857	-0.613	0.037	-0.001	0.473	-0.204	0.857
110.00	-41.162	-0.044	0.876	-0.541	0.035	-0.041	0.155	-0.044	0.876
115.00	-43.685	0.090	0.597	-0.489	0.011	-0.048	0.037	0.090	0.597
120.00	-45.922	0.109	0.532	-0.391	0.001	-0.059	-0.029	0.109	0.532
125.00	-48.276	0.246	0.514	-0.321	-0.034	-0.027	-0.434	0.246	0.514
130.00	-49.869	0.152	0.235	-0.370	-0.009	0.015	-0.143	0.152	0.235
135.00	-51.702	0.065	0.215	-0.376	-0.017	-0.017	0.005	0.065	0.215
140.00	-53.757	-0.021	0.183	-0.445	-0.019	-0.005	0.185	-0.021	0.183
145.00	-56.190	-0.116	0.152	-0.535	-0.021	-0.005	0.401	-0.116	0.152
150.00	-59.152	-0.227	0.148	-0.594	-0.023	0.096	0.292	-0.227	0.148
150.25	-59.291	-0.233	0.184	-0.510	-0.025	0.188	0.144	-0.233	0.184
153.19	-59.459	-0.325	0.252	0.115	-0.013	-0.195	-0.025	-0.325	0.252
158.69	-59.287	-0.267	0.009	0.014	-0.022	0.013	0.148	-0.267	0.009
159.99	-59.269	-0.292	0.018	0.007	-0.011	0.005	0.166	-0.292	0.018
160.07	-59.268	-0.293	0.018	0.006	-0.011	0.005	0.167	-0.293	0.018

TABLE 4B
AS-204/IM-1 I/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-IVB STAGE FLIGHT DATA

	FLIGHT TIME (SEC)	MASS (KG)	THRUST (TOTAL) (N)	DRAW (N)	LONGITUDINAL ACCELERATION (M/SEC ²)	DYNAMIC PRESSURE (N/M ²)	A.H.I. (KG-M/M ² -RAD)	MACH NO.	PITCH ANGLE OF ATTACK (DEG)
1)	160.07	134360.	38915.	1219.	0.281	167.	40590577.	6.22	-0.641
2)	161.29	134326.	38364.	1005.	0.278	138.	40614451.	6.25	-0.329
3)	163.74	134211.	38088.	714.	0.273	98.	40646954.	6.31	0.129
4)	164.65	134101.	797976.	623.	5.946	86.	40657249.	6.34	0.292
	164.65	134101.	757976.	623.	5.946	86.	40657249.	6.34	0.292
5)	167.29	132545.	875243.	421.	6.551	59.	40681240.	6.46	0.756
	170.00	132000.	928606.	288.	6.980	40.	40696277.	6.59	1.194
6)	171.99	132542.	980807.	215.	7.308	30.	40704497.	6.69	1.887
7)	175.75	131560.	981582.	122.	7.460	17.	40714785.	6.85	2.779
	190.00	128179.	991798.	14.	7.737	2.	40726189.	6.64	6.160
	210.00	122295.	998009.	2.	8.088	0.	40727699.	6.11	9.901
	230.00	118598.	997675.	0.	8.412	0.	40727862.	4.91	12.365
	250.00	112812.	998565.	0.	8.774	0.	40727862.	4.14	14.227
	270.00	105022.	997466.	0.	9.148	0.	40727862.	3.93	16.360
	280.00	104254.	997617.	0.	9.549	0.	40727862.	3.92	17.715
	300.00	95485.	996766.	0.	10.019	0.	40727862.	3.99	18.514
	320.00	94714.	997637.	0.	10.533	0.	40727862.	4.12	19.336
	350.00	89949.	996152.	0.	11.075	0.	40727862.	4.34	19.748
	370.00	85180.	997464.	0.	11.710	0.	40727862.	4.59	19.797
	390.00	80413.	994850.	0.	12.372	0.	40727862.	4.87	19.722
	410.00	75657.	993217.	0.	13.128	0.	40727862.	5.19	19.392
	430.00	70896.	994777.	0.	14.031	0.	40727862.	5.55	18.775
	450.00	66124.	994430.	0.	15.036	0.	40727862.	5.95	18.032
	470.00	61381.	990247.	0.	16.133	0.	40727862.	6.39	17.183
	490.00	56655.	954403.	0.	16.845	0.	40727862.	6.88	16.197
8)	492.25	56122.	938118.	0.	16.715	0.	40727862.	6.94	16.145
	510.00	52385.	856004.	0.	16.340	0.	40727862.	7.39	15.386
	530.00	48284.	834381.	0.	17.245	0.	40727901.	7.91	15.121
	550.00	44441.	826775.	0.	18.603	0.	40727981.	8.50	13.576
	570.00	40548.	816039.	0.	20.125	0.	40728061.	9.14	12.135
	590.00	36682.	814535.	0.	22.202	0.	40728215.	9.83	10.119
	610.00	32850.	802886.	0.	24.440	0.	40728237.	10.56	6.503
9)	622.75	30424.	801717.	0.	26.250	0.	40728337.	11.05	7.764
	630.00	30217.	1602.	0.	0.052	0.	40728337.	11.06	8.223
10)	632.75	30215.	1602.	0.	0.052	0.	40728337.	11.06	8.416

1) Physical Sep.; 2) J-2 Start Command; 3) Ullage Rocket Burnout; 4) 90% Thrust Level; 5) Command P. U. Activation; 6) Ullage

Case Jettison; 7) IGM Initiation; 8) EMI Shift Sensor by IGM; 9) Guidance Cutoff Signal; 10) Orbit Insertion.

TABLE 4B (Cont'd.)
AS-204/DM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	RADIUS (M)	SPACE FIXED VELOCITY (M/S)	PATH ANGLE (DEG)	X (M)	Y (M)	Z (M)	DX (M/S)	DY (M/S)	DZ (M/S)
160.07	6442550.	2211.11	63.382	6441252.	38752.	123381.	951.87	144.95	1990.46
161.29	6443851.	2205.81	63.652	6442501.	38944.	126010.	939.37	144.89	1990.53
163.74	6446127.	2197.35	64.134	6444683.	39284.	130688.	917.57	144.76	1991.34
164.69	6447035.	2197.71	64.320	6445551.	39422.	132582.	910.68	144.63	1994.91
164.69	6447035.	2197.71	64.320	6445551.	39422.	132582.	910.68	144.63	1994.91
167.39	6449586.	2203.78	64.832	6447987.	39812.	137987.	893.55	144.23	2009.33
170.00	6452012.	2210.45	65.322	6450297.	40187.	143248.	877.32	143.89	2023.78
171.99	6453839.	2216.94	65.688	6452032.	40474.	147289.	865.60	143.62	2035.91
175.75	6457235.	2229.92	66.370	6455244.	41013.	154986.	843.73	143.09	2059.18
180.00	6469482.	2284.53	68.813	6466694.	43046.	184961.	763.63	142.57	2148.40
210.00	6485063.	2375.68	72.031	6480848.	45902.	229233.	651.73	143.53	2280.03
220.00	6488822.	2482.18	74.974	6492766.	48799.	276206.	540.15	146.31	2418.27
250.00	6510829.	2602.85	77.676	6502456.	51759.	326005.	428.81	149.77	2562.91
270.00	6521156.	2737.63	79.996	6509916.	54794.	378771.	317.13	153.84	2714.85
290.00	6529876.	2886.39	82.093	6515137.	57917.	434653.	204.77	158.57	2874.75
310.00	6537066.	3048.64	83.930	6518101.	61140.	493814.	91.27	163.40	3042.89
330.00	6542801.	3225.11	85.520	6518778.	64465.	556433.	-23.76	169.40	3220.57
350.00	6547171.	3415.87	86.880	6517137.	67924.	622705.	-140.72	176.67	3408.39
370.00	6550270.	3621.66	88.025	6513132.	71538.	692844.	-260.28	184.91	3607.55
390.00	6552197.	3843.32	89.974	6506703.	75327.	767090.	-383.19	194.21	3819.24
410.00	6553064.	4081.36	89.736	6497780.	79314.	845701.	-509.92	204.68	4044.21
430.00	6552992.	4338.13	90.329	6486274.	83523.	928963.	-641.62	216.47	4284.95
450.00	6552116.	4615.82	90.762	6472075.	87983.	1017218.	-779.38	229.77	4543.74
470.00	6550592.	4915.91	91.043	6455052.	92725.	1110843.	-924.16	244.75	4822.05
490.00	6548600.	5240.05	91.185	6435053.	97785.	1210248.	-1077.46	261.57	5121.40
492.25	6548340.	5278.83	91.197	6432471.	98409.	1222453.	-1096.38	263.61	5156.99
510.00	6546115.	5562.10	91.260	6411630.	103206.	1316041.	-1240.82	278.91	5414.75
530.00	6543569.	5889.72	91.264	6385089.	108962.	1427259.	-1414.45	297.05	5709.63
550.00	6541017.	6241.06	91.136	6354997.	115102.	1544563.	-1597.41	317.28	6024.82
570.00	6538700.	6621.48	90.916	6321092.	121668.	1668410.	-1795.79	339.69	6364.26
590.00	6536871.	7028.58	90.611	6283033.	128706.	1799336.	-2014.21	364.55	6734.37
610.00	6535780.	7500.13	90.247	6240345.	136269.	1938027.	-2260.04	392.26	7140.75
622.75	6535541.	7821.49	90.006	6210404.	141389.	2030807.	-2436.84	411.36	7420.81
630.00	6535543.	7828.87	89.996	6192490.	144371.	2084599.	-2502.43	410.47	7406.79
632.75	6535545.	7829.00	89.995	6185582.	145498.	2104934.	-2526.73	409.95	7398.71

TABLE 4b (Cont'd.)
AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
5-TH STAGE FLIGHT DATA

FLIGHT TIME (SEC)	POSITION (M)	EARTH FIXED POSITION AND VELOCITY VECTOR COMPONENTS			EARTH FIXED POSITION AND VELOCITY VECTOR COMPONENTS				
		VELOCITY (M/S)	PATH ANGLE (DEG)	X (M)	Y (M)	Z (M)	DX (M/S)	DY (M/S)	DZ (M/S)
160.00	64073	1863.24	57.880	68967	1172	62068	976.25	27.72	1586.77
161.00	64440	1856.90	58.182	70248	1209	66064	964.04	27.81	1586.80
162.00	100434	1846.59	58.726	72488	1275	72488	942.77	27.96	1587.55
163.00	102325	1846.24	58.764	72381	1301	71303	926.12	27.96	1591.07
164.00	102325	1846.24	58.764	72381	1301	71303	926.12	27.96	1591.07
165.00	102325	1846.24	58.764	72381	1301	71303	926.12	27.96	1591.07
166.00	102325	1846.24	58.764	72381	1301	71303	926.12	27.96	1591.07
167.00	102325	1846.24	58.764	72381	1301	71303	926.12	27.96	1591.07
168.00	102325	1846.24	58.764	72381	1301	71303	926.12	27.96	1591.07
169.00	102325	1846.24	58.764	72381	1301	71303	926.12	27.96	1591.07
170.00	111901	1855.20	50.167	78265	1450	79825	904.25	27.98	1619.67
171.00	115270	1860.34	60.619	80054	1505	82061	893.11	28.00	1621.70
172.00	122135	1870.84	61.661	82272	1611	82272	872.25	28.05	1624.77
173.00	148151	1916.99	64.487	85261	2021	112446	796.62	29.82	1742.27
174.00	165769	1908.17	68.482	110140	2657	149611	601.34	34.39	1874.44
175.00	225038	2096.76	72.127	122922	3411	188469	586.98	41.24	2012.50
176.00	266168	2311.27	75.800	132625	4314	220155	482.48	49.24	2157.20
177.00	309590	2341.61	78.282	142262	5388	274812	380.22	58.25	2309.78
178.00	355344	2487.05	80.812	148838	6656	322602	277.19	68.65	2470.60
179.00	404016	2646.96	82.304	153240	8141	373692	172.68	79.62	2640.05
180.00	455830	2821.79	84.879	155782	9857	428271	69.49	92.37	2819.42
181.00	511112	3011.45	86.460	156122	11948	486541	-25.72	107.02	3009.24
182.00	570191	3216.52	87.775	154322	14795	548722	-142.56	122.26	3211.00
183.00	632612	3427.76	88.853	150404	16795	615067	-251.66	141.50	3425.62
184.00	701125	3675.56	90.707	144250	19822	685828	-362.42	161.62	3653.98
185.00	772709	3922.22	90.262	125942	22275	761224	-478.87	182.98	3898.61
186.00	851579	4209.87	91.325	125076	27108	841005	-568.92	208.82	4161.81
187.00	935192	4505.98	91.127	111850	31646	927040	-724.42	236.47	4445.12
188.00	1025021	4824.14	91.285	96052	36277	1019862	-856.70	267.12	4750.12
189.00	1026124	4872.92	91.297	92097	37216	1021187	-872.04	270.88	4796.42
190.00	1121727	5156.25	91.360	77277	42265	1118200	-998.04	299.14	5049.88
191.00	1224522	5482.92	91.357	55820	48679	1222291	-1148.49	322.87	5361.97
192.00	1324051	5835.29	91.215	31225	55702	1222520	-1206.40	320.01	5675.12
193.00	1450856	6215.74	90.275	2478	62505	1449462	-1477.63	410.87	6022.56
194.00	1575575	6632.85	90.440	-27926	72166	1573674	-1666.29	456.01	6402.89
195.00	1709002	7064.27	90.761	-62227	81779	1705870	-1879.70	506.14	6822.07
196.00	1768588	7415.71	90.006	-88289	88440	1794622	-2034.09	540.85	7110.74
197.00	1851652	7422.07	89.295	-102260	92298	1846200	-2092.56	544.80	7100.86
198.00	1871229	7422.20	89.295	-100041	92886	1845607	-2115.66	546.04	7094.25

TABLE 1B (Cont'd.)
AS-204/IN-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	ALTITUDE (KM)	RANGE (KM)	VELOCITY VECTOR		LONGITUDE (POS. EAST) (DEG)	GEOCENTRIC DECLINATION (DEG)	GEOETIC LATITUDE (DEG)
			SPACE FIXED (DEG)	EARTH FIXED (DEG)			
160.07	69.284	63.348	76.661	73.201	-79.945	28.537	28.697
161.39	70.587	65.410	76.673	73.216	-79.925	28.542	28.702
162.74	72.866	69.076	76.692	73.240	-79.889	28.552	28.712
164.65	73.775	70.560	76.691	73.245	-79.875	28.556	28.716
164.69	73.775	70.560	76.691	73.245	-79.875	28.556	28.716
167.39	76.329	74.799	76.678	73.258	-79.843	28.567	28.727
170.00	78.759	78.929	76.666	73.272	-79.793	28.577	28.737
171.99	80.588	82.105	76.655	73.282	-79.762	28.585	28.745
175.75	83.989	88.163	76.635	73.302	-79.702	28.601	28.761
190.00	96.255	111.860	76.610	73.433	-79.470	28.662	28.822
210.00	111.864	147.157	76.629	73.685	-79.123	28.752	28.912
230.00	125.653	184.983	76.735	74.000	-78.750	28.847	29.006
250.00	137.692	225.484	76.866	74.338	-78.350	28.946	29.106
270.00	148.052	268.824	77.028	74.695	-77.920	29.050	29.210
290.00	156.807	315.176	77.219	75.072	-77.460	29.159	29.319
310.00	164.032	364.731	77.430	75.456	-76.966	29.272	29.432
330.00	169.805	417.699	77.678	75.869	-76.437	29.390	29.550
350.00	174.214	474.308	77.965	76.313	-75.870	29.512	29.673
370.00	177.354	534.807	78.283	76.780	-75.261	29.639	29.800
390.00	179.323	599.477	78.633	77.271	-74.609	29.769	29.931
410.00	180.233	668.615	79.018	77.787	-73.909	29.904	30.066
430.00	180.205	742.557	79.437	78.332	-73.158	30.041	30.204
450.00	179.376	821.690	79.893	78.906	-72.352	30.182	30.344
470.00	177.899	906.446	80.388	79.514	-71.485	30.324	30.488
490.00	175.953	997.291	80.926	80.156	-70.553	30.468	30.632
492.25	175.699	1008.503	80.992	80.235	-70.438	30.486	30.649
510.00	173.515	1094.936	81.509	80.835	-69.547	30.613	30.778
530.00	171.017	1198.454	82.132	81.545	-68.478	30.756	30.921
550.00	168.510	1308.607	82.800	82.296	-67.336	30.895	31.061
570.00	166.237	1425.931	83.515	83.089	-66.115	31.029	31.195
590.00	164.450	1551.051	84.278	83.927	-64.809	31.157	31.323
610.00	163.199	1684.764	85.095	84.813	-63.410	31.274	31.441
622.75	163.182	1774.881	85.644	85.405	-62.465	31.344	31.510
630.00	163.197	1827.353	85.947	85.726	-61.914	31.380	31.547
632.75	163.203	1847.229	86.062	85.847	-61.705	31.393	31.560

TABLE 4B (Cont'd.)
AS-204/IM-1 LV OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	VEHICLE ATTITUDE ANGLE			VEHICLE ATTITUDE RATE			VEHICLE ATTITUDE ERROR		
	PITCH (DEG)	YAW (DEG)	ROLL (DEG)	PITCH (DEG/S)	YAW (DEG/S)	ROLL (DEG/S)	PITCH (DEG)	YAW (DEG)	ROLL (DEG)
160.07	-59.268	-0.293	0.018	0.006	-0.011	0.005	0.167	-0.293	0.018
161.39	-59.282	-0.349	0.024	-0.024	-0.074	0.005	0.152	-0.349	0.024
163.74	-59.371	-0.640	0.037	-0.059	-0.149	0.009	0.063	-0.640	0.037
164.69	-59.448	-0.735	0.050	-0.098	-0.037	0.019	-0.014	-0.735	0.050
164.65	-59.448	-0.735	0.050	-0.058	-0.037	0.019	-0.014	-0.735	0.050
167.39	-59.642	-0.582	0.114	-0.074	0.073	0.023	-0.207	-0.582	0.114
170.00	-59.637	-0.492	0.170	0.012	0.004	0.023	-0.202	-0.492	0.170
171.95	-59.622	-0.498	0.221	0.007	-0.005	0.028	-0.198	-0.498	0.221
175.75	-59.629	-0.505	0.343	-0.007	0.000	0.036	-0.194	-0.505	0.343
190.00	-59.406	0.546	0.447	-0.004	0.014	-0.048	-0.046	-0.527	0.447
210.00	-61.158	1.405	-0.462	-0.067	0.026	-0.047	-0.116	-0.561	-0.462
230.00	-62.611	1.698	-0.092	-0.044	0.010	0.049	-0.181	-0.552	-0.092
250.00	-64.089	1.862	0.531	-0.079	0.008	-0.048	-0.116	-0.569	0.531
270.00	-65.525	2.023	-0.439	-0.078	0.008	-0.048	-0.118	-0.590	-0.439
290.00	-67.188	2.189	0.004	-0.067	0.008	0.061	-0.144	-0.611	0.004
310.00	-69.000	1.856	0.186	-0.045	0.142	-0.054	-0.489	-1.469	0.186
330.00	-70.531	2.529	-0.547	-0.108	0.011	0.048	-0.397	-1.295	-0.547
350.00	-72.228	2.706	0.371	-0.083	0.006	0.046	-0.447	-1.329	0.371
370.00	-74.095	2.852	0.041	-0.096	0.008	-0.059	-0.449	-1.382	0.041
390.00	-75.893	3.006	-0.442	-0.089	0.008	0.042	-0.480	-1.425	-0.442
410.00	-77.737	3.154	0.397	-0.096	0.007	0.047	-0.495	-1.468	0.397
430.00	-79.747	3.296	0.076	-0.102	0.007	-0.060	-0.508	-1.515	0.076
450.00	-81.753	3.436	-0.399	-0.096	0.006	0.054	-0.540	-1.568	-0.399
470.00	-83.706	3.565	0.690	-0.107	0.005	0.055	-0.550	-1.623	0.690
490.00	-85.759	3.703	-0.390	-0.080	0.006	-0.056	-0.629	-1.678	-0.390
492.25	-85.936	3.718	-0.525	-0.074	0.007	-0.057	-0.625	-1.690	-0.525
510.00	-87.570	3.853	0.546	-0.108	0.005	0.081	-0.591	-1.722	0.546
530.00	-89.862	4.028	-0.282	-0.043	0.006	-0.045	-0.658	-1.771	-0.282
550.00	-91.334	4.110	-0.449	-0.114	0.006	0.066	-0.632	-1.819	-0.449
570.00	-93.639	4.187	0.469	-0.120	0.002	-0.048	-0.623	-1.860	0.469
590.00	-96.560	4.216	-0.480	-0.154	0.002	-0.047	-0.612	-1.905	-0.480
610.00	-101.057	4.187	-0.031	-0.728	-0.009	0.068	-0.035	-1.939	-0.031
622.75	-100.390	4.210	0.733	-0.001	-0.001	0.047	-0.849	-1.957	0.733
630.00	-100.394	4.204	0.908	-0.002	-0.001	0.010	-0.863	-1.963	0.908
632.75	-100.398	4.202	0.936	-0.001	-0.001	0.010	-0.867	-1.965	0.936

TABLE 5B
AS-204/1M-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-1B STAGE FLIGHT DATA

FLIGHT TIME (SEC)	MASS (LB)	THRUST (TOTAL) (LB)	DPAG (LB)	LONGITUDINAL ACCELERATION (FT/SEC ²)	DYNAMIC PRESSURE (LB/FT ²)	A.H.I. (LB-FT/FT ² -RAD)	MACH NO.	PITCH ANGLE OF ATTACK (DEG)
1) -5.00	1299059.	0.	---	0.000	0.	C.	0.00	0.000
2) 0.00	1285045.	1575301.	1323.	39.752	0.	0.	0.00	0.000
5.00	1254262.	1608531.	2945.	41.537	2.	77.	0.04	1.471
10.00	1223353.	1615700.	6238.	42.688	10.	1417.	0.08	2.831
15.00	1192304.	1630743.	8775.	44.134	25.	8229.	0.13	1.554
20.00	1161063.	1645569.	11042.	45.666	50.	29972.	0.19	1.054
25.00	1129704.	1659136.	15832.	47.179	85.	83996.	0.25	0.813
30.00	1098256.	1673671.	20349.	48.818	133.	197904.	0.33	0.289
35.00	1066743.	1688298.	26325.	50.515	193.	411858.	0.41	-0.063
36.09	1059864.	1691690.	28032.	50.851	208.	476800.	0.43	-0.120
40.00	1037790.	1486156.	31938.	45.437	242.	759259.	0.48	1.114
45.00	1010237.	1499029.	37397.	46.955	287.	1234877.	0.55	2.988
50.00	982671.	1512012.	42263.	48.582	334.	1869814.	0.63	3.784
55.00	955101.	1525193.	46762.	50.287	382.	2698824.	0.72	3.727
60.00	927535.	1538046.	56315.	51.792	428.	3756111.	0.82	1.640
65.00	899576.	1549178.	94915.	52.367	465.	5066762.	0.94	0.666
70.00	872363.	1559486.	128855.	53.143	485.	6620902.	1.07	0.127
75.00	846661.	1570230.	122501.	55.530	492.	8390521.	1.22	-0.380
80.00	816955.	1579863.	103939.	58.516	483.	10351687.	1.39	-0.309
85.00	789254.	158085.	80314.	61.860	456.	12463728.	1.58	0.027
90.00	761561.	1594197.	63302.	65.085	405.	14635355.	1.78	0.140
95.00	733962.	1598405.	45982.	68.470	336.	16718890.	1.97	0.044
100.00	706455.	1600898.	33425.	71.818	273.	18635747.	2.17	-0.152
105.00	678988.	1602170.	23462.	75.255	217.	20352624.	2.39	-0.323
110.00	651543.	1602050.	16388.	78.767	168.	21851029.	2.63	-0.714
115.00	624129.	1600928.	11440.	82.424	126.	23120736.	2.87	-0.865
120.00	596759.	1599400.	7792.	86.319	92.	24156854.	3.11	-0.938
125.00	569437.	1596703.	5239.	90.453	66.	24985822.	3.37	-1.171
130.00	542170.	1593530.	3088.	94.942	46.	25630294.	3.62	-1.041
135.00	514969.	1589705.	1414.	99.824	32.	26125958.	3.91	-1.031
140.00	487843.	1585052.	549.	105.126	23.	26505241.	4.26	-1.457
145.00	460804.	1579563.	-115.	110.960	16.	26798223.	4.74	-2.195
150.00	433870.	1572639.	-703.	117.380	11.	27019558.	5.32	-3.404
150.25	432530.	1572316.	-733.	117.721	11.	27026613.	5.36	-3.428
153.19	416765.	1566004.	-1040.	121.711	8.	27128200.	5.74	-2.636
158.69	402100.	592461.	-859.	47.445	4.	27253461.	6.17	-0.993
159.99	400755.	39238.	-761.	2.211	4.	27272857.	6.22	-0.661
160.07	400673.	36315.	-755.	2.976	3.	27273923.	6.22	-0.641

1) CBR; 2) First Motion; 3) Engine No. 4 Premature Shutdown; 4) Max. Dyn. Pressure; 5) Tilt Arrest; 6) IECO; 7) OECO;

8) Sep. Signal; 9) Physical Sep.

TABLE 5B (Cont'd.)
AS-204/DM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-IR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	SPACE FIXED VELOCITY		PATH ANGLE		SPACE FIXED POSITION			VELOCITY VECTOR			COMPONENTS		
	RADIUS (FT)	VELOCITY (FT/S)	DEG	(DEG)	X (FT)	Y (FT)	Z (FT)	DX (FT/S)	DY (FT/S)	DZ (FT/S)	DX (FT/S)	DY (FT/S)	DZ (FT/S)
-5.00	20909949.	1341.64	90.000	90.000	20909867.	55942.	-18177.	0.00	414.59	1275.97	0.00	414.59	1275.97
0.00	20909949.	1341.64	90.000	90.000	20909865.	58015.	-11797.	-0.43	414.37	1276.05	-0.43	414.37	1276.05
5.00	20910056.	1342.36	88.130	88.130	20909969.	60086.	-5416.	42.94	414.05	1276.18	42.94	414.05	1276.18
10.00	20910397.	1344.69	86.008	86.008	20910304.	62155.	965.	92.32	413.71	1276.13	92.32	413.71	1276.13
15.00	20911002.	1350.11	83.627	83.627	20910903.	64223.	7345.	148.15	413.48	1276.67	148.15	413.48	1276.67
20.00	20911908.	1361.72	80.968	80.968	20911799.	66290.	13736.	211.63	413.23	1280.13	211.63	413.23	1280.13
25.00	20913152.	1382.03	78.094	78.094	20913011.	68355.	20155.	282.54	412.96	1288.27	282.54	412.96	1288.27
30.00	20914772.	1413.87	75.078	75.078	20914637.	70419.	26630.	361.03	412.60	1303.24	361.03	412.60	1303.24
35.00	20916806.	1460.13	72.023	72.023	20916654.	72481.	33203.	447.11	412.18	1327.47	447.11	412.18	1327.47
36.09	20917308.	1472.39	71.364	71.364	20917152.	72931.	34653.	466.87	412.09	1334.22	466.87	412.09	1334.22
40.00	20915247.	1514.15	69.899	69.899	20919076.	74547.	39923.	516.30	415.31	1361.47	516.30	415.31	1361.47
45.00	20922017.	1566.81	67.924	67.924	20921824.	76633.	46808.	584.23	418.85	1392.17	584.23	418.85	1392.17
50.00	20925149.	1622.24	65.773	65.773	20924933.	78733.	53841.	660.47	421.25	1420.56	660.47	421.25	1420.56
55.00	20928688.	1682.94	63.489	63.489	20928443.	80844.	61013.	745.33	422.92	1448.30	745.33	422.92	1448.30
60.00	20932672.	1760.19	61.382	61.382	20932396.	82962.	68348.	836.55	424.14	1489.49	836.55	424.14	1489.49
65.00	20937123.	1855.44	59.658	59.658	20936813.	85085.	75936.	929.98	425.15	1548.24	929.98	425.15	1548.24
70.00	20942040.	1962.75	58.355	58.355	20941691.	87212.	83853.	1021.48	425.30	1621.13	1021.48	425.30	1621.13
75.00	20947427.	2087.40	57.356	57.356	20947034.	89338.	92177.	1116.64	425.30	1711.57	1116.64	425.30	1711.57
80.00	20953313.	2232.14	56.556	56.556	20952870.	91445.	101000.	1219.23	425.27	1820.73	1219.23	425.27	1820.73
85.00	20955741.	2357.75	55.934	55.934	20959242.	93593.	110415.	1330.95	426.26	1948.35	1330.95	426.26	1948.35
90.00	20966756.	2585.85	55.515	55.515	20965192.	95726.	120521.	1450.10	426.87	2097.99	1450.10	426.87	2097.99
95.00	20974391.	2796.75	55.335	55.335	20973752.	97861.	131435.	1574.54	427.33	2271.57	1574.54	427.33	2271.57
100.00	20982671.	3030.78	55.389	55.389	20981943.	100000.	143279.	1702.63	428.33	2470.47	1702.63	428.33	2470.47
105.00	20991612.	3287.13	55.632	55.632	20990783.	102145.	156181.	1833.53	429.51	2694.24	1833.53	429.51	2694.24
110.00	21001229.	3566.31	56.055	56.055	21000280.	104298.	170266.	1965.48	431.89	2944.30	1965.48	431.89	2944.30
115.00	21011529.	3868.02	56.606	56.606	21010439.	106467.	185666.	2098.39	435.98	3219.98	2098.39	435.98	3219.98
120.00	21022522.	4192.48	57.233	57.233	21021266.	108559.	202508.	2232.98	440.89	3520.84	2232.98	440.89	3520.84
125.00	21034224.	4540.61	57.917	57.917	21032772.	110877.	220917.	2369.13	446.82	3847.69	2369.13	446.82	3847.69
130.00	21046649.	4913.21	58.609	58.609	21044965.	113126.	241026.	2508.81	452.76	4200.06	2508.81	452.76	4200.06
135.00	21059824.	5311.90	59.299	59.299	21057967.	115404.	262963.	2652.62	458.27	4579.29	2652.62	458.27	4579.29
140.00	21073777.	5738.89	60.001	60.001	21071495.	117708.	286869.	2709.17	463.12	4988.49	2709.17	463.12	4988.49
145.00	21085521.	6196.78	60.744	60.744	21085858.	120034.	312905.	2945.57	467.19	5431.88	2945.57	467.19	5431.88
150.00	21104057.	6688.56	61.562	61.562	21100943.	122378.	341253.	3087.24	470.25	5914.78	3087.24	470.25	5914.78
150.25	21104854.	6714.10	61.606	61.606	21101716.	122496.	342735.	3094.06	470.37	5940.09	3094.06	470.37	5940.09
153.19	21114378.	7021.27	62.104	62.104	21110934.	123881.	360649.	3176.13	471.46	6244.05	3176.13	471.46	6244.05
158.69	21132468.	7257.26	63.108	63.108	21128383.	126485.	395792.	3158.22	475.52	6516.69	3158.22	475.52	6516.69
159.99	21136719.	7255.17	63.366	63.366	21132470.	127103.	404277.	3125.32	475.57	6530.21	3125.32	475.57	6530.21
160.07	21136575.	7254.29	63.382	63.382	21132717.	127140.	404793.	3122.95	475.56	6530.38	3122.95	475.56	6530.38

TABLE 5B (Cont'd.)
AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-IB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	EARTH FIXED			EARTH FIXED POSITION AND VELOCITY			VECTOR COMPONENTS		
	POSITION (FT)	VELOCITY (FT/S)	PATH ANGLE (DEG)	X (FT)	Y (FT)	Z (FT)	DX (FT/S)	DY (FT/S)	DZ (FT/S)
-5.00	113.	0.00	N/A	113.	-0.	0.	-0.00	0.00	-0.00
0.00	113.	0.00	N/A	113.	-0.	-0.	-0.00	0.00	0.00
5.00	220.	43.80	0.298	220.	-0.	0.	43.80	-0.10	0.03
10.00	561.	93.61	0.309	561.	-1.	0.	93.61	-0.25	-0.18
15.00	1166.	149.87	0.291	1166.	-3.	-1.	149.87	-0.30	0.16
20.00	2072.	213.81	0.983	2072.	-4.	6.	213.81	-0.39	3.35
25.00	3317.	285.36	2.303	3316.	-7.	40.	285.14	-0.52	11.15
30.00	4938.	365.00	4.095	4935.	-10.	129.	364.10	-0.74	25.70
35.00	6977.	453.39	6.312	6970.	-14.	312.	450.69	-1.04	49.41
36.09	7481.	473.89	6.845	7472.	-15.	370.	470.56	-1.10	56.03
40.00	9433.	527.00	9.094	9412.	-14.	641.	520.44	2.23	82.85
45.00	12234.	599.71	10.910	12182.	7.	1131.	588.95	5.90	112.94
50.00	15417.	680.53	11.984	15315.	43.	1766.	665.79	8.42	140.62
55.00	19024.	749.80	12.629	18854.	90.	2537.	751.28	10.18	167.55
60.00	23100.	868.51	13.899	22838.	144.	3466.	843.20	11.51	207.84
65.00	27683.	974.42	15.865	27290.	204.	4643.	937.45	12.66	265.58
70.00	32790.	1083.82	18.179	32208.	269.	6145.	1029.89	12.99	327.39
75.00	38449.	1204.33	20.782	37596.	334.	8047.	1126.14	13.23	426.65
80.00	44721.	1341.19	23.511	43483.	401.	10442.	1230.01	13.50	534.49
85.00	51687.	1496.96	26.206	49912.	471.	13422.	1343.20	14.86	660.66
90.00	59438.	1672.65	28.919	56927.	549.	17086.	1464.08	15.94	808.69
95.00	68066.	1868.54	31.645	64562.	631.	21548.	1590.52	16.97	980.51
100.00	77662.	2085.31	34.358	72839.	720.	26933.	1720.94	18.70	1177.51
105.00	88325.	2323.28	36.994	81776.	818.	33364.	1854.53	20.75	1399.25
110.00	100154.	2583.02	39.560	91386.	930.	40970.	1989.56	24.19	1647.14
115.00	113255.	2865.13	42.008	101674.	1064.	49878.	2125.98	29.53	1920.51
120.00	127740.	3170.64	44.304	112649.	1227.	60216.	2264.52	35.89	2218.91
125.00	143730.	3500.59	46.453	124324.	1424.	72110.	2405.11	43.52	2543.16
130.00	161352.	3856.41	48.424	136708.	1662.	85689.	2549.75	51.39	2892.76
135.00	180748.	4239.71	50.232	149828.	1938.	101082.	2699.06	59.10	3289.05
140.00	202064.	4652.27	51.920	163704.	2252.	118429.	2851.74	66.44	3675.16
145.00	225451.	5066.17	53.540	178347.	2602.	137890.	3004.95	73.36	4115.31
150.00	251066.	5573.90	55.149	193747.	2985.	159648.	3154.22	79.67	4594.88
150.25	252409.	5598.72	55.231	194537.	3005.	160800.	3161.44	79.97	4620.02
153.19	268655.	5897.85	56.152	203961.	3245.	174829.	3248.38	83.20	4921.96
158.69	300508.	6119.50	57.561	221825.	3721.	202694.	3237.05	90.31	5192.46
159.59	308172.	6114.07	57.862	226015.	3839.	209457.	3205.23	90.92	5205.77
160.07	308637.	6112.99	57.880	226268.	3847.	209868.	3202.92	90.94	5205.93

TABLE 5B (Cont'd.)
AS-20A/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-IR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	ALTITUDE (FT)	RANGE (NM)	VELOCITY VECTOR SPACE FIXED (DEG)	VELOCITY VECTOR EARTH FIXED (DEG)	LONGITUDE (POS. EAST) (DEG)	GEOCENTRIC DECLINATION (DEG)	GEOCENTRIC LATITUDE (DEG)
-5.00	112.	0.000	90.000	N/A	-80.565	28.371	28.532
0.00	112.	0.000	90.000	N/A	-80.565	28.371	28.532
5.00	218.	0.000	89.990	N/A	-80.565	28.371	28.532
10.00	560.	0.000	89.981	N/A	-80.565	28.371	28.532
15.00	1165.	-0.001	89.968	N/A	-80.565	28.371	28.532
20.00	2071.	0.002	89.914	55.743	-80.565	28.371	28.532
25.00	3315.	0.007	89.799	65.594	-80.565	28.371	28.532
30.00	4635.	0.022	89.594	68.224	-80.565	28.371	28.532
35.00	6569.	0.053	89.277	69.419	-80.564	28.371	28.532
36.09	7471.	0.062	89.192	69.605	-80.564	28.371	28.532
40.00	9410.	0.107	88.995	72.580	-80.563	28.371	28.532
45.00	12181.	0.188	88.779	74.185	-80.562	28.372	28.533
50.00	15314.	0.293	88.555	74.696	-80.560	28.372	28.533
55.00	18853.	0.420	88.319	74.786	-80.557	28.373	28.534
60.00	22838.	0.573	87.938	74.545	-80.555	28.373	28.534
65.00	27289.	0.767	87.402	74.189	-80.551	28.374	28.535
70.00	32208.	1.015	86.752	73.742	-80.547	28.375	28.536
75.00	37595.	1.328	86.013	73.380	-80.541	28.377	28.538
80.00	43484.	1.722	85.212	73.107	-80.534	28.379	28.540
85.00	49515.	2.212	84.414	72.994	-80.525	28.381	28.542
90.00	56533.	2.813	83.584	72.974	-80.514	28.384	28.545
95.00	64572.	3.545	82.749	72.772	-80.501	28.388	28.548
100.00	72855.	4.428	81.945	72.722	-80.485	28.392	28.553
105.00	81802.	5.482	81.183	72.692	-80.466	28.397	28.558
110.00	91425.	6.727	80.489	72.713	-80.443	28.403	28.564
115.00	101733.	8.185	79.877	72.780	-80.417	28.411	28.571
120.00	112735.	9.874	79.328	72.854	-80.386	28.419	28.579
125.00	124446.	11.817	78.842	72.937	-80.351	28.428	28.589
130.00	136882.	14.032	78.400	73.003	-80.311	28.439	28.600
135.00	150070.	16.541	77.995	73.051	-80.266	28.451	28.612
140.00	164036.	19.365	77.620	73.083	-80.214	28.465	28.625
145.00	178797.	22.530	77.270	73.103	-80.157	28.480	28.641
150.00	194350.	26.064	76.943	73.112	-80.093	28.498	28.658
150.25	195148.	26.251	76.727	73.113	-80.090	28.498	28.659
153.19	204683.	28.527	76.744	73.113	-80.048	28.509	28.670
158.69	222796.	33.043	75.655	73.186	-79.966	28.531	28.691
159.99	227052.	34.139	75.460	73.201	-79.947	28.537	28.697
160.07	227509.	34.205	75.661	73.201	-79.945	28.537	28.697

TABLE 5B (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-IR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	VEHICLE ATTITUDE ANGLE			VEHICLE ATTITUDE RATE			VEHICLE ATTITUDE ERROR		
	PITCH (DEG)	YAW (DEG)	ROLL (DEG)	PITCH (DEG/S)	YAW (DEG/S)	ROLL (DEG/S)	PITCH (DEG)	YAW (DEG)	ROLL (DEG)
-5.00	0.000	0.000	18.000	-0.003	0.001	-0.002	0.000	0.000	0.000
0.00	-0.017	0.006	17.990	-0.003	0.001	-0.002	-0.017	0.006	-0.010
5.00	-0.013	-0.015	18.004	-0.007	-0.004	-0.003	-0.013	-0.015	0.004
10.00	-0.003	-0.019	18.001	-0.000	-0.000	0.000	-0.003	-0.019	0.001
15.00	-0.567	-0.001	14.384	-0.117	-0.013	-1.087	0.109	-0.001	1.184
20.00	-1.500	0.012	9.387	-0.229	-0.001	-1.002	0.195	0.012	1.187
25.00	-2.863	0.002	4.385	-0.313	-0.004	-1.000	0.267	0.002	1.185
30.00	-4.638	-0.022	-0.007	-0.394	-0.004	-0.169	0.323	-0.022	-0.007
35.00	-6.800	-0.023	0.000	-0.469	-0.000	-0.001	0.365	-0.023	0.000
36.09	-7.319	-0.023	-0.000	-0.484	-0.000	-0.000	0.374	-0.023	-0.000
40.00	-8.118	0.323	0.160	0.232	-0.093	-0.286	-0.347	0.323	0.160
45.00	-7.861	0.153	-0.368	0.002	-0.028	0.044	-0.090	0.153	-0.368
50.00	-7.955	0.077	-0.568	-0.544	-0.011	-0.010	-0.187	0.077	-0.568
55.00	-8.458	0.037	-0.911	-0.544	-0.002	-0.401	0.160	0.037	-0.911
60.00	-11.718	0.004	0.153	-0.533	0.002	-0.117	-0.299	0.004	0.153
65.00	-14.463	-0.011	0.105	-0.549	-0.027	0.072	-0.012	-0.011	0.105
70.00	-17.065	-0.071	0.276	-0.590	-0.000	0.128	0.373	-0.071	0.276
75.00	-19.952	-0.104	0.778	-0.567	-0.005	0.040	0.622	-0.104	0.778
80.00	-22.790	-0.092	0.740	-0.573	0.012	-0.083	0.951	-0.092	0.740
85.00	-25.847	-0.036	0.196	-0.661	-0.030	0.027	1.054	-0.036	0.186
90.00	-29.128	-0.184	0.464	-0.645	-0.011	0.005	0.891	-0.184	0.464
95.00	-32.335	-0.178	0.464	-0.631	-0.005	0.025	0.721	-0.178	0.464
100.00	-35.417	-0.161	0.535	-0.600	0.009	-0.003	0.559	-0.161	0.535
105.00	-38.269	-0.204	0.857	-0.513	0.037	-0.001	0.473	-0.204	0.857
110.00	-41.162	-0.044	0.876	-0.541	0.035	-0.041	0.155	-0.044	0.876
115.00	-42.685	0.090	0.537	-0.489	0.011	-0.048	0.037	0.090	0.597
120.00	-45.922	0.109	0.532	-0.391	0.001	-0.059	-0.029	0.109	0.532
125.00	-48.276	0.246	0.514	-0.321	-0.034	-0.027	-0.434	0.246	0.514
130.00	-49.860	0.152	0.235	-0.370	-0.009	0.015	-0.143	0.152	0.235
135.00	-51.702	0.045	0.215	-0.376	-0.017	-0.017	0.005	0.065	0.215
140.00	-53.757	-0.021	0.183	-0.445	-0.019	-0.005	0.185	-0.021	0.185
145.00	-56.190	-0.116	0.152	-0.535	-0.021	-0.005	0.401	-0.116	0.152
150.00	-59.152	-0.227	0.148	-0.594	-0.023	0.096	0.292	-0.227	0.148
150.25	-59.291	-0.233	0.194	-0.510	-0.025	0.188	0.144	-0.233	0.184
153.19	-59.459	-0.325	0.252	0.115	-0.013	-0.195	-0.025	-0.325	0.252
158.69	-59.287	-0.267	0.000	0.014	-0.022	0.013	0.148	-0.267	0.009
159.99	-59.269	-0.292	0.018	0.007	-0.011	0.005	0.166	-0.292	0.018
160.07	-59.268	-0.293	0.018	0.004	-0.011	0.005	0.167	-0.293	0.018

TABLE 6B
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
3-IVB STAGE FLIGHT DATA

	FLIGHT TIME (SEC)	MASS (LB)	THRUST (TOTAL) (LB)	DRAW (LB)	LONGITUDINAL ACCELERATION (FT/SEC ²)	DYNAMIC PRESSURE (LB/FT ²)	A.H.I. (LB-FT/FT ² -RAD)	MACH NO.	PITCH ANGLE OF ATTACK (DEG)
1)	160.07	296213.	8749.	274.	0.921	3.	27275608.	6.22	-0.641
2)	161.39	296139.	8625.	226.	0.913	3.	27291651.	6.25	-0.339
3)	163.74	296086.	85626.	160.	0.292	2.	27313491.	6.31	0.139
4)	164.65	295643.	179392.	140.	19.507	2.	27320410.	6.34	0.293
	164.65	295643.	179392.	140.	19.507	2.	27320410.	6.34	0.293
5)	167.39	294416.	196783.	95.	21.492	1.	27336530.	6.46	0.756
	170.00	293215.	208759.	45.	22.900	1.	27346635.	6.59	1.394
6)	171.99	292205.	220494.	48.	24.273	1.	27352158.	6.69	1.887
7)	175.75	290041.	220669.	27.	24.475	0.	27359072.	6.85	2.779
	190.00	282597.	222965.	3.	25.385	0.	27366735.	6.64	6.160
	210.00	272039.	224361.	0.	26.535	0.	27367749.	6.11	9.901
	230.00	261463.	224286.	0.	27.599	0.	27367859.	4.91	12.365
	250.00	250912.	224486.	0.	28.785	0.	27367859.	4.14	14.277
	270.00	240375.	224239.	0.	30.014	0.	27367859.	3.93	16.360
	290.00	225840.	224273.	0.	31.394	0.	27367859.	3.92	17.716
	310.00	215329.	224082.	0.	32.871	0.	27367859.	3.99	18.514
	330.00	208803.	224278.	0.	34.557	0.	27367859.	4.12	19.336
	350.00	198303.	223944.	0.	36.334	0.	27367859.	4.34	19.748
	370.00	187789.	224239.	0.	38.419	0.	27367859.	4.59	19.797
	390.00	177280.	223653.	0.	40.590	0.	27367859.	4.87	19.722
	410.00	166794.	223284.	0.	43.070	0.	27367859.	5.19	19.392
	430.00	156298.	223635.	0.	46.035	0.	27367859.	5.55	18.775
	450.00	145802.	223557.	0.	49.331	0.	27367859.	5.95	18.032
	470.00	135321.	222616.	0.	52.928	0.	27367859.	6.39	17.183
	490.00	124904.	214558.	0.	55.267	0.	27367859.	6.88	16.197
8)	492.25	123728.	210897.	0.	54.840	0.	27367859.	6.94	16.145
	510.00	115490.	192437.	0.	53.609	0.	27367859.	7.39	15.386
	530.00	106669.	187576.	0.	56.577	0.	27367859.	7.91	15.121
	550.00	97576.	185866.	0.	61.035	0.	27367939.	8.50	13.576
	570.00	89394.	183453.	0.	66.025	0.	27367993.	9.14	12.135
	590.00	80875.	183115.	0.	72.846	0.	27368096.	9.83	10.119
	610.00	72422.	180496.	0.	80.185	0.	27368179.	10.56	6.503
9)	622.75	67074.	180233.	0.	86.452	0.	27368179.	11.05	7.764
	630.00	66838.	360.	0.	0.173	0.	27368179.	11.06	8.223
10)	632.75	66833.	360.	0.	0.174	0.	27368179.	11.06	8.416

1) Physical Sep.; 2) J-2 Start Command; 3) Ullage Rocket Burnout; 4) 90% Thrust Level; 5) Command P. U. Activation; 6) Ullage

Case Jettison; 7) IGM Initiation; 8) EMR Shift Sensed by IGM; 9) Guidance Cutoff Signal; 10) Orbit Insertion.

TABLE 6B (Cont'd.)
AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	RADIUS (FT)	SPACE FIXED			--- SPACE FIXED POSITION AND VELOCITY VECTOR COMPONENTS ---				
		VELOCITY (FT/S)	PATH ANGLE (DEG)	X (FT)	Y (FT)	Z (FT)	DX (FT/S)	DY (FT/S)	DZ (FT/S)
160.07	21136575.	7254.29	63.382	21122717.	127140.	404793.	3122.95	475.56	6530.38
161.39	21141244.	7236.92	63.652	21136815.	127769.	413420.	3081.94	475.35	6530.60
163.74	21148712.	7209.15	64.134	21143972.	128885.	428768.	3010.41	474.93	6533.28
164.69	21151689.	7210.32	64.320	21146821.	129336.	434979.	2987.78	474.52	6544.98
164.69	21151689.	7210.32	64.320	21146821.	129336.	434979.	2987.78	474.52	6544.98
167.39	21160058.	7230.24	64.832	21154812.	130615.	452714.	2931.60	473.18	6592.29
170.00	21168019.	7252.13	65.322	21162390.	131849.	469974.	2878.33	472.07	6639.71
171.95	21174014.	7273.42	65.688	21168083.	132788.	483233.	2839.88	471.18	6679.50
175.75	21185153.	7316.02	66.370	21178623.	134556.	508485.	2768.14	469.45	6755.83
190.00	21225335.	7495.17	68.813	21216189.	141226.	606829.	2505.35	467.76	7048.55
210.00	21276453.	7794.24	72.031	21262624.	150597.	752078.	2138.21	470.89	7480.41
230.00	21321593.	8143.63	74.974	21301727.	160101.	906186.	1772.14	480.02	7933.97
250.00	21360987.	8539.53	77.626	21332517.	169812.	1069571.	1406.85	491.38	8408.50
270.00	21354868.	8981.73	79.996	21357991.	179770.	1242688.	1040.47	504.72	8906.97
290.00	21423478.	9469.79	82.093	21375121.	190016.	1426028.	671.83	520.24	9431.59
310.00	21447066.	10002.10	83.930	21384845.	200590.	1620126.	299.44	536.09	9983.23
330.00	21465891.	10581.06	85.520	21387068.	211498.	1825567.	-77.95	555.77	10566.17
350.00	21480220.	11206.92	86.880	21381683.	222847.	2042995.	-461.69	579.62	11182.40
370.00	21490388.	11882.07	89.025	21368545.	234704.	2273109.	-853.94	606.65	11835.81
390.00	21496710.	12609.33	88.974	21347452.	247136.	2516701.	-1257.18	637.18	12530.31
410.00	21495552.	13390.29	89.736	21318175.	260216.	2774608.	-1672.97	671.52	13268.39
430.00	21493316.	14232.70	90.329	21280426.	274026.	3047780.	-2105.06	710.21	14058.24
450.00	21496445.	15143.75	90.762	21233842.	288658.	3337331.	-2557.02	753.83	14907.27
470.00	21491447.	16128.32	91.043	21177993.	304216.	3644497.	-3032.03	803.00	15820.39
490.00	21484508.	17191.77	91.185	21112377.	320818.	3970629.	-3534.99	858.16	16802.51
492.25	21484056.	17319.00	91.197	21103908.	322864.	4010674.	-3597.05	864.87	16919.25
510.00	21476754.	18248.36	91.260	21035532.	338602.	4317720.	-4070.92	915.05	17764.94
530.00	21468403.	19223.23	91.264	20948454.	357488.	4682609.	-4640.57	974.57	18732.39
550.00	21460031.	20475.90	91.136	20849727.	377632.	5067465.	-5240.83	1040.95	19766.45
570.00	21452428.	21724.02	90.916	20738490.	399173.	5473787.	-5891.72	1114.47	20880.10
590.00	21445476.	23092.46	90.611	20613624.	422264.	5903335.	-6608.29	1196.05	22094.38
610.00	21442949.	24606.74	90.247	20473573.	447078.	6358358.	-7414.83	1286.94	23427.67
627.75	21442063.	25661.07	90.006	20375343.	463876.	6862754.	-7994.87	1349.61	24346.48
630.00	21442070.	25685.27	89.996	20316567.	472659.	6892336.	-8210.07	1346.69	24300.50
632.75	21442075.	25685.71	89.995	20293904.	477356.	6905933.	-8289.81	1344.97	24273.97

TABLE 6B (Cont'd.)
AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-IVR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	POSITION (FT)	EARTH FIXED		EARTH FIXED POSITION AND VELOCITY VECTOR COMPONENTS		EARTH FIXED POSITION AND VELOCITY VECTOR COMPONENTS		DY (FT/S)	DZ (FT/S)
		VELOCITY (FT/S)	PATH ANGLE (DEG)	X (FT)	Y (FT)	Z (FT)	DX (FT/S)		
160.07	308437.	6112.99	57.880	226268.	3847.	20868.	3202.92	90.94	5205.93
161.39	316405.	6092.19	58.183	230473.	3967.	216745.	3162.87	91.24	5206.02
163.74	330145.	6058.38	58.726	237822.	4182.	228980.	3093.08	91.73	5208.50
164.65	335713.	6057.23	58.946	240750.	4269.	233933.	3071.26	91.74	5220.05
164.65	335713.	6057.23	58.946	240750.	4269.	233933.	3071.26	91.74	5220.05
167.39	351503.	6070.76	53.569	248949.	4517.	248090.	3017.53	91.67	5266.90
170.00	366802.	6084.63	60.167	256775.	4756.	261892.	2966.69	91.79	5313.88
171.99	378509.	6103.47	69.619	262645.	4939.	272511.	2930.14	91.88	5353.33
175.75	400706.	6137.94	61.461	273532.	5284.	292776.	2862.04	92.03	5429.05
180.00	486060.	6289.33	64.487	312537.	6630.	372198.	2613.58	97.88	5719.72
210.00	609578.	6555.67	63.482	361351.	8718.	490851.	2268.17	112.83	6149.75
220.00	738213.	6879.12	72.127	403286.	11192.	618337.	1925.78	135.29	6602.68
250.00	873255.	7255.14	75.390	438403.	14155.	755100.	1586.22	161.54	7077.77
270.00	1015419.	7682.45	78.282	466740.	17678.	901618.	1247.76	191.43	7578.03
280.00	1165827.	8159.62	80.813	488314.	21838.	1058407.	909.42	225.24	8105.66
310.00	1325512.	8684.24	93.004	503114.	26710.	1226028.	569.83	261.23	8661.59
320.00	1455506.	9257.85	84.879	511095.	22340.	1405089.	228.00	303.04	9250.08
350.00	1676879.	9880.09	86.460	512210.	38873.	1596262.	-117.22	351.14	9873.15
370.00	1870706.	10552.91	87.776	506373.	46421.	1800270.	-467.70	404.71	10534.77
380.00	2078122.	11278.75	88.853	493452.	55101.	2017935.	-825.66	464.25	11238.90
410.00	2300280.	12058.93	99.707	473290.	65035.	2250123.	-1192.36	530.27	11988.11
420.00	2538412.	12900.97	90.363	445679.	76260.	2457814.	-1571.10	603.60	12790.71
450.00	2793895.	13811.91	90.835	410346.	89233.	2762156.	-1964.98	685.13	13654.24
470.00	3068216.	14794.51	91.137	366961.	103827.	3044423.	-2376.72	775.81	14583.76
480.00	3322564.	15860.05	91.285	315132.	120333.	3346003.	-2810.70	876.41	15584.38
482.25	3399390.	15987.30	91.297	308388.	122426.	3383159.	-2864.31	888.72	15703.49
510.00	3680337.	16914.82	91.360	253534.	139991.	3668962.	-3274.40	981.43	16567.86
530.00	4017498.	17991.86	91.357	183139.	159710.	4010142.	-3748.00	1092.10	17558.95
550.00	4376807.	19144.66	91.215	102672.	182751.	4271785.	-4286.10	1213.95	18619.18
570.00	4760027.	20392.86	90.975	11409.	208349.	4755451.	-4847.87	1348.00	19762.33
580.00	5169209.	21761.30	90.649	-91622.	236764.	5162971.	-5467.16	1496.09	21010.14
590.00	5606645.	22275.50	90.261	-207800.	268303.	5596686.	-6166.98	1660.56	22382.13
610.00	5902103.	24329.74	90.036	-289661.	300186.	5887935.	-6673.52	1774.44	23329.21
620.75	6074122.	24353.91	89.996	-338778.	303109.	6057087.	-6868.64	1787.39	23296.78
633.75	6139331.	24354.34	89.995	-357746.	308024.	6171054.	-6941.16	1791.48	23275.41

TABLE 6B (Cont'd.)
AS-204/1A-1 I/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	ALTITUDE (FT)	RANGE (NM)	SPACE FIXED (DEG)	VELOCITY VECTOR EARTH FIXED (DEG)	LONGITUDE (POS. EAST) (DEG)	GEOCENTRIC DECLINATION (DEG)	GEODETTIC LATITUDE (DEG)
160.07	277209.	34.205	76.661	73.201	-79.945	28.537	28.697
161.39	231583.	35.319	76.673	73.216	-79.925	28.542	28.702
163.74	239061.	37.298	76.692	73.240	-79.889	28.552	28.712
164.65	242043.	38.099	76.691	73.245	-79.875	28.556	28.716
164.65	242043.	38.099	76.691	73.245	-79.875	28.556	28.716
167.39	250422.	40.388	76.678	73.258	-79.833	28.567	28.727
170.00	258294.	42.618	76.666	73.272	-79.793	28.577	28.737
171.09	264398.	44.333	76.655	73.282	-79.762	28.585	28.745
175.75	275553.	47.604	76.635	73.302	-79.702	28.601	28.761
190.00	315708.	60.399	76.610	73.433	-79.470	28.662	28.822
210.00	367009.	79.459	76.639	73.685	-79.123	28.752	28.912
230.00	412247.	99.883	76.735	74.000	-78.750	28.847	29.006
250.00	451744.	121.752	76.866	74.338	-78.350	28.946	29.106
270.00	485733.	145.153	77.028	74.695	-77.920	29.050	29.210
290.00	514457.	170.181	77.219	75.072	-77.460	29.159	29.319
310.00	538163.	196.939	77.430	75.456	-76.966	29.272	29.432
330.00	557102.	225.539	77.678	75.869	-76.437	29.390	29.550
350.00	571569.	256.106	77.965	76.313	-75.870	29.512	29.673
370.00	581871.	288.773	78.283	76.780	-75.261	29.639	29.800
390.00	588331.	323.692	78.633	77.271	-74.609	29.769	29.931
410.00	591315.	361.023	79.018	77.787	-73.909	29.904	30.066
430.00	591225.	400.949	79.437	78.332	-73.158	30.041	30.204
450.00	588504.	443.677	79.893	78.906	-72.352	30.182	30.344
470.00	583658.	489.442	80.388	79.514	-71.485	30.324	30.488
490.00	577274.	538.494	80.926	80.156	-70.553	30.468	30.632
492.25	576440.	544.548	80.992	80.235	-70.438	30.486	30.649
510.00	565275.	591.218	81.509	80.835	-69.547	30.613	30.778
530.00	561078.	647.114	82.132	81.545	-68.478	30.756	30.921
550.00	552856.	706.591	82.800	82.296	-67.336	30.895	31.061
570.00	545258.	769.941	83.515	83.089	-66.115	31.029	31.195
590.00	535535.	837.501	84.278	83.927	-64.809	31.157	31.323
610.00	536086.	909.700	85.095	84.813	-63.410	31.274	31.441
622.75	535375.	958.359	85.644	85.405	-62.465	31.344	31.510
630.00	535422.	986.692	85.947	85.726	-61.914	31.380	31.547
632.75	535442.	997.424	86.062	85.847	-61.705	31.393	31.560

TABLE 6B (Cont'd.)
AS-204/IM-1 I/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 2
S-IVF STAGE FLIGHT DATA

FLIGHT TIME (SEC)	VEHICLE ATTITUDE ANGLE		VEHICLE ATTITUDE RATE		VEHICLE ATTITUDE ERROR		
	PITCH (DEG)	YAW (DEG)	PITCH (DEG/S)	YAW (DEG/S)	PITCH (DEG)	YAW (DEG)	ROLL (DEG)
160.07	-59.268	-0.293	0.006	-0.011	0.167	-0.292	0.018
161.39	-59.282	-0.349	-0.024	-0.074	0.153	-0.349	0.024
163.74	-59.371	-0.640	-0.059	-0.149	0.063	-0.640	0.037
164.69	-59.448	-0.735	-0.098	-0.037	-0.014	-0.735	0.050
164.65	-59.448	-0.735	-0.098	-0.037	-0.014	-0.735	0.050
167.39	-59.642	-0.582	-0.024	0.073	-0.207	-0.582	0.114
170.00	-59.637	-0.492	0.002	0.004	-0.202	-0.492	0.170
171.95	-59.622	-0.498	0.002	-0.005	-0.188	-0.498	0.221
175.75	-59.629	-0.505	-0.002	0.000	-0.194	-0.505	0.242
190.00	-59.406	0.546	-0.094	0.014	-0.066	-0.527	0.447
210.00	-61.158	1.405	-0.067	0.026	-0.116	-0.561	-0.467
230.00	-62.611	1.698	-0.044	0.010	-0.191	-0.552	-0.092
250.00	-64.089	1.862	-0.079	0.008	-0.116	-0.569	0.531
270.00	-65.525	2.023	-0.078	0.008	-0.118	-0.590	-0.439
290.00	-67.188	2.189	-0.057	0.008	-0.144	-0.611	0.004
310.00	-69.000	1.856	-0.045	0.142	-0.489	-1.469	0.186
330.00	-70.531	2.529	-0.108	0.011	-0.397	-1.295	-0.547
350.00	-72.228	2.706	-0.082	0.006	-0.447	-1.329	0.371
370.00	-74.095	2.852	-0.096	0.008	-0.449	-1.382	0.041
390.00	-75.893	2.006	-0.039	0.008	-0.480	-1.425	-0.442
410.00	-77.737	3.154	-0.096	0.007	-0.495	-1.468	0.297
430.00	-79.747	3.296	-0.102	0.007	-0.508	-1.515	0.076
450.00	-81.753	3.436	-0.096	0.006	-0.540	-1.568	-0.300
470.00	-83.706	3.565	-0.107	0.005	-0.550	-1.622	0.690
490.00	-85.759	3.703	-0.080	0.006	-0.629	-1.678	-0.390
492.25	-85.936	3.718	-0.074	0.007	-0.625	-1.690	-0.525
510.00	-87.570	3.853	-0.108	0.005	-0.591	-1.722	0.546
530.00	-88.862	4.028	-0.043	0.006	-0.658	-1.771	-0.282
550.00	-91.334	4.110	-0.114	0.006	-0.632	-1.819	-0.449
570.00	-93.639	4.187	-0.130	0.002	-0.623	-1.860	0.469
590.00	-96.550	4.216	-0.154	0.002	-0.612	-1.905	-0.480
610.00	-101.057	4.187	-0.728	-0.009	-0.035	-1.939	-0.031
622.75	-100.390	4.210	-0.001	-0.001	-0.869	-1.957	0.732
630.00	-100.394	4.204	-0.002	-0.001	-0.863	-1.963	0.908
632.75	-100.398	4.202	-0.001	-0.001	-0.867	-1.965	0.936

FIGURE 1B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ALTITUDE HISTORY

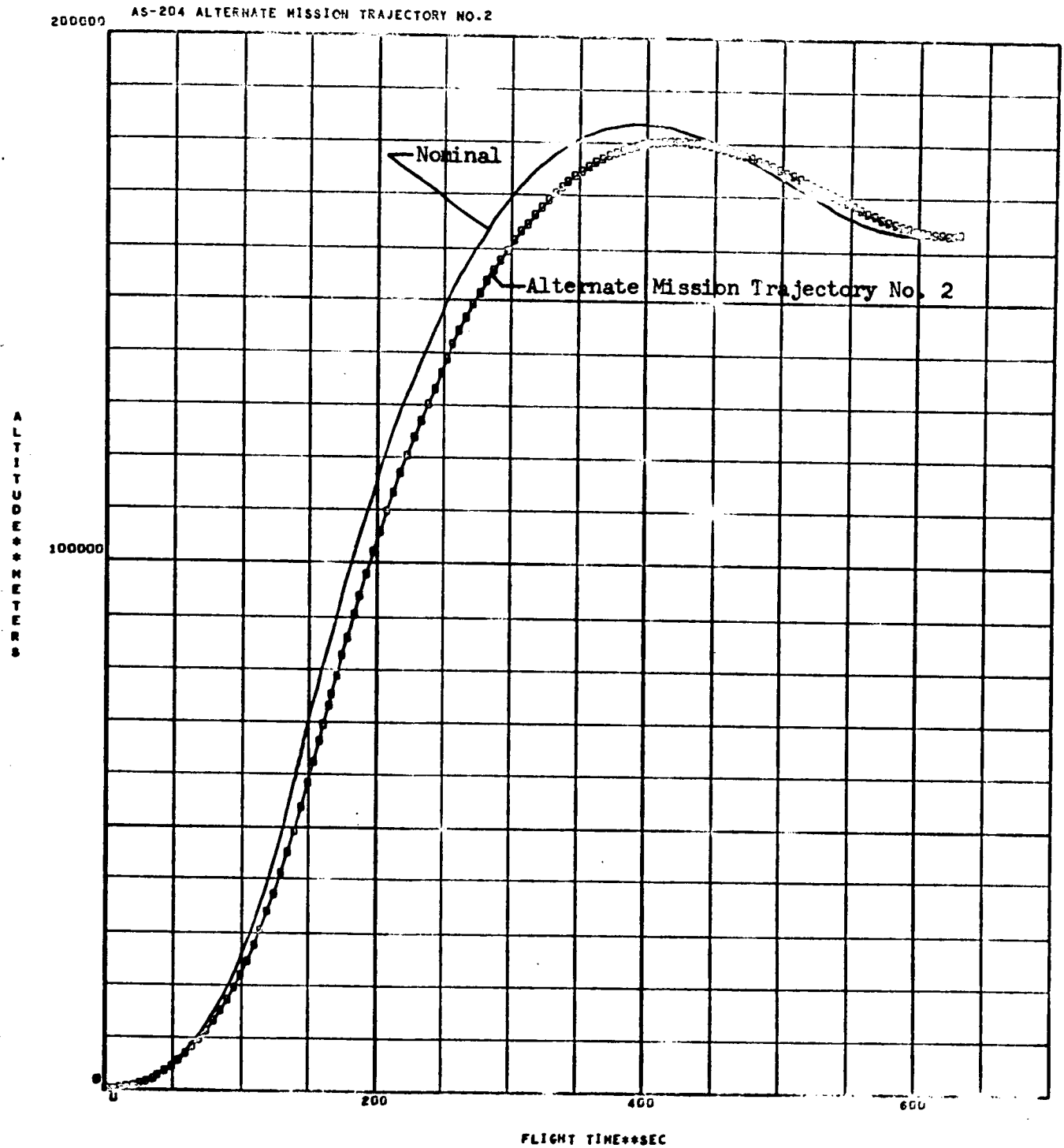


FIGURE 2B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
GROUND RANGE HISTORY

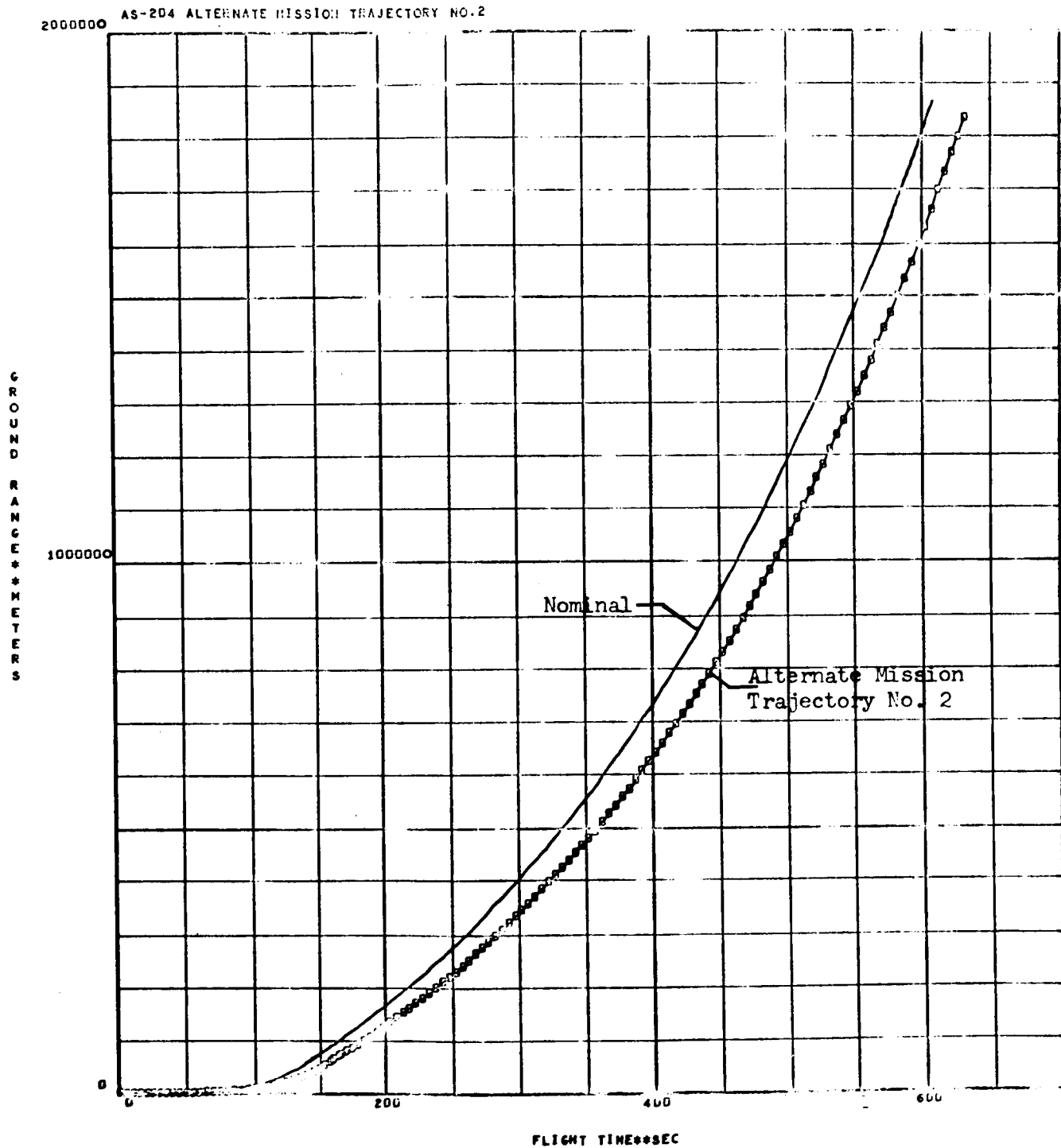


FIGURE 3B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
SPACE FIXED VELOCITY HISTORY

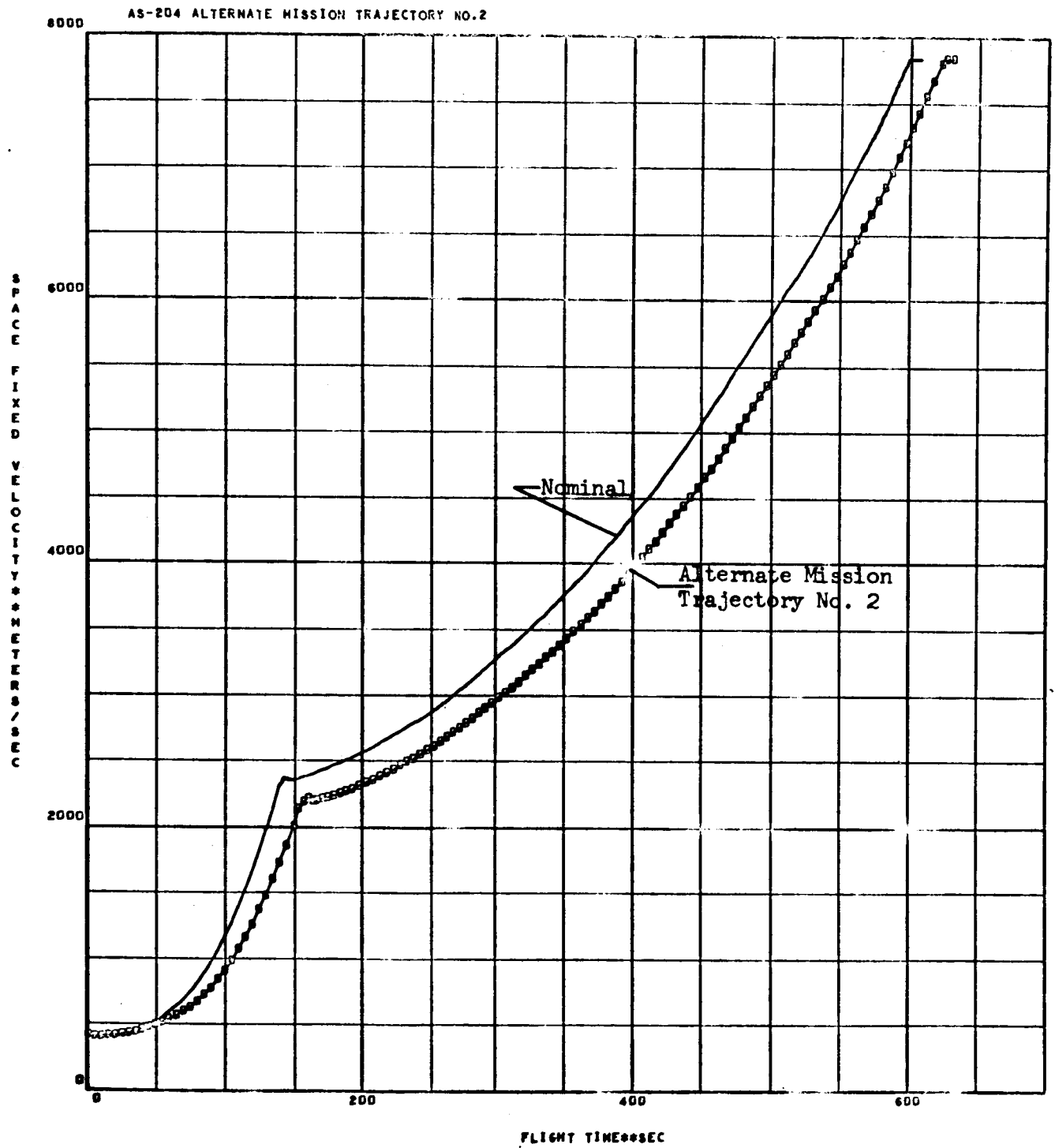


FIGURE 4B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
SPACE FIXED PATH ANGLE HISTORY

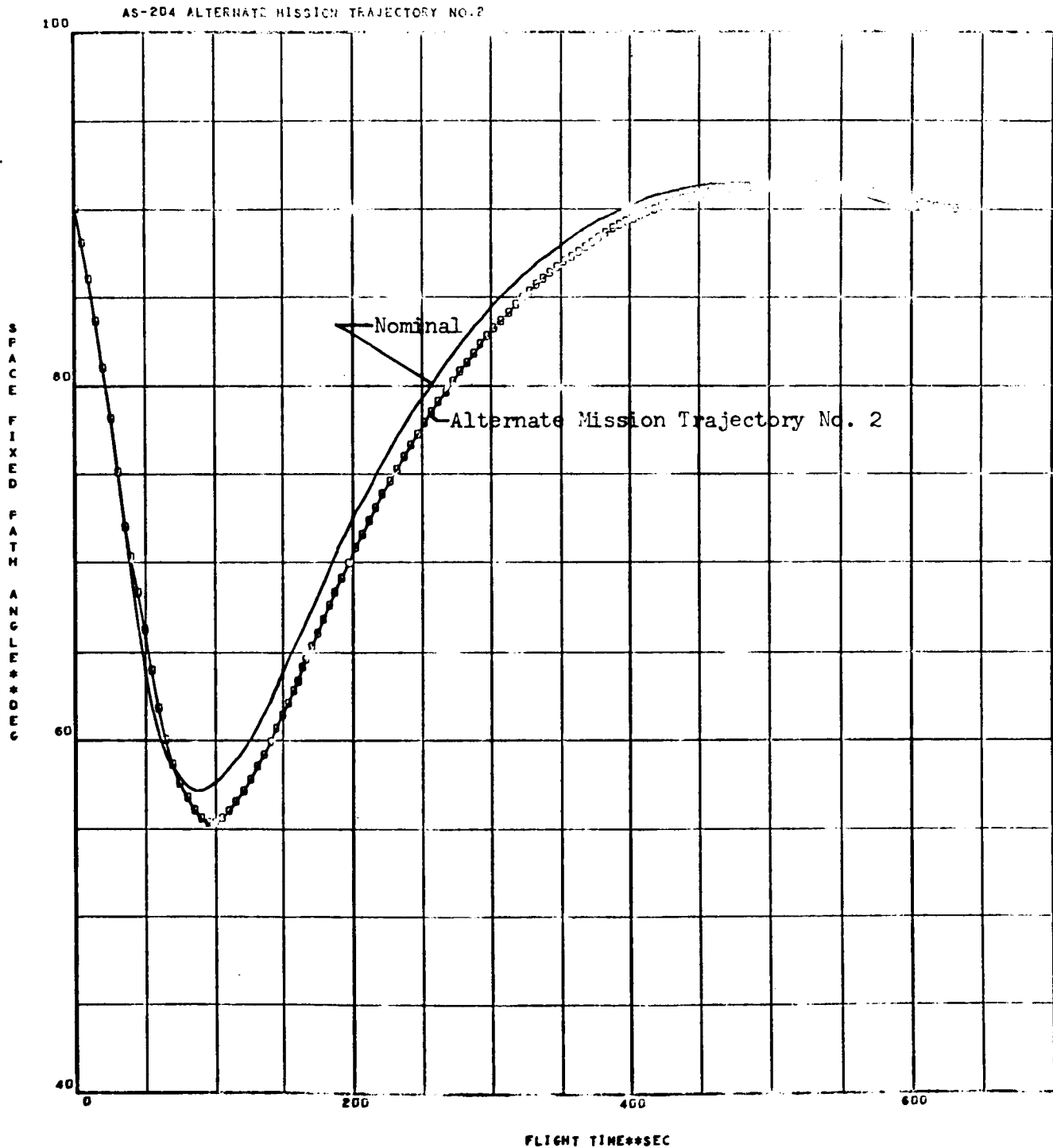


FIGURE 5B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
SPACE FIXED AZIMUTH HISTORY

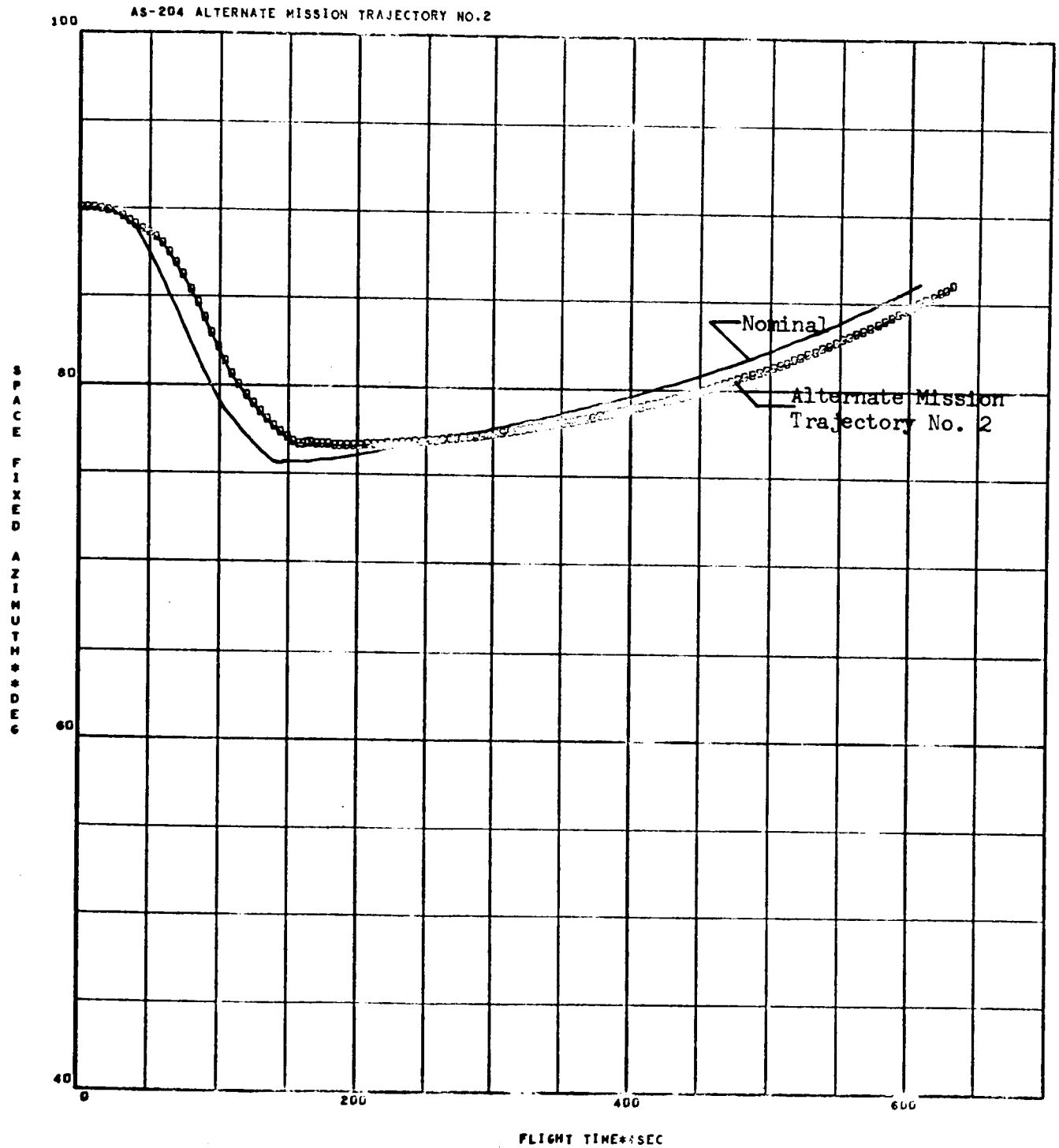


FIGURE 6B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
TRAJECTORY PROFILE

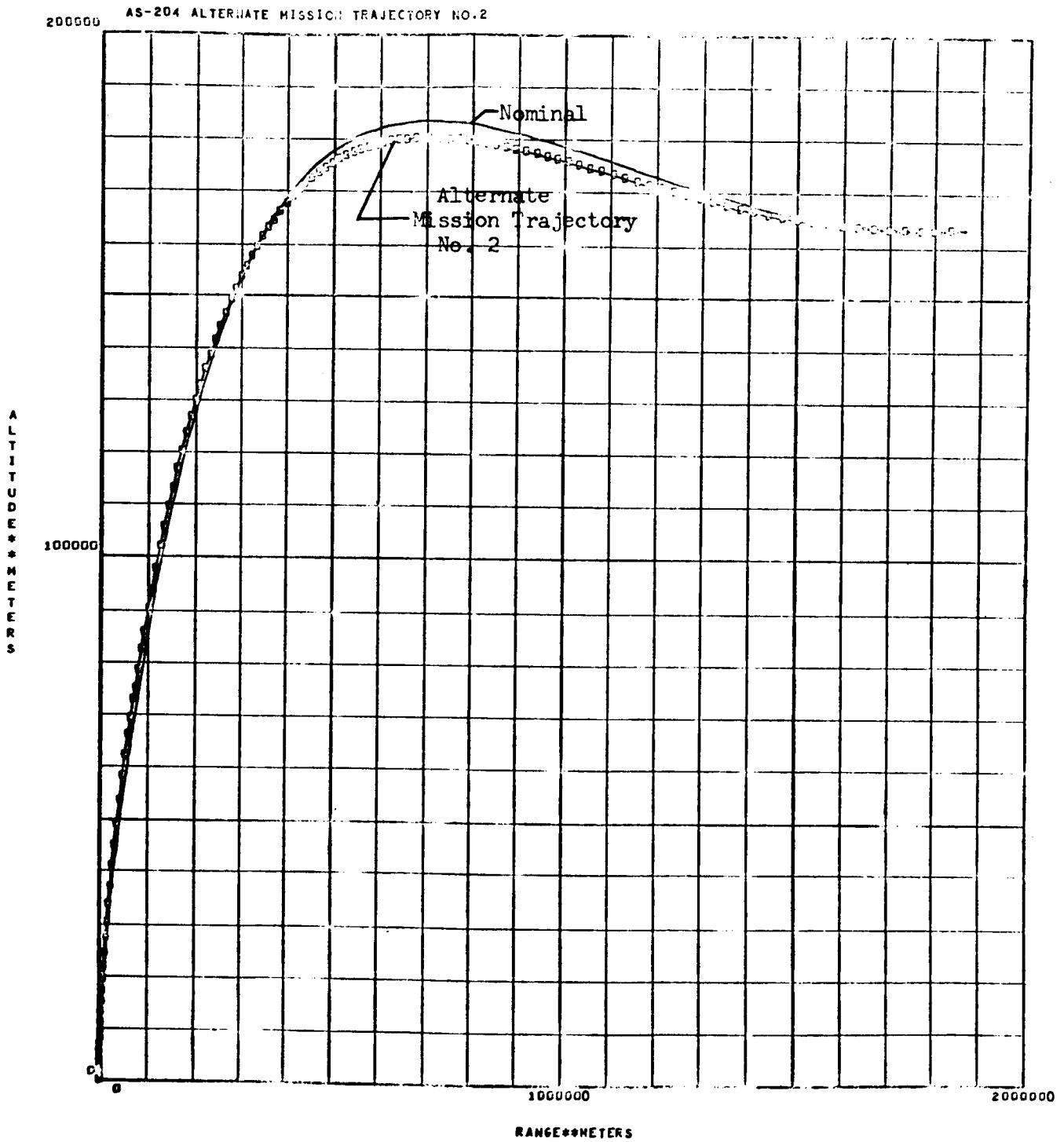


FIGURE 7B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ANGLE OF ATTACK
S-IB STAGE

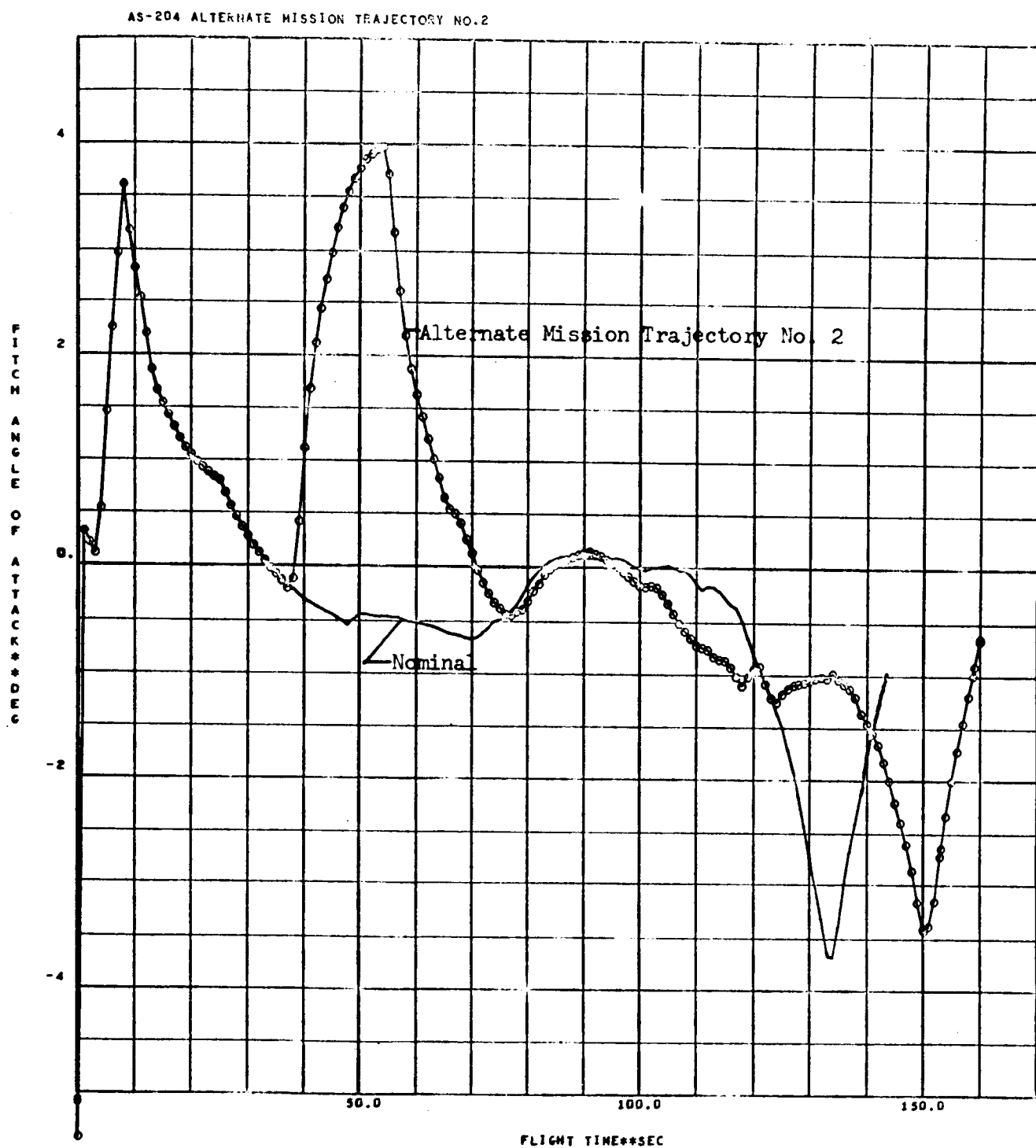


FIGURE 8B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ANGLE OF ATTACK HISTORY
S-IB STAGE

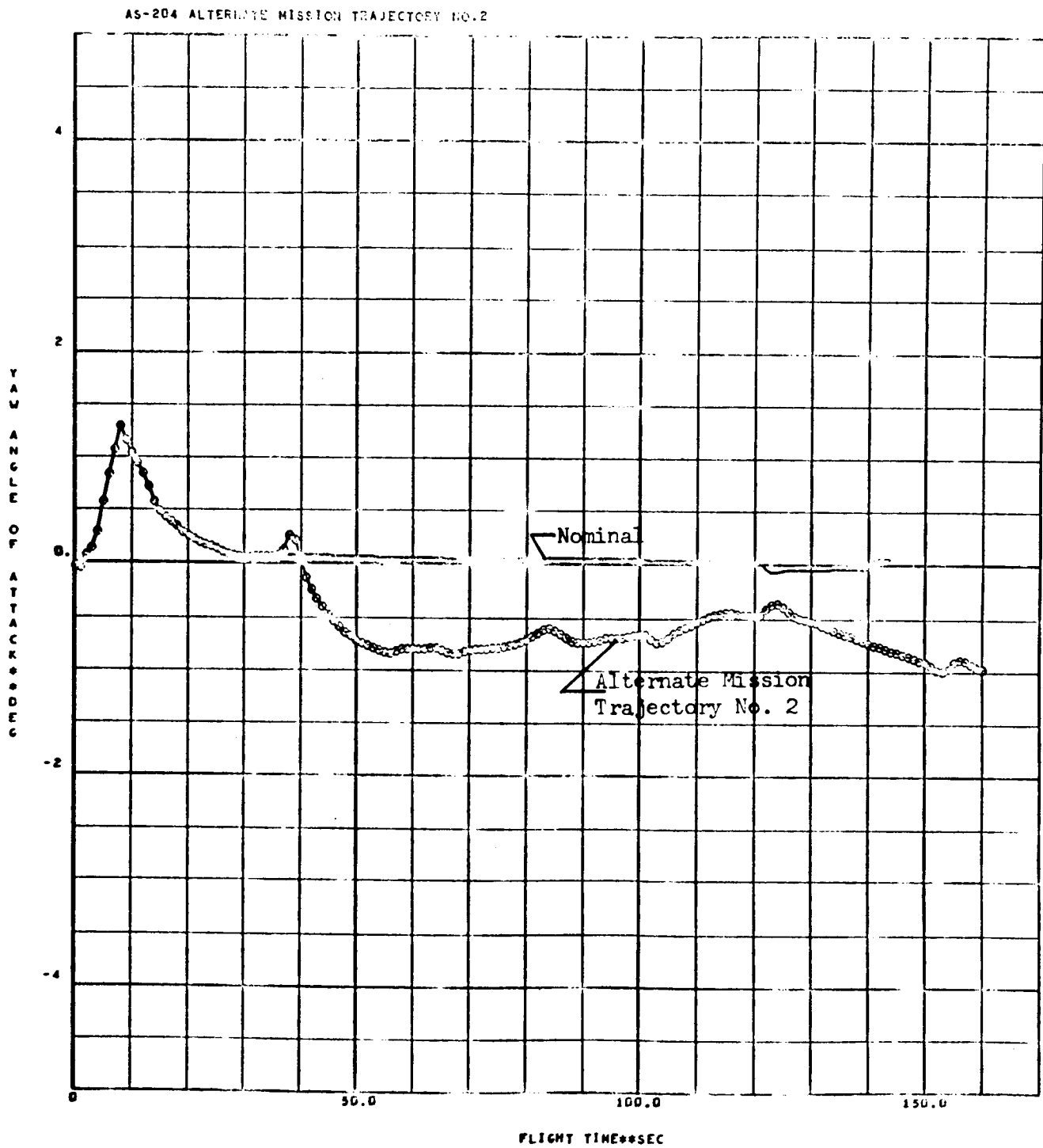


FIGURE 9B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
DYNAMIC PRESSURE HISTORY
S-IB STAGE

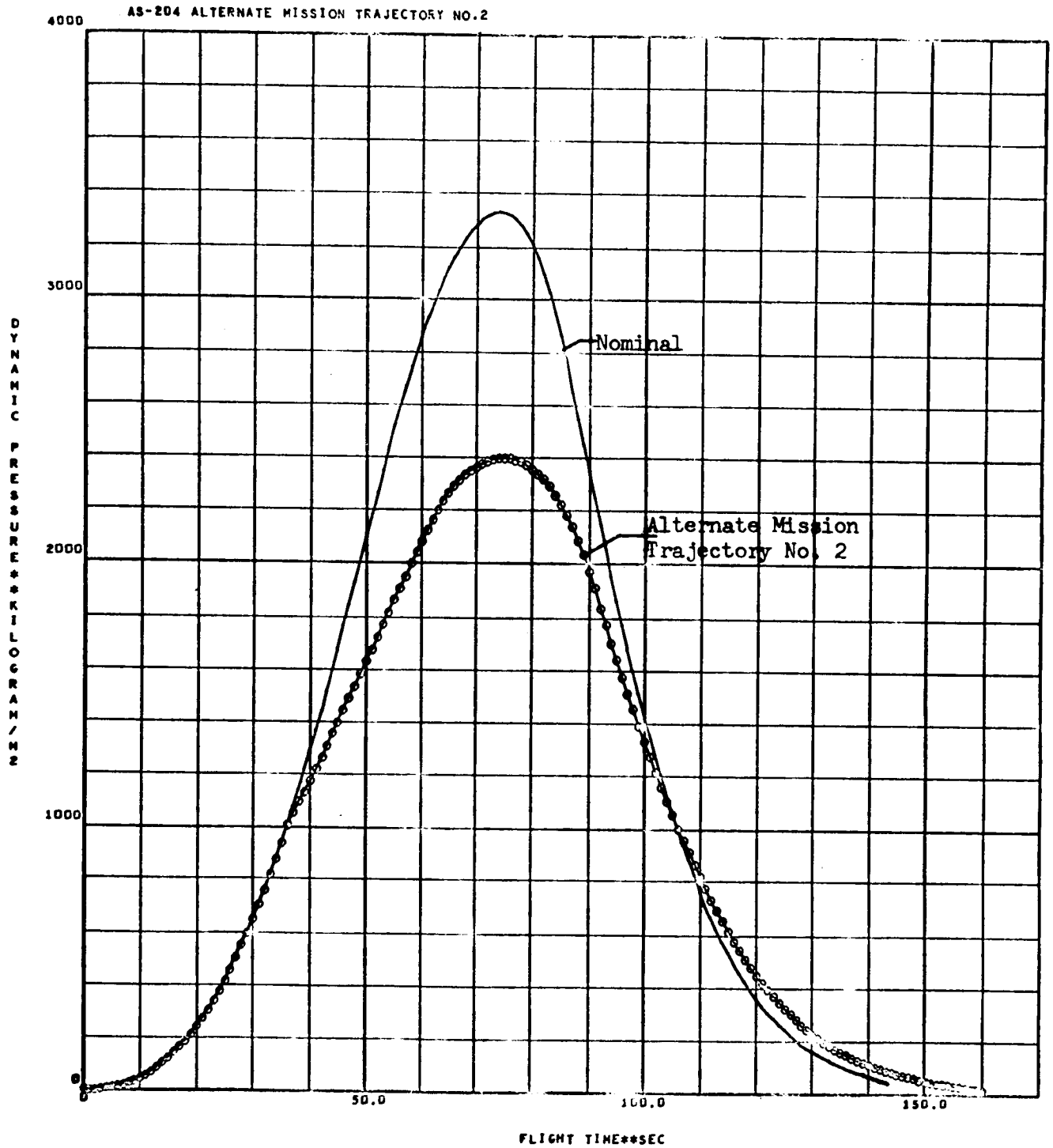


FIGURE 10B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
AERODYNAMIC LOADING INDICATOR HISTORY
S-1B STAGE

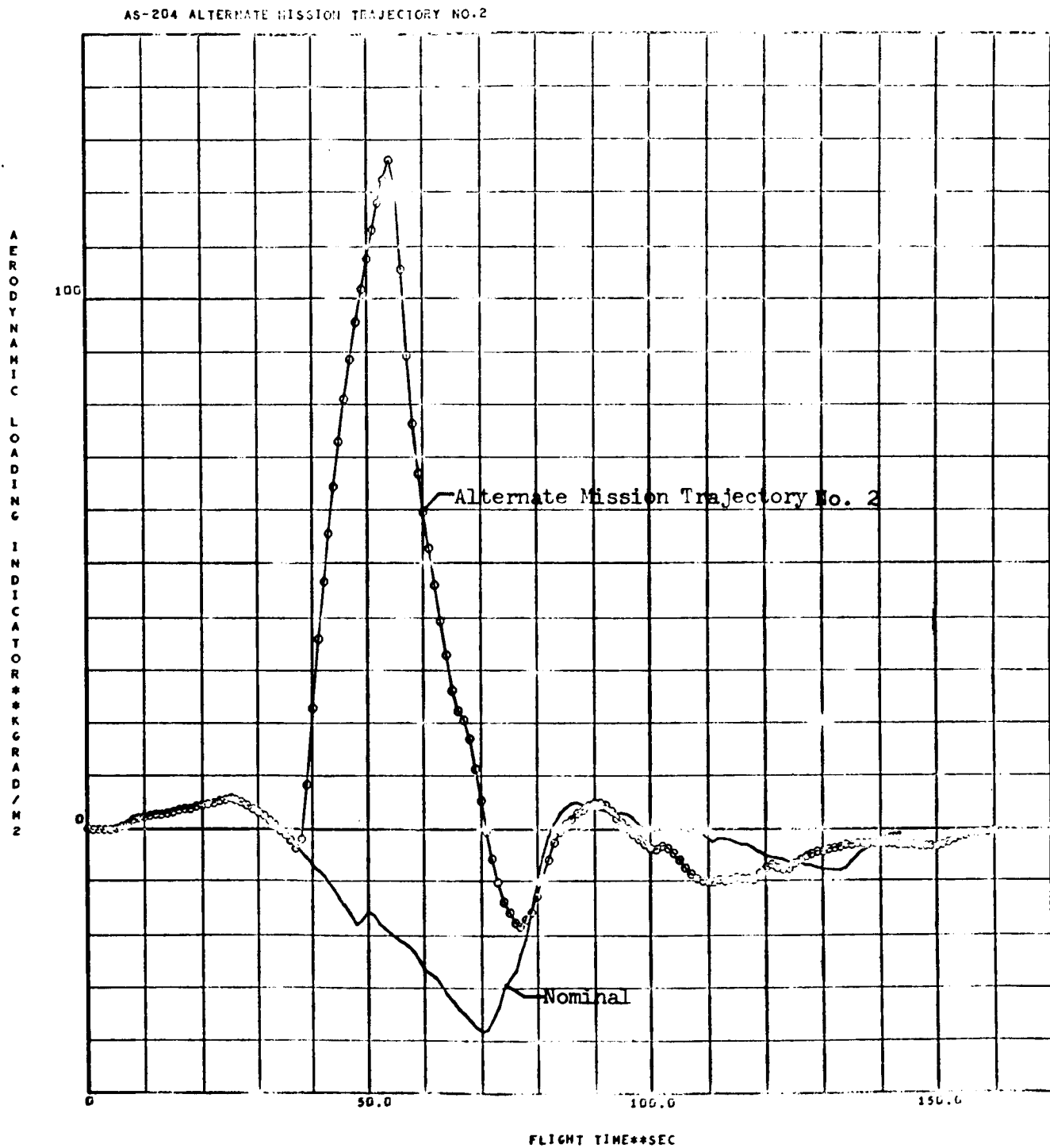


FIGURE 11B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
MACH NUMBER HISTORY
S-IB STAGE

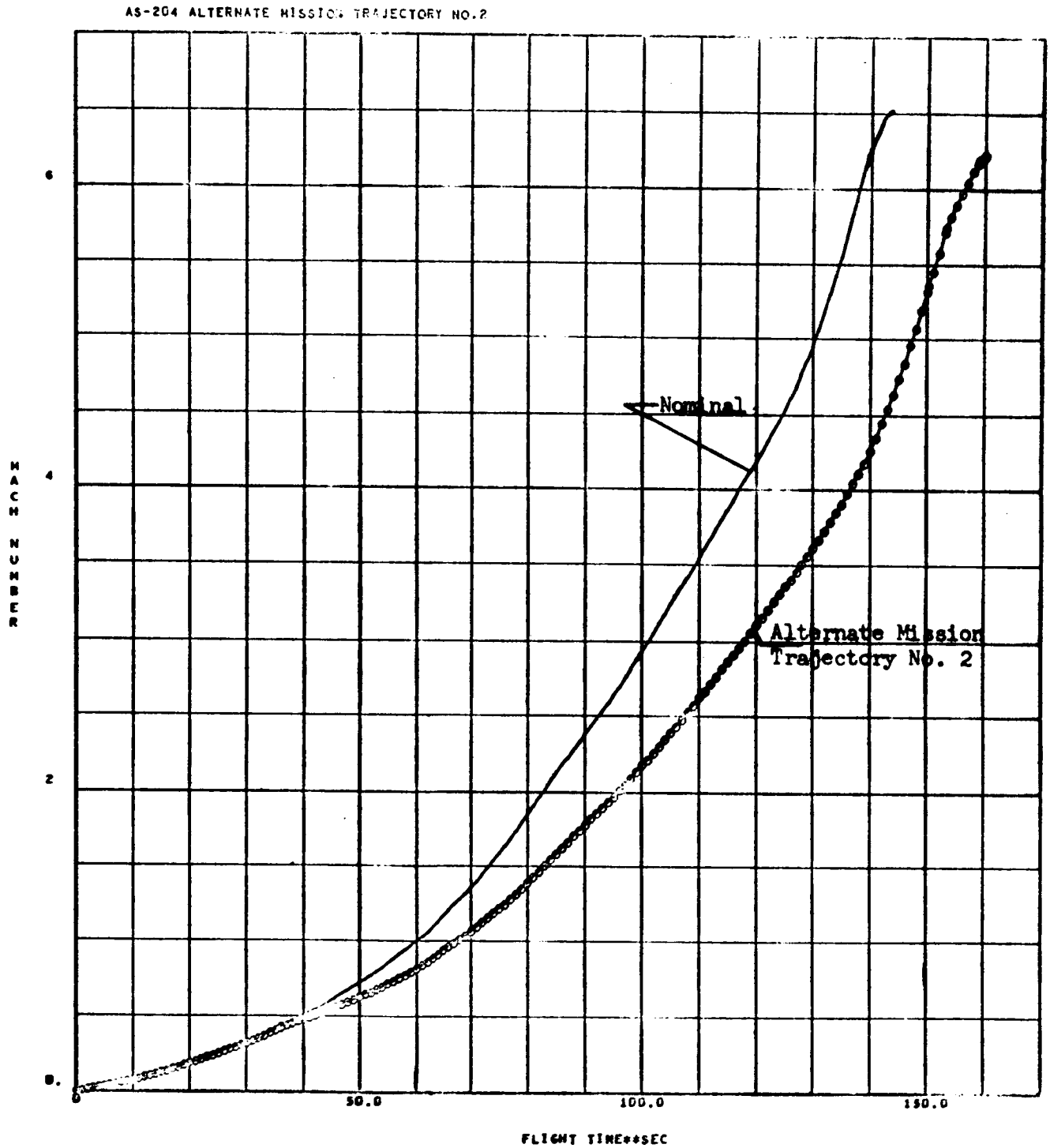


FIGURE 12B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
LONGITUDINAL ACCELERATION HISTORY
S-IB STAGE

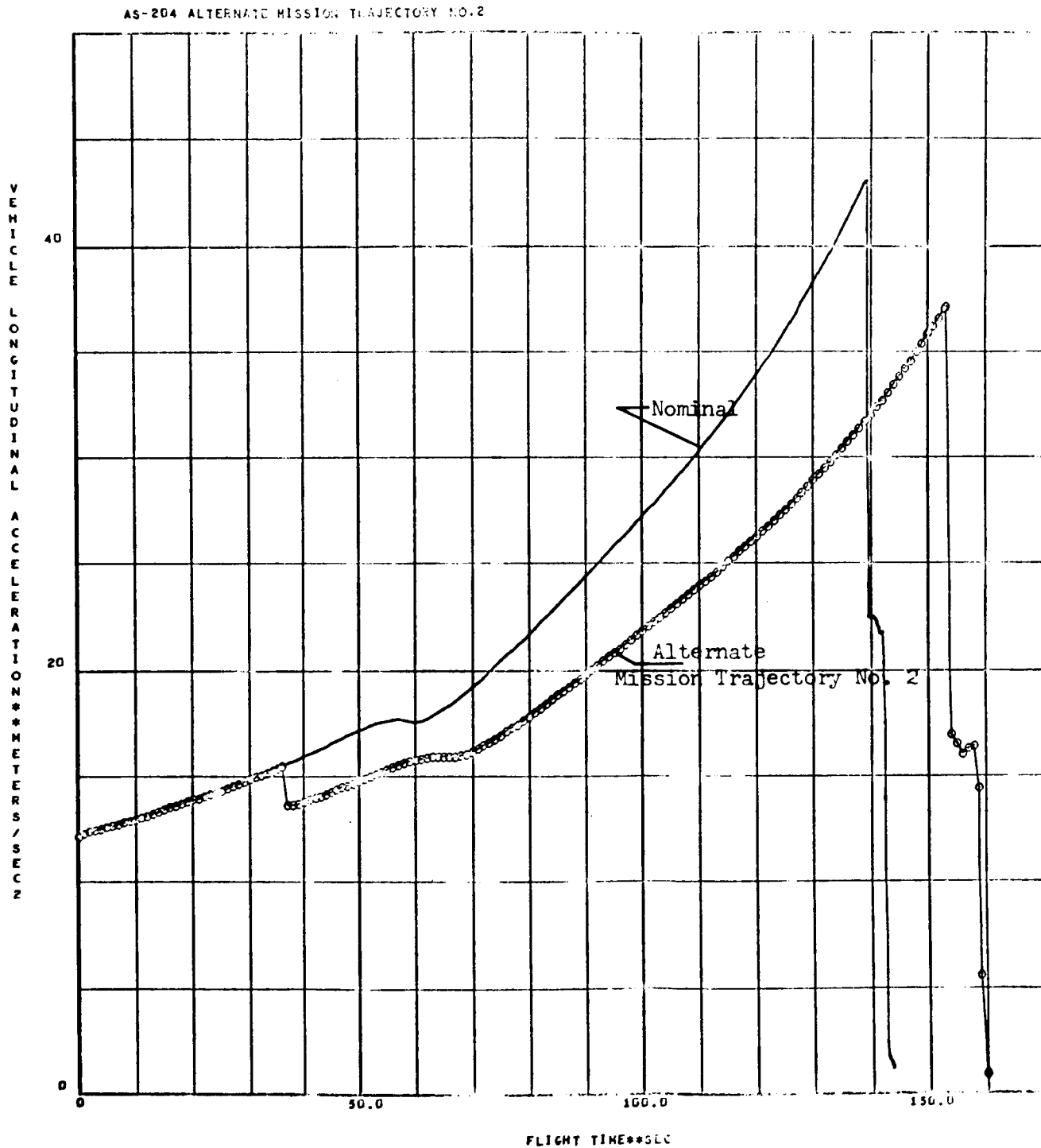


FIGURE 13 B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE COMMAND HISTORY
S-IB STAGE

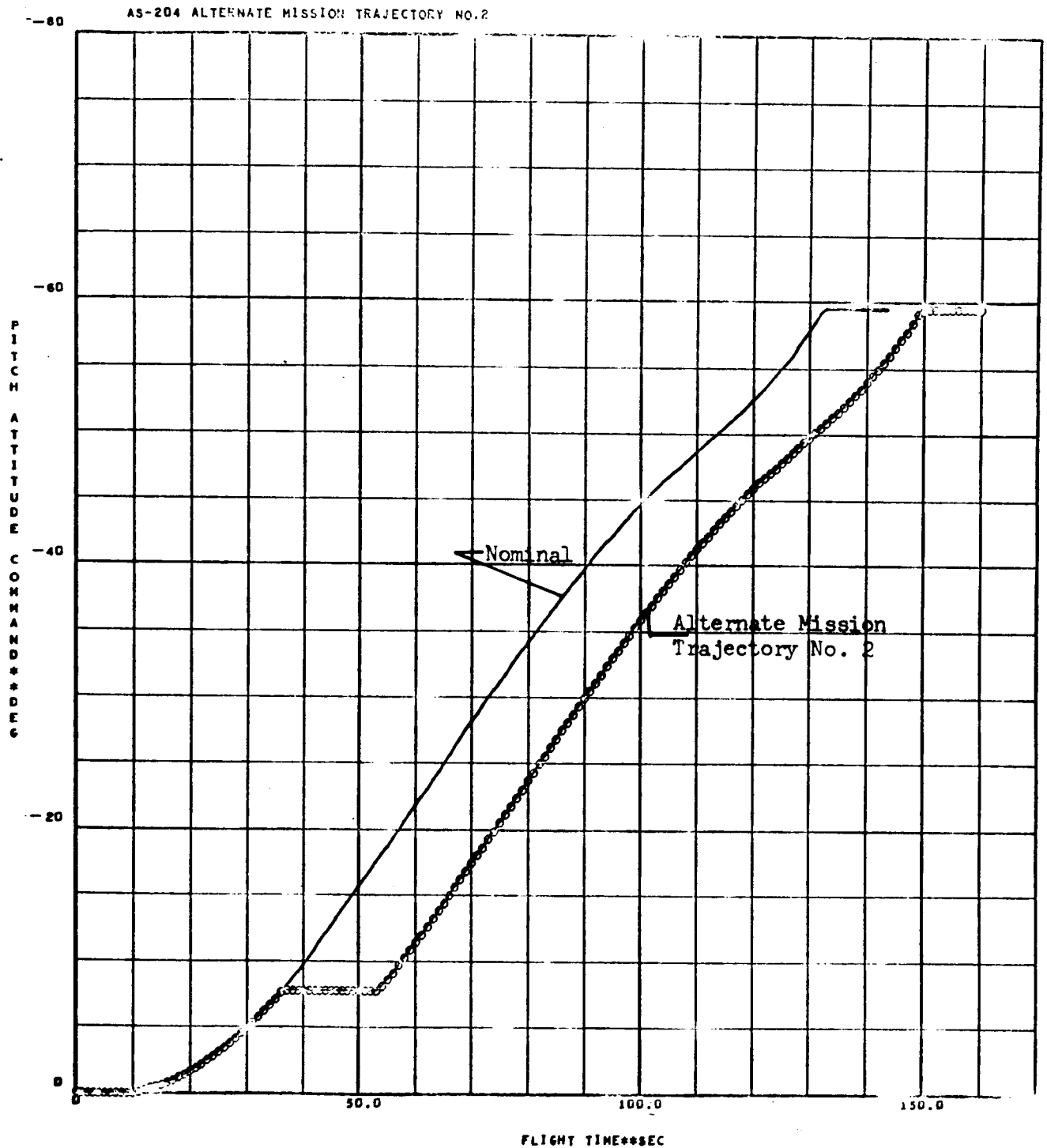


FIGURE 14B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE COMMAND RATE HISTORY
S-IB STAGE

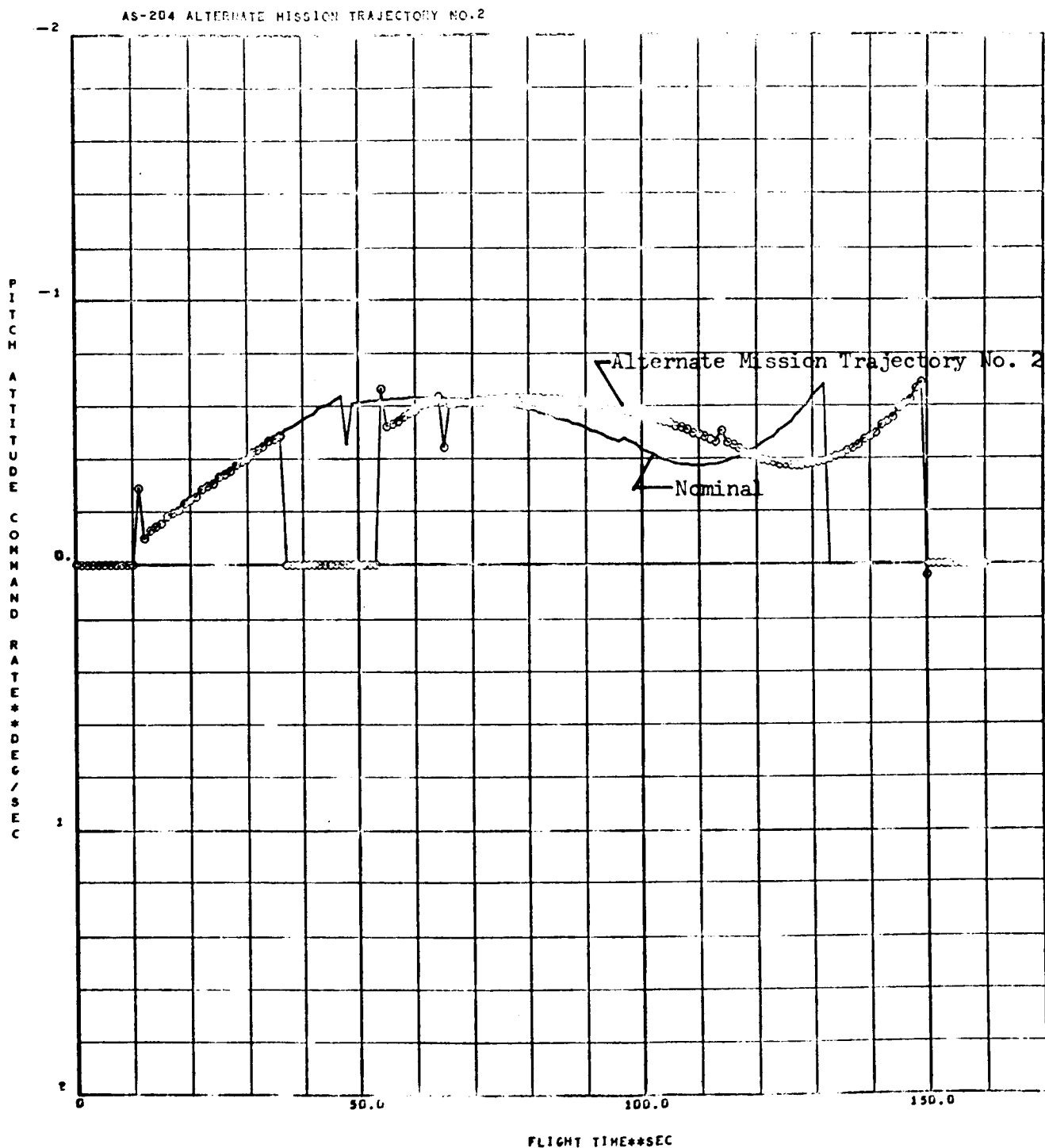


FIGURE 15B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE ERROR HISTORY
S-1B STAGE

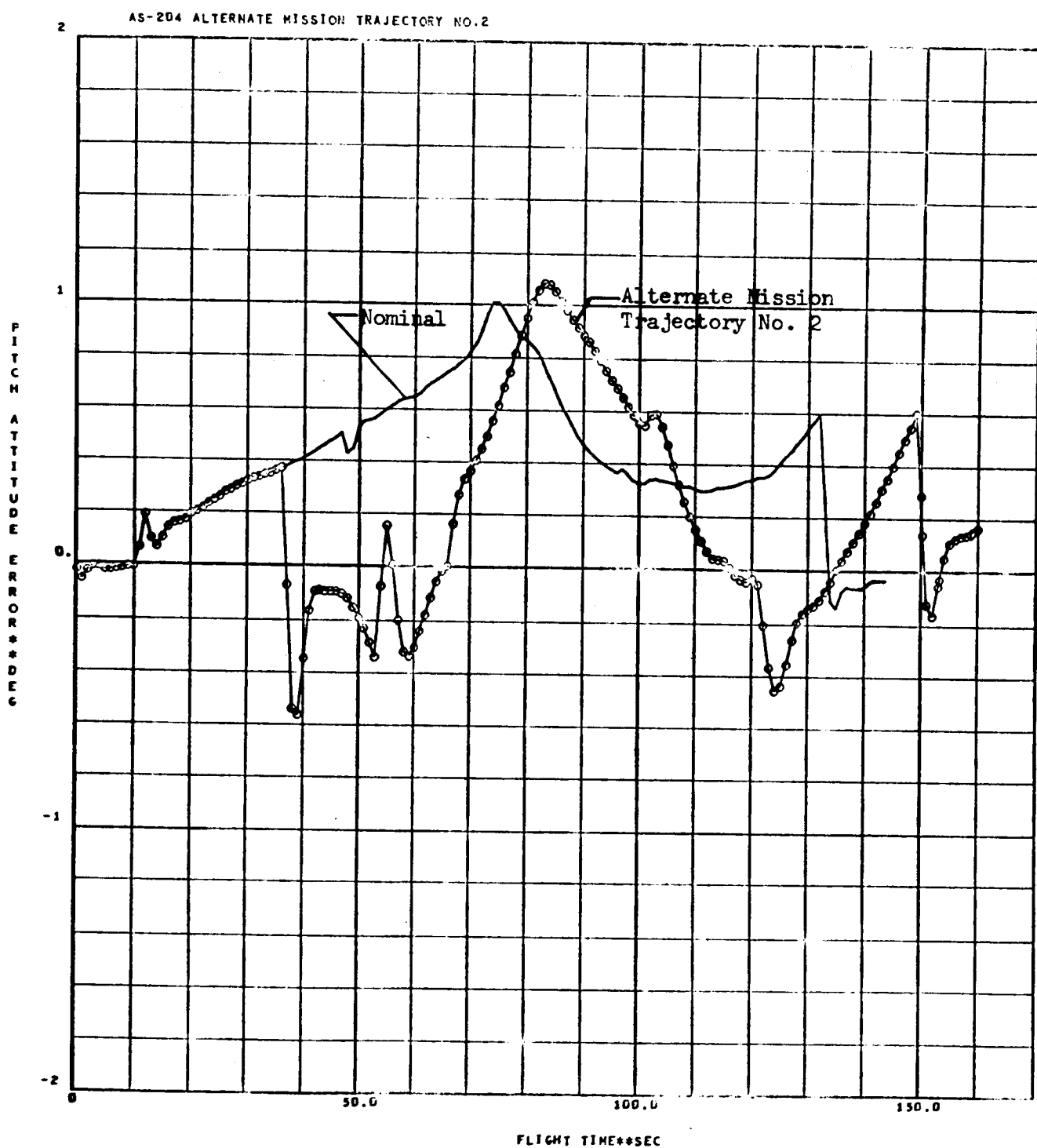


FIGURE 16 B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ATTITUDE ERROR HISTORY
S-IB STAGE

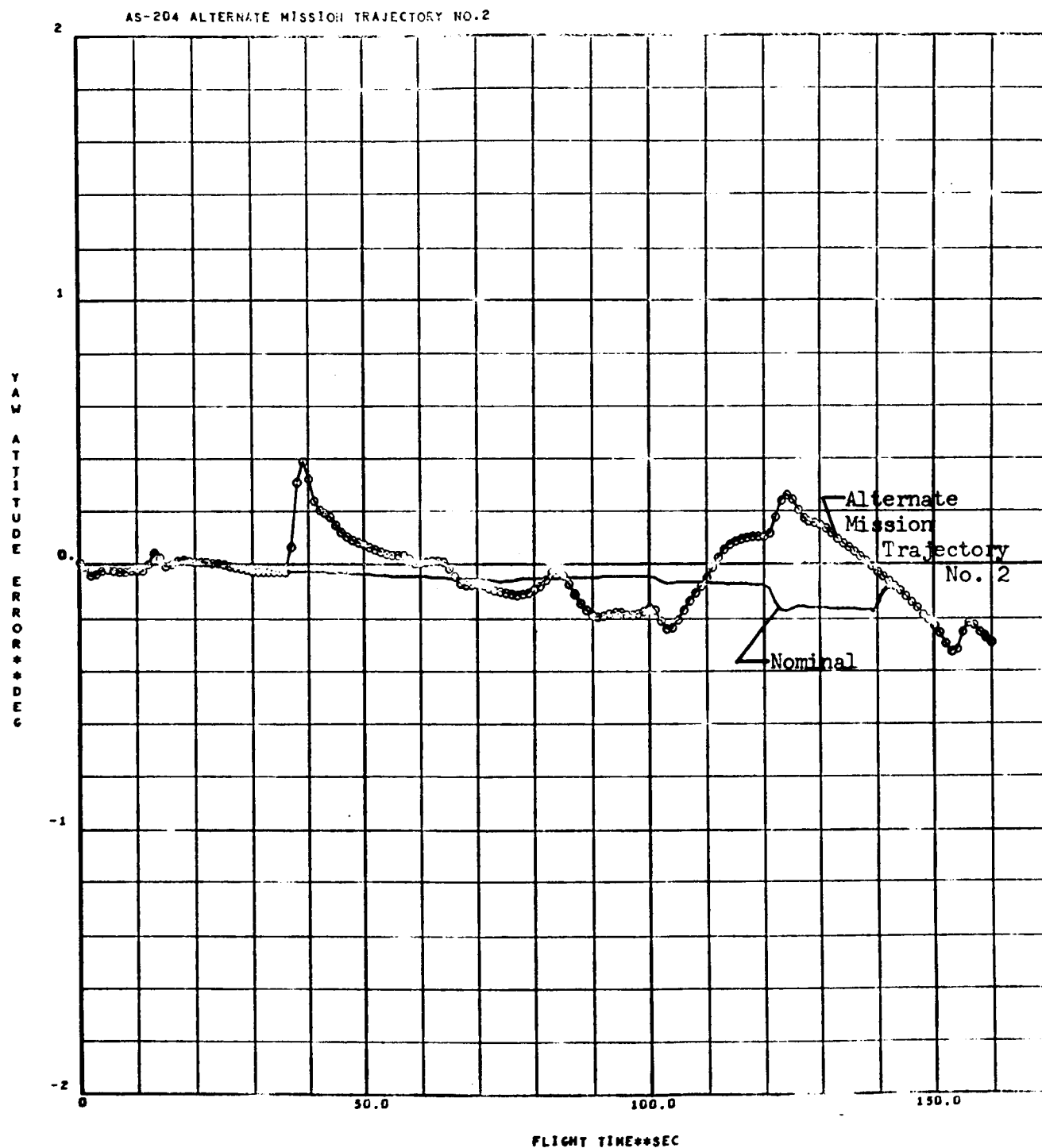


FIGURE 17B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ROLL ATTITUDE ERROR HISTORY
S-IB STAGE

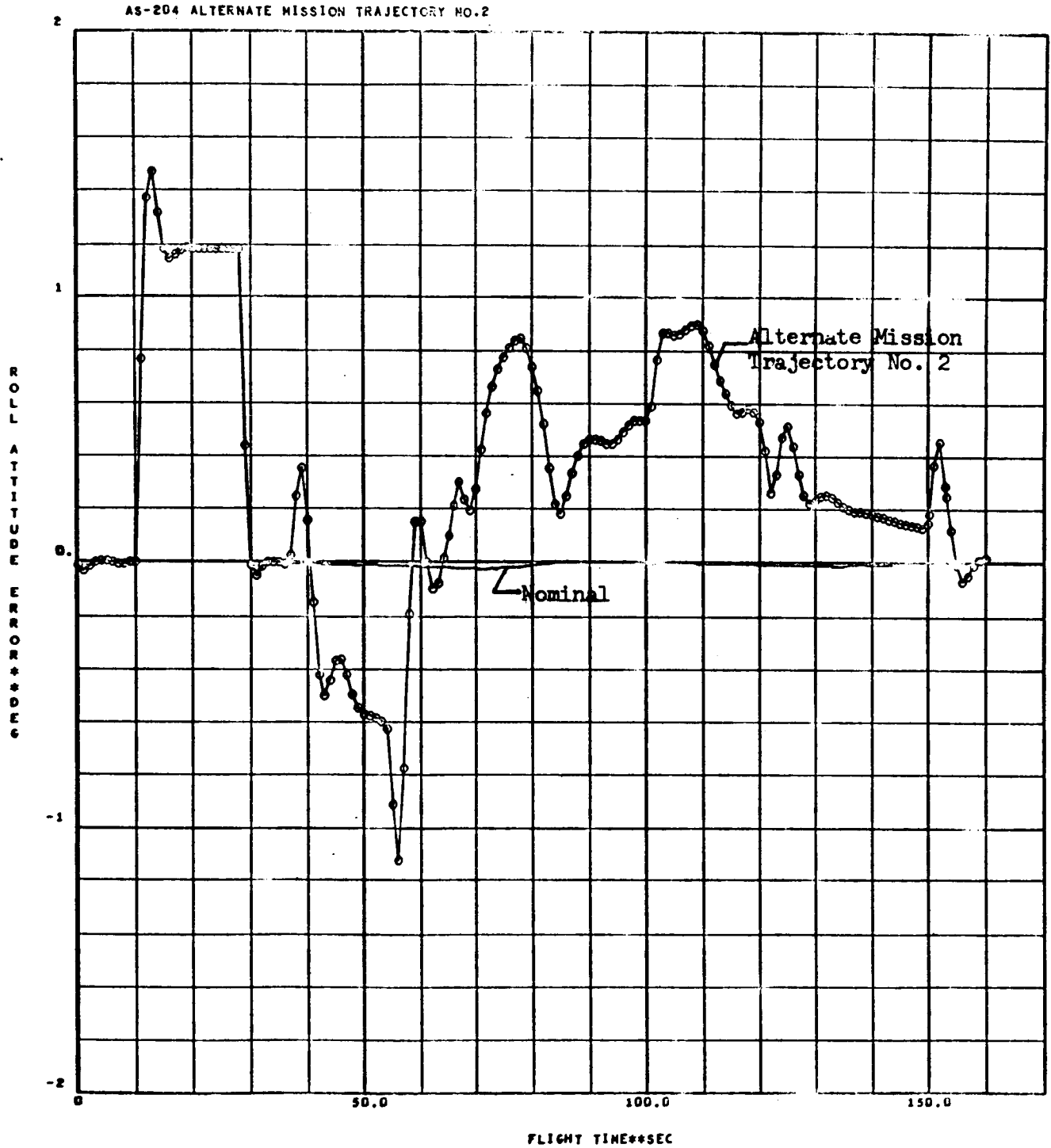


FIGURE 18B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE HISTORY
S-IB STAGE

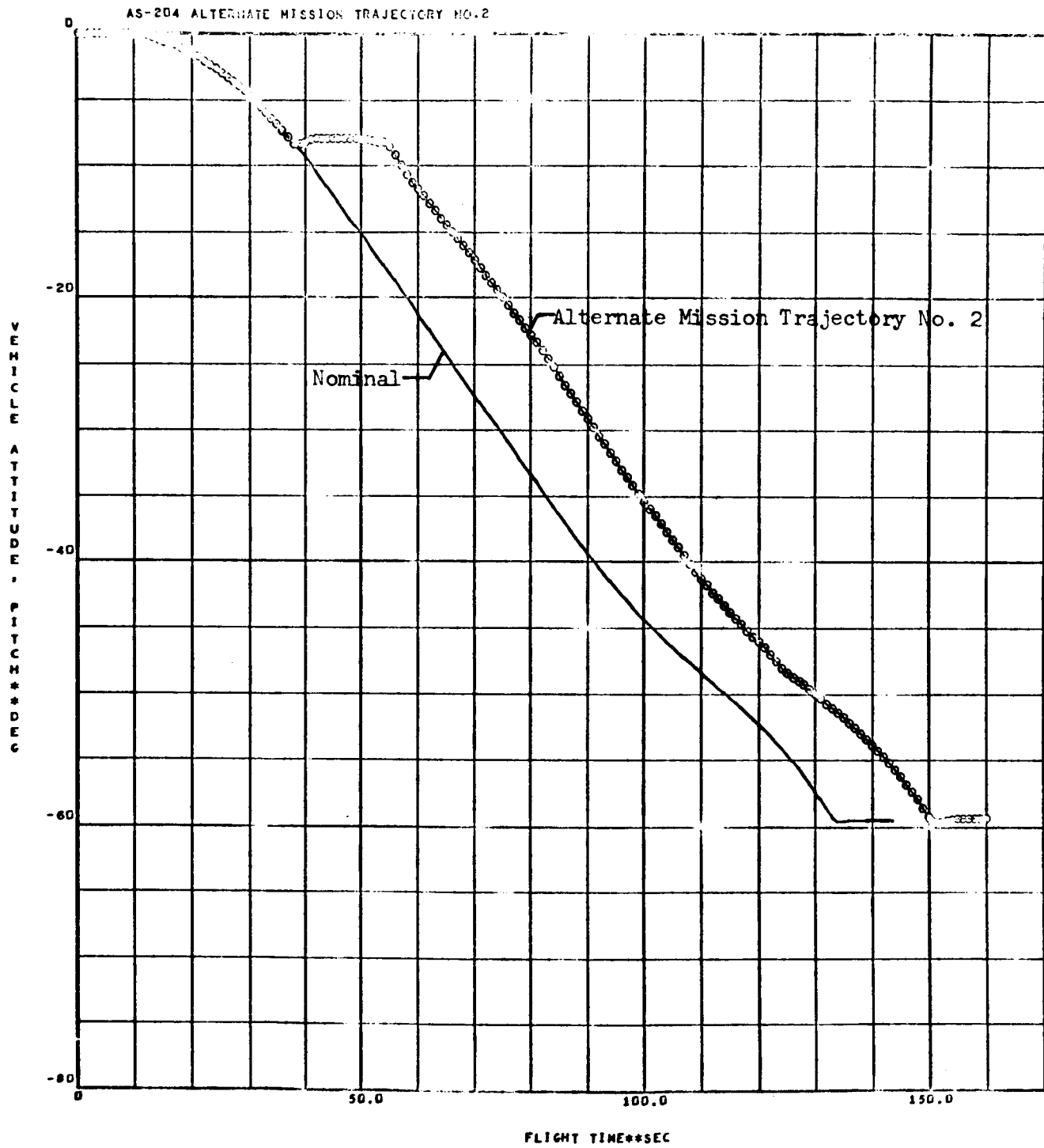


FIGURE 19B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ATTITUDE HISTORY
S-IB STAGE

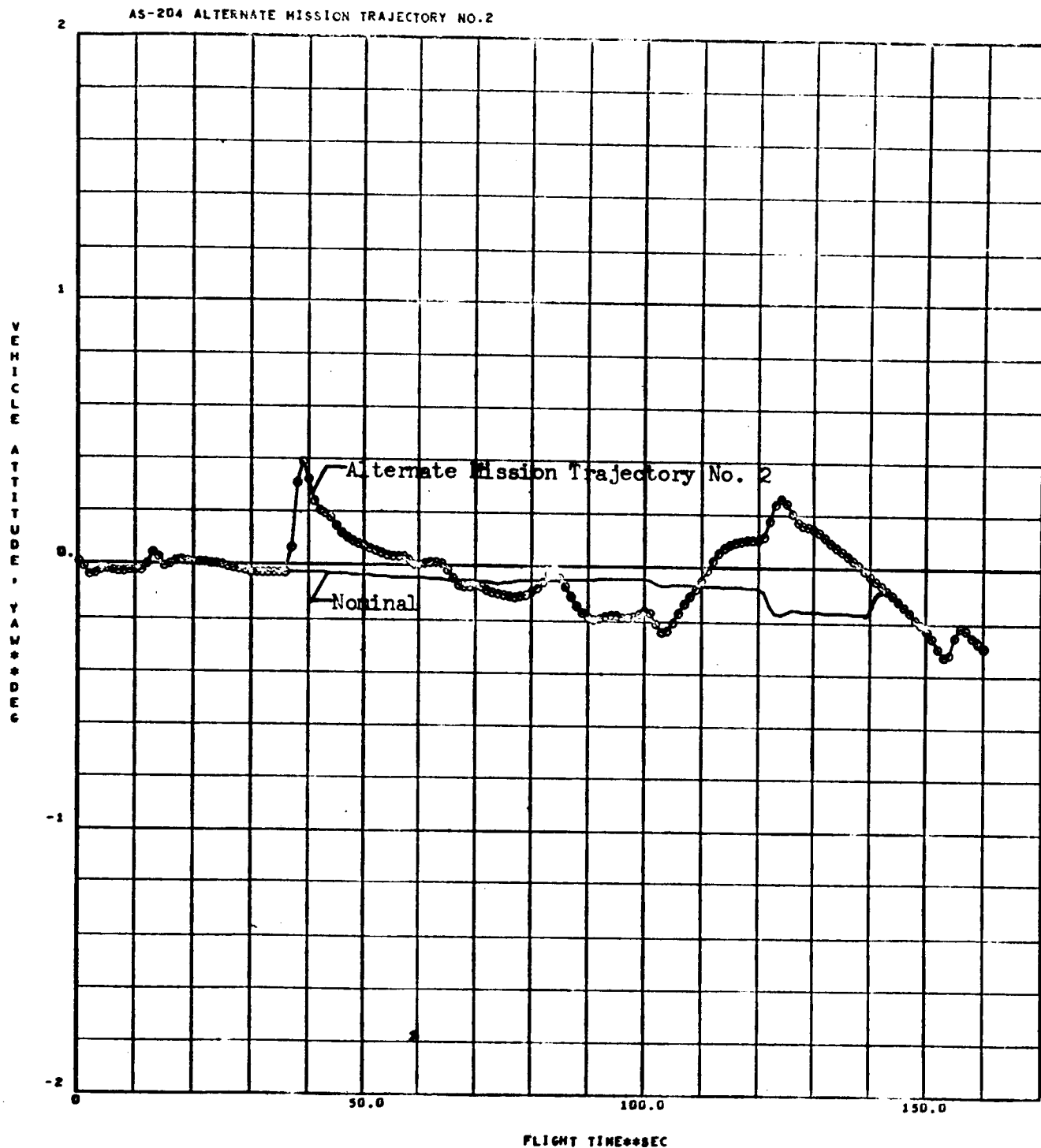


FIGURE 20B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY
ROLL ATTITUDE HISTORY
S-1B STAGE

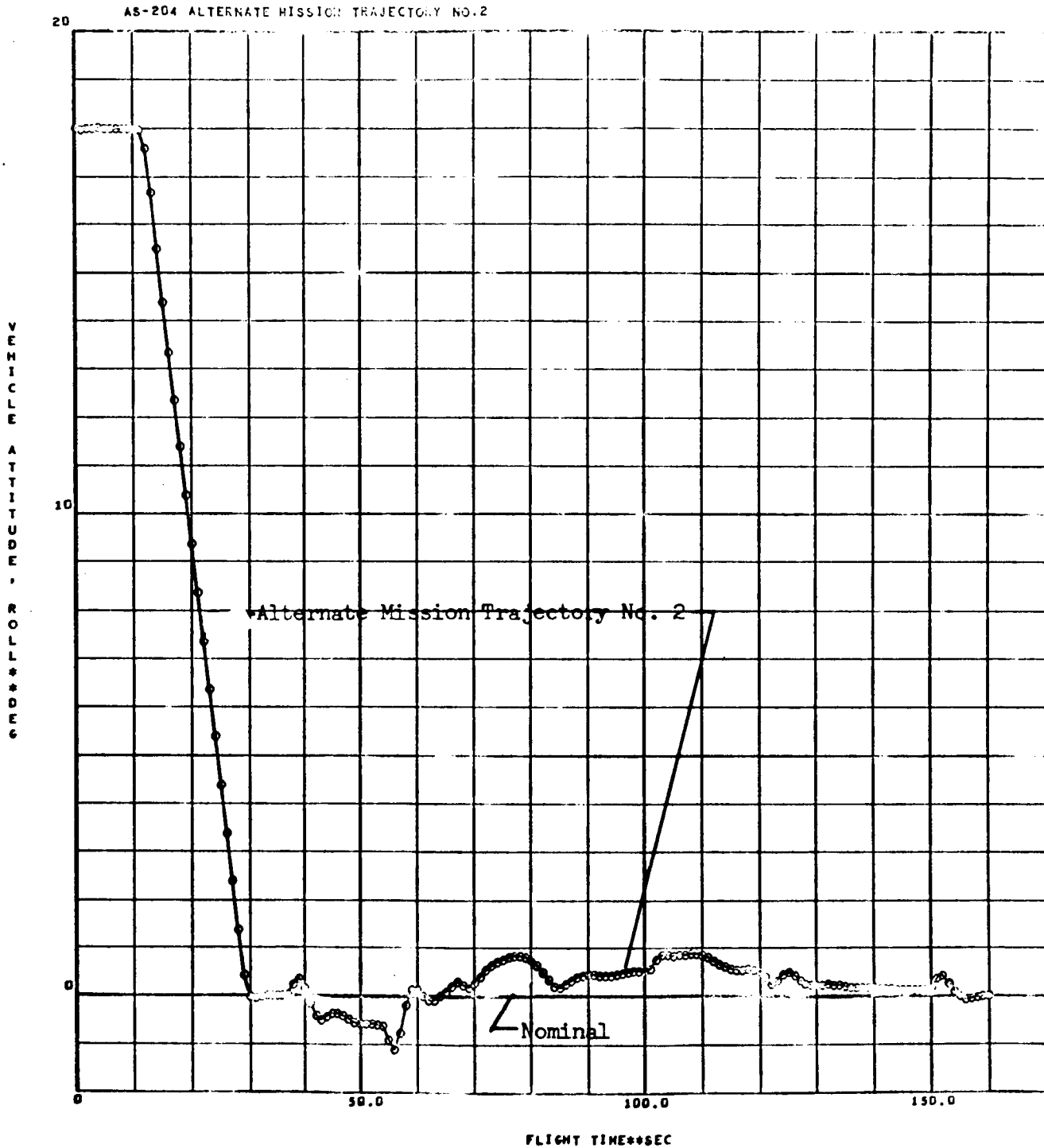


FIGURE 21B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE RATE HISTORY
S-IB STAGE

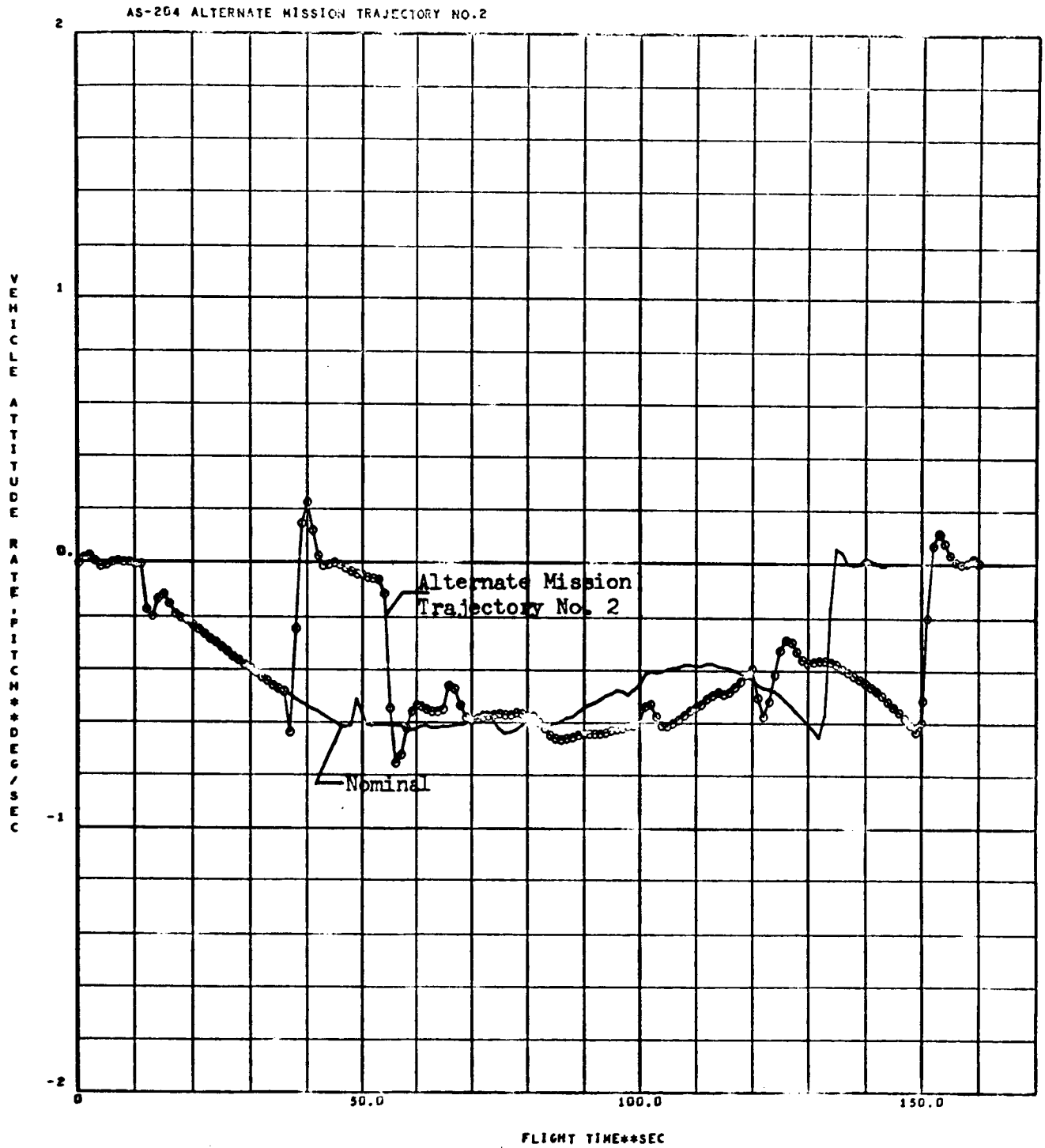


FIGURE 22B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ATTITUDE RATE HISTORY
S-IB STAGE

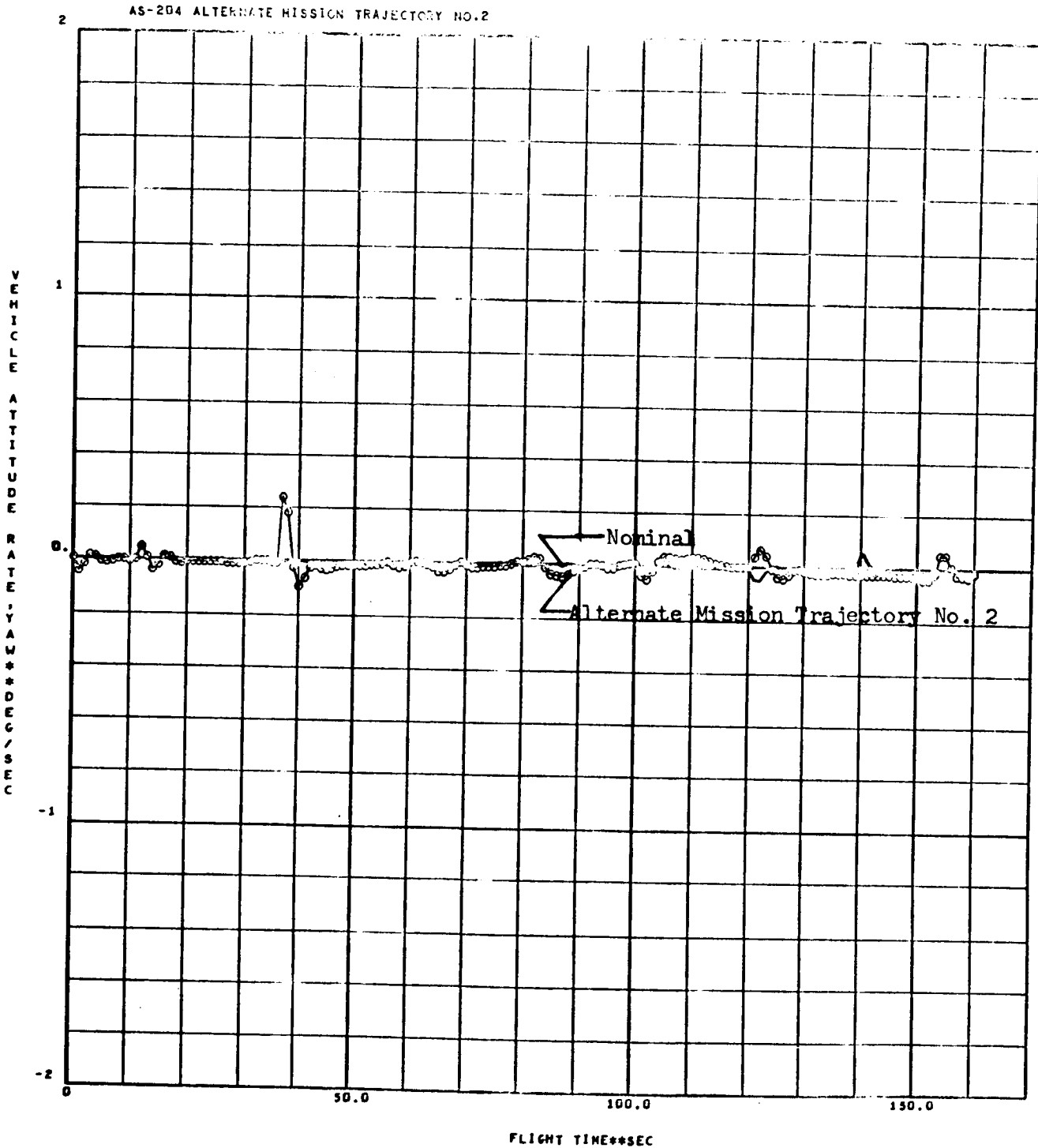


FIGURE 23B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ROLL ATTITUDE RATE HISTORY
S-1B STAGE

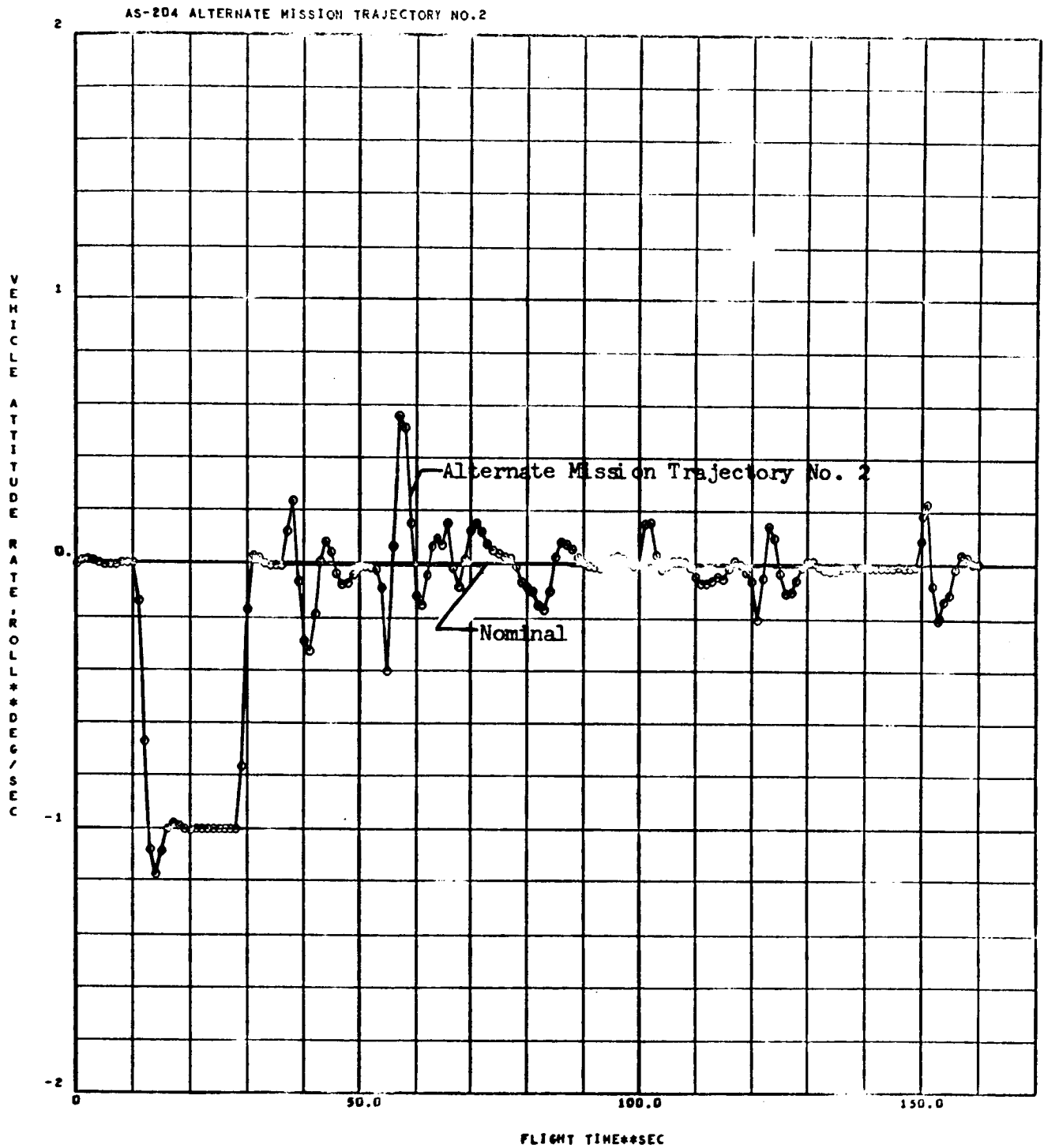


FIGURE 24B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH DEFLECTION HISTORY, ENGINES 1 AND 2
S-IB STAGE

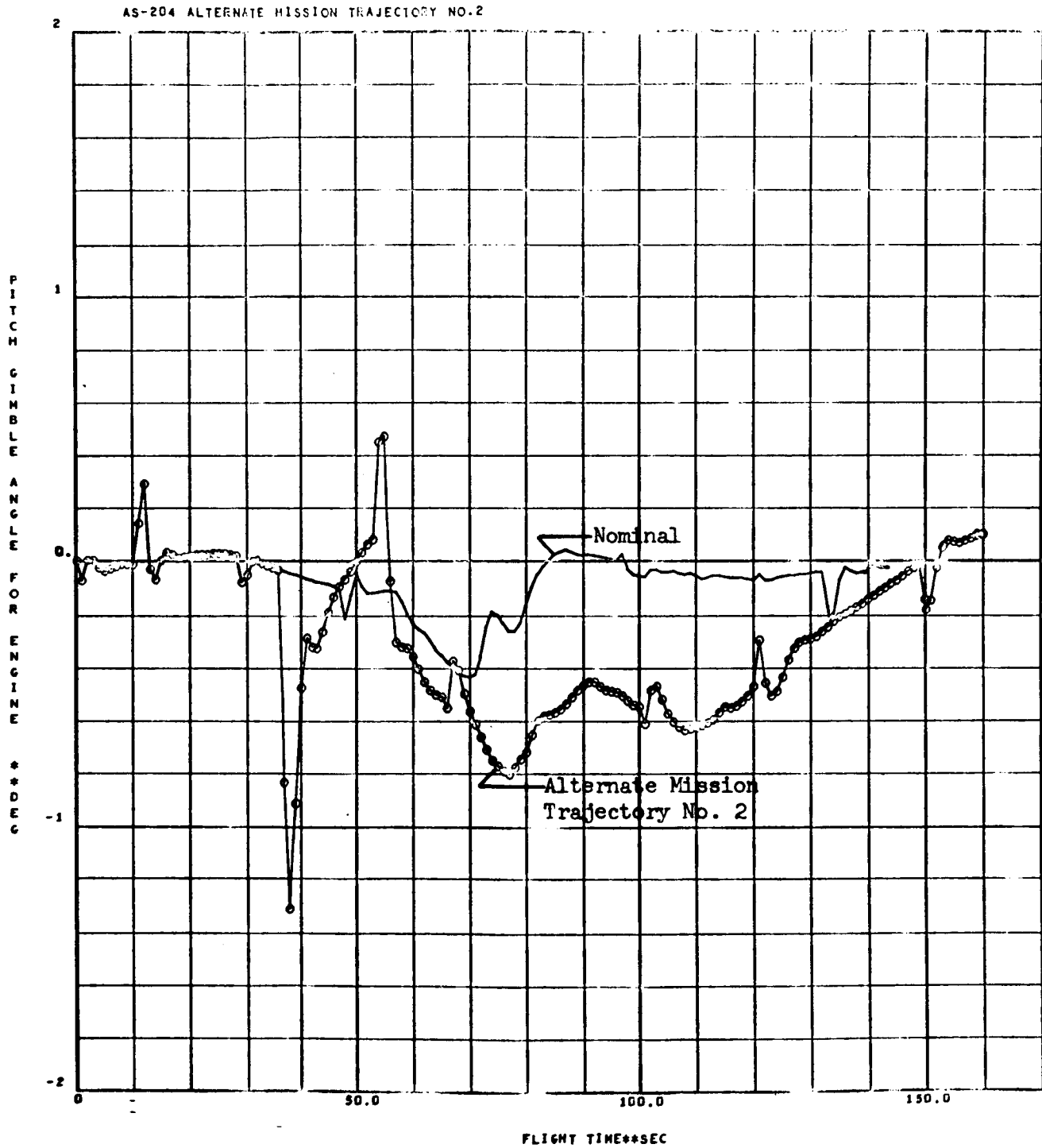


FIGURE 25B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH DEFLECTION HISTORY, ENGINE 3
S-IB STAGE

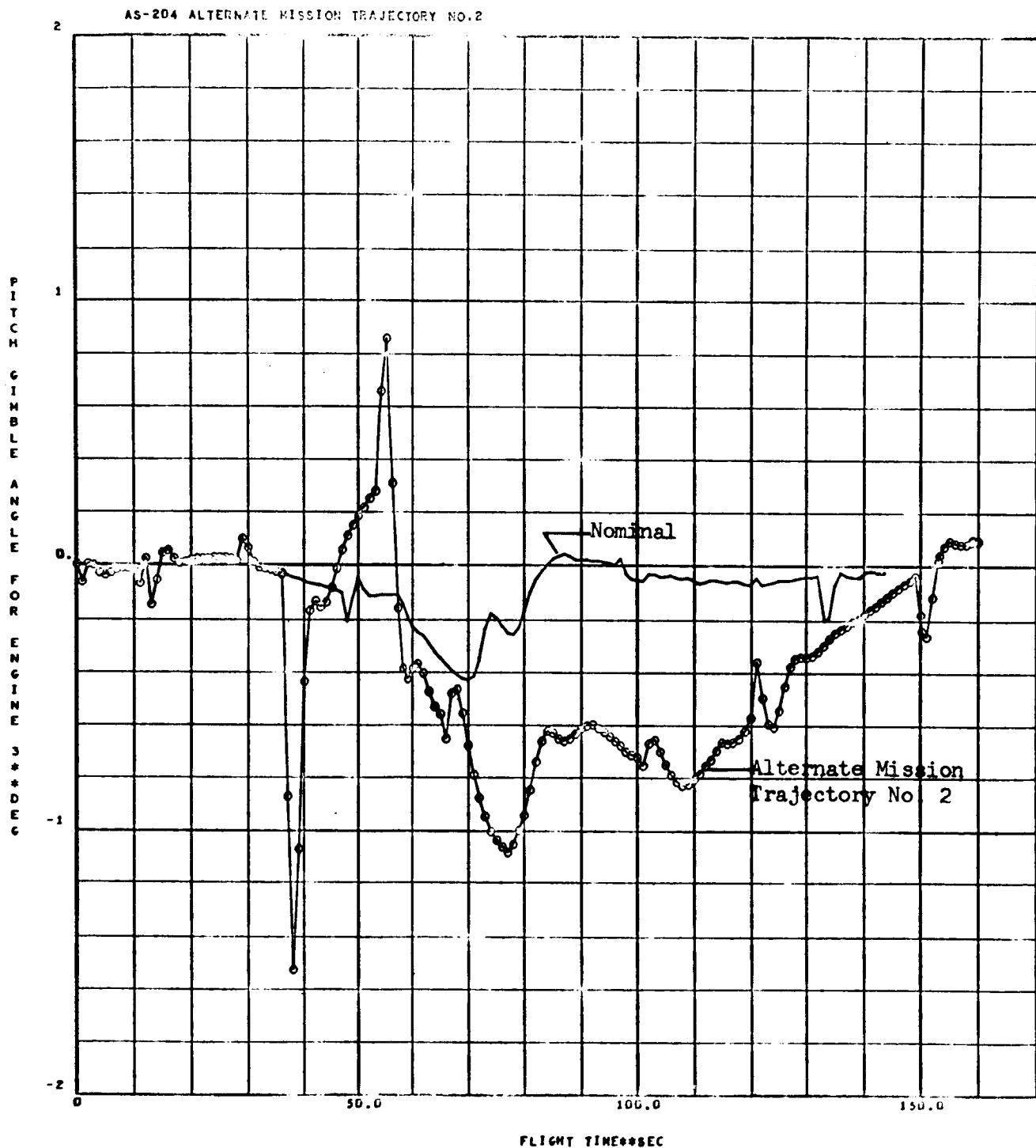


FIGURE 26B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW DEFLECTION HISTORY, ENGINE 1
S-IB STAGE

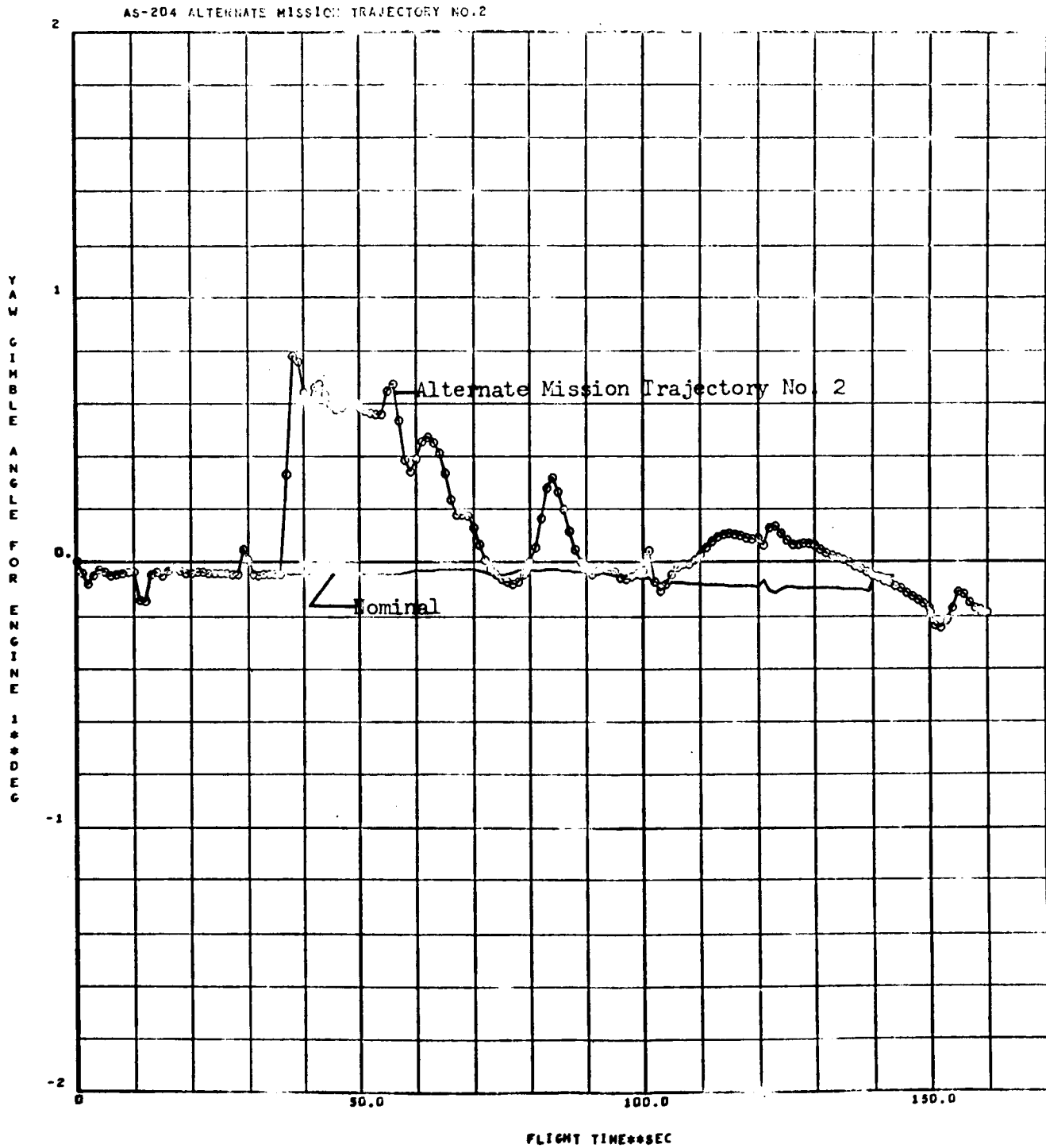


FIGURE 27B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW DEFLECTION HISTORY, ENGINES 2 AND 3
S-IB STAGE

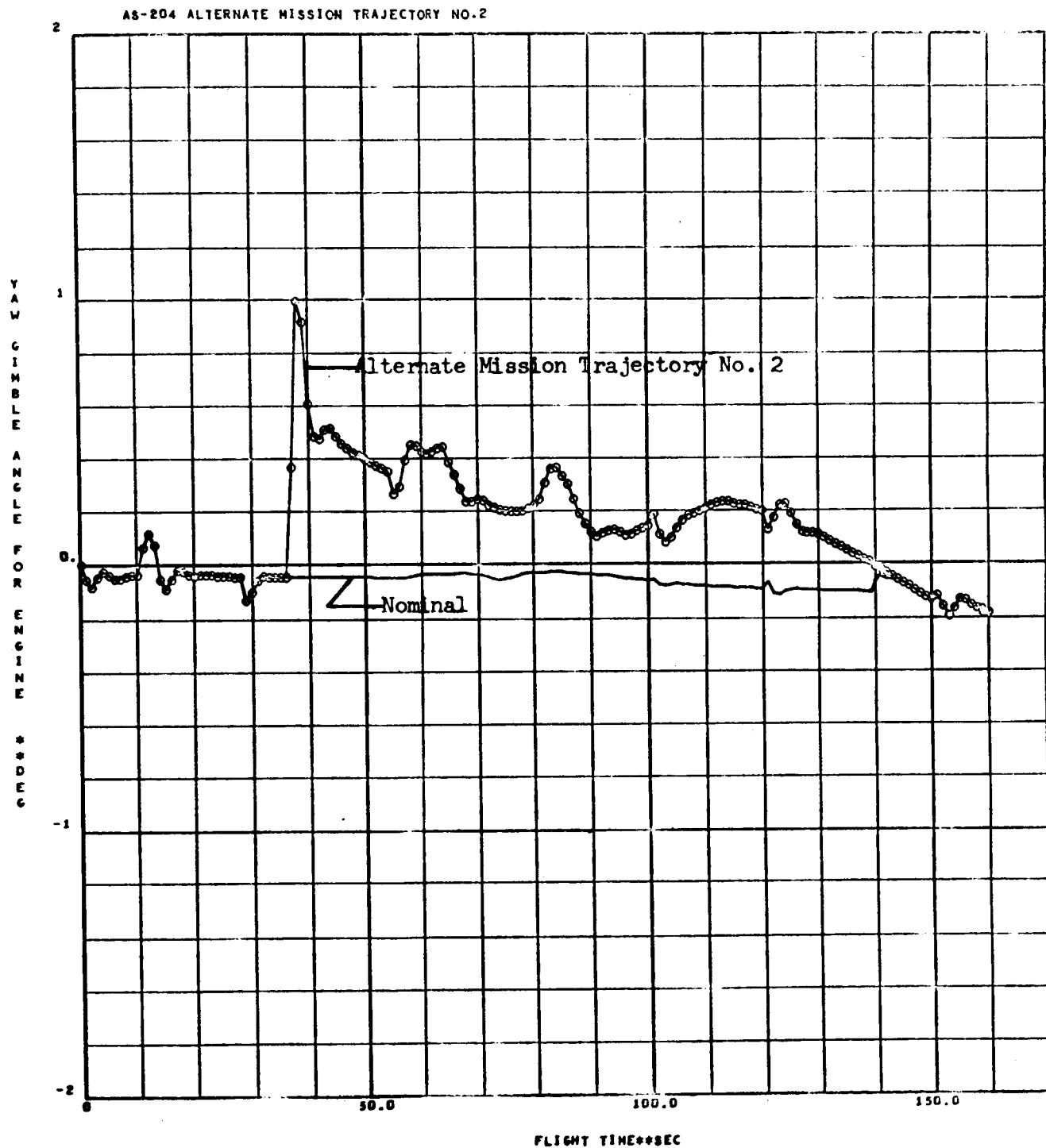


FIGURE 28B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE ERROR HISTORY
S-IVB STAGE

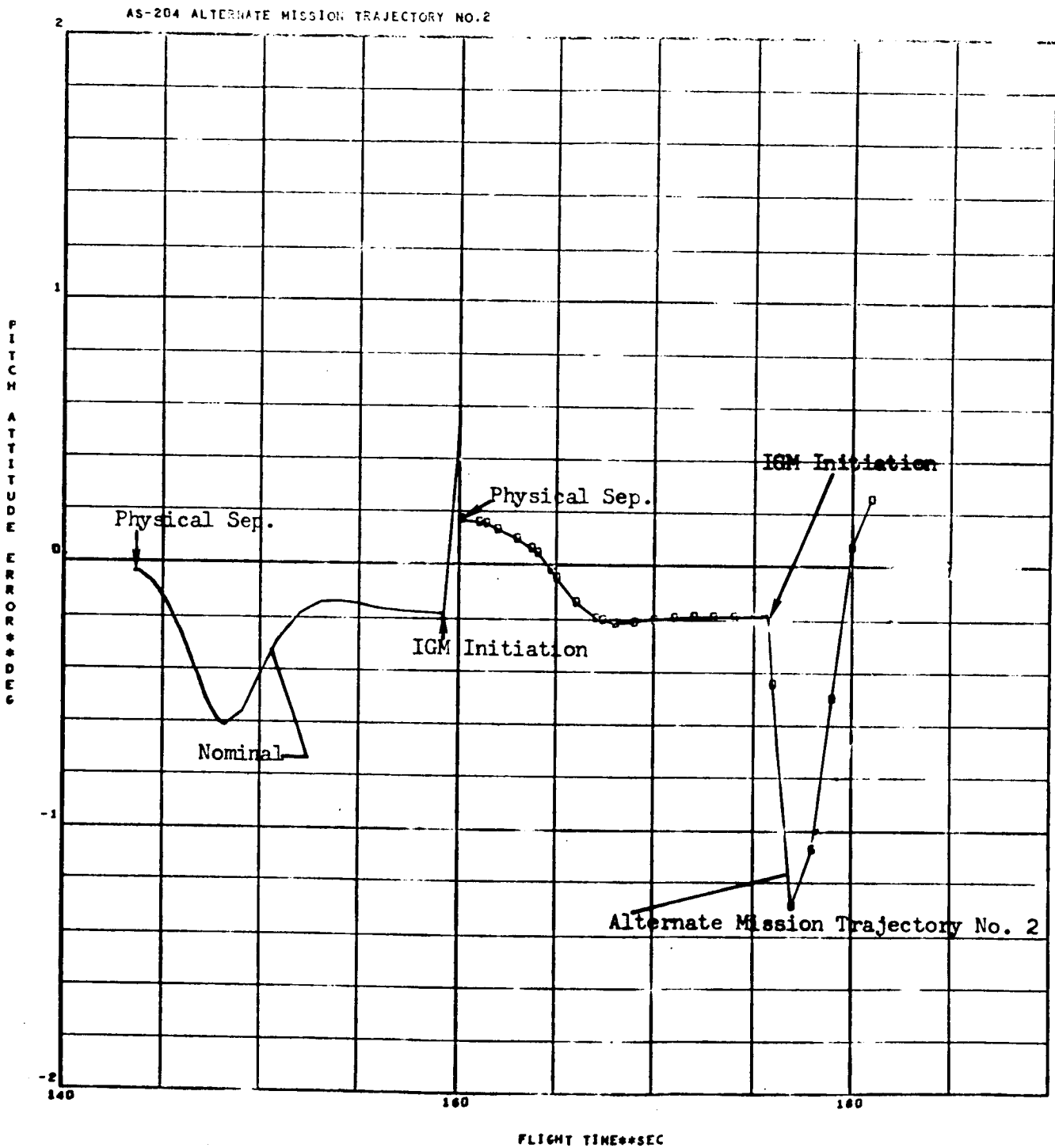


FIGURE 29B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ATTITUDE ERROR HISTORY
S-IVB STAGE

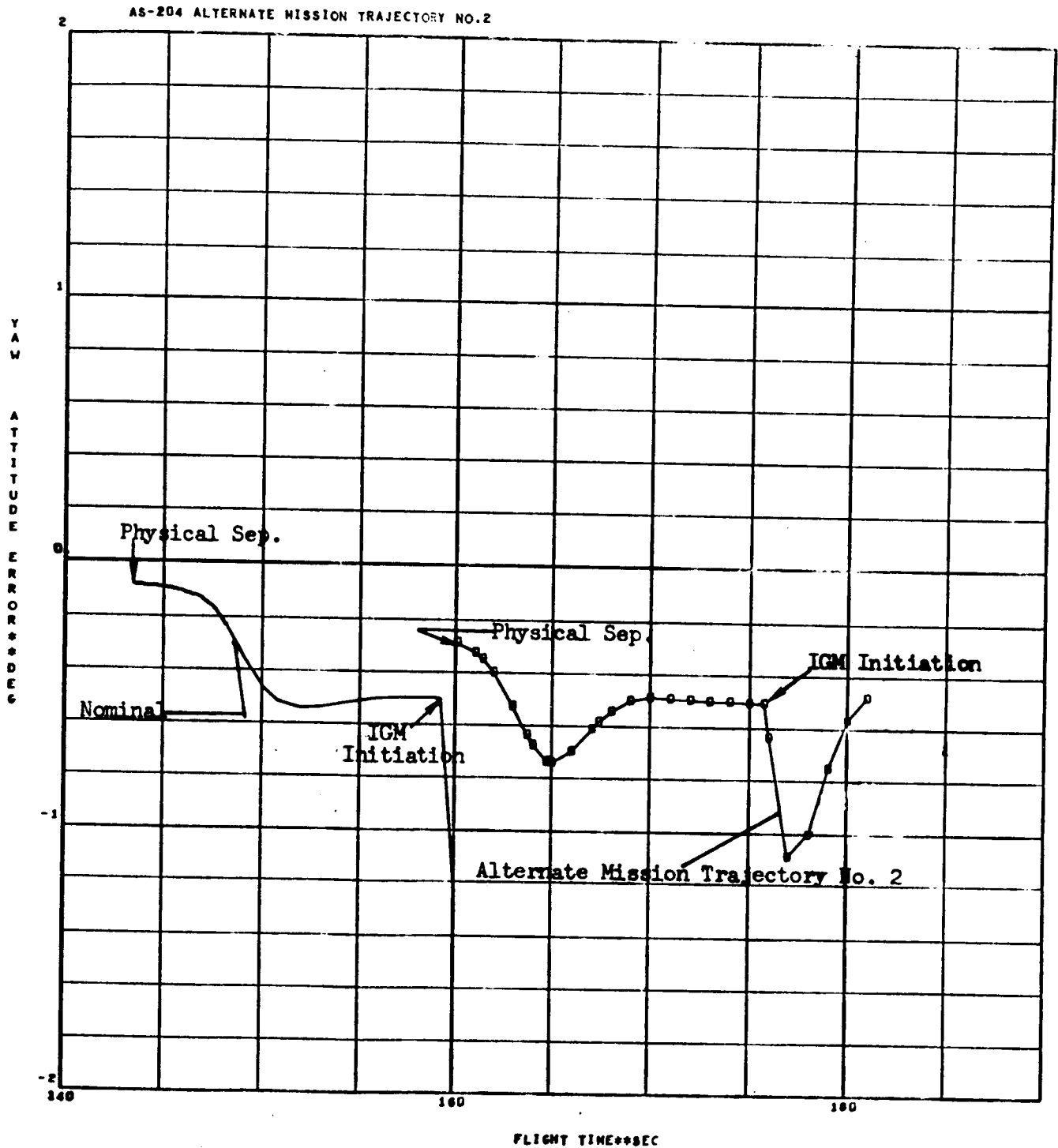


FIGURE 30B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ROLL ATTITUDE ERROR HISTORY
S-IVB STAGE

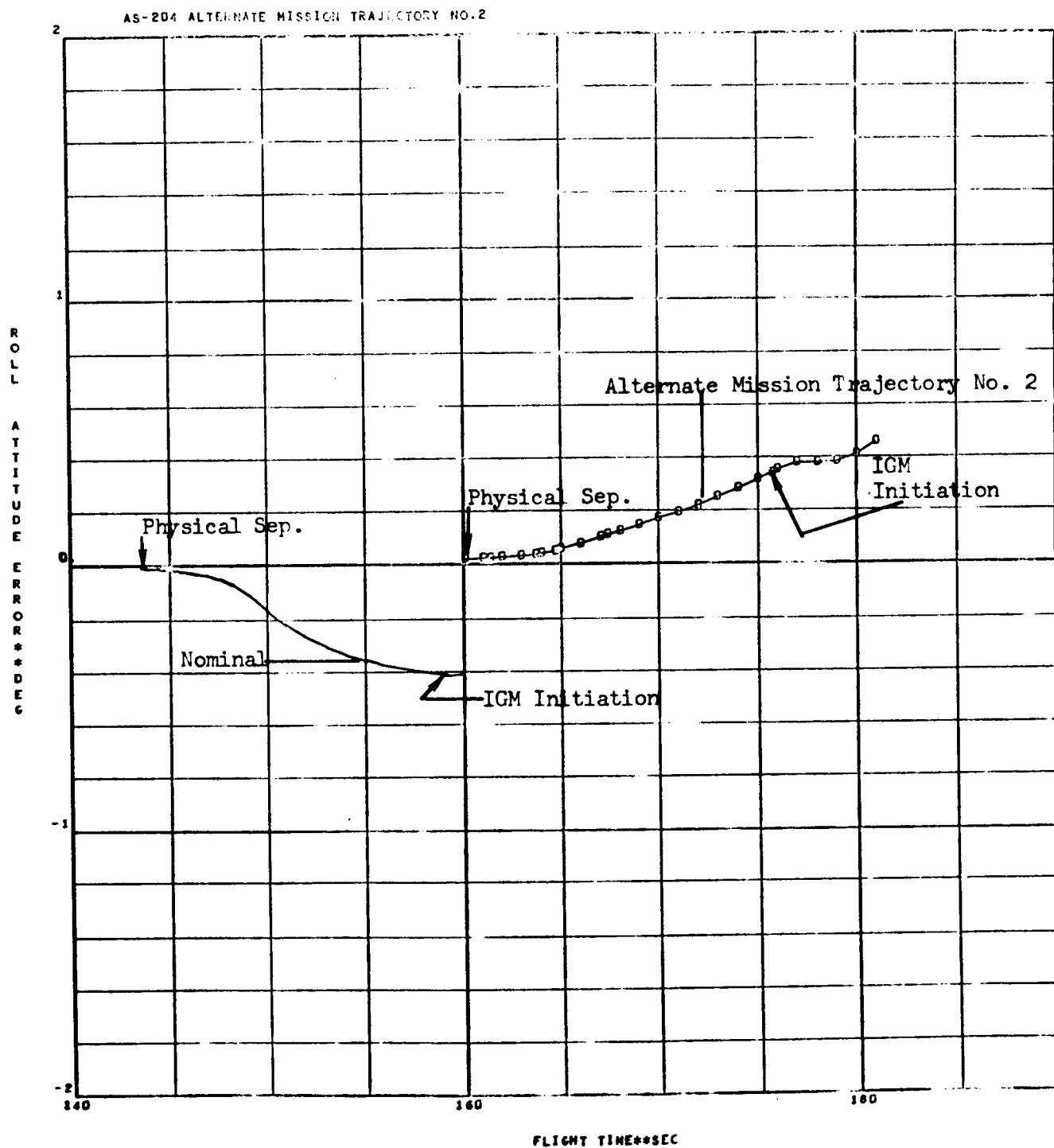


FIGURE 31B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE RATE HISTORY
S-IVB STAGE

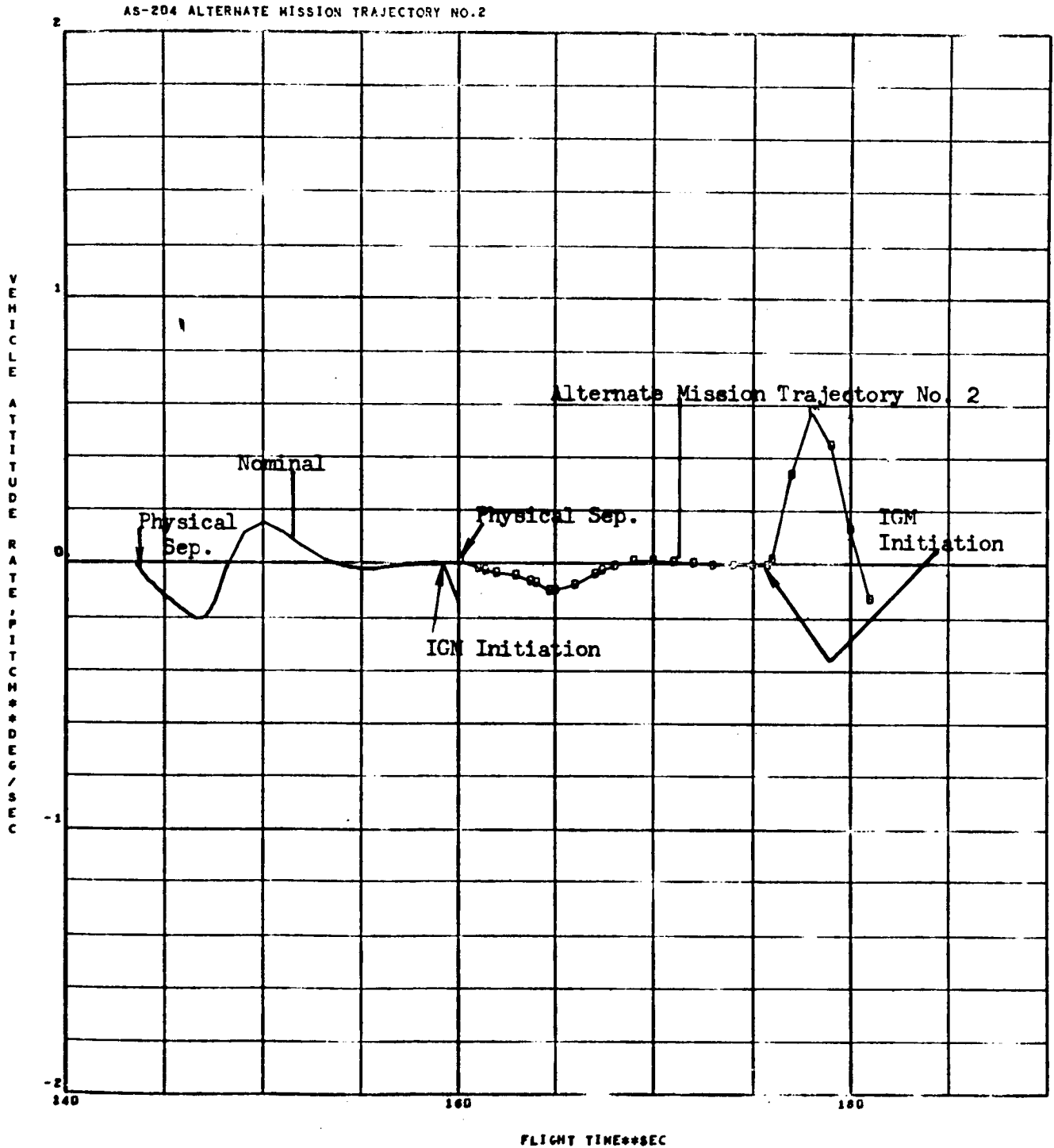


FIGURE 32B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ATTITUDE RATE HISTORY
S-IVB STAGE

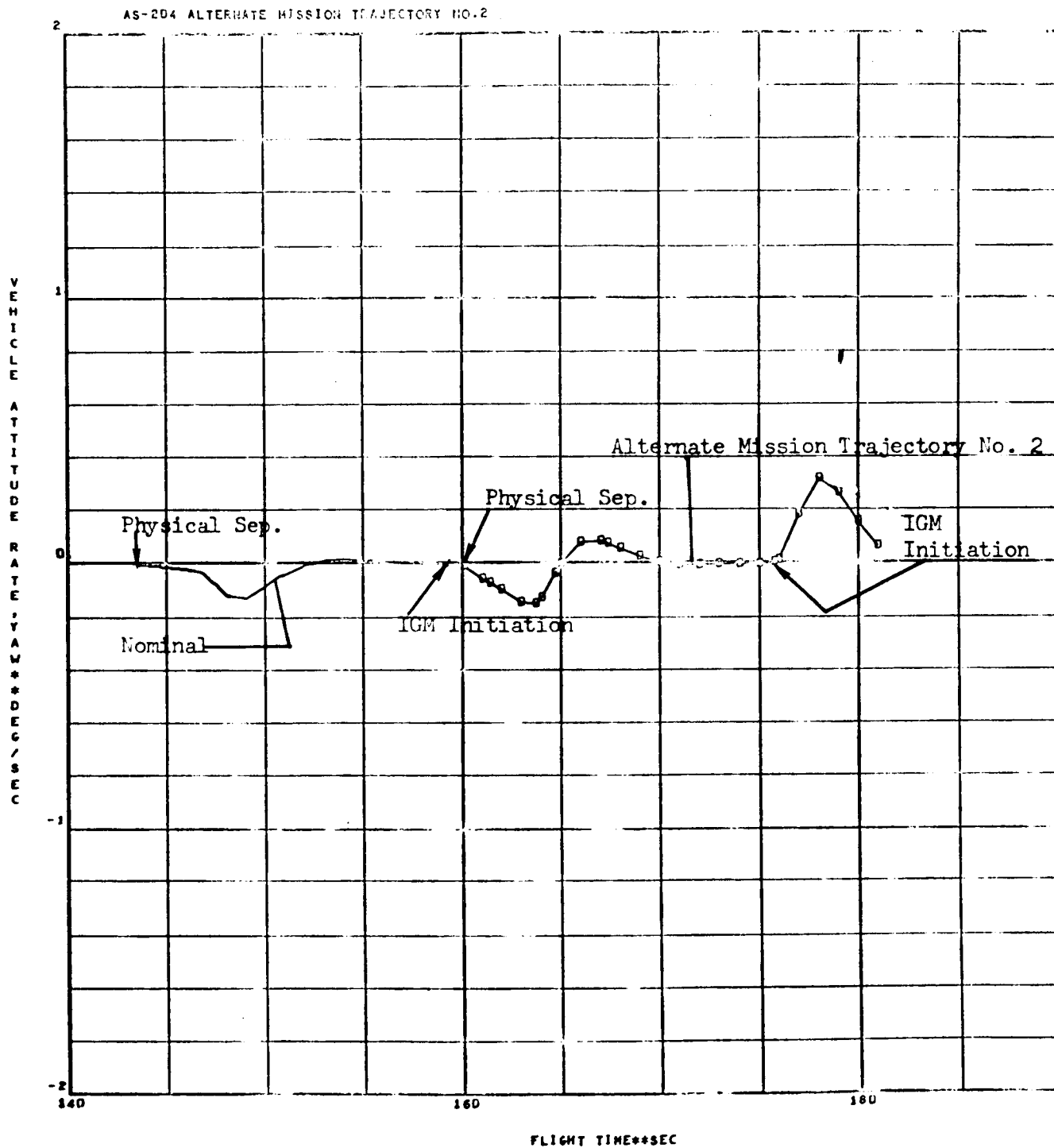
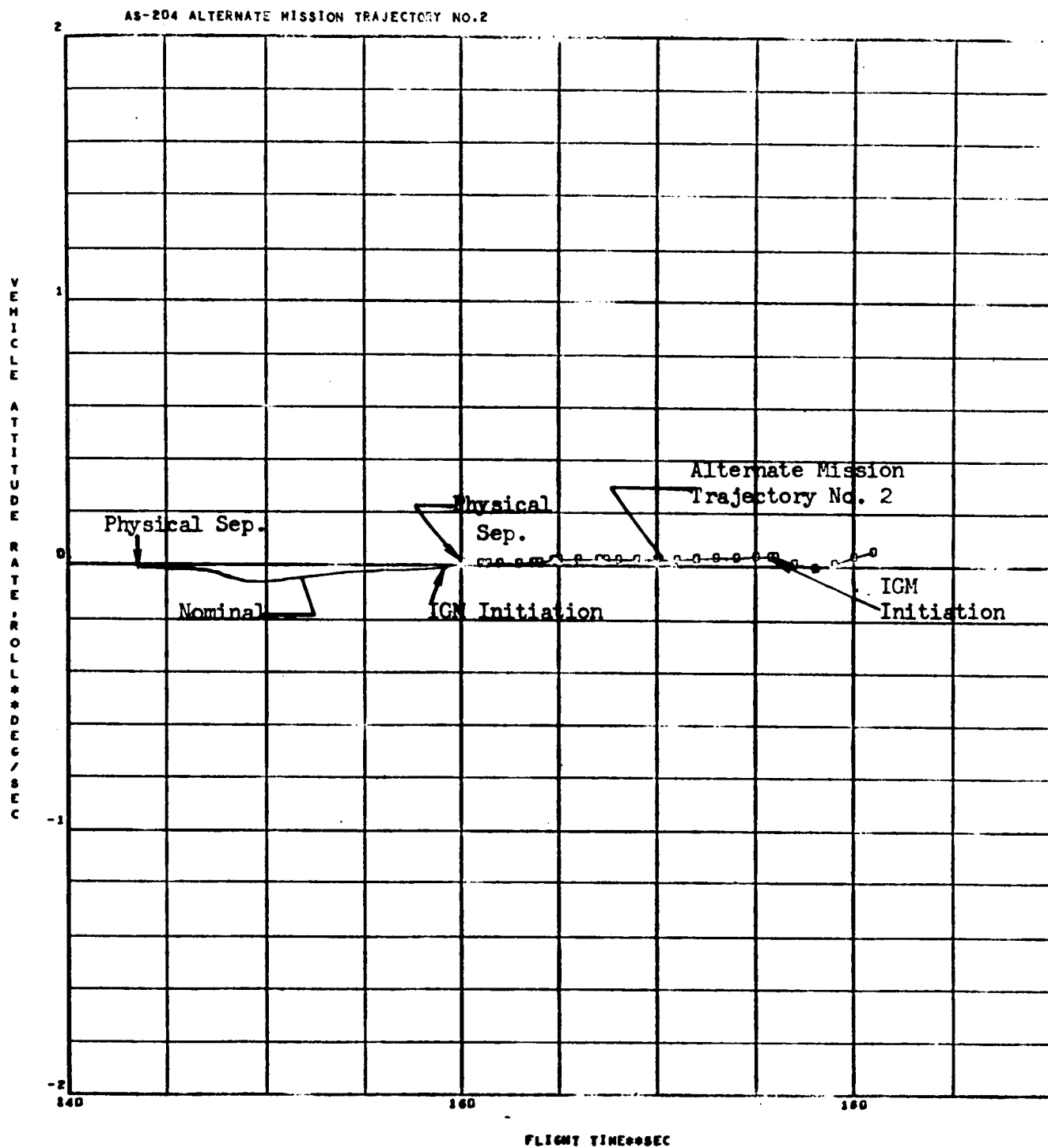


FIGURE 33B

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ROLL ATTITUDE RATE HISTORY
S-IVB STAGE



APPENDIX C: "AS-204/IM-1 A/M TRAJECTORY NO.3 DATA DISPLAY"

TABLE 1C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
FLIGHT SEQUENCE OF EVENTS

<u>NOMINAL FLIGHT TIME</u> <u>(HR: MIN: SEC)</u>	<u>TIME</u> <u>(SEC)</u>	<u>PROGRAM</u> <u>TIME (SEC)</u>	<u>EVENT</u>
- 0:0:05.0	- 5.00	---	Guidance Reference Release (GRR).
- 0:0:03.1	- 3.10	---	Initiate S-IB Mainstage Ignition Sequence.
0:0:00.0	0.00	---	First Motion.
0:0:00.2	0.20	(0.0) ₁	Lift-off Signal. Initiate Time Base 1.
0:0:10.2	10.20	(10.0) ₁	Command Pitch and Roll Maneuvers.
0:0:40.2	40.20	(40.0) ₁	Control Gain Switch Point.
0:0:55.0	55.02	---	Engine No. 4 Premature Shutdown.
0:1:09.0	69.00	---	Maximum Dynamic Pressure.
0:1:40.2	100.20	(100.0) ₁	Control Gain Switch Point.
0:2:00.2	120.20	(120.0) ₁	Control Gain Switch Point.
0:2:12.5	132.50	(132.3) ₁	Enable S-IB Propellant Level Sensors.
0:2:18.9	138.90	(138.7) ₁	Command Tilt Arrest.
0:2:27.3	147.25	(0.0) ₂	Level Sensor Activation; Initiate Time Base 2.
0:2:30.4	150.35	(3.1) ₂	Inboard Engine Cutoff (IECO).
0:2:35.9	155.85	(0.0) ₃	Outboard Engine Cutoff (OECO); Initiate Time Base 3.
0:2:37.2	157.15	(1.3) ₃	Separation Signal.
0:2:37.2	157.23	---	S-IB/S-IVB Physical Separation;
		(1.4) ₃	Control Gain Switch Point.

TABLE 1C (Cont'd)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
FLIGHT SEQUENCE OF EVENTS

<u>NOMINAL FLIGHT</u> <u>(HR: MIN: SEC)</u>	<u>TIME</u> <u>(SEC)</u>	<u>PROGRAM</u> <u>TIME (SEC)</u>	<u>EVENT</u>
0:2:38.6	158.55	(2.7) ₃	J-2 Engine Start Command.
0:2:40.9	160.90	----	Ullage Burn Out.
0:2:41.9	161.85	----	90% J-2 Thrust Level.
0:2:44.6	164.55	(8.7) ₃	Command PU System Activation.
0:2:49.2	169.15	(13.3) ₃	Jettison Ullage Rocket Motors.
0:2:52.9	172.85	(17.0) ₃	Command Active Guidance Initiation.
0:4:59.6	299.55	(143.7) ₃	Control Gain Switch Point.
0:8:10.0	490.00	----	EMR Shift Sensed by IGM.
0:10:16.8	616.83	----	Guidance Cutoff Signal (CCS).
0:10:17.0	617.03	(0.0) ₄	Initiate Time Base 4. (Reflects an approximate 0.2 second systems delay)
0:10:26.8	626.83	----	Orbital Insertion.
0:11:02.0	662.03	(45.0) ₄	Nose Cone Jettisoned.
0:20:17.0	1217.03	(600.0) ₄	SLA Panel Deployment.
0:53:55.0	3235.00	----	LM Separation.
4:30:00.0	16200.00	----	Loss of S-IVB/IU Attitude Control.

TABLE 2C

COMPARISON OF AS-204/IM-1 OPERATIONAL FLIGHT TRAJECTORY (REVISION 1)
AND AS-204/IM-1 ALTERNATE MISSION TRAJECTORY NO. 3

FLIGHT EVENT	FINAL OPERATIONAL TRAJECTORY					ALTERNATE MISSION TRAJECTORY #3				
	FLIGHT TIME	ALTITUDE	RANGE	SPACE FIXED	SPACE FIXED	FLIGHT TIME	ALTITUDE	RANGE	SPACE FIXED	SPACE FIXED
	(SEC)	(KM)	(KM)	VELOCITY (M/SEC)	PATH ANGLE (DEG)	(SEC)	(KM)	(KM)	VELOCITY (M/SEC)	PATH ANGLE (DEG)
GRR	-5.00	0.03	0.00	408.93	90.000	-5.00	0.03	0.00	408.93	90.000
First Motion	0.00	0.03	0.00	408.93	90.000	0.00	0.03	0.00	408.93	90.000
Max. Dynamic Pressure	74.00	12.34	3.83	745.54	57.854	69.00	10.27	2.66	652.94	59.260
Tilt Arrest	133.20	52.62	46.36	2091.86	61.285	139.75	51.00	45.00	1893.59	63.413
IECO	139.14	58.82	55.44	2309.91	62.154	150.35	60.47	60.25	2217.68	64.913
OECO	142.14	62.08	60.43	2368.73	62.606	155.85	65.66	69.25	2291.54	65.780
Separation	143.52	63.58	62.77	2369.58	62.854	157.23	66.95	71.57	2291.19	66.042
J-2 Engine Start	144.84	65.00	65.00	2364.15	63.102	158.55	68.17	73.78	2286.41	66.307
Ullage Case Jettison	155.44	75.97	83.12	2374.30	64.990	169.15	77.54	91.72	2301.26	68.223
Initiate ICM	159.25	79.76	89.76	2387.08	65.631	173.50	81.21	99.23	2317.75	68.955
EMR Shift	475.75	177.00	1062.70	5483.43	91.465	490.00	171.65	1050.22	5362.23	90.751
Guidance Cutoff Signal	598.15	163.19	1796.20	7821.49	90.004	616.83	163.19	1801.48	7821.49	90.005
Orbit Insertion	608.15	163.22	1868.55	7828.60	89.992	626.83	163.21	1873.82	7828.86	89.996

TABLE 3C
AS-204/LV-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-13 STAGE FLIGHT DATA

FLIGHT TIME (SEC)	MASS (KG)	THRUST (TOTAL) (N)	DRAW (N)	LONGITUDINAL ACCELERATION (M/SEC ²)	DYNAMIC PRESSURE (N/M ²)	A.H.I. (KG-M/M ² -RAD)	MACH NO.	PITCH ANGLE OF ATTACK (DEG)
1) -5.00	589243.	7007287.	---	0.000	0.	0.	0.00	0.000
2) 0.00	532886.	7007287.	5884.	12.117	0.	0.	0.00	0.000
5.00	548074.	7155103.	13100.	12.660	105.	114.	0.04	1.471
10.00	546504.	7195361.	27749.	13.011	476.	2109.	0.08	2.831
15.00	540820.	7253004.	30024.	13.459	1198.	12266.	0.12	1.554
20.00	524449.	7319856.	40119.	13.919	2377.	44603.	0.19	1.054
25.00	512425.	7280234.	70425.	14.380	4088.	125000.	0.25	0.812
30.00	498140.	7444858.	90516.	14.880	6376.	294514.	0.32	0.280
35.00	483857.	7506924.	117100.	15.397	9246.	612912.	0.41	-0.062
40.00	465554.	7579321.	152508.	15.937	12648.	1160467.	0.50	-0.289
45.00	455229.	7642404.	191531.	16.524	16481.	2037658.	0.60	-0.444
50.00	440899.	7719219.	216590.	17.162	20589.	3263223.	0.72	-0.435
55.00	424694.	7791132.	230455.	17.856	24599.	5265105.	0.85	-0.445
60.00	413830.	7851515.	231486.	17.673	24719.	5276255.	0.95	-0.465
65.00	401291.	7905331.	560759.	15.330	24279.	7708946.	0.97	1.732
70.00	385724.	7959238.	632418.	16.237	27141.	10526565.	1.09	2.108
75.00	374163.	8053612.	626042.	16.411	27361.	13022714.	1.20	0.799
80.00	363592.	8074222.	535050.	17.325	26902.	12675266.	1.22	0.701
85.00	351024.	8047071.	419921.	18.254	25935.	17147826.	1.40	0.428
90.00	338470.	8103667.	340142.	20.384	23097.	20892400.	1.59	0.889
95.00	325075.	8117106.	134525.	21.403	16439.	24813555.	1.81	1.381
100.00	312509.	8125214.	110878.	22.660	12716.	28684792.	2.21	1.451
105.00	301051.	8127371.	34020.	23.506	10413.	32289066.	2.42	1.415
110.00	288607.	8124057.	56702.	24.630	8014.	3558146.	2.67	1.382
115.00	276179.	8117513.	46278.	25.757	5064.	38451896.	2.92	1.304
120.00	262770.	8117928.	31640.	26.397	4274.	40952022.	3.16	1.170
125.00	251234.	8050116.	17706.	28.220	3126.	42623101.	3.43	1.024
130.00	239024.	8078905.	7972.	29.758	2225.	44099996.	3.69	0.552
135.00	226667.	8060245.	3226.	31.215	1576.	47154665.	3.97	0.084
140.00	214413.	8038922.	-120.	32.932	1146.	47975176.	4.29	-0.256
145.00	202172.	8037741.	-320.	33.022	1128.	48575965.	4.67	-2.045
150.00	190030.	8002450.	-4250.	34.001	802.	49411465.	4.69	-2.084
155.00	183123.	8079285.	-7500.	36.050	551.	40110992.	5.22	-0.449
160.00	171529.	8065843.	-7710.	37.036	535.	40492556.	5.85	1.049
165.00	160276.	8035200.	-6700.	37.471	526.	40515507.	5.89	1.124
170.00	148446.	8015139.	-6010.	38.023	251.	40788077.	6.31	2.513
175.00	131972.	8015139.	-5963.	38.022	248.	42322147.	6.36	2.827
180.00	115135.	8015139.	-5963.	38.022	248.	40324596.	6.36	2.856

1) GRP; 2) First Motion; 3) Engine No. 4 Premature Shutdown; 4) Max. Dyn. Pressure; 5) Tilt Arrest; 6) IECC; 7) OECO;
8) Sep. Signal; 9) Physical Sep.

TABLE 3C (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-IB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	SPACE FIXED			--- SPACE FIXED POSITION AND VELOCITY VECTOR COMPONENTS ---			DZ (M/S)		
	RADIUS (M)	VELOCITY (M/S)	PATH ANGLE (DEG)	X (M)	Y (M)	Z (M)		DX (M/S)	DY (M/S)
-5.00	6373353.	408.93	90.000	6373327.	17051.	-5540.	0.00	126.37	388.92
0.00	6373352.	408.93	90.000	6373327.	17483.	-3596.	-0.13	126.30	388.94
5.00	6373385.	409.15	88.130	6373359.	18314.	-1651.	12.05	126.20	388.98
10.00	6373489.	409.86	86.008	6373461.	18945.	204.	28.14	126.10	388.96
15.00	6373673.	411.51	83.627	6373643.	19575.	2239.	45.16	126.02	389.12
20.00	6373950.	415.05	80.958	6373916.	20205.	4187.	64.50	125.95	390.18
25.00	6374329.	421.24	78.094	6374292.	20825.	6142.	86.12	125.87	392.66
30.00	6374823.	430.95	75.078	6374781.	21464.	8117.	110.04	125.76	397.23
35.00	6375442.	445.05	72.023	6375396.	22092.	10120.	136.28	125.63	404.61
40.00	6376200.	464.30	69.051	6376148.	22720.	12169.	164.76	125.51	415.54
45.00	6377106.	489.31	66.283	6377047.	23347.	14282.	195.39	125.39	430.73
50.00	6378171.	520.54	63.818	6378105.	23974.	16485.	228.04	125.27	450.85
55.00	6379406.	557.71	61.721	6379231.	24600.	18799.	262.34	125.14	475.98
55.02	6379412.	557.91	61.712	6379237.	24603.	18811.	262.52	125.14	476.12
60.00	6380788.	591.66	60.833	6380703.	25229.	21246.	286.18	126.39	502.18
65.00	6382292.	623.08	59.804	6382195.	25862.	23813.	310.92	126.76	524.88
69.00	6383586.	652.94	59.260	6383479.	26369.	25958.	331.00	126.93	548.32
70.00	6383523.	661.05	59.152	6383813.	26496.	26509.	336.14	126.96	554.87
75.00	6385686.	705.23	58.680	6385560.	27131.	29371.	363.33	127.11	590.91
80.00	6387592.	756.02	58.366	6387450.	27768.	32429.	392.77	127.42	633.30
85.00	6389655.	813.13	58.159	6389492.	28405.	35714.	424.61	127.53	681.63
90.00	6391885.	876.94	58.101	6391699.	29042.	39257.	458.25	127.67	736.59
95.00	6394201.	947.48	58.222	6394077.	29682.	43092.	493.00	127.88	798.95
100.00	6396876.	1024.89	58.499	6396630.	30322.	47258.	528.52	128.34	868.68
105.00	6399647.	1108.90	58.882	6399363.	30965.	51791.	564.83	128.81	945.54
110.00	6402608.	1199.73	59.385	6402278.	31611.	56727.	601.25	129.75	1030.05
115.00	6405759.	1297.40	59.957	6405376.	32263.	62104.	638.05	131.15	1122.02
120.00	6409104.	1402.07	60.566	6408640.	32923.	67959.	675.41	132.73	1221.48
125.00	6412650.	1514.10	61.214	6412131.	33591.	74332.	713.08	134.57	1328.97
130.00	6416397.	1634.26	61.902	6415791.	34268.	81264.	750.76	136.36	1445.19
135.00	6420247.	1762.86	62.639	6419638.	34954.	88800.	787.82	137.95	1570.98
139.75	6424285.	1893.59	63.413	6423460.	35612.	96565.	821.25	139.24	1700.55
140.00	6424497.	1900.72	63.457	6423666.	35647.	96991.	822.93	139.31	1707.67
145.00	6428842.	2048.36	64.254	6427867.	36347.	105894.	858.57	140.35	1854.44
150.00	6433405.	2206.10	64.874	6432261.	37050.	115549.	899.98	141.07	2009.24
150.35	6433738.	2217.68	64.912	6432580.	37100.	116262.	903.12	141.10	2020.54
155.85	6438618.	2291.54	65.780	6437542.	37880.	127620.	897.73	142.34	2103.56
157.15	6440135.	2291.42	66.027	6439703.	38065.	130359.	887.72	142.35	2107.68
157.23	6440208.	2291.10	66.042	6439773.	38076.	130525.	887.00	142.35	2107.73

TABLE 3C (Cont'd.)
AS-204/LM-1 L/1 OPERATIONAL ALTERNATE MISSION TRAJECTORY NO-3
3-STAGE FLIGHT DATA

FLIGHT TIME (SEC)	POSITION (M)	EARTH FIXED		EARTH FIXED POSITION AND VELOCITY			VELOCITY VECTOR COMPONENTS		
		VELOCITY (M/S)	PATH ANGLE (DEG)	X (M)	Y (M)	Z (M)	DX (M/S)	DY (M/S)	DZ (M/S)
0.00	34.	0.00	R/R	34.	-0.	0.	-0.00	0.00	-0.00
0.00	34.	0.00	R/R	34.	-0.	-0.	-0.00	0.00	0.00
0.00	67.	13.35	0.268	67.	-0.	0.	13.35	-0.07	-0.05
10.00	171.	24.53	0.300	171.	-0.	0.	24.53	-0.07	-0.05
15.00	355.	45.65	0.291	355.	-1.	-0.	45.65	-0.09	0.05
20.00	433.	65.17	0.243	433.	-1.	2.	65.16	-0.12	1.02
25.00	1011.	85.08	2.302	1011.	-3.	12.	85.91	-0.16	2.40
30.00	1505.	111.25	4.005	1505.	-3.	39.	110.98	-0.23	7.83
35.00	2177.	138.19	6.312	2177.	-4.	95.	137.37	-0.27	15.06
40.00	2889.	163.02	8.386	2889.	-6.	196.	166.03	-0.40	25.80
45.00	3605.	201.02	11.750	3605.	-8.	360.	196.84	-0.48	40.76
50.00	4392.	237.50	14.822	4392.	-11.	612.	229.72	-0.55	60.64
55.00	5166.	277.77	17.065	5166.	-14.	975.	264.29	-0.63	85.47
60.00	5914.	307.98	19.080	5914.	-14.	1468.	264.46	-0.63	111.39
65.00	6609.	320.81	21.153	6609.	-9.	2081.	288.42	1.14	133.78
70.00	7257.	340.87	23.242	7257.	-4.	2660.	333.81	1.38	156.05
75.00	7857.	368.37	25.741	7857.	-3.	3290.	339.03	1.42	183.44
80.00	8409.	417.22	28.521	8409.	5.	3724.	366.64	1.70	190.11
85.00	8911.	464.00	31.305	8911.	15.	4022.	396.55	2.15	241.09
90.00	9311.	517.21	33.763	9311.	26.	4145.	428.05	2.42	288.08
95.00	9662.	574.66	36.525	9662.	39.	4223.	463.22	2.72	323.45
100.00	10011.	642.63	39.082	10011.	54.	4502.	498.70	3.22	405.28
105.00	10362.	715.12	41.509	10362.	72.	4788.	535.05	3.98	474.45
110.00	10614.	784.26	43.313	10614.	84.	4948.	572.31	4.80	550.71
115.00	10874.	847.17	44.025	10874.	121.	5081.	609.81	6.14	634.58
120.00	11137.	907.04	44.117	11137.	156.	5205.	647.81	8.02	725.88
125.00	11401.	973.04	45.151	11401.	201.	5279.	685.53	10.14	824.61
130.00	11674.	1040.77	45.266	11674.	258.	5307.	725.71	12.50	931.35
135.00	11947.	1094.61	45.585	11947.	327.	5349.	765.06	15.08	1045.76
140.00	12211.	1141.14	45.722	12211.	409.	5349.	802.99	17.44	1171.73
145.00	12484.	1185.90	45.802	12484.	497.	5316.	830.39	19.63	1300.49
150.00	12757.	1233.72	45.889	12757.	502.	5242.	841.18	21.81	1432.45
155.00	13031.	1285.61	45.964	13031.	606.	5090.	870.11	23.64	1567.27
160.00	13304.	1335.01	46.022	13304.	728.	4972.	926.27	25.98	1700.02
165.00	13577.	1385.41	46.061	13577.	864.	4805.	973.28	26.18	1834.08
170.00	13850.	1434.20	46.080	13850.	900.	4647.	1012.67	26.18	1968.02
175.00	14123.	1481.11	46.087	14123.	900.	4485.	1045.76	26.18	2102.02

TABLE 3C (Cont'd.)
AS-204/1M-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-IB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	ALTITUDE (KM)	RANGE (KM)	SPACE FIXED (DEG)	VELOCITY VECTOR EARTH FIXED (DEG)	LONGITUDE (POS. EAST) (DEG)	GEOCENTRIC DECLINATION (DEG)	GEOCENTRIC LATITUDE (DEG)
-5.00	0.034	0.000	90.000	N/A	-80.565	28.371	28.532
0.00	0.034	0.000	90.000	N/A	-80.565	28.371	28.532
5.00	0.067	0.000	89.950	N/A	-80.565	28.371	28.532
10.00	0.171	0.001	89.981	N/A	-80.565	28.371	28.532
15.00	0.355	-0.002	89.968	N/A	-80.565	28.371	28.532
20.00	0.631	0.004	89.914	56.742	-80.565	28.371	28.532
25.00	1.010	0.014	89.799	65.594	-80.565	28.371	28.532
30.00	1.504	0.041	89.594	68.224	-80.565	28.371	28.532
35.00	2.124	0.097	89.277	69.410	-80.564	28.371	28.532
40.00	2.882	0.199	88.825	70.135	-80.562	28.371	28.532
45.00	3.788	0.364	88.260	70.594	-80.561	28.372	28.533
50.00	4.854	0.616	87.558	70.902	-80.559	28.373	28.534
55.00	6.088	0.980	86.763	71.111	-80.556	28.374	28.535
55.02	6.095	0.982	86.759	71.112	-80.556	28.374	28.535
60.00	7.473	1.473	86.166	71.966	-80.551	28.375	28.536
65.00	8.976	2.086	85.625	72.138	-80.545	28.377	28.538
69.00	10.270	2.665	85.088	72.189	-80.539	28.378	28.539
70.00	10.607	2.825	84.944	72.197	-80.538	28.379	28.540
75.00	12.370	3.728	84.206	72.223	-80.529	28.381	28.542
80.00	14.278	4.824	83.453	72.280	-80.518	28.384	28.545
85.00	16.342	6.143	82.686	72.282	-80.505	28.388	28.549
90.00	18.574	7.716	81.933	72.283	-80.490	28.392	28.553
95.00	20.981	9.578	81.212	72.312	-80.472	28.397	28.558
100.00	23.568	11.765	80.542	72.362	-80.451	28.403	28.564
105.00	26.341	14.312	79.916	72.406	-80.426	28.410	28.571
110.00	29.304	17.254	79.361	72.487	-80.397	28.418	28.579
115.00	32.458	20.629	78.874	72.592	-80.364	28.427	28.588
120.00	35.807	24.473	78.438	72.691	-80.327	28.438	28.598
125.00	39.356	28.822	78.049	72.790	-80.284	28.449	28.610
130.00	43.107	33.717	77.691	72.870	-80.236	28.462	28.623
135.00	47.062	39.202	77.357	72.932	-80.183	28.477	28.637
139.75	51.004	45.002	77.058	72.976	-80.126	28.492	28.652
140.00	51.216	45.324	77.042	72.978	-80.123	28.493	28.653
145.00	55.567	52.138	76.751	73.010	-80.056	28.511	28.671
150.00	60.127	59.683	76.485	73.033	-79.982	28.530	28.691
150.35	60.470	60.246	76.467	73.034	-79.977	28.532	28.692
155.85	65.657	69.254	76.401	73.115	-79.889	28.556	28.716
157.15	66.876	71.434	76.408	73.131	-79.867	28.561	28.721
157.21	66.950	71.567	76.400	73.132	-79.866	28.562	28.722

TABLE 3C (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-1st STAGE FLIGHT DATA

FLIGHT TIME (SEC)	VEHICLE ATTITUDE ANGLE			VEHICLE ATTITUDE RATE			VEHICLE ATTITUDE ERROR		
	PITCH (DEG)	YAW (DEG)	ROLL (DEG)	PITCH (DEG/SEC)	YAW (DEG/SEC)	ROLL (DEG/SEC)	PITCH (DEG)	YAW (DEG)	ROLL (DEG)
-5.00	-0.000	0.000	18.000	-0.002	0.001	-0.002	0.000	0.000	0.000
0.00	-0.017	0.006	17.900	-0.002	0.001	-0.002	-0.017	0.006	-0.010
5.00	-0.012	-0.015	18.004	-0.007	-0.004	-0.002	-0.012	-0.015	0.004
10.00	-0.002	-0.019	18.001	-0.000	-0.000	0.000	-0.002	-0.019	0.001
15.00	-0.557	-0.001	14.384	-0.117	-0.012	-1.087	0.109	-0.001	1.184
20.00	-1.500	0.012	6.287	-0.229	-0.001	-1.002	0.105	0.012	1.187
25.00	-2.652	0.002	4.285	-0.212	-0.004	-1.000	0.267	0.002	1.185
30.00	-4.628	-0.022	-0.307	-0.102	-0.004	-0.169	0.372	-0.022	-0.007
35.00	-6.800	-0.022	0.000	-0.460	-0.000	-0.001	0.265	-0.022	0.000
40.00	-9.212	-0.024	-0.002	-0.526	-0.000	-0.001	0.476	-0.024	-0.002
45.00	-12.110	-0.027	-0.005	-0.595	-0.001	-0.001	0.529	-0.027	-0.005
50.00	-15.057	-0.027	-0.008	-0.562	-0.001	0.001	0.599	-0.027	-0.008
55.00	-18.088	-0.029	-0.010	-0.609	-0.001	-0.000	0.599	-0.029	-0.010
60.00	-18.021	-0.024	-0.014	-0.509	-0.001	-0.000	0.226	-0.024	-0.016
65.00	-20.229	-0.026	-0.016	-0.210	-0.009	0.102	0.406	-0.026	-0.1759
70.00	-23.427	-0.024	0.260	-0.077	-0.001	-0.111	-0.168	-0.024	0.260
75.00	-26.961	-0.022	0.042	-0.498	0.006	-0.272	-0.042	-0.022	0.042
80.00	-29.242	-0.025	-0.082	-0.576	-0.027	-0.022	0.261	-0.025	-0.002
85.00	-32.569	-0.022	-0.470	-0.580	-0.002	-0.022	0.292	-0.022	-0.082
90.00	-35.641	-0.022	-0.612	-0.560	0.001	-0.016	0.595	-0.022	-0.470
95.00	-38.521	-0.026	-0.544	-0.524	0.007	0.020	0.534	-0.026	-0.612
100.00	-40.016	-0.022	-0.464	-0.496	0.011	0.019	0.405	-0.022	-0.544
105.00	-42.088	-0.020	-0.588	-0.542	0.050	0.087	0.526	-0.020	-0.464
110.00	-45.734	-0.018	-0.109	-0.422	0.021	-0.026	0.221	-0.018	-0.588
115.00	-49.634	0.015	-0.012	-0.296	0.006	0.021	0.205	0.015	-0.198
120.00	-51.382	0.022	0.102	-0.297	-0.002	0.001	0.176	0.022	-0.092
125.00	-52.016	0.020	0.159	-0.468	-0.011	0.003	-0.021	0.020	-0.012
130.00	-56.536	0.020	0.142	-0.552	-0.018	0.001	0.095	0.020	0.159
135.00	-59.389	-0.020	0.106	-0.560	-0.020	0.141	0.261	-0.020	0.168
140.00	-59.520	-0.025	0.055	-0.488	-0.022	0.206	0.046	-0.025	0.106
145.00	-59.422	-0.023	0.165	0.026	-0.012	-0.004	-0.085	-0.023	0.055
150.00	-59.219	-0.020	0.162	0.027	-0.022	-0.008	0.015	-0.020	0.165
155.00	-59.234	-0.025	0.002	0.027	-0.022	-0.008	0.025	-0.025	0.162
160.00	-59.267	-0.020	0.024	0.027	-0.022	0.019	0.168	-0.020	0.002
165.00	-59.266	-0.020	0.025	0.027	-0.012	0.017	0.168	-0.020	0.024
170.00	-59.266	-0.020	0.025	0.027	-0.012	0.017	0.168	-0.020	0.025

TABLE 4C
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-IVB STAGE FLIGHT DATA

	FLIGHT TIME (SEC)	MASS (KG)	THRUST (TOTAL) (N)	DRAW (N)	LONGITUDINAL ACCELERATION (M/SEC ²)	DYNAMIC PRESSURE (N/M ²)	A.H.I. (KG-M/M ² -RAD)	MACH NO.	PITCH ANGLE OF ATTACK (DEG)
1)	157.23	134260.	38915.	1833.	0.276	248.	49838461.	6.36	2.856
2)	158.55	134264.	38264.	1553.	0.274	209.	49875625.	6.39	3.318
3)	160.00	134205.	37761.	1306.	0.272	173.	49909458.	6.42	4.138
4)	160.90	134211.	380882.	1170.	2.829	154.	49927541.	6.45	4.782
5)	161.85	134101.	797977.	1054.	5.943	136.	49944407.	6.48	5.165
6)	161.85	134101.	797977.	1054.	5.943	136.	49944407.	6.48	5.165
7)	164.55	132545.	875240.	729.	6.549	97.	49984673.	6.60	4.607
8)	169.15	132542.	880805.	403.	7.397	53.	50025864.	6.82	5.322
9)	172.50	131422.	881863.	220.	7.469	30.	50047629.	7.05	6.292
10)	180.00	129885.	888486.	113.	7.610	12.	50063581.	7.22	11.575
11)	200.00	125111.	957679.	8.	7.974	1.	50073462.	6.82	13.339
12)	220.00	120316.	998856.	1.	8.302	0.	50074332.	6.21	16.179
13)	240.00	115527.	957774.	0.	8.637	0.	50074469.	5.12	17.905
14)	260.00	110742.	997253.	0.	9.005	0.	50074473.	4.48	19.010
15)	280.00	105544.	959900.	0.	9.427	0.	50074473.	4.30	20.049
16)	300.00	101194.	955485.	0.	9.837	0.	50074473.	4.30	20.966
17)	320.00	96422.	997080.	0.	10.341	0.	50074473.	4.38	21.167
18)	340.00	91655.	996682.	0.	10.874	0.	50074473.	4.53	21.284
19)	360.00	86889.	957177.	0.	11.476	0.	50074473.	4.73	21.070
20)	380.00	82119.	996071.	0.	12.129	0.	50074473.	4.99	20.726
21)	400.00	77360.	993409.	0.	12.844	0.	50074473.	5.29	20.157
22)	420.00	72602.	994340.	0.	13.695	0.	50074473.	5.63	19.294
23)	440.00	67839.	994894.	0.	14.665	0.	50074473.	6.01	18.337
24)	460.00	63032.	990842.	0.	15.707	0.	50074473.	6.43	17.226
25)	480.00	58234.	989076.	0.	16.955	0.	50074473.	6.90	16.007
26)	500.00	56019.	934870.	0.	16.688	0.	50074473.	7.14	15.491
27)	520.00	53862.	876061.	0.	16.281	0.	50074473.	7.39	15.143
28)	540.00	48004.	838932.	0.	16.842	0.	50074527.	7.89	13.678
29)	560.00	45850.	830432.	0.	18.112	0.	50074507.	8.46	12.646
30)	580.00	41027.	818841.	0.	19.525	0.	50074687.	9.07	11.140
31)	600.00	36058.	814561.	0.	21.397	0.	50074835.	9.72	9.236
32)	620.00	34215.	806662.	0.	23.575	0.	50075007.	10.42	7.180
33)	640.00	31010.	801717.	0.	25.853	0.	50075029.	11.04	6.616
34)	660.00	28006.	1603.	0.	0.052	0.	50075029.	11.05	6.835
35)	676.82	30001.	1603.	0.	0.052	0.	50075029.	11.05	7.318

1) Physical Sep.; 2) J-2 Start Command; 3) Ullage Rocket Burnout; 4) 90% Thrust Level; 5) Command P. U. Activation; 6) Ullage Case

Jettison; 7) IGM Initiation; 8) EMR Shift Sensed By IGM; 9) Guidance Cutoff Signal; 10) Orbit Insertion.

TABLE 4C (Cont'd.)
AS-204/LN-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	RADIUS (M)	SPACE FIXED		SPACE FIXED POSITION AND VELOCITY VECTOR COMPONENTS			--- COMPONENTS		
		VELOCITY (M/S)	PATH ANGLE (DEG)	X (M)	Y (M)	Z (M)	DX (M/S)	DY (M/S)	DZ (M/S)
157.23	6440209.	2261.19	66.042	6438772.	38076.	120525.	887.00	142.25	2107.73
158.55	6441430.	2286.41	66.237	6439937.	38264.	132310.	874.49	142.29	2107.77
160.00	6442749.	2281.25	66.598	6441101.	38470.	136257.	860.82	142.22	2107.81
160.90	6443565.	2278.87	66.777	6441664.	38598.	138263.	852.72	142.15	2108.53
161.85	6444415.	2279.55	66.949	6442772.	38733.	140268.	845.94	142.02	2112.00
161.85	6444415.	2279.55	66.949	6442772.	38733.	140268.	845.94	142.02	2112.00
164.85	6445805.	2286.52	67.422	6445034.	39116.	145989.	929.09	141.59	2126.20
169.15	6450787.	2301.26	68.223	6449782.	39766.	155829.	801.14	140.97	2152.69
172.50	6454450.	2317.75	68.355	6452209.	40377.	165242.	775.89	140.36	2179.51
180.00	6459759.	2343.59	69.987	6457122.	41288.	179539.	729.77	140.25	2219.35
200.00	6474640.	2432.25	72.870	6470874.	44107.	225156.	636.31	141.78	2343.80
220.00	6488435.	2535.59	75.527	6482504.	46977.	272339.	528.83	145.45	2475.56
240.00	6500310.	2652.16	77.931	6490228.	49931.	327942.	427.54	150.13	2613.82
260.00	6510438.	2782.04	80.090	6499443.	52986.	377942.	317.80	155.38	2759.45
280.00	6516487.	2924.95	82.007	6504740.	56151.	434650.	211.59	161.22	2912.83
300.00	6526930.	3080.99	83.697	6507898.	59439.	494512.	104.09	167.69	3074.66
320.00	6537856.	3250.59	85.175	6509888.	62851.	557701.	-5.36	173.98	3245.93
340.00	6547866.	3434.16	86.445	6507671.	66409.	624416.	-116.77	182.01	3427.35
360.00	6547587.	3632.21	87.524	6504199.	70137.	694868.	-230.97	190.91	3619.82
380.00	6544203.	3846.01	88.429	6498407.	74052.	769294.	-348.91	200.78	3824.89
400.00	6545840.	4075.92	89.168	6490214.	78174.	847950.	-471.10	211.62	4043.07
420.00	6546607.	4323.78	91.755	6476528.	93525.	931116.	-598.66	223.59	4276.30
440.00	6546621.	4562.17	90.200	6464224.	97127.	1019119.	-732.90	236.82	4527.12
460.00	6546012.	4892.84	91.511	6450159.	97008.	1112329.	-875.07	251.53	4797.22
480.00	6544634.	5197.80	90.495	6431141.	97198.	1211146.	-1026.46	267.80	5088.40
500.00	6542247.	5362.23	90.751	6420499.	99919.	1315016.	-1106.44	276.42	5239.55
520.00	6541853.	5844.27	90.877	6403025.	102726.	1426498.	-1188.74	284.89	5385.06
540.00	6540033.	6196.74	91.843	6383511.	108593.	1542011.	-1364.89	301.97	5674.63
560.00	6538280.	6557.52	91.721	6363322.	114815.	1645868.	-1551.72	320.58	5980.40
580.00	6536911.	6761.49	90.515	6348056.	128657.	1795558.	-1754.54	340.95	6309.30
600.00	6535848.	7408.33	90.247	6324074.	132677.	1927702.	-1976.94	363.26	6664.99
616.82	6535446.	7821.42	90.005	6302611.	142977.	205977.	-2226.31	388.10	7055.23
620.00	6535446.	7828.55	89.998	6294757.	142998.	2077988.	-2465.01	410.73	7411.53
626.82	6535446.	7828.84	89.996	6177505.	146799.	2128442.	-2554.04	409.25	7409.12
									7188.90

TABLE 4C (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	EARTH FIXED			EARTH FIXED POSITION AND VELOCITY VECTOR COMPONENTS			EARTH FIXED POSITION AND VELOCITY VECTOR COMPONENTS		
	POSITION (M)	VELOCITY (M/S)	PATH ANGLE (DEG)	X (M)	Y (M)	Z (M)	DX (M/S)	DY (M/S)	DZ (M/S)
157.23	58234.	1934.11	61.247	66545.	900.	72255.	912.67	26.18	1705.02
158.55	100764.	1928.40	61.547	67743.	935.	74505.	900.48	26.29	1705.04
160.00	102400.	1922.21	61.877	69025.	973.	76975.	887.15	26.40	1705.04
160.90	105082.	1919.22	62.082	70665.	1022.	78515.	879.27	26.46	1705.75
161.85	106848.	1919.30	62.287	72000.	1072.	80137.	872.75	26.46	1705.18
161.85	106848.	1919.30	62.287	70665.	1072.	80137.	872.75	26.46	1705.18
164.55	111876.	1924.64	62.863	73000.	1094.	84770.	856.69	26.44	1723.26
168.15	120480.	1936.67	63.842	76979.	1215.	92755.	820.12	26.54	1749.54
173.50	128666.	1950.76	64.745	80434.	1331.	100416.	806.20	26.64	1776.17
180.00	141023.	1973.29	66.018	85611.	1506.	112091.	772.12	27.60	1815.74
200.00	179990.	2053.24	69.581	100015.	2107.	149629.	673.29	32.71	1939.54
220.00	220586.	2149.72	72.856	112497.	2835.	189723.	575.01	40.40	2071.00
240.00	263080.	2260.85	75.802	123020.	3732.	232515.	477.52	49.55	2209.29
260.00	307746.	2386.56	78.427	131599.	4824.	278148.	380.31	59.75	2355.20
280.00	354868.	2526.34	80.736	138234.	6120.	326780.	283.14	71.04	2509.42
300.00	404735.	2680.08	82.749	142921.	7673.	378583.	185.52	83.52	2672.34
320.00	457638.	2848.04	84.491	145645.	9467.	433741.	86.74	96.40	2845.09
340.00	513882.	3030.44	85.970	148384.	11544.	492457.	-13.11	111.63	3028.36
360.00	573777.	3227.68	87.214	145108.	13942.	554950.	-114.81	128.42	3223.08
380.00	637652.	3440.94	88.244	141773.	16692.	621467.	-219.20	146.88	3430.81
400.00	705845.	3670.51	89.076	136320.	19829.	692772.	-226.73	167.12	3652.12
420.00	778716.	3919.16	89.729	128377.	23291.	767655.	-438.38	189.36	3888.95
440.00	856645.	4186.43	90.219	118750.	27419.	847951.	-555.32	213.84	4143.92
460.00	940124.	4477.06	90.557	106422.	31961.	933544.	-678.67	240.84	4418.77
480.00	1029554.	4791.98	90.754	91554.	37070.	1024845.	-809.53	270.60	4715.34
490.00	1076725.	4956.40	90.812	83116.	39855.	1072772.	-878.66	286.38	4869.48
500.00	1125464.	5116.23	90.861	73974.	42768.	1122214.	-949.99	302.16	5018.17
520.00	1227677.	5438.47	90.942	53460.	49162.	1225527.	-1103.41	324.55	5314.84
540.00	1326437.	5780.97	90.903	29785.	56199.	1334922.	-1265.82	369.69	5628.55
560.00	1452243.	6151.83	90.768	2730.	63971.	1450831.	-1442.20	408.11	5966.45
580.00	1575685.	6555.74	90.547	-28016.	72548.	1572764.	-1625.87	450.25	6332.37
600.00	1707500.	7002.57	90.261	-62867.	82011.	1704370.	-1853.79	496.81	6734.43
616.82	1825553.	7415.70	90.005	-95821.	90728.	1820778.	-2063.73	539.64	7102.28
620.00	1848431.	7422.75	89.998	-102400.	92441.	1843776.	-2090.42	541.67	7101.69
626.82	1867787.	7423.06	89.996	-116872.	95153.	1891743.	-2145.37	544.76	7085.37

TABLE 4C (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	ALTITUDE (KM)	RANGE (KM)	SPACE FIXED (DEG)	VELOCITY VECTOR EARTH FIXED (DEG)	LONGITUDE (POS. EAST) (DEG)	GEOCENTRIC DECLINATION (DEG)	GEODETTIC LATITUDE (DEG)
157.23	66.950	71.567	76.409	73.132	-79.866	28.562	28.722
158.55	68.173	73.783	76.422	73.147	-79.844	28.567	28.728
160.00	69.494	76.208	76.436	73.163	-79.821	28.574	28.734
160.90	70.311	77.724	76.443	73.172	-79.806	28.578	28.738
161.85	71.163	79.319	76.443	73.179	-79.790	28.582	28.742
161.85	71.163	79.319	76.443	73.179	-79.790	28.582	28.742
164.55	73.557	83.873	76.435	73.195	-79.745	28.594	28.754
169.15	77.545	91.716	76.422	73.225	-79.669	28.614	28.774
172.50	81.214	99.233	76.408	73.254	-79.595	28.632	28.794
180.00	86.523	110.676	76.411	73.323	-79.483	28.663	28.823
200.00	101.743	147.389	76.486	73.605	-79.122	28.757	28.917
220.00	115.269	186.494	76.627	73.953	-78.737	28.855	29.015
240.00	127.177	228.147	76.805	74.329	-78.325	28.959	29.118
260.00	137.538	272.507	77.007	74.720	-77.884	29.064	29.224
280.00	146.422	319.748	77.233	75.124	-77.414	29.174	29.335
300.00	153.902	370.063	77.483	75.544	-76.915	29.289	29.450
320.00	160.049	423.553	77.743	75.962	-76.370	29.408	29.568
340.00	164.945	480.749	78.047	76.418	-75.806	29.530	29.691
360.00	168.677	541.593	78.279	76.894	-75.194	29.656	29.818
380.00	171.334	606.461	78.738	77.391	-74.530	29.786	29.948
400.00	173.014	675.647	79.127	77.909	-73.839	29.919	30.081
420.00	173.826	749.475	79.548	78.452	-73.088	30.055	30.218
440.00	173.885	828.319	80.001	79.021	-72.284	30.184	30.357
460.00	173.323	912.599	80.490	79.619	-71.422	30.334	30.498
480.00	172.289	1002.773	81.018	80.250	-70.496	30.474	30.640
490.00	171.645	1050.222	81.297	80.578	-70.008	30.547	30.711
500.00	170.932	1099.253	81.586	80.913	-69.503	30.618	30.782
520.00	169.306	1201.995	82.193	81.607	-68.441	30.758	30.923
540.00	167.526	1311.216	82.843	82.338	-67.308	30.895	31.061
560.00	165.817	1427.412	83.537	83.109	-66.099	31.028	31.194
580.00	164.383	1551.175	84.278	83.922	-64.808	31.153	31.320
600.00	163.465	1683.245	85.076	84.782	-63.426	31.270	31.437
616.82	163.193	1801.477	85.774	85.545	-62.185	31.360	31.527
620.00	163.198	1824.387	85.909	85.685	-61.945	31.376	31.543
626.82	163.210	1873.824	86.105	85.987	-61.425	31.408	31.575

TABLE 4C (Cont'd.)
AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	VEHICLE ATTITUDE ANGLE			VEHICLE ATTITUDE RATE			VEHICLE ATTITUDE ERROR		
	PITCH (DEG)	YAW (DEG)	ROLL (DEG)	PITCH (DEG/S)	YAW (DEG/S)	ROLL (DEG/S)	PITCH (DEG)	YAW (DEG)	ROLL (DEG)
157.23	-59.266	-0.207	0.025	0.007	-0.012	0.017	0.168	-0.292	0.025
158.55	-59.121	-0.341	0.055	0.212	-0.001	0.028	0.314	-0.361	0.055
160.00	-58.651	-0.553	0.102	0.420	-0.175	0.028	0.784	-0.552	0.102
160.90	-58.225	-0.727	0.144	0.424	-0.188	0.061	1.210	-0.727	0.144
161.85	-58.063	-0.842	0.241	-0.124	-0.027	0.148	1.372	-0.842	0.241
161.85	-58.063	-0.843	0.241	-0.124	-0.037	0.148	1.372	-0.842	0.241
164.55	-59.234	-0.615	0.215	-0.371	0.000	-0.010	0.201	-0.615	0.215
165.15	-59.567	-0.504	0.157	0.025	-0.006	0.003	-0.132	-0.504	0.157
172.50	-59.571	-0.510	0.262	-0.010	0.001	0.041	-0.317	-0.510	0.262
180.00	-55.663	1.093	0.390	0.177	-0.011	0.062	0.084	-0.435	0.390
200.00	-57.916	1.418	0.685	-0.108	0.088	0.018	-0.061	-0.648	0.685
220.00	-55.526	2.103	0.516	-0.084	0.011	-0.087	-0.100	-0.552	0.516
240.00	-61.051	2.269	-0.496	-0.106	0.007	0.012	-0.056	-0.554	-0.496
260.00	-62.803	2.400	-0.248	-0.084	0.006	0.012	-0.117	-0.580	-0.248
280.00	-64.569	2.523	0.007	-0.097	0.007	0.012	-0.108	-0.604	0.007
300.00	-66.216	2.626	0.246	-0.122	-0.089	0.011	-0.127	-0.642	0.246
320.00	-68.244	2.745	0.519	-0.089	0.020	0.012	-0.441	-1.289	0.519
340.00	-70.239	2.929	0.771	-0.069	0.007	0.013	-0.426	-1.314	0.771
360.00	-72.294	3.053	0.139	-0.102	0.005	-0.090	-0.446	-1.355	0.139
380.00	-74.312	3.162	-0.270	-0.102	0.004	0.028	-0.452	-1.404	-0.270
400.00	-76.381	3.271	0.282	-0.108	0.005	0.028	-0.474	-1.451	0.282
420.00	-78.609	3.366	0.787	-0.112	0.006	-0.075	-0.491	-1.501	0.787
440.00	-80.348	3.469	-0.651	-0.122	0.007	0.045	-0.490	-1.554	-0.651
460.00	-82.122	3.568	0.241	-0.098	0.005	0.044	-0.570	-1.599	0.241
480.00	-85.422	3.652	0.146	-0.119	0.006	-0.069	-0.546	-1.658	0.146
490.00	-86.478	3.701	-0.550	-0.088	0.004	-0.071	-0.591	-1.684	-0.550
500.00	-87.248	3.769	-0.400	-0.226	-0.001	0.044	-0.438	-1.701	-0.400
520.00	-89.872	3.844	0.359	-0.077	0.006	0.035	-0.661	-1.754	0.359
540.00	-91.925	3.915	0.167	-0.124	0.002	-0.071	-0.594	-1.797	0.167
560.00	-94.420	3.971	-0.321	-0.128	0.002	0.047	-0.622	-1.846	-0.321
580.00	-97.278	3.984	0.627	-0.152	-0.000	0.048	-0.606	-1.884	0.627
600.00	-100.242	3.989	-0.532	-0.147	0.000	-0.068	-0.632	-1.932	-0.532
616.82	-101.786	3.964	-0.879	0.008	-0.002	0.006	-0.847	-1.952	-0.879
620.00	-101.776	3.957	-0.860	0.002	-0.002	0.006	-0.838	-1.960	-0.860
626.82	-101.759	3.942	-0.818	0.002	-0.002	0.006	-0.820	-1.974	-0.818

TABLE 5C
AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-IR STAGE FLIGHT DATA

FLIGHT TIME (SEC)	MASS (LB)	THRUST (TOTAL) (LB)	DRAG (LB)	LONGITUDINAL ACCELERATION (FT/SEC ²)	DYNAMIC PRESSURE (LB/FT ²)	A.H.I. (LB-FT/FT ² -RAD)	MACH NO.	PITCH ANGLE OF ATTACK (DEG)
1) -5.00	1299059.	0.	---	0.000	0.	0.	0.00	0.000
2) 0.00	129045.	1575301.	1223.	29.752	0.	0.	0.00	0.000
5.00	1254262.	1608531.	2045.	41.537	2.	77.	0.04	1.471
10.00	1223353.	1615700.	6238.	42.688	10.	1417.	0.09	2.831
15.00	1192304.	1630743.	8775.	44.134	25.	8229.	0.13	1.554
20.00	1161063.	1645569.	11042.	45.666	50.	29972.	0.19	1.054
25.00	1129704.	1659136.	15832.	47.179	85.	82096.	0.25	0.812
30.00	1098256.	1673671.	20349.	48.818	133.	197904.	0.33	0.289
35.00	1066743.	1688298.	26325.	50.515	193.	411858.	0.41	-0.063
40.00	1035188.	1703904.	34285.	52.287	264.	779758.	0.50	-0.209
45.00	1003609.	1719474.	40900.	54.212	344.	1369242.	0.60	-0.444
50.00	972014.	1735507.	48601.	56.240	430.	2250981.	0.72	-0.435
55.00	940417.	1751602.	74291.	57.796	516.	3537987.	0.85	-0.465
60.00	907293.	1763665.	126064.	57.753	516.	3545460.	0.85	-0.465
65.00	884695.	1552715.	151175.	50.234	551.	5180173.	0.97	1.732
70.00	857012.	1540664.	144444.	51.403	567.	7073525.	1.00	2.108
75.00	829297.	1545583.	120286.	53.271	572.	8750860.	1.20	0.709
80.00	801583.	1584447.	94177.	56.841	564.	9192042.	1.23	0.791
85.00	772876.	1591675.	76220.	60.217	540.	11522807.	1.40	0.628
90.00	746158.	1506064.	56010.	63.424	492.	14039044.	1.59	0.889
95.00	718653.	1600010.	41493.	66.877	418.	16572039.	1.81	1.381
100.00	691169.	1601812.	29423.	70.219	342.	19775291.	2.01	1.451
105.00	663704.	1602207.	21137.	72.650	276.	21697250.	2.21	1.415
110.00	636269.	1601552.	14095.	77.110	217.	23893971.	2.43	1.382
115.00	608870.	1600078.	10404.	80.710	167.	25838480.	2.67	1.394
120.00	581512.	1597926.	7113.	84.503	125.	27519160.	2.92	1.170
125.00	554206.	1555024.	2981.	88.541	91.	28924149.	3.16	1.021
130.00	526558.	1501402.	1702.	92.914	56.	30065975.	3.43	1.034
135.00	498792.	1587205.	728.	97.631	46.	30977699.	3.69	0.552
140.00	472699.	1582404.	-27.	102.740	23.	31686472.	3.97	0.084
145.00	445716.	1575708.	-978.	108.044	24.	32237829.	4.29	-0.756
150.00	418857.	1566983.	-1706.	108.339	24.	32661541.	4.67	-2.045
155.00	392201.	1565900.	-1733.	114.505	17.	32665396.	4.69	-2.084
160.00	364546.	152461.	-1529.	121.223	12.	33001063.	5.22	-0.449
165.00	336946.	152461.	-1353.	121.705	11.	33257461.	5.85	1.049
170.00	309299.	152461.	-1353.	47.477	6.	33272945.	5.89	1.124
175.00	281646.	152461.	-1353.	3.259	5.	33456042.	6.31	2.513
180.00	254096.	152461.	-1353.	3.024	5.	33485656.	6.36	2.827
185.00	226546.	152461.	-1353.	3.024	5.	33487202.	6.36	2.856

1) GRR; 2) First Motion; 3) Engine No. 4 Premature Shutdown; 4) Max. Dyn. Pressure; 5) Tilt Arrest; 6) IECO; 7) OEEO;

8) Sep. Signal; 9) Physical Sep.

TABLE 5C (Cont'd.)
AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-IB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	SPACE FIXED		PATH ANGLE		--- SPACE FIXED POSITION AND VELOCITY VECTOR COMPONENTS ---		DZ	
	RADIUS (FT)	VELOCITY (FT/S)	(DEG)	(FT)	Y (FT)	Z (FT)	DX (FT/S)	DY (FT/S)
-5.00	20909949.	1341.64	90.000	20909947.	55942.	-18177.	0.00	414.59
0.00	20909949.	1341.64	90.000	20909945.	58015.	-11797.	-0.43	414.37
5.00	20910055.	1342.36	88.130	20909960.	60086.	-5416.	42.04	414.05
10.00	20910257.	1344.69	86.008	20910204.	62155.	965.	92.32	413.71
15.00	20911002.	1350.11	83.627	20910903.	64223.	7346.	148.15	413.48
20.00	20911508.	1361.72	80.968	20911799.	66290.	13736.	211.63	413.23
25.00	20913152.	1382.03	78.094	20913031.	68255.	20155.	282.54	412.96
30.00	20914772.	1413.87	75.078	20914637.	70419.	26630.	361.03	412.60
35.00	20916806.	1460.13	72.023	20916654.	72481.	32203.	447.11	412.18
40.00	20919291.	1523.29	69.051	20919120.	74541.	39924.	540.56	411.78
45.00	20922264.	1605.35	66.283	20922071.	76599.	44859.	641.04	411.40
50.00	20925759.	1707.82	63.818	20925542.	78655.	54083.	748.17	411.00
55.00	20929809.	1829.77	61.721	20929563.	80709.	61678.	860.71	410.57
55.02	20929820.	1830.42	61.712	20929584.	80719.	61717.	861.27	410.57
60.00	20932345.	1941.74	60.833	20932076.	82772.	69705.	938.92	414.66
65.00	20934279.	2044.24	59.804	20933961.	84849.	78128.	1020.06	415.89
69.00	20936524.	2142.18	58.260	20936291.	86514.	85163.	1085.95	416.43
70.00	20944628.	2168.81	58.152	20944267.	86930.	86973.	1102.83	416.54
75.00	20950412.	2313.74	58.690	20950001.	89014.	96363.	1192.04	417.03
80.00	20956667.	2480.38	58.366	20956200.	91101.	106305.	1288.60	418.04
85.00	20963335.	2657.75	58.159	20962901.	93193.	117172.	1393.08	418.40
90.00	20970782.	2876.76	58.101	20970140.	95285.	128794.	1503.46	418.69
95.00	20978644.	3108.53	58.222	20977942.	97381.	141379.	1617.47	419.55
100.00	20987127.	3367.50	58.499	20984319.	99482.	155047.	1733.98	421.05
105.00	20996219.	3638.14	58.882	20995286.	101591.	169918.	1853.11	422.60
110.00	21005530.	3936.11	59.385	21004850.	103711.	186111.	1972.61	425.67
115.00	21016768.	4256.55	59.957	21015014.	105851.	203753.	2093.33	430.28
120.00	21027245.	4599.98	60.566	21025786.	108015.	222964.	2215.91	435.47
125.00	21038877.	4967.81	61.214	21037175.	110207.	243871.	2330.51	441.51
130.00	21051170.	5361.74	61.902	21049182.	112429.	266613.	2463.11	447.36
135.00	21064130.	5783.65	62.629	21061803.	114679.	291338.	2586.72	452.58
135.75	21077649.	6212.58	63.413	21074344.	116839.	316816.	2694.39	456.82
140.00	21077745.	6235.96	63.457	21075018.	116954.	318214.	2690.90	457.04
145.00	21092000.	6720.34	64.254	21088802.	119248.	347420.	2816.81	460.45
150.00	21106572.	7217.87	64.874	21102218.	121557.	379099.	2952.68	462.82
150.35	21108064.	7275.85	64.913	21104266.	121721.	381442.	2963.02	462.93
155.85	21125059.	7518.18	65.780	21120523.	124277.	418701.	2945.31	466.98
157.15	21125051.	7517.78	66.027	21124253.	124885.	427686.	2912.46	467.04
157.23	21125053.	7517.02	66.042	21124584.	124922.	428233.	2910.09	467.03

TABLE 5C (Cont'd.)
AS-204/14-1 I/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-IB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	POSITION (FT)	VELOCITY (FT/S)	PATH ANGLE (DEG)	----- EARTH FIXED X (FT)	Y (FT)	Z (FT)	VELOCITY (FT/S)	VECTOR COMPONENTS DX (FT/S) DY (FT/S) DZ (FT/S)
-5.00	113.	0.00	N/A	113.	-0.	0.	-0.00	-0.00
0.00	113.	0.00	N/A	113.	-0.	-0.	-0.00	0.00
5.00	220.	43.80	0.298	220.	-0.	0.	-0.10	0.03
10.00	561.	93.61	0.309	561.	-1.	0.	-0.25	-0.18
15.00	1166.	149.87	0.291	1166.	-3.	-1.	-0.30	0.16
20.00	2072.	213.81	0.983	2072.	-4.	6.	-0.39	2.25
25.00	3317.	285.36	2.303	3316.	-7.	40.	-0.52	11.15
30.00	4638.	365.00	4.095	4934.	-10.	129.	-0.74	25.70
35.00	6577.	452.39	6.312	6970.	-14.	312.	-1.04	49.41
40.00	9477.	551.25	8.884	9456.	-20.	642.	-1.32	84.64
45.00	12485.	659.52	11.750	12429.	-27.	1182.	-1.57	133.74
50.00	16051.	779.51	14.833	15925.	-36.	2007.	-1.82	198.94
55.00	20230.	911.21	17.965	19975.	-45.	3198.	-2.07	280.42
55.02	20252.	911.99	17.980	19997.	-45.	3205.	-2.07	280.87
60.00	24582.	1014.24	21.153	24512.	-45.	4817.	-2.26	365.44
65.10	30223.	1118.14	23.143	30448.	-30.	6826.	-3.73	438.89
69.00	34804.	1210.21	25.208	32694.	-13.	8728.	-4.51	514.94
70.00	36007.	1234.82	25.761	34798.	-8.	9253.	-4.59	536.20
75.00	42382.	1368.83	28.521	40583.	17.	12218.	-5.56	653.25
80.00	49439.	1522.61	31.305	46939.	48.	15820.	-7.04	790.98
85.00	57273.	1695.89	33.963	52607.	86.	20160.	-7.95	948.10
90.00	65582.	1891.97	36.525	60923.	128.	25327.	-8.92	1126.80
95.00	75664.	2108.25	39.063	68911.	176.	31468.	-10.59	1329.67
100.00	86425.	2346.19	41.509	77289.	225.	38674.	-13.06	1556.59
105.00	98366.	2605.83	43.819	86370.	307.	47073.	-15.74	1806.80
110.00	111554.	2887.52	46.035	96046.	396.	56785.	-20.15	2081.97
115.00	124222.	3192.07	48.117	104380.	512.	67922.	-26.20	2381.48
120.00	142366.	3520.46	50.051	117323.	660.	80640.	-33.25	2705.42
125.00	160152.	3873.91	51.866	128907.	846.	95031.	-41.31	3055.60
130.00	179708.	4254.05	53.585	141124.	1073.	111243.	-49.46	3434.27
135.00	201172.	4662.54	55.242	154005.	1340.	129426.	-57.30	3844.24
135.75	223458.	5078.66	56.806	166813.	1629.	148675.	-64.39	4266.69
140.00	244885.	5101.24	56.889	167502.	1546.	149745.	-64.76	4289.91
145.00	250399.	5573.42	58.414	181603.	1987.	172281.	-71.54	4768.55
150.00	278565.	6081.41	59.646	196377.	2360.	197474.	-77.57	5273.21
150.25	280555.	6118.81	59.723	197452.	2387.	199250.	-77.95	5310.05
155.55	312810.	6349.77	60.940	214168.	2836.	229249.	-85.22	5580.44
157.15	321804.	6245.44	61.220	218087.	2947.	236616.	-85.88	5593.75
157.22	322280.	6345.49	61.247	218323.	2954.	237058.	-85.90	5593.91

TABLE 5C (Cont'd.)
AS-204/DM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-IB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	ALTITUDE (FT)	RANGE (NM)	VELOCITY VECTOR SPACE FIXED (DEG)	EARTH FIXED AZIMUTH (DEG)	LONGITUDE (POS. EAST) (DEG)	GEOCENTRIC DECLINATION (DEG)	GEOCENTRIC LATITUDE (DEG)
-5.00	112.	0.000	90.000	N/A	-80.565	28.371	28.532
0.00	112.	0.000	90.000	N/A	-80.565	28.371	28.532
5.00	218.	0.000	80.900	N/A	-80.565	28.371	28.532
10.00	560.	0.000	80.081	N/A	-80.565	28.371	28.532
15.00	1165.	-0.001	80.068	N/A	-80.565	28.371	28.532
20.00	2071.	0.002	80.014	56.743	-80.565	28.371	28.532
25.00	3315.	0.007	80.709	65.594	-80.565	28.371	28.532
30.00	4935.	0.022	80.504	68.224	-80.565	28.371	28.532
35.00	6965.	0.053	80.277	69.419	-80.564	28.371	28.532
40.00	9454.	0.107	88.825	70.125	-80.563	28.371	28.532
45.00	12428.	0.196	88.260	70.594	-80.561	28.372	28.532
50.00	15924.	0.333	87.558	70.907	-80.559	28.373	28.534
55.00	18975.	0.529	86.762	71.111	-80.556	28.374	28.535
55.02	18996.	0.530	86.759	71.112	-80.556	28.374	28.535
60.00	24513.	0.795	86.166	71.966	-80.551	28.375	28.536
65.00	29448.	1.126	85.625	72.128	-80.545	28.377	28.538
69.00	33675.	1.439	85.088	72.189	-80.539	28.378	28.539
70.00	34709.	1.525	84.944	72.197	-80.538	28.379	28.540
75.00	40585.	2.012	84.206	72.223	-80.529	28.381	28.542
80.00	46844.	2.505	83.453	72.280	-80.518	28.384	28.545
85.00	52615.	3.317	82.686	72.282	-80.505	28.388	28.549
90.00	60937.	4.167	81.923	72.282	-80.490	28.392	28.552
95.00	68824.	5.172	81.212	72.312	-80.472	28.397	28.558
100.00	77323.	6.352	80.542	72.362	-80.451	28.403	28.564
105.00	86422.	7.728	79.916	72.406	-80.426	28.410	28.571
110.00	96142.	9.317	79.241	72.487	-80.397	28.418	28.579
115.00	106480.	11.139	78.874	72.592	-80.364	28.427	28.588
120.00	117477.	13.214	78.428	72.691	-80.327	28.438	28.598
125.00	129121.	15.553	78.049	72.790	-80.284	28.449	28.610
130.00	141427.	18.206	77.661	72.870	-80.236	28.462	28.623
135.00	154401.	21.167	77.257	72.932	-80.183	28.477	28.637
135.75	167326.	24.299	77.058	72.976	-80.126	28.492	28.652
140.00	180322.	28.473	77.043	72.978	-80.123	28.493	28.652
145.00	192307.	32.152	76.751	73.010	-80.056	28.511	28.671
150.00	198300.	36.226	76.485	73.033	-79.982	28.530	28.691
150.35	198392.	36.530	76.487	73.034	-79.977	28.532	28.692
155.85	215411.	37.394	76.401	73.115	-79.889	28.556	28.716
157.15	219410.	38.571	76.408	73.131	-79.867	28.561	28.721
157.23	219652.	38.643	76.409	73.132	-79.866	28.562	28.722

TABLE 5C (Cont'd.)
AS-20A/1M-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-1R STAGE FLIGHT DATA

FLIGHT TIME (SFC)	VEHICLE ATTITUDE ANGLE			VEHICLE ATTITUDE RATE			VEHICLE ATTITUDE ERROR		
	PITCH (DEG)	YAW (DEG)	ROLL (DEG)	PITCH (DEG/S)	YAW (DEG/S)	ROLL (DEG/S)	PITCH (DEG)	YAW (DEG)	ROLL (DEG)
-5.00	0.000	0.000	12.000	-0.003	0.001	-0.002	0.000	0.000	0.000
0.00	-0.017	0.006	17.990	-0.003	0.001	-0.002	-0.017	-0.006	-0.010
5.00	-0.013	-0.015	18.004	-0.007	-0.004	-0.003	-0.013	-0.015	0.004
10.00	-0.003	-0.013	18.001	-0.000	-0.000	0.000	-0.003	-0.019	0.001
15.00	-0.567	-0.001	14.384	-0.117	-0.013	-1.087	0.109	-0.001	1.184
20.00	-1.500	0.012	9.387	-0.229	-0.001	-1.002	0.195	0.012	1.187
25.00	-2.863	0.002	4.385	-0.313	-0.004	-1.000	0.267	0.002	1.185
30.00	-4.638	-0.022	-0.007	-0.394	-0.004	-0.169	0.323	-0.022	-0.007
35.00	-6.800	-0.023	0.000	-0.469	-0.000	-0.001	0.365	-0.023	0.000
40.00	-9.312	-0.024	-0.002	-0.536	-0.000	-0.000	0.410	-0.024	-0.002
45.00	-12.139	-0.027	-0.005	-0.595	-0.001	-0.001	0.476	-0.027	-0.005
50.00	-15.057	-0.027	-0.008	-0.563	-0.001	0.001	0.529	-0.027	-0.008
55.00	-18.088	-0.029	-0.010	-0.609	-0.001	-0.000	0.599	-0.029	-0.010
55.02	-18.103	-0.029	-0.010	-0.609	-0.001	-0.000	0.599	-0.029	-0.010
60.00	-18.321	-0.024	-0.116	0.210	-0.087	-0.774	0.236	-0.094	-0.116
65.00	-20.299	-0.186	-1.759	-0.975	-0.009	0.193	0.496	-0.186	-1.759
69.00	-23.437	-0.214	0.260	-0.531	-0.001	-0.111	-0.168	-0.214	0.260
70.00	-24.005	-0.212	0.042	-0.498	0.006	-0.273	-0.042	-0.212	0.042
75.00	-26.861	-0.203	-0.002	-0.602	0.003	0.096	0.261	-0.203	-0.002
80.00	-29.342	-0.165	-0.082	-0.576	-0.027	-0.023	0.392	-0.165	-0.023
85.00	-32.569	-0.273	-0.470	-0.580	-0.002	-0.101	0.595	-0.273	-0.082
90.00	-35.641	-0.413	-0.544	-0.569	0.001	-0.016	0.524	-0.413	-0.016
95.00	-38.431	-0.216	-0.544	-0.536	0.007	0.020	0.498	-0.216	-0.020
100.00	-40.956	-0.172	-0.464	-0.496	0.011	0.019	0.495	-0.172	-0.019
105.00	-43.288	-0.005	-0.588	-0.542	0.050	0.087	0.596	-0.005	-0.087
110.00	-45.704	-0.106	-0.198	-0.422	0.031	-0.026	0.331	-0.106	-0.026
115.00	-47.769	0.106	-0.093	-0.396	0.006	0.031	0.205	0.106	-0.031
120.00	-49.594	0.115	-0.012	-0.383	-0.002	0.001	0.176	0.115	-0.012
125.00	-51.883	0.230	0.109	-0.397	-0.030	0.012	-0.031	0.230	0.109
130.00	-54.316	0.107	0.158	-0.468	-0.011	0.003	0.095	0.107	0.158
135.00	-56.536	0.020	0.168	-0.552	-0.018	0.001	0.261	0.020	0.168
140.00	-59.289	-0.070	0.196	-0.560	-0.020	0.141	0.046	-0.070	0.196
145.00	-59.520	-0.075	0.239	-0.488	-0.022	0.206	-0.085	-0.075	0.239
150.00	-59.493	-0.173	0.055	0.026	-0.012	-0.004	-0.058	-0.173	0.055
150.00	-59.419	-0.302	0.166	0.028	-0.023	-0.011	0.015	-0.302	0.166
150.35	-59.410	-0.210	0.162	0.027	-0.023	-0.008	0.025	-0.210	0.162
155.65	-59.284	-0.265	0.003	0.012	-0.022	0.019	0.151	-0.265	0.019
157.15	-59.257	-0.261	0.024	0.007	-0.012	0.017	0.168	-0.261	0.024
157.23	-59.266	-0.292	0.025	0.007	-0.012	0.017	0.168	-0.292	0.025

TABLE 6C
AS-204/IM-1 I/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-IVR STAGE FLIGHT DATA

	FLIGHT TIME (SEC)	MASS (LB)	THRUST (TOTAL) (LB)	DRAW (LB)	LONGITUDINAL ACCELERATION (FT/SEC ²)	DYNAMIC PRESSURE (LB/FT ²)	A.H.I. (LB-FT/FT ² -RAD)	MACH NO.	PITCH ANGLE OF ATTACK (DEG)
1)	157.22	296213.	8749.	412.	0.907	5.	33489899.	6.26	2.856
2)	158.55	296130.	8625.	349.	0.900	4.	33514872.	6.29	3.318
3)	160.00	296091.	8483.	294.	0.892	4.	33527607.	6.42	4.118
4)	161.85	295996.	85626.	265.	9.283	2.	33549758.	6.45	4.782
5)	161.85	295643.	179392.	237.	19.498	2.	33561091.	6.48	5.165
6)	164.55	294416.	179392.	237.	19.498	2.	33561091.	6.48	5.165
7)	169.15	292205.	156762.	164.	21.485	2.	33588149.	6.60	4.607
	173.50	289737.	220494.	91.	24.262	1.	33615828.	6.82	5.322
	180.00	286247.	220731.	52.	24.506	1.	33630453.	7.05	6.292
	200.00	275823.	222221.	25.	24.967	0.	33641172.	7.22	11.575
	220.00	265251.	224287.	2.	26.162	0.	33647812.	6.82	13.339
	240.00	254694.	224309.	0.	27.237	0.	33648357.	6.21	16.179
	260.00	244145.	224191.	0.	28.335	0.	33648489.	5.12	17.905
	280.00	233095.	224562.	0.	29.544	0.	33648452.	4.48	19.010
	300.00	212575.	224374.	0.	30.927	0.	33648452.	4.30	20.049
	320.00	202064.	223794.	0.	32.275	0.	33648452.	4.30	20.966
	340.00	191554.	224152.	0.	33.926	0.	33648452.	4.38	21.167
	360.00	181041.	224063.	0.	35.676	0.	33648452.	4.53	21.284
	380.00	170549.	223925.	0.	37.652	0.	33648452.	4.73	21.070
	400.00	160061.	223372.	0.	39.795	0.	33648452.	4.99	20.726
	420.00	149560.	223637.	0.	42.139	0.	33648452.	5.29	20.157
	440.00	139071.	222750.	0.	44.933	0.	33648452.	5.63	19.204
	460.00	128499.	222353.	0.	48.114	0.	33648452.	6.01	18.327
	480.00	118746.	222750.	0.	51.522	0.	33648452.	6.43	17.226
8)	500.00	109803.	210167.	0.	55.627	0.	33648452.	6.90	16.007
	520.00	101081.	198577.	0.	54.752	0.	33648452.	7.14	15.491
	540.00	92455.	186689.	0.	53.416	0.	33648452.	7.39	15.143
	560.00	83926.	184082.	0.	55.255	0.	33648528.	7.89	13.678
	580.00	75431.	181211.	0.	59.422	0.	33648528.	8.46	12.646
	600.00	68245.	180233.	0.	64.058	0.	33648528.	9.07	11.140
9)	616.82	62126.	181240.	0.	70.200	0.	33648735.	9.72	9.236
	620.00	62126.	180233.	0.	77.346	0.	33648850.	10.42	7.180
10)	626.82	62126.	360.	0.	84.819	0.	33648865.	11.04	6.616
		62126.	360.	0.	0.170	0.	33648865.	11.05	6.825
		62126.	360.	0.	0.170	0.	33648865.	11.05	7.318

1) Physical Sep.; 2) J-2 Start Command; 3) Ullage Rocket Burnout; 4) 90% Thrust Level; 5) Command P. U. Activation;
6) Ullage Case Jettison; 7) ICM Initiation; 8) EMR Shift Sensed by ICM; 9) Guidance Cutoff Signal; 10) Orbit Insertion.

TABLE 6C (Cont'd.)
AS-204/IN-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	EARTH FIXED		PATH ANGLE (DEG)	EARTH FIXED POSITION AND VELOCITY			VELOCITY VECTOR COMPONENTS		
	POSITION (FT)	VELOCITY (FT/S)		X (FT)	Y (FT)	Z (FT)	DX (FT/S)	DY (FT/S)	DZ (FT/S)
157.23	322289.	6345.49	61.247	218223.	2054.	237058.	2994.34	85.90	5593.91
158.55	330394.	6326.74	61.547	222252.	3068.	244448.	2954.34	86.25	5593.95
160.00	339237.	6306.48	61.877	226491.	3193.	252534.	2910.60	86.62	5593.98
160.90	344758.	6296.64	62.082	229112.	3271.	257504.	2884.74	86.81	5596.29
161.85	350552.	6296.91	62.287	231842.	3353.	262015.	2863.37	86.82	5607.55
161.85	350552.	6296.91	62.287	231842.	3353.	262015.	2863.37	86.82	5607.55
164.55	367046.	6314.43	62.863	239502.	3588.	278117.	2810.66	86.73	5653.73
169.15	355276.	6353.91	63.842	252227.	3987.	304317.	2723.48	87.09	5739.95
173.50	422131.	6400.12	64.745	263891.	4367.	329450.	2645.03	87.40	5827.33
180.00	462472.	6474.03	66.018	280712.	4941.	367752.	2533.22	90.56	5957.16
200.00	550518.	6736.69	69.581	328134.	6914.	490909.	2208.96	107.32	6263.32
220.00	723709.	7052.86	72.856	369083.	9200.	622451.	1886.53	132.56	6794.61
240.00	863124.	7417.40	75.302	402610.	12246.	762844.	1566.66	162.56	7248.33
260.00	1005666.	7829.91	78.427	431754.	15826.	912559.	1247.72	196.03	7727.37
280.00	1164255.	8288.52	80.736	452523.	20111.	1072112.	928.94	233.08	8233.00
300.00	1327872.	8792.90	82.749	468900.	25175.	1242072.	608.65	274.02	8767.53
320.00	1501438.	9343.97	84.491	477827.	31059.	1422033.	284.59	316.26	9334.28
340.00	1685566.	9942.40	85.970	480262.	37875.	1615672.	-43.01	366.24	9935.56
360.00	1882472.	10589.49	87.214	476077.	45742.	1820703.	-376.66	421.33	10574.39
380.00	2052033.	11289.18	88.244	465126.	54765.	2038934.	-719.16	481.90	11255.94
400.00	2315765.	12042.35	89.076	447244.	65057.	2271225.	-1071.94	548.30	11982.01
420.00	2554842.	12854.86	89.729	422160.	76741.	2518552.	-1439.25	621.26	12759.03
440.00	2810581.	13735.01	90.219	389598.	89956.	2781002.	-1821.92	701.56	13595.54
460.00	3084428.	14688.52	90.557	360152.	104859.	3062808.	-2226.60	790.15	14497.26
480.00	3377532.	15721.71	90.754	300374.	121622.	3362251.	-2655.95	887.78	15470.29
490.00	3532562.	16261.16	90.812	272689.	130759.	3519593.	-2882.75	939.58	15975.99
500.00	3652465.	16785.54	90.861	242696.	140413.	3681805.	-3116.77	991.34	16463.82
520.00	4027813.	17842.75	90.942	175392.	161291.	4020759.	-3620.11	1097.59	17437.14
540.00	4344435.	18964.43	90.993	97721.	184279.	4379667.	-4152.96	1212.90	18466.38
560.00	4764578.	20183.16	90.769	8957.	209878.	4759944.	-4731.62	1338.93	19574.96
580.00	5165569.	21508.33	90.547	-01015.	239017.	5163269.	-5367.02	1477.21	20775.50
600.00	5602034.	22974.30	90.261	-206258.	269063.	5591766.	-6081.99	1629.96	22094.60
614.83	5569347.	24329.73	90.005	-314372.	297664.	5673680.	-6770.77	1770.46	23201.45
620.00	6064406.	24252.85	89.998	-325957.	302384.	6047493.	-6858.32	1777.14	23299.50
626.83	6226234.	24353.86	89.906	-363437.	315451.	6206505.	-7038.62	1787.27	23245.95

TABLE 6C (Cont'd.)
AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	ALTITUDE (FT)	RANGE (NM)	VELOCITY VECTOR SPACE FIXED (DFG)	EARTH FIXED AZIMUTH (DEG)	LONGITUDE (POS. EAST) (DFG)	GEOCENTRIC DECLINATION (DEG)	GEODETTIC LATITUDE (DFG)
157.23	213652.	38.643	76.400	73.132	-79.866	28.562	28.722
158.55	221665.	39.840	76.422	73.147	-79.844	28.567	28.728
160.00	227008.	41.149	76.426	73.163	-79.821	28.574	28.734
160.90	230680.	41.968	76.442	73.173	-79.806	28.578	28.738
161.85	233475.	42.829	76.442	73.179	-79.790	28.582	28.742
161.85	233475.	42.829	76.442	73.179	-79.790	28.582	28.742
164.55	241329.	45.288	76.425	73.105	-79.745	28.594	28.754
165.15	254413.	49.523	76.422	73.225	-79.660	28.614	28.774
173.50	266451.	53.581	76.408	73.254	-79.595	28.623	28.794
180.00	293000.	59.760	76.411	73.323	-79.483	28.663	28.823
200.00	333801.	79.584	76.486	73.605	-79.122	28.757	28.917
220.00	378178.	100.509	76.627	73.953	-78.737	28.855	29.015
240.00	417247.	123.100	76.805	74.320	-78.325	28.958	29.118
260.00	451240.	147.142	77.007	74.720	-77.886	29.064	29.224
280.00	490289.	172.650	77.223	75.124	-77.416	29.174	29.335
300.00	504027.	199.818	77.483	75.544	-76.915	29.289	29.450
320.00	525096.	228.755	77.742	75.962	-76.370	29.408	29.568
340.00	541159.	259.584	78.047	76.418	-75.806	29.520	29.691
360.00	552403.	292.427	78.370	76.894	-75.194	29.656	29.818
380.00	562170.	327.463	78.728	77.391	-74.530	29.786	29.948
400.00	567622.	364.820	79.127	77.909	-73.830	29.919	30.081
420.00	570294.	404.684	79.548	78.452	-73.088	30.055	30.218
440.00	570489.	447.256	80.001	79.021	-72.284	30.184	30.357
460.00	568544.	492.764	80.400	79.619	-71.422	30.324	30.498
480.00	555253.	541.454	81.018	80.250	-70.464	30.476	30.640
490.00	563143.	567.074	81.207	80.578	-70.008	30.547	30.711
500.00	560801.	593.549	81.586	80.913	-69.502	30.618	30.782
520.00	555465.	649.026	82.103	81.607	-68.441	30.758	30.923
540.00	549627.	708.000	82.842	82.338	-67.308	30.895	31.061
560.00	544018.	770.741	83.527	83.109	-66.099	31.028	31.194
580.00	535335.	827.567	84.278	83.922	-64.808	31.153	31.320
600.00	535202.	908.380	85.069	84.782	-63.426	31.270	31.437
616.82	535410.	972.720	85.776	85.545	-62.185	31.360	31.527
620.00	535428.	985.000	85.000	85.685	-61.945	31.376	31.543
626.82	535463.	1011.784	86.195	85.987	-61.425	31.408	31.575

TABLE 6C (Cont'd.)
AS-204/IN-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORY NO. 3
S-IVB STAGE FLIGHT DATA

FLIGHT TIME (SEC)	VEHICLE ATTITUDE ANGLE			VEHICLE ATTITUDE RATE			VEHICLE ATTITUDE ERROR		
	PITCH (DEG)	YAW (DEG)	ROLL (DEG)	PITCH (DEG/S)	YAW (DEG/S)	ROLL (DEG/S)	PITCH (DEG)	YAW (DEG)	ROLL (DEG)
157.23	-59.266	-0.292	0.025	0.007	-0.012	0.017	0.168	-0.292	0.025
158.55	-59.121	-0.361	0.055	0.212	-0.091	0.028	0.314	-0.361	0.055
160.00	-58.651	-0.553	0.103	0.429	-0.175	0.038	0.784	-0.553	0.103
160.90	-58.225	-0.727	0.144	0.424	-0.188	0.061	1.210	-0.727	0.144
161.85	-58.053	-0.843	0.241	-0.124	-0.027	0.148	1.372	-0.843	0.241
161.85	-58.063	-0.843	0.241	-0.124	-0.037	0.148	1.372	-0.843	0.241
164.55	-59.234	-0.615	0.215	-0.271	0.099	-0.010	0.201	-0.615	0.215
165.15	-59.567	-0.504	0.157	0.025	-0.006	0.002	-0.132	-0.504	0.157
173.50	-59.571	-0.510	0.262	-0.010	0.001	0.041	-0.127	-0.510	0.262
180.00	-55.663	1.093	0.390	0.177	-0.011	0.062	0.084	-0.435	0.390
200.00	-57.916	1.418	0.685	-0.108	0.088	0.018	-0.061	-0.648	0.685
220.00	-59.526	2.108	0.516	-0.084	0.011	-0.087	-0.100	-0.552	0.516
240.00	-61.051	2.269	-0.496	-0.106	0.007	0.013	-0.056	-0.564	-0.496
260.00	-62.803	2.400	-0.248	-0.084	0.006	0.012	-0.117	-0.580	-0.248
280.00	-64.669	2.523	0.007	-0.067	0.007	0.013	-0.108	-0.604	0.007
300.00	-66.316	2.626	0.246	-0.132	-0.089	0.013	-0.127	-0.642	0.246
320.00	-68.364	2.745	0.519	-0.089	0.020	0.013	-0.441	-1.289	0.519
340.00	-70.239	2.929	0.771	-0.069	0.007	0.013	-0.426	-1.314	0.771
360.00	-72.294	3.053	0.139	-0.103	0.005	-0.050	-0.446	-1.355	0.139
380.00	-74.312	3.162	-0.270	-0.103	0.004	0.028	-0.452	-1.404	-0.270
400.00	-76.381	3.271	0.283	-0.103	0.005	0.028	-0.474	-1.451	0.283
420.00	-78.409	3.366	0.787	-0.113	0.006	-0.075	-0.491	-1.501	0.787
440.00	-80.868	3.468	-0.651	-0.123	0.007	0.045	-0.499	-1.554	-0.651
460.00	-83.123	3.568	0.241	-0.058	0.005	0.044	-0.570	-1.599	0.241
480.00	-85.423	3.653	0.146	-0.119	0.006	-0.059	-0.546	-1.658	0.146
490.00	-86.478	3.701	-0.550	-0.089	0.004	-0.071	-0.591	-1.684	-0.550
500.00	-87.348	3.769	-0.400	-0.236	-0.001	0.044	-0.438	-1.701	-0.400
520.00	-89.872	3.844	0.359	-0.077	0.006	0.035	-0.661	-1.754	0.359
540.00	-91.025	3.915	0.167	-0.134	0.002	-0.071	-0.594	-1.797	0.167
560.00	-94.430	3.971	-0.321	-0.128	0.002	0.047	-0.622	-1.846	-0.321
580.00	-97.278	3.984	0.637	-0.154	-0.000	0.048	-0.606	-1.884	0.637
600.00	-100.342	3.989	-0.532	-0.147	0.000	-0.068	-0.632	-1.932	-0.532
616.83	-101.786	3.964	-0.979	0.008	-0.003	0.006	-0.847	-1.952	-0.979
620.00	-101.776	3.957	-0.860	0.003	-0.002	0.006	-0.838	-1.960	-0.860
626.83	-101.759	3.942	-0.813	0.002	-0.002	0.006	-0.820	-1.974	-0.813

Figure 1C

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ALTITUDE HISTORY

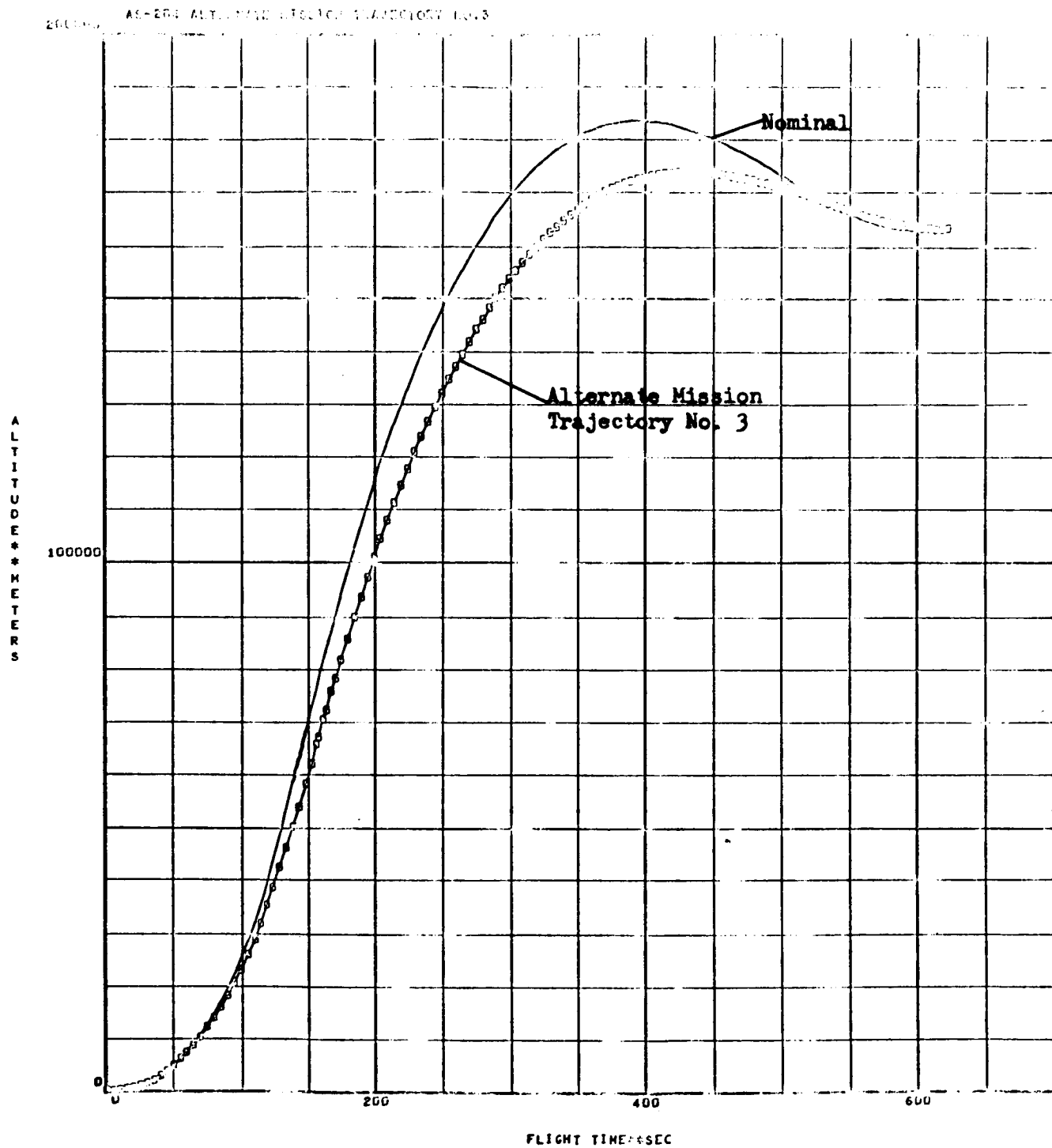


Figure 2C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
GROUND RANGE HISTORY

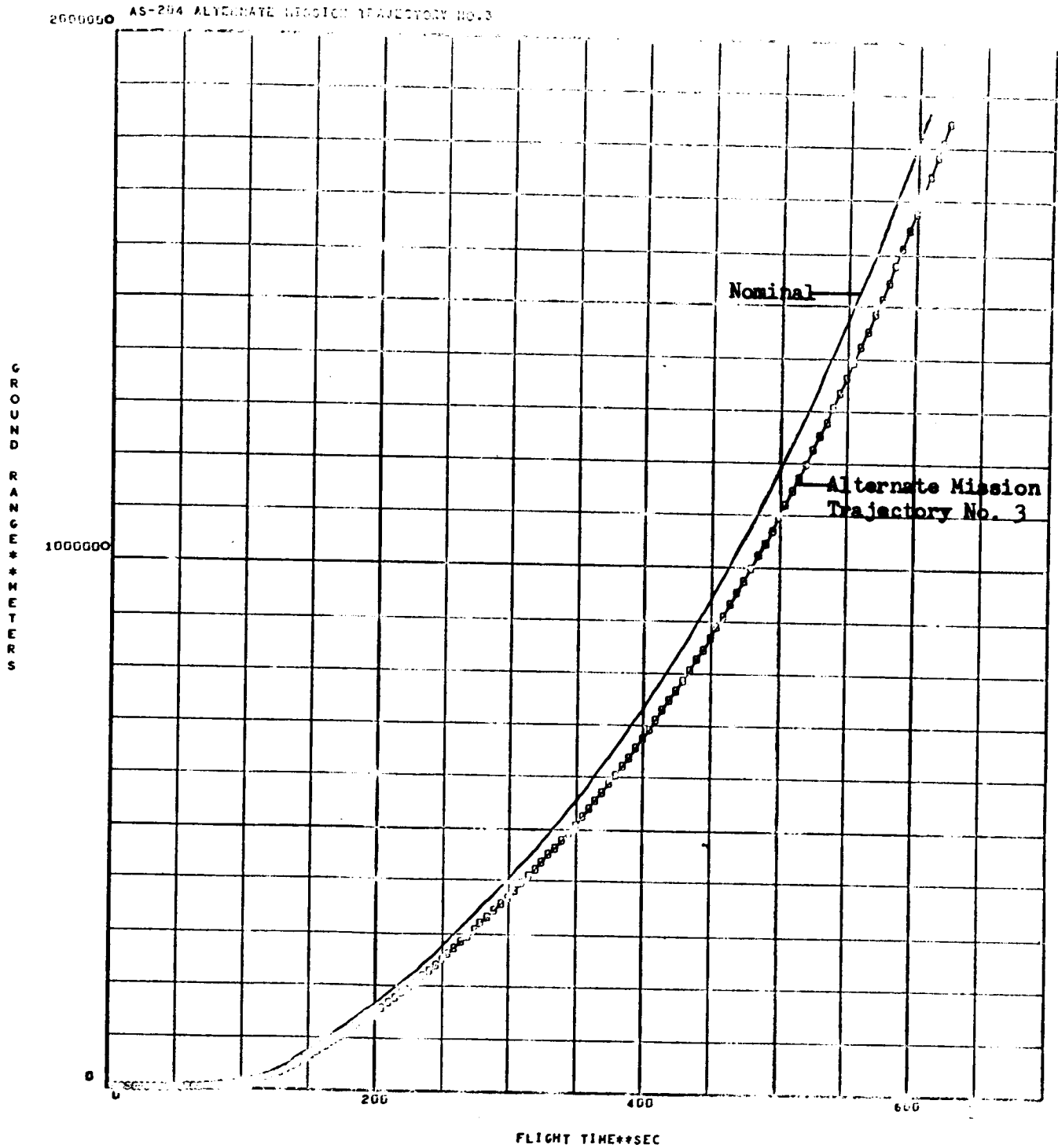


Figure 3C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
SPACE FIXED VELOCITY HISTORY

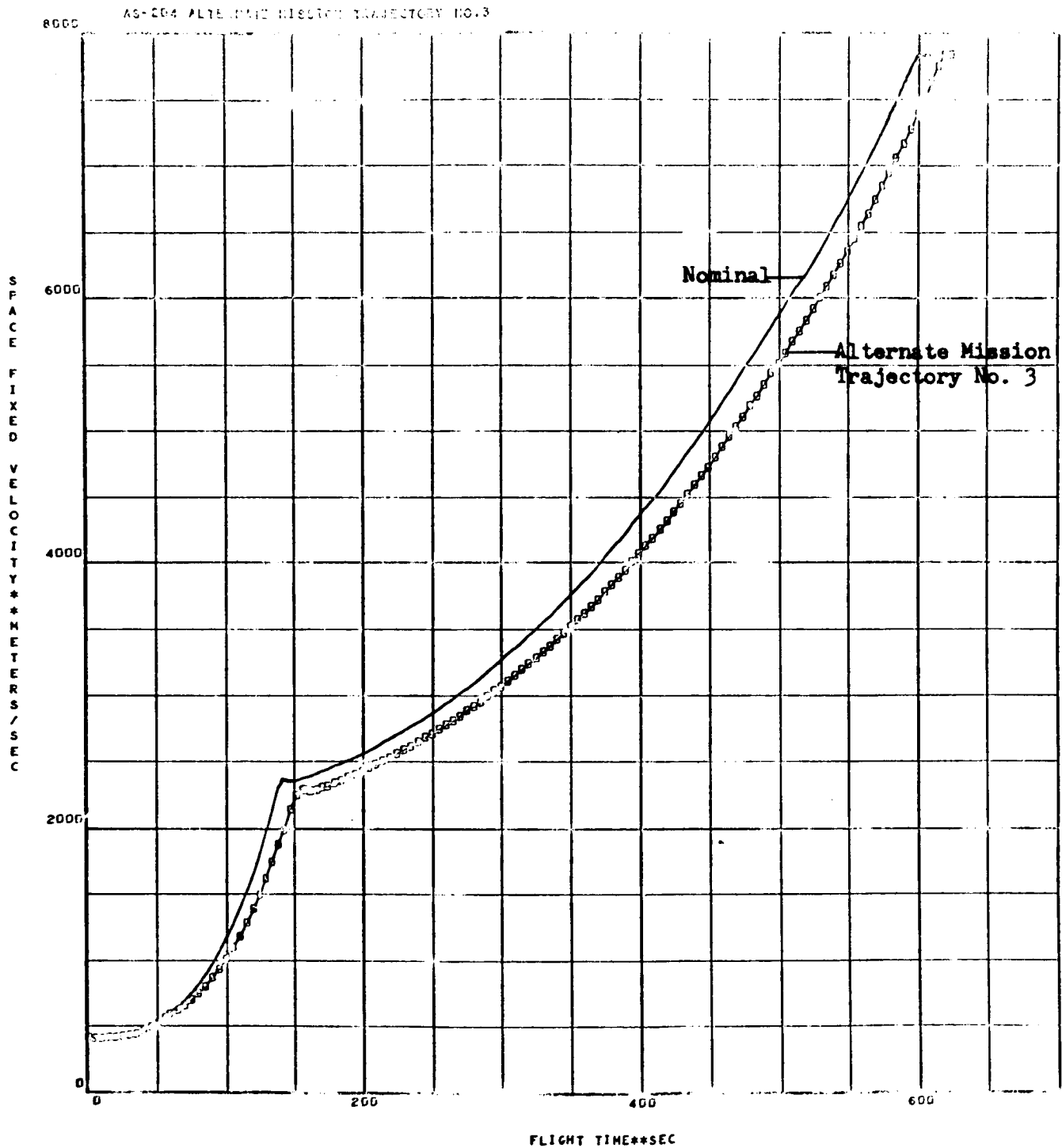


Figure 4C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
SPACE FIXED PATH ANGLE HISTORY

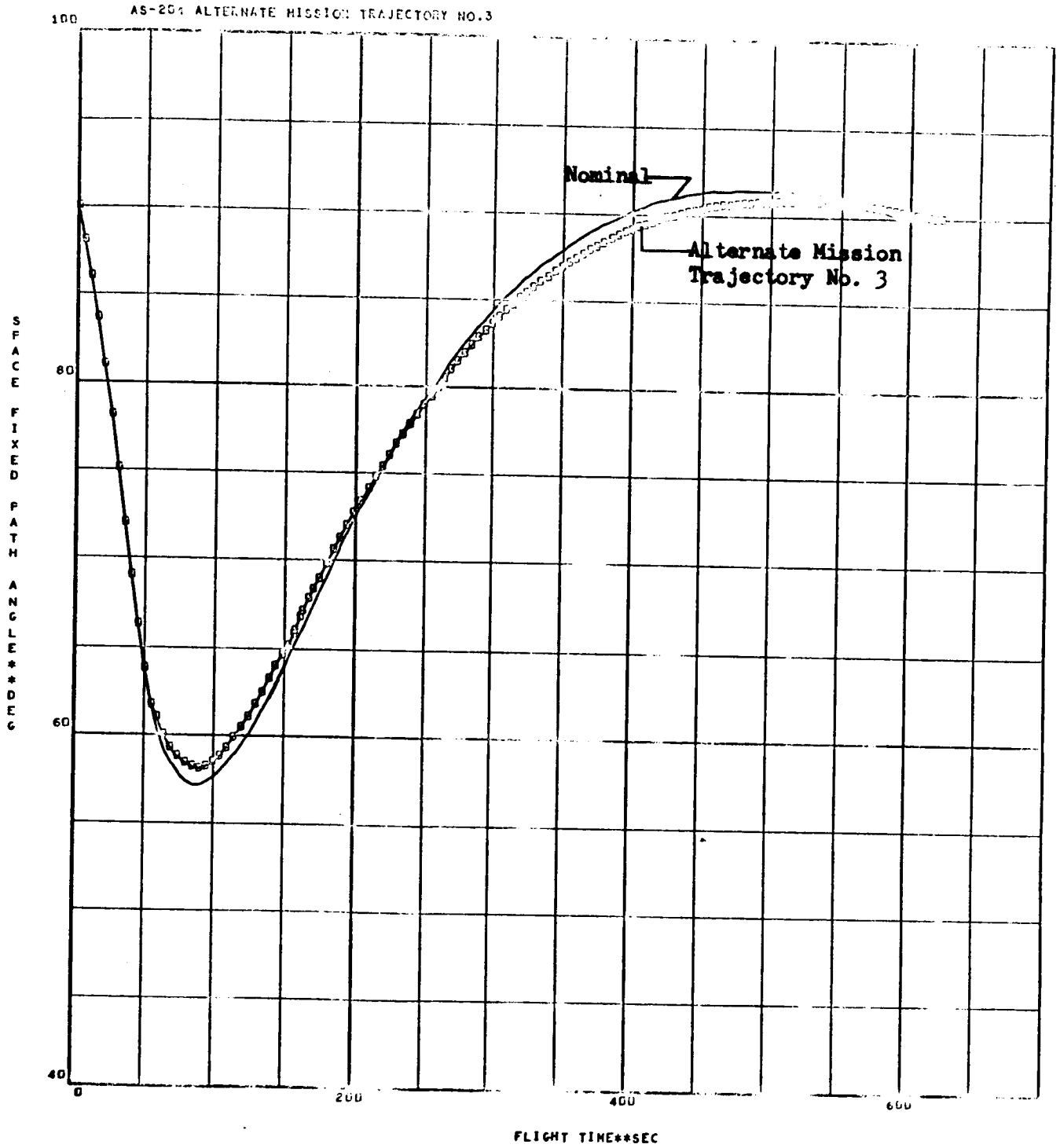


Figure 5C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
SPACE FIXED AZIMUTH HISTORY

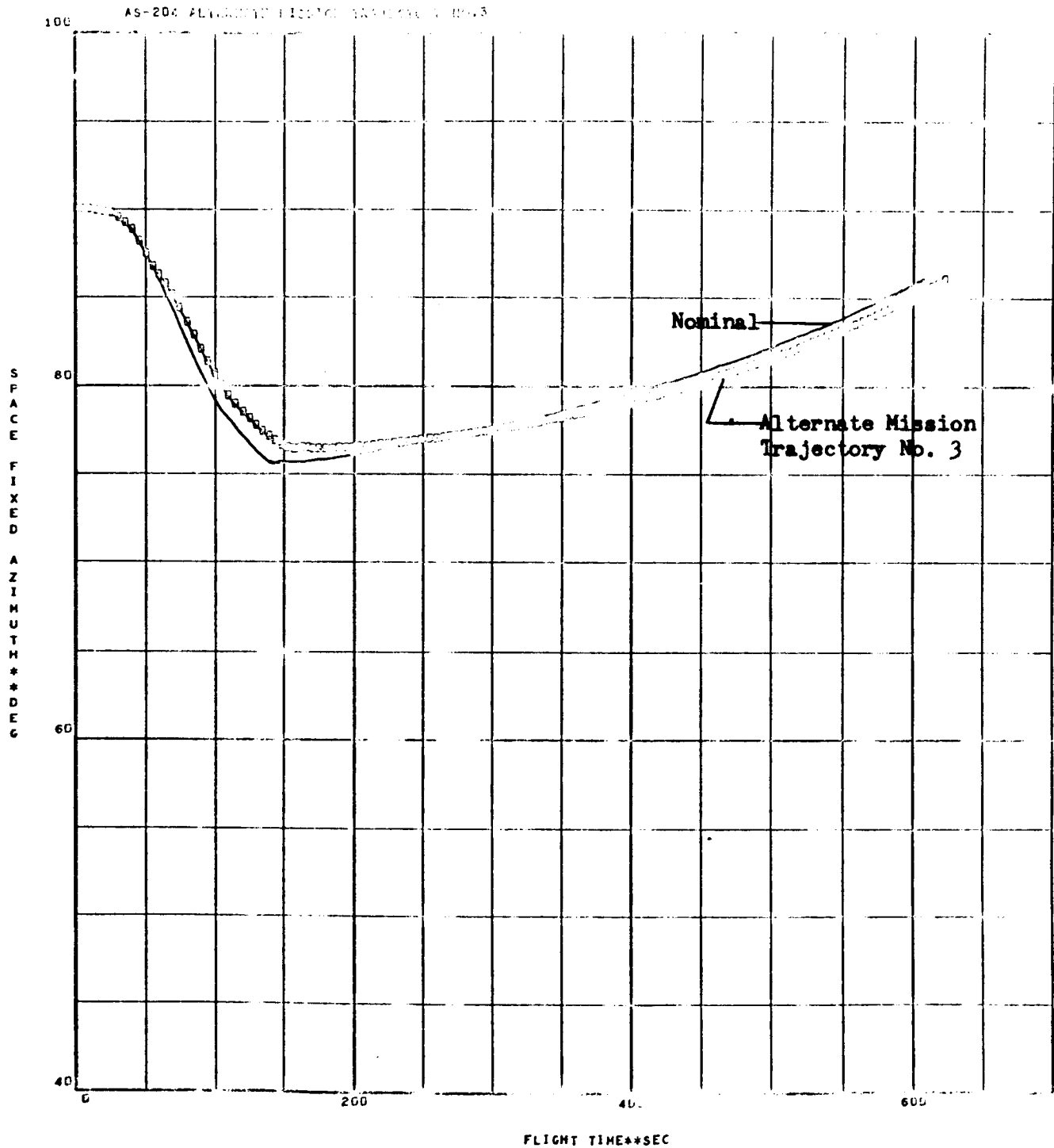


Figure 6C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
TRAJECTORY PROFILE

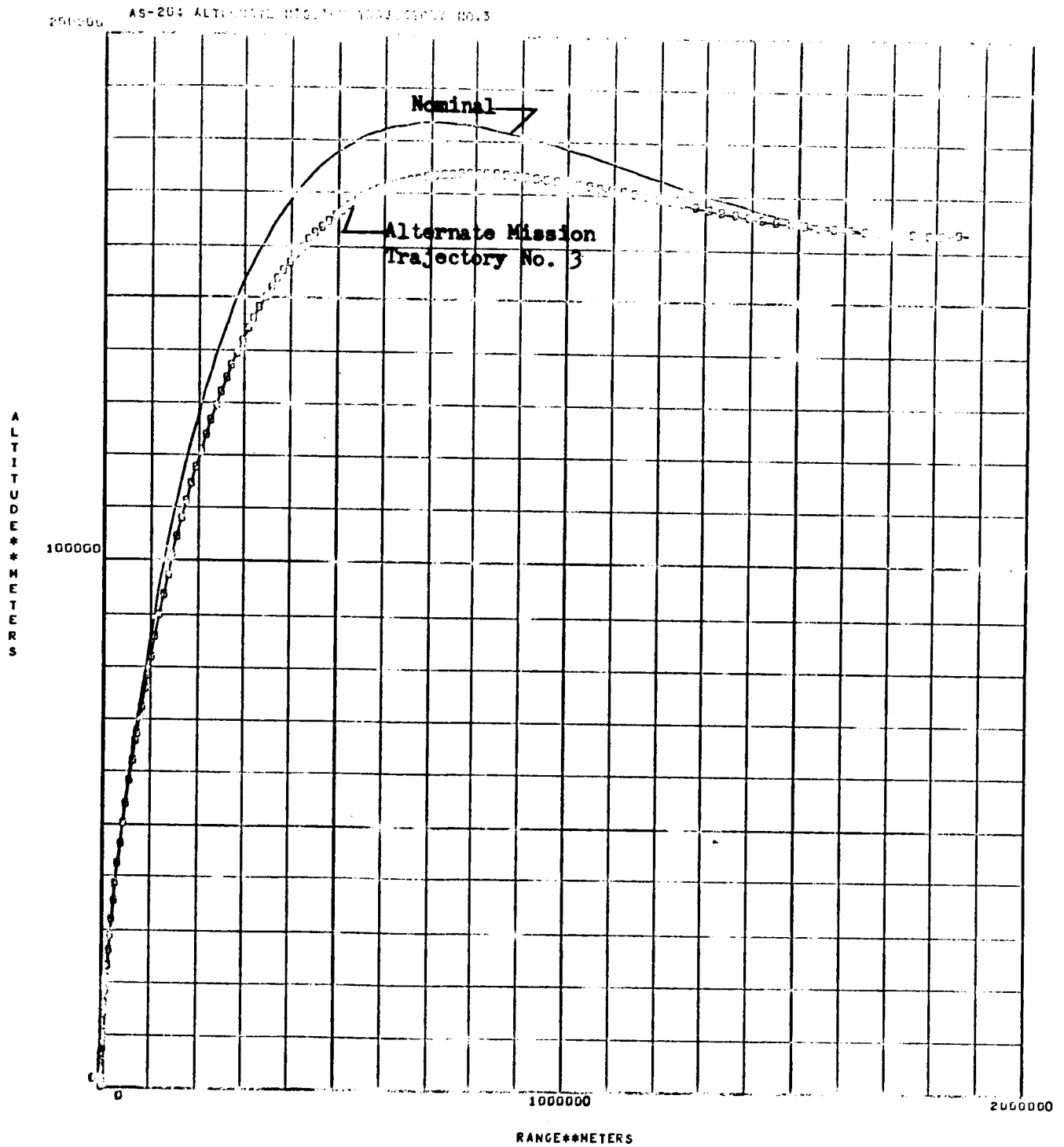


Figure 7C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ANGLE OF ATTACK HISTORY
S-IB STAGE

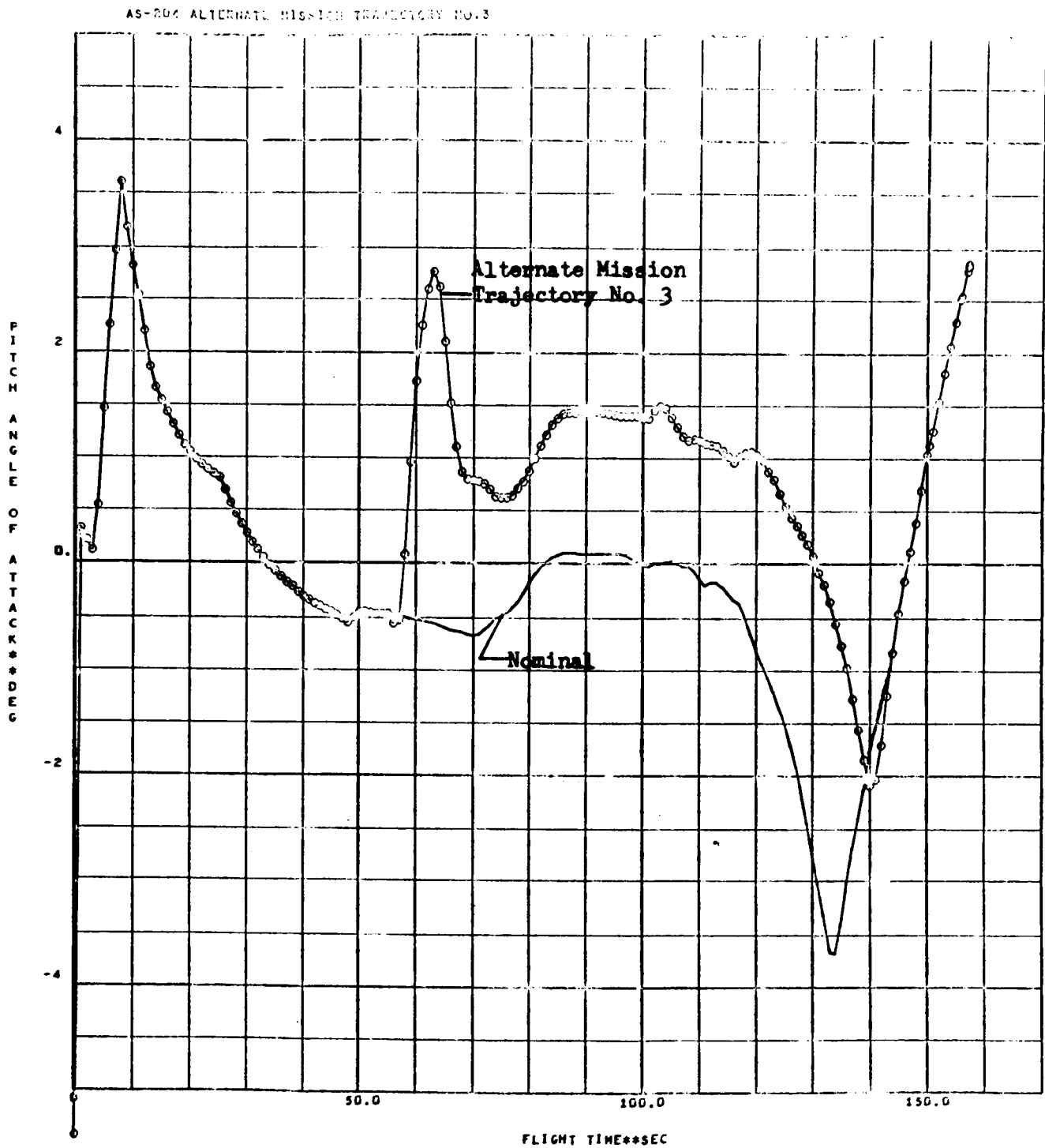


Figure 8C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ANGLE OF ATTACK HISTORY
S-IB STAGE

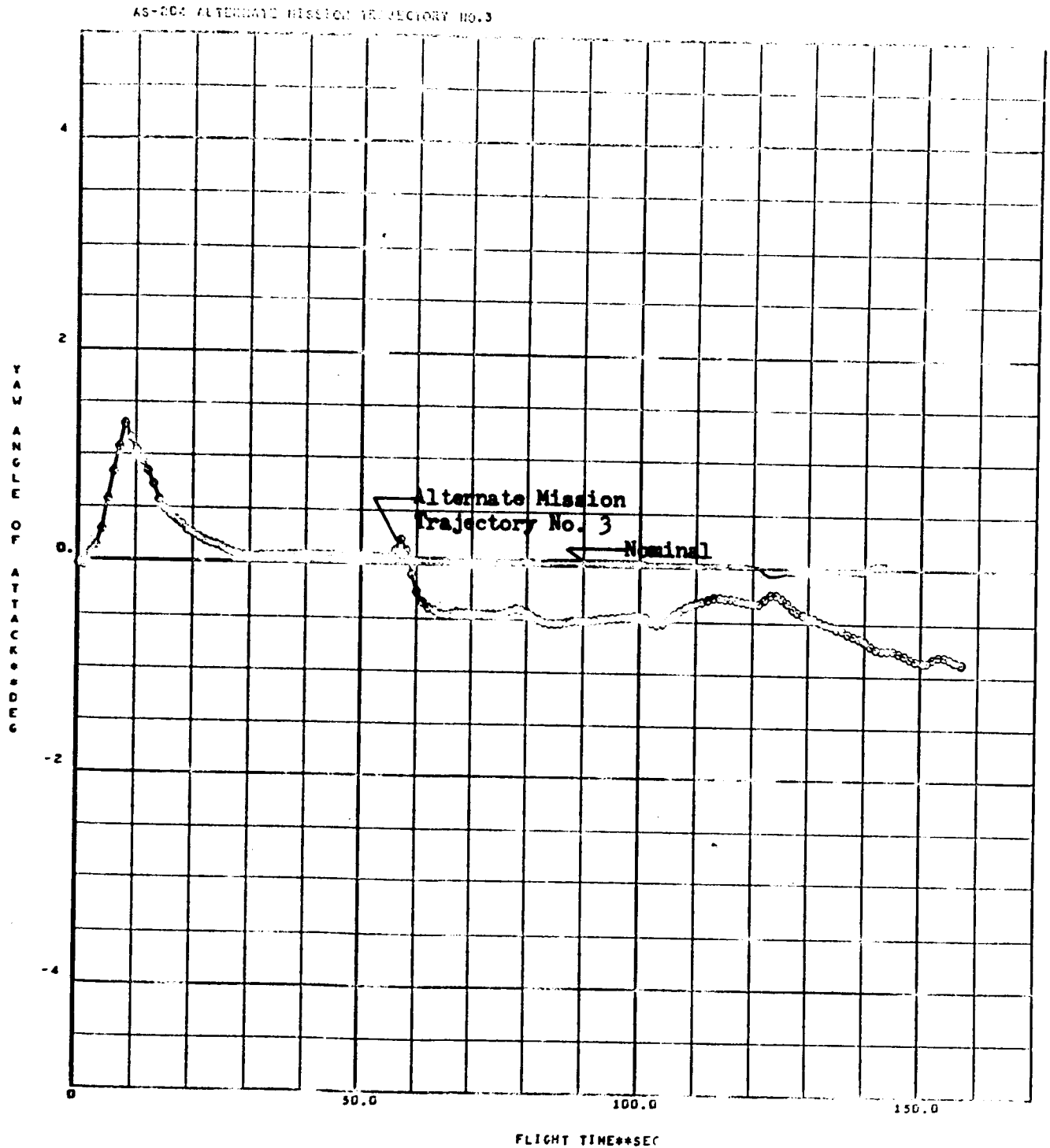


Figure 9C

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
DYNAMIC PRESSURE HISTORY
S-IB STAGE

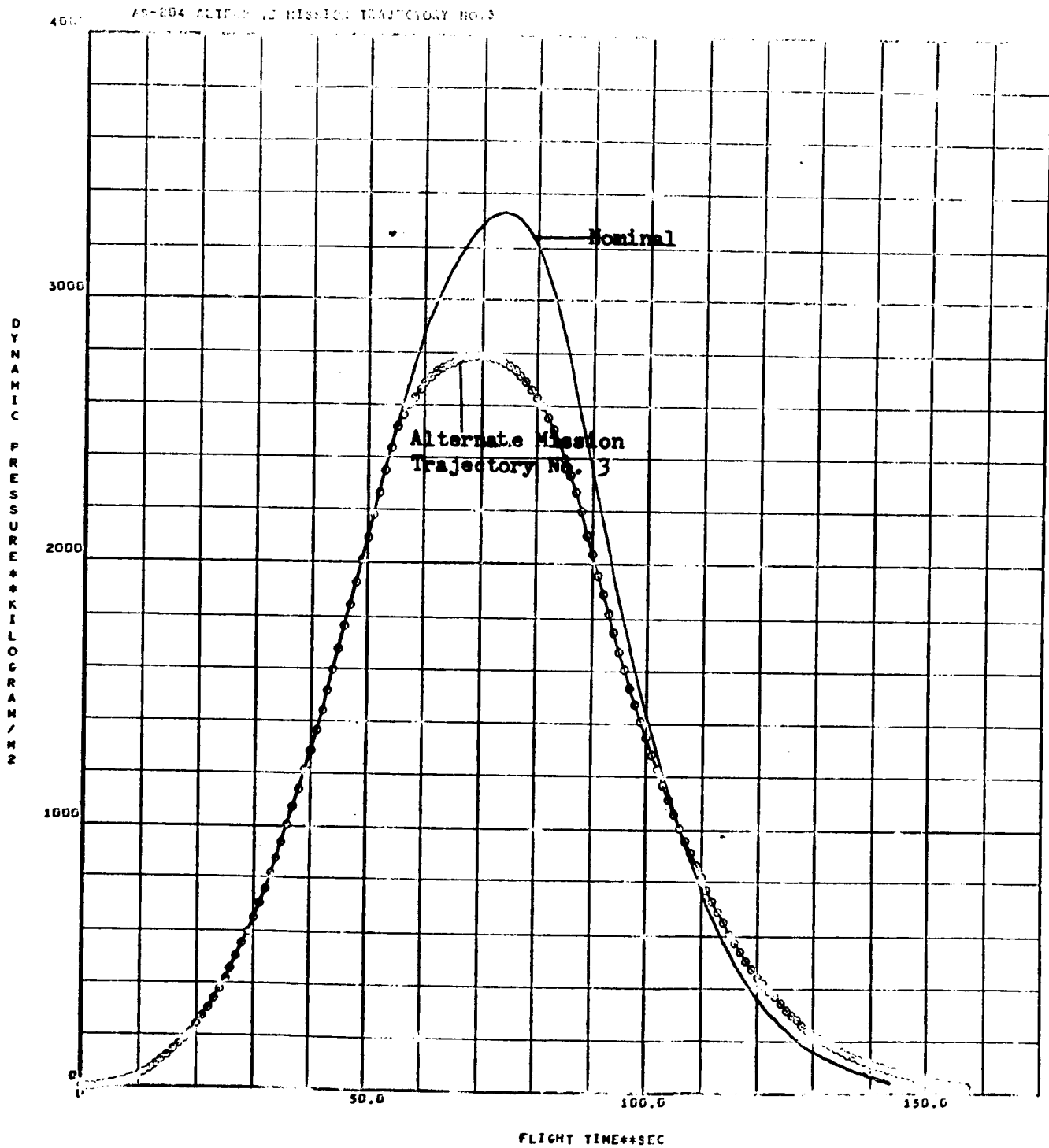


FIGURE 10C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
AERODYNAMIC LOADING INDICATOR HISTORY
S-1B STAGE

AS-204 ALTERNATE MISSION TRAJECTORY NO. 3

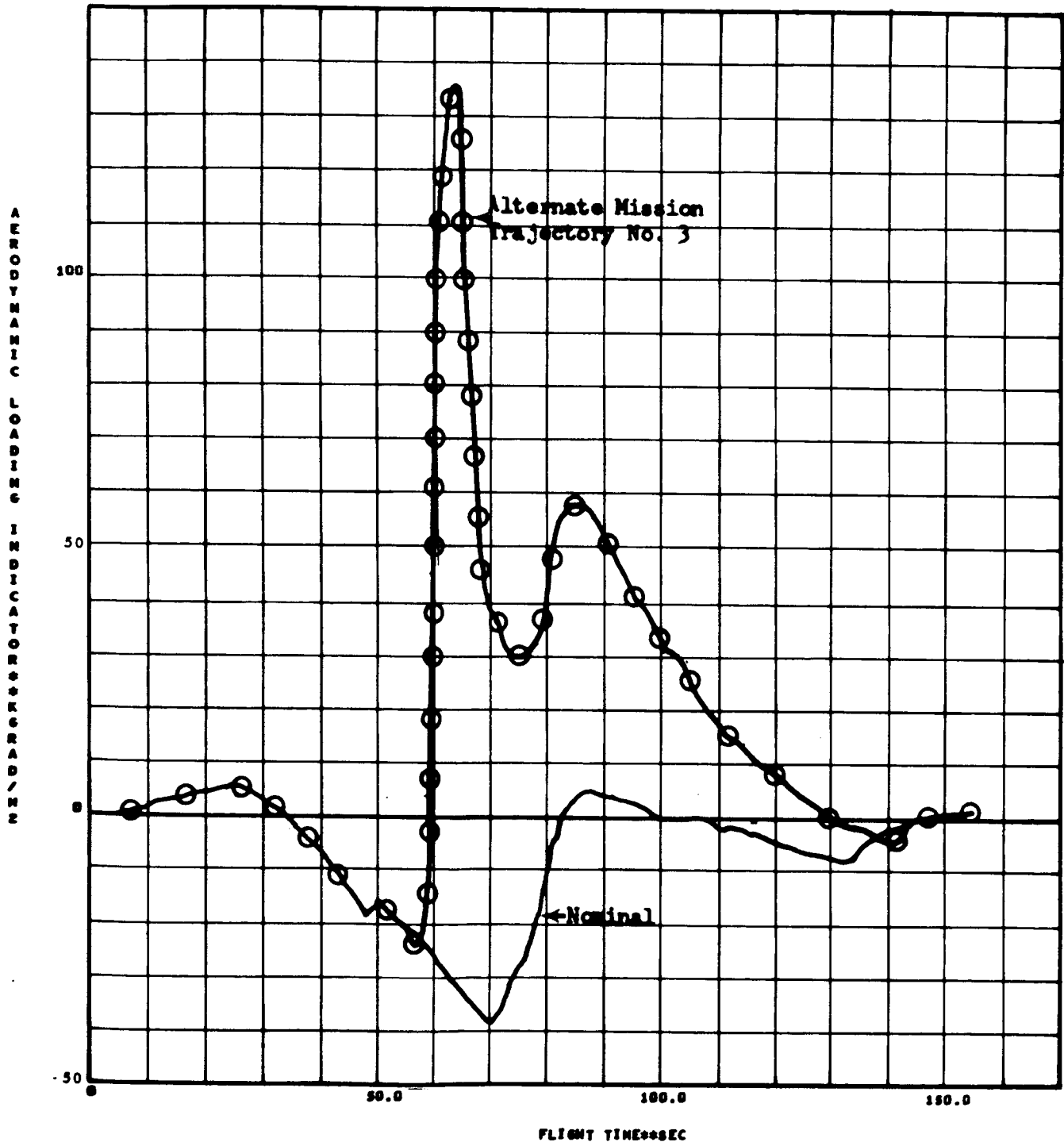


Figure 11C

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
MACH NUMBER HISTORY
S-IB STAGE

AS-204 ALTERNATE MISSION TRAJECTORY NO.3

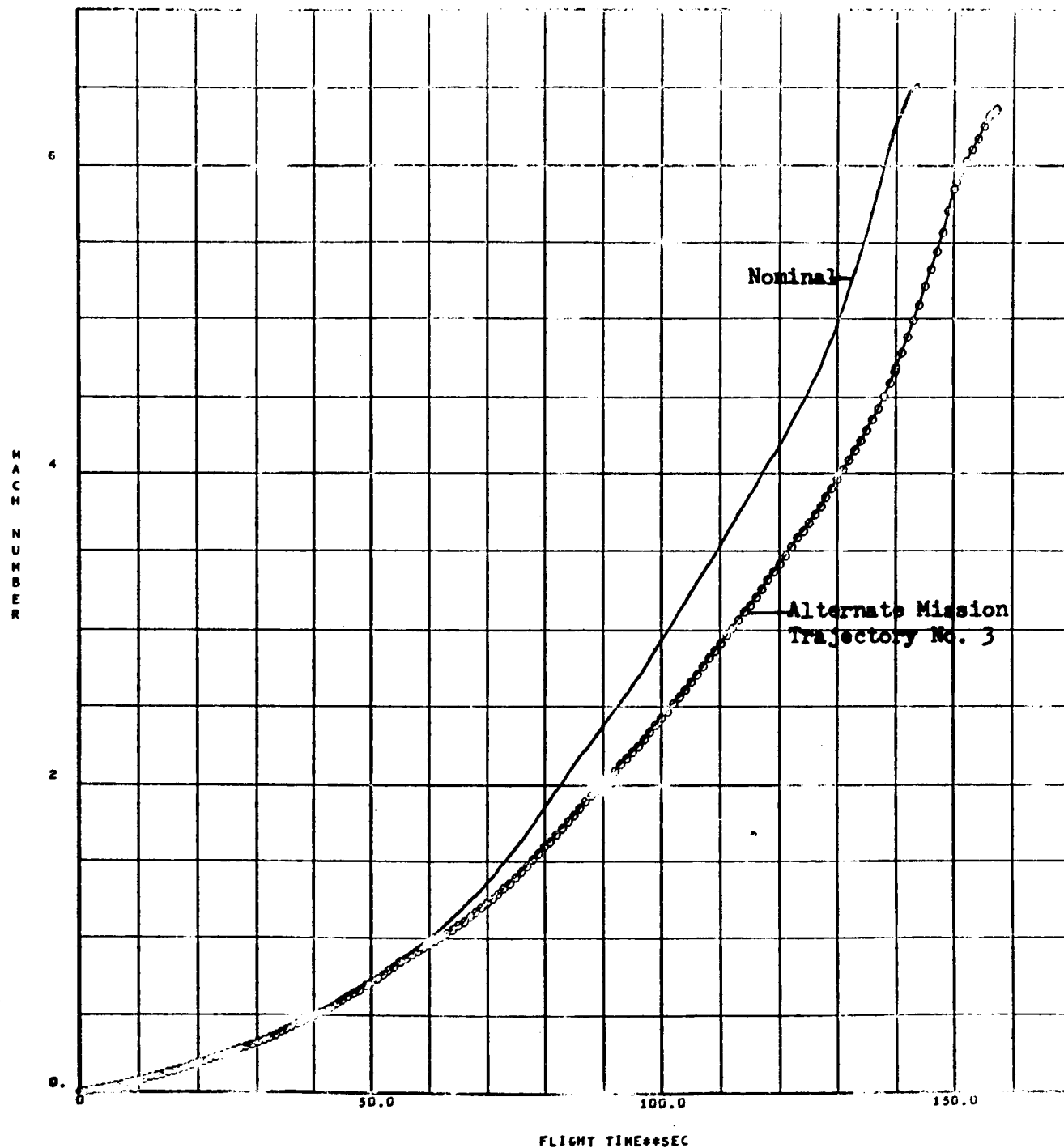


Figure 12C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
LONGITUDINAL ACCELERATION HISTORY
S-1B STAGE

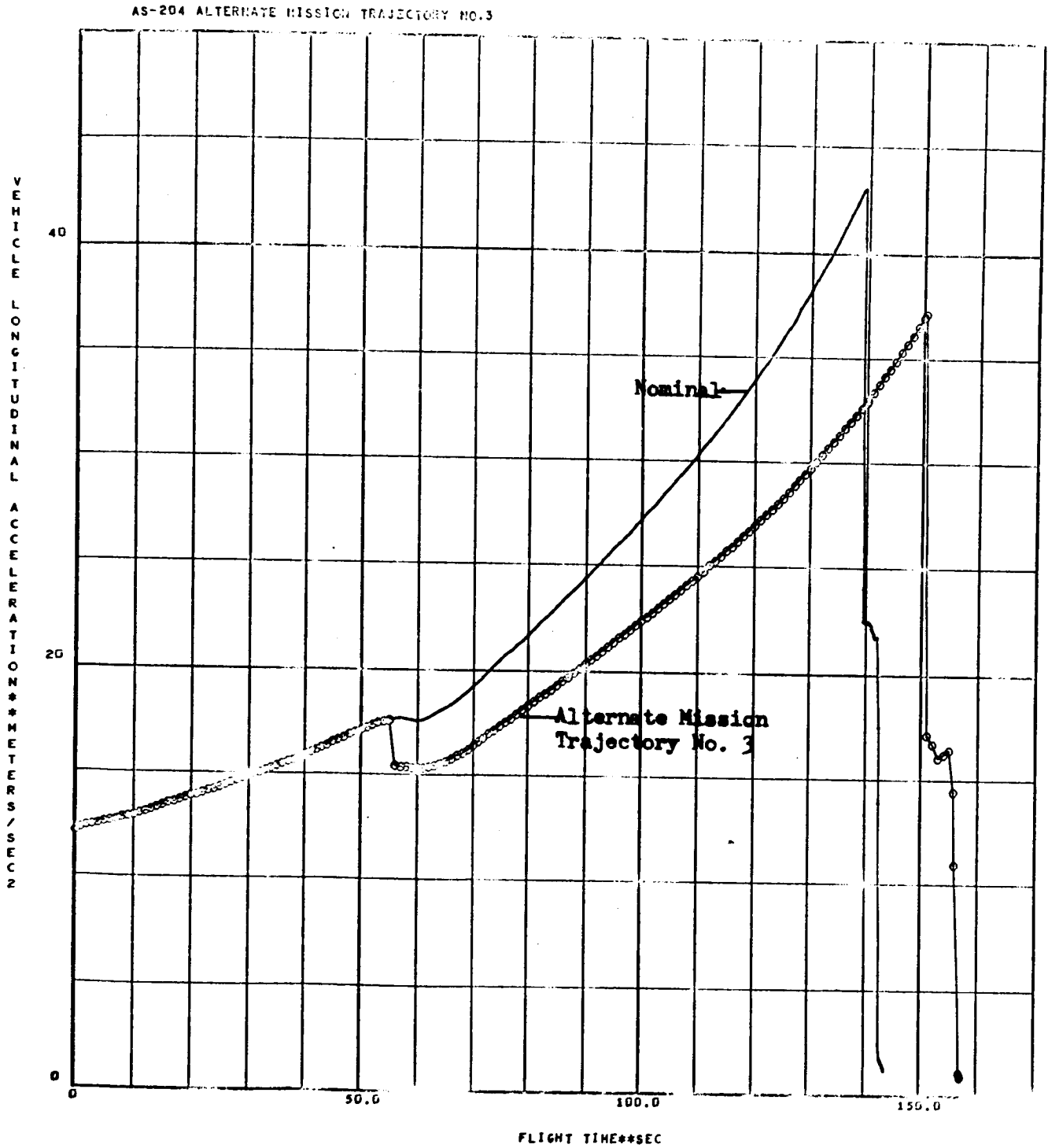


Figure 13C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE COMMAND HISTORY
S-IB STAGE

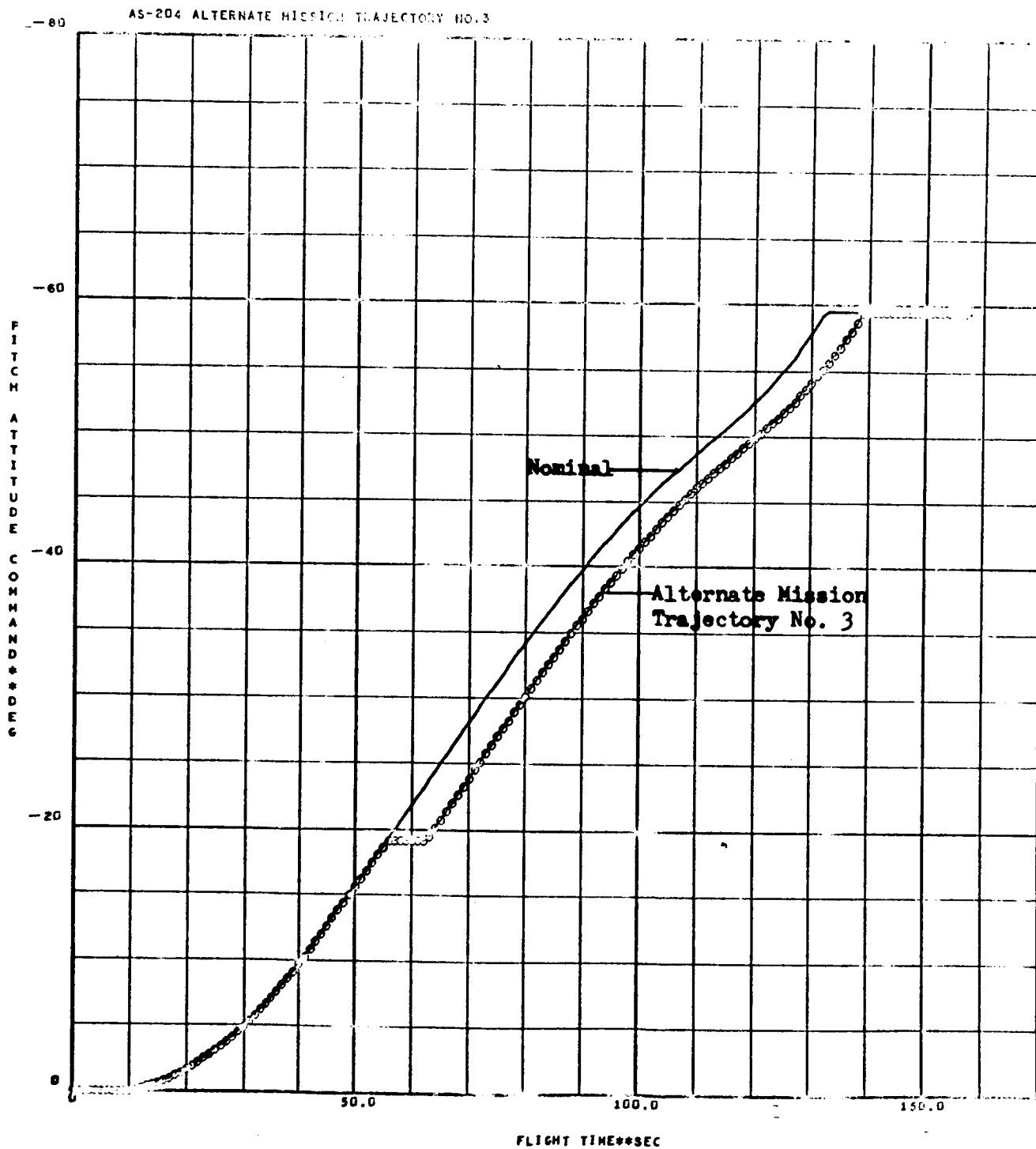


Figure 14C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE COMMAND RATE HISTORY
S-1B STAGE

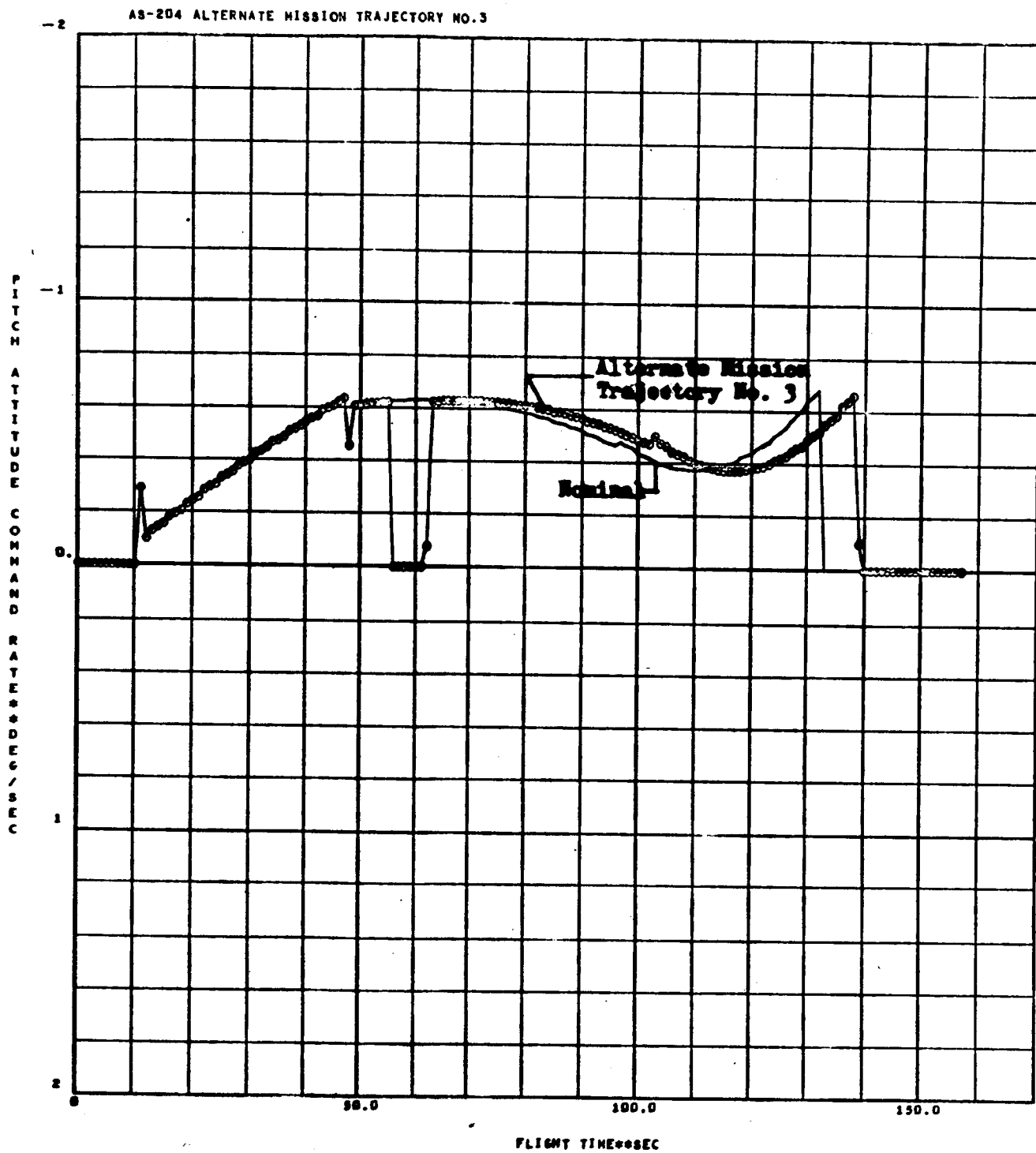


Figure 15C

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE ERROR HISTORY
S-1B STAGE

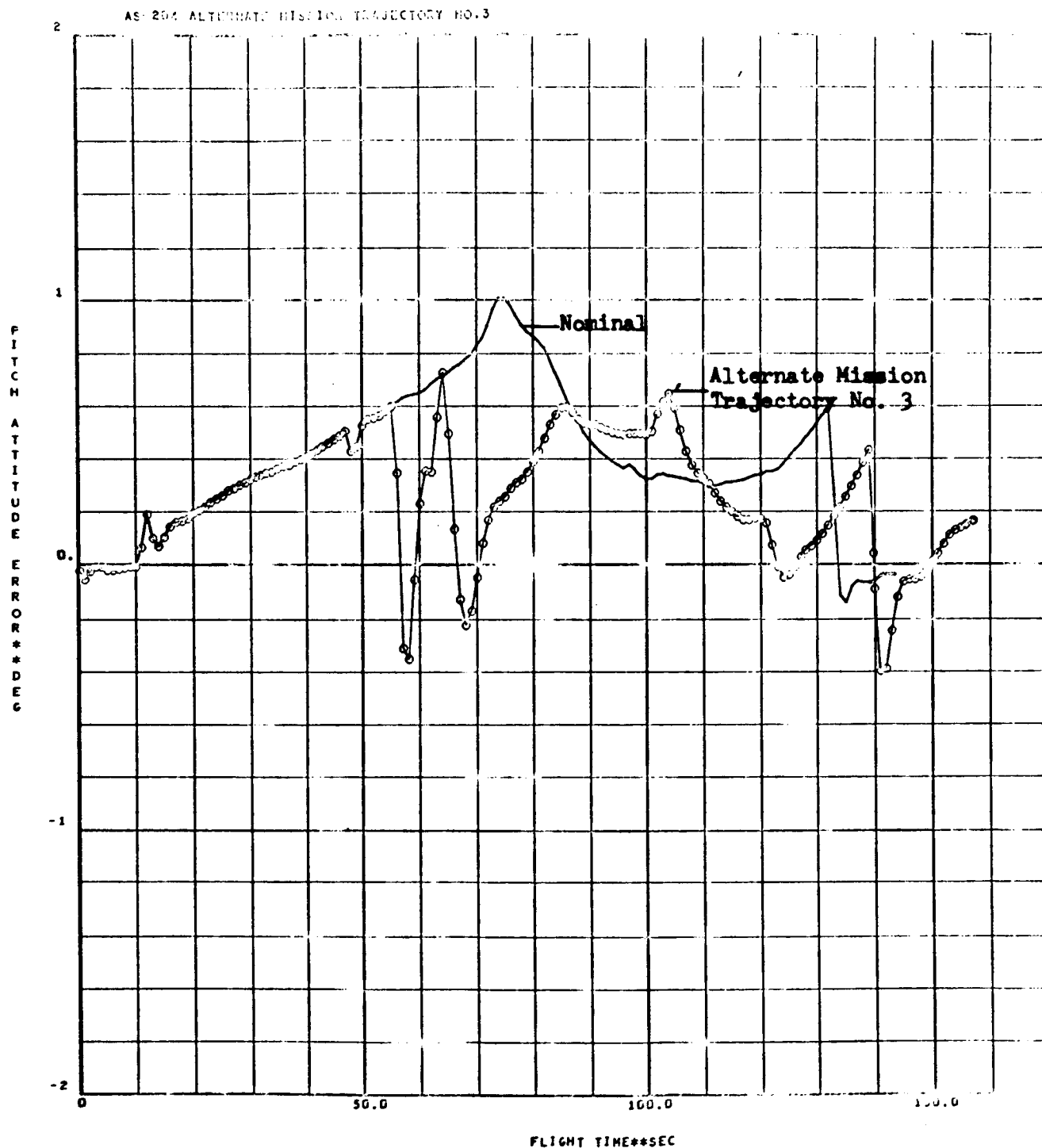


Figure 16C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ATTITUDE ERROR HISTORY
S-1B STAGE

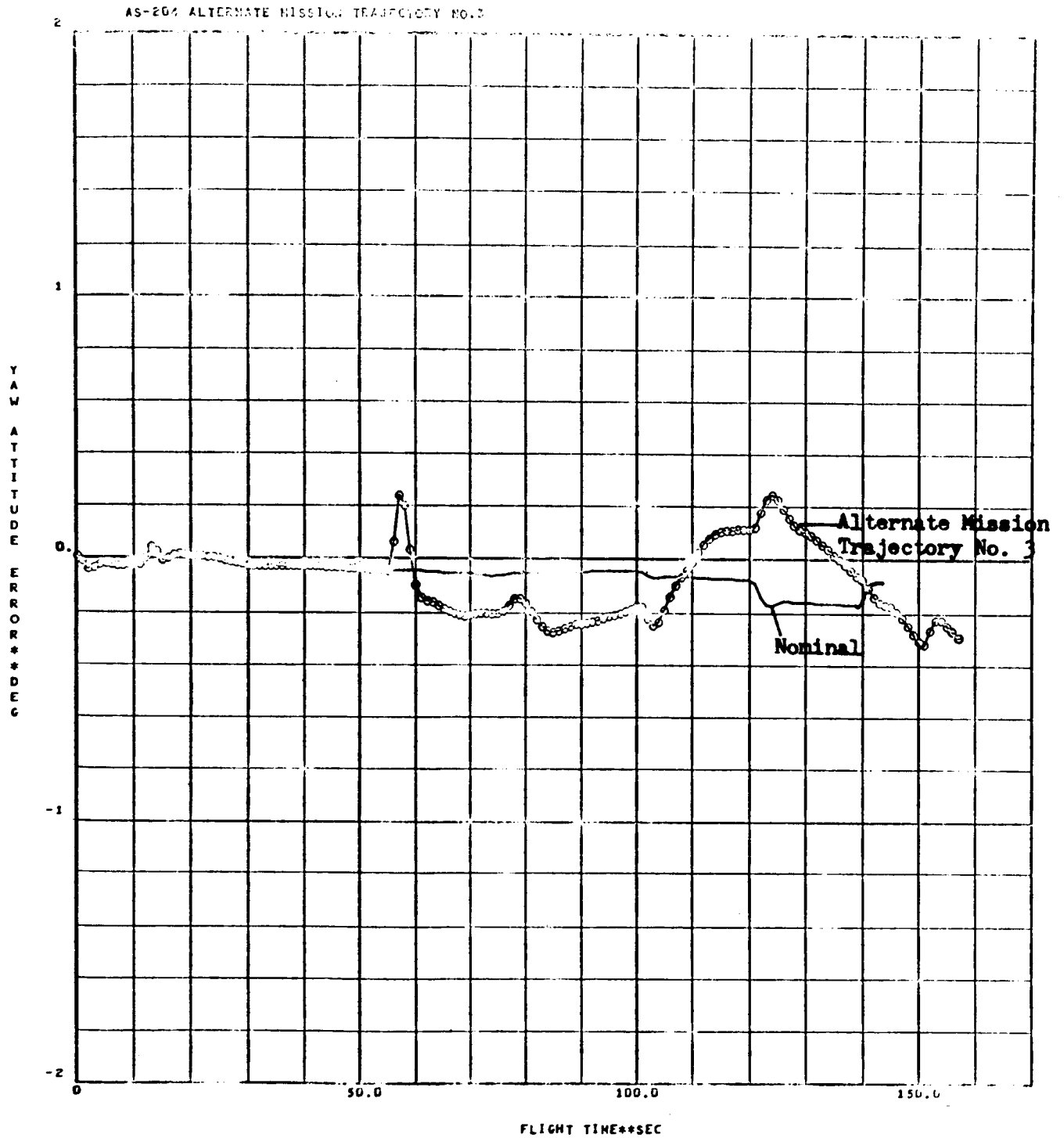


Figure 17C

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ROLL ATTITUDE ERROR HISTORY
S-IB STAGE

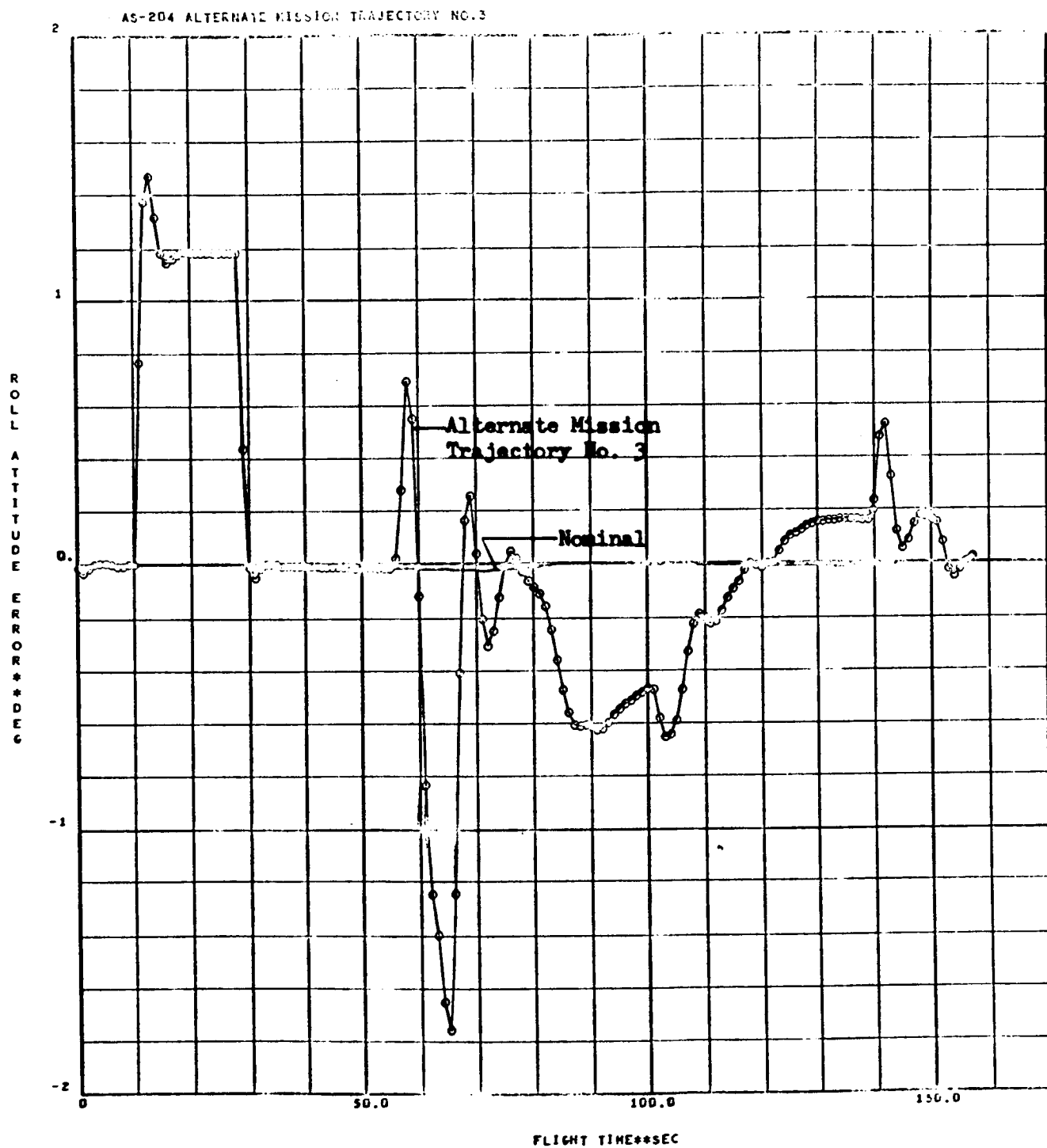


Figure 18C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE HISTORY
S-1B STAGE

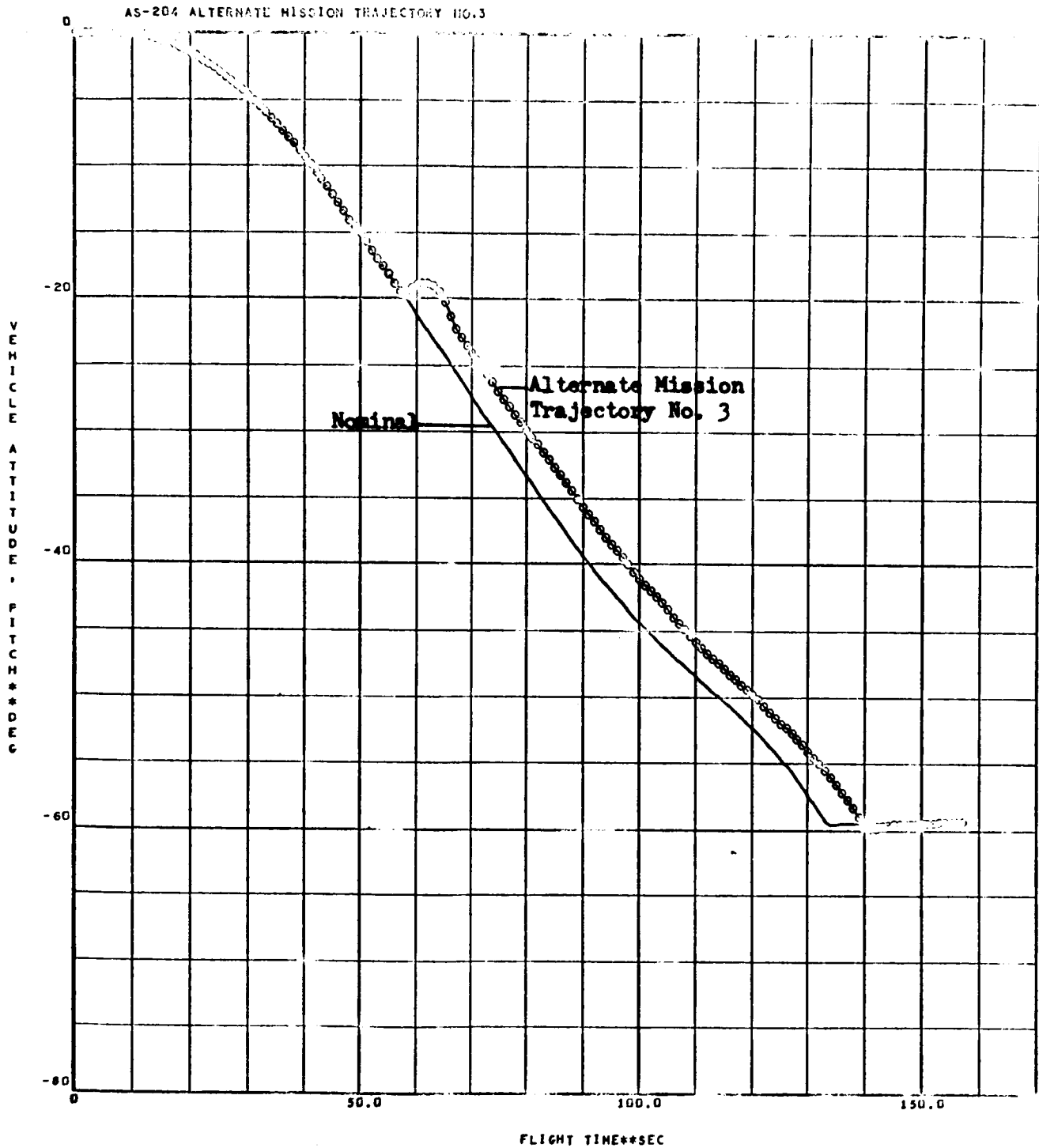


Figure 19C

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ATTITUDE HISTORY
S-IB STAGE

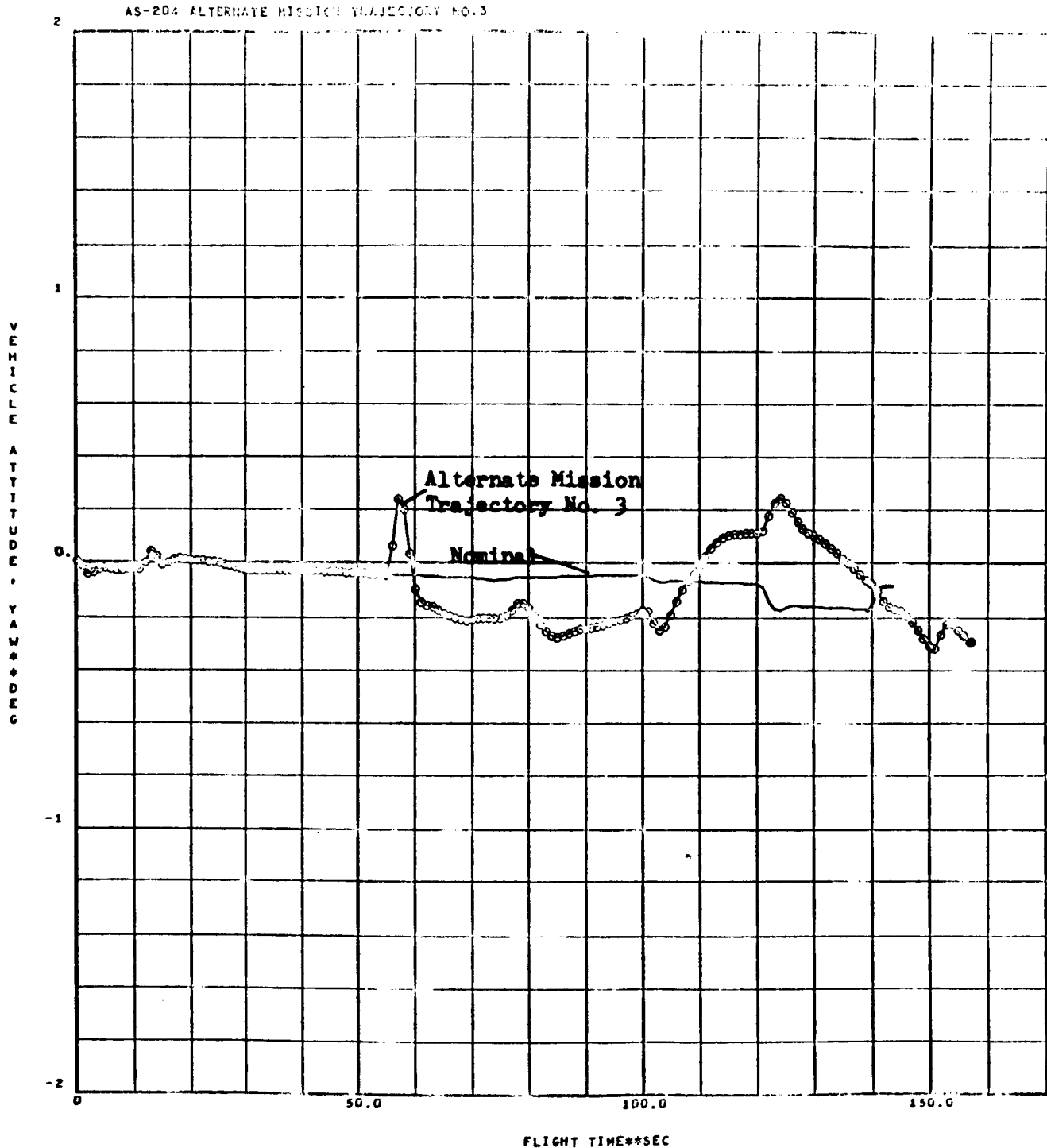


Figure 20C

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ROLL ATTITUDE HISTORY
S-IB STAGE

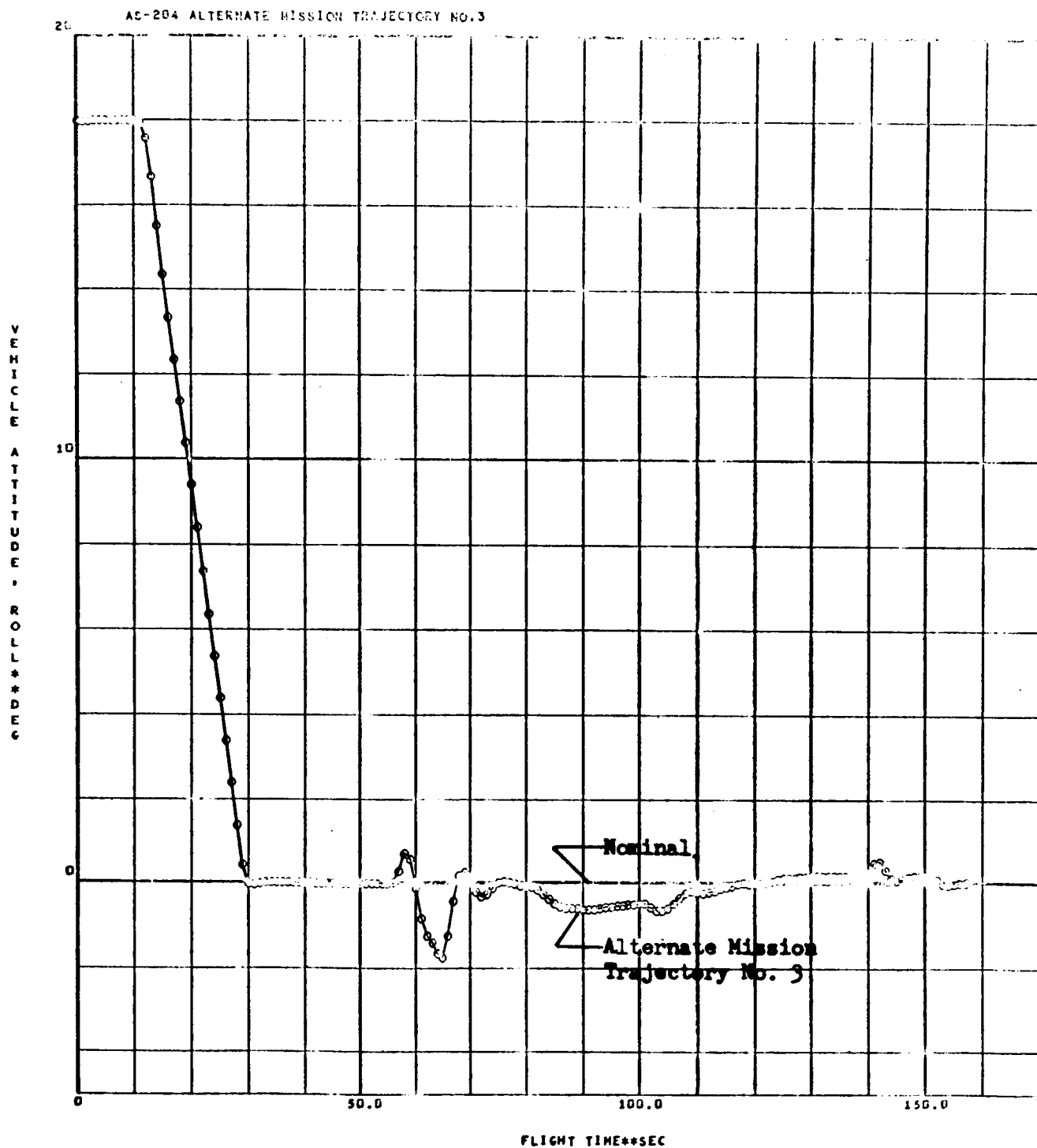


Figure 21C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE RATE HISTORY
S-1B STAGE

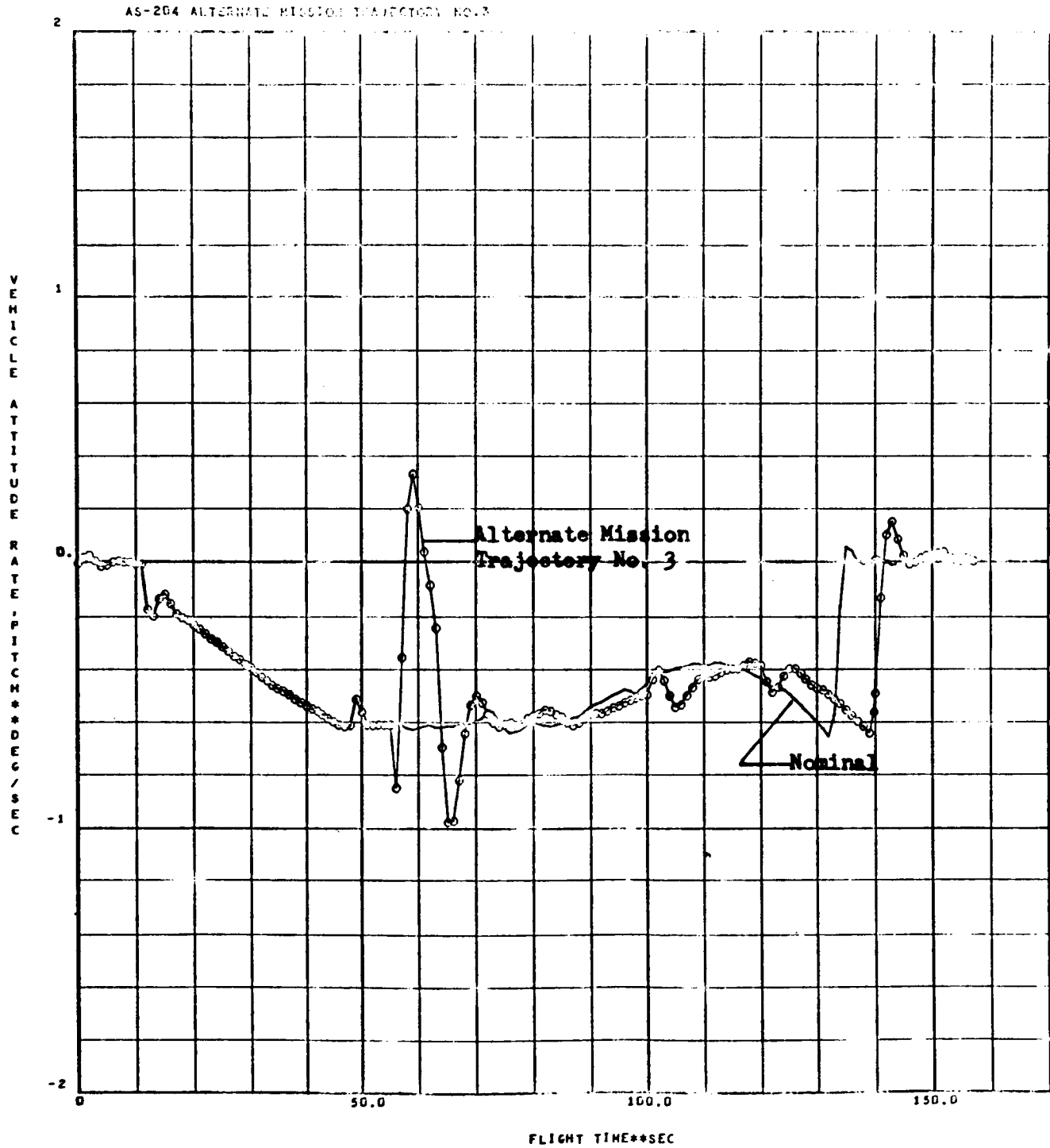


Figure 22C

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ATTITUDE RATE HISTORY
S-IB STAGE

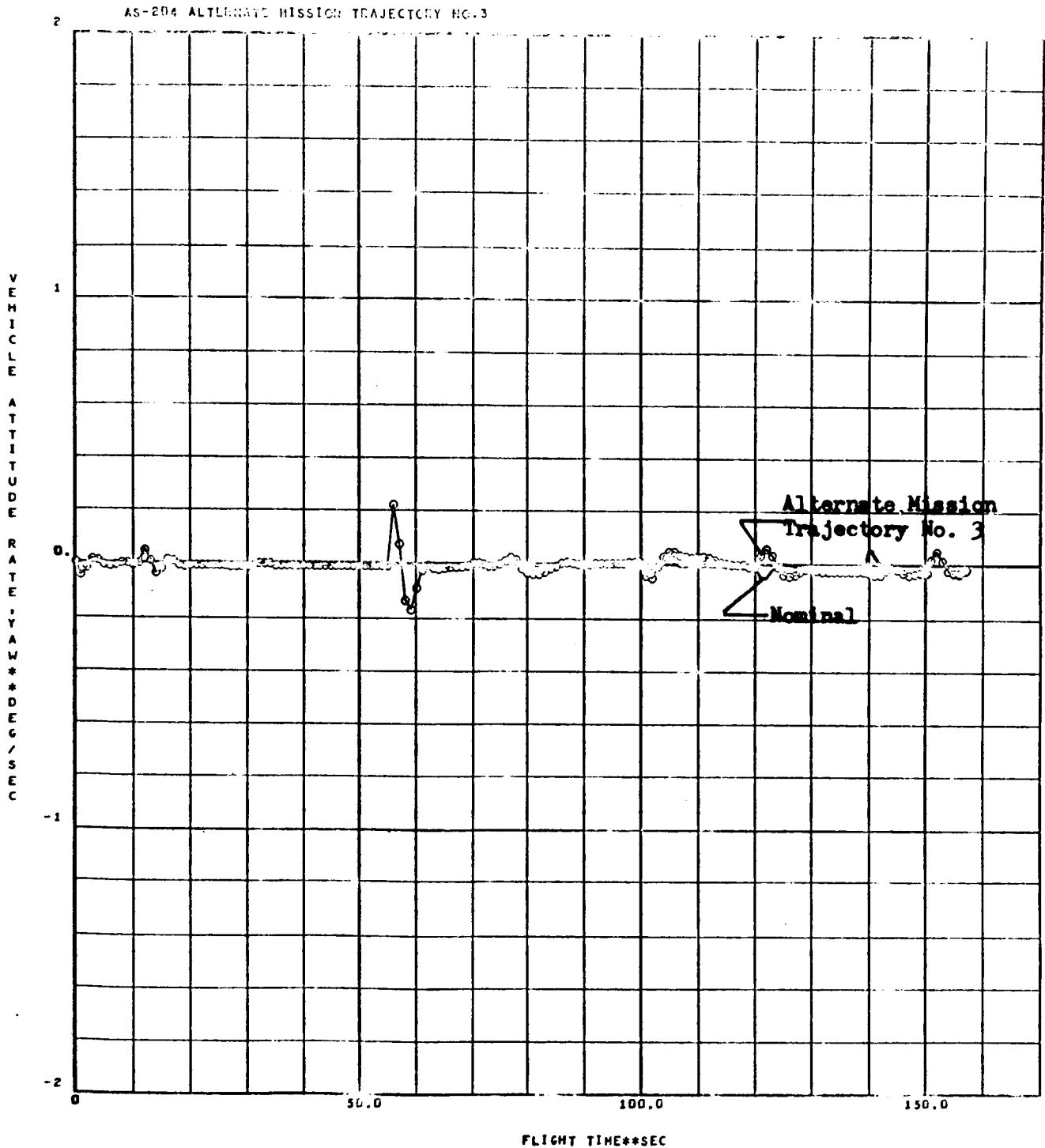


Figure 23C

AS-204/1M-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ROLL ATTITUDE RATE HISTORY
S-1B STAGE

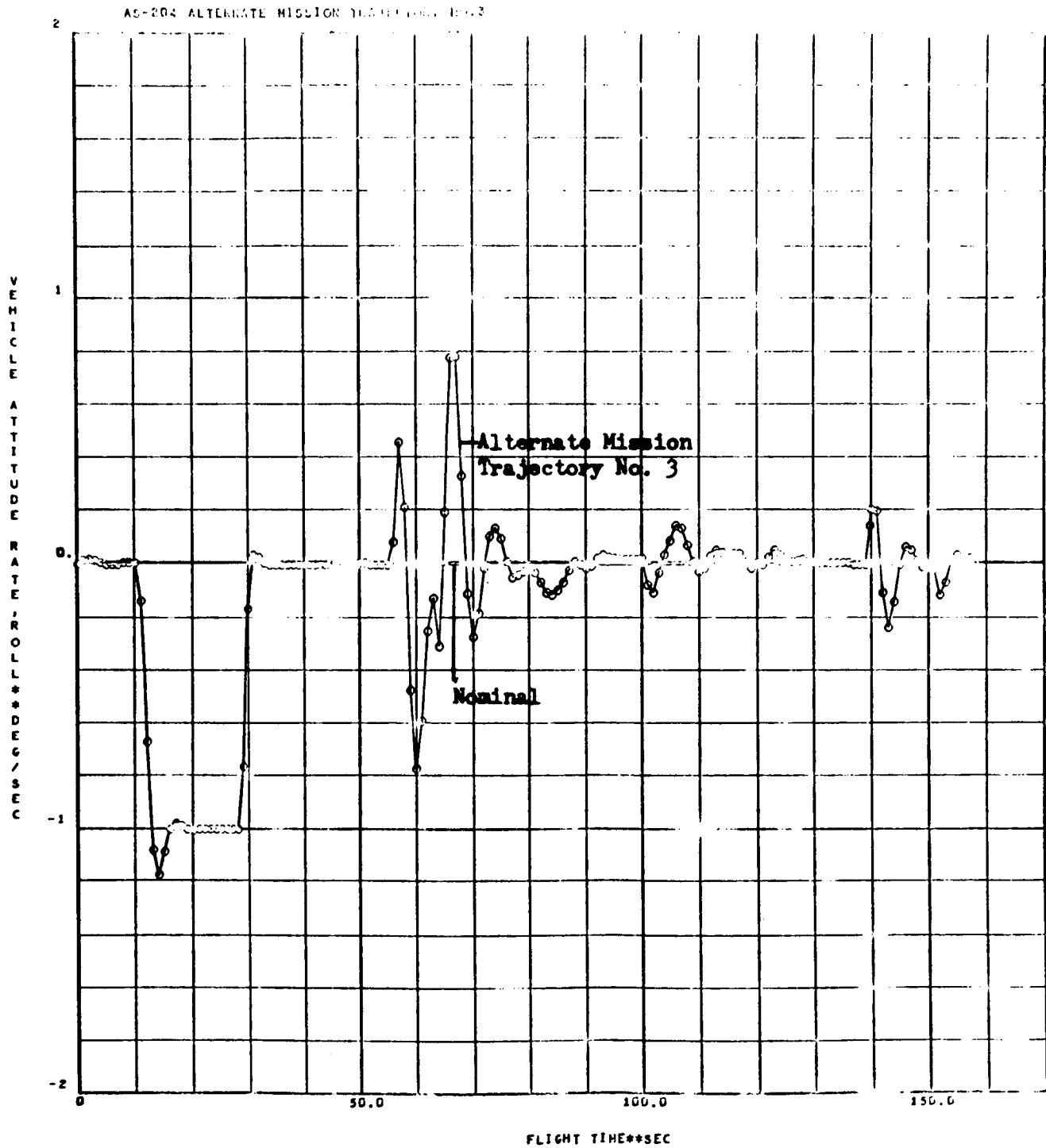


Figure 24C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH DEFLECTION HISTORY, ENGINES 1 AND 2
S-1B STAGE

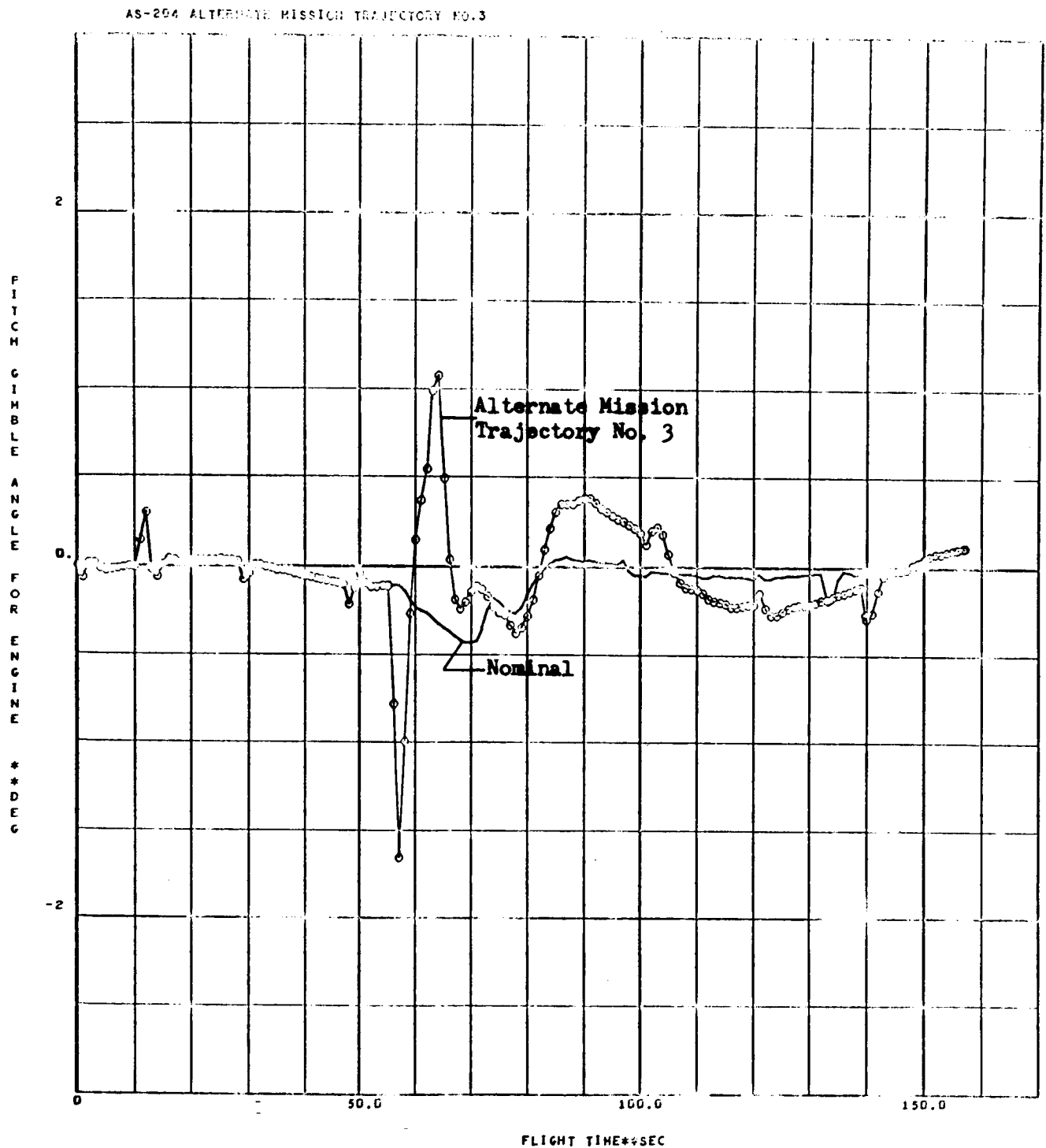


Figure 25C

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH DEFLECTION HISTORY, ENGINE 3
S-IB STAGE

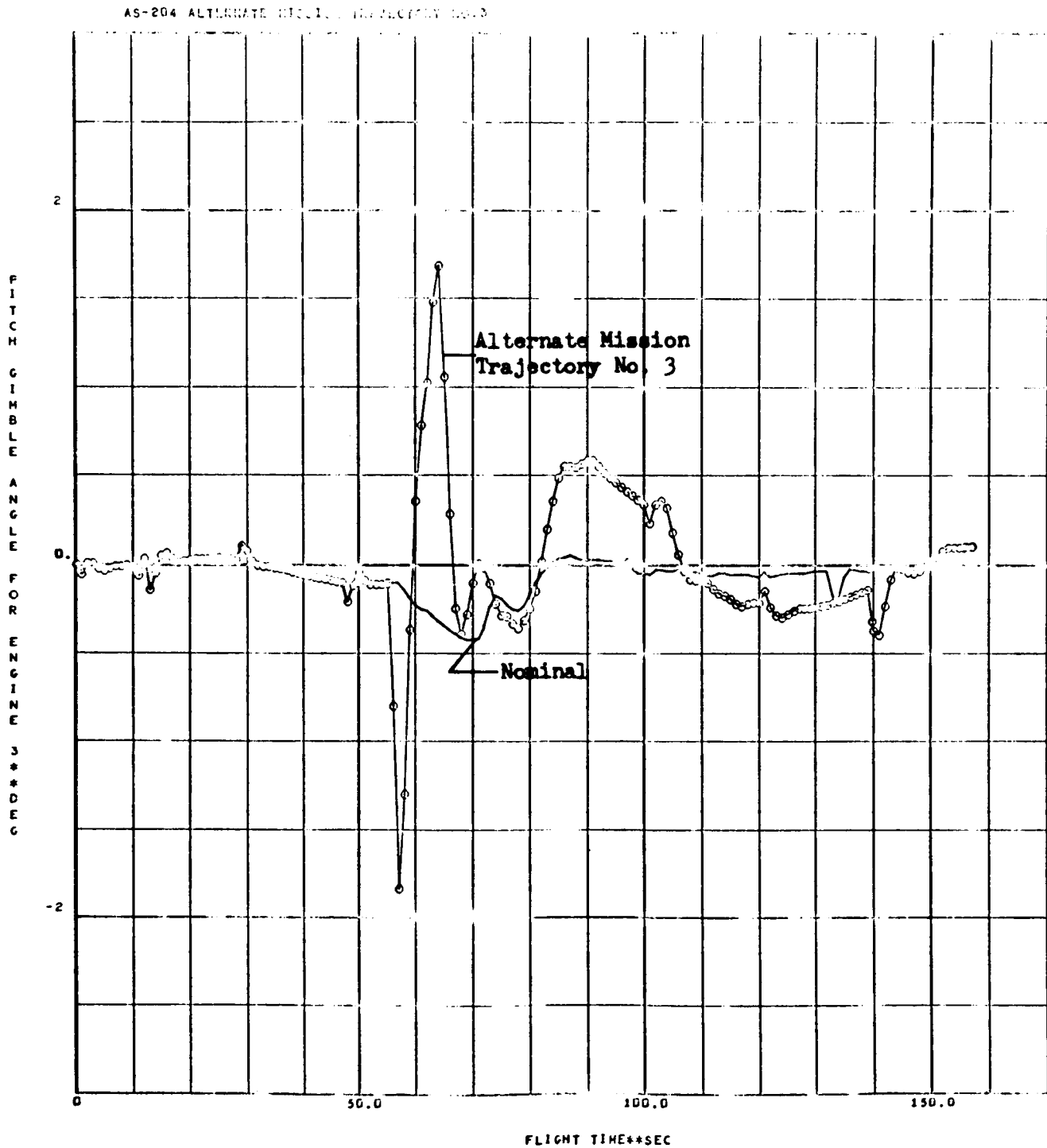


Figure 26C

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW DEFLECTION HISTORY, ENGINE 1
S-IB STAGE

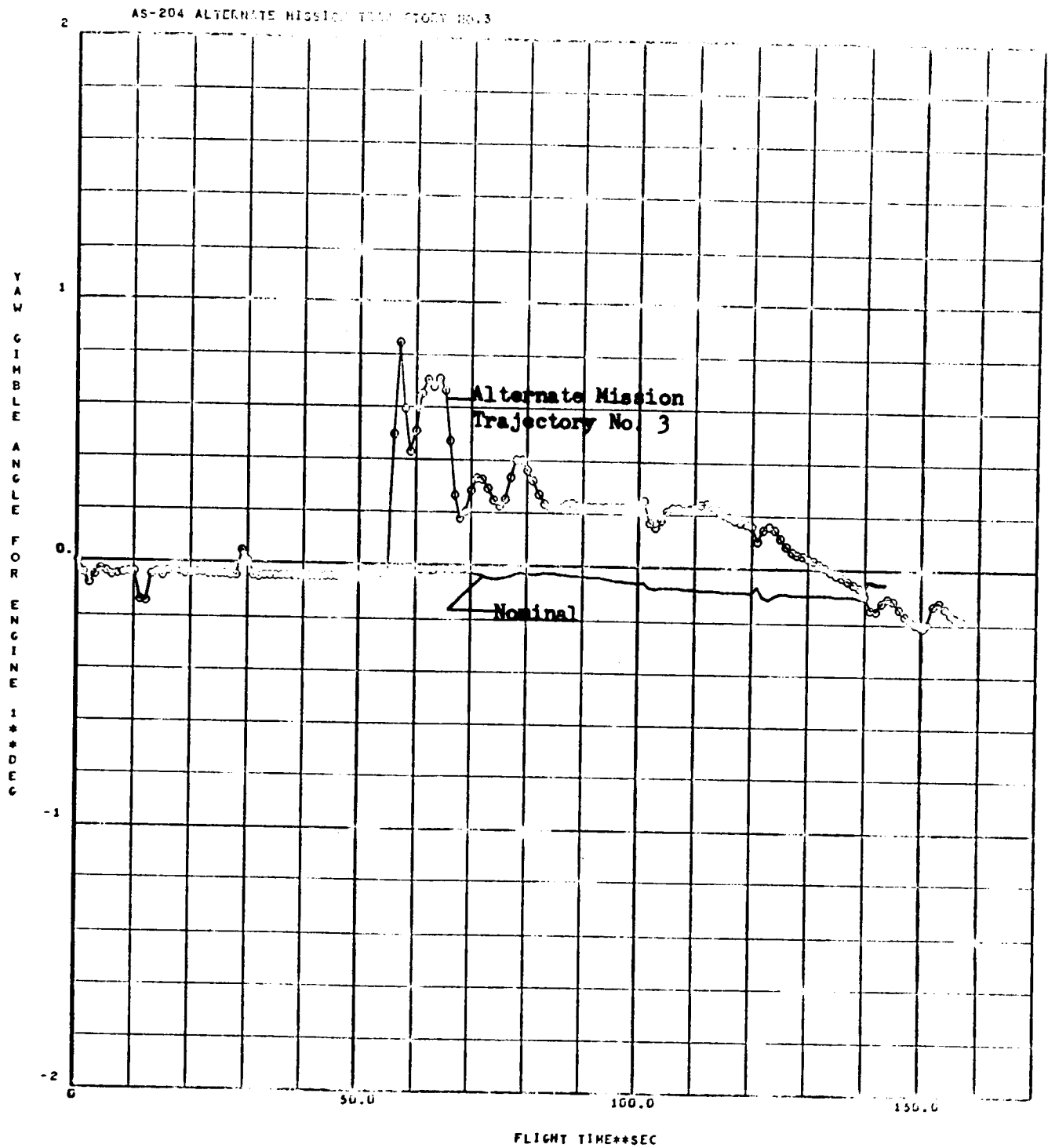


Figure 27C

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW DEFLECTION HISTORY, ENGINES 2 AND 3
S-IB STAGE

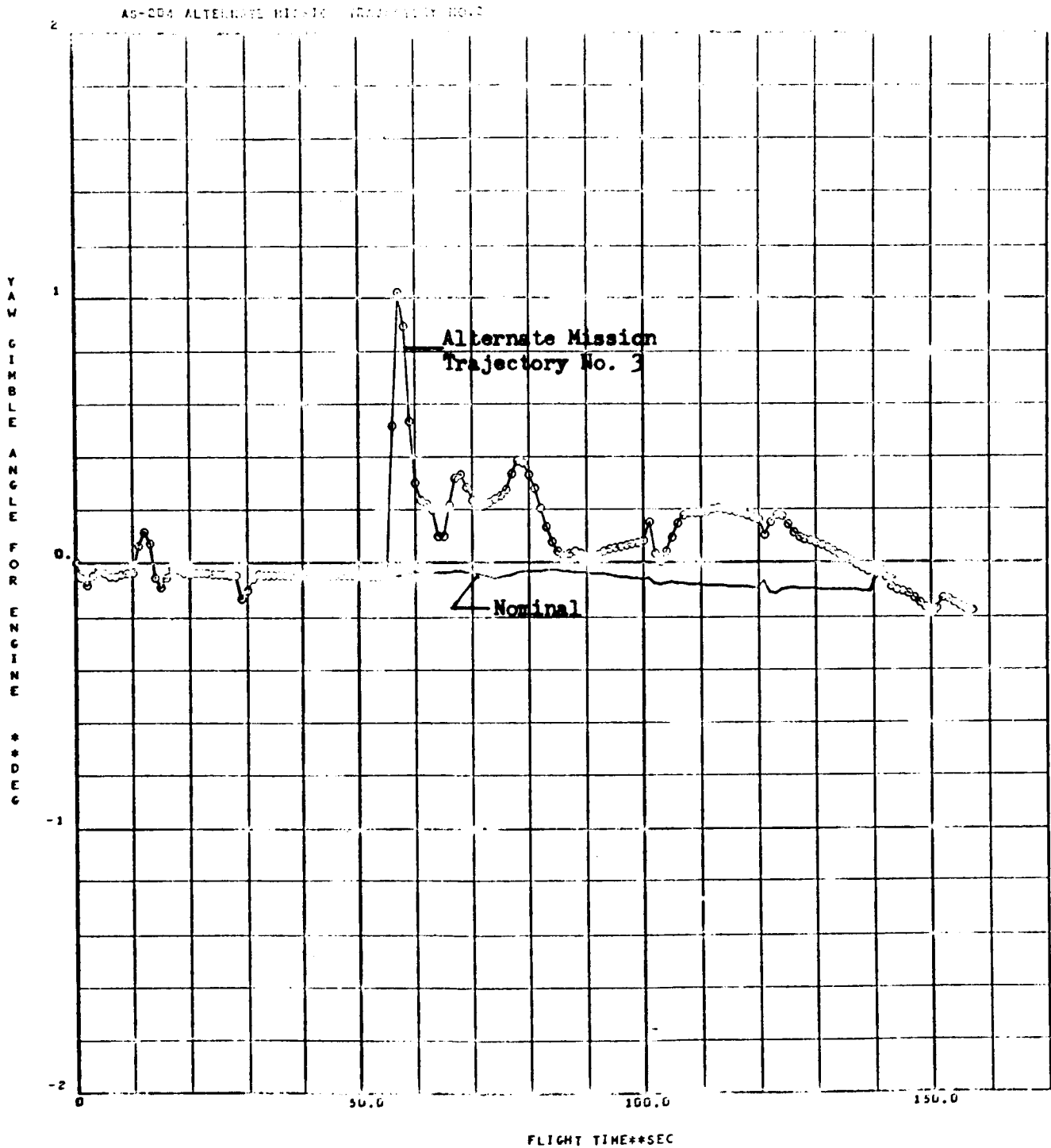


Figure 28C

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE ERROR HISTORY
S-IVB STAGE

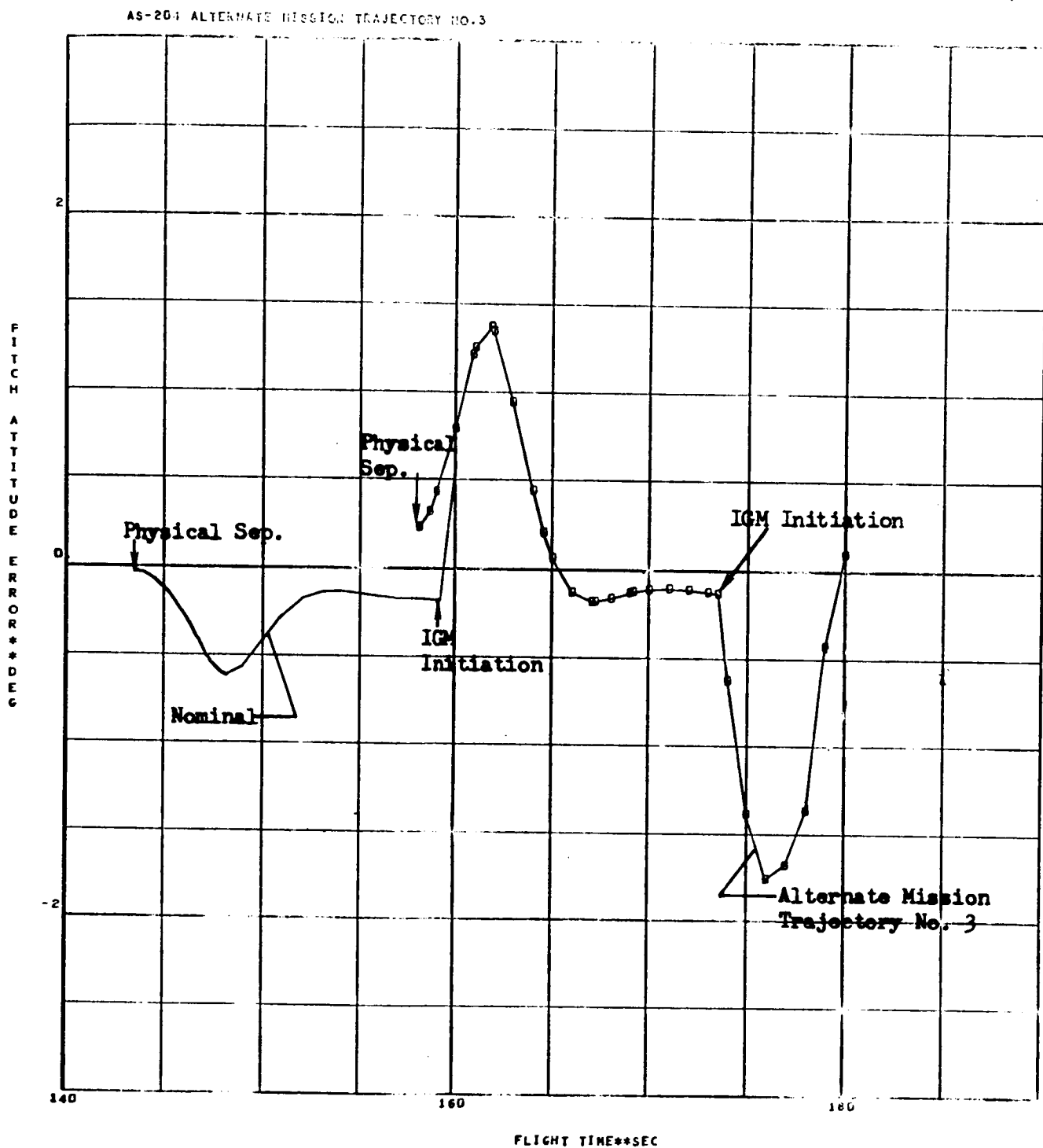


Figure 29C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ATTITUDE ERROR HISTORY
S-IVB STAGE

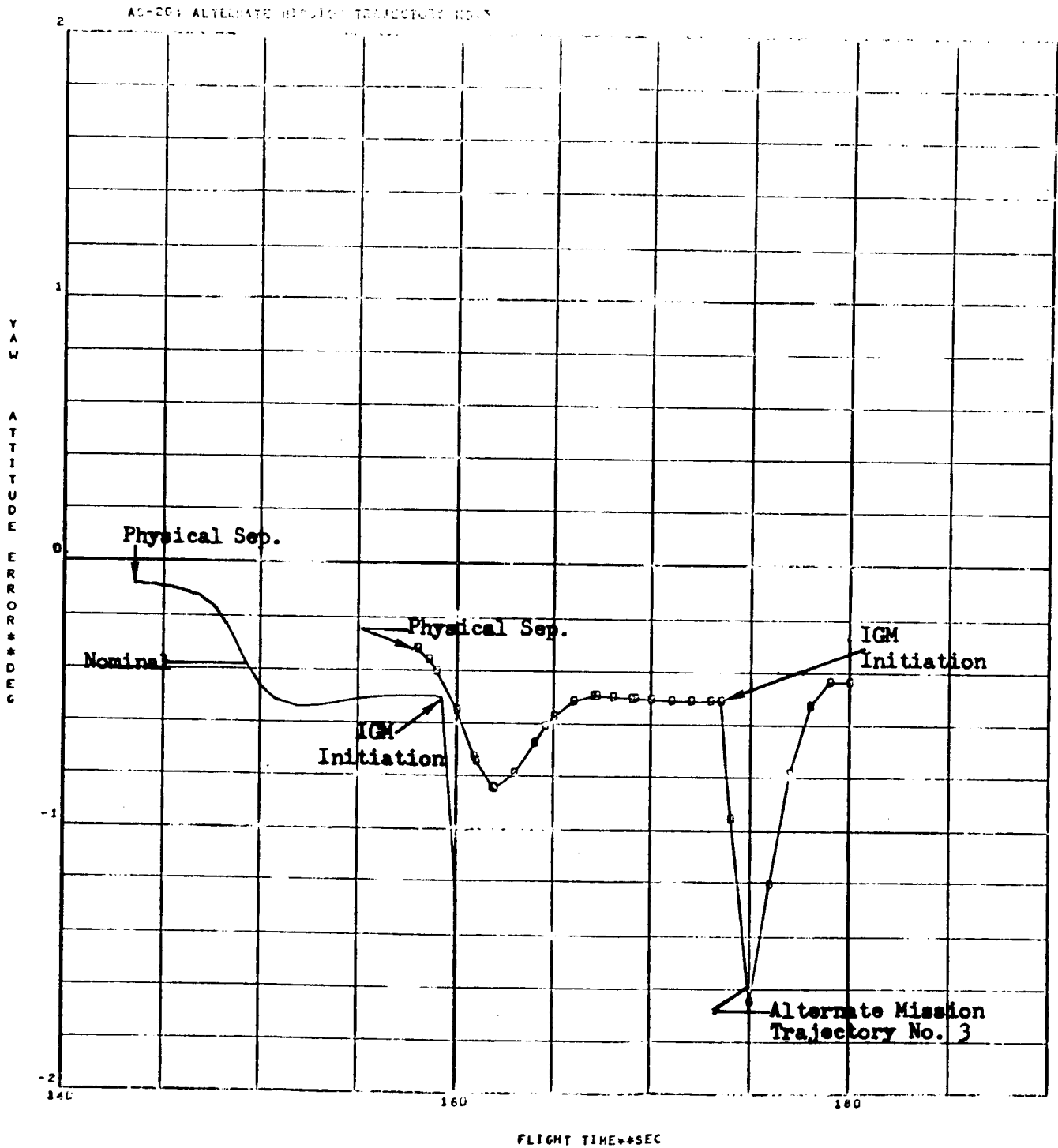


Figure 30C

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ROLL ATTITUDE ERROR HISTORY
S-IVB STAGE

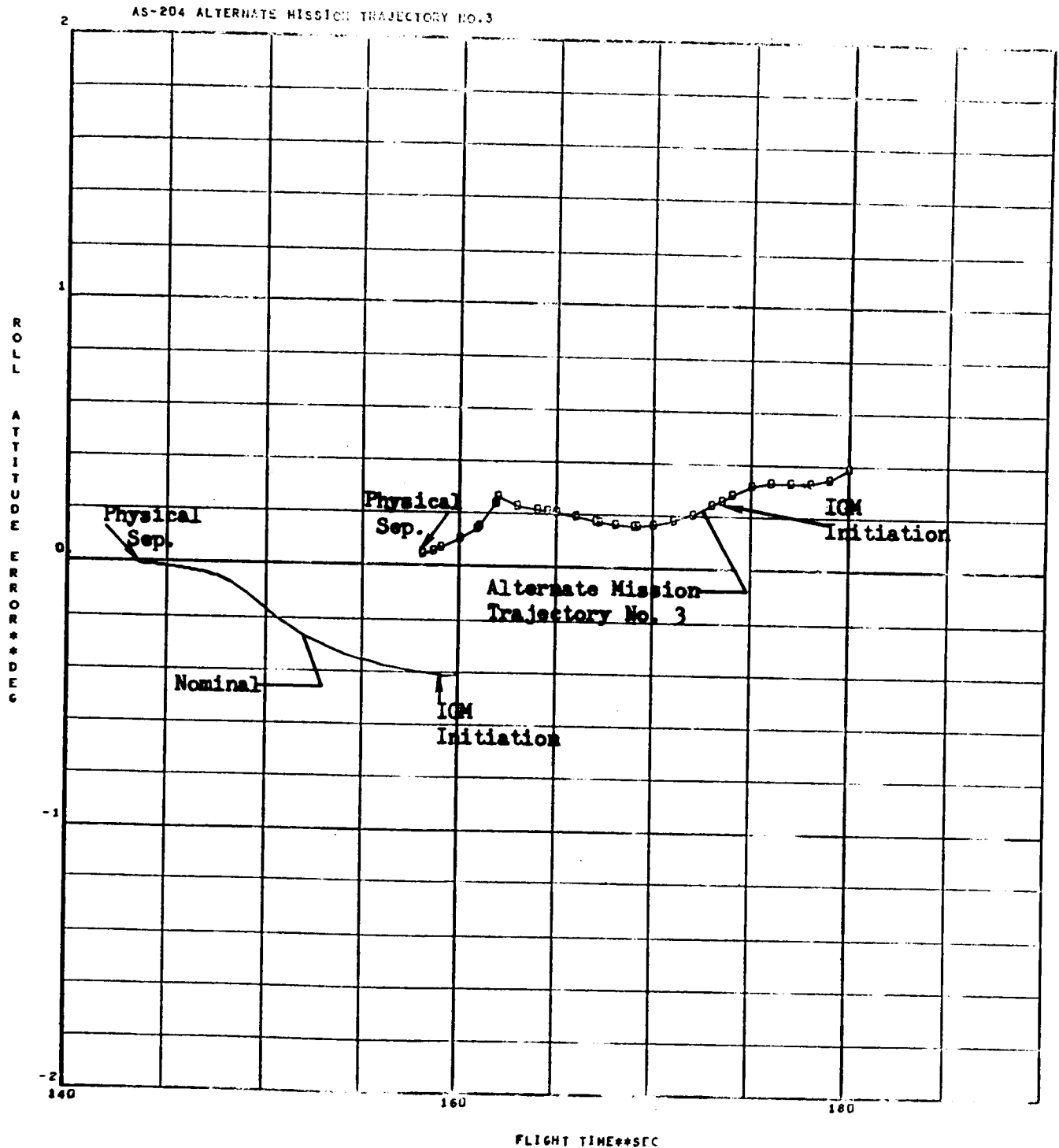


Figure 31C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
PITCH ATTITUDE RATE HISTORY
S-IVB STAGE

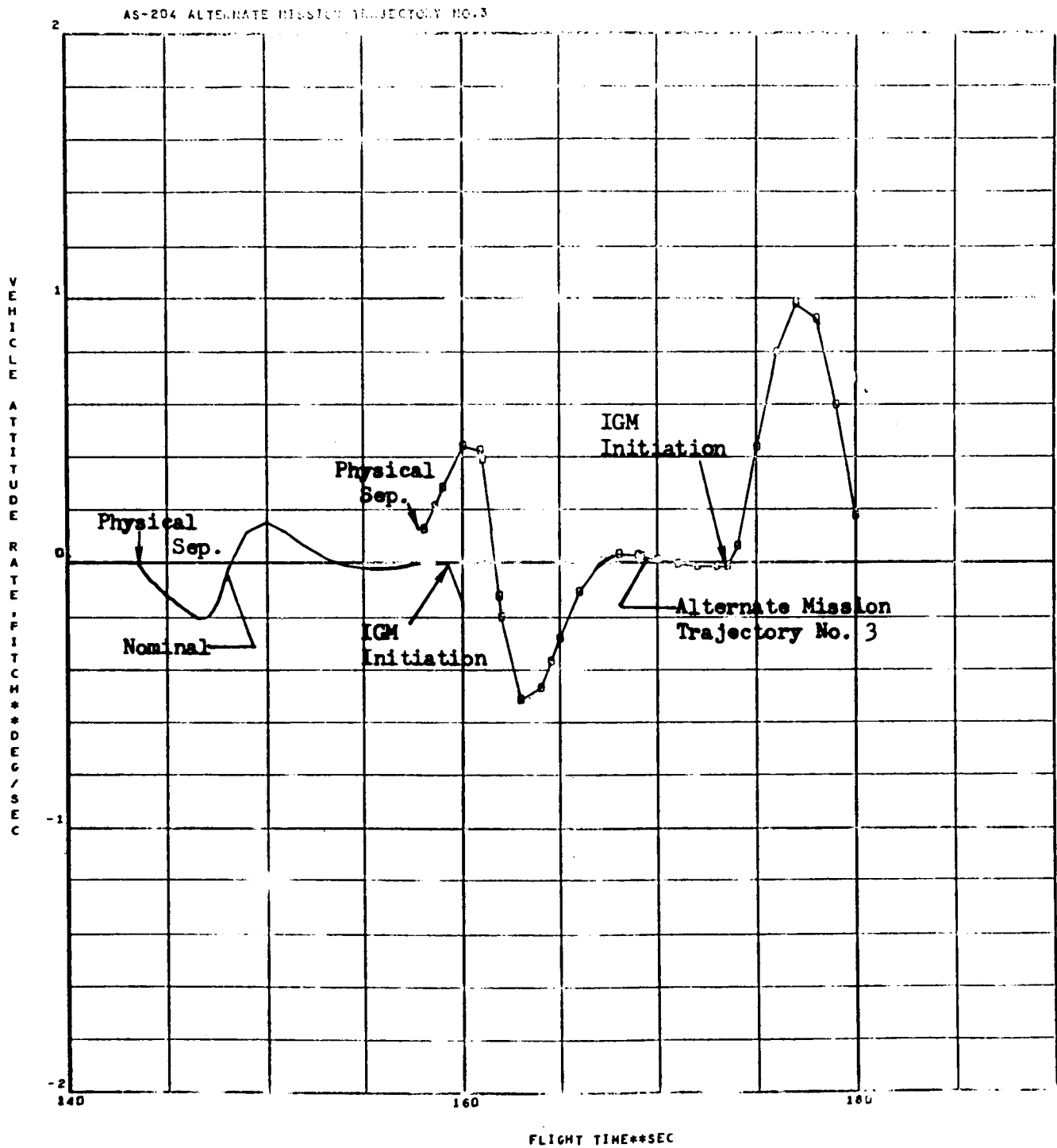


Figure 32C

AS-204/LM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
YAW ATTITUDE RATE HISTORY
S-IVB STAGE

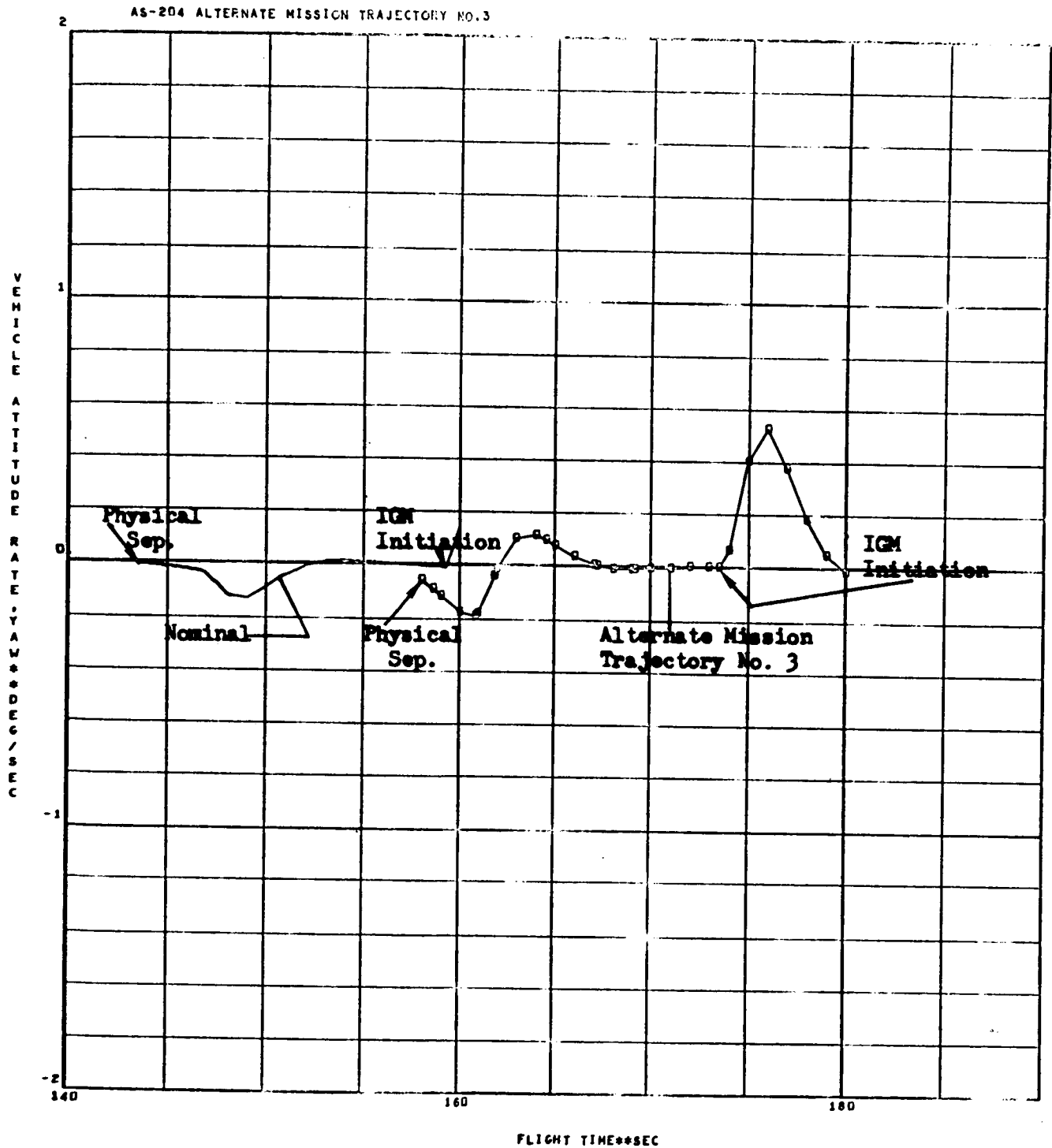
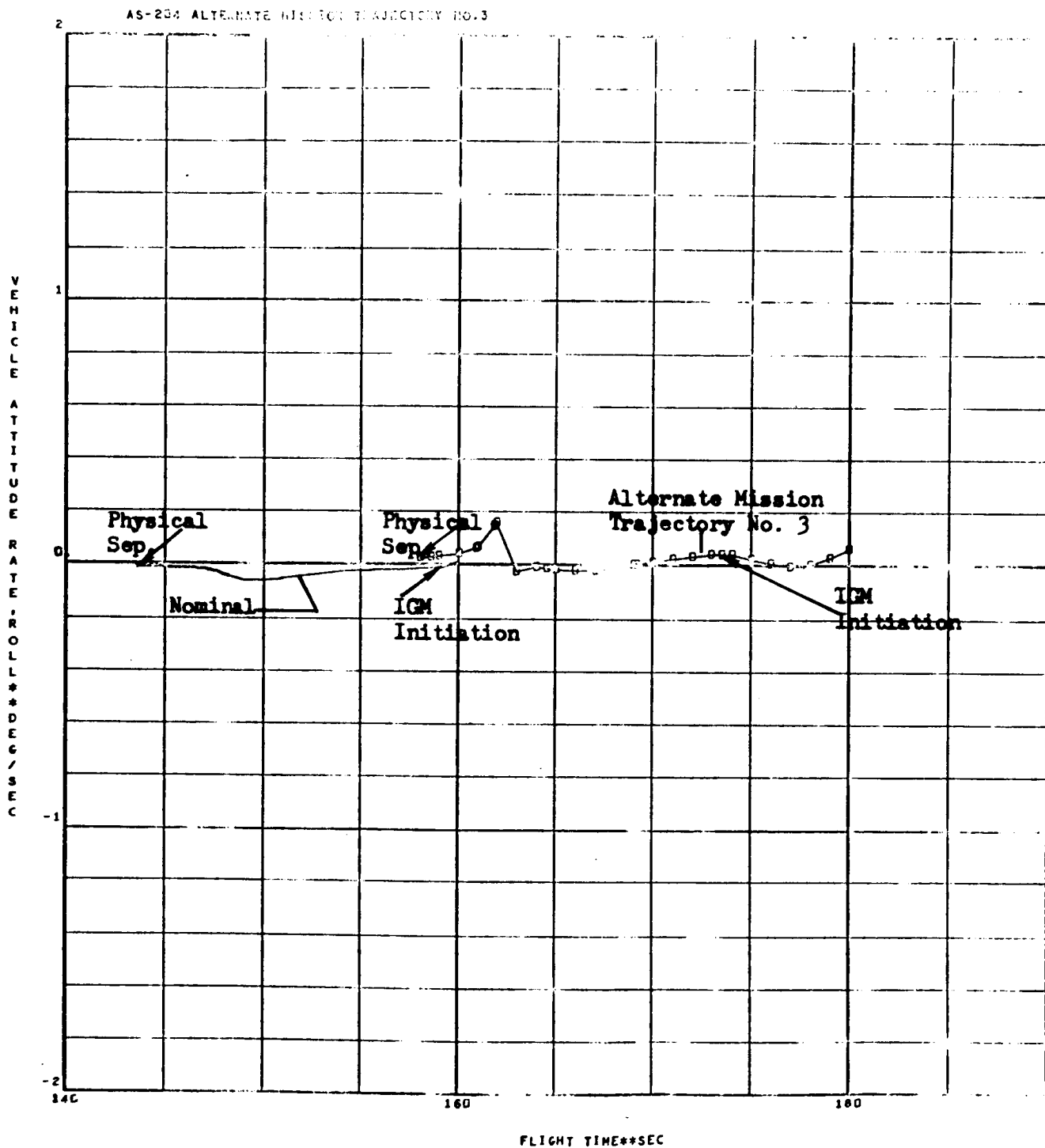


Figure 33C

AS-204/IM-1 L/V OPERATIONAL ALTERNATE MISSION TRAJECTORIES
ROLL ATTITUDE RATE HISTORY
S-IVB STAGE



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