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ENTRY TRAJECTORY, ENTRY ENVIRONMENT, AND ANALYSIS OF SPACECRAFT MOTION FOR THE RAM C-III FLIGHT EXPERIMENT

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SUMMARY

The RAM C-III flight experiment was launched from NASA Wallops Station on September 30, 1970, to study the problem of radiofrequency blackout at an entry velocity 7.407 km/sec (24 300 ft/sec). The flight is described, and data for the entry trajectory and environment, which include the effects of actual temperature measured the day of launch, are presented. An analysis of entry spacecraft motions was performed. This analysis included the determination of wind angles from measured accelerations and estimates of wind angles at high altitudes from gyro-measured rotation rates. The maximum wind angles were found to be less than 5° to the point of pitch-roll resonance (an altitude of 35.052 km (115 000 ft)), where the total wind angle increased to 8.5° and the roll rate started decreasing. A plausible cause for the decrease in roll rate was shown to be a combination of trim angle and an offset center of gravity.

INTRODUCTION

RAM C-III was one in a series of flight experiments conducted by Project RAM (Radio Attenuation Measurements) at the Langley Research Center to study the problem of radiofrequency blackout associated with high-speed entry into the earth's atmosphere. Some results of previous flight experiments are reported in references 1 to 7, and a summary of the RAM Program is presented in reference 8.

The RAM C-III spacecraft was launched from NASA Wallops Station, Wallops Island, Virginia, by a Scout vehicle September 30, 1970. Several experiments were included with the objectives of comparing the effectiveness of electrophilic liquids with that of water in reducing radiofrequency blackout and of obtaining measurements of ion and electron concentrations in the plasma sheath. Some results of this flight are presented in references 9 to 12.

In the present paper the RAM C-III flight is described, and comprehensive data for the entry trajectory and environment are presented. The results reported will serve as a base-line source for trajectory and environmental data required in the continuing analyses of flight data. All of the experimental data showed effects of spacecraft rotational motions and wind-angle changes. This paper contains an analysis of these data which can be used in the evaluation of the experimental data.

The analysis includes determination of the wind angles from measured accelerations in the region of substantial aerodynamic effects and the determination of inertial rotations and estimates of maximum wind angles from gyro-measured rotation rates in the high-altitude, low-density region. A computer simulation was used to demonstrate a plausible cause for the significant decrease in spacecraft roll rate.

SYMBOLS

Measurements and calculations were made in the U.S. Customary Units. (See appendix for further explanation and factors for conversion to SI Units.)

a_N normal acceleration, $-a_Z$

a_X,a_Y,a_Z accelerations along body axes (nondimensionalized by earth gravitational acceleration)

$C_{m,o}$ static pitching-moment coefficient at $\alpha = 0$

C_{m_η} slope of pitching-moment coefficient at $\eta = 0$

$C_{n,o}$ static yawing-moment coefficient at $\alpha = 0$

C_N normal-force coefficient

C_Y side-force coefficient

D diameter of base of spacecraft, 0.67 m (2.2 ft)

f( ) function of quantity in parentheses

I_l lateral moment of inertia, $\left(I_Y + I_Z\right)/2$

I_X,I_Y,I_Z spacecraft moments of inertia

L	geodetic latitude; angle between the equatorial plane and the altitude vector (positive north)
p,q,r	rotation rates about X-, Y-, and Z-axes
q_∞	dynamic pressure, $\frac{1}{2}\rho_m V^2$
S	area of base of spacecraft, 0.35 m^2 (3.8 ft^2)
t	time
t_p	time at beginning of interval for rotation and α,β cross plots
Δt	time interval defined in equation (15)
V	magnitude of earth-relative velocity vector, $\sqrt{u^2 + v^2 + w^2}$
V'	magnitude of lateral velocity, $\sqrt{v^2 + w^2}$
W	spacecraft weight
u,v,w	components of relative velocity along spacecraft X-, Y-, and Z-axes
X,Y,Z	spacecraft body axes
X_b	axis defined in figure 9
x_b,y,z	measurements along X_b-, Y-, and Z-axes in figure 9
$\Delta y,\Delta z$	displacements of center of gravity from X-axis of spacecraft
α,β,η	wind angles (angle of attack, angle of sideslip, and total wind angle)
δ	angle between gyro spin axis and spacecraft roll angular velocity vector
η'	uncertainty in direction of relative velocity with respect to inertial frame at 405 seconds

λ longitude; angle between Greenwich meridian and the spacecraft meridian (positive east)

ρ_m atmospheric density computed on basis of temperature measurements the day of launch

ρ_o atmospheric density based on 1962 Standard Atmosphere model (ref. 13)

τ resultant inertial angle in ψ,θ plane, $\sqrt{\psi^2 + \theta^2}$

ϕ' angle between negative Z-axis and V' (positive clockwise looking forward), $\tan^{-1}\left(-a_Y/-a_N\right)$

ψ,θ,ϕ inertial or Euler angles

$\dot{\Omega}$ total angular rate of change of earth-relative coordinates with respect to inertial frame

ω_o spacecraft natural oscillation frequency

$\Delta\omega$ modified roll frequency

$\omega_o/\Delta\omega$ resonance parameter

Subscripts:

max maximum value

0 value for beginning of integration

A dot over a quantity represents differentiation with respect to time.

NOMENCLATURE

Altitude magnitude of geodetic altitude vector; geodetic height above earth

Earth range great-circle distance along earth between launch site and projected spacecraft position

Flight azimuth	angle between spacecraft meridian and projection of relative velocity vector onto spacecraft horizon (positive clockwise from north)
Flight elevation	angle between spacecraft horizon and relative velocity vector (positive up)
Mach number	ratio of spacecraft velocity to velocity of sound
Radar azimuth	angle between radar meridian and projection of range vector on radar horizon (positive clockwise from north)
Radar elevation	angle between radar horizon and range vector (positive up)
Radar range	magnitude of range vector from radar to spacecraft

LAUNCH VEHICLE AND TRAJECTORY

A photograph of the RAM C-III launch vehicle on the launch pad at Wallops Station is shown in figure 1. The vehicle was launched at 20:06:29.1 GMT September 30, 1970. The lift-off was vertical, and the vehicle was pitched down on a flight azimuth of 109°. Table I lists some of the important flight events, and figure 2 shows plots of flight parameters. The time scale is based on time elapsed after lift-off. The plots show the overlapping of the data from the principal tracking radars.

The second-stage motor was ignited at zero angle of attack, and during the long coast between second burnout and third ignition (see fig. 2(a)), the vehicle was pitched down; the third stage was ignited just prior to apogee at a negative angle of attack. Therefore, the trajectory for the data period was uprange about 185 km (100 nautical miles) from that of a nominal ballistic trajectory. The indicated roll-up took place after third-stage burnout and just prior to fourth ignition. The purpose of rolling the spacecraft was to minimize anomalies due to separation and thrust misalinement for the unguided fourth stage. A few seconds after fourth-stage burnout (an altitude of about 141.732 km (465 000 ft)), a command signal from Bermuda initiated the start of an onboard programer which controlled several subsequent spacecraft events (separation, liquid injection, probe retraction, etc.). Separation of the fourth-stage motor case from the spacecraft was produced initially by a spring-loaded device. This system was augmented by a system of two small rocket motors designed to produce permanent separation.

ENTRY TRAJECTORY AND ENVIRONMENT

The Bermuda AN/FPS-16 radar which was tracking the C-band beacon in the spacecraft lost signal because of plasma at about 400 seconds; the Bermuda AN/FPQ-6 radar, however, switched to the skin-track mode at onset of attenuation and tracked throughout the entire period of interest. Trajectory data obtained by the two radars prior to loss of signal by the FPS-16 (see fig. 2(c), for instance) are in very good agreement. All the data for entry trajectory and environment presented or used in this paper are taken from the FPQ-6 radar. The coordinates of the FPQ-6 radar at Bermuda are

Latitude, 32.348°

Longitude, -64.654°

Radar data showing the spacecraft position relative to Bermuda are shown in figure 3.

Entry-trajectory parameters (altitude, latitude, longitude, earth range, velocity, flight azimuth, and flight elevation) are presented in figure 4. All parameters except flight azimuth and flight elevation vary smoothly and indicate no anomalies. The behavior of these parameters after about 420 seconds probably reflects inaccuracies in differentiating the position data obtained by the radar. It can be seen in figure 3, for instance, that the elevation angle from Bermuda is quite low at 420 seconds. Table II gives the entry-trajectory parameters in 0.1-second intervals.

Dynamic pressure and Mach number are plotted in figure 5. In computing these parameters, the atmospheric density was corrected for the temperature measured at Bermuda within a few hours after the entry. The temperatures to 182.88 km (60 000 ft) were obtained with a radiosonde, and above that altitude they were obtained with an Arcasonde. The variation in density from the 1962 Standard Atmosphere (ref. 13) is given in figure 6, and the actual correction factor used is also shown. The velocity of the wind relative to the earth was not considered in the computations. During the data period the spacecraft velocity is large, and wind effects could be expected to have a negligible effect on dynamic pressure. At the lower altitudes the effect may be more significant. Table III presents atmospheric density, dynamic pressure, and Mach number for the entry trajectory in 0.1-second intervals. For convenience the spacecraft altitude and velocity are also tabulated.

SPACECRAFT DESCRIPTION AND INSTRUMENTATION

The spacecraft consisted of a hemispherical nose with a radius of 15.95 cm (6.28 in.) faired into a cone frustum with a half-angle of 9°. A sketch of the geometry is shown in figure 7(a). The fins at the base of the spacecraft contained the probe rakes used to measure electron and positive-ion densities. They were retracted at 401.3 seconds (an altitude of about 60.808 km (199 500 ft)) to prevent adverse aerodynamic and heating effects on the spacecraft at lower altitudes. The nose of the spacecraft was covered with phenolic-graphite (see sketch in fig. 1), a hard, charring ablative material which permitted the drilling of holes for liquid injection. The remainder of the frustum was covered with teflon, and the base was protected by cork. Figure 7(b) lists the preflight-measured weight and moments of inertia of the spacecraft, and figure 7(c) shows plots of the preflight-computed histories of the weight and moments of inertia. The computations accounted for mass loss due to ablation and liquid injection. The sketches of figure 8 illustrate the axis systems and nomenclature employed.

A list of the performance instruments is shown in table IV. Shown also are the response of each instrument, its Inter-Range Instrumentation Group (IRIG) channel assignment, and the range and estimated error of each instrument. Note that the total ranges of the accelerometers measuring normal and side accelerations are divided into three subranges to improve the accuracy of their measurements at the lower end of the scale. The locations of the instruments on the spacecraft are shown in figure 9.

MEASURED SPACECRAFT-MOTION DATA

Spacecraft rotation rates measured by the gyros are presented in figure 10, and lateral (side and normal) accelerations measured by the accelerometers are presented in figure 11. All data have been smoothed. The data from 315 to 325 seconds are presented to illustrate the effects at roll-up, and the data from 370 to 380 seconds are presented to show the effects at separation of the fourth stage. From 380 to 440 seconds the acceleration which was due to the displacement of the accelerometers from the spacecraft center of gravity has been removed. The most significant component of that acceleration is shown in figure 11(a) and results from displacements of the lateral accelerometers from the spacecraft X-axis. (See fig. 9.) Figure 11(b) shows that separation of the fourth stage leaves this rotational component of measured acceleration essentially unchanged.

DETERMINATION OF WIND ANGLES FROM ACCELERATION DATA

Wind angles were determined from the following relationships:

$$C_N = \frac{Wa_N}{q_\infty S} \tag{1}$$

$$C_Y = \frac{Wa_Y}{q_\infty S} \tag{2}$$

$$\alpha = f(C_N) \tag{3}$$

$$\beta = f(C_Y) \tag{4}$$

$$\eta = \sqrt{\alpha^2 + \beta^2} \tag{5}$$

$$\phi' = \tan^{-1} \frac{-a_Y}{-a_N} \tag{6}$$

The quadrant of ϕ' was determined by testing the sign of the numerator and denominator of equation (6). The values of a_N and a_Y used in equations (1) and (2) were those shown in figure 11; values of W were taken from figure 7(b); and values of q_∞ were taken from table III. Aerodynamic-force coefficients were obtained in wind-tunnel tests from Mach 1.5 to Mach 20.3. Typical curves of the coefficients as a function of wind angles are shown in figure 12. All acceleration was assumed to be due to static aerodynamic forces, and cross coupling between α and β was considered negligible.

Wind angles determined from the acceleration data and equations (3) to (6) are presented in figures 13 and 14 from 400 seconds to 440 seconds. Wind angles determined by this method are not considered reliable prior to 400 seconds because of the very low measured accelerations. The maximum possible error in the absolute values of the wind angles from 400 to 405 seconds based on the instrument errors of table IV is about 3°. The consistent behavior of the angles, however, suggests that the errors are probably less than the maximum possible values. Between 405 and 410 seconds the maximum error in wind angles based on instrument measurement error goes to about 1.0°. The reason for presenting the roll rate with the total wind angle and phase angle is the relationship between these three quantities during the period when roll rate was decreasing.

INERTIAL ROTATIONS AND WIND ANGLES AT HIGH ALTITUDES

Integration and Analysis of Gyro Data

The data periods for most of the experiments began prior to 400 seconds, and additional analysis was required to determine spacecraft motions and to estimate maximum wind angles in the high-altitude, low-dynamic-pressure region. In reference 7, measured spacecraft rotation rates were used in the equations for the force-free motions of a symmetrical gyro to determine inertial rotations of the RAM C-I and C-II spacecraft. These were then utilized to estimate maximum wind angles on the assumption that the X-axis of each spacecraft was alined with its velocity vector at fourth-stage separation. In the present analysis measured spacecraft rotation rates were numerically integrated to obtain inertial rotations of the spacecraft. These rotations and the uncertainties in the direction of the relative velocity vector were used to estimate conservative maximum wind angles from 380 to 410 seconds.

Inertial rotations were determined from the following relationships:

$$\psi = \int_t \dot{\psi}\, dt + \psi_0 \tag{7}$$

$$\theta = \int_t \dot{\theta}\, dt + \theta_0 \tag{8}$$

$$\phi = \int_t \dot{\phi}\, dt + \phi_0 \tag{9}$$

$$\dot{\psi} = \frac{q \sin \phi + r \cos \phi}{\cos \theta} \tag{10}$$

$$\dot{\theta} = q \cos \phi - r \sin \phi \tag{11}$$

$$\dot{\phi} = p + q \tan \theta \sin \phi + r \tan \theta \cos \phi \tag{12}$$

The lateral (pitch and yaw) gyros are measuring components of the roll angular velocity, as can be seen from figure 10(a). These components are due to misalinements between the gyro axes and the roll angular velocity vector. The values of angular misalinement required to produce these measured values were found to be

$$\delta = 0.35^\circ \quad \text{(yaw gyro)}$$

$$\delta = 0.02^\circ \quad \text{(pitch gyro)}$$

Whether these misalinements were due to an inertial unbalance (principal-axis misalinement) of the spacecraft or to a geometric misalinement of the instruments cannot be precisely established. However, the fact that values of roll rate measured by the lateral gyros were essentially the same after fourth-stage separation as before suggests an instrument misalinement. This was concluded since it is improbable that the same inertial unbalance would have been present in the fourth-stage—spacecraft configuration as in the spacecraft alone because of the significant differences in their moments of inertia.

Inertial rotations of the spacecraft obtained by integrating equations (7) to (9) over two different time intervals are shown in figure 15. Over each of these time intervals a comparison is made between the rotations obtained by using rotation rates corrected for the roll components (instrument misalinement) and the measured rotation rates (assumes inertial misalinement). The inclusion of the roll components can be seen in figure 15(a) to produce nutation and to increase the rotation angles over those obtained with the modified rotation rates. The differences are not as apparent from 405 to 410 seconds (fig. 15(b)), probably because of the increased effect of aerodynamics. Because the main use of the inertial rotations will be to estimate conservative maximum wind angles, inertial rotation obtained by using the measured lateral rotation rates will be employed.

In figure 8 it can be seen that the total wind angle η is the angle between the direction of the relative wind velocity and the spacecraft X-axis. Figure 16 illustrates the relationship between the total wind angle and the resultant inertial angle τ. For simplicity the X-axis of the spacecraft, the X-axis of the inertial frame, and the relative velocity vector are shown in the same plane. It can be seen in figure 16 that if the inertial X-axis and the relative velocity vector have the same direction, then $\tau \equiv \eta$. Thus, values of η determined from inertial rotations will be in error because of the uncertainty in the direction of the relative velocity vector with respect to the inertial frame. This uncertainty results from two factors: (1) the initial misalinement between the relative velocity and the inertial frame at the time that integration of the gyro data is started, and (2) the change with time in the direction of the relative velocity vector due to the rotation of the earth.

Figure 15(b) indicates conelike angular motion of the spacecraft from 405 to 410 seconds. When the cross plot of α and β over the same time interval in figure 17 is compared with the inertial rotations, it is apparent that the relative velocity vector was inside the inertial cone. The proximity of the relative velocity vector to the angular momentum vector at this time make it a good time to initiate integration of the gyro data to obtain inertial rotations. The origin of the inertial coordinate system was chosen as the approximate center of the rotation in figure 15(b) and integration was started at 405 seconds. Equations (7) to (9) were integrated forward to 410 seconds and backward to 380 seconds. Plots of the inertial rotation in 5-second intervals are shown in figure 18. The arrows indicate the direction of rotation and the solid circular symbols approximate the average direction of the angular momentum vector during the time interval. These plots show that the variation in inertial angle increased from about 3° in the interval from

380 to 385 seconds to about 6.5° in the interval from 405 to 410 seconds and that the average direction of the angular momentum changed about 1.0° from 380 to 410 seconds.

Determinations of Conservative Maximum Wind Angles

First a resultant inertial angle τ was determined from each 5-second-interval plot by graphically measuring the distance from the origin to the outside rotation along a line passing through the angular momentum vector. A maximum value of η was then determined by adding linearly to this value of τ the initial uncertainty of the relative velocity assumed at 405 seconds η' and the total angular change in the relative frame with respect to the inertial frame. The equation for η_{max} is

$$\eta_{max} = \tau_{max} + \eta' + \dot{\Omega}\,\Delta t \tag{13}$$

where

$$\dot{\Omega} = \sqrt{\dot{L}^2 + \dot{\lambda}^2} \tag{14}$$

$$\Delta t = 405 - t_p \tag{15}$$

An initial uncertainty of 1° was assumed on the basis of the error in the determination of wind angles at 405 seconds. The rotation of the relative frame was nearly constant over the entire time interval:

$$\dot{L} = -0.028 \text{ deg/sec}$$

$$\dot{\lambda} = 0.068 \text{ deg/sec}$$

$$\dot{\Omega} = 0.074 \text{ deg/sec}$$

Figure 19 graphically illustrates the technique for obtaining conservative maximum total wind angles from the inertial plots. Figure 20 is a plot of the values of η_{max} from 380 to 410 seconds. The values were plotted at a time halfway through the time interval of the inertial-rotation plot. Shown also in this figure are the maximum total wind angles determined from acceleration data. It was shown in reference 7 that the cyclic changes in ion density measured by the electrostatic probes on the RAM C-I and C-II spacecraft were due to changes in the angle of attack. The locations of the RAM C-III probes relative to the angle-of-attack plane were identical with the probe locations on the RAM C-I and C-II spacecraft, and hence, the cyclic changes in ion density measured during the RAM C-III entry (see ref. 12) can be attributed to changes in angle of attack. The variation in angle of attack was shown in reference 7 to be $\alpha = \pm\eta_{max}$. The maximum wind angles are seen to be less than 5^o prior to resonance.

PITCH ROLL RESONANCE AND ROLL ANOMALY

Determination of Pitch Roll Resonance

It can be seen in figures 13 and 14 that the spacecraft continued to cone about the velocity vector until about 413 seconds, when the motions started to amplify. The resonance parameter

$$\frac{\omega_o}{\Delta\omega} = \frac{\sqrt{\dfrac{-C_{m_\eta} q_\infty SD}{I_l} + \left(\dfrac{pI_X}{2I_l}\right)^2}}{p\left(1 - \dfrac{I_X}{2I_l}\right)} \tag{16}$$

was computed by using q_∞ from table III and the measured roll rate p. The plot of the resonance parameter in figure 21 indicates that resonance amplification should have started at 415 seconds. The actual onset of amplification occurred 1 to 2 seconds prior to 415 seconds, as can be seen in figures 10, 11, 13, and 14. This early occurrence may have been because the total wind angle η was greater than zero for several seconds prior to resonance, and the effective moment coefficient may have been greater than C_{m_η}.

After 415 seconds both the oscillation and trim are greater in the β-plane than that in the α-plane. (See fig. 13.) It can be seen in figure 14 that the orientation of the lateral velocity ϕ' is essentially oscillating between 270^o and 360^o (0^o to -90^o). That is, the spacecraft is presenting only its fourth quadrant to the wind vector. The times of maximum roll deceleration can be seen in figure 14 to correspond to the times when η is about maximum and when ϕ' is increasing. At around 425 seconds, the spacecraft was undergoing small oscillations about a trim angle of approximately 2^o. Thus the spacecraft X-axis coned about the relative velocity vector while the spacecraft presented only a few degrees of its circumference to the wind vector. The maximum wind angle of 8.5^o which occurred at about 414.7 seconds is slightly greater than the maximum values reached during the resonance periods of the RAM C-I and C-II spacecraft.

Computer Simulation of Roll Anomaly

Unpublished studies by the authors indicated that the changes in roll rate which occurred during and after resonance conditions on the RAM C-I and C-II entries could be attributed to a combination of an aerodynamic trim and an offset center of gravity. Therefore, a set of equations in six degrees of freedom were computer-programed with the capability to simulate an aerodynamic trim and an offset center of gravity. Because the location of the center of gravity and an aerodynamic trim could have varied as a result of unsymmetrical ablation of the heat shield, a period of time after most of the ablation had occurred was chosen for simulation of the RAM C-III spacecraft motions. The simulation period was 433 to 440 seconds. Angular motions were small during this period. (See figs. 10, 11, 13, and 14.) The trim angle was slightly greater than 1°, and the changes in orientation of the lateral velocity vector were small. It is during this period that the roll rate passes through zero. (See fig. 14.) Figure 22 shows the computed simulation of roll rate and the wind angles compared with the flight-measured roll rate and the accelerometer-inferred wind angles. Values of static moment coefficients at $\alpha = 0$ and center-of-gravity displacement required were

$$C_{m,o} = -0.0030$$

$$C_{n,o} = 0.0025$$

$$\Delta y = 1.22 \text{ mm} \quad (0.004 \text{ ft})$$

$$\Delta z = 0$$

The average value of roll is simulated well even though the small oscillations are not. The wind angles are simulated in magnitude and frequency at certain times, but the main point is that the general trends in the angles are matched up fairly well. This type of simulation demonstrates the plausibility that a combination of trim angle and offset center of gravity caused the roll deceleration experienced by the spacecraft.

CONCLUDING REMARKS

The RAM C-III flight experiment was launched from NASA Wallops Station September 30, 1970, to study the problem of radiofrequency blackout at an entry velocity of 7.407 km/sec (24 300 ft/sec). The flight is described, and data for the entry trajectory and environment, which include the effects of actual temperature measured the day of launch, are presented. An analysis of entry spacecraft motions was performed. This analysis included the determination of wind angles from measured accelerations and estimates of wind angles at high altitudes from gyro-measured rotation rates. The maximum wind angles were found to be less than 5° to the point of pitch roll resonance (an altitude of 35.052 km (115 000 ft)), where the total wind angle went to 8.5° and the roll rate started decreasing. A plausible cause for the decrease in roll rate was shown to be a combination of trim angle and an offset center of gravity.

Langley Research Center,
National Aeronautics and Space Administration,
Hampton, Va., May 9, 1972.

APPENDIX

WORKING UNITS AND CONVERSION TO SI UNITS

The RAM C-III spacecraft was designed and fabricated to specifications in the U.S. Customary Units. All measurements (ground and flight) pertinent to the present paper were made in the U.S. Customary Units, and all data reduction and computations were made in that system. Graphical data were therefore plotted in the U.S. Customary Units. The final data were converted to SI Units, and a secondary SI scale is presented on each of the graphical figures. In other cases where numerical data are presented or discussed the value of each quantity is presented first in the SI Units followed by its value in the U.S. Customary Units. A list of the conversion factors used is given below. The conversion factors were taken from or derived from values given in reference 14. (1 n. mi. = 6080 ft herein.)

Physical quantity	U.S. Customary Unit	Conversion factor (*)	SI Unit
Length	feet	3.048×10^{-1}	meters (m)
	feet	3.048×10^{-4}	kilometers (km)
	inches	2.54	centimeters (cm)
	inches	25.4	millimeters (mm)
Velocity	ft/sec	3.048×10^{-4}	kilometers per second (km/sec)
Pressure	lb/sq ft	47.88	newtons per square meter (N/m^2)
Density	$slugs/ft^3$	515.379	kilograms per cubic meter (kg/m^3)
Weight	pounds	4.536×10^{-1}	kilograms (kg)
Moment of inertia	$slug\text{-}ft^2$	1.357	kilogram-meters^2 ($kg\text{-}m^2$)

*Multiply value given in U.S. Customary Units by conversion factor to obtain equivalent value in SI Units.

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TABLE I.- TRAJECTORY EVENTS

Event	Time, sec
Launch	0
First-stage burnout	76.70
Second-stage ignition	81.40
Second-stage burnout	123.50
Heat-shield ejection	262.40
Third-stage ignition	264.00
Third-stage burnout	299.00
Fourth-stage roll-up	319.60
Fourth-stage ignition	325.00
Fourth-stage burnout	359.00
Command signal to programer	362.24
Fourth-stage separation	372.56
Begin liquid injection	389.24
Begin VHF blackout	390.10
Probe retraction	401.30
End liquid injection	413.46
End VHF blackout	419.80
Impact	520.00

TABLE II.- ENTRY-TRAJECTORY PARAMETERS

TIME	ALTITUDE		LATITUDE	LONGITUDE	VELOCITY		FLIGHT AZIMUTH	FLIGHT ELEVATION	HORIZONTAL RANGE	
SEC	KM	FT	DEG	DEG	KM/SEC	FT/SEC	DEG	DEG	KM	NAUT. MI.
380.00	102.705	336960	34.446	-65.333	7.382	24218	115.701	-15.445	987.031	532.614
380.10	102.509	336315	34.443	-65.326	7.382	24218	115.706	-15.444	987.732	532.992
380.20	102.312	335670	34.440	-65.319	7.382	24218	115.712	-15.443	988.433	533.370
380.30	102.116	335026	34.438	-65.312	7.382	24219	115.717	-15.443	989.133	533.748
380.40	101.919	334381	34.435	-65.305	7.382	24219	115.723	-15.443	989.834	534.126
380.50	101.723	333736	34.432	-65.298	7.382	24220	115.728	-15.443	990.535	534.504
380.60	101.526	333091	34.429	-65.291	7.383	24221	115.734	-15.443	991.236	534.882
380.70	101.330	332446	34.427	-65.285	7.383	24221	115.739	-15.443	991.936	535.261
380.80	101.133	331801	34.424	-65.278	7.383	24221	115.744	-15.444	992.637	535.639
380.90	100.937	331157	34.421	-65.271	7.383	24222	115.750	-15.444	993.338	536.017
381.00	100.740	330511	34.418	-65.264	7.383	24221	115.755	-15.445	994.039	536.395
381.10	100.543	329866	34.416	-65.257	7.383	24221	115.761	-15.447	994.740	536.774
381.20	100.347	329222	34.413	-65.250	7.383	24221	115.766	-15.448	995.441	537.152
381.30	100.150	328577	34.410	-65.243	7.383	24221	115.771	-15.450	996.142	537.530
381.40	99.953	327931	34.407	-65.236	7.383	24221	115.776	-15.451	996.843	537.908
381.50	99.757	327286	34.405	-65.230	7.383	24221	115.782	-15.453	997.544	538.287
381.60	99.560	326641	34.402	-65.223	7.383	24222	115.787	-15.455	998.245	538.665
381.70	99.363	325995	34.399	-65.216	7.383	24222	115.792	-15.457	998.946	539.043
381.80	99.166	325349	34.396	-65.209	7.383	24222	115.797	-15.459	999.647	539.421
381.90	98.970	324704	34.394	-65.202	7.383	24222	115.802	-15.462	1000.348	539.800
382.00	98.773	324058	34.391	-65.195	7.383	24222	115.807	-15.464	1001.049	540.178
382.10	98.576	323412	34.388	-65.188	7.383	24222	115.812	-15.466	1001.750	540.556
382.20	98.379	322766	34.385	-65.182	7.383	24222	115.817	-15.468	1002.451	540.935
382.30	98.182	322120	34.383	-65.175	7.383	24223	115.822	-15.470	1003.153	541.313
382.40	97.985	321474	34.380	-65.168	7.383	24223	115.827	-15.472	1003.854	541.691
382.50	97.788	320827	34.377	-65.161	7.383	24223	115.831	-15.474	1004.555	542.070
382.60	97.591	320181	34.374	-65.154	7.383	24224	115.836	-15.476	1005.256	542.448
382.70	97.394	319535	34.372	-65.147	7.383	24224	115.841	-15.477	1005.957	542.826
382.80	97.197	318888	34.369	-65.140	7.383	24224	115.845	-15.478	1006.659	543.205
382.90	97.000	318242	34.366	-65.133	7.384	24225	115.850	-15.480	1007.360	543.583
383.00	96.803	317595	34.363	-65.127	7.384	24226	115.854	-15.481	1008.061	543.962
383.10	96.606	316948	34.361	-65.120	7.384	24226	115.859	-15.482	1008.762	544.340
383.20	96.409	316301	34.358	-65.113	7.384	24227	115.864	-15.482	1009.464	544.719
383.30	96.211	315654	34.355	-65.106	7.385	24228	115.868	-15.483	1010.165	545.097
383.40	96.014	315008	34.352	-65.099	7.385	24229	115.873	-15.483	1010.867	545.476
383.50	95.817	314361	34.350	-65.092	7.385	24229	115.877	-15.483	1011.568	545.854
383.60	95.620	313714	34.347	-65.086	7.386	24231	115.881	-15.483	1012.270	546.233
383.70	95.423	313067	34.344	-65.079	7.386	24232	115.886	-15.482	1012.972	546.612
383.80	95.226	312420	34.341	-65.072	7.386	24233	115.890	-15.482	1013.673	546.990
383.90	95.028	311773	34.339	-65.065	7.387	24234	115.895	-15.481	1014.375	547.369
384.00	94.831	311126	34.336	-65.058	7.387	24235	115.899	-15.480	1015.077	547.748
384.10	94.634	310479	34.333	-65.051	7.387	24236	115.903	-15.479	1015.779	548.126
384.20	94.437	309832	34.330	-65.044	7.388	24238	115.908	-15.477	1016.481	548.505
384.30	94.240	309186	34.328	-65.037	7.388	24240	115.912	-15.476	1017.183	548.884
384.40	94.043	308539	34.325	-65.031	7.388	24240	115.916	-15.474	1017.885	549.263
384.50	93.845	307892	34.322	-65.024	7.388	24240	115.921	-15.473	1018.587	549.642
384.60	93.648	307245	34.319	-65.017	7.389	24242	115.925	-15.471	1019.289	550.020
384.70	93.451	306598	34.316	-65.010	7.389	24243	115.929	-15.469	1019.991	550.399
384.80	93.254	305952	34.314	-65.003	7.390	24244	115.933	-15.467	1020.694	550.778
384.90	93.057	305305	34.311	-64.996	7.390	24246	115.937	-15.465	1021.396	551.157
385.00	92.860	304659	34.308	-64.990	7.390	24247	115.942	-15.463	1022.098	551.536

TABLE II.- ENTRY-TRAJECTORY PARAMETERS – Continued

TIME	ALTITUDE		LATITUDE	LONGITUDE	VELOCITY		FLIGHT AZIMUTH	FLIGHT ELEVATION	HORIZONTAL RANGE	
SEC	KM	FT	DEG	DEG	KM/SEC	FT/SEC	DEG	DEG	KM	NAUT. MI.
385.00	92.860	304659	34.308	-64.990	7.390	24247	115.942	-15.463	1022.098	551.536
385.10	92.663	304012	34.305	-64.983	7.391	24248	115.946	-15.461	1022.801	551.915
385.20	92.466	303366	34.303	-64.976	7.391	24249	115.950	-15.459	1023.503	552.295
385.30	92.269	302720	34.300	-64.969	7.391	24250	115.954	-15.457	1024.206	552.674
385.40	92.072	302073	34.297	-64.962	7.392	24251	115.959	-15.455	1024.909	553.053
385.50	91.875	301427	34.294	-64.955	7.392	24251	115.963	-15.453	1025.611	553.432
385.60	91.678	300781	34.292	-64.948	7.392	24253	115.967	-15.451	1026.314	553.811
385.70	91.481	300135	34.289	-64.941	7.392	24253	115.971	-15.449	1027.017	554.191
385.80	91.284	299489	34.286	-64.935	7.393	24254	115.976	-15.448	1027.720	554.570
385.90	91.087	298843	34.283	-64.928	7.393	24255	115.980	-15.446	1028.423	554.949
386.00	90.890	298197	34.280	-64.921	7.393	24255	115.984	-15.445	1029.126	555.328
386.10	90.694	297551	34.278	-64.914	7.393	24256	115.988	-15.444	1029.829	555.708
386.20	90.497	296906	34.275	-64.907	7.394	24257	115.992	-15.443	1030.532	556.087
386.30	90.300	296260	34.272	-64.900	7.394	24257	115.996	-15.442	1031.235	556.467
386.40	90.103	295614	34.269	-64.893	7.394	24258	116.001	-15.441	1031.938	556.846
386.50	89.906	294968	34.266	-64.887	7.394	24258	116.005	-15.440	1032.641	557.225
386.60	89.710	294323	34.264	-64.880	7.394	24259	116.009	-15.440	1033.345	557.605
386.70	89.513	293677	34.261	-64.873	7.394	24260	116.013	-15.440	1034.048	557.984
386.80	89.316	293031	34.258	-64.866	7.394	24260	116.017	-15.440	1034.751	558.364
386.90	89.119	292385	34.255	-64.859	7.394	24260	116.021	-15.440	1035.454	558.743
387.00	88.922	291739	34.253	-64.852	7.395	24261	116.025	-15.440	1036.158	559.123
387.10	88.725	291093	34.250	-64.845	7.395	24261	116.030	-15.440	1036.861	559.502
387.20	88.529	290448	34.247	-64.838	7.395	24262	116.034	-15.440	1037.564	559.882
387.30	88.332	289802	34.244	-64.832	7.395	24263	116.038	-15.441	1038.268	560.262
387.40	88.135	289156	34.241	-64.825	7.396	24264	116.042	-15.441	1038.971	560.641
387.50	87.938	288510	34.239	-64.818	7.396	24264	116.046	-15.442	1039.675	561.021
387.60	87.741	287864	34.236	-64.811	7.396	24265	116.050	-15.442	1040.379	561.401
387.70	87.544	287217	34.233	-64.804	7.396	24266	116.055	-15.443	1041.082	561.780
387.80	87.347	286571	34.230	-64.797	7.397	24267	116.059	-15.444	1041.786	562.160
387.90	87.150	285925	34.227	-64.791	7.397	24268	116.063	-15.445	1042.490	562.540
388.00	86.953	285279	34.225	-64.784	7.397	24268	116.068	-15.446	1043.194	562.920
388.10	86.756	284633	34.222	-64.777	7.397	24269	116.072	-15.447	1043.897	563.299
388.20	86.559	283986	34.219	-64.770	7.397	24270	116.076	-15.448	1044.601	563.679
388.30	86.362	283340	34.216	-64.763	7.398	24271	116.081	-15.449	1045.305	564.059
388.40	86.165	282693	34.214	-64.756	7.398	24272	116.085	-15.450	1046.009	564.439
388.50	85.968	282047	34.211	-64.749	7.398	24272	116.090	-15.451	1046.713	564.819
388.60	85.771	281400	34.208	-64.742	7.399	24274	116.094	-15.452	1047.417	565.199
388.70	85.574	280753	34.205	-64.736	7.399	24274	116.099	-15.453	1048.121	565.578
388.80	85.376	280106	34.202	-64.729	7.399	24275	116.104	-15.455	1048.825	565.958
388.90	85.179	279459	34.200	-64.722	7.399	24276	116.108	-15.456	1049.529	566.338
389.00	84.982	278812	34.197	-64.715	7.399	24276	116.113	-15.458	1050.234	566.718
389.10	84.785	278165	34.194	-64.708	7.400	24277	116.117	-15.459	1050.938	567.098
389.20	84.587	277518	34.191	-64.701	7.400	24277	116.122	-15.461	1051.642	567.478
389.30	84.390	276871	34.188	-64.695	7.400	24279	116.127	-15.463	1052.346	567.858
389.40	84.193	276224	34.186	-64.688	7.400	24279	116.132	-15.465	1053.050	568.238
389.50	83.996	275576	34.183	-64.681	7.400	24279	116.136	-15.467	1053.755	568.619
389.60	83.798	274929	34.180	-64.674	7.400	24279	116.141	-15.469	1054.459	568.999
389.70	83.601	274281	34.177	-64.667	7.400	24279	116.146	-15.471	1055.164	569.379
389.80	83.404	273634	34.174	-64.660	7.401	24282	116.151	-15.473	1055.868	569.759
389.90	83.206	272986	34.172	-64.653	7.400	24279	116.156	-15.476	1056.572	570.139
390.00	83.009	272338	34.169	-64.646	7.399	24276	116.160	-15.478	1057.277	570.519

TABLE II.- ENTRY-TRAJECTORY PARAMETERS – Continued

TIME	ALTITUDE		LATITUDE	LONGITUDE	VELOCITY		FLIGHT AZIMUTH	FLIGHT ELEVATION	HORIZONTAL RANGE	
SEC	KM	FT	DEG	DEG	KM/SEC	FT/SEC	DEG	DEG	KM	NAUT. MI.
390.00	83.009	272338	34.169	-64.646	7.399	24276	116.160	-15.478	1057.277	570.519
390.10	82.811	271690	34.166	-64.640	7.401	24280	116.165	-15.480	1057.981	570.899
390.20	82.614	271042	34.163	-64.633	7.400	24279	116.170	-15.482	1058.686	571.279
390.30	82.416	270394	34.160	-64.626	7.400	24278	116.174	-15.484	1059.390	571.659
390.40	82.219	269746	34.158	-64.619	7.400	24278	116.179	-15.487	1060.095	572.040
390.50	82.021	269097	34.155	-64.612	7.400	24277	116.184	-15.489	1060.799	572.420
390.60	81.823	268449	34.152	-64.605	7.400	24277	116.188	-15.491	1061.503	572.800
390.70	81.625	267800	34.149	-64.599	7.400	24277	116.193	-15.493	1062.208	573.180
390.80	81.428	267152	34.146	-64.592	7.400	24279	116.197	-15.494	1062.912	573.560
390.90	81.230	266503	34.144	-64.585	7.399	24276	116.202	-15.496	1063.617	573.940
391.00	81.032	265854	34.141	-64.578	7.398	24273	116.206	-15.497	1064.321	574.320
391.10	80.835	265206	34.138	-64.571	7.399	24276	116.211	-15.498	1065.026	574.700
391.20	80.637	264557	34.135	-64.564	7.399	24276	116.215	-15.499	1065.730	575.081
391.30	80.439	263908	34.132	-64.557	7.399	24276	116.220	-15.500	1066.435	575.461
391.40	80.241	263259	34.130	-64.550	7.399	24276	116.224	-15.500	1067.139	575.841
391.50	80.044	262610	34.127	-64.544	7.399	24275	116.228	-15.500	1067.844	576.221
391.60	79.846	261961	34.124	-64.537	7.399	24275	116.233	-15.500	1068.548	576.601
391.70	79.648	261313	34.121	-64.530	7.399	24275	116.237	-15.500	1069.253	576.982
391.80	79.450	260664	34.118	-64.523	7.400	24279	116.241	-15.499	1069.958	577.362
391.90	79.253	260015	34.116	-64.516	7.400	24277	116.245	-15.498	1070.662	577.742
392.00	79.055	259366	34.113	-64.510	7.399	24275	116.249	-15.497	1071.367	578.122
392.10	78.857	258718	34.110	-64.503	7.400	24278	116.254	-15.495	1072.072	578.503
392.20	78.659	258069	34.107	-64.496	7.400	24278	116.258	-15.493	1072.777	578.883
392.30	78.462	257420	34.104	-64.489	7.401	24280	116.262	-15.492	1073.482	579.263
392.40	78.264	256772	34.101	-64.482	7.401	24281	116.266	-15.490	1074.186	579.644
392.50	78.066	256123	34.099	-64.475	7.401	24281	116.270	-15.488	1074.891	580.024
392.60	77.869	255475	34.096	-64.468	7.401	24282	116.274	-15.485	1075.596	580.404
392.70	77.671	254827	34.093	-64.461	7.402	24284	116.278	-15.483	1076.302	580.785
392.80	77.473	254178	34.090	-64.455	7.403	24288	116.282	-15.480	1077.007	581.165
392.90	77.275	253530	34.087	-64.448	7.402	24286	116.286	-15.478	1077.712	581.546
393.00	77.078	252882	34.085	-64.441	7.402	24285	116.290	-15.475	1078.417	581.927
393.10	76.881	252234	34.082	-64.434	7.403	24289	116.294	-15.473	1079.122	582.307
393.20	76.683	251586	34.079	-64.427	7.404	24290	116.298	-15.471	1079.828	582.688
393.30	76.486	250938	34.076	-64.420	7.404	24291	116.302	-15.468	1080.533	583.069
393.40	76.289	250291	34.073	-64.414	7.404	24292	116.305	-15.466	1081.239	583.449
393.50	76.091	249643	34.071	-64.407	7.405	24294	116.309	-15.464	1081.945	583.830
393.60	75.894	248995	34.068	-64.400	7.405	24295	116.314	-15.462	1082.650	584.211
393.70	75.696	248343	34.065	-64.393	7.405	24296	116.318	-15.460	1083.356	584.592
393.80	75.499	247700	34.062	-64.386	7.407	24300	116.322	-15.459	1084.062	584.973
393.90	75.302	247053	34.059	-64.379	7.406	24298	116.325	-15.457	1084.768	585.354
394.00	75.104	246405	34.056	-64.372	7.405	24296	116.329	-15.456	1085.474	585.734
394.10	74.907	245758	34.054	-64.366	7.407	24300	116.334	-15.455	1086.180	586.115
394.20	74.710	245110	34.051	-64.359	7.407	24300	116.338	-15.455	1086.886	586.496
394.30	74.512	244463	34.048	-64.352	7.407	24301	116.342	-15.454	1087.592	586.877
394.40	74.315	243815	34.045	-64.345	7.407	24302	116.346	-15.454	1088.298	587.258
394.50	74.118	243168	34.042	-64.338	7.407	24302	116.350	-15.455	1089.004	587.639
394.60	73.920	242520	34.040	-64.331	7.408	24303	116.354	-15.455	1089.710	588.021
394.70	73.723	241873	34.037	-64.325	7.408	24303	116.358	-15.455	1090.417	588.402
394.80	73.525	241225	34.034	-64.318	7.408	24306	116.363	-15.456	1091.123	588.783
394.90	73.328	240577	34.031	-64.311	7.408	24303	116.367	-15.457	1091.829	589.164
395.00	73.131	239930	34.028	-64.304	7.407	24300	116.371	-15.458	1092.535	589.545

TABLE II.- ENTRY-TRAJECTORY PARAMETERS – Continued

TIME	ALTITUDE		LATITUDE	LONGITUDE	VELOCITY		FLIGHT AZIMUTH	FLIGHT ELEVATION	HORIZONTAL RANGE	
SEC	KM	FT	DEG	DEG	KM/SEC	FT/SEC	DEG	DEG	KM	NAUT. MI.
395.00	73.131	239930	34.028	-64.304	7.407	24300	116.371	-15.458	1092.535	589.545
395.10	72.933	239282	34.025	-64.297	7.408	24303	116.376	-15.459	1093.241	589.926
395.20	72.736	238634	34.023	-64.290	7.408	24303	116.380	-15.461	1093.948	590.307
395.30	72.538	237986	34.020	-64.283	7.408	24303	116.384	-15.462	1094.654	590.688
395.40	72.341	237339	34.017	-64.276	7.408	24303	116.389	-15.464	1095.360	591.069
395.50	72.143	236691	34.014	-64.270	7.408	24303	116.393	-15.465	1096.067	591.450
395.60	71.946	236042	34.011	-64.263	7.407	24302	116.398	-15.467	1096.773	591.832
395.70	71.748	235394	34.008	-64.256	7.407	24302	116.403	-15.468	1097.479	592.213
395.80	71.551	234746	34.005	-64.249	7.408	24305	116.407	-15.469	1098.186	592.594
395.90	71.353	234098	34.003	-64.242	7.407	24302	116.412	-15.471	1098.892	592.975
396.00	71.156	233450	34.000	-64.235	7.406	24298	116.416	-15.472	1099.599	593.356
396.10	70.958	232801	33.997	-64.229	7.407	24301	116.421	-15.473	1100.305	593.737
396.20	70.760	232153	33.994	-64.222	7.407	24301	116.426	-15.473	1101.011	594.119
396.30	70.562	231504	33.991	-64.215	7.407	24301	116.430	-15.474	1101.718	594.500
396.40	70.365	230856	33.988	-64.208	7.407	24301	116.435	-15.474	1102.424	594.881
396.50	70.167	230207	33.986	-64.201	7.407	24300	116.440	-15.474	1103.131	595.262
396.60	69.970	229559	33.983	-64.194	7.407	24300	116.444	-15.474	1103.837	595.644
396.70	69.772	228911	33.980	-64.187	7.407	24300	116.449	-15.473	1104.544	596.025
396.80	69.574	228262	33.977	-64.181	7.407	24302	116.454	-15.472	1105.250	596.406
396.90	69.377	227614	33.974	-64.174	7.406	24299	116.458	-15.471	1105.957	596.787
397.00	69.179	226965	33.972	-64.167	7.405	24296	116.463	-15.470	1106.663	597.169
397.10	68.981	226317	33.969	-64.160	7.406	24298	116.468	-15.468	1107.370	597.550
397.20	68.784	225669	33.966	-64.153	7.406	24298	116.472	-15.466	1108.076	597.931
397.30	68.586	225021	33.963	-64.146	7.406	24298	116.477	-15.464	1108.783	598.312
397.40	68.389	224373	33.960	-64.140	7.406	24298	116.481	-15.462	1109.489	598.694
397.50	68.192	223726	33.957	-64.133	7.406	24297	116.486	-15.460	1110.196	599.075
397.60	67.994	223078	33.955	-64.126	7.406	24297	116.491	-15.458	1110.903	599.456
397.70	67.797	222430	33.952	-64.119	7.405	24296	116.495	-15.456	1111.609	599.837
397.80	67.599	221783	33.949	-64.112	7.406	24299	116.500	-15.454	1112.316	600.219
397.90	67.402	221136	33.946	-64.105	7.405	24295	116.505	-15.452	1113.023	600.600
398.00	67.205	220488	33.943	-64.099	7.404	24292	116.510	-15.450	1113.729	600.982
398.10	67.008	219841	33.940	-64.092	7.405	24294	116.514	-15.448	1114.436	601.363
398.20	66.811	219195	33.937	-64.085	7.405	24293	116.519	-15.447	1115.143	601.744
398.30	66.613	218548	33.935	-64.078	7.405	24293	116.524	-15.445	1115.850	602.126
398.40	66.416	217901	33.932	-64.071	7.405	24293	116.528	-15.444	1116.556	602.507
398.50	66.219	217254	33.929	-64.064	7.404	24292	116.533	-15.443	1117.263	602.888
398.60	66.022	216607	33.926	-64.058	7.404	24292	116.537	-15.442	1117.970	603.270
398.70	65.825	215961	33.923	-64.051	7.404	24291	116.541	-15.442	1118.677	603.651
398.80	65.628	215314	33.920	-64.044	7.405	24293	116.545	-15.442	1119.383	604.033
398.90	65.431	214667	33.918	-64.037	7.404	24290	116.549	-15.442	1120.091	604.414
399.00	65.234	214021	33.915	-64.030	7.403	24287	116.552	-15.442	1120.797	604.795
399.10	65.036	213374	33.912	-64.023	7.403	24289	116.556	-15.443	1121.504	605.177
399.20	64.839	212727	33.909	-64.017	7.403	24288	116.560	-15.444	1122.211	605.558
399.30	64.642	212081	33.906	-64.010	7.403	24287	116.563	-15.446	1122.918	605.940
399.40	64.445	211434	33.903	-64.003	7.403	24287	116.566	-15.447	1123.624	606.321
399.50	64.248	210787	33.900	-63.996	7.402	24286	116.568	-15.449	1124.331	606.702
399.60	64.051	210140	33.898	-63.989	7.402	24286	116.570	-15.451	1125.038	607.084
399.70	63.854	209494	33.895	-63.982	7.402	24285	116.572	-15.453	1125.745	607.465
399.80	63.656	208846	33.892	-63.976	7.403	24288	116.573	-15.456	1126.452	607.847
399.90	63.459	208199	33.889	-63.969	7.402	24285	116.575	-15.458	1127.159	608.228
400.00	63.262	207552	33.886	-63.962	7.401	24281	116.576	-15.461	1127.865	608.610

TABLE II.- ENTRY-TRAJECTORY PARAMETERS – Continued

TIME	ALTITUDE		LATITUDE	LONGITUDE	VELOCITY		FLIGHT AZIMUTH	FLIGHT ELEVATION	HORIZONTAL RANGE	
SEC	KM	FT	DEG	DEG	KM/SEC	FT/SEC	DEG	DEG	KM	NAUT. MI.
400.00	63.262	207552	33.886	-63.962	7.401	24281	116.576	-15.461	1127.865	608.610
400.10	63.064	206904	33.883	-63.955	7.402	24284	116.577	-15.464	1128.572	608.991
400.20	62.867	206257	33.880	-63.948	7.401	24282	116.579	-15.467	1129.279	609.372
400.30	62.670	205609	33.878	-63.941	7.401	24280	116.580	-15.470	1129.986	609.754
400.40	62.472	204962	33.875	-63.935	7.401	24280	116.581	-15.473	1130.692	610.135
400.50	62.275	204314	33.872	-63.928	7.401	24280	116.583	-15.477	1131.399	610.516
400.60	62.077	203666	33.869	-63.921	7.400	24279	116.584	-15.480	1132.106	610.898
400.70	61.880	203018	33.866	-63.914	7.400	24278	116.586	-15.484	1132.813	611.279
400.80	61.682	202370	33.863	-63.907	7.401	24280	116.588	-15.487	1133.520	611.661
400.90	61.485	201722	33.861	-63.900	7.400	24277	116.590	-15.490	1134.226	612.042
401.00	61.287	201073	33.858	-63.894	7.398	24272	116.592	-15.494	1134.933	612.423
401.10	61.090	200425	33.855	-63.887	7.398	24273	116.594	-15.497	1135.639	612.804
401.20	60.892	199776	33.852	-63.880	7.398	24273	116.597	-15.500	1136.346	613.186
401.30	60.694	199127	33.849	-63.873	7.398	24271	116.600	-15.504	1137.052	613.567
401.40	60.496	198478	33.846	-63.866	7.397	24269	116.604	-15.507	1137.759	613.948
401.50	60.298	197829	33.843	-63.860	7.397	24267	116.607	-15.510	1138.465	614.329
401.60	60.100	197180	33.841	-63.853	7.396	24265	116.610	-15.512	1139.172	614.711
401.70	59.903	196531	33.838	-63.846	7.395	24263	116.613	-15.515	1139.879	615.092
401.80	59.705	195882	33.835	-63.839	7.396	24265	116.617	-15.517	1140.585	615.473
401.90	59.507	195233	33.832	-63.832	7.394	24260	116.620	-15.519	1141.291	615.854
402.00	59.309	194584	33.829	-63.825	7.393	24255	116.624	-15.521	1141.998	616.235
402.10	59.111	193934	33.826	-63.819	7.393	24256	116.627	-15.522	1142.704	616.616
402.20	58.913	193285	33.823	-63.812	7.393	24254	116.630	-15.523	1143.410	616.998
402.30	58.715	192635	33.821	-63.805	7.392	24252	116.634	-15.523	1144.116	617.379
402.40	58.517	191986	33.818	-63.798	7.391	24249	116.637	-15.524	1144.822	617.760
402.50	58.320	191337	33.815	-63.791	7.390	24247	116.640	-15.523	1145.528	618.141
402.60	58.122	190688	33.812	-63.784	7.390	24246	116.643	-15.523	1146.234	618.522
402.70	57.924	190039	33.809	-63.778	7.389	24243	116.646	-15.521	1146.940	618.903
402.80	57.726	189390	33.806	-63.771	7.390	24244	116.648	-15.520	1147.646	619.284
402.90	57.529	188742	33.803	-63.764	7.388	24239	116.650	-15.517	1148.352	619.664
403.00	57.331	188093	33.801	-63.757	7.387	24235	116.652	-15.515	1149.058	620.045
403.10	57.133	187445	33.798	-63.750	7.387	24236	116.654	-15.512	1149.764	620.426
403.20	56.935	186796	33.795	-63.744	7.387	24234	116.655	-15.508	1150.470	620.807
403.30	56.738	186148	33.792	-63.737	7.386	24233	116.657	-15.505	1151.176	621.188
403.40	56.540	185500	33.789	-63.730	7.386	24231	116.659	-15.501	1151.882	621.569
403.50	56.343	184853	33.786	-63.723	7.385	24229	116.661	-15.497	1152.587	621.950
403.60	56.146	184205	33.784	-63.716	7.385	24228	116.664	-15.492	1153.293	622.331
403.70	55.948	183558	33.781	-63.710	7.384	24226	116.666	-15.488	1153.999	622.712
403.80	55.752	182912	33.778	-63.703	7.384	24227	116.668	-15.483	1154.705	623.093
403.90	55.554	182265	33.775	-63.696	7.383	24223	116.671	-15.479	1155.411	623.474
404.00	55.357	181619	33.772	-63.689	7.382	24219	116.674	-15.474	1156.117	623.854
404.10	55.161	180973	33.769	-63.682	7.382	24220	116.677	-15.470	1156.823	624.235
404.20	54.964	180327	33.766	-63.676	7.382	24219	116.680	-15.466	1157.528	624.616
404.30	54.767	179681	33.764	-63.669	7.382	24218	116.684	-15.462	1158.234	624.997
404.40	54.570	179036	33.761	-63.662	7.381	24215	116.689	-15.459	1158.940	625.378
404.50	54.373	178390	33.758	-63.655	7.380	24213	116.694	-15.455	1159.646	625.759
404.60	54.177	177746	33.755	-63.648	7.380	24211	116.699	-15.453	1160.352	626.139
404.70	53.980	177101	33.752	-63.641	7.379	24209	116.705	-15.451	1161.057	626.520
404.80	53.784	176456	33.749	-63.635	7.379	24209	116.711	-15.449	1161.763	626.901
404.90	53.587	175812	33.746	-63.628	7.377	24204	116.718	-15.448	1162.469	627.282
405.00	53.391	175167	33.744	-63.621	7.376	24198	116.725	-15.447	1163.174	627.662

TABLE II.- ENTRY-TRAJECTORY PARAMETERS – Continued

TIME	ALTITUDE		LATITUDE	LONGITUDE	VELOCITY		FLIGHT AZIMUTH	FLIGHT ELEVATION	HORIZONTAL RANGE	
SEC	KM	FT	DEG	DEG	KM/SEC	FT/SEC	DEG	DEG	KM	NAUT. MI.
405.00	53.391	175167	33.744	-63.621	7.376	24198	116.725	-15.447	1163.174	627.662
405.10	53.195	174523	33.741	-63.614	7.376	24198	116.732	-15.447	1163.880	628.043
405.20	52.998	173879	33.738	-63.608	7.374	24194	116.739	-15.447	1164.585	628.424
405.30	52.802	173235	33.735	-63.601	7.373	24191	116.746	-15.448	1165.290	628.804
405.40	52.606	172591	33.732	-63.594	7.372	24187	116.753	-15.450	1165.996	629.185
405.50	52.409	171947	33.729	-63.587	7.371	24183	116.761	-15.452	1166.701	629.566
405.60	52.213	171302	33.726	-63.580	7.370	24179	116.768	-15.454	1167.406	629.946
405.70	52.017	170658	33.723	-63.573	7.368	24174	116.776	-15.457	1168.111	630.326
405.80	51.820	170014	33.721	-63.567	7.368	24173	116.783	-15.460	1168.816	630.707
405.90	51.624	169370	33.718	-63.560	7.365	24165	116.790	-15.463	1169.521	631.087
406.00	51.428	168726	33.715	-63.553	7.363	24158	116.797	-15.466	1170.225	631.467
406.10	51.231	168081	33.712	-63.546	7.362	24155	116.803	-15.470	1170.929	631.847
406.20	51.035	167437	33.709	-63.540	7.361	24149	116.809	-15.474	1171.634	632.227
406.30	50.839	166793	33.706	-63.533	7.359	24145	116.814	-15.477	1172.338	632.607
406.40	50.642	166149	33.703	-63.526	7.358	24139	116.820	-15.481	1173.042	632.987
406.50	50.446	165504	33.700	-63.519	7.356	24133	116.825	-15.485	1173.745	633.367
406.60	50.249	164860	33.698	-63.513	7.354	24127	116.829	-15.488	1174.449	633.747
406.70	50.053	164216	33.695	-63.506	7.352	24122	116.834	-15.492	1175.153	634.126
406.80	49.856	163571	33.692	-63.499	7.351	24119	116.838	-15.495	1175.856	634.506
406.90	49.660	162927	33.689	-63.492	7.349	24110	116.843	-15.498	1176.559	634.885
407.00	49.464	162282	33.686	-63.486	7.346	24102	116.847	-15.502	1177.262	635.265
407.10	49.267	161638	33.683	-63.479	7.345	24098	116.851	-15.504	1177.965	635.644
407.20	49.071	160994	33.680	-63.472	7.343	24092	116.855	-15.507	1178.668	636.023
407.30	48.875	160350	33.678	-63.465	7.341	24086	116.859	-15.509	1179.371	636.402
407.40	48.678	159705	33.675	-63.458	7.339	24079	116.863	-15.510	1180.073	636.781
407.50	48.482	159061	33.672	-63.452	7.337	24073	116.867	-15.512	1180.775	637.160
407.60	48.286	158418	33.669	-63.445	7.335	24066	116.870	-15.513	1181.477	637.539
407.70	48.090	157774	33.666	-63.438	7.333	24059	116.874	-15.513	1182.179	637.918
407.80	47.893	157130	33.663	-63.431	7.332	24055	116.879	-15.514	1182.880	638.296
407.90	47.697	156487	33.660	-63.425	7.329	24045	116.883	-15.514	1183.582	638.675
408.00	47.501	155844	33.658	-63.418	7.326	24035	116.887	-15.514	1184.283	639.053
408.10	47.305	155201	33.655	-63.411	7.324	24030	116.892	-15.513	1184.984	639.432
408.20	47.109	154558	33.652	-63.405	7.322	24022	116.897	-15.512	1185.685	639.810
408.30	46.914	153916	33.649	-63.398	7.319	24014	116.902	-15.511	1186.386	640.188
408.40	46.718	153273	33.646	-63.391	7.317	24006	116.907	-15.509	1187.086	640.566
408.50	46.522	152631	33.643	-63.384	7.314	23997	116.912	-15.508	1187.786	640.944
408.60	46.327	151990	33.640	-63.378	7.312	23988	116.918	-15.506	1188.487	641.321
408.70	46.131	151349	33.638	-63.371	7.308	23978	116.923	-15.503	1189.186	641.699
408.80	45.936	150708	33.635	-63.364	7.306	23971	116.928	-15.501	1189.886	642.076
408.90	45.741	150068	33.632	-63.357	7.302	23958	116.934	-15.499	1190.585	642.454
409.00	45.546	149428	33.629	-63.351	7.299	23946	116.939	-15.496	1191.284	642.831
409.10	45.351	148788	33.626	-63.344	7.296	23938	116.945	-15.493	1191.983	643.208
409.20	45.156	148149	33.623	-63.337	7.293	23926	116.950	-15.490	1192.681	643.585
409.30	44.961	147510	33.620	-63.331	7.289	23915	116.956	-15.487	1193.379	643.962
409.40	44.766	146871	33.618	-63.324	7.286	23903	116.961	-15.485	1194.077	644.338
409.50	44.572	146233	33.615	-63.317	7.282	23890	116.967	-15.482	1194.775	644.714
409.60	44.378	145596	33.612	-63.311	7.278	23878	116.972	-15.479	1195.472	645.091
409.70	44.184	144959	33.609	-63.304	7.274	23865	116.978	-15.476	1196.168	645.467
409.80	43.989	144322	33.606	-63.297	7.271	23854	116.983	-15.473	1196.865	645.842
409.90	43.795	143686	33.603	-63.290	7.266	23838	116.988	-15.470	1197.561	646.218
410.00	43.602	143051	33.601	-63.284	7.261	23821	116.994	-15.468	1198.257	646.594

TABLE II.- ENTRY-TRAJECTORY PARAMETERS – Continued

TIME	ALTITUDE		LATITUDE	LONGITUDE	VELOCITY		FLIGHT AZIMUTH	FLIGHT ELEVATION	HORIZONTAL RANGE	
SEC	KM	FT	DEG	DEG	KM/SEC	FT/SEC	DEG	DEG	KM	NAUT. MI.
410.00	43.602	143051	33.601	-63.284	7.261	23821	116.994	-15.468	1198.257	646.594
410.10	43.408	142416	33.598	-63.277	7.257	23809	116.999	-15.465	1198.952	646.969
410.20	43.215	141781	33.595	-63.270	7.252	23794	117.004	-15.463	1199.647	647.344
410.30	43.022	141147	33.592	-63.264	7.248	23779	117.009	-15.461	1200.341	647.718
410.40	42.829	140514	33.589	-63.257	7.243	23763	117.014	-15.459	1201.036	648.093
410.50	42.636	139881	33.586	-63.250	7.238	23746	117.018	-15.457	1201.729	648.467
410.60	42.443	139248	33.583	-63.244	7.233	23730	117.023	-15.456	1202.423	648.841
410.70	42.250	138616	33.581	-63.237	7.228	23714	117.027	-15.454	1203.115	649.215
410.80	42.058	137984	33.578	-63.230	7.224	23700	117.032	-15.454	1203.808	649.589
410.90	41.865	137353	33.575	-63.224	7.217	23679	117.036	-15.453	1204.499	649.962
411.00	41.673	136723	33.572	-63.217	7.211	23658	117.040	-15.453	1205.190	650.335
411.10	41.481	136093	33.569	-63.211	7.206	23643	117.044	-15.453	1205.881	650.708
411.20	41.289	135463	33.566	-63.204	7.201	23624	117.048	-15.453	1206.572	651.080
411.30	41.097	134834	33.564	-63.197	7.195	23605	117.052	-15.454	1207.261	651.452
411.40	40.906	134206	33.561	-63.191	7.189	23585	117.056	-15.454	1207.950	651.824
411.50	40.715	133578	33.558	-63.184	7.183	23565	117.059	-15.455	1208.639	652.196
411.60	40.523	132950	33.555	-63.178	7.177	23546	117.063	-15.457	1209.327	652.567
411.70	40.332	132323	33.552	-63.171	7.170	23524	117.067	-15.458	1210.015	652.938
411.80	40.141	131696	33.550	-63.164	7.165	23507	117.070	-15.460	1210.702	653.309
411.90	39.950	131070	33.547	-63.158	7.157	23482	117.074	-15.462	1211.388	653.679
412.00	39.759	130444	33.544	-63.151	7.150	23457	117.077	-15.464	1212.073	654.049
412.10	39.569	129819	33.541	-63.145	7.144	23437	117.081	-15.466	1212.758	654.419
412.20	39.378	129194	33.538	-63.138	7.136	23413	117.084	-15.469	1213.443	654.788
412.30	39.188	128570	33.535	-63.131	7.129	23389	117.088	-15.471	1214.127	655.157
412.40	38.998	127946	33.533	-63.125	7.122	23365	117.091	-15.474	1214.809	655.525
412.50	38.808	127323	33.530	-63.118	7.114	23340	117.094	-15.476	1215.492	655.894
412.60	38.618	126701	33.527	-63.112	7.106	23314	117.098	-15.479	1216.173	656.262
412.70	38.429	126079	33.524	-63.105	7.098	23288	117.102	-15.481	1216.854	656.629
412.80	38.240	125458	33.522	-63.099	7.091	23263	117.105	-15.484	1217.534	656.996
412.90	38.050	124837	33.519	-63.092	7.081	23233	117.109	-15.487	1218.213	657.362
413.00	37.861	124217	33.516	-63.086	7.071	23200	117.113	-15.489	1218.892	657.728
413.10	37.673	123598	33.513	-63.079	7.063	23174	117.117	-15.491	1219.569	658.094
413.20	37.484	122979	33.510	-63.073	7.054	23143	117.121	-15.494	1220.246	658.459
413.30	37.296	122361	33.508	-63.066	7.045	23112	117.125	-15.496	1220.922	658.824
413.40	37.108	121744	33.505	-63.060	7.034	23079	117.130	-15.498	1221.596	659.188
413.50	36.920	121127	33.502	-63.053	7.024	23046	117.134	-15.500	1222.270	659.551
413.60	36.732	120512	33.499	-63.047	7.014	23012	117.139	-15.502	1222.943	659.915
413.70	36.545	119897	33.497	-63.041	7.003	22976	117.143	-15.504	1223.615	660.277
413.80	36.358	119284	33.494	-63.034	6.993	22943	117.148	-15.505	1224.286	660.639
413.90	36.171	118671	33.491	-63.028	6.981	22902	117.153	-15.507	1224.956	661.001
414.00	35.984	118059	33.488	-63.021	6.968	22860	117.158	-15.508	1225.625	661.362
414.10	35.798	117443	33.486	-63.015	6.956	22823	117.164	-15.510	1226.292	661.722
414.20	35.612	116833	33.483	-63.009	6.944	22782	117.169	-15.511	1226.958	662.081
414.30	35.427	116229	33.480	-63.002	6.931	22741	117.174	-15.512	1227.624	662.440
414.40	35.242	115622	33.477	-62.996	6.918	22698	117.180	-15.514	1228.288	662.799
414.50	35.057	115015	33.475	-62.990	6.905	22653	117.186	-15.515	1228.951	663.156
414.60	34.872	114410	33.472	-62.983	6.891	22607	117.191	-15.516	1229.612	663.513
414.70	34.688	113806	33.469	-62.977	6.876	22559	117.197	-15.517	1230.272	663.869
414.80	34.504	113203	33.466	-62.971	6.862	22514	117.203	-15.519	1230.931	664.225
414.90	34.321	112601	33.464	-62.964	6.846	22462	117.209	-15.520	1231.588	664.579
415.00	34.138	112001	33.461	-62.958	6.830	22409	117.215	-15.522	1232.244	664.933

TABLE II.- ENTRY-TRAJECTORY PARAMETERS – Continued

TIME	ALTITUDE		LATITUDE	LONGITUDE	VELOCITY		FLIGHT AZIMUTH	FLIGHT ELEVATION	HORIZONTAL RANGE	
SEC	KM	FT	DEG	DEG	KM/SEC	FT/SEC	DEG	DEG	KM	NAUT. MI.
415.00	34.138	112001	33.461	-62.958	6.830	22409	117.215	-15.522	1232.244	664.933
415.10	33.955	111402	33.458	-62.952	6.815	22360	117.221	-15.523	1232.898	665.286
415.20	33.773	110804	33.456	-62.946	6.799	22307	117.227	-15.525	1233.551	665.639
415.30	33.591	110208	33.453	-62.939	6.783	22253	117.233	-15.527	1234.202	665.990
415.40	33.410	109613	33.450	-62.933	6.766	22197	117.238	-15.529	1234.852	666.341
415.50	33.229	109019	33.448	-62.927	6.749	22141	117.244	-15.531	1235.500	666.690
415.60	33.049	108427	33.445	-62.921	6.731	22083	117.250	-15.534	1236.147	667.039
415.70	32.869	107837	33.442	-62.915	6.713	22023	117.256	-15.536	1236.791	667.387
415.80	32.689	107248	33.440	-62.908	6.695	21965	117.262	-15.538	1237.434	667.734
415.90	32.510	106660	33.437	-62.902	6.675	21901	117.267	-15.541	1238.076	668.080
416.00	32.331	106074	33.434	-62.896	6.655	21834	117.273	-15.544	1238.715	668.425
416.10	32.153	105490	33.432	-62.890	6.636	21773	117.279	-15.547	1239.352	668.769
416.20	31.976	104907	33.429	-62.884	6.616	21707	117.285	-15.549	1239.988	669.112
416.30	31.799	104326	33.427	-62.878	6.596	21639	117.291	-15.552	1240.621	669.454
416.40	31.622	103747	33.424	-62.872	6.575	21571	117.296	-15.555	1241.253	669.795
416.50	31.446	103169	33.421	-62.866	6.553	21500	117.302	-15.557	1241.883	670.135
416.60	31.270	102593	33.419	-62.860	6.531	21428	117.308	-15.560	1242.510	670.473
416.70	31.096	102020	33.416	-62.854	6.509	21355	117.314	-15.562	1243.136	670.811
416.80	30.921	101447	33.414	-62.848	6.487	21284	117.320	-15.564	1243.759	671.147
416.90	30.747	100877	33.411	-62.842	6.463	21204	117.325	-15.565	1244.380	671.482
417.00	30.574	100309	33.408	-62.836	6.438	21123	117.331	-15.567	1244.999	671.816
417.10	30.402	99743	33.406	-62.830	6.415	21047	117.337	-15.567	1245.615	672.149
417.20	30.230	99179	33.403	-62.824	6.390	20966	117.343	-15.568	1246.230	672.480
417.30	30.058	98617	33.401	-62.819	6.365	20884	117.349	-15.568	1246.842	672.811
417.40	29.888	98058	33.398	-62.813	6.339	20798	117.355	-15.567	1247.451	673.139
417.50	29.718	97501	33.396	-62.807	6.313	20712	117.361	-15.566	1248.058	673.467
417.60	29.549	96946	33.393	-62.801	6.286	20624	117.367	-15.565	1248.663	673.793
417.70	29.381	96393	33.391	-62.795	6.259	20535	117.373	-15.562	1249.264	674.118
417.80	29.213	95843	33.388	-62.790	6.232	20447	117.379	-15.560	1249.864	674.441
417.90	29.046	95296	33.386	-62.784	6.203	20351	117.385	-15.556	1250.460	674.763
418.00	28.880	94751	33.383	-62.778	6.173	20254	117.392	-15.552	1251.054	675.084
418.10	28.715	94209	33.381	-62.773	6.145	20160	117.399	-15.548	1251.645	675.403
418.20	28.551	93670	33.379	-62.767	6.115	20062	117.405	-15.543	1252.234	675.720
418.30	28.387	93134	33.376	-62.762	6.084	19962	117.412	-15.537	1252.819	676.036
418.40	28.224	92600	33.374	-62.756	6.053	19860	117.419	-15.532	1253.401	676.350
418.50	28.063	92070	33.371	-62.750	6.022	19756	117.425	-15.525	1253.981	676.663
418.60	27.902	91543	33.369	-62.745	5.990	19652	117.433	-15.519	1254.557	676.974
418.70	27.742	91018	33.367	-62.739	5.957	19545	117.440	-15.512	1255.131	677.284
418.80	27.583	90497	33.364	-62.734	5.925	19440	117.447	-15.505	1255.701	677.591
418.90	27.425	89979	33.362	-62.729	5.891	19327	117.455	-15.499	1256.269	677.897
419.00	27.269	89464	33.359	-62.723	5.856	19213	117.463	-15.492	1256.832	678.202
419.10	27.113	88953	33.357	-62.718	5.822	19102	117.471	-15.486	1257.393	678.504
419.20	26.958	88444	33.355	-62.713	5.788	18988	117.479	-15.480	1257.950	678.805
419.30	26.804	87939	33.352	-62.707	5.752	18873	117.487	-15.475	1258.505	679.104
419.40	26.651	87438	33.350	-62.702	5.717	18755	117.495	-15.470	1259.055	679.401
419.50	26.499	86939	33.348	-62.697	5.680	18636	117.504	-15.466	1259.603	679.697
419.60	26.348	86444	33.346	-62.692	5.644	18516	117.512	-15.463	1260.147	679.990
419.70	26.198	85953	33.343	-62.686	5.607	18395	117.521	-15.461	1260.687	680.282
419.80	26.049	85464	33.341	-62.681	5.570	18275	117.530	-15.460	1261.224	680.571
419.90	25.902	84979	33.339	-62.676	5.532	18149	117.539	-15.460	1261.757	680.859
420.00	25.755	84498	33.337	-62.671	5.493	18022	117.548	-15.461	1262.286	681.145

TABLE II.- ENTRY-TRAJECTORY PARAMETERS - Continued

TIME	ALTITUDE		LATITUDE	LONGITUDE	VELOCITY		FLIGHT AZIMUTH	FLIGHT ELEVATION	HORIZONTAL RANGE	
SEC	KM	FT	DEG	DEG	KM/SEC	FT/SEC	DEG	DEG	KM	NAUT. MI.
420.00	25.755	84498	33.337	-62.671	5.493	18022	117.548	-15.461	1262.286	681.145
420.10	25.609	84019	33.335	-62.666	5.456	17900	117.558	-15.462	1262.812	681.428
420.20	25.464	83544	33.332	-62.661	5.417	17773	117.567	-15.466	1263.334	681.710
420.30	25.320	83072	33.330	-62.656	5.378	17645	117.577	-15.470	1263.853	681.990
420.40	25.177	82603	33.328	-62.651	5.339	17517	117.587	-15.476	1264.368	682.268
420.50	25.036	82138	33.326	-62.647	5.300	17388	117.597	-15.482	1264.879	682.544
420.60	24.895	81675	33.324	-62.642	5.260	17257	117.607	-15.490	1265.386	682.817
420.70	24.755	81217	33.322	-62.637	5.220	17126	117.618	-15.498	1265.889	683.089
420.80	24.616	80761	33.320	-62.632	5.181	16997	117.629	-15.508	1266.389	683.358
420.90	24.478	80308	33.318	-62.627	5.139	16861	117.640	-15.518	1266.884	683.626
421.00	24.341	79859	33.316	-62.623	5.098	16725	117.651	-15.529	1267.376	683.891
421.10	24.205	79413	33.313	-62.618	5.058	16594	117.663	-15.540	1267.864	684.154
421.20	24.070	78970	33.312	-62.613	5.017	16459	117.675	-15.553	1268.347	684.415
421.30	23.936	78531	33.310	-62.609	4.975	16323	117.686	-15.566	1268.827	684.674
421.40	23.803	78094	33.307	-62.604	4.933	16186	117.698	-15.579	1269.303	684.931
421.50	23.671	77662	33.306	-62.600	4.891	16048	117.710	-15.594	1269.775	685.186
421.60	23.540	77232	33.304	-62.595	4.850	15911	117.722	-15.608	1270.242	685.438
421.70	23.410	76806	33.302	-62.591	4.808	15773	117.734	-15.624	1270.706	685.688
421.80	23.282	76383	33.300	-62.587	4.766	15636	117.746	-15.639	1271.166	685.936
421.90	23.154	75963	33.298	-62.582	4.723	15495	117.757	-15.655	1271.621	686.182
422.00	23.027	75547	33.296	-62.578	4.680	15353	117.769	-15.671	1272.072	686.425
422.10	22.901	75134	33.294	-62.574	4.638	15215	117.780	-15.687	1272.520	686.667
422.20	22.776	74724	33.292	-62.570	4.595	15074	117.791	-15.702	1272.963	686.906
422.30	22.652	74313	33.290	-62.565	4.552	14933	117.801	-15.719	1273.402	687.143
422.40	22.529	73915	33.289	-62.561	4.508	14790	117.811	-15.734	1273.836	687.377
422.50	22.407	73515	33.287	-62.557	4.464	14647	117.820	-15.750	1274.267	687.610
422.60	22.287	73119	33.285	-62.553	4.421	14504	117.829	-15.765	1274.693	687.839
422.70	22.167	72727	33.283	-62.549	4.377	14361	117.837	-15.779	1275.115	688.067
422.80	22.049	72338	33.282	-62.545	4.334	14220	117.845	-15.793	1275.533	688.293
422.90	21.931	71953	33.280	-62.541	4.289	14073	117.852	-15.805	1275.947	688.516
423.00	21.815	71571	33.278	-62.537	4.245	13926	117.859	-15.818	1276.356	688.737
423.10	21.700	71193	33.276	-62.534	4.201	13782	117.865	-15.829	1276.761	688.956
423.20	21.586	70819	33.275	-62.530	4.156	13636	117.869	-15.841	1277.162	689.172
423.30	21.473	70448	33.273	-62.526	4.112	13491	117.873	-15.851	1277.559	689.386
423.40	21.361	70081	33.271	-62.522	4.068	13345	117.876	-15.861	1277.951	689.598
423.50	21.250	69718	33.270	-62.518	4.023	13198	117.877	-15.871	1278.339	689.807
423.60	21.141	69359	33.268	-62.515	3.978	13051	117.878	-15.881	1278.723	690.014
423.70	21.032	69004	33.266	-62.511	3.934	12906	117.878	-15.890	1279.102	690.219
423.80	20.925	68653	33.265	-62.508	3.890	12763	117.876	-15.899	1279.478	690.421
423.90	20.819	68305	33.263	-62.504	3.845	12615	117.874	-15.908	1279.849	690.622
424.00	20.715	67961	33.262	-62.501	3.800	12467	117.871	-15.917	1280.215	690.819
424.10	20.611	67621	33.260	-62.497	3.757	12325	117.866	-15.926	1280.578	691.015
424.20	20.508	67285	33.259	-62.494	3.712	12180	117.861	-15.935	1280.936	691.208
424.30	20.407	66953	33.257	-62.491	3.669	12036	117.855	-15.943	1281.290	691.399
424.40	20.307	66624	33.256	-62.487	3.625	11894	117.848	-15.952	1281.639	691.588
424.50	20.208	66299	33.254	-62.484	3.582	11751	117.840	-15.962	1281.985	691.774
424.60	20.110	65977	33.253	-62.481	3.538	11609	117.833	-15.971	1282.327	691.959
424.70	20.013	65660	33.252	-62.477	3.496	11469	117.826	-15.981	1282.664	692.140
424.80	19.917	65346	33.250	-62.474	3.454	11331	117.820	-15.991	1282.997	692.320
424.90	19.823	65036	33.249	-62.471	3.410	11188	117.815	-16.001	1283.326	692.498
425.00	19.729	64729	33.247	-62.468	3.367	11047	117.812	-16.012	1283.651	692.673

TABLE II.- ENTRY-TRAJECTORY PARAMETERS – Continued

TIME	ALTITUDE		LATITUDE	LONGITUDE	VELOCITY		FLIGHT AZIMUTH	FLIGHT ELEVATION	HORIZONTAL	RANGE
SEC	KM	FT	DEG	DEG	KM/SEC	FT/SEC	DEG	DEG	KM	NAUT. MI.
425.00	19.729	64729	33.247	-62.468	3.367	11047	117.812	-16.012	1283.651	692.673
425.10	19.637	64427	33.246	-62.465	3.326	10913	117.809	-16.024	1283.972	692.846
425.20	19.546	64127	33.245	-62.462	3.285	10777	117.808	-16.037	1284.289	693.017
425.30	19.456	63832	33.243	-62.459	3.244	10643	117.808	-16.049	1284.602	693.186
425.40	19.367	63540	33.242	-62.456	3.202	10506	117.810	-16.063	1284.911	693.353
425.50	19.279	63251	33.241	-62.453	3.161	10370	117.814	-16.077	1285.216	693.518
425.60	19.192	62965	33.240	-62.450	3.121	10238	117.819	-16.092	1285.517	693.680
425.70	19.106	62683	33.238	-62.447	3.080	10106	117.827	-16.107	1285.814	693.840
425.80	19.021	62405	33.237	-62.445	3.042	9979	117.836	-16.123	1286.107	693.999
425.90	18.937	62129	33.236	-62.442	3.002	9849	117.847	-16.139	1286.397	694.155
426.00	18.854	61857	33.235	-62.439	2.962	9719	117.860	-16.155	1286.682	694.309
426.10	18.772	61588	33.234	-62.437	2.925	9595	117.873	-16.172	1286.965	694.461
426.20	18.691	61323	33.232	-62.434	2.886	9470	117.888	-16.189	1287.243	694.612
426.30	18.611	61060	33.231	-62.431	2.849	9348	117.902	-16.206	1287.518	694.760
426.40	18.532	60801	33.230	-62.429	2.812	9226	117.917	-16.222	1287.789	694.906
426.50	18.454	60545	33.229	-62.426	2.776	9106	117.932	-16.239	1288.056	695.050
426.60	18.377	60292	33.228	-62.424	2.739	8987	117.946	-16.255	1288.321	695.193
426.70	18.301	60042	33.227	-62.421	2.704	8870	117.960	-16.271	1288.581	695.334
426.80	18.226	59795	33.226	-62.419	2.670	8759	117.972	-16.287	1288.839	695.473
426.90	18.151	59550	33.225	-62.416	2.634	8643	117.983	-16.303	1289.093	695.610
427.00	18.077	59309	33.224	-62.414	2.599	8528	117.993	-16.319	1289.343	695.745
427.10	18.005	59071	33.223	-62.412	2.567	8421	118.000	-16.335	1289.591	695.878
427.20	17.933	58835	33.222	-62.409	2.533	8312	118.004	-16.351	1289.835	696.010
427.30	17.862	58603	33.220	-62.407	2.501	8206	118.006	-16.369	1290.075	696.140
427.40	17.792	58373	33.219	-62.405	2.469	8102	118.004	-16.387	1290.313	696.268
427.50	17.723	58146	33.218	-62.403	2.438	7999	117.999	-16.406	1290.548	696.395
427.60	17.654	57921	33.217	-62.400	2.408	7899	117.990	-16.426	1290.780	696.520
427.70	17.587	57700	33.216	-62.398	2.377	7799	117.978	-16.448	1291.009	696.644
427.80	17.520	57481	33.216	-62.396	2.348	7704	117.962	-16.471	1291.235	696.766
427.90	17.454	57264	33.215	-62.394	2.318	7605	117.943	-16.496	1291.459	696.886
428.00	17.389	57049	33.214	-62.392	2.289	7509	117.921	-16.523	1291.679	697.005
428.10	17.324	56837	33.213	-62.390	2.262	7420	117.895	-16.552	1291.897	697.123
428.20	17.260	56627	33.212	-62.388	2.234	7330	117.867	-16.584	1292.112	697.239
428.30	17.197	56419	33.211	-62.386	2.207	7241	117.836	-16.617	1292.324	697.353
428.40	17.134	56214	33.210	-62.384	2.181	7154	117.803	-16.653	1292.534	697.466
428.50	17.072	56010	33.209	-62.382	2.154	7068	117.769	-16.691	1292.741	697.578
428.60	17.010	55808	33.208	-62.380	2.129	6984	117.734	-16.731	1292.946	697.689
428.70	16.949	55608	33.207	-62.378	2.103	6900	117.699	-16.772	1293.148	697.798
428.80	16.889	55410	33.207	-62.376	2.079	6820	117.663	-16.814	1293.348	697.906
428.90	16.829	55214	33.206	-62.374	2.053	6737	117.629	-16.857	1293.545	698.012
429.00	16.770	55020	33.205	-62.372	2.028	6655	117.597	-16.900	1293.740	698.117
429.10	16.711	54827	33.204	-62.370	2.005	6579	117.566	-16.944	1293.933	698.221
429.20	16.653	54636	33.204	-62.369	1.981	6500	117.539	-16.987	1294.123	698.324
429.30	16.595	54447	33.203	-62.367	1.957	6422	117.516	-17.030	1294.311	698.425
429.40	16.538	54260	33.202	-62.365	1.934	6346	117.497	-17.071	1294.496	698.525
429.50	16.482	54074	33.201	-62.363	1.912	6273	117.482	-17.110	1294.680	698.625
429.60	16.426	53890	33.200	-62.362	1.889	6199	117.472	-17.145	1294.861	698.722
429.70	16.370	53708	33.200	-62.360	1.866	6123	117.466	-17.177	1295.040	698.819
429.80	16.315	53528	33.199	-62.358	1.844	6051	117.467	-17.205	1295.217	698.914
429.90	16.261	53349	33.198	-62.357	1.821	5975	117.472	-17.227	1295.392	699.009
430.00	16.207	53173	33.197	-62.355	1.798	5899	117.483	-17.243	1295.564	699.102

TABLE II.- ENTRY-TRAJECTORY PARAMETERS – Continued

TIME	ALTITUDE		LATITUDE	LONGITUDE	VELOCITY		FLIGHT AZIMUTH	FLIGHT ELEVATION	HORIZONTAL RANGE	
SEC	KM	FT	DEG	DEG	KM/SEC	FT/SEC	DEG	DEG	KM	NAUT. MI.
430.00	16.207	53173	33.197	-62.355	1.798	5899	117.483	-17.243	1295.564	699.102
430.10	16.154	52998	33.197	-62.353	1.777	5829	117.499	-17.253	1295.734	699.194
430.20	16.101	52825	33.196	-62.352	1.755	5758	117.520	-17.255	1295.903	699.284
430.30	16.049	52655	33.196	-62.350	1.733	5687	117.546	-17.251	1296.069	699.374
430.40	15.998	52486	33.195	-62.349	1.712	5616	117.576	-17.238	1296.233	699.463
430.50	15.947	52320	33.194	-62.347	1.691	5547	117.610	-17.218	1296.395	699.550
430.60	15.897	52156	33.193	-62.345	1.669	5477	117.648	-17.190	1296.555	699.637
430.70	15.848	51995	33.193	-62.344	1.648	5408	117.690	-17.153	1296.713	699.722
430.80	15.800	51836	33.192	-62.342	1.629	5343	117.734	-17.109	1296.869	699.806
430.90	15.752	51679	33.191	-62.341	1.607	5273	117.781	-17.056	1297.024	699.889
431.00	15.705	51525	33.191	-62.340	1.586	5203	117.831	-16.997	1297.176	699.972
431.10	15.659	51374	33.190	-62.338	1.567	5140	117.883	-16.931	1297.327	700.053
431.20	15.613	51225	33.190	-62.337	1.547	5075	117.936	-16.860	1297.475	700.133
431.30	15.569	51078	33.189	-62.335	1.527	5009	117.991	-16.785	1297.622	700.212
431.40	15.525	50935	33.188	-62.334	1.507	4945	118.046	-16.705	1297.767	700.290
431.50	15.482	50793	33.188	-62.333	1.488	4881	118.101	-16.623	1297.910	700.368
431.60	15.440	50655	33.187	-62.331	1.469	4818	118.156	-16.540	1298.051	700.444
431.70	15.398	50519	33.187	-62.330	1.449	4755	118.210	-16.457	1298.191	700.519
431.80	15.357	50385	33.186	-62.329	1.431	4696	118.263	-16.376	1298.329	700.594
431.90	15.318	50255	33.185	-62.327	1.412	4633	118.315	-16.296	1298.465	700.667
432.00	15.278	50126	33.185	-62.326	1.393	4571	118.366	-16.221	1298.599	700.740
432.10	15.240	50000	33.184	-62.325	1.376	4514	118.414	-16.152	1298.732	700.811
432.20	15.202	49876	33.184	-62.324	1.358	4456	118.458	-16.089	1298.863	700.882
432.30	15.165	49755	33.183	-62.322	1.341	4399	118.500	-16.034	1298.993	700.952
432.40	15.129	49635	33.183	-62.321	1.324	4343	118.538	-15.989	1299.121	701.021
432.50	15.093	49517	33.182	-62.320	1.307	4287	118.573	-15.955	1299.247	701.089
432.60	15.057	49401	33.181	-62.319	1.290	4232	118.605	-15.932	1299.372	701.156
432.70	15.023	49287	33.181	-62.318	1.274	4179	118.633	-15.921	1299.495	701.223
432.80	14.988	49174	33.180	-62.316	1.259	4129	118.658	-15.924	1299.616	701.288
432.90	14.954	49062	33.180	-62.315	1.242	4074	118.680	-15.939	1299.736	701.353
433.00	14.921	48952	33.179	-62.314	1.226	4021	118.700	-15.968	1299.855	701.417
433.10	14.887	48843	33.179	-62.313	1.211	3974	118.716	-16.010	1299.972	701.480
433.20	14.854	48735	33.178	-62.312	1.196	3925	118.729	-16.066	1300.088	701.543
433.30	14.822	48628	33.178	-62.311	1.182	3877	118.739	-16.135	1300.202	701.604
433.40	14.789	48521	33.177	-62.310	1.167	3830	118.747	-16.218	1300.314	701.665
433.50	14.757	48415	33.177	-62.309	1.153	3783	118.753	-16.312	1300.425	701.725
433.60	14.725	48310	33.177	-62.308	1.139	3738	118.757	-16.419	1300.535	701.784
433.70	14.693	48206	33.176	-62.307	1.126	3693	118.760	-16.537	1300.643	701.843
433.80	14.661	48101	33.176	-62.306	1.113	3653	118.761	-16.664	1300.751	701.900
433.90	14.629	47997	33.175	-62.305	1.099	3607	118.762	-16.800	1300.857	701.958
434.00	14.598	47894	33.175	-62.304	1.086	3563	118.763	-16.944	1300.961	702.014
434.10	14.567	47791	33.174	-62.303	1.074	3525	118.763	-17.094	1301.064	702.070
434.20	14.535	47688	33.174	-62.302	1.062	3484	118.763	-17.250	1301.166	702.125
434.30	14.504	47585	33.173	-62.301	1.050	3445	118.763	-17.410	1301.266	702.179
434.40	14.473	47482	33.173	-62.300	1.038	3407	118.764	-17.573	1301.366	702.232
434.50	14.441	47379	33.172	-62.299	1.027	3369	118.766	-17.739	1301.464	702.285
434.60	14.410	47276	33.172	-62.298	1.016	3332	118.769	-17.905	1301.561	702.338
434.70	14.379	47174	33.172	-62.297	1.004	3295	118.773	-18.073	1301.657	702.389
434.80	14.348	47072	33.171	-62.296	.994	3262	118.780	-18.240	1301.752	702.441
434.90	14.316	46970	33.171	-62.295	.983	3224	118.788	-18.406	1301.846	702.491
435.00	14.285	46868	33.170	-62.295	.971	3186	118.798	-18.571	1301.938	702.541

TABLE II.- ENTRY-TRAJECTORY PARAMETERS – Concluded

TIME	ALTITUDE		LATITUDE	LONGITUDE	VELOCITY		FLIGHT AZIMUTH	FLIGHT ELEVATION	HORIZONTAL RANGE	
SEC	KM	FT	DEG	DEG	KM/SEC	FT/SEC	DEG	DEG	KM	NAUT. MI.
435.00	14.285	46868	33.170	-62.295	.971	3186	118.798	-18.571	1301.938	702.541
435.10	14.254	46766	33.170	-62.294	.962	3155	118.810	-18.736	1302.029	702.590
435.20	14.223	46665	33.170	-62.293	.951	3121	118.823	-18.899	1302.120	702.639
435.30	14.193	46564	33.169	-62.292	.941	3087	118.837	-19.061	1302.209	702.687
435.40	14.162	46463	33.169	-62.291	.931	3055	118.852	-19.222	1302.297	702.735
435.50	14.131	46363	33.168	-62.291	.921	3023	118.868	-19.384	1302.384	702.782
435.60	14.101	46263	33.168	-62.290	.912	2991	118.885	-19.547	1302.471	702.829
435.70	14.070	46163	33.168	-62.289	.902	2959	118.902	-19.712	1302.556	702.875
435.80	14.040	46063	33.167	-62.288	.893	2931	118.920	-19.879	1302.640	702.920
435.90	14.010	45964	33.167	-62.287	.883	2898	118.939	-20.049	1302.724	702.965
436.00	13.980	45865	33.167	-62.286	.874	2866	118.958	-20.223	1302.806	703.009
436.10	13.949	45766	33.166	-62.286	.866	2840	118.975	-20.402	1302.887	703.053
436.20	13.920	45668	33.166	-62.285	.856	2810	118.991	-20.586	1302.968	703.097
436.30	13.889	45569	33.166	-62.284	.848	2783	119.004	-20.776	1303.047	703.140
436.40	13.860	45471	33.165	-62.284	.840	2755	119.016	-20.971	1303.126	703.182
436.50	13.830	45373	33.165	-62.283	.831	2728	119.026	-21.171	1303.204	703.224
436.60	13.800	45275	33.165	-62.282	.823	2701	119.034	-21.376	1303.281	703.266
436.70	13.770	45177	33.164	-62.281	.816	2676	119.040	-21.586	1303.357	703.307
436.80	13.740	45078	33.164	-62.281	.809	2653	119.043	-21.798	1303.432	703.348
436.90	13.710	44980	33.164	-62.280	.800	2626	119.045	-22.010	1303.507	703.388
437.00	13.680	44882	33.163	-62.279	.792	2600	119.045	-22.221	1303.581	703.427
437.10	13.650	44783	33.163	-62.278	.786	2579	119.042	-22.430	1303.654	703.467
437.20	13.620	44685	33.163	-62.278	.779	2555	119.035	-22.634	1303.726	703.506
437.30	13.590	44586	33.162	-62.277	.771	2531	119.026	-22.830	1303.797	703.544
437.40	13.560	44487	33.162	-62.276	.765	2509	119.014	-23.017	1303.868	703.582
437.50	13.530	44389	33.162	-62.276	.758	2486	119.001	-23.192	1303.937	703.620
437.60	13.500	44290	33.161	-62.275	.751	2463	118.985	-23.351	1304.006	703.657
437.70	13.470	44192	33.161	-62.275	.743	2439	118.969	-23.492	1304.075	703.694
437.80	13.440	44094	33.161	-62.274	.737	2417	118.951	-23.613	1304.142	703.731
437.90	13.410	43997	33.161	-62.273	.729	2391	118.934	-23.709	1304.209	703.767
438.00	13.381	43900	33.160	-62.273	.721	2365	118.918	-23.779	1304.275	703.802
438.10	13.351	43804	33.160	-62.272	.714	2344	118.901	-23.822	1304.341	703.838
438.20	13.322	43708	33.160	-62.272	.707	2321	118.883	-23.833	1304.405	703.873
438.30	13.294	43614	33.159	-62.271	.700	2296	118.865	-23.812	1304.470	703.907
438.40	13.265	43520	33.159	-62.270	.692	2270	118.849	-23.758	1304.533	703.941
438.50	13.237	43428	33.159	-62.270	.684	2244	118.834	-23.668	1304.596	703.975
438.60	13.209	43337	33.159	-62.269	.676	2218	118.820	-23.544	1304.658	704.009
438.70	13.182	43248	33.158	-62.268	.668	2191	118.808	-23.384	1304.719	704.042
438.80	13.155	43160	33.158	-62.268	.660	2166	118.797	-23.190	1304.780	704.075
438.90	13.129	43075	33.158	-62.267	.651	2136	118.790	-22.962	1304.840	704.107
439.00	13.104	42991	33.158	-62.267	.641	2104	118.785	-22.701	1304.899	704.139
439.10	13.079	42910	33.157	-62.266	.633	2078	118.780	-22.410	1304.958	704.171
439.20	13.055	42831	33.157	-62.266	.624	2048	118.776	-22.094	1305.016	704.202
439.30	13.031	42754	33.157	-62.265	.616	2020	118.773	-21.755	1305.073	704.233
439.40	13.009	42680	33.157	-62.265	.607	1991	118.769	-21.398	1305.130	704.263
439.50	12.987	42608	33.156	-62.264	.598	1961	118.766	-21.028	1305.186	704.294
439.60	12.966	42538	33.156	-62.264	.589	1932	118.763	-20.651	1305.241	704.323
439.70	12.945	42471	33.156	-62.263	.580	1904	118.758	-20.273	1305.296	704.353
439.80	12.925	42406	33.156	-62.263	.572	1878	118.752	-19.900	1305.350	704.382
439.90	12.906	42344	33.155	-62.262	.563	1848	118.744	-19.537	1305.403	704.411
440.00	12.888	42284	33.155	-62.262	.554	1819	118.736	-19.194	1305.456	704.439

TABLE III.- ENTRY-ENVIRONMENT PARAMETERS

TIME	ALTITUDE		VELOCITY		DENSITY		DYNAMIC PRESSURE		MACH
SEC	KM	FT	KM/SEC	FT/SEC	KG/METER**3	SLUGS/FT**3	NEWTONS/M**2	LBS/FT**2	
380.00	102.705	336960	7.382	24218	3.2178E-07	6.2435E-10	8.62	.18	27.074
380.10	102.509	336315	7.382	24218	3.3275E-07	6.4564E-10	8.62	.18	27.074
380.20	102.312	335670	7.382	24218	3.4415E-07	6.6776E-10	9.10	.19	27.074
380.30	102.116	335026	7.382	24219	3.5597E-07	6.9070E-10	9.58	.20	27.075
380.40	101.919	334381	7.382	24219	3.6828E-07	7.1458E-10	9.58	.20	27.075
380.50	101.723	333736	7.382	24220	3.8107E-07	7.3939E-10	10.05	.21	27.077
380.60	101.526	333091	7.383	24221	3.9436E-07	7.6519E-10	10.53	.22	27.078
380.70	101.330	332446	7.383	24221	4.0819E-07	7.9201E-10	11.01	.23	27.078
380.80	101.133	331801	7.383	24221	4.2256E-07	8.1990E-10	11.49	.24	27.078
380.90	100.937	331157	7.383	24222	4.3748E-07	8.4886E-10	11.49	.24	27.079
381.00	100.740	330511	7.383	24221	4.5306E-07	8.7908E-10	11.97	.25	27.078
381.10	100.543	329866	7.383	24221	4.6924E-07	9.1047E-10	12.45	.26	27.078
381.20	100.347	329222	7.383	24221	4.8605E-07	9.4309E-10	12.93	.27	27.078
381.30	100.150	328577	7.383	24221	5.0357E-07	9.7709E-10	13.41	.28	27.078
381.40	99.953	327931	7.383	24221	5.2156E-07	1.0120E-09	13.89	.29	27.078
381.50	99.757	327286	7.383	24221	5.3955E-07	1.0469E-09	14.36	.30	27.078
381.60	99.560	326641	7.383	24222	5.5816E-07	1.0830E-09	14.84	.31	27.079
381.70	99.363	325995	7.383	24222	5.7748E-07	1.1205E-09	15.32	.32	27.079
381.80	99.166	325349	7.383	24222	5.9758E-07	1.1595E-09	16.28	.34	27.079
381.90	98.970	324704	7.383	24222	6.1840E-07	1.1999E-09	16.76	.35	27.079
382.00	98.773	324058	7.383	24222	6.4000E-07	1.2418E-09	17.24	.36	27.079
382.10	98.576	323412	7.383	24222	6.6247E-07	1.2854E-09	17.72	.37	27.079
382.20	98.379	322766	7.383	24222	6.8576E-07	1.3306E-09	18.67	.39	27.079
382.30	98.182	322120	7.383	24223	7.0999E-07	1.3776E-09	19.15	.40	27.080
382.40	97.985	321474	7.383	24223	7.3509E-07	1.4263E-09	19.63	.41	27.080
382.50	97.788	320827	7.383	24223	7.6127E-07	1.4771E-09	20.59	.43	27.080
382.60	97.591	320181	7.383	24224	7.8838E-07	1.5297E-09	21.07	.44	27.081
382.70	97.394	319535	7.383	24224	8.1651E-07	1.5843E-09	22.02	.46	27.081
382.80	97.197	318888	7.383	24224	8.4579E-07	1.6411E-09	22.98	.48	27.081
382.90	97.000	318242	7.384	24225	8.7620E-07	1.7001E-09	23.46	.49	27.082
383.00	96.803	317595	7.384	24226	9.0779E-07	1.7614E-09	24.42	.51	27.083
383.10	96.606	316948	7.384	24226	9.4067E-07	1.8252E-09	25.38	.53	27.083
383.20	96.409	316301	7.384	24227	9.7484E-07	1.8915E-09	26.33	.55	27.084
383.30	96.211	315654	7.385	24228	1.0103E-06	1.9604E-09	27.29	.57	27.086
383.40	96.014	315008	7.385	24229	1.0472E-06	2.0319E-09	28.25	.59	27.087
383.50	95.817	314361	7.385	24229	1.0856E-06	2.1064E-09	29.21	.61	27.087
383.60	95.620	313714	7.386	24231	1.1255E-06	2.1838E-09	30.64	.64	27.089
383.70	95.423	313067	7.386	24232	1.1670E-06	2.2644E-09	31.60	.66	27.090
383.80	95.226	312420	7.386	24233	1.2102E-06	2.3482E-09	32.56	.68	27.091
383.90	95.028	311773	7.387	24234	1.2551E-06	2.4353E-09	33.99	.71	27.092
384.00	94.831	311126	7.387	24235	1.3018E-06	2.5260E-09	35.43	.74	27.093
384.10	94.634	310479	7.387	24236	1.3504E-06	2.6203E-09	36.39	.76	27.094
384.20	94.437	309832	7.388	24238	1.4011E-06	2.7185E-09	37.83	.79	27.097
384.30	94.240	309186	7.388	24240	1.4536E-06	2.8204E-09	39.26	.82	27.099
384.40	94.043	308539	7.388	24240	1.5084E-06	2.9268E-09	40.70	.85	27.099
384.50	93.845	307892	7.388	24240	1.5655E-06	3.0375E-09	42.61	.89	27.099
384.60	93.648	307245	7.389	24242	1.6248E-06	3.1527E-09	44.05	.92	27.101
384.70	93.451	306598	7.389	24243	1.6867E-06	3.2727E-09	45.96	.96	27.102
384.80	93.254	305952	7.390	24244	1.7510E-06	3.3975E-09	47.40	.99	27.103
384.90	93.057	305305	7.390	24246	1.8181E-06	3.5276E-09	49.32	1.03	27.106
385.00	92.860	304659	7.390	24247	1.8878E-06	3.6630E-09	51.23	1.07	27.107

TABLE III.- ENTRY-ENVIRONMENT PARAMETERS – Continued

TIME	ALTITUDE		VELOCITY		DENSITY		DYNAMIC PRESSURE		MACH
SEC	KM	FT	KM/SEC	FT/SEC	KG/METER**3	SLUGS/FT**3	NEWTONS/M**2	LBS/FT**2	
385.00	92.860	304659	7.390	24247	1.8878E-06	3.6630E-09	51.23	1.07	27.107
385.10	92.663	304012	7.391	24248	1.9606E-06	3.8042E-09	53.15	1.11	27.108
385.20	92.466	303366	7.391	24249	2.0363E-06	3.9511E-09	55.54	1.16	27.109
385.30	92.269	302720	7.391	24250	2.1152E-06	4.1042E-09	57.46	1.20	27.110
385.40	92.072	302073	7.392	24251	2.1976E-06	4.2640E-09	59.85	1.25	27.111
385.50	91.875	301427	7.392	24251	2.2833E-06	4.4303E-09	62.24	1.30	27.111
385.60	91.678	300781	7.392	24253	2.3726E-06	4.6036E-09	64.64	1.35	27.113
385.70	91.481	300135	7.392	24253	2.4657E-06	4.7843E-09	67.03	1.40	27.113
385.80	91.284	299489	7.393	24254	2.5629E-06	4.9728E-09	69.90	1.46	27.149
385.90	91.087	298843	7.393	24255	2.6641E-06	5.1693E-09	72.78	1.52	27.194
386.00	90.890	298197	7.393	24255	2.7698E-06	5.3743E-09	75.65	1.58	27.237
386.10	90.694	297551	7.393	24256	2.8800E-06	5.5881E-09	78.52	1.64	27.282
386.20	90.497	296906	7.394	24257	2.9947E-06	5.8107E-09	81.40	1.70	27.328
386.30	90.300	296260	7.394	24257	3.1147E-06	6.0435E-09	84.75	1.77	27.372
386.40	90.103	295614	7.394	24258	3.2398E-06	6.2863E-09	88.10	1.84	27.418
386.50	89.906	294968	7.394	24258	3.3652E-06	6.5295E-09	91.93	1.92	27.441
386.60	89.710	294323	7.394	24259	3.4893E-06	6.7703E-09	95.28	1.99	27.443
386.70	89.513	293677	7.394	24260	3.6181E-06	7.0203E-09	98.63	2.06	27.444
386.80	89.316	293031	7.394	24260	3.7518E-06	7.2796E-09	102.46	2.14	27.444
386.90	89.119	292385	7.394	24260	3.8903E-06	7.5485E-09	106.29	2.22	27.444
387.00	88.922	291739	7.395	24261	4.0340E-06	7.8273E-09	110.12	2.30	27.445
387.10	88.725	291093	7.395	24261	4.1831E-06	8.1165E-09	113.95	2.38	27.445
387.20	88.529	290448	7.395	24262	4.3373E-06	8.4158E-09	118.26	2.47	27.446
387.30	88.332	289802	7.395	24263	4.4976E-06	8.7268E-09	122.57	2.56	27.447
387.40	88.135	289156	7.396	24264	4.6638E-06	9.0492E-09	127.36	2.66	27.448
387.50	87.938	288510	7.396	24264	4.8361E-06	9.3836E-09	132.15	2.76	27.448
387.60	87.741	287864	7.396	24265	5.0148E-06	9.7303E-09	136.94	2.86	27.449
387.70	87.544	287217	7.396	24266	5.2002E-06	1.0090E-08	142.20	2.97	27.450
387.80	87.347	286571	7.397	24267	5.3924E-06	1.0463E-08	147.47	3.08	27.452
387.90	87.150	285925	7.397	24268	5.5919E-06	1.0850E-08	152.74	3.19	27.453
388.00	86.953	285279	7.397	24268	5.7985E-06	1.1251E-08	158.48	3.31	27.453
388.10	86.756	284633	7.397	24269	6.0129E-06	1.1667E-08	164.23	3.43	27.454
388.20	86.559	283986	7.397	24270	6.2356E-06	1.2099E-08	170.45	3.56	27.455
388.30	86.362	283340	7.398	24271	6.4659E-06	1.2546E-08	176.68	3.69	27.456
388.40	86.165	282693	7.398	24272	6.7051E-06	1.3010E-08	183.38	3.83	27.457
388.50	85.968	282047	7.398	24272	6.9530E-06	1.3491E-08	190.08	3.97	27.457
388.60	85.771	281400	7.399	24274	7.2107E-06	1.3991E-08	197.27	4.12	27.459
388.70	85.574	280753	7.399	24274	7.4776E-06	1.4509E-08	204.45	4.27	27.459
388.80	85.376	280106	7.399	24275	7.7549E-06	1.5047E-08	212.11	4.43	27.461
388.90	85.179	279459	7.399	24276	8.0420E-06	1.5604E-08	219.77	4.59	27.462
389.00	84.982	278812	7.399	24276	8.3399E-06	1.6182E-08	227.91	4.76	27.462
389.10	84.785	278165	7.400	24277	8.6491E-06	1.6782E-08	236.53	4.94	27.463
389.20	84.587	277518	7.400	24277	8.9691E-06	1.7403E-08	245.15	5.12	27.463
389.30	84.390	276871	7.400	24279	9.3016E-06	1.8048E-08	254.24	5.31	27.465
389.40	84.193	276224	7.400	24279	9.6463E-06	1.8717E-08	263.82	5.51	27.465
389.50	83.996	275576	7.400	24279	1.0005E-05	1.9412E-08	273.87	5.72	27.465
389.60	83.798	274929	7.400	24279	1.0375E-05	2.0131E-08	283.93	5.93	27.465
389.70	83.601	274281	7.400	24279	1.0760E-05	2.0878E-08	294.46	6.15	27.465
389.80	83.404	273634	7.401	24282	1.1159E-05	2.1652E-08	305.47	6.38	27.469
389.90	83.206	272986	7.400	24279	1.1573E-05	2.2456E-08	316.49	6.61	27.465
390.00	83.009	272338	7.399	24276	1.2003E-05	2.3289E-08	328.46	6.86	27.462

TABLE III.- ENTRY-ENVIRONMENT PARAMETERS – Continued

TIME	ALTITUDE		VELOCITY		DENSITY		DYNAMIC PRESSURE		MACH
SEC	KM	FT	KM/SEC	FT/SEC	KG/METER**3	SLUGS/FT**3	NEWTONS/M**2	LBS/FT**2	
390.00	83.009	272338	7.399	24276	1.2003E-05	2.3289E-08	328.46	6.86	27.462
390.10	82.811	271690	7.401	24280	1.2448E-05	2.4154E-08	340.43	7.11	27.466
390.20	82.614	271042	7.400	24279	1.2911E-05	2.5051E-08	353.35	7.38	27.465
390.30	82.416	270394	7.400	24278	1.3390E-05	2.5981E-08	366.28	7.65	27.464
390.40	82.219	269746	7.400	24278	1.3887E-05	2.6946E-08	380.17	7.94	27.464
390.50	82.021	269097	7.400	24277	1.4404E-05	2.7948E-08	394.05	8.23	27.463
390.60	81.823	268449	7.400	24277	1.4939E-05	2.8986E-08	408.90	8.54	27.463
390.70	81.625	267800	7.400	24277	1.5494E-05	3.0064E-08	423.74	8.85	27.463
390.80	81.428	267152	7.400	24279	1.6070E-05	3.1181E-08	440.02	9.19	27.465
390.90	81.230	266503	7.399	24276	1.6668E-05	3.2341E-08	455.82	9.52	27.462
391.00	81.032	265854	7.398	24273	1.7298E-05	3.3544E-08	473.05	9.88	27.458
391.10	80.835	265206	7.399	24276	1.7930E-05	3.4790E-08	490.77	10.25	27.462
391.20	80.637	264557	7.399	24276	1.8597E-05	3.6085E-08	508.96	10.63	27.462
391.30	80.439	263908	7.399	24276	1.9290E-05	3.7428E-08	527.64	11.02	27.462
391.40	80.241	263259	7.399	24276	2.0008E-05	3.8821E-08	547.27	11.43	27.462
391.50	80.044	262610	7.399	24275	2.0752E-05	4.0266E-08	567.86	11.86	27.461
391.60	79.846	261961	7.399	24275	2.1455E-05	4.1629E-08	587.01	12.26	27.417
391.70	79.648	261313	7.399	24275	2.2154E-05	4.2985E-08	606.16	12.66	27.359
391.80	79.450	260664	7.400	24279	2.2873E-05	4.4381E-08	626.27	13.08	27.305
391.90	79.253	260015	7.400	24277	2.3613E-05	4.5817E-08	646.38	13.50	27.246
392.00	79.055	259366	7.399	24275	2.4374E-05	4.7293E-08	666.97	13.93	27.186
392.10	78.857	258718	7.400	24278	2.5154E-05	4.8807E-08	688.51	14.38	27.133
392.20	78.659	258069	7.400	24278	2.5958E-05	5.0367E-08	710.54	14.84	27.076
392.30	78.462	257420	7.401	24280	2.6784E-05	5.1969E-08	733.04	15.31	27.023
392.40	78.264	256772	7.401	24281	2.7631E-05	5.3613E-08	756.50	15.80	26.968
392.50	78.066	256123	7.401	24281	2.8503E-05	5.5305E-08	780.44	16.30	26.913
392.60	77.869	255475	7.401	24282	2.9397E-05	5.7040E-08	804.86	16.81	26.859
392.70	77.671	254827	7.402	24284	3.0316E-05	5.8822E-08	830.24	17.34	26.806
392.80	77.473	254178	7.403	24288	3.1260E-05	6.0655E-08	856.57	17.89	26.756
392.90	77.276	253530	7.402	24286	3.2229E-05	6.2535E-08	882.91	18.44	26.700
393.00	77.078	252882	7.402	24285	3.3224E-05	6.4466E-08	909.72	19.00	26.645
393.10	76.881	252234	7.403	24289	3.4246E-05	6.6448E-08	938.45	19.60	26.596
393.20	76.683	251586	7.404	24290	3.5295E-05	6.8483E-08	967.18	20.20	26.545
393.30	76.486	250938	7.404	24291	3.6371E-05	7.0572E-08	996.86	20.82	26.493
393.40	76.289	250291	7.404	24292	3.7474E-05	7.2712E-08	1027.03	21.45	26.442
393.50	76.091	249643	7.405	24294	3.8609E-05	7.4913E-08	1058.15	22.10	26.392
393.60	75.894	248995	7.405	24295	3.9772E-05	7.7171E-08	1090.23	22.77	26.341
393.70	75.696	248348	7.405	24296	4.0965E-05	7.9485E-08	1122.79	23.45	26.291
393.80	75.499	247700	7.407	24300	4.2190E-05	8.1862E-08	1156.78	24.16	26.244
393.90	75.302	247053	7.406	24298	4.3445E-05	8.4297E-08	1191.25	24.88	26.191
394.00	75.104	246405	7.405	24296	4.4734E-05	8.6799E-08	1226.21	25.61	26.138
394.10	74.907	245758	7.407	24300	4.6055E-05	8.9361E-08	1263.07	26.38	26.092
394.20	74.710	245110	7.407	24300	4.7411E-05	9.1993E-08	1300.42	27.16	26.042
394.30	74.512	244463	7.407	24301	4.8800E-05	9.4688E-08	1338.25	27.95	25.993
394.40	74.315	243815	7.407	24302	5.0226E-05	9.7455E-08	1377.51	28.77	25.945
394.50	74.118	243168	7.407	24302	5.1682E-05	1.0028E-07	1417.73	29.61	25.896
394.60	73.920	242520	7.408	24303	5.3182E-05	1.0319E-07	1458.90	30.47	25.848
394.70	73.723	241873	7.408	24303	5.4718E-05	1.0617E-07	1501.04	31.35	25.799
394.80	73.525	241225	7.408	24306	5.6295E-05	1.0923E-07	1544.61	32.26	25.754
394.90	73.328	240577	7.408	24303	5.7908E-05	1.1236E-07	1588.66	33.18	25.703
395.00	73.131	239930	7.407	24300	5.9562E-05	1.1557E-07	1633.67	34.12	25.652

TABLE III.- ENTRY-ENVIRONMENT PARAMETERS – Continued

TIME	ALTITUDE		VELOCITY		DENSITY		DYNAMIC PRESSURE		MACH
SEC	KM	FT	KM/SEC	FT/SEC	KG/METER**3	SLUGS/FT**3	NEWTONS/M**2	LBS/FT**2	
395.00	73.131	239930	7.407	24300	5.9562E-05	1.1557E-07	1633.67	34.12	25.652
395.10	72.933	239282	7.408	24303	6.1258E-05	1.1886E-07	1680.59	35.10	25.607
395.20	72.736	238634	7.408	24303	6.2995E-05	1.2223E-07	1727.99	36.09	25.560
395.30	72.538	237986	7.408	24303	6.4773E-05	1.2568E-07	1776.83	37.11	25.513
395.40	72.341	237339	7.408	24303	6.6597E-05	1.2922E-07	1827.10	38.16	25.466
395.50	72.143	236691	7.408	24303	6.8463E-05	1.3284E-07	1878.33	39.23	25.419
395.60	71.946	236042	7.407	24302	7.0380E-05	1.3656E-07	1930.52	40.32	25.372
395.70	71.748	235394	7.407	24302	7.2344E-05	1.4037E-07	1984.63	41.45	25.326
395.80	71.551	234746	7.408	24305	7.4349E-05	1.4426E-07	2040.17	42.61	25.283
395.90	71.353	234098	7.407	24302	7.6405E-05	1.4825E-07	2095.71	43.77	25.234
396.00	71.156	233450	7.406	24298	7.8513E-05	1.5234E-07	2153.16	44.97	25.185
396.10	70.958	232801	7.407	24301	8.0672E-05	1.5653E-07	2212.53	46.21	25.143
396.20	70.760	232153	7.407	24301	8.2878E-05	1.6081E-07	2273.34	47.48	25.098
396.30	70.562	231504	7.407	24301	8.5141E-05	1.6520E-07	2335.59	48.78	25.053
396.40	70.365	230856	7.407	24301	8.7455E-05	1.6969E-07	2398.79	50.10	25.009
396.50	70.167	230207	7.407	24300	8.9825E-05	1.7429E-07	2463.43	51.45	24.964
396.60	69.970	229559	7.407	24300	9.2248E-05	1.7899E-07	2529.98	52.84	24.920
396.70	69.772	228911	7.407	24300	9.4727E-05	1.8380E-07	2597.97	54.26	24.876
396.80	69.574	228262	7.407	24302	9.7273E-05	1.8874E-07	2668.35	55.73	24.835
396.90	69.377	227614	7.406	24299	9.9865E-05	1.9377E-07	2738.74	57.20	24.788
397.00	69.179	226965	7.405	24296	1.0253E-04	1.9894E-07	2811.03	58.71	24.742
397.10	68.981	226317	7.406	24298	1.0525E-04	2.0421E-07	2886.21	60.28	24.701
397.20	68.784	225669	7.406	24298	1.0803E-04	2.0961E-07	2962.34	61.87	24.659
397.30	68.586	225021	7.406	24298	1.1087E-04	2.1513E-07	3040.38	63.50	24.616
397.40	68.389	224373	7.406	24298	1.1378E-04	2.2077E-07	3120.34	65.17	24.574
397.50	68.192	223726	7.406	24297	1.1675E-04	2.2654E-07	3201.26	66.86	24.531
397.60	67.994	223078	7.406	24297	1.1979E-04	2.3244E-07	3285.05	68.61	24.490
397.70	67.797	222430	7.405	24296	1.2291E-04	2.3848E-07	3369.79	70.38	24.447
397.80	67.599	221783	7.406	24299	1.2608E-04	2.4464E-07	3457.89	72.22	24.409
397.90	67.402	221136	7.405	24295	1.2933E-04	2.5095E-07	3545.99	74.06	24.364
398.00	67.205	220488	7.404	24292	1.3266E-04	2.5740E-07	3636.01	75.94	24.320
398.10	67.008	219841	7.405	24294	1.3605E-04	2.6399E-07	3729.85	77.90	24.281
398.20	66.811	219195	7.405	24293	1.3952E-04	2.7071E-07	3824.65	79.88	24.240
398.30	66.613	218548	7.405	24293	1.4306E-04	2.7759E-07	3921.85	81.91	24.200
398.40	66.416	217901	7.405	24293	1.4669E-04	2.8463E-07	4020.96	83.98	24.160
398.50	66.219	217254	7.404	24292	1.5040E-04	2.9182E-07	4122.47	86.10	24.119
398.60	66.022	216607	7.404	24292	1.5418E-04	2.9916E-07	4225.89	88.26	24.079
398.70	65.825	215961	7.404	24291	1.5805E-04	3.0666E-07	4331.70	90.47	24.039
398.80	65.628	215314	7.405	24293	1.6200E-04	3.1433E-07	4440.87	92.75	24.002
398.90	65.431	214667	7.404	24290	1.6604E-04	3.2217E-07	4550.52	95.04	23.960
399.00	65.234	214021	7.403	24287	1.7016E-04	3.3016E-07	4662.08	97.37	23.918
399.10	65.036	213374	7.403	24289	1.7437E-04	3.3834E-07	4778.42	99.80	23.881
399.20	64.839	212727	7.403	24288	1.7868E-04	3.4669E-07	4895.73	102.25	23.842
399.30	64.642	212081	7.403	24287	1.8307E-04	3.5521E-07	5015.91	104.76	23.802
399.40	64.445	211434	7.403	24287	1.8756E-04	3.6393E-07	5138.96	107.33	23.764
399.50	64.248	210787	7.402	24286	1.9215E-04	3.7283E-07	5263.93	109.94	23.725
399.60	64.051	210140	7.402	24286	1.9683E-04	3.8192E-07	5392.72	112.63	23.688
399.70	63.854	209494	7.402	24285	2.0161E-04	3.9118E-07	5522.96	115.35	23.649
399.80	63.656	208846	7.403	24288	2.0650E-04	4.0068E-07	5658.46	118.18	23.614
399.90	63.459	208199	7.402	24285	2.1149E-04	4.1035E-07	5793.48	121.00	23.574
400.00	63.262	207552	7.401	24281	2.1658E-04	4.2023E-07	5930.90	123.87	23.533

TABLE III.- ENTRY-ENVIRONMENT PARAMETERS – Continued

TIME	ALTITUDE		VELOCITY		DENSITY		DYNAMIC PRESSURE		MACH
SEC	KM	FT	KM/SEC	FT/SEC	KG/METER**3	SLUGS/FT**3	NEWTONS/M**2	LBS/FT**2	
400.00	63.262	207552	7.401	24281	2.1658E-04	4.2023E-07	5930.90	123.87	23.533
400.10	63.064	206904	7.402	24284	2.2178E-04	4.3033E-07	6075.01	126.88	23.499
400.20	62.867	206257	7.401	24282	2.2709E-04	4.4063E-07	6219.61	129.90	23.461
400.30	62.670	205609	7.401	24280	2.3252E-04	4.5116E-07	6367.08	132.98	23.422
400.40	62.472	204962	7.401	24280	2.3805E-04	4.6189E-07	6518.38	136.14	23.386
400.50	62.275	204314	7.401	24279	2.4370E-04	4.7285E-07	6673.04	139.37	23.349
400.60	62.077	203666	7.400	24278	2.4947E-04	4.8405E-07	6830.56	142.66	23.312
400.70	61.880	203018	7.400	24280	2.5535E-04	4.9547E-07	6991.44	146.02	23.276
400.80	61.682	202370	7.401	24280	2.6136E-04	5.0713E-07	7157.10	149.48	23.242
400.90	61.485	201722	7.400	24277	2.6771E-04	5.1945E-07	7328.99	153.07	23.213
401.00	61.287	201073	7.398	24272	2.7442E-04	5.3246E-07	7509.50	156.84	23.190
401.10	61.090	200425	7.398	24273	2.8126E-04	5.4574E-07	7697.67	160.77	23.173
401.20	60.892	199776	7.398	24273	2.8828E-04	5.5936E-07	7889.67	164.78	23.156
401.30	60.694	199127	7.398	24271	2.9547E-04	5.7330E-07	8085.02	168.86	23.136
401.40	60.496	198478	7.397	24269	3.0282E-04	5.8756E-07	8284.68	173.03	23.117
401.50	60.298	197829	7.397	24267	3.1034E-04	6.0216E-07	8489.12	177.30	23.097
401.60	60.100	197180	7.396	24265	3.1804E-04	6.1710E-07	8698.36	181.67	23.078
401.70	59.903	196531	7.395	24263	3.2592E-04	6.3239E-07	8912.38	186.14	23.058
401.80	59.705	195882	7.396	24265	3.3398E-04	6.4803E-07	9134.07	190.77	23.043
401.90	59.507	195233	7.394	24260	3.4223E-04	6.6404E-07	9355.75	195.40	23.020
402.00	59.309	194584	7.393	24255	3.5067E-04	6.8041E-07	9582.70	200.14	22.998
402.10	59.111	193934	7.393	24256	3.5932E-04	6.9720E-07	9820.19	205.10	22.982
402.20	58.913	193285	7.393	24254	3.6816E-04	7.1434E-07	10059.59	210.10	22.963
402.30	58.715	192635	7.392	24252	3.7721E-04	7.3191E-07	10305.69	215.24	22.944
402.40	58.517	191986	7.391	24249	3.8646E-04	7.4986E-07	10555.62	220.46	22.923
402.50	58.320	191337	7.390	24247	3.9592E-04	7.6821E-07	10812.26	225.82	22.904
402.60	58.122	190688	7.390	24246	4.0560E-04	7.8700E-07	11075.60	231.32	22.886
402.70	57.924	190039	7.389	24243	4.1550E-04	8.0621E-07	11343.25	236.91	22.866
402.80	57.726	189390	7.390	24244	4.2563E-04	8.2586E-07	11620.95	242.71	22.850
402.90	57.529	188742	7.388	24239	4.3597E-04	8.4593E-07	11898.18	248.50	22.828
403.00	57.331	188093	7.387	24235	4.4658E-04	8.6650E-07	12183.54	254.46	22.808
403.10	57.133	187445	7.387	24236	4.5740E-04	8.8750E-07	12479.92	260.65	22.792
403.20	56.935	186796	7.387	24234	4.6843E-04	9.0901E-07	12780.13	266.92	22.773
403.30	56.738	186148	7.386	24233	4.7980E-04	9.3097E-07	13088.00	273.35	22.755
403.40	56.540	185500	7.386	24231	4.9138E-04	9.5344E-07	13401.61	279.90	22.736
403.50	56.343	184853	7.385	24229	5.0321E-04	9.7638E-07	13721.45	286.58	22.718
403.60	56.146	184205	7.385	24228	5.1531E-04	9.9987E-07	14050.86	293.46	22.700
403.70	55.948	183558	7.384	24226	5.2765E-04	1.0238E-06	14385.55	300.45	22.682
403.80	55.752	182912	7.384	24227	5.4027E-04	1.0483E-06	14730.76	307.66	22.666
403.90	55.554	182265	7.383	24223	5.5321E-04	1.0734E-06	15077.89	314.91	22.645
404.00	55.357	181619	7.382	24219	5.6640E-04	1.0990E-06	15432.68	322.32	22.625
404.10	55.161	180973	7.382	24220	5.7990E-04	1.1252E-06	15801.36	330.02	22.610
404.20	54.964	180327	7.382	24219	5.9367E-04	1.1519E-06	16175.78	337.84	22.592
404.30	54.767	179681	7.382	24218	6.0779E-04	1.1793E-06	16558.82	345.84	22.575
404.40	54.570	179036	7.381	24215	6.2217E-04	1.2072E-06	16946.65	353.94	22.556
404.50	54.373	178390	7.380	24213	6.3691E-04	1.2358E-06	17345.01	362.26	22.537
404.60	54.177	177746	7.380	24211	6.5190E-04	1.2649E-06	17751.03	370.74	22.519
404.70	53.980	177101	7.379	24209	6.6731E-04	1.2948E-06	18166.63	379.42	22.501
404.80	53.784	176456	7.379	24209	6.8298E-04	1.3252E-06	18594.68	388.36	22.485
404.90	53.587	175812	7.377	24204	6.9906E-04	1.3564E-06	19023.20	397.31	22.464
405.00	53.391	175167	7.376	24199	7.1545E-04	1.3882E-06	19460.35	406.44	22.442

TABLE III.- ENTRY-ENVIRONMENT PARAMETERS – Continued

TIME	ALTITUDE		VELOCITY		DENSITY		DYNAMIC PRESSURE		MACH
SEC	KM	FT	KM/SEC	FT/SEC	KG/METER**3	SLUGS/FT**3	NEWTONS/M**2	LBS/FT**2	
405.00	53.391	175167	7.376	24198	7.1545E-04	1.3882E-06	19460.35	406.44	22.442
405.10	53.195	174523	7.376	24198	7.3220E-04	1.4207E-06	19915.69	415.95	22.426
405.20	52.998	173879	7.374	24194	7.4931E-04	1.4539E-06	20374.86	425.54	22.407
405.30	52.802	173235	7.373	24191	7.6683E-04	1.4879E-06	20845.52	435.37	22.388
405.40	52.606	172591	7.372	24187	7.8472E-04	1.5226E-06	21324.32	445.37	22.368
405.50	52.409	171947	7.371	24183	8.0306E-04	1.5582E-06	21816.52	455.65	22.350
405.60	52.213	171302	7.370	24179	8.2296E-04	1.5968E-06	22349.43	466.78	22.346
405.70	52.017	170658	7.368	24174	8.4331E-04	1.6363E-06	22892.86	478.13	22.342
405.80	51.820	170014	7.368	24173	8.6419E-04	1.6768E-06	23457.37	489.92	22.341
405.90	51.624	169370	7.365	24165	8.8558E-04	1.7183E-06	24021.87	501.71	22.333
406.00	51.428	168726	7.363	24158	9.0748E-04	1.7608E-06	24601.70	513.82	22.327
406.10	51.231	168081	7.362	24155	9.2995E-04	1.8044E-06	25204.99	526.42	22.324
406.20	51.035	167437	7.361	24149	9.5299E-04	1.8491E-06	25815.94	539.18	22.319
406.30	50.839	166793	7.359	24145	9.7654E-04	1.8948E-06	26445.56	552.33	22.315
406.40	50.642	166149	7.358	24139	1.0007E-03	1.9417E-06	27086.67	565.72	22.309
406.50	50.446	165504	7.356	24133	1.0255E-03	1.9898E-06	27744.07	579.45	22.304
406.60	50.249	164860	7.354	24127	1.0509E-03	2.0391E-06	28416.78	593.50	22.298
406.70	50.053	164216	7.352	24122	1.0769E-03	2.0896E-06	29108.17	607.94	22.294
406.80	49.856	163571	7.351	24119	1.1036E-03	2.1414E-06	29822.06	622.85	22.291
406.90	49.660	162927	7.349	24110	1.1309E-03	2.1944E-06	30537.39	637.79	22.282
407.00	49.464	162282	7.346	24102	1.1590E-03	2.2488E-06	31273.78	653.17	22.275
407.10	49.267	161638	7.345	24098	1.1876E-03	2.3044E-06	32037.47	669.12	22.271
407.20	49.071	160994	7.343	24092	1.2171E-03	2.3615E-06	32814.08	685.34	22.266
407.30	48.875	160350	7.341	24086	1.2472E-03	2.4200E-06	33609.84	701.96	22.260
407.40	48.678	159705	7.339	24079	1.2781E-03	2.4800E-06	34423.33	718.95	22.254
407.50	48.482	159061	7.337	24073	1.3098E-03	2.5414E-06	35258.35	736.39	22.248
407.60	48.286	158418	7.335	24066	1.3421E-03	2.6042E-06	36108.70	754.15	22.242
407.70	48.090	157774	7.333	24059	1.3754E-03	2.6687E-06	36981.55	772.38	22.235
407.80	47.893	157130	7.332	24055	1.4095E-03	2.7348E-06	37884.57	791.24	22.232
407.90	47.697	156487	7.329	24045	1.4443E-03	2.8024E-06	38789.50	810.14	22.222
408.00	47.501	155844	7.326	24035	1.4800E-03	2.8717E-06	39715.50	829.48	22.213
408.10	47.305	155201	7.324	24030	1.5173E-03	2.9441E-06	40699.44	850.03	22.214
408.20	47.109	154558	7.322	24022	1.5580E-03	3.0231E-06	41763.33	872.25	22.228
408.30	46.914	153916	7.319	24014	1.5998E-03	3.1042E-06	42855.47	895.06	22.243
408.40	46.718	153273	7.317	24006	1.6429E-03	3.1878E-06	43980.65	918.56	22.258
408.50	46.522	152631	7.314	23997	1.6872E-03	3.2737E-06	45131.69	942.60	22.272
408.60	46.327	151990	7.312	23988	1.7327E-03	3.3620E-06	46313.85	967.29	22.286
408.70	46.131	151349	7.308	23978	1.7795E-03	3.4528E-06	47525.69	992.60	22.299
408.80	45.936	150708	7.306	23971	1.8277E-03	3.5463E-06	48783.97	1018.88	22.315
408.90	45.741	150068	7.302	23958	1.8772E-03	3.6424E-06	50050.88	1045.34	22.326
409.00	45.546	149428	7.299	23946	1.9282E-03	3.7413E-06	51358.48	1072.65	22.337
409.10	45.351	148788	7.296	23938	1.9306E-03	3.8430E-06	52720.19	1101.09	22.353
409.20	45.156	148149	7.293	23926	2.0345E-03	3.9476E-06	54101.05	1129.93	22.364
409.30	44.961	147510	7.289	23915	2.0900E-03	4.0553E-06	55525.48	1159.68	22.376
409.40	44.766	146871	7.286	23903	2.1472E-03	4.1662E-06	56985.82	1190.18	22.388
409.50	44.572	146233	7.282	23890	2.2059E-03	4.2801E-06	58480.63	1221.40	22.399
409.60	44.378	145596	7.278	23878	2.2662E-03	4.3972E-06	60020.45	1253.56	22.410
409.70	44.184	144959	7.274	23865	2.3284E-03	4.5178E-06	61599.54	1286.54	22.421
409.80	43.989	144322	7.271	23854	2.3923E-03	4.6419E-06	63233.68	1320.67	22.434
409.90	43.795	143686	7.266	23838	2.4582E-03	4.7696E-06	64885.54	1355.17	22.442
410.00	43.602	143051	7.261	23821	2.5258E-03	4.9008E-06	66575.22	1390.46	22.449

TABLE III.- ENTRY-ENVIRONMENT PARAMETERS – Continued

TIME	ALTITUDE		VELOCITY		DENSITY		DYNAMIC PRESSURE		MACH
SEC	KM	FT	KM/SEC	FT/SEC	KG/METER**3	SLUGS/FT**3	NEWTONS/M**2	LBS/FT**2	
410.00	43.602	143051	7.261	23821	2.5258E-03	4.9008E-06	66575.22	1390.46	22.449
410.10	43.408	142416	7.257	23809	2.5954E-03	5.0359E-06	68341.52	1427.35	22.460
410.20	43.215	141781	7.252	23794	2.6671E-03	5.1750E-06	70141.33	1464.94	22.469
410.30	43.022	141147	7.248	23779	2.7408E-03	5.3181E-06	71989.50	1503.54	22.478
410.40	42.829	140514	7.243	23763	2.8166E-03	5.4652E-06	73881.23	1543.05	22.486
410.50	42.636	139881	7.238	23746	2.8947E-03	5.6167E-06	75820.37	1583.55	22.494
410.60	42.443	139248	7.233	23730	2.9729E-03	5.7683E-06	77762.87	1624.12	22.502
410.70	42.250	138616	7.228	23714	3.0477E-03	5.9136E-06	79613.91	1662.78	22.510
410.80	42.058	137984	7.224	23700	3.1247E-03	6.0629E-06	81527.19	1702.74	22.520
410.90	41.865	137353	7.217	23679	3.2036E-03	6.2160E-06	83438.56	1742.66	22.523
411.00	41.673	136723	7.211	23658	3.2846E-03	6.3731E-06	85394.94	1783.52	22.527
411.10	41.481	136093	7.206	23643	3.3677E-03	6.5345E-06	87446.60	1826.37	22.536
411.20	41.289	135463	7.201	23624	3.4532E-03	6.7003E-06	89521.71	1869.71	22.541
411.30	41.097	134834	7.195	23605	3.5409E-03	6.8704E-06	91647.11	1914.10	22.547
411.40	40.906	134206	7.189	23585	3.6308E-03	7.0450E-06	93816.07	1959.40	22.551
411.50	40.715	133578	7.183	23565	3.7233E-03	7.2243E-06	96041.53	2005.88	22.556
411.60	40.523	132950	7.177	23546	3.8182E-03	7.4086E-06	98333.07	2053.74	22.561
411.70	40.332	132323	7.170	23524	3.9157E-03	7.5978E-06	100654.77	2102.23	22.564
411.80	40.141	131696	7.165	23507	4.0159E-03	7.7921E-06	103080.37	2152.89	22.571
411.90	39.950	131070	7.157	23482	4.1214E-03	7.9969E-06	105563.91	2204.76	22.571
412.00	39.759	130444	7.150	23457	4.2379E-03	8.2228E-06	108316.05	2262.24	22.571
412.10	39.569	129819	7.144	23437	4.3577E-03	8.4553E-06	111188.85	2322.24	22.575
412.20	39.378	129194	7.136	23413	4.4812E-03	8.6949E-06	114105.22	2383.15	22.576
412.30	39.188	128570	7.129	23389	4.6083E-03	8.9415E-06	117100.12	2445.70	22.577
412.40	38.998	127946	7.122	23365	4.7392E-03	9.1956E-06	120180.72	2510.04	22.578
412.50	38.808	127323	7.114	23340	4.8739E-03	9.4570E-06	123333.61	2575.89	22.577
412.60	38.618	126701	7.106	23314	5.0126E-03	9.7261E-06	126559.77	2643.27	22.576
412.70	38.429	126079	7.098	23288	5.1553E-03	1.0003E-05	129878.33	2712.58	22.575
412.80	38.240	125458	7.091	23263	5.3022E-03	1.0288E-05	133296.96	2783.98	22.575
412.90	38.050	124837	7.081	23233	5.4543E-03	1.0583E-05	136755.33	2856.21	22.570
413.00	37.861	124217	7.071	23200	5.6099E-03	1.0885E-05	140268.29	2929.58	22.562
413.10	37.673	123598	7.063	23174	5.7707E-03	1.1197E-05	143960.80	3006.70	22.561
413.20	37.484	122979	7.054	23143	5.9361E-03	1.1518E-05	147694.96	3084.69	22.555
413.30	37.296	122361	7.045	23112	6.1067E-03	1.1849E-05	151528.23	3164.75	22.549
413.40	37.108	121744	7.034	23079	6.2820E-03	1.2189E-05	155436.20	3246.37	22.541
413.50	36.920	121127	7.024	23046	6.4629E-03	1.2540E-05	159454.29	3330.29	22.533
413.60	36.732	120512	7.014	23012	6.6489E-03	1.2901E-05	163556.16	3415.96	22.524
413.70	36.545	119897	7.003	22976	6.8406E-03	1.3273E-05	167744.23	3503.43	22.513
413.80	36.358	119284	6.993	22943	7.0375E-03	1.3655E-05	172078.80	3593.96	22.504
413.90	36.171	118671	6.981	22902	7.2406E-03	1.4049E-05	176412.42	3684.47	22.488
414.00	35.984	118059	6.968	22860	7.4498E-03	1.4455E-05	180841.32	3776.97	22.471
414.10	35.798	117448	6.956	22823	7.6647E-03	1.4872E-05	185464.14	3873.52	22.459
414.20	35.612	116838	6.944	22782	7.8863E-03	1.5302E-05	190140.58	3971.19	22.443
414.30	35.427	116229	6.931	22741	8.1146E-03	1.5745E-05	194937.20	4071.37	22.427
414.40	35.242	115622	6.918	22698	8.3491E-03	1.6200E-05	199811.86	4173.18	22.409
414.50	35.057	115015	6.905	22653	8.5909E-03	1.6669E-05	204783.72	4277.02	22.388
414.60	34.872	114410	6.891	22607	8.8393E-03	1.7151E-05	209852.77	4382.89	22.367
414.70	34.688	113806	6.876	22559	9.0954E-03	1.7648E-05	215010.41	4490.61	22.344
414.80	34.504	113203	6.862	22514	9.3588E-03	1.8159E-05	220355.73	4602.25	22.323
414.90	34.321	112601	6.846	22462	9.6299E-03	1.8685E-05	225694.83	4713.76	22.296
415.00	34.138	112001	6.830	22409	9.9087E-03	1.9226E-05	231132.56	4827.33	22.267

TABLE III.- ENTRY-ENVIRONMENT PARAMETERS – Continued

TIME	ALTITUDE		VELOCITY		DENSITY		DYNAMIC PRESSURE		MACH
SEC	KM	FT	KM/SEC	FT/SEC	KG/METER**3	SLUGS/FT**3	NEWTONS/M**2	LBS/FT**2	
415.00	34.138	112001	6.830	22409	9.9087E-03	1.9226E-05	231132.56	4827.33	22.267
415.10	33.955	111402	6.815	22360	1.0195E-02	1.9782E-05	236787.67	4945.44	22.243
415.20	33.773	110804	6.799	22307	1.0491E-02	2.0356E-05	242494.96	5064.64	22.214
415.30	33.591	110208	6.783	22253	1.0795E-02	2.0945E-05	248307.12	5186.03	22.184
415.40	33.410	109613	6.766	22197	1.1107E-02	2.1551E-05	254213.59	5309.39	22.152
415.50	33.229	109019	6.749	22141	1.1429E-02	2.2176E-05	260261.32	5435.70	22.120
415.60	33.049	108427	6.731	22083	1.1760E-02	2.2818E-05	266392.35	5563.75	22.086
415.70	32.869	107837	6.713	22023	1.2100E-02	2.3477E-05	272605.74	5693.52	22.050
415.80	32.689	107248	6.695	21965	1.2449E-02	2.4156E-05	279014.48	5827.37	22.016
415.90	32.510	106660	6.675	21901	1.2810E-02	2.4855E-05	285417.95	5961.11	21.975
416.00	32.331	106074	6.655	21834	1.3180E-02	2.5574E-05	291873.13	6095.93	21.932
416.10	32.153	105490	6.636	21773	1.3560E-02	2.6310E-05	298603.14	6236.49	21.893
416.20	31.976	104907	6.616	21707	1.3932E-02	2.7032E-05	304938.14	6368.80	21.835
416.30	31.799	104326	6.596	21639	1.4313E-02	2.7772E-05	311322.46	6502.14	21.775
416.40	31.622	103747	6.575	21571	1.4704E-02	2.8530E-05	317811.16	6637.66	21.715
416.50	31.446	103169	6.553	21500	1.5105E-02	2.9308E-05	324330.50	6773.82	21.652
416.60	31.270	102593	6.531	21428	1.5515E-02	3.0105E-05	330922.14	6911.49	21.588
416.70	31.096	102020	6.509	21355	1.5935E-02	3.0919E-05	337568.36	7050.30	21.522
416.80	30.921	101447	6.487	21284	1.6367E-02	3.1757E-05	344412.33	7193.24	21.459
416.90	30.747	100877	6.463	21204	1.6809E-02	3.2614E-05	351047.54	7331.82	21.386
417.00	30.574	100309	6.438	21123	1.7261E-02	3.3491E-05	357741.17	7471.62	21.313
417.10	30.402	99743	6.415	21047	1.7723E-02	3.4389E-05	364698.13	7616.92	21.244
417.20	30.230	99179	6.390	20966	1.8198E-02	3.5309E-05	371577.05	7760.59	21.170
417.30	30.058	98617	6.365	20884	1.8683E-02	3.6251E-05	378510.55	7905.40	21.095
417.40	29.888	98058	6.339	20798	1.9179E-02	3.7214E-05	385366.97	8048.60	21.016
417.50	29.718	97501	6.313	20712	1.9687E-02	3.8199E-05	392306.22	8193.53	20.937
417.60	29.549	96946	6.286	20624	2.0206E-02	3.9207E-05	399249.30	8338.54	20.856
417.70	29.381	96393	6.259	20535	2.0739E-02	4.0240E-05	406231.64	8484.37	20.774
417.80	29.213	95843	6.232	20447	2.1282E-02	4.1294E-05	413310.69	8632.22	20.692
417.90	29.046	95296	6.203	20351	2.1837E-02	4.2371E-05	420116.36	8774.36	20.603
418.00	28.880	94751	6.173	20254	2.2405E-02	4.3473E-05	426941.65	8916.91	20.512
418.10	28.715	94209	6.145	20160	2.2985E-02	4.4598E-05	433934.52	9062.96	20.424
418.20	28.551	93670	6.115	20062	2.3577E-02	4.5746E-05	440792.86	9206.20	20.332
418.30	28.387	93134	6.084	19962	2.4181E-02	4.6919E-05	447594.21	9348.25	20.238
418.40	28.224	92600	6.053	19860	2.4799E-02	4.8118E-05	454351.99	9489.39	20.142
418.50	28.063	92070	6.022	19756	2.5428E-02	4.9339E-05	461015.93	9628.57	20.044
418.60	27.902	91543	5.990	19652	2.6070E-02	5.0585E-05	467693.76	9768.04	19.945
418.70	27.742	91018	5.957	19545	2.6727E-02	5.1858E-05	474260.50	9905.19	19.844
418.80	27.583	90497	5.925	19440	2.7395E-02	5.3155E-05	480907.68	10044.02	19.744
418.90	27.426	89979	5.891	19327	2.8076E-02	5.4477E-05	487155.54	10174.51	19.636
419.00	27.269	89464	5.856	19213	2.8771E-02	5.5825E-05	493338.28	10303.64	19.527
419.10	27.113	88953	5.822	19102	2.9478E-02	5.7196E-05	499635.46	10435.16	19.421
419.20	26.958	88444	5.788	18988	3.0200E-02	5.8597E-05	505779.90	10563.49	19.312
419.30	26.804	87939	5.752	18873	3.0934E-02	6.0022E-05	511820.44	10689.65	19.201
419.40	26.651	87438	5.717	18755	3.1680E-02	6.1470E-05	517639.78	10811.19	19.088
419.50	26.499	86939	5.680	18636	3.2443E-02	6.2949E-05	523386.81	10931.22	18.973
419.60	26.349	86444	5.644	18516	3.3217E-02	6.4452E-05	529005.05	11048.56	18.857
419.70	26.198	85953	5.607	18395	3.4005E-02	6.5980E-05	534488.27	11163.08	18.740
419.80	26.049	85464	5.570	18275	3.4808E-02	6.7538E-05	539997.82	11278.15	18.624
419.90	25.902	84979	5.532	18149	3.5624E-02	6.9121E-05	545061.13	11383.90	18.502
420.00	25.755	84498	5.493	18022	3.6452E-02	7.0729E-05	549962.13	11486.26	18.378

TABLE III.- ENTRY-ENVIRONMENT PARAMETERS – Continued

TIME	ALTITUDE		VELOCITY		DENSITY		DYNAMIC PRESSURE		MACH
SEC	KM	FT	KM/SEC	FT/SEC	KG/METER**3	SLUGS/FT**3	NEWTONS/M**2	LBS/FT**2	
420.00	25.755	84498	5.493	18022	3.6452E-02	7.0729E-05	549962.13	11486.26	18.378
420.10	25.609	84019	5.456	17900	3.7297E-02	7.2369E-05	555117.37	11593.93	18.260
420.20	25.464	83544	5.417	17773	3.8155E-02	7.4033E-05	559856.05	11692.90	18.136
420.30	25.320	83072	5.378	17645	3.9028E-02	7.5727E-05	564441.04	11788.66	18.011
420.40	25.177	82603	5.339	17517	3.9916E-02	7.7449E-05	568930.75	11882.43	17.886
420.50	25.036	82138	5.300	17388	4.0816E-02	7.9196E-05	573227.98	11972.18	17.760
420.60	24.895	81675	5.260	17257	4.1733E-02	8.0976E-05	577313.10	12057.50	17.632
420.70	24.755	81217	5.220	17126	4.2662E-02	8.2777E-05	581229.68	12139.30	17.504
420.80	24.616	80761	5.181	16997	4.3607E-02	8.4611E-05	585194.15	12222.10	17.377
420.90	24.478	80308	5.139	16861	4.4567E-02	8.6475E-05	588552.93	12292.25	17.243
421.00	24.341	79859	5.098	16725	4.5541E-02	8.8365E-05	591748.44	12358.99	17.110
421.10	24.205	79413	5.058	16594	4.6530E-02	9.0283E-05	595163.72	12430.32	16.981
421.20	24.070	78970	5.017	16459	4.7534E-02	9.2232E-05	598155.26	12492.80	16.848
421.30	23.936	78531	4.975	16323	4.8551E-02	9.4205E-05	600899.27	12550.11	16.714
421.40	23.803	78094	4.933	16186	4.9586E-02	9.6213E-05	603447.92	12603.34	16.578
421.50	23.671	77662	4.891	16048	5.0631E-02	9.8241E-05	605706.90	12650.52	16.442
421.60	23.540	77232	4.850	15911	5.1693E-02	1.0030E-04	607909.86	12696.53	16.306
421.70	23.410	76806	4.808	15773	5.2770E-02	1.0239E-04	609843.25	12736.91	16.170
421.80	23.282	76383	4.766	15636	5.3857E-02	1.0450E-04	611686.15	12775.40	16.034
421.90	23.154	75963	4.723	15495	5.4965E-02	1.0665E-04	613043.07	12803.74	15.894
422.00	23.027	75547	4.680	15353	5.6084E-02	1.0882E-04	614109.36	12826.01	15.753
422.10	22.901	75134	4.638	15215	5.7217E-02	1.1102E-04	615314.50	12851.18	15.615
422.20	22.776	74724	4.595	15074	5.8367E-02	1.1325E-04	616092.55	12867.43	15.475
422.30	22.652	74318	4.552	14933	5.9531E-02	1.1551E-04	616651.79	12879.11	15.335
422.40	22.529	73915	4.508	14790	6.0706E-02	1.1779E-04	616851.45	12883.28	15.192
422.50	22.407	73515	4.464	14647	6.1897E-02	1.2010E-04	616853.84	12883.33	15.049
422.60	22.287	73119	4.421	14504	6.3098E-02	1.2243E-04	616624.97	12878.55	14.907
422.70	22.167	72727	4.377	14361	6.4314E-02	1.2479E-04	616163.89	12868.92	14.764
422.80	22.049	72338	4.334	14220	6.5546E-02	1.2718E-04	615671.20	12858.63	14.623
422.90	21.931	71953	4.289	14073	6.6783E-02	1.2958E-04	614420.58	12832.51	14.475
423.00	21.815	71571	4.245	13926	6.8040E-02	1.3202E-04	612955.45	12801.91	14.328
423.10	21.700	71193	4.201	13782	6.9303E-02	1.3447E-04	611510.91	12771.74	14.183
423.20	21.586	70819	4.156	13636	7.0581E-02	1.3695E-04	609645.51	12732.78	14.037
423.30	21.473	70448	4.112	13491	7.1870E-02	1.3945E-04	607653.22	12691.17	13.891
423.40	21.361	70081	4.068	13345	7.3174E-02	1.4198E-04	605324.82	12642.54	13.744
423.50	21.250	69718	4.023	13199	7.4483E-02	1.4452E-04	602657.42	12586.83	13.596
423.60	21.141	69359	3.978	13051	7.5797E-02	1.4707E-04	599741.53	12525.93	13.448
423.70	21.032	69004	3.934	12906	7.7126E-02	1.4965E-04	596761.96	12463.70	13.302
423.80	20.925	68653	3.890	12763	7.8461E-02	1.5224E-04	593722.53	12400.22	13.158
423.90	20.819	68305	3.845	12615	7.9812E-02	1.5486E-04	590001.30	12322.50	13.008
424.00	20.715	67961	3.800	12467	8.1167E-02	1.5749E-04	586032.05	12239.60	12.859
424.10	20.611	67621	3.757	12325	8.2533E-02	1.6014E-04	582383.11	12163.39	12.715
424.20	20.508	67285	3.712	12180	8.3904E-02	1.6280E-04	578210.37	12076.24	12.569
424.30	20.407	66953	3.669	12036	8.5280E-02	1.6547E-04	573891.60	11986.04	12.423
424.40	20.307	66624	3.625	11894	8.6671E-02	1.6817E-04	569554.62	11895.46	12.279
424.50	20.208	66299	3.582	11751	8.8063E-02	1.7087E-04	564886.80	11797.97	12.134
424.60	20.110	65977	3.538	11609	8.9470E-02	1.7360E-04	560108.86	11698.18	11.991
424.70	20.013	65660	3.496	11469	9.0851E-02	1.7629E-04	555139.39	11594.39	11.847
424.80	19.917	65346	3.454	11331	9.2340E-02	1.7917E-04	550728.69	11502.27	11.705
424.90	19.823	65036	3.410	11188	9.3851E-02	1.8210E-04	545695.06	11397.14	11.557
425.00	19.729	64729	3.367	11047	9.5371E-02	1.8505E-04	540640.85	11291.58	11.411

TABLE III.- ENTRY-ENVIRONMENT PARAMETERS – Continued

TIME	ALTITUDE		VELOCITY		DENSITY		DYNAMIC PRESSURE		MACH
SEC	KM	FT	KM/SEC	FT/SEC	KG/METER**3	SLUGS/FT**3	NEWTONS/M**2	LBS/FT**2	
425.00	19.729	64729	3.367	11047	9.5371E-02	1.8505E-04	540640.85	11291.58	11.411
425.10	19.637	64427	3.326	10913	9.6886E-02	1.8799E-04	536005.11	11194.76	11.273
425.20	19.546	64127	3.285	10777	9.8422E-02	1.9097E-04	530995.90	11090.14	11.132
425.30	19.456	63832	3.244	10643	9.9953E-02	1.9394E-04	525925.41	10984.24	10.994
425.40	19.367	63540	3.202	10506	1.0149E-01	1.9692E-04	520358.40	10867.97	10.852
425.50	19.279	63251	3.161	10370	1.0303E-01	1.9992E-04	514692.76	10749.64	10.712
425.60	19.192	62965	3.121	10238	1.0459E-01	2.0293E-04	509231.57	10635.58	10.576
425.70	19.106	62683	3.080	10106	1.0614E-01	2.0595E-04	503554.44	10517.01	10.439
425.80	19.021	62405	3.042	9979	1.0769E-01	2.0896E-04	498165.54	10404.46	10.308
425.90	18.937	62129	3.002	9849	1.0926E-01	2.1200E-04	492322.27	10282.42	10.174
426.00	18.854	61857	2.962	9719	1.1082E-01	2.1503E-04	486275.98	10156.14	10.040
426.10	18.772	61588	2.925	9595	1.1239E-01	2.1808E-04	480657.27	10038.79	9.911
426.20	18.691	61323	2.886	9470	1.1396E-01	2.2112E-04	474744.56	9915.30	9.782
426.30	18.611	61060	2.849	9348	1.1554E-01	2.2418E-04	468992.74	9795.17	9.656
426.40	18.532	60801	2.812	9226	1.1711E-01	2.2723E-04	463055.62	9671.17	9.530
426.50	18.454	60545	2.776	9106	1.1869E-01	2.3029E-04	457162.07	9548.08	9.406
426.60	18.377	60292	2.739	8987	1.2027E-01	2.3336E-04	451216.33	9423.90	9.283
426.70	18.301	60042	2.704	8870	1.2185E-01	2.3643E-04	445322.30	9300.80	9.163
426.80	18.226	59795	2.670	8759	1.2343E-01	2.3950E-04	439886.01	9187.26	9.048
426.90	18.151	59550	2.634	8643	1.2502E-01	2.4258E-04	433828.23	9060.74	8.928
427.00	18.077	59309	2.599	8528	1.2660E-01	2.4565E-04	427710.12	8932.96	8.809
427.10	18.005	59071	2.567	8421	1.2819E-01	2.4873E-04	422260.42	8819.14	8.699
427.20	17.933	58835	2.533	8312	1.2978E-01	2.5181E-04	416501.90	8698.87	8.586
427.30	17.862	58603	2.501	8206	1.3136E-01	2.5488E-04	410894.19	8581.75	8.477
427.40	17.792	58373	2.469	8102	1.3295E-01	2.5796E-04	405384.64	8466.63	8.369
427.50	17.723	58146	2.438	7999	1.3453E-01	2.6103E-04	399854.02	8351.17	8.263
427.60	17.654	57921	2.408	7899	1.3612E-01	2.6412E-04	394525.93	8239.89	8.159
427.70	17.587	57700	2.377	7799	1.3770E-01	2.6718E-04	389062.83	8125.79	8.056
427.80	17.520	57481	2.348	7704	1.3929E-01	2.7026E-04	384007.18	8020.20	7.958
427.90	17.454	57264	2.318	7605	1.4087E-01	2.7333E-04	378464.11	7904.43	7.856
428.00	17.389	57049	2.289	7509	1.4246E-01	2.7642E-04	373133.63	7793.10	7.757
428.10	17.324	56837	2.262	7420	1.4404E-01	2.7949E-04	368394.47	7694.12	7.665
428.20	17.260	56627	2.234	7330	1.4563E-01	2.8257E-04	363473.84	7591.35	7.572
428.30	17.197	56419	2.207	7241	1.4722E-01	2.8566E-04	358571.88	7488.97	7.480
428.40	17.134	56214	2.181	7154	1.4881E-01	2.8873E-04	353771.43	7388.71	7.390
428.50	17.072	56010	2.154	7068	1.5040E-01	2.9182E-04	349012.64	7289.32	7.301
428.60	17.010	55808	2.129	6984	1.5199E-01	2.9491E-04	344376.90	7192.50	7.214
428.70	16.949	55608	2.103	6900	1.5347E-01	2.9779E-04	339422.28	7089.02	7.128
428.80	16.889	55410	2.079	6820	1.5493E-01	3.0062E-04	334751.10	6991.46	7.045
428.90	16.829	55214	2.053	6737	1.5639E-01	3.0345E-04	329728.01	6886.55	6.959
429.00	16.770	55020	2.028	6655	1.5785E-01	3.0628E-04	324748.49	6782.55	6.874
429.10	16.711	54827	2.005	6579	1.5931E-01	3.0912E-04	320315.76	6689.97	6.796
429.20	16.653	54636	1.981	6500	1.6078E-01	3.1196E-04	315537.82	6590.18	6.714
429.30	16.595	54447	1.957	6422	1.6224E-01	3.1479E-04	310806.32	6491.36	6.634
429.40	16.538	54260	1.934	6346	1.6369E-01	3.1762E-04	306219.41	6395.56	6.555
429.50	16.482	54074	1.912	6273	1.6515E-01	3.2045E-04	301887.71	6305.09	6.480
429.60	16.426	53890	1.889	6199	1.6661E-01	3.2328E-04	297412.37	6211.62	6.403
429.70	16.370	53708	1.866	6123	1.6807E-01	3.2611E-04	292700.49	6113.21	6.325
429.80	16.315	53528	1.844	6051	1.6952E-01	3.2893E-04	288328.57	6021.90	6.251
429.90	16.261	53349	1.821	5975	1.7098E-01	3.3176E-04	283547.75	5922.05	6.172
430.00	16.207	53173	1.798	5899	1.7243E-01	3.3456E-04	278716.18	5821.14	6.094

TABLE III.- ENTRY-ENVIRONMENT PARAMETERS – Continued

TIME	ALTITUDE		VELOCITY		DENSITY		DYNAMIC PRESSURE		MACH
SEC	KM	FT	KM/SEC	FT/SEC	KG/METER**3	SLUGS/FT**3	NEWTONS/M**2	LBS/FT**2	
430.00	16.207	53173	1.798	5899	1.7243E-01	3.3456E-04	278716.18	5821.14	6.094
430.10	16.154	52998	1.777	5829	1.7387E-01	3.3737E-04	274427.57	5731.57	6.021
430.20	16.101	52825	1.755	5758	1.7532E-01	3.4018E-04	270007.77	5639.26	5.948
430.30	16.049	52655	1.733	5687	1.7675E-01	3.4295E-04	265540.09	5545.95	5.875
430.40	15.998	52486	1.712	5616	1.7819E-01	3.4574E-04	261052.29	5452.22	5.801
430.50	15.947	52320	1.691	5547	1.7960E-01	3.4849E-04	256706.70	5361.46	5.730
430.60	15.897	52156	1.669	5477	1.8102E-01	3.5123E-04	252239.50	5268.16	5.658
430.70	15.848	51995	1.648	5408	1.8242E-01	3.5395E-04	247824.49	5175.95	5.586
430.80	15.800	51836	1.629	5343	1.8381E-01	3.5665E-04	243749.42	5090.84	5.519
430.90	15.752	51679	1.607	5273	1.8520E-01	3.5934E-04	239194.12	4995.70	5.447
431.00	15.705	51525	1.586	5203	1.8657E-01	3.6200E-04	234607.21	4899.90	5.375
431.10	15.659	51374	1.567	5140	1.8792E-01	3.6462E-04	230619.29	4816.61	5.310
431.20	15.613	51225	1.547	5075	1.8926E-01	3.6723E-04	226431.22	4729.14	5.242
431.30	15.569	51078	1.527	5009	1.9060E-01	3.6982E-04	222136.39	4639.44	5.174
431.40	15.525	50935	1.507	4945	1.9191E-01	3.7236E-04	217982.32	4552.68	5.108
431.50	15.482	50793	1.488	4881	1.9321E-01	3.7489E-04	213823.46	4465.82	5.042
431.60	15.440	50655	1.469	4818	1.9449E-01	3.7738E-04	209719.19	4380.10	4.977
431.70	15.398	50519	1.449	4755	1.9576E-01	3.7984E-04	205603.42	4294.14	4.912
431.80	15.357	50385	1.431	4696	1.9702E-01	3.8228E-04	201822.34	4215.17	4.851
431.90	15.318	50255	1.412	4633	1.9825E-01	3.8467E-04	197668.75	4128.42	4.786
432.00	15.278	50126	1.393	4571	1.9948E-01	3.8705E-04	193604.70	4043.54	4.722
432.10	15.240	50000	1.376	4514	2.0068E-01	3.8939E-04	189947.62	3967.16	4.663
432.20	15.202	49876	1.358	4456	2.0187E-01	3.9170E-04	186199.10	3888.87	4.603
432.30	15.165	49755	1.341	4399	2.0305E-01	3.9398E-04	182519.52	3812.02	4.544
432.40	15.129	49635	1.324	4343	2.0422E-01	3.9625E-04	178926.12	3736.97	4.486
432.50	15.093	49517	1.307	4287	2.0537E-01	3.9849E-04	175328.42	3661.83	4.428
432.60	15.057	49401	1.290	4232	2.0652E-01	4.0071E-04	171809.24	3588.33	4.372
432.70	15.023	49287	1.274	4179	2.0765E-01	4.0290E-04	168449.02	3518.15	4.317
432.80	14.988	49174	1.259	4129	2.0877E-01	4.0508E-04	165333.47	3453.08	4.265
432.90	14.954	49062	1.242	4074	2.0989E-01	4.0726E-04	161822.91	3379.76	4.208
433.00	14.921	48952	1.226	4021	2.1100E-01	4.0941E-04	158471.79	3309.77	4.154
433.10	14.887	48843	1.211	3974	2.1210E-01	4.1155E-04	155598.03	3249.75	4.105
433.20	14.854	48735	1.196	3925	2.1320E-01	4.1368E-04	152570.58	3186.52	4.054
433.30	14.822	48628	1.182	3877	2.1429E-01	4.1580E-04	149625.96	3125.02	4.005
433.40	14.789	48521	1.167	3830	2.1540E-01	4.1794E-04	146769.44	3065.36	3.956
433.50	14.757	48415	1.153	3783	2.1649E-01	4.2006E-04	143917.23	3005.79	3.908
433.60	14.725	48310	1.139	3738	2.1758E-01	4.2218E-04	141221.58	2949.49	3.861
433.70	14.693	48206	1.126	3693	2.1867E-01	4.2428E-04	138529.29	2893.26	3.815
433.80	14.661	48101	1.113	3653	2.1977E-01	4.2642E-04	136227.22	2845.18	3.773
433.90	14.629	47997	1.099	3607	2.2087E-01	4.2855E-04	133480.34	2787.81	3.726
434.00	14.598	47894	1.086	3563	2.2195E-01	4.3066E-04	130887.16	2733.65	3.680
434.10	14.567	47791	1.074	3525	2.2305E-01	4.3279E-04	128743.10	2688.87	3.641
434.20	14.535	47688	1.062	3484	2.2415E-01	4.3493E-04	126386.92	2639.66	3.599
434.30	14.504	47585	1.050	3445	2.2526E-01	4.3708E-04	124183.48	2593.64	3.559
434.40	14.473	47482	1.038	3407	2.2638E-01	4.3924E-04	122059.05	2549.27	3.519
434.50	14.441	47379	1.027	3369	2.2749E-01	4.4141E-04	119941.32	2505.04	3.480
434.60	14.410	47276	1.016	3332	2.2862E-01	4.4359E-04	117900.67	2462.42	3.442
434.70	14.379	47174	1.004	3295	2.2974E-01	4.4576E-04	115860.98	2419.82	3.404
434.80	14.348	47072	.994	3262	2.3086E-01	4.4794E-04	114107.14	2383.19	3.370
434.90	14.316	46970	.983	3224	2.3199E-01	4.5013E-04	112009.51	2339.38	3.330
435.00	14.285	46868	.971	3186	2.3312E-01	4.5233E-04	109920.03	2295.74	3.291

TABLE III.- ENTRY-ENVIRONMENT PARAMETERS – Concluded

TIME	ALTITUDE		VELOCITY		DENSITY		DYNAMIC PRESSURE		MACH
SEC	KM	FT	KM/SEC	FT/SEC	KG/METER**3	SLUGS/FT**3	NEWTONS/M**2	LBS/FT**2	
435.00	14.285	46868	.971	3186	2.3312E-01	4.5233E-04	109920.03	2295.74	3.291
435.10	14.254	46766	.962	3155	2.3426E-01	4.5454E-04	108318.45	2262.29	3.259
435.20	14.223	46665	.951	3121	2.3540E-01	4.5675E-04	106510.02	2224.52	3.224
435.30	14.193	46564	.941	3087	2.3654E-01	4.5896E-04	104706.86	2186.86	3.189
435.40	14.162	46463	.931	3055	2.3768E-01	4.6118E-04	103043.98	2152.13	3.156
435.50	14.131	46363	.921	3023	2.3882E-01	4.6339E-04	101380.63	2117.39	3.123
435.60	14.101	46263	.912	2991	2.3997E-01	4.6562E-04	99721.59	2082.74	3.090
435.70	14.070	46163	.902	2959	2.4112E-01	4.6785E-04	98067.34	2048.19	3.057
435.80	14.040	46063	.893	2931	2.4227E-01	4.7009E-04	96681.69	2019.25	3.028
435.90	14.010	45964	.883	2898	2.4343E-01	4.7233E-04	94965.67	1983.41	2.994
436.00	13.980	45865	.874	2866	2.4458E-01	4.7457E-04	93320.99	1949.06	2.961
436.10	13.949	45766	.866	2840	2.4574E-01	4.7682E-04	92070.85	1922.95	2.934
436.20	13.920	45668	.856	2810	2.4690E-01	4.7907E-04	90559.75	1891.39	2.903
436.30	13.889	45569	.848	2783	2.4807E-01	4.8134E-04	89249.76	1864.03	2.875
436.40	13.860	45471	.840	2755	2.4924E-01	4.8360E-04	87873.69	1835.29	2.846
436.50	13.830	45373	.831	2728	2.5041E-01	4.8588E-04	86564.65	1807.95	2.818
436.60	13.800	45275	.823	2701	2.5159E-01	4.8816E-04	85258.96	1780.68	2.790
436.70	13.770	45177	.816	2676	2.5277E-01	4.9045E-04	84081.11	1756.08	2.764
436.80	13.740	45078	.809	2653	2.5397E-01	4.9278E-04	83034.45	1734.22	2.740
436.90	13.710	44980	.800	2626	2.5516E-01	4.9510E-04	81735.47	1707.09	2.713
437.00	13.680	44882	.792	2600	2.5636E-01	4.9743E-04	80501.60	1681.32	2.686
437.10	13.650	44783	.786	2579	2.5758E-01	4.9979E-04	79582.78	1662.13	2.664
437.20	13.620	44685	.779	2555	2.5879E-01	5.0214E-04	78475.32	1639.00	2.639
437.30	13.590	44586	.771	2531	2.6002E-01	5.0452E-04	77373.60	1615.99	2.614
437.40	13.560	44487	.765	2509	2.6126E-01	5.0692E-04	76395.89	1595.57	2.592
437.50	13.530	44389	.758	2486	2.6248E-01	5.0930E-04	75354.02	1573.81	2.568
437.60	13.500	44290	.751	2463	2.6373E-01	5.1172E-04	74317.42	1552.16	2.544
437.70	13.470	44192	.743	2439	2.6497E-01	5.1413E-04	73218.57	1529.21	2.519
437.80	13.440	44094	.737	2417	2.6622E-01	5.1655E-04	72241.82	1508.81	2.497
437.90	13.410	43997	.729	2391	2.6746E-01	5.1895E-04	71025.19	1483.40	2.470
438.00	13.381	43900	.721	2365	2.6870E-01	5.2136E-04	69811.91	1458.06	2.443
438.10	13.351	43804	.714	2344	2.6994E-01	5.2377E-04	68893.57	1438.88	2.421
438.20	13.322	43708	.707	2321	2.7118E-01	5.2618E-04	67859.37	1417.28	2.398
438.30	13.294	43614	.700	2296	2.7240E-01	5.2855E-04	66704.98	1393.17	2.372
438.40	13.265	43520	.692	2270	2.7363E-01	5.3093E-04	65496.49	1367.93	2.345
438.50	13.237	43428	.684	2244	2.7484E-01	5.3328E-04	64287.52	1342.68	2.318
438.60	13.209	43337	.676	2218	2.7604E-01	5.3560E-04	63080.46	1317.47	2.291
438.70	13.182	43248	.668	2191	2.7722E-01	5.3789E-04	61816.91	1291.08	2.263
438.80	13.155	43160	.660	2166	2.7839E-01	5.4016E-04	60669.23	1267.11	2.237
438.90	13.129	43075	.651	2136	2.7952E-01	5.4236E-04	59240.49	1237.27	2.206
439.00	13.104	42991	.641	2104	2.8065E-01	5.4455E-04	57710.72	1205.32	2.173
439.10	13.079	42910	.633	2078	2.8174E-01	5.4666E-04	56511.81	1180.28	2.147
439.20	13.055	42831	.624	2049	2.8281E-01	5.4874E-04	55099.83	1150.79	2.116
439.30	13.031	42754	.616	2020	2.8385E-01	5.5076E-04	53801.32	1123.67	2.087
439.40	13.009	42680	.607	1991	2.8486E-01	5.5272E-04	52453.02	1095.51	2.057
439.50	12.987	42608	.598	1961	2.8584E-01	5.5462E-04	51059.71	1066.41	2.026
439.60	12.966	42538	.589	1932	2.8680E-01	5.5649E-04	49727.21	1038.58	1.996
439.70	12.945	42471	.580	1904	2.8772E-01	5.5827E-04	48451.69	1011.94	1.967
439.80	12.925	42406	.572	1878	2.8862E-01	5.6001E-04	47284.37	987.56	1.940
439.90	12.906	42344	.563	1848	2.8948E-01	5.6168E-04	45921.71	959.10	1.909
440.00	12.888	42284	.554	1819	2.9031E-01	5.6329E-04	44619.85	931.91	1.879

TABLE IV.- SPACECRAFT PERFORMANCE INSTRUMENTS

Instrument	Measurement	Response, Hz	IRIG channel number	Range	Error
Sun sensor	Roll frequency	20.0	5	--------------	-------------
Gyro	Roll velocity, p	8.4	2	0 to 26 rad/sec	±0.26 rad/sec
Gyro	Pitch velocity, q	26	6	3 to -3 rad/sec	±0.06 rad/sec
Gyro	Yaw velocity, r	11	3	3 to -3 rad/sec	±0.06 rad/sec
Accelerometer	Axial acceleration, a_X	59	9	1 to -2	±0.03
Accelerometer	Axial acceleration, a_X	160	12	25 to -60	±0.85
Accelerometer	Side acceleration, a_Y	45	8	(1) 1 to -1 (2) ±1 to ±5 (3) ±5 to ±30	±0.06 ±0.24 ±1.50
Accelerometer	Normal acceleration, a_N	35	7	(1) 1 to -1 (2) ±1 to ±5 (3) ±5 to ±30	±0.06 ±0.24 ±1.50

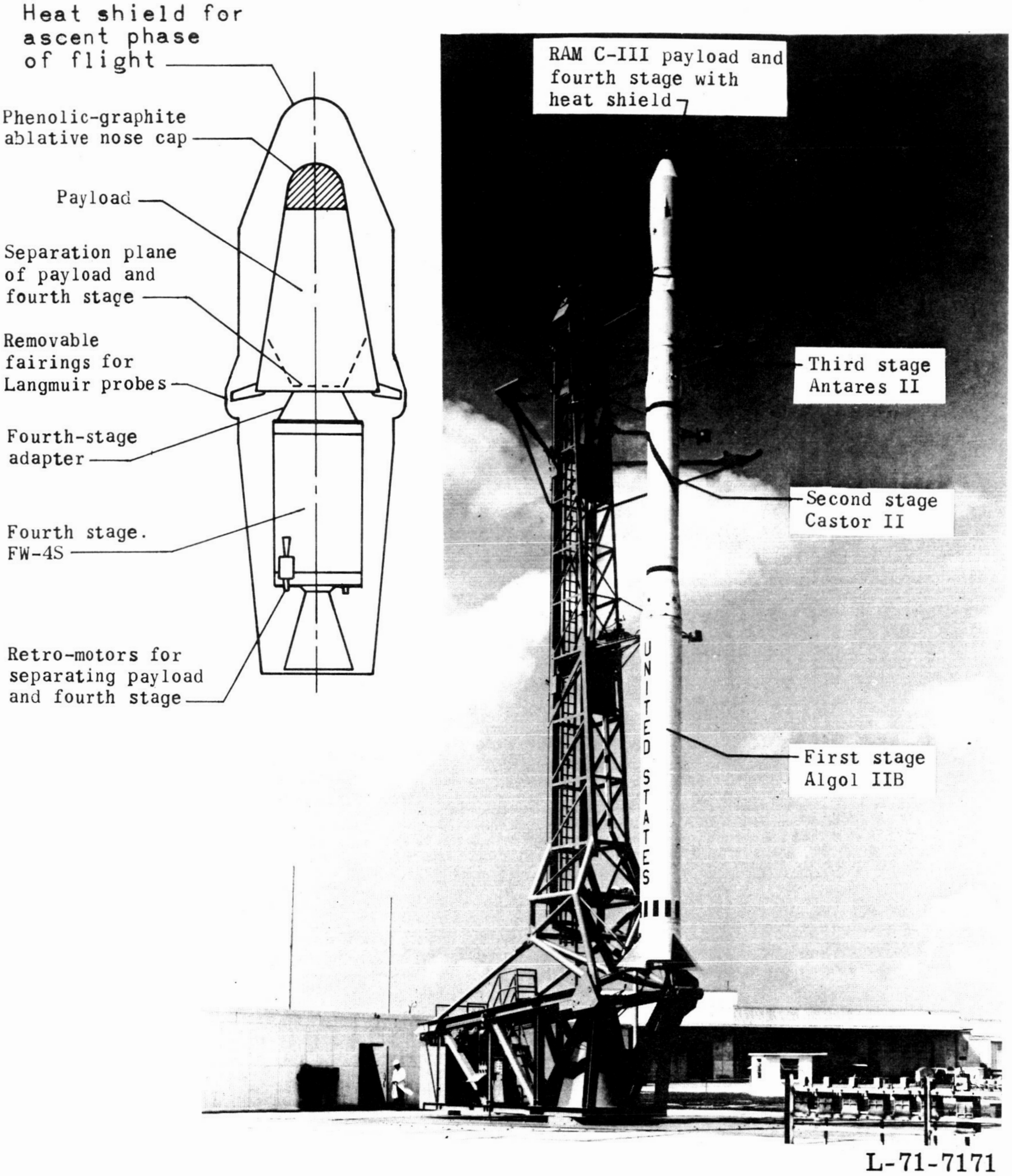
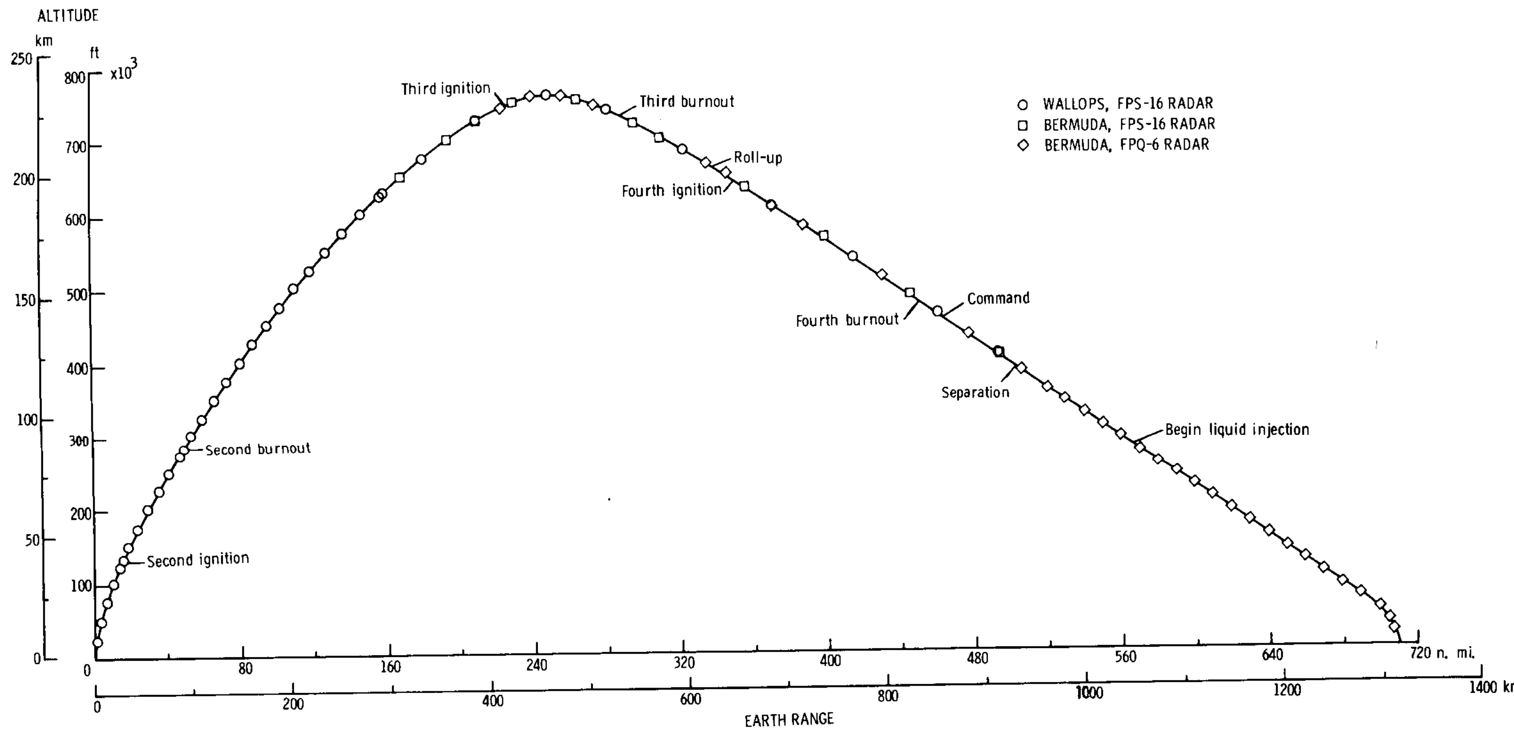
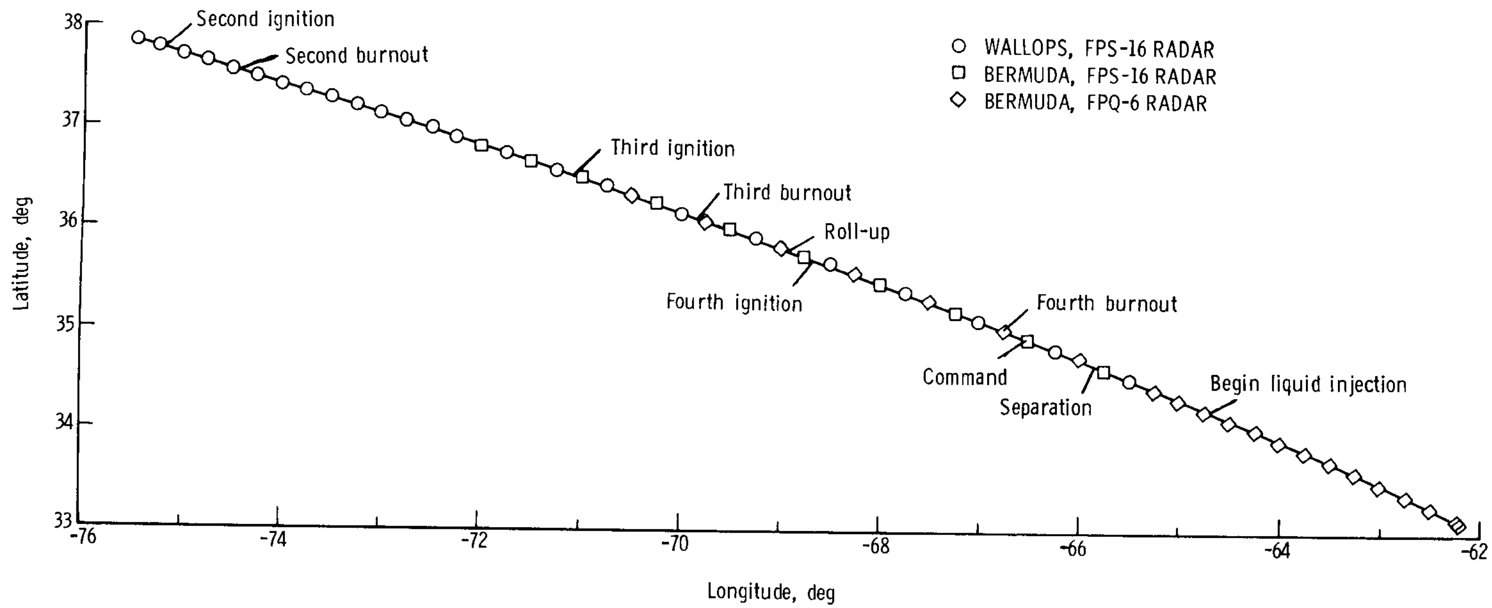


Figure 1.- Boost vehicle and spacecraft for RAM C-III flight.



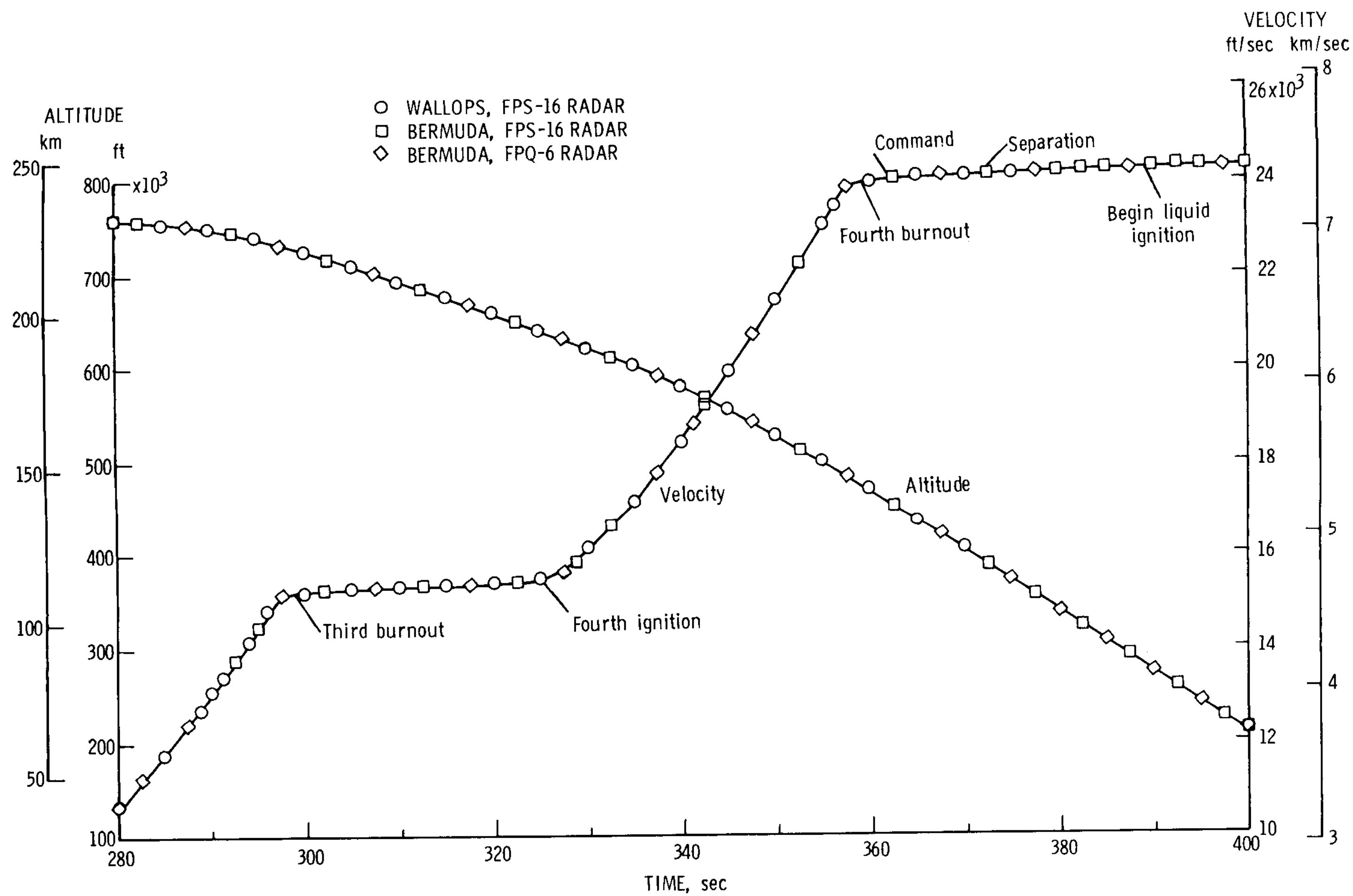
(a) Altitude and earth range.

Figure 2.- Boost trajectory.



(b) Ground track.

Figure 2.- Continued.



(c) Altitude and velocity (partial trajectory).

Figure 2.- Concluded.

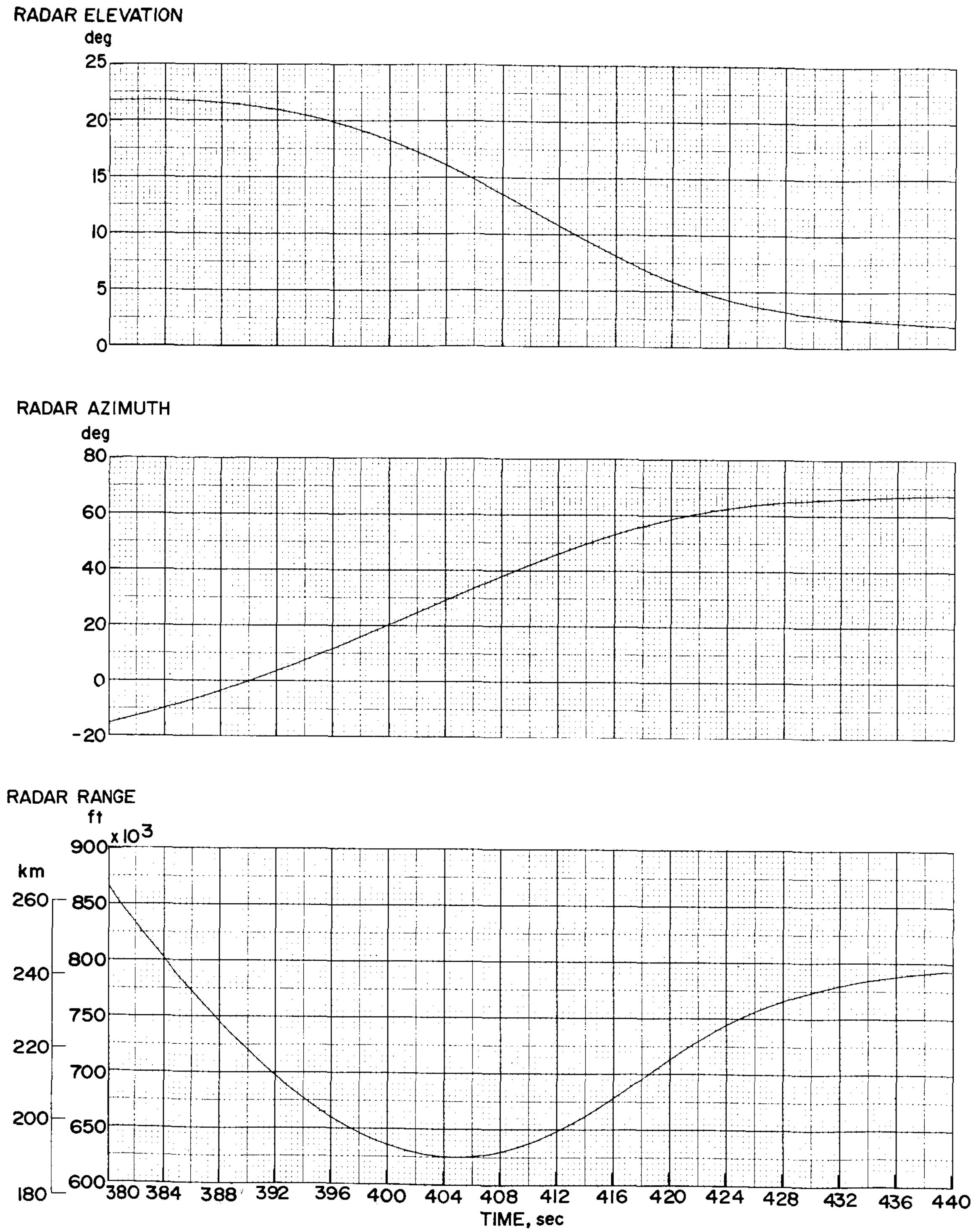
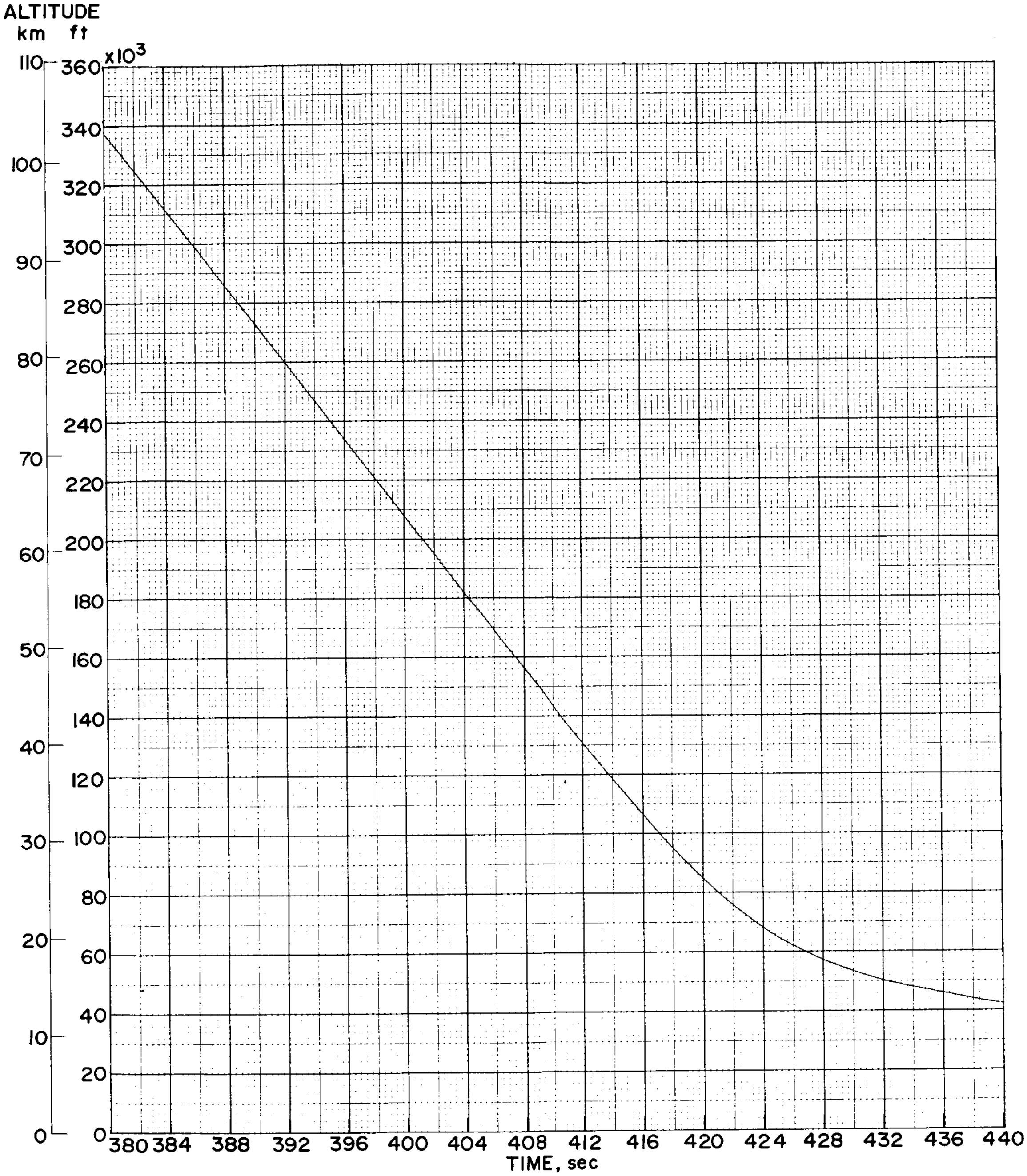
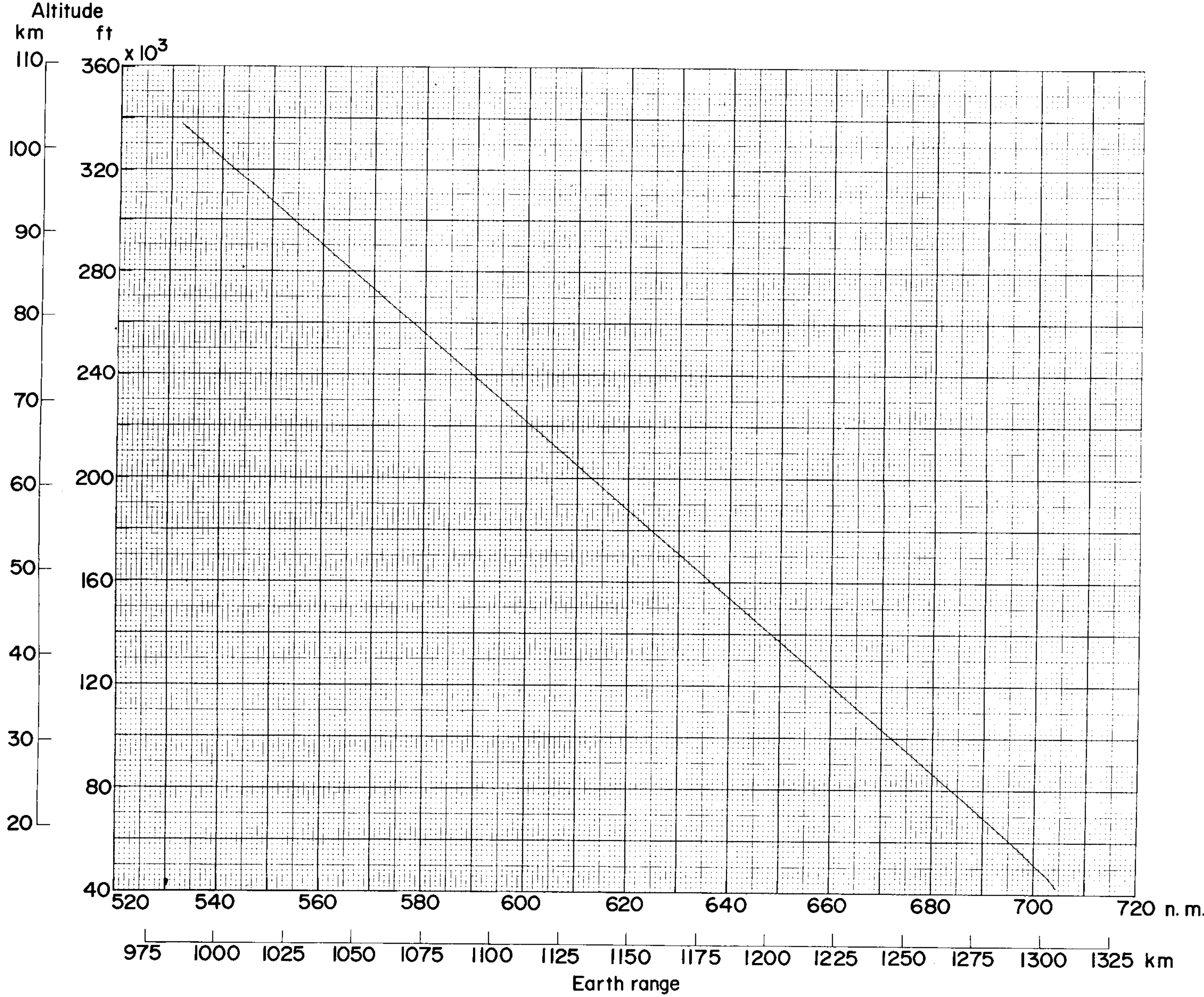


Figure 3.- Spacecraft position relative to AN/FPQ-6 radar at Bermuda.



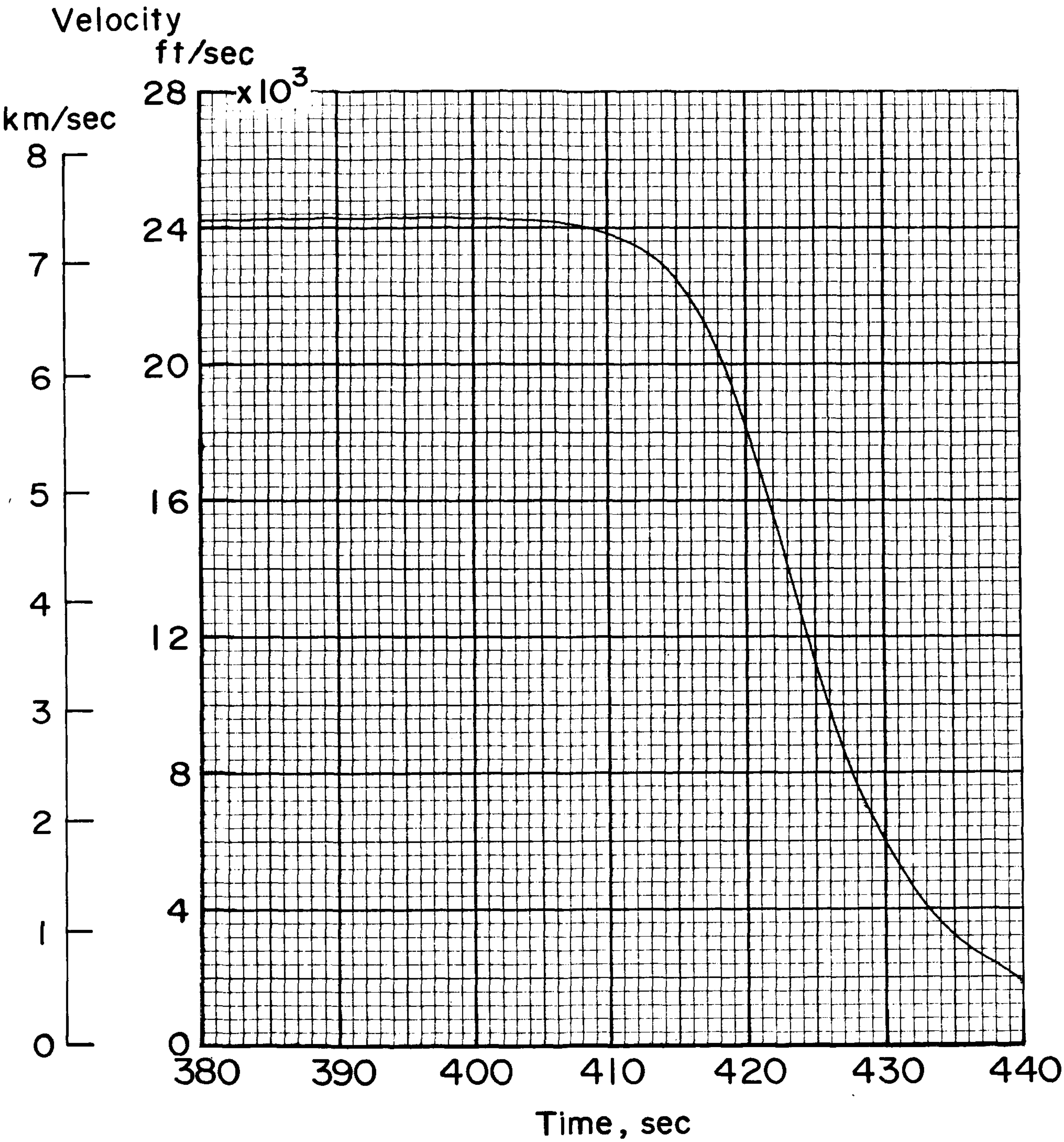
(a) Altitude vs time.

Figure 4.- Entry trajectory parameters.



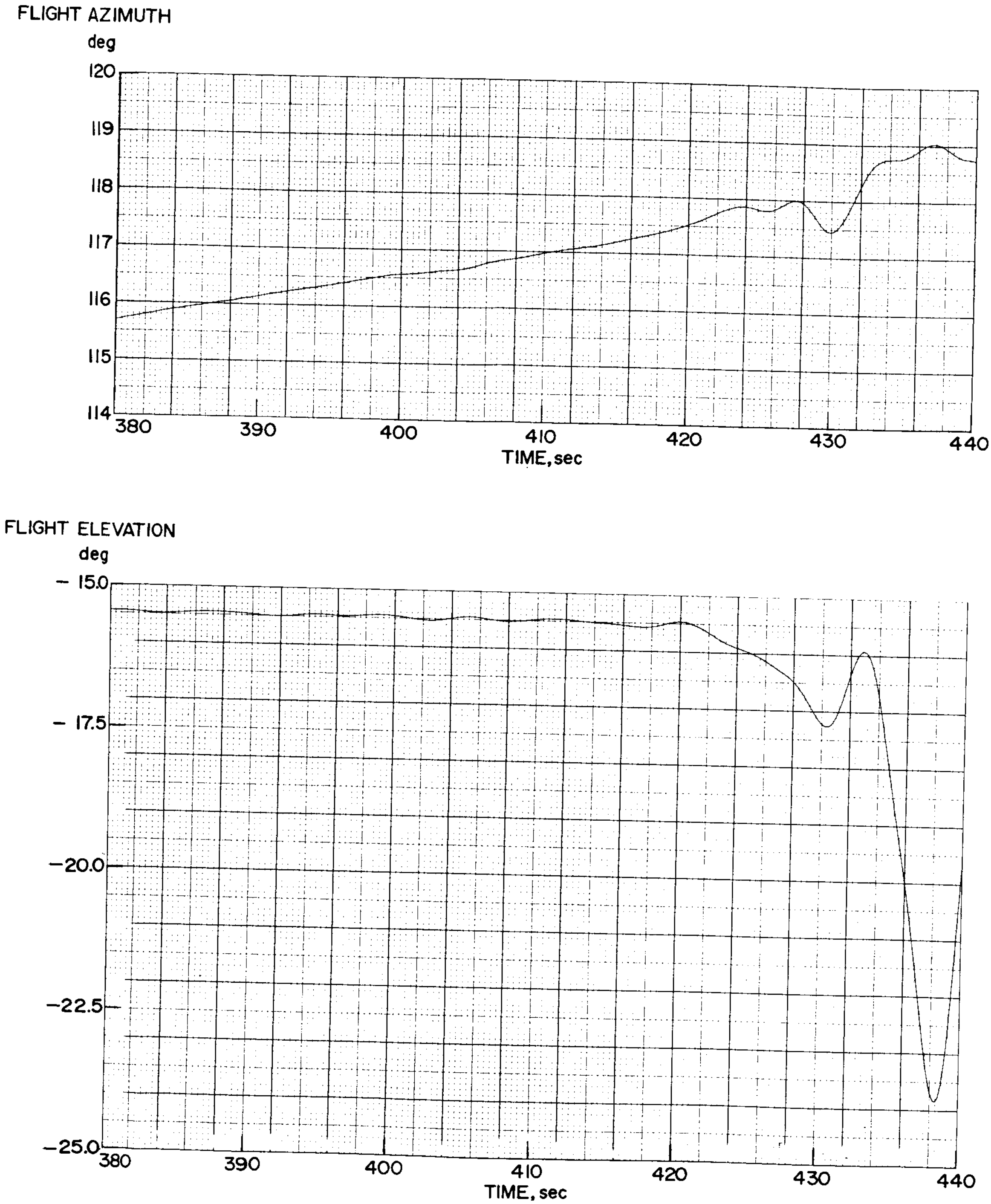
(b) Altitude vs earth range.

Figure 4.- Continued.



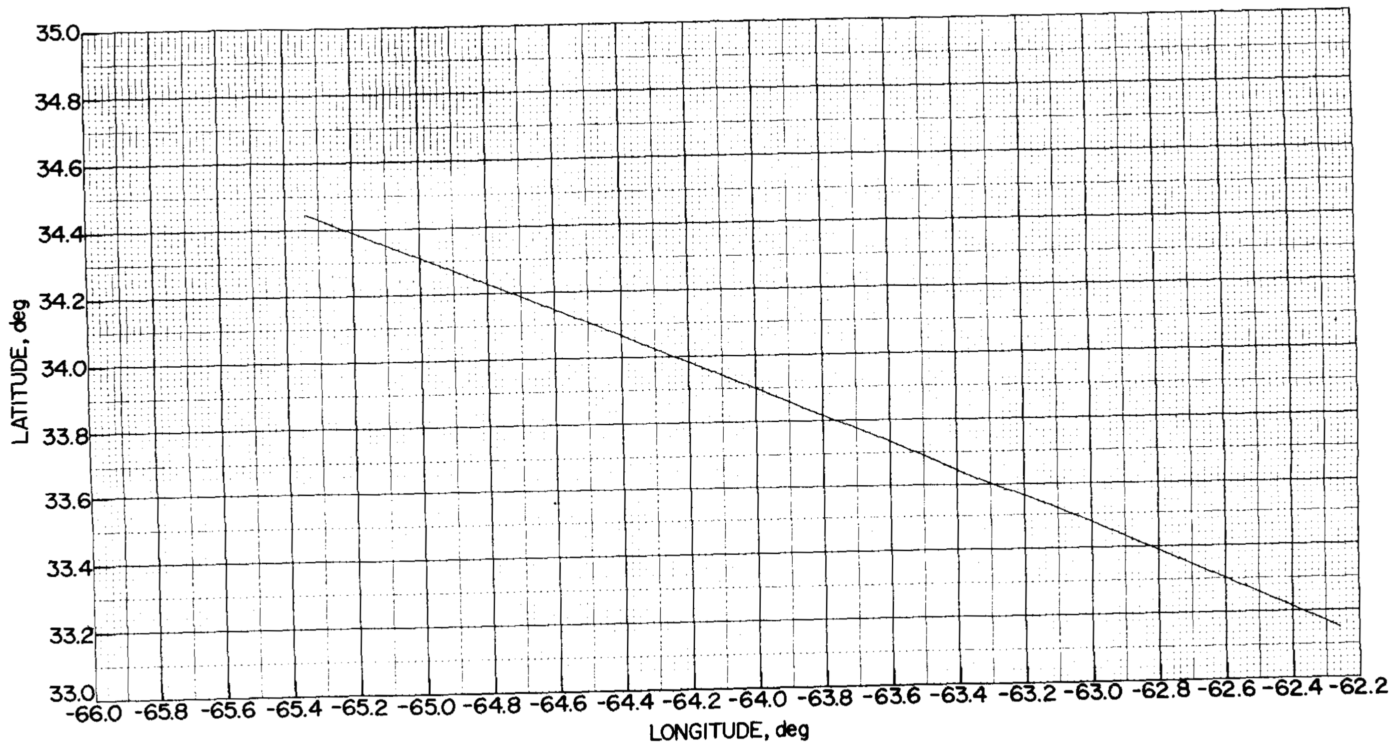
(c) Velocity.

Figure 4.- Continued.



(d) Flight azimuth and elevation angle.

Figure 4.- Continued.



(e) Ground track.

Figure 4.- Concluded.

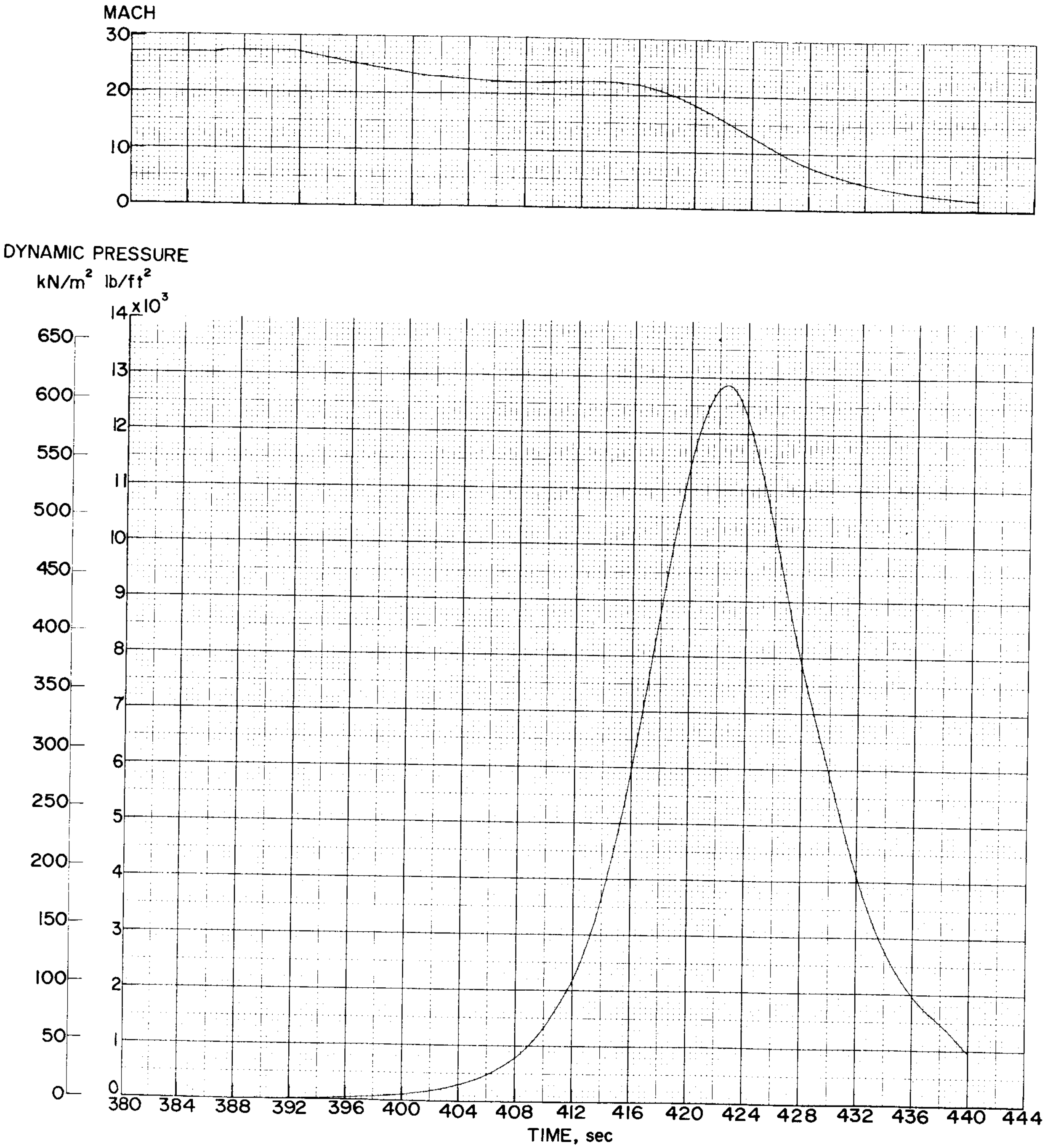


Figure 5.- Dynamic pressure and Mach number.

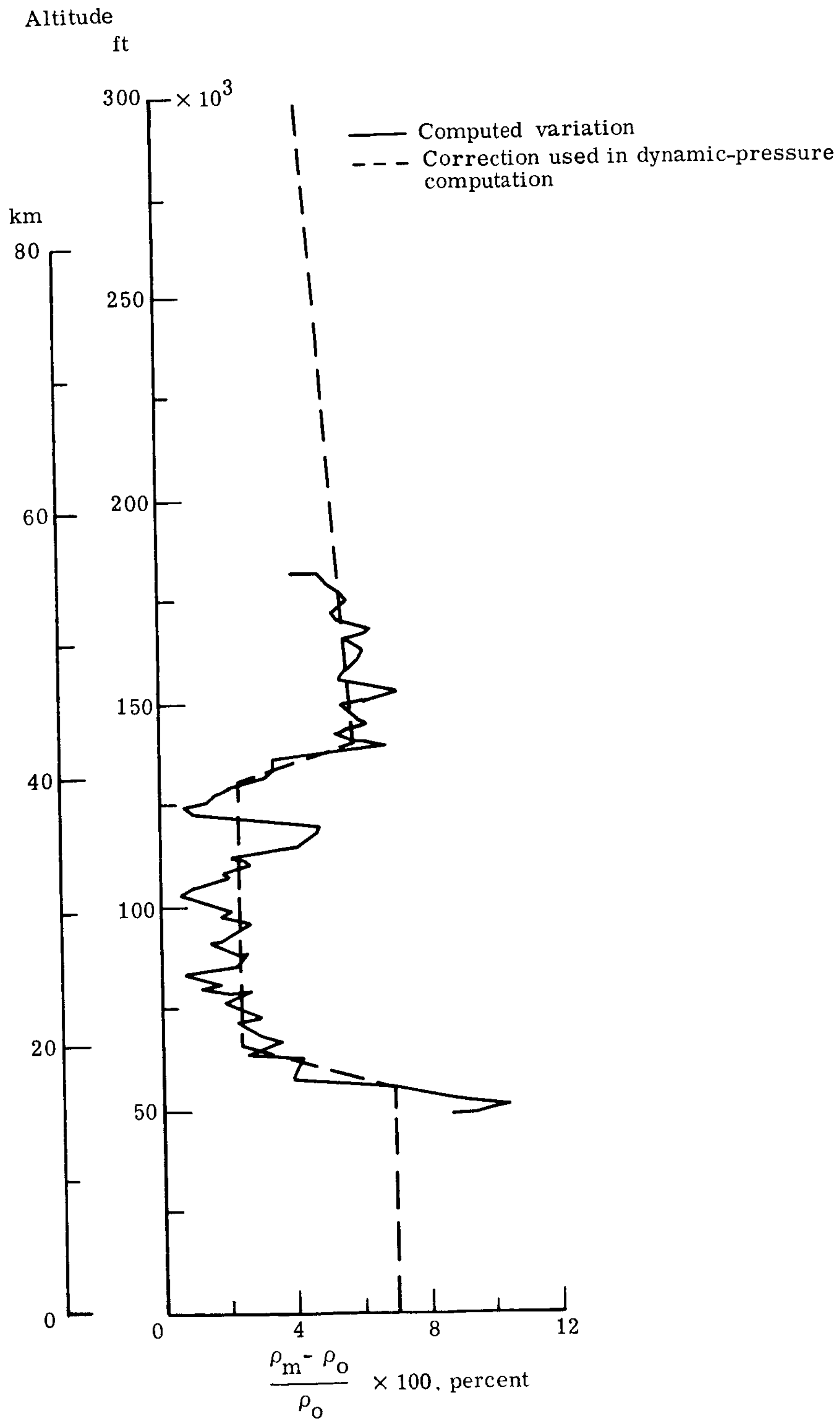
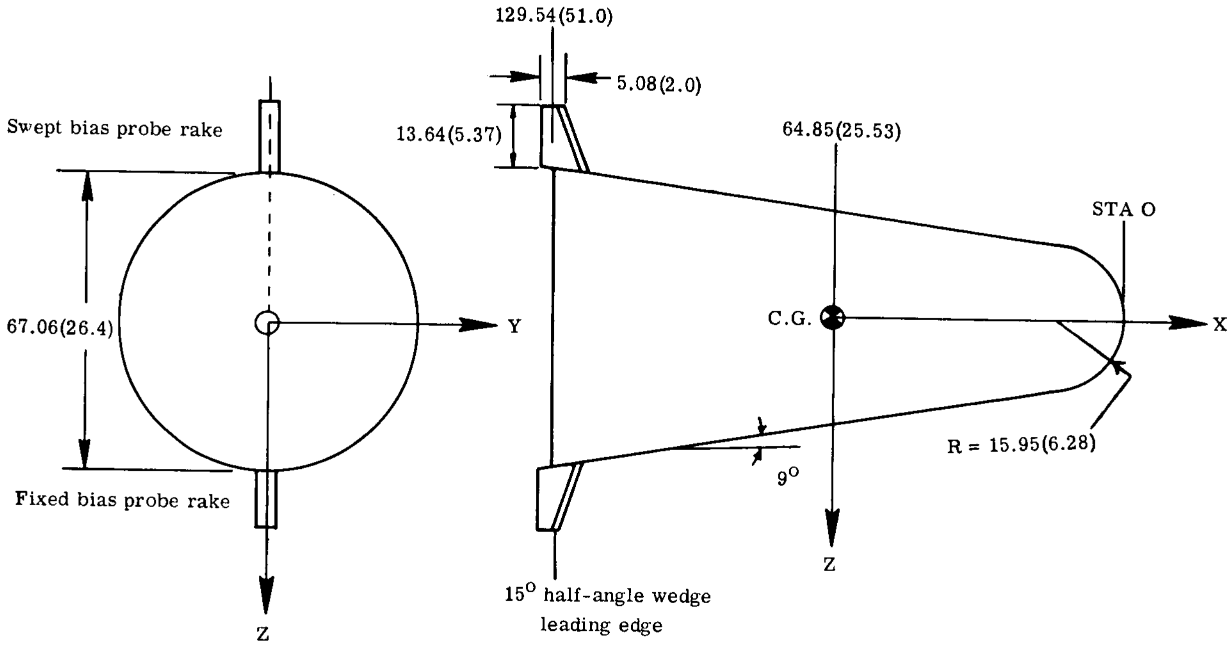


Figure 6.- Variation of computed atmospheric density from standard. $\left(\rho_o\right.$ from 1962 Standard Atmosphere; ρ_m based on temperature measured the day of launch.$\left.\right)$

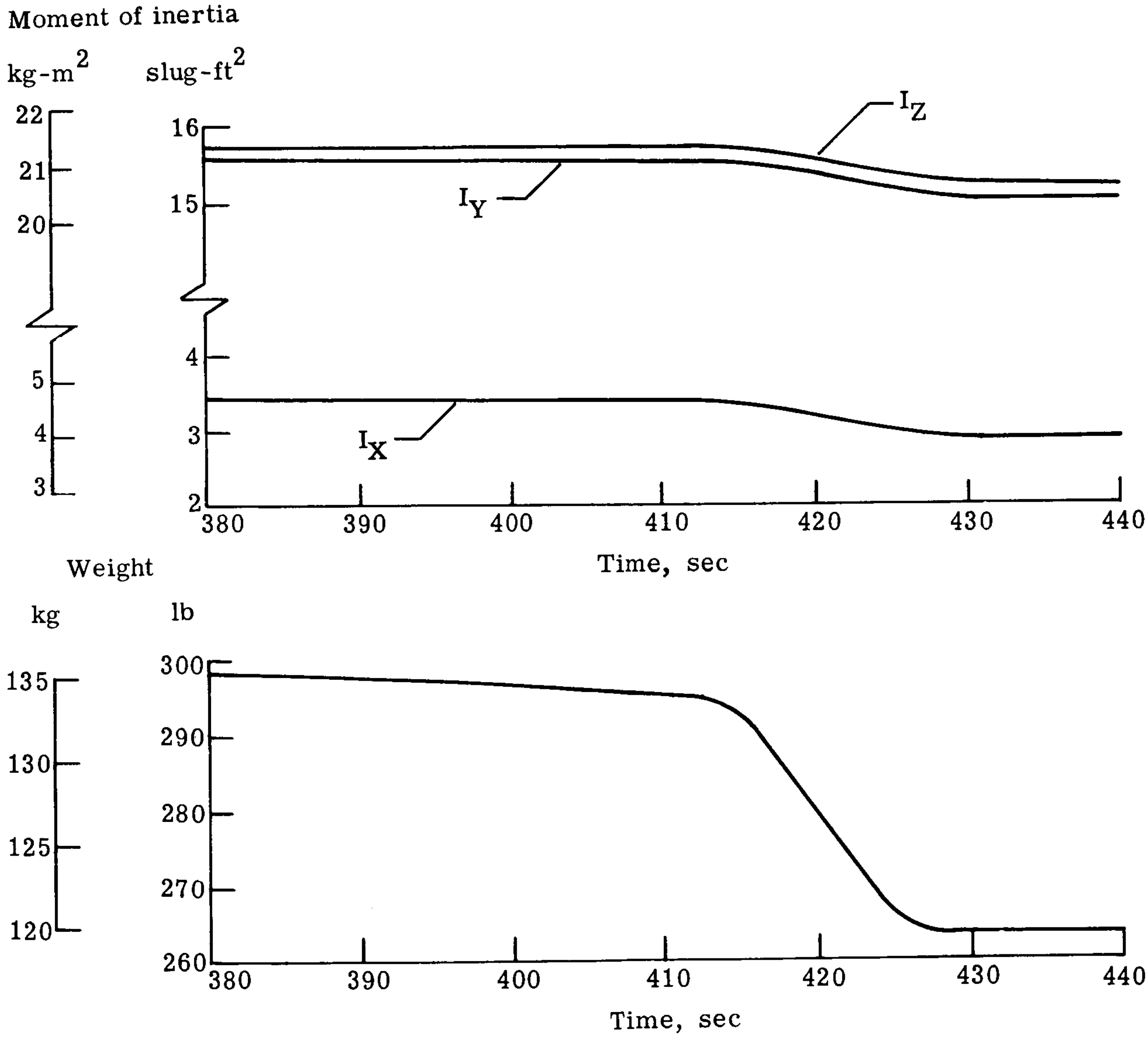


(a) Sketch of RAM C-III spacecraft. (Dimensions in cm and parenthetically in inches.)

W		I_X		I_Y		I_Z	
kg	lb	kg-m2	slug-ft2	kg-m2	slug-ft2	kg-m2	slug-ft2
135	298	4.7	3.5	21.2	15.6	21.3	15.7

(b) Preflight-measured weight and moments of inertia at entry.

Figure 7.- Spacecraft geometry, weight, and moments of inertia.



(c) Preflight-computed histories of weight and moments of inertia.

Figure 7.- Concluded.

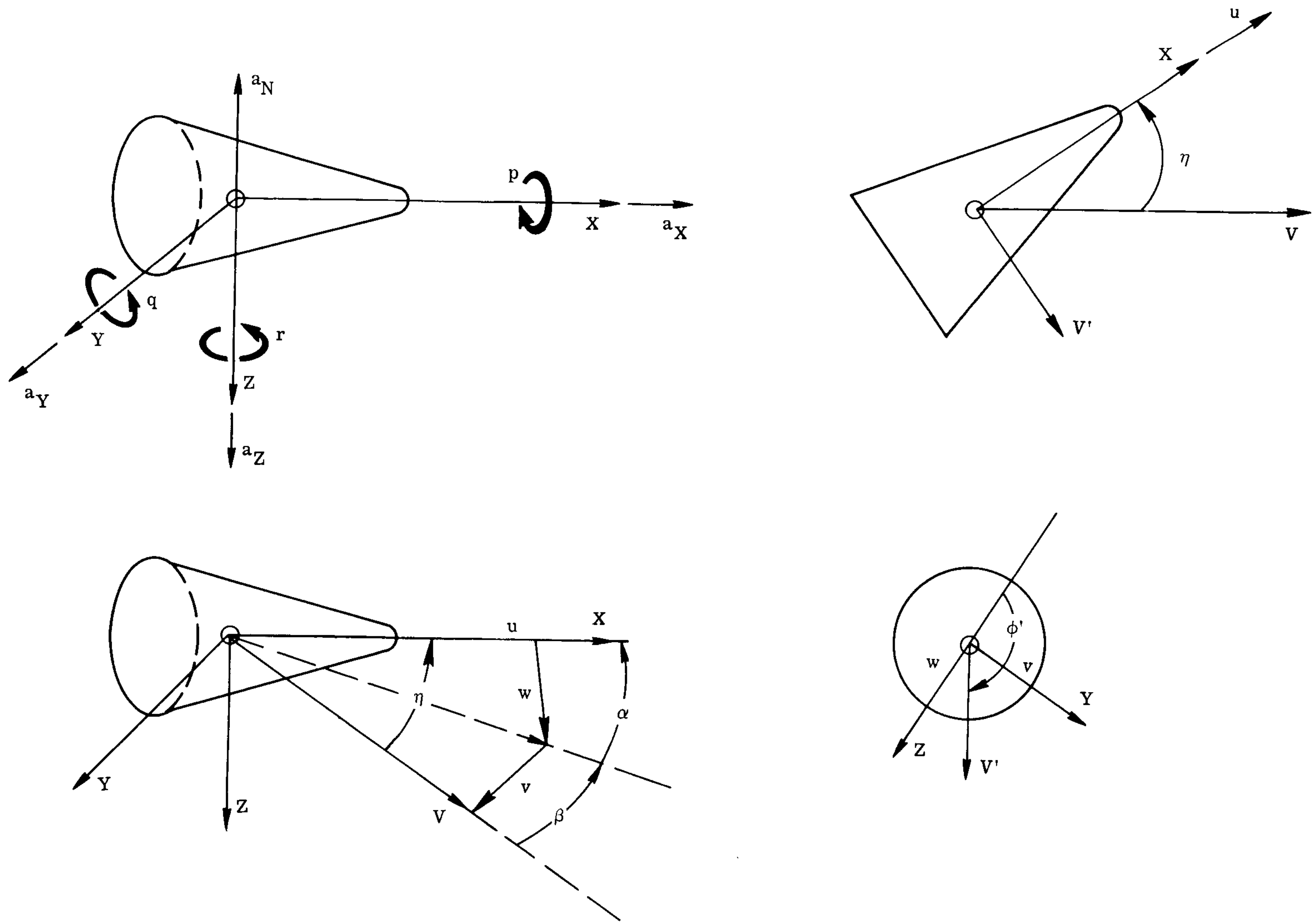
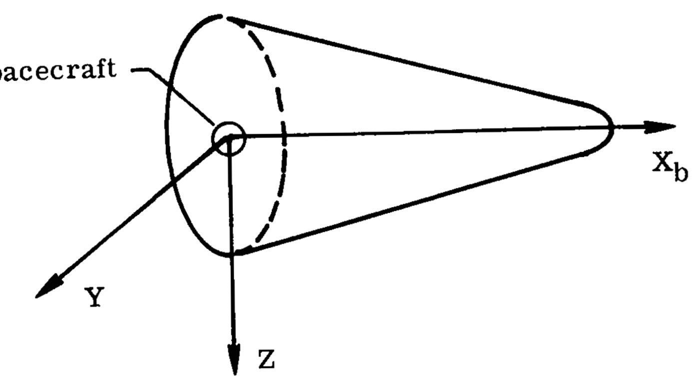


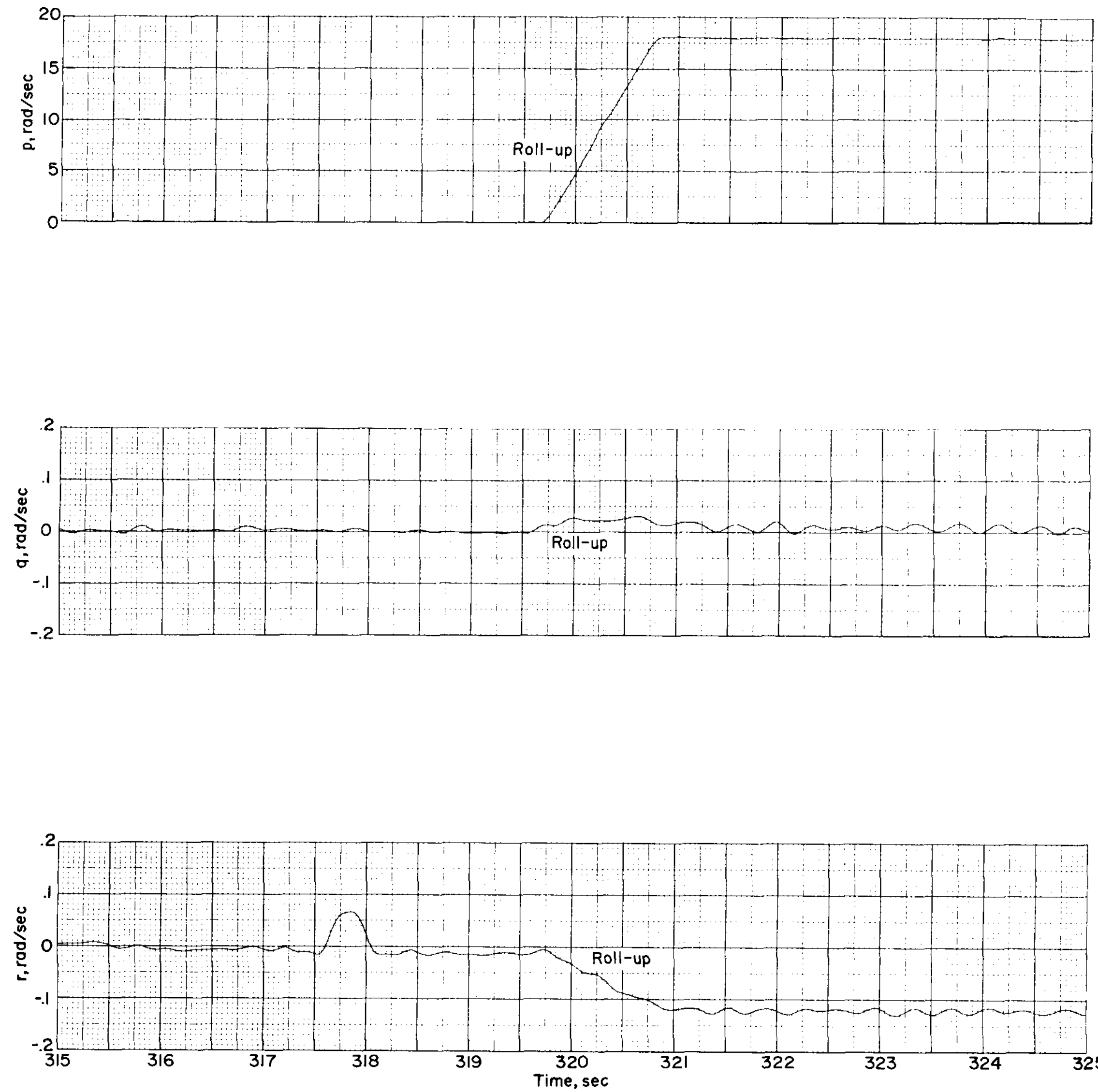
Figure 8.- Velocity-vector orientation relative to body axis system.



Axis system

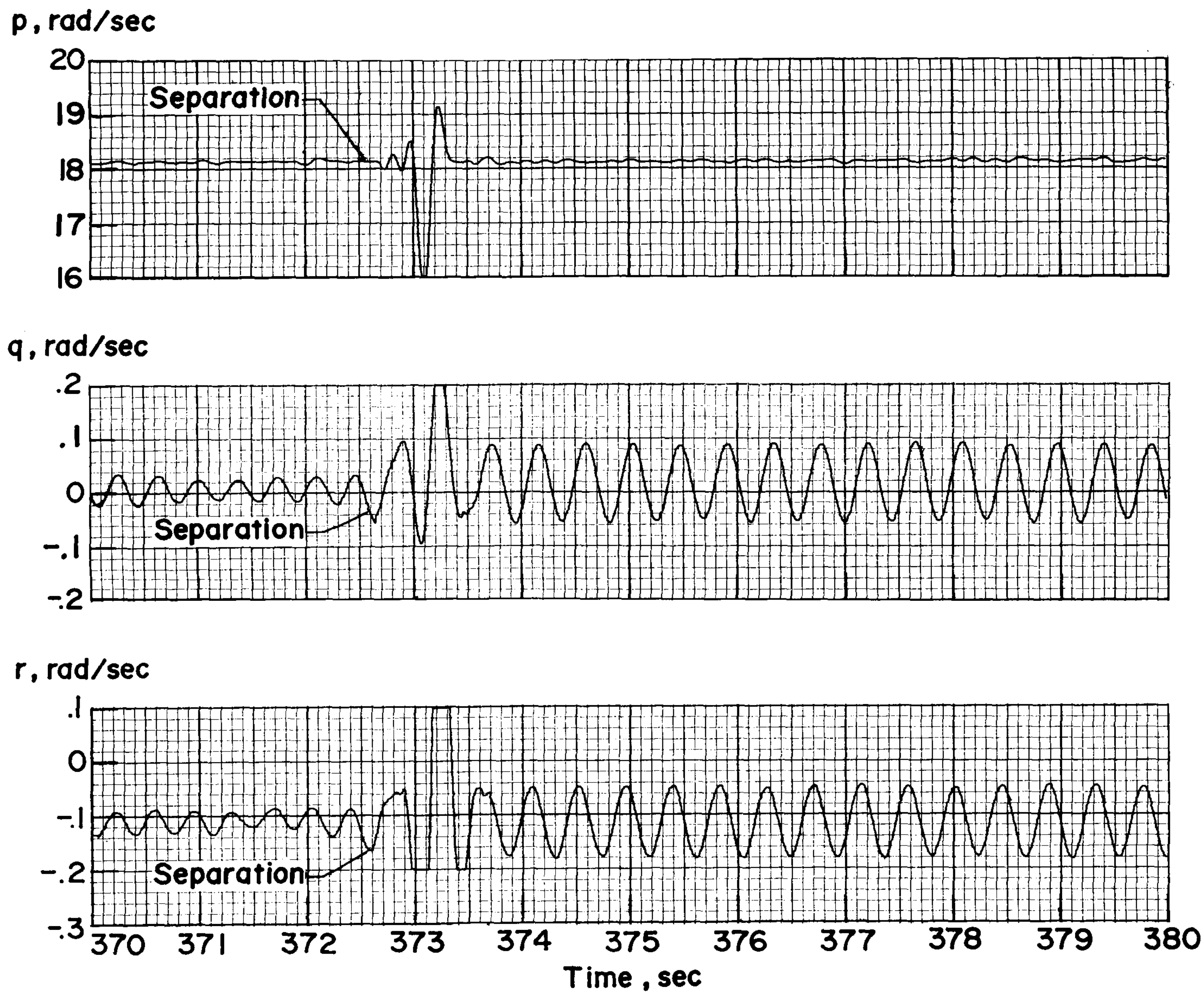
	x_b		y		z	
	cm	in.	cm	in.	cm	in.
Roll gyro	79.53	31.31	-3.43	-1.35	0	0
Pitch gyro	76.84	30.25	0	0	4.83	1.90
Yaw gyro	76.84	30.25	0	0	-4.83	-1.90
Axial accelerometer (low)	63.32	24.93	0	0	5.08	2.00
Axial accelerometer (high)	63.32	24.93	0	0	-5.08	-2.00
Side accelerometer	66.01	25.99	-1.40	-0.55	0	0
Normal accelerometer	66.98	26.37	0	0	-0.61	-0.24

Figure 9.- Instrument locations on spacecraft.



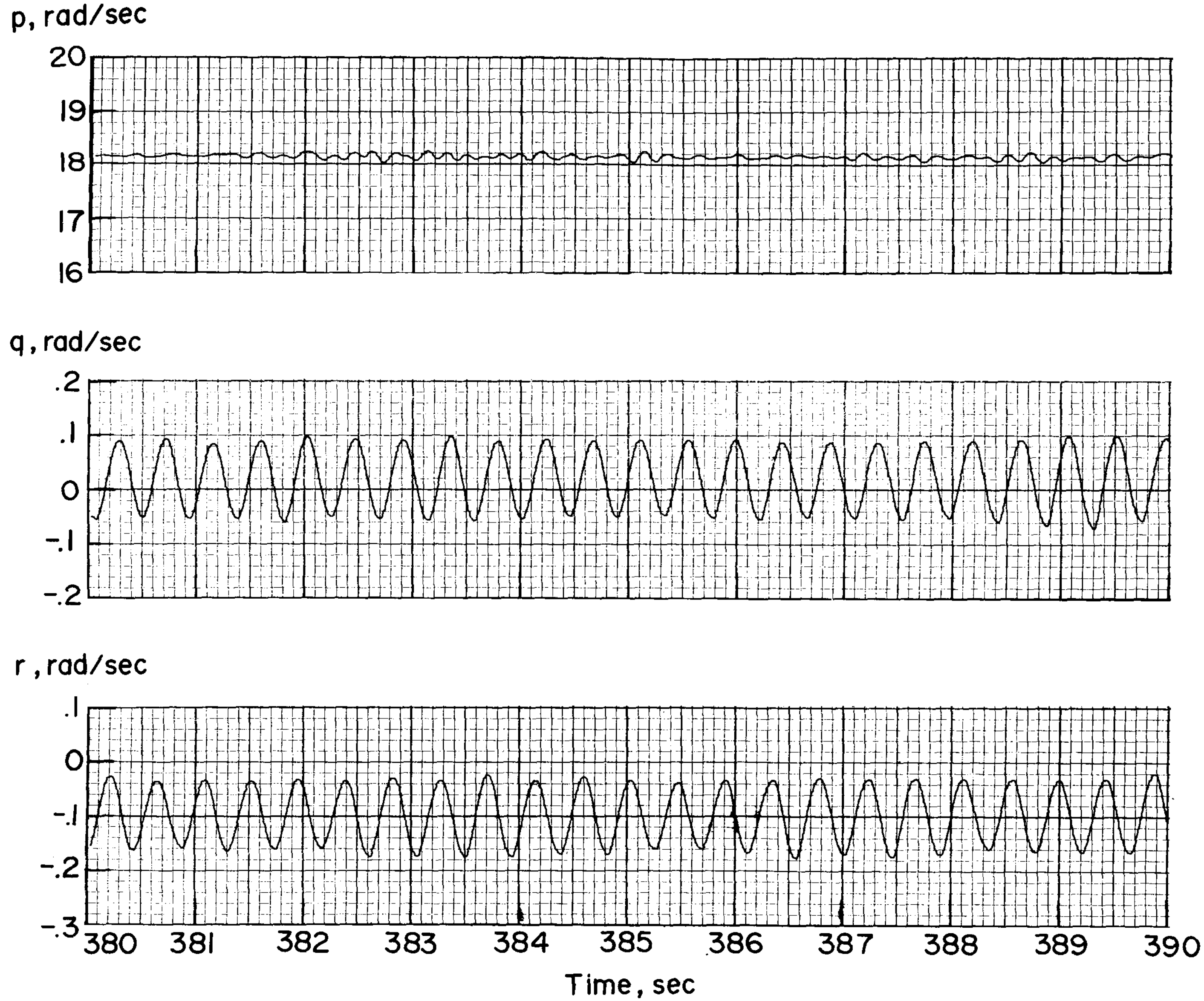
(a) 315 to 325 seconds.

Figure 10.- Spacecraft rotation rates.



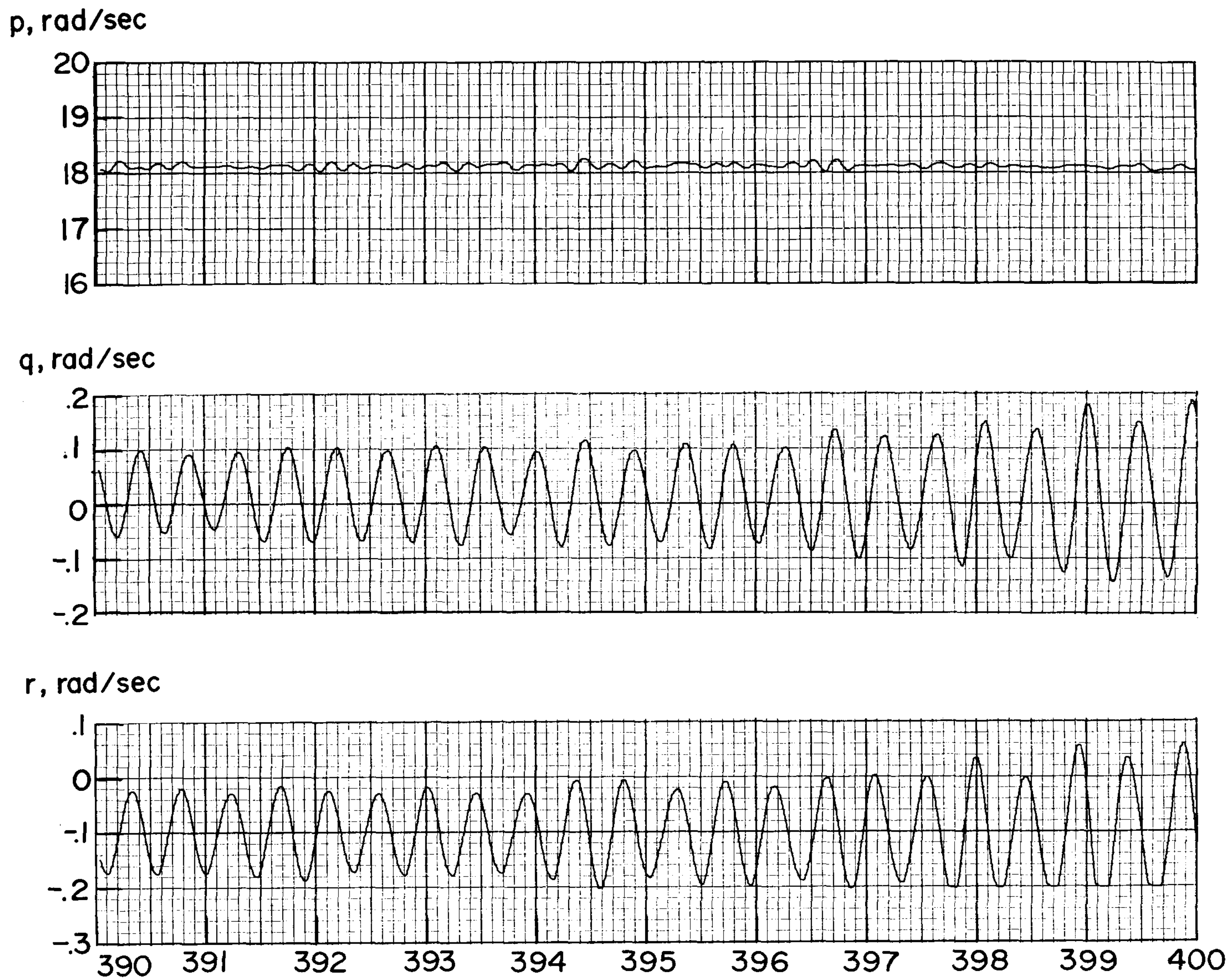
(b) 370 to 380 seconds.

Figure 10.- Continued.



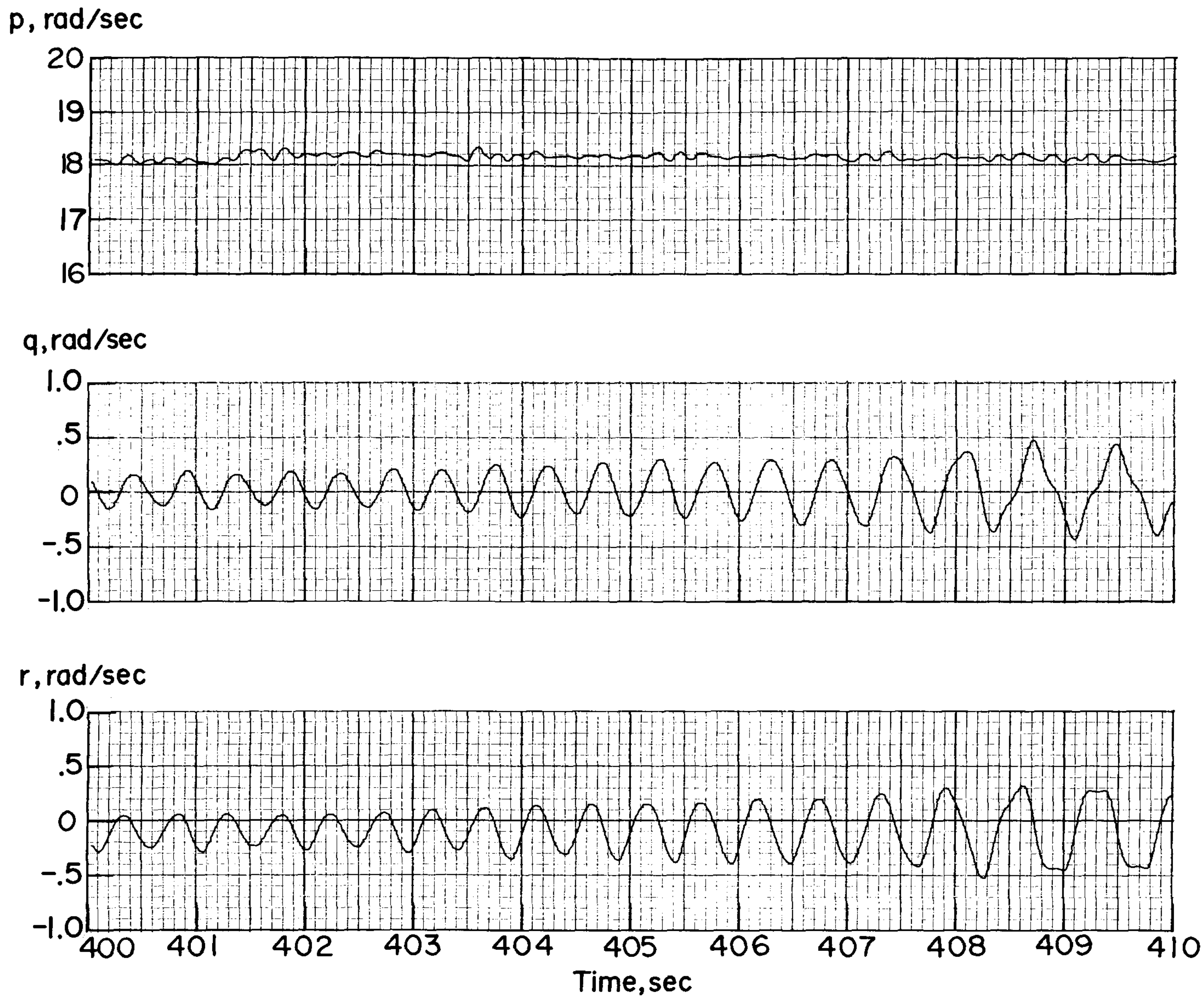
(c) 380 to 390 seconds.

Figure 10.- Continued.



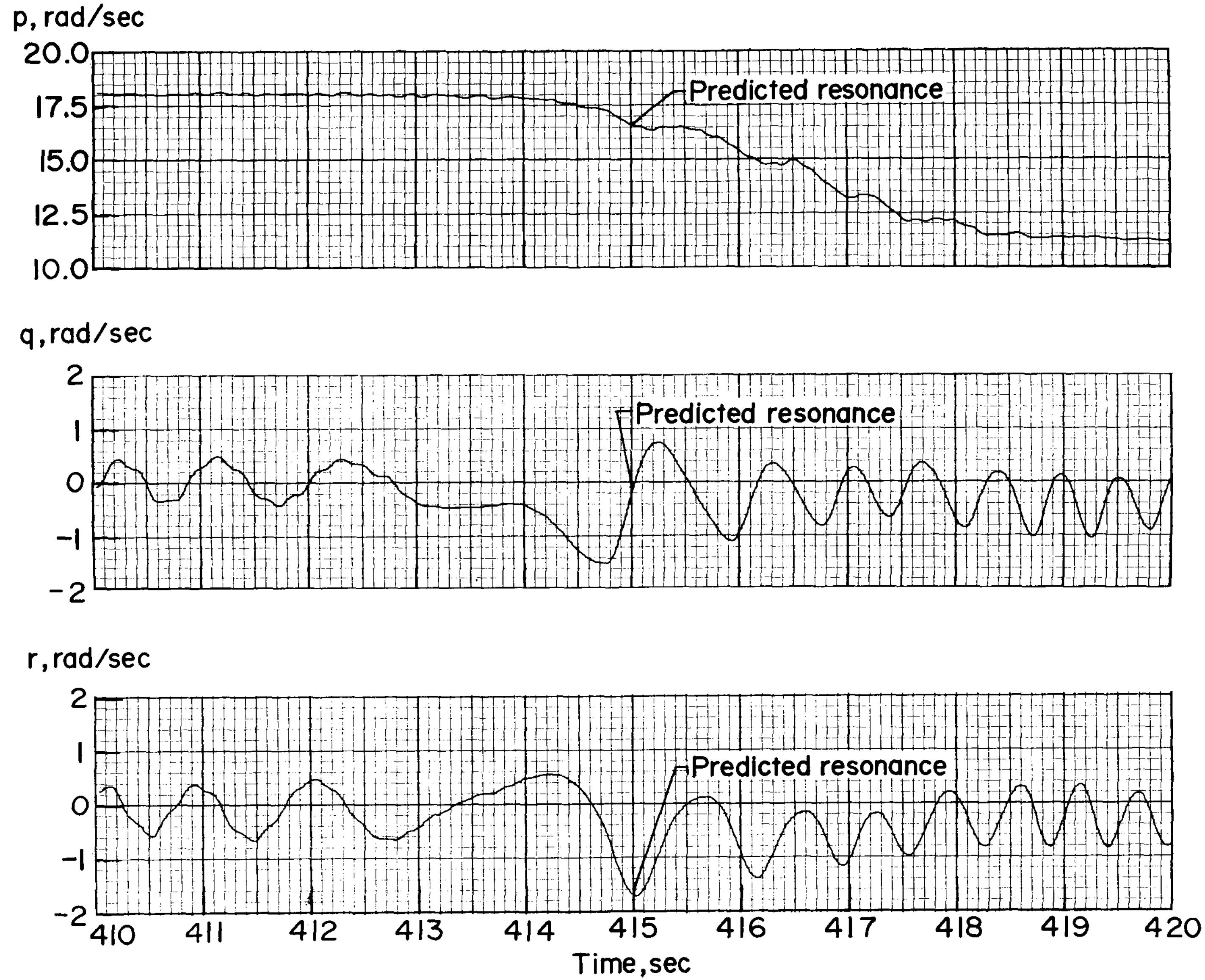
(d) 390 to 400 seconds.

Figure 10.- Continued.



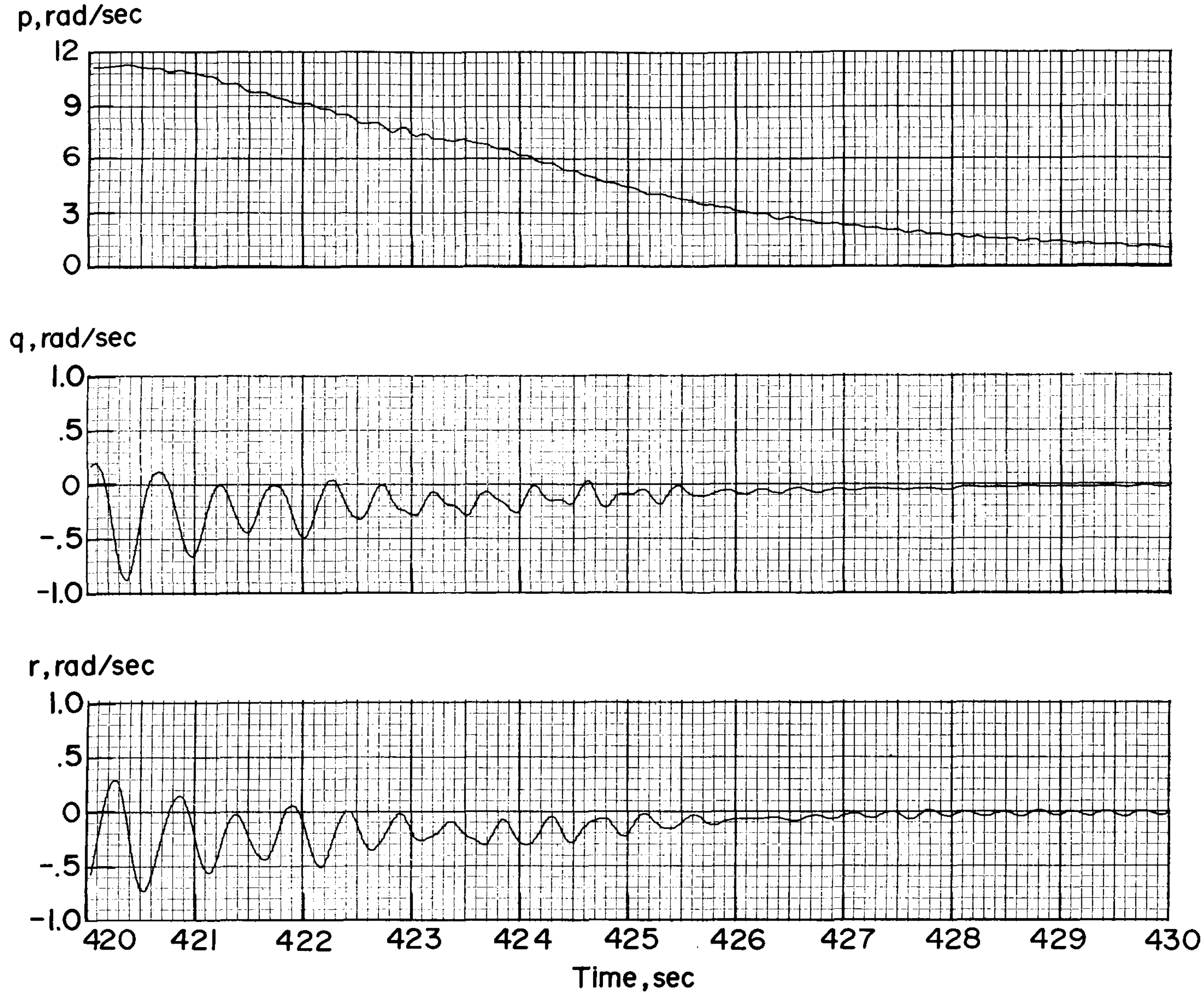
(e) 400 to 410 seconds.

Figure 10.- Continued.



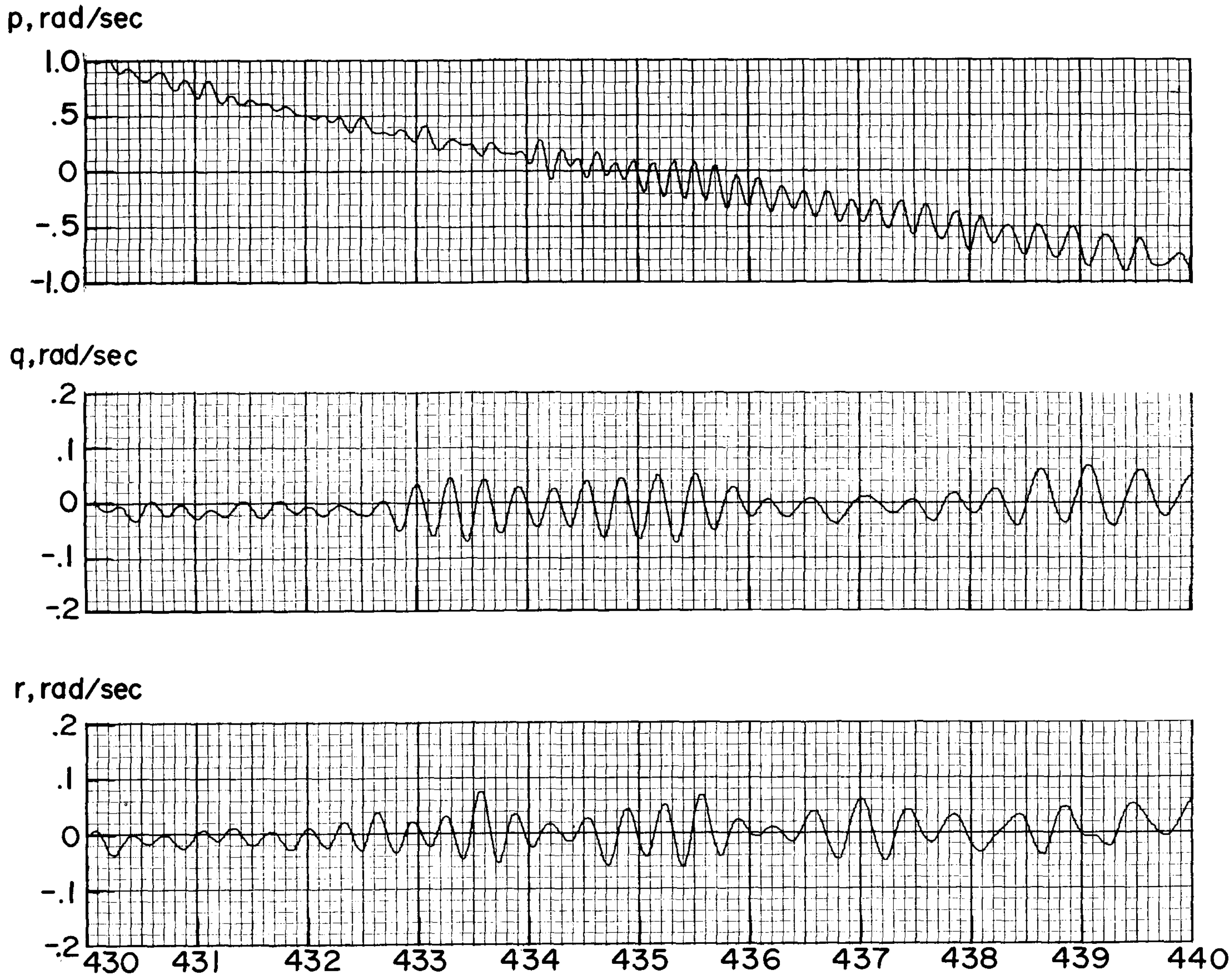
(f) 410 to 420 seconds.

Figure 10.- Continued.



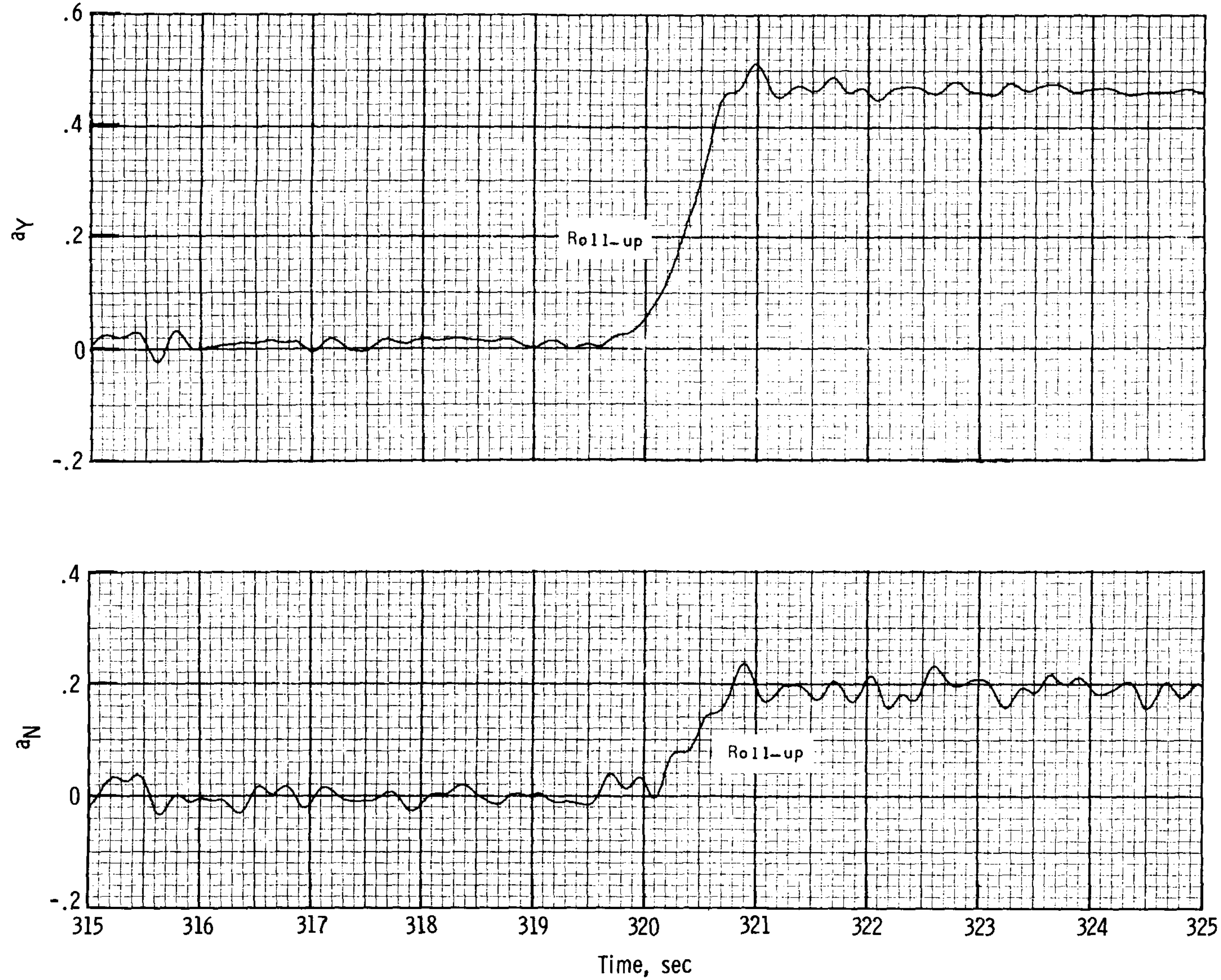
(g) 420 to 430 seconds.

Figure 10.- Continued.



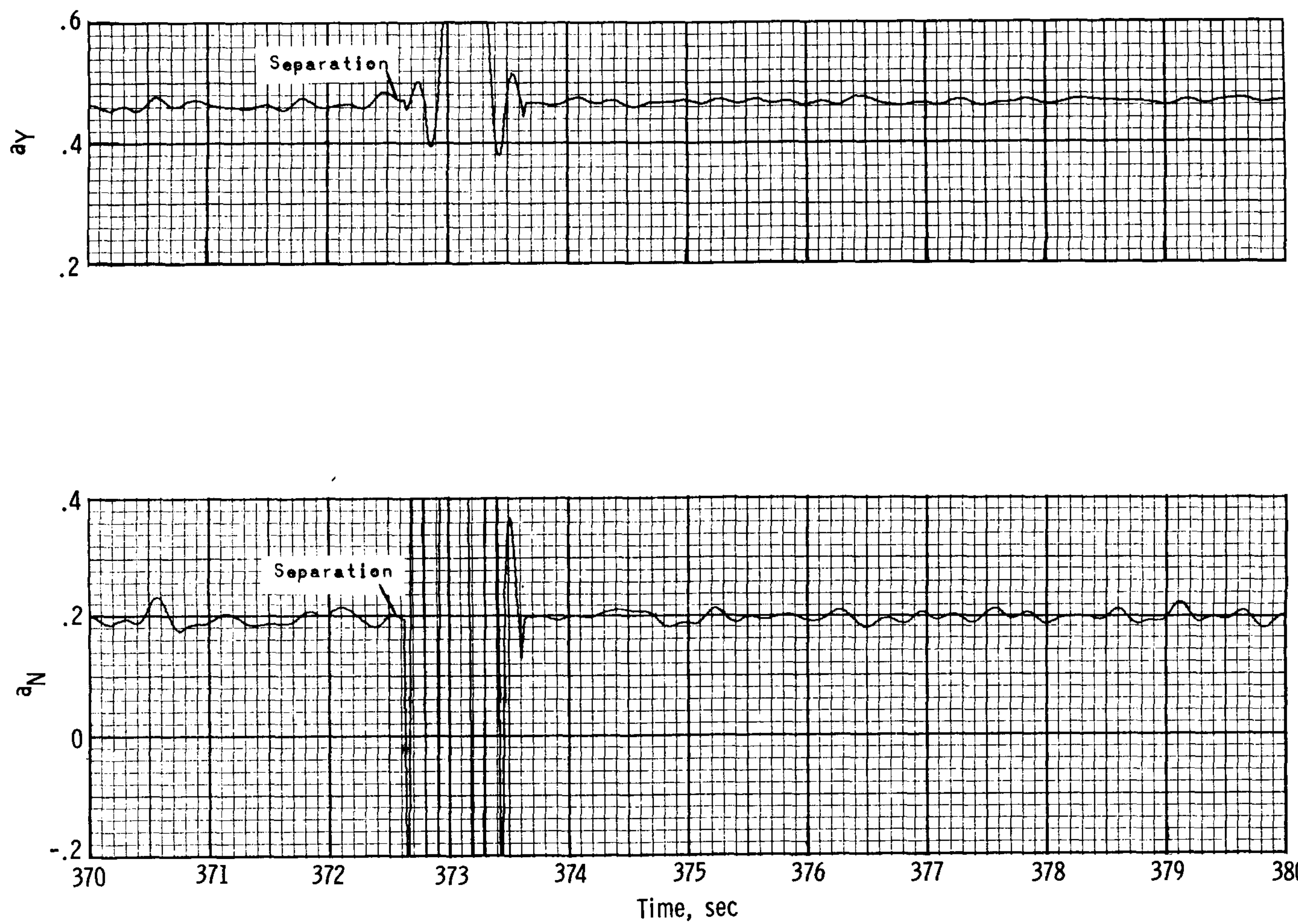
(h) 430 to 440 seconds.

Figure 10.- Concluded.



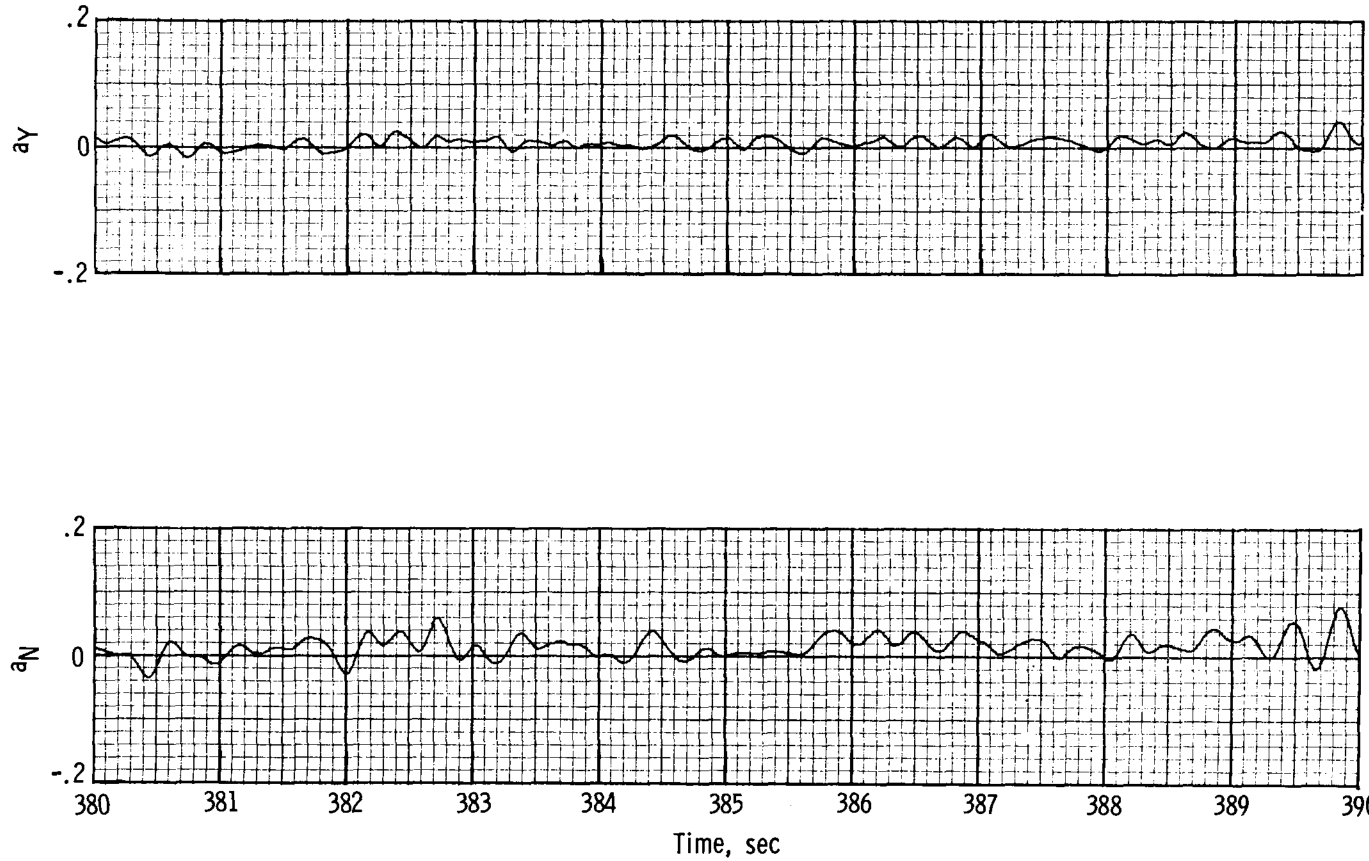
(a) 315 to 325 seconds. (Includes centripetal acceleration.)

Figure 11.- Measured side and normal acceleration.



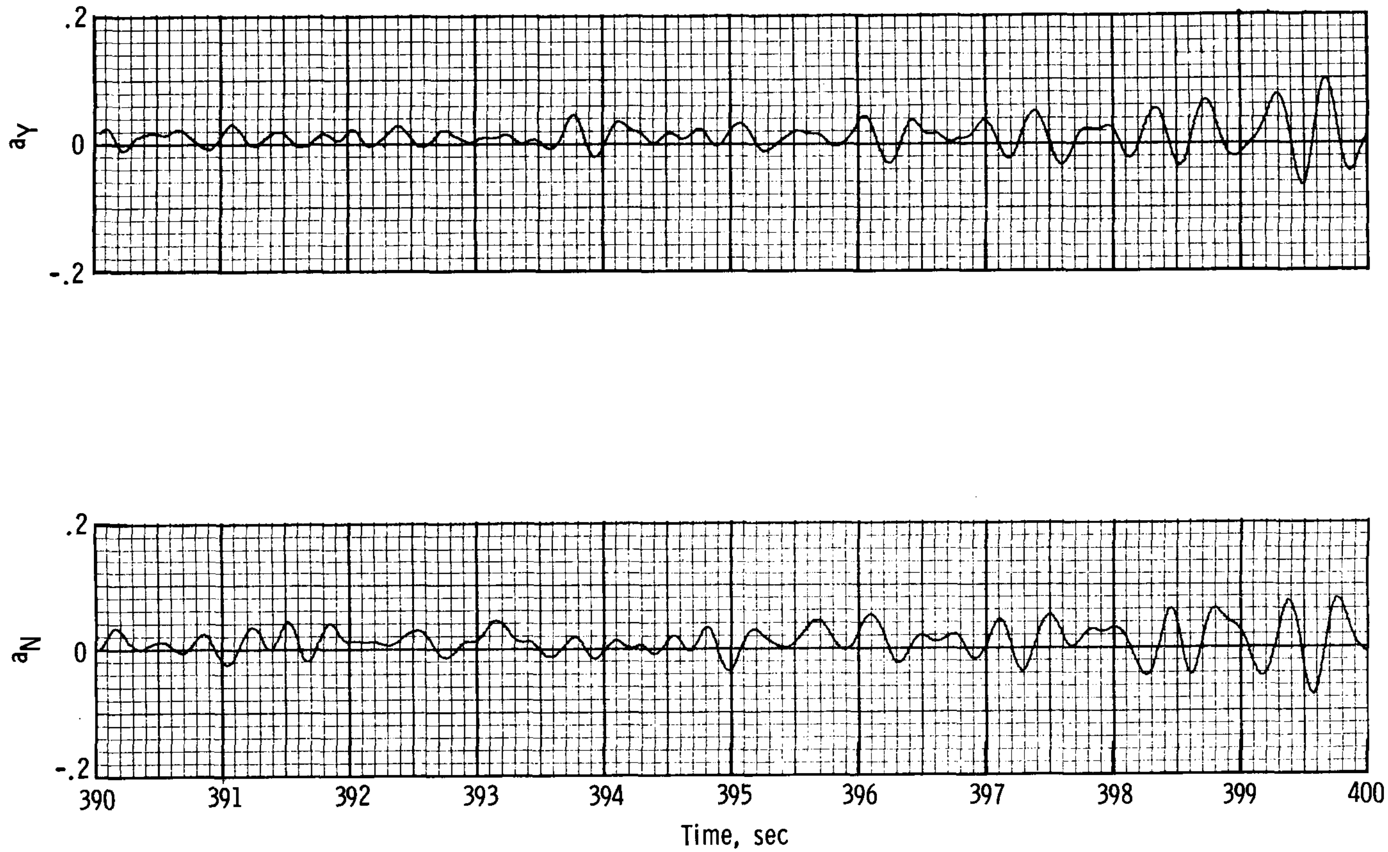
(b) 370 to 380 seconds. (Includes centripetal acceleration.)

Figure 11.- Continued.



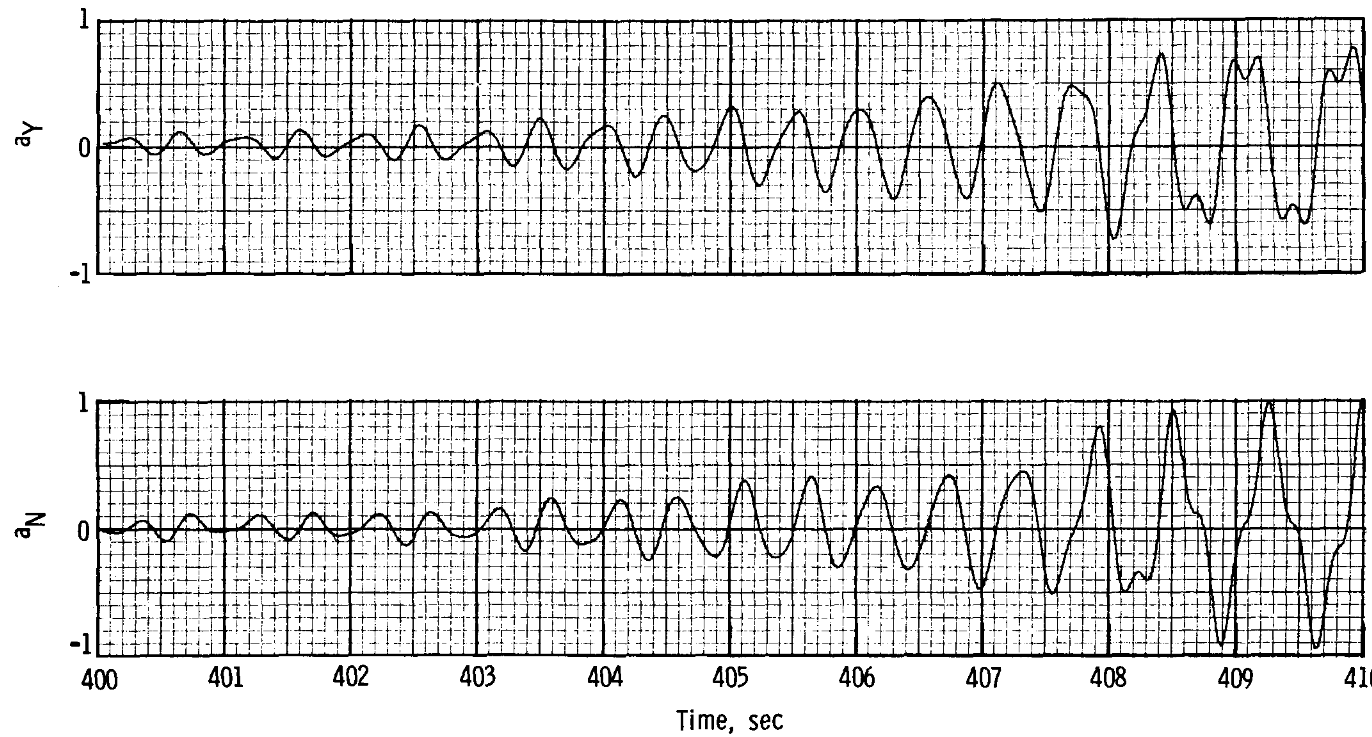
(c) 380 to 390 seconds. (Centripetal acceleration removed.)

Figure 11.- Continued.



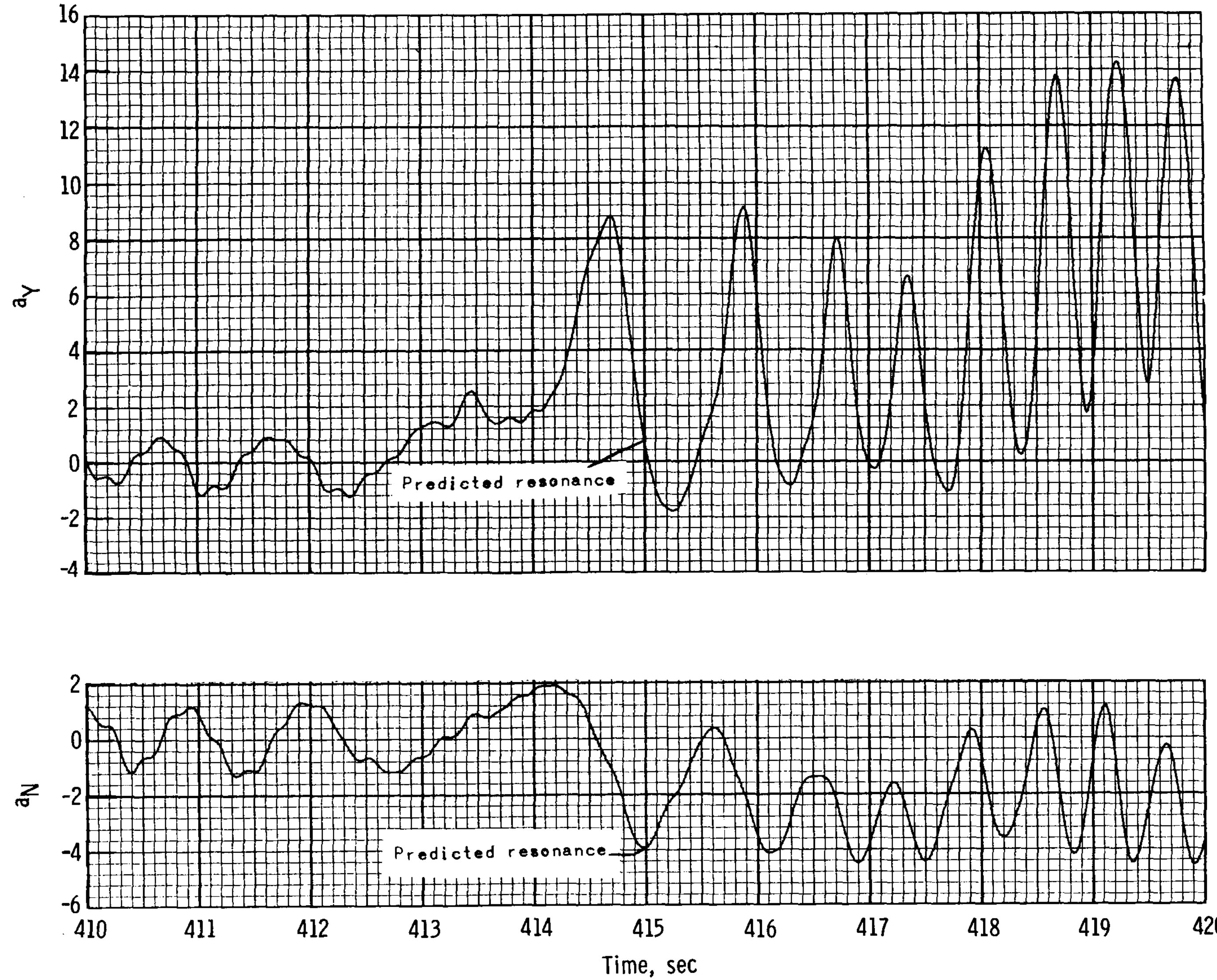
(d) 390 to 400 seconds. (Centripetal acceleration removed.)

Figure 11.- Continued.



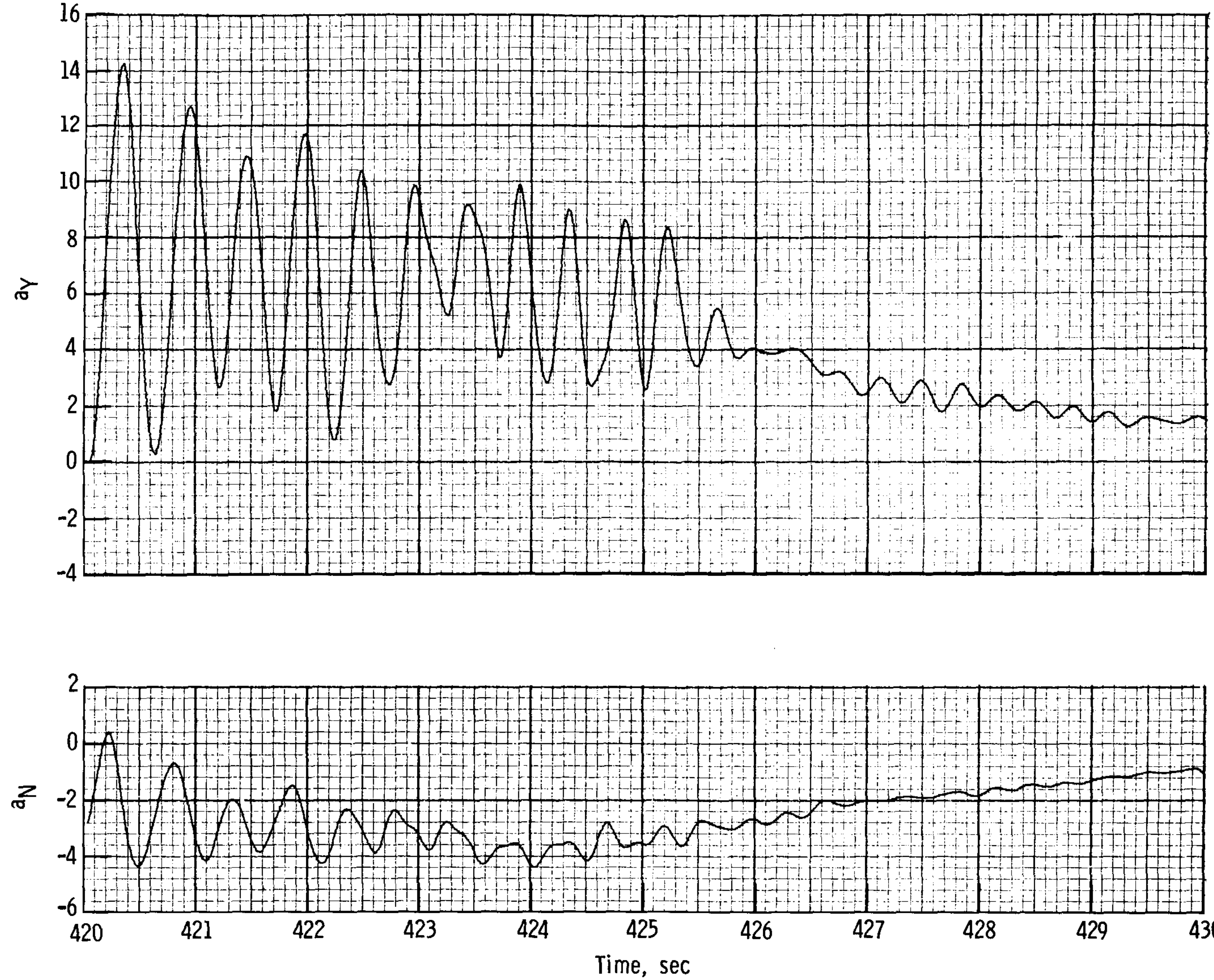
(e) 400 to 410 seconds. (Centripetal acceleration removed.)

Figure 11.- Continued.



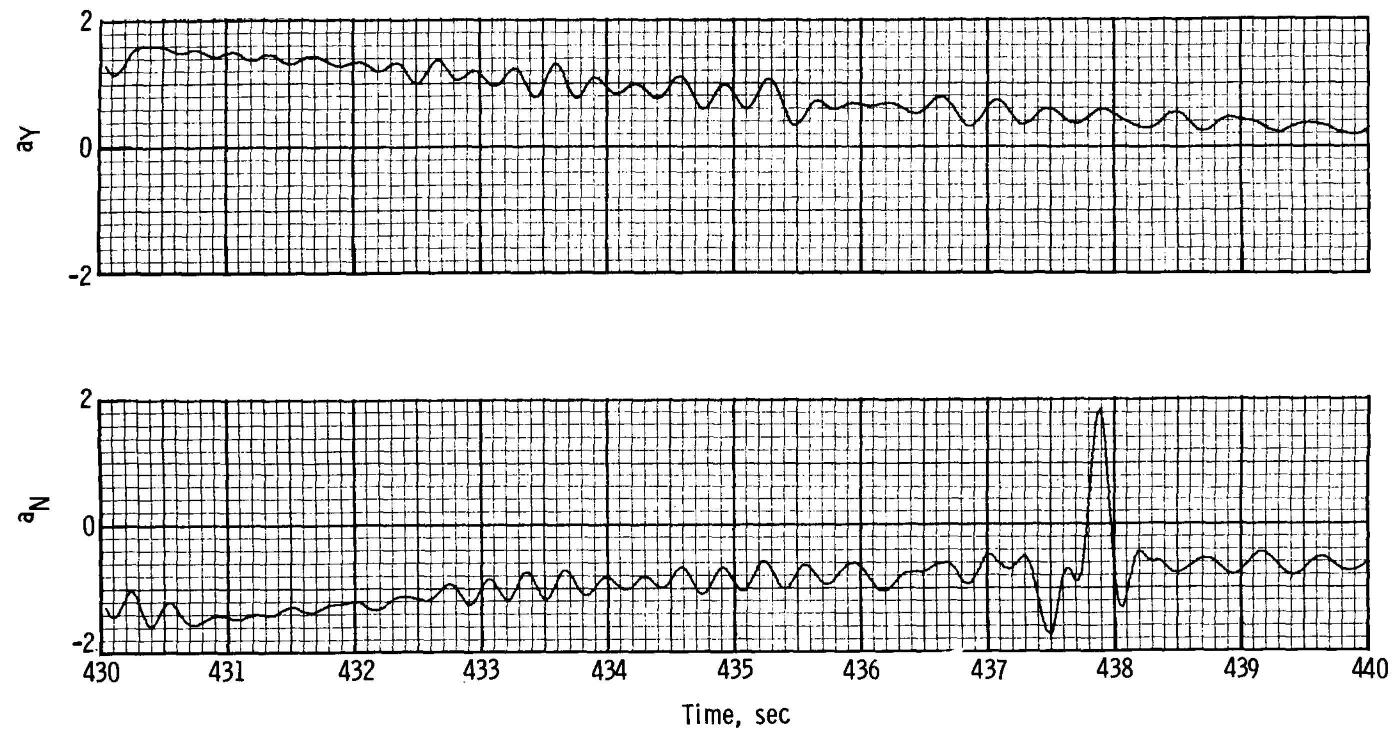
(f) 410 to 420 seconds. (Centripetal acceleration removed.)

Figure 11.- Continued.



(g) 420 to 430 seconds. (Centripetal acceleration removed.)

Figure 11.- Continued.



(h) 430 to 440 seconds. (Centripetal acceleration removed.)

Figure 11.- Concluded.

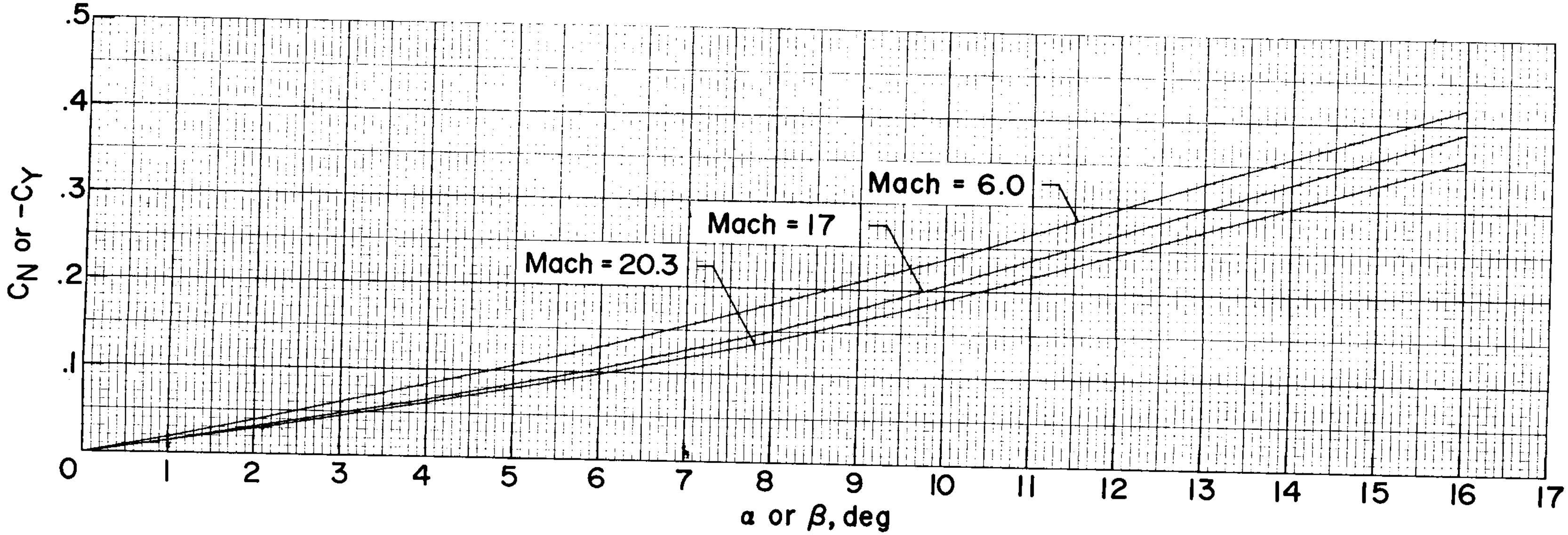
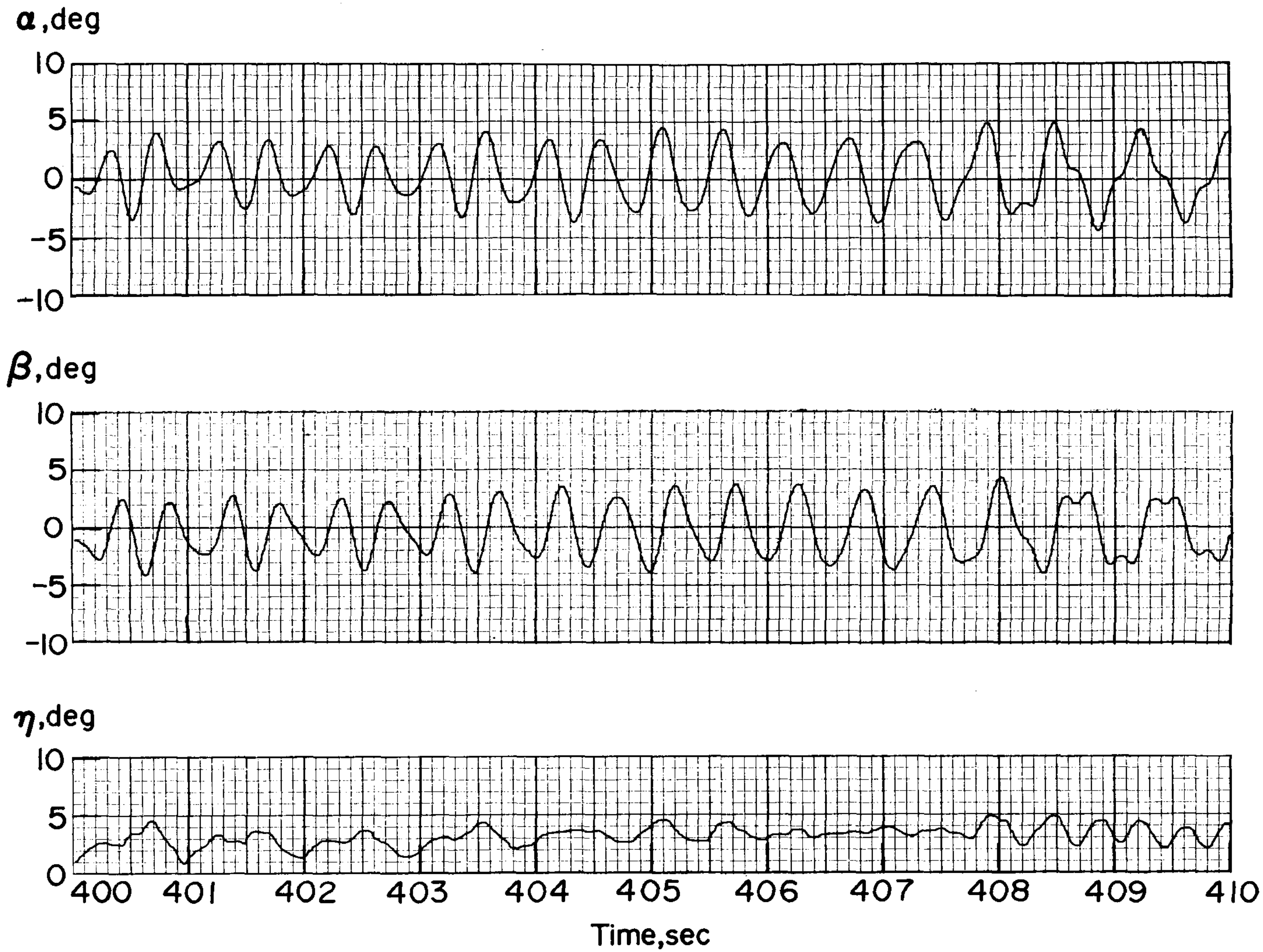
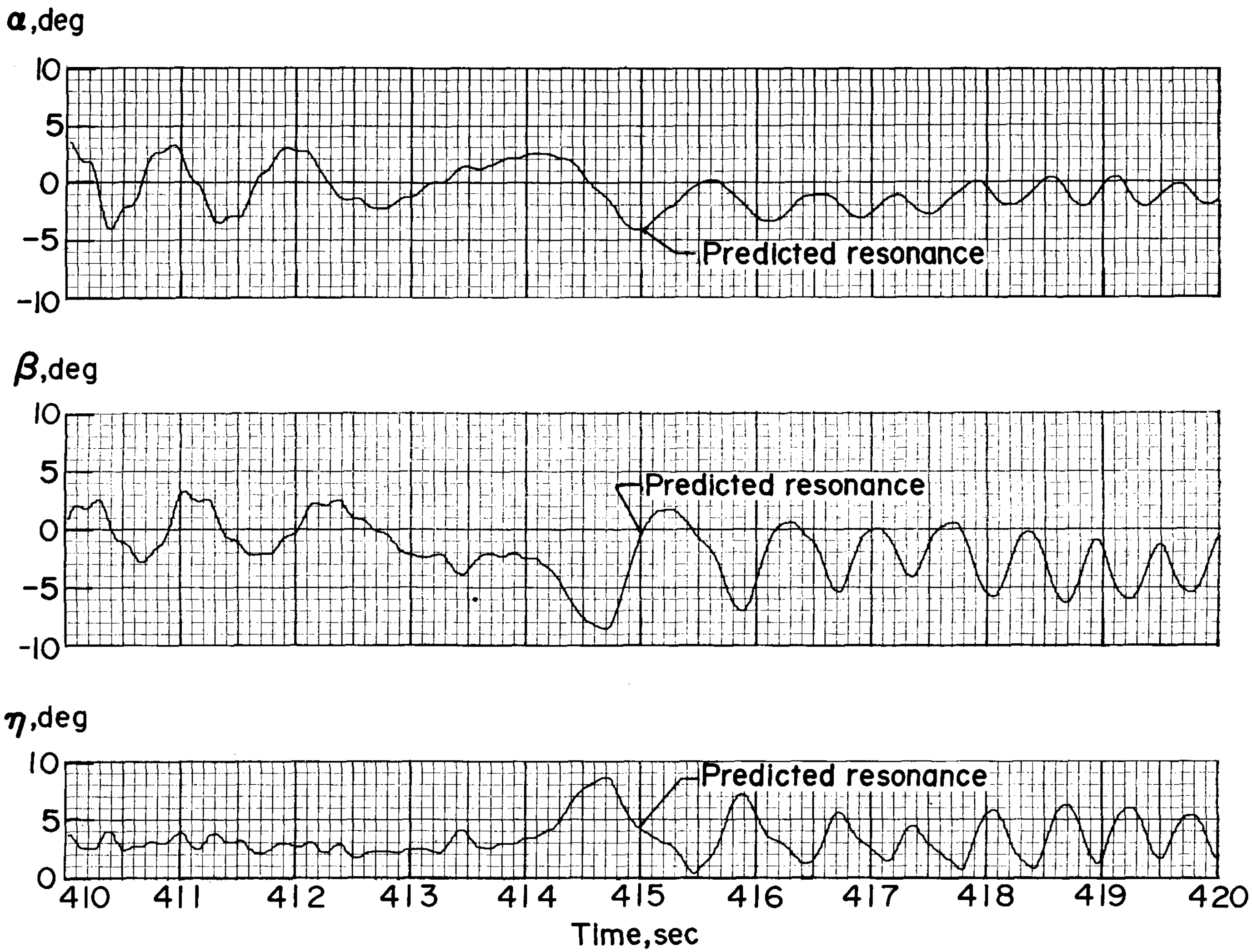


Figure 12.- Normal- and side-force coefficients obtained from wind-tunnel tests.



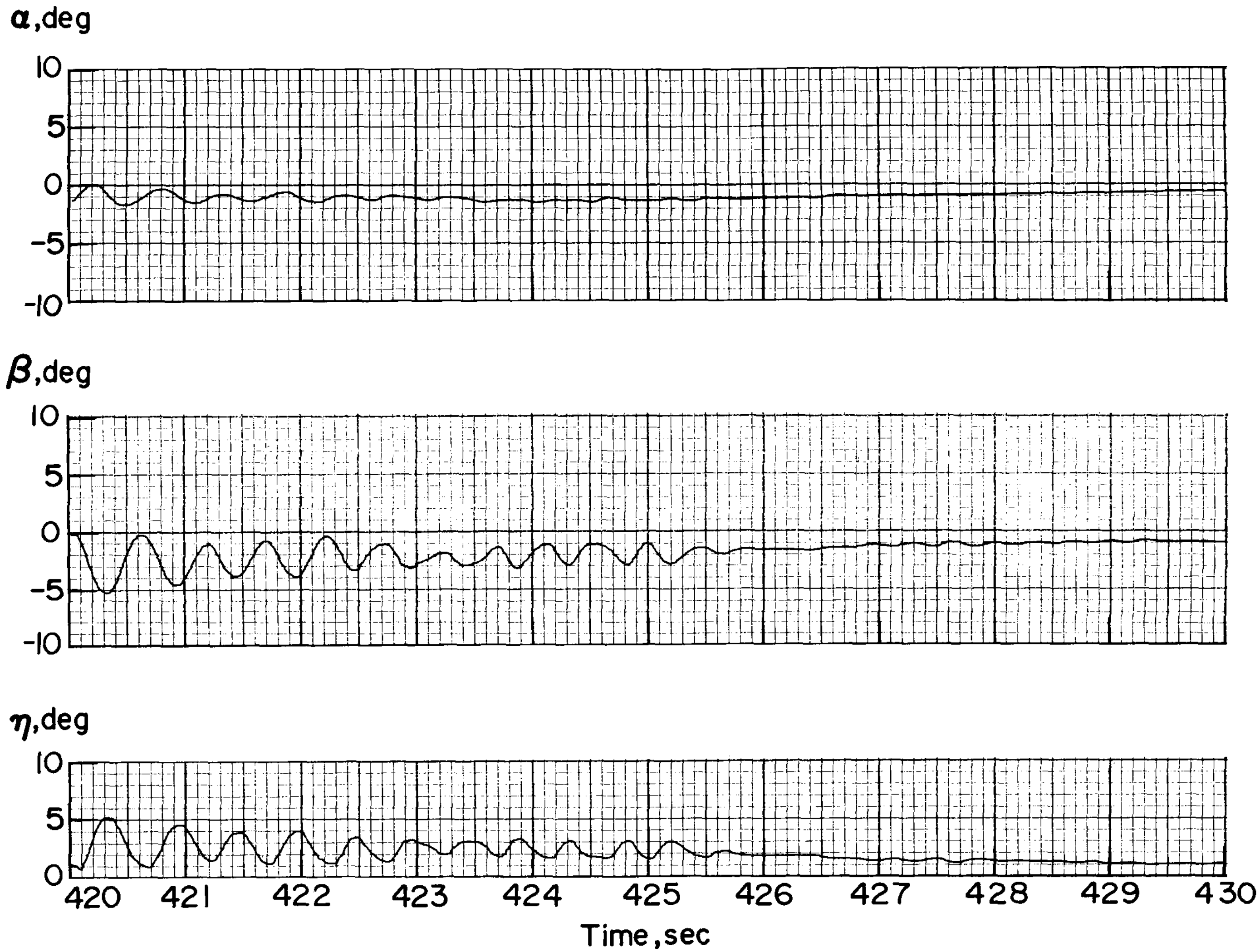
(a) 400 to 410 seconds.

Figure 13.- Wind angles determined from acceleration data.



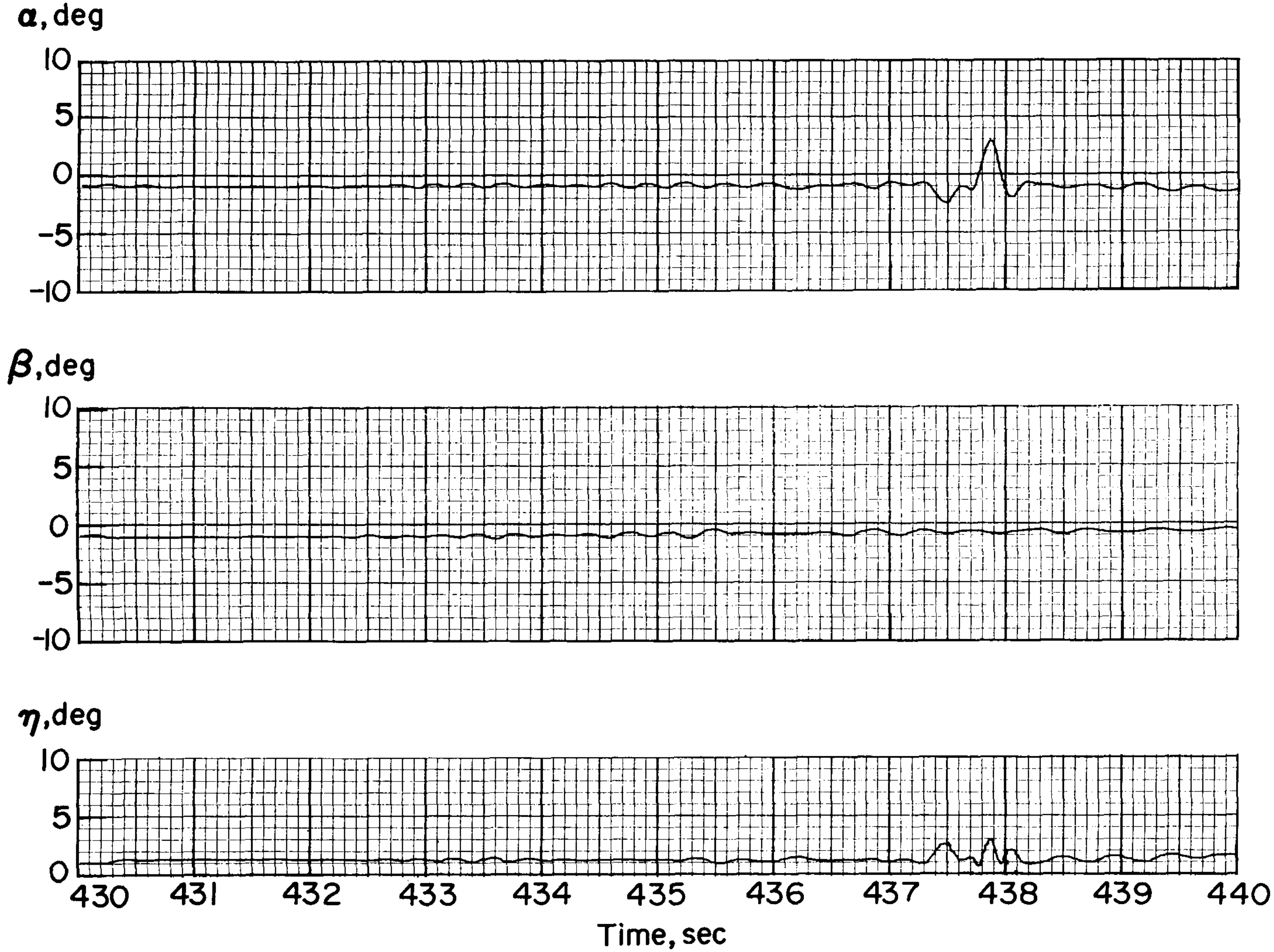
(b) 410 to 420 seconds.

Figure 13.- Continued.



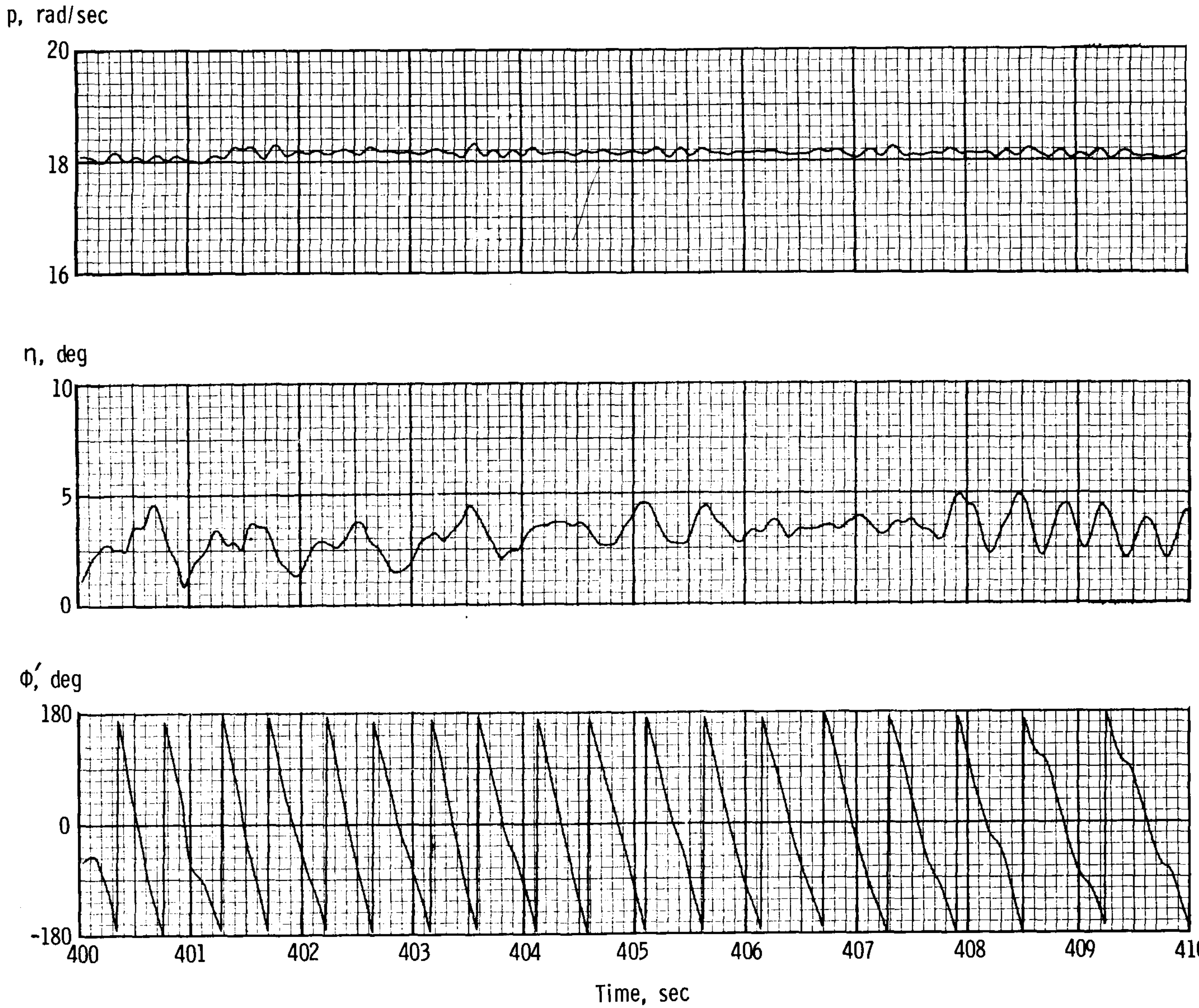
(c) 420 to 430 seconds.

Figure 13.- Continued.



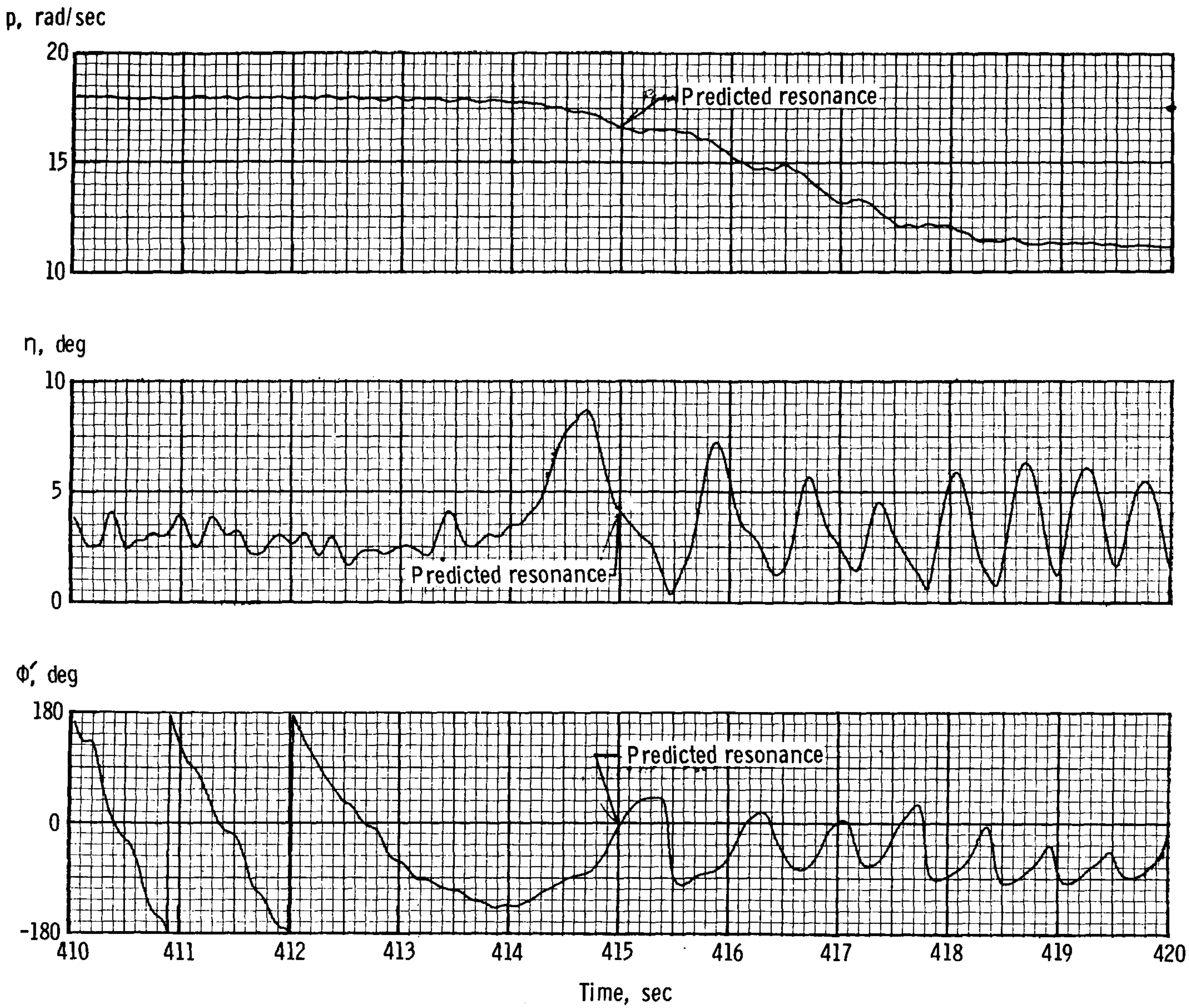
(d) 430 to 440 seconds.

Figure 13.- Concluded.



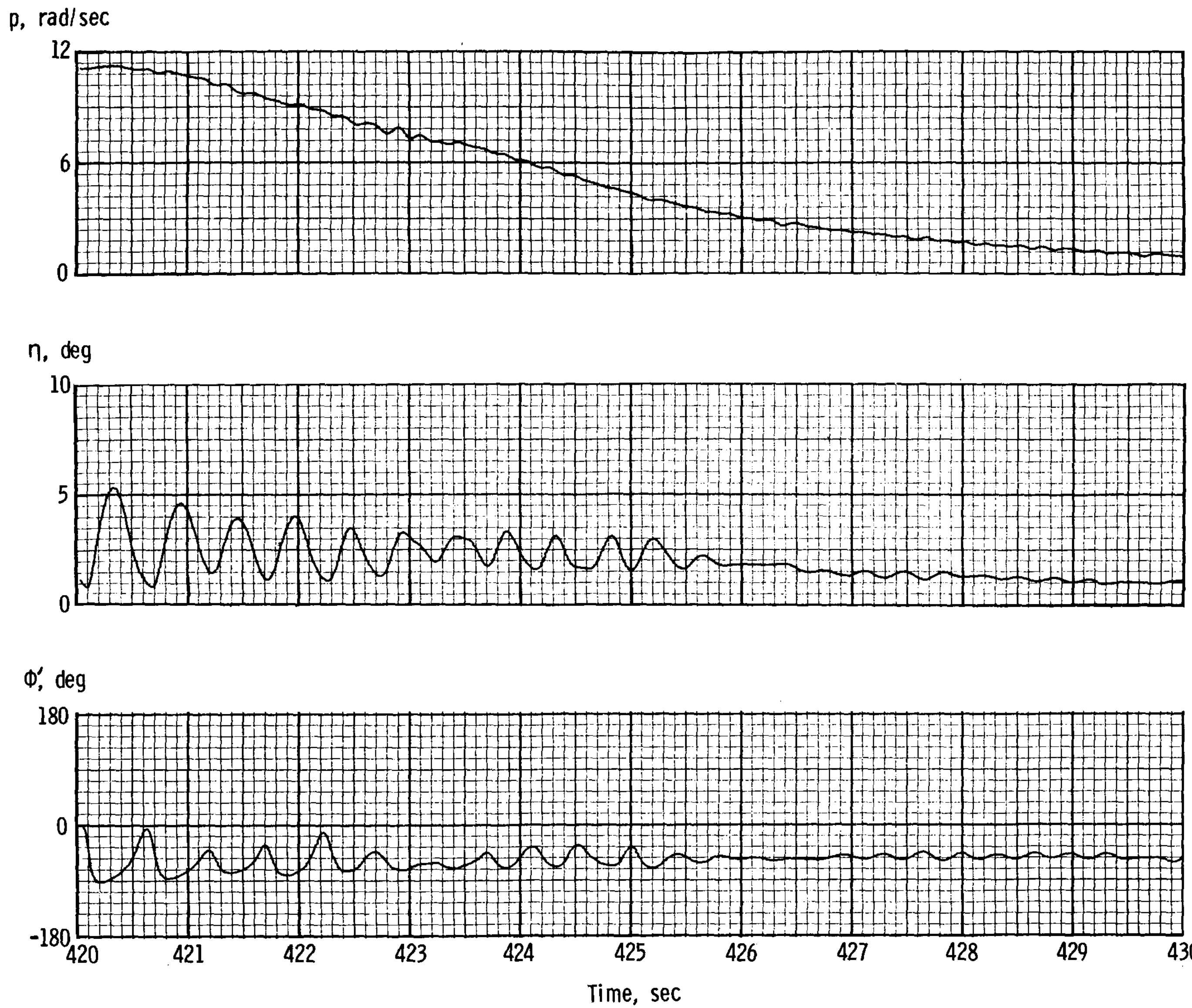
(a) 400 to 410 seconds.

Figure 14.- Roll rate, total wind angle, and phase angle.



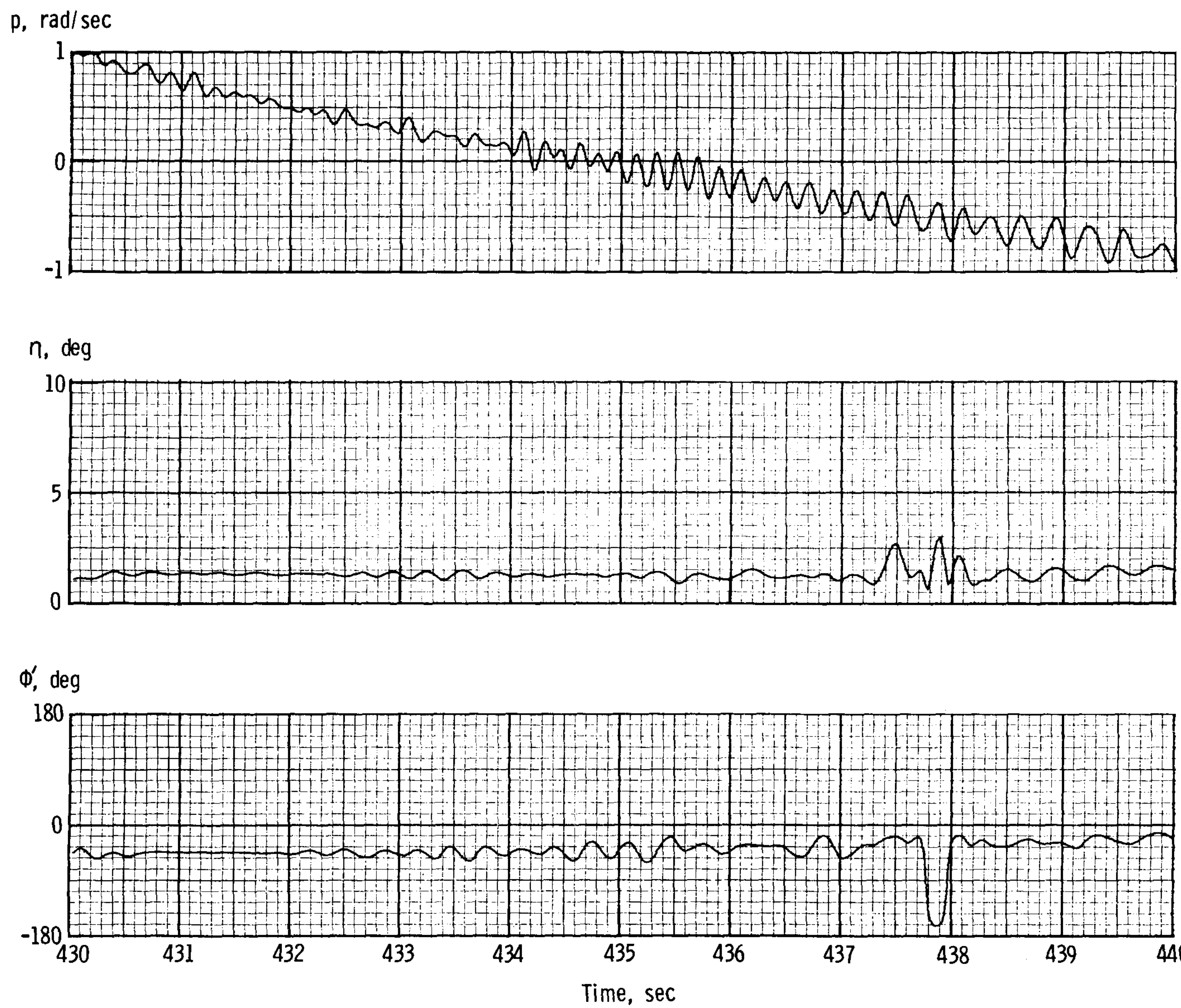
(b) 410 to 420 seconds.

Figure 14.- Continued.



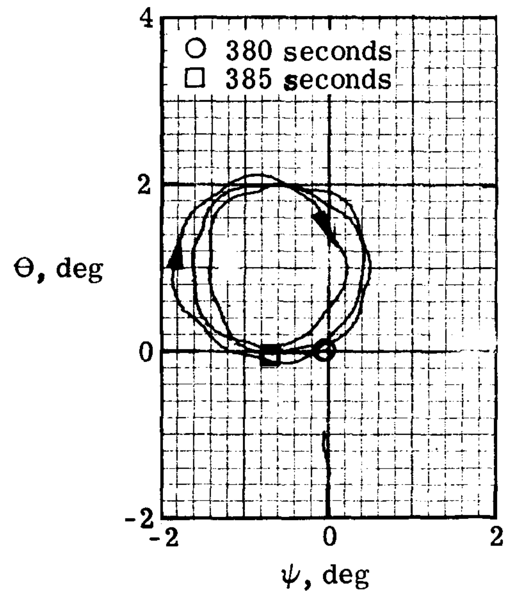
(c) 420 to 430 seconds.

Figure 14.- Continued.

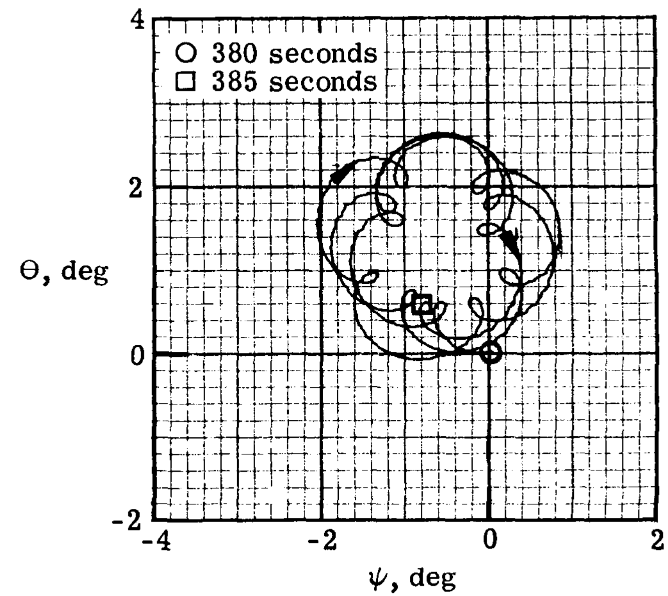


(d) 430 to 440 seconds.

Figure 14.- Concluded.



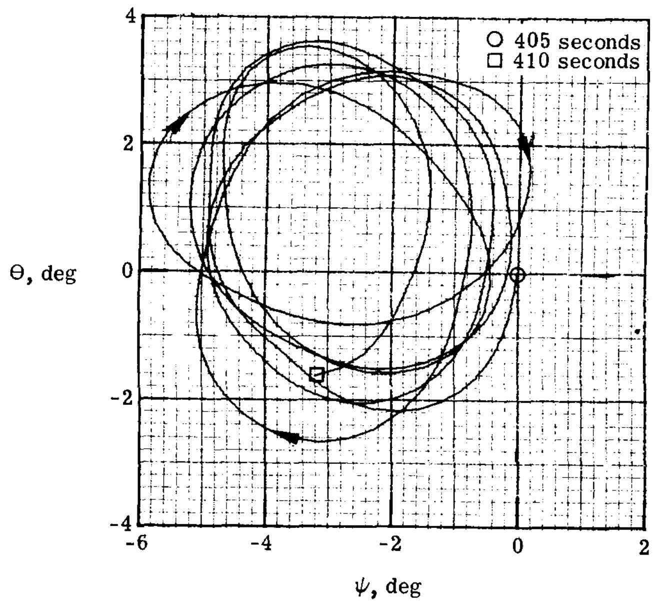
Roll component of lateral rates removed



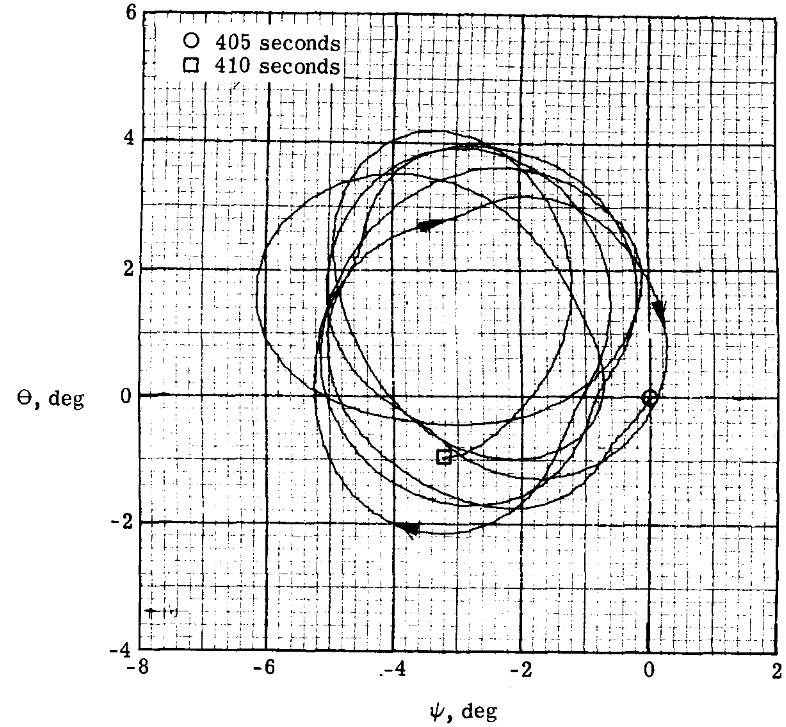
Measured lateral rates

(a) 380 to 385 seconds. $t_0 = 380$ seconds; $\psi_0 = \theta_0 = \phi_0 = 0$.

Figure 15.- Comparisons of inertial rotations determined with different rotation rates.



Roll component of lateral rates removed



Measured lateral rates

(b) 405 to 410 seconds. $t_0 = 405$ seconds; $\psi_0 = \theta_0 = \phi_0 = 0$.

Figure 15.- Concluded.

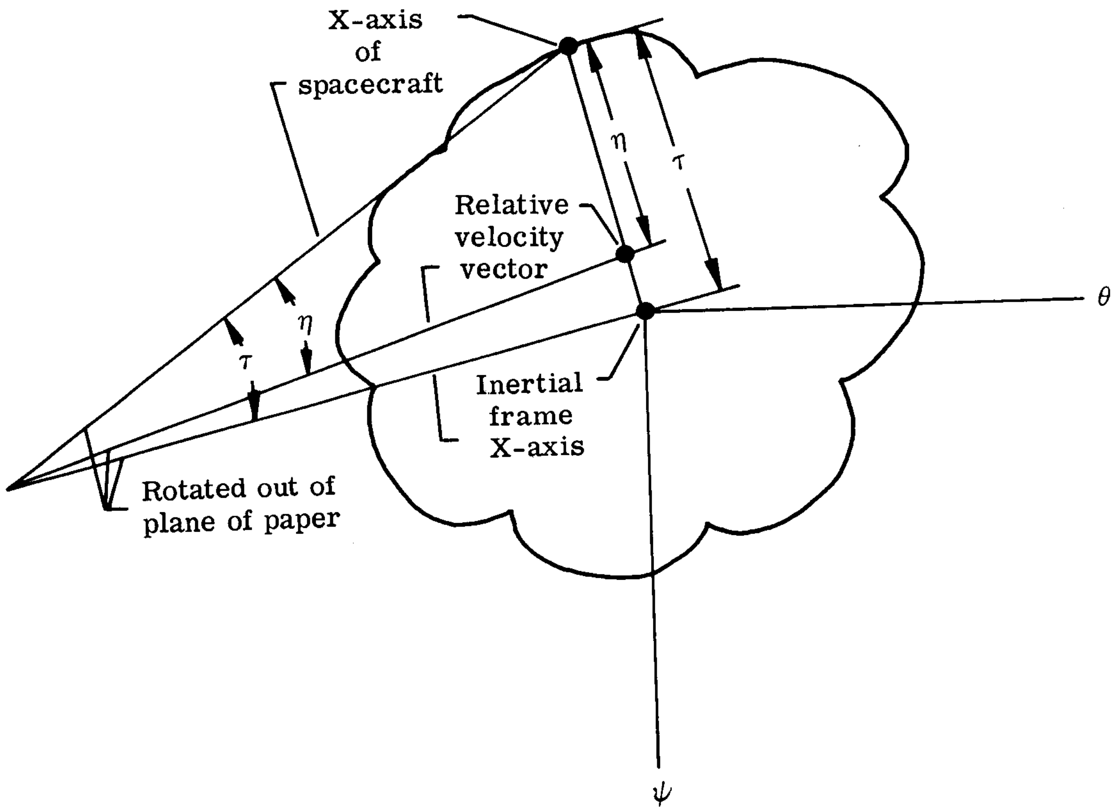


Figure 16.- Relation between inertial- and wind-axis systems.

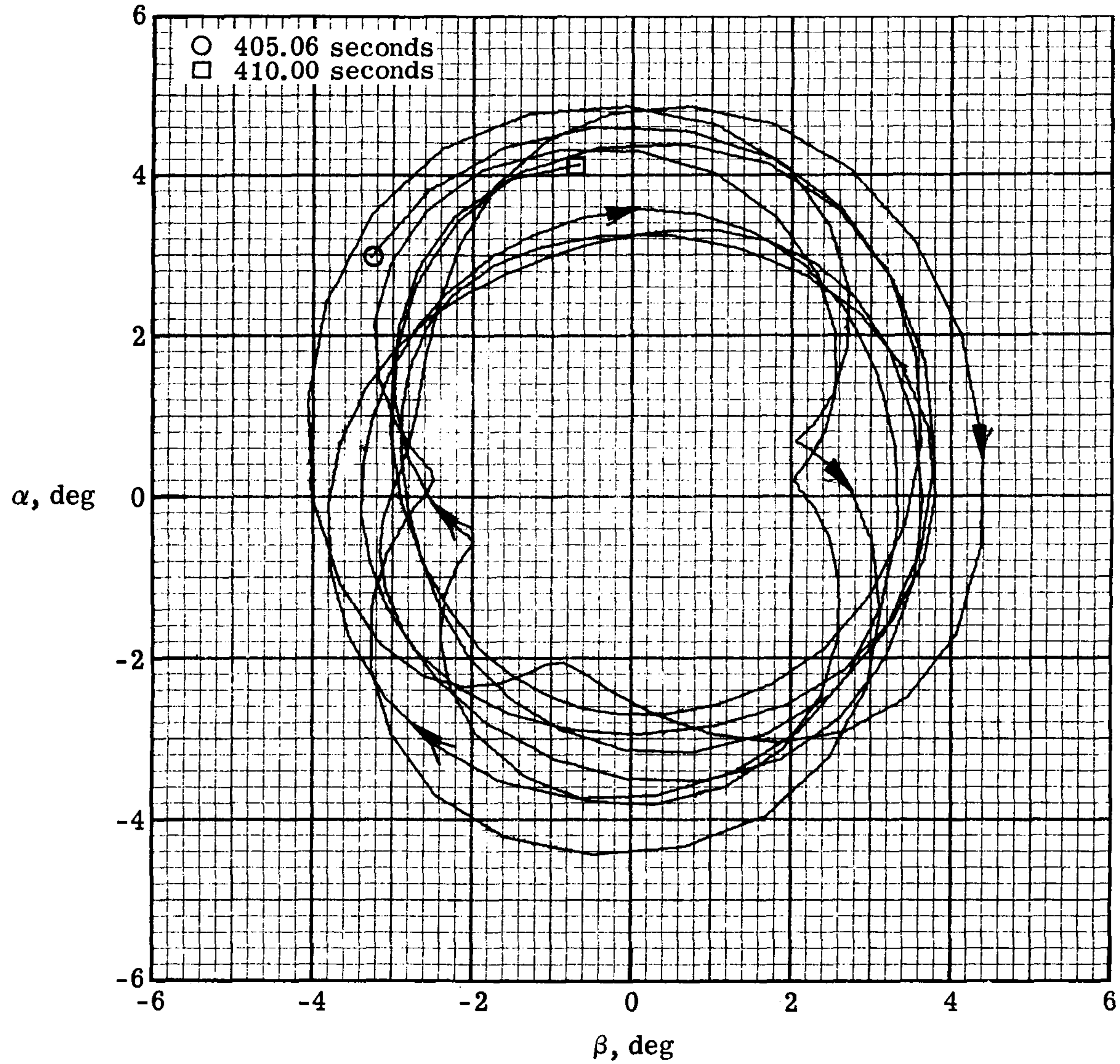
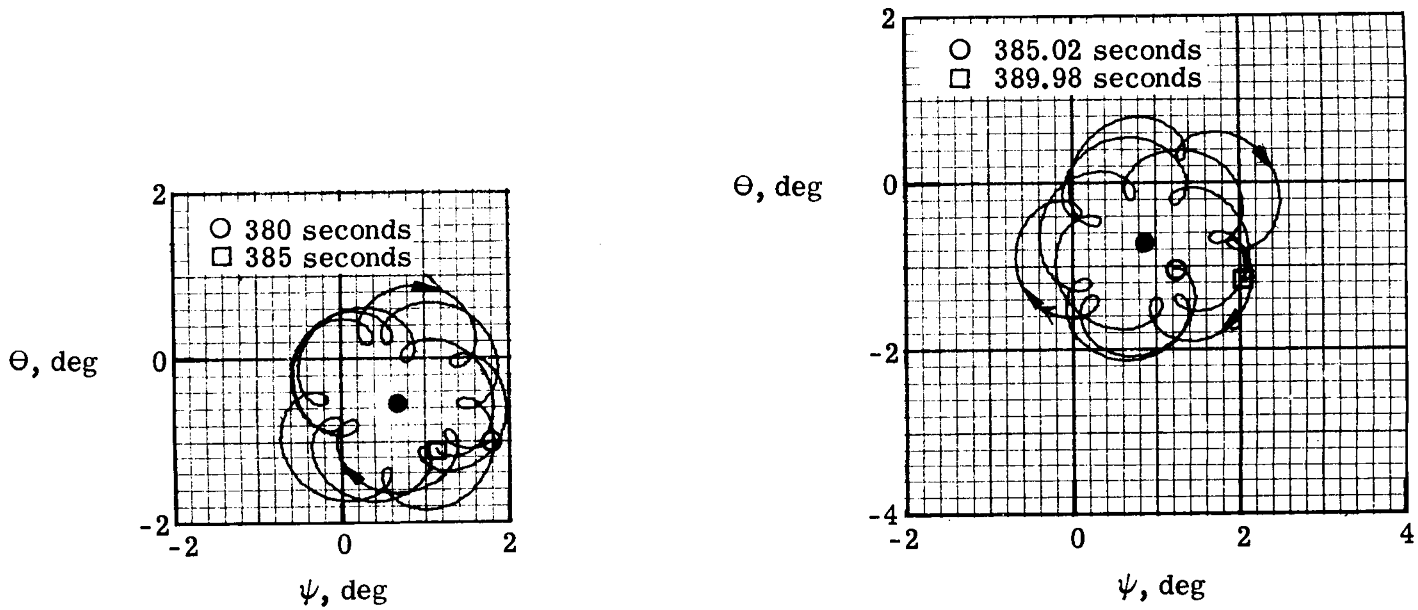


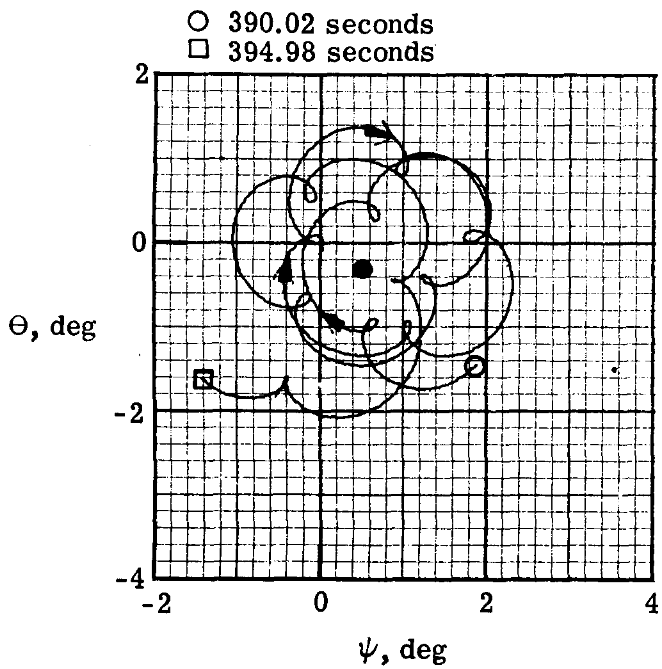
Figure 17.- Cross plot of α against β for 405 to 410 seconds.



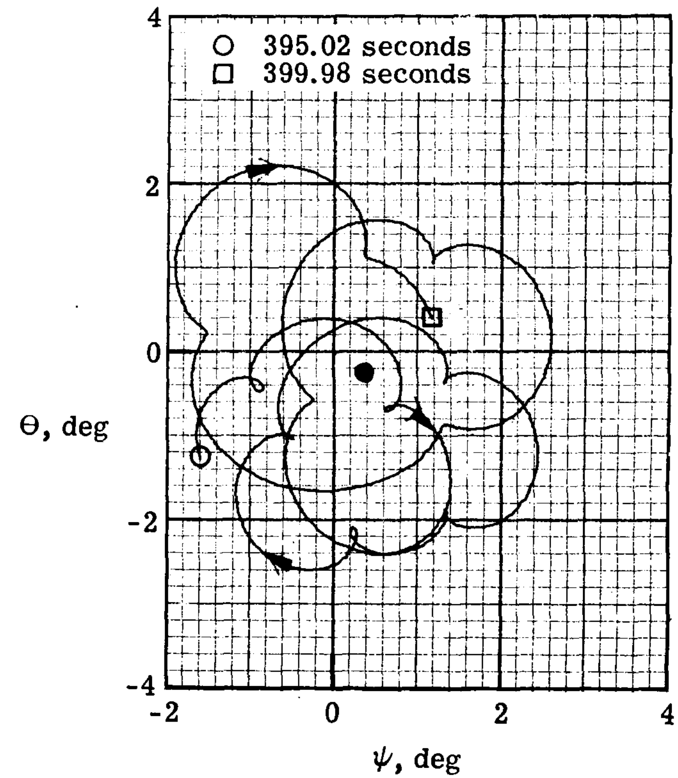
(a) 380 to 385 seconds.

(b) 385 to 390 seconds.

Figure 18.- Inertial rotations. $t_0 = 405$ seconds; $\psi_0 = 3.0^{\circ}$; $\theta_0 = -1.3^{\circ}$; $\phi = 0$.

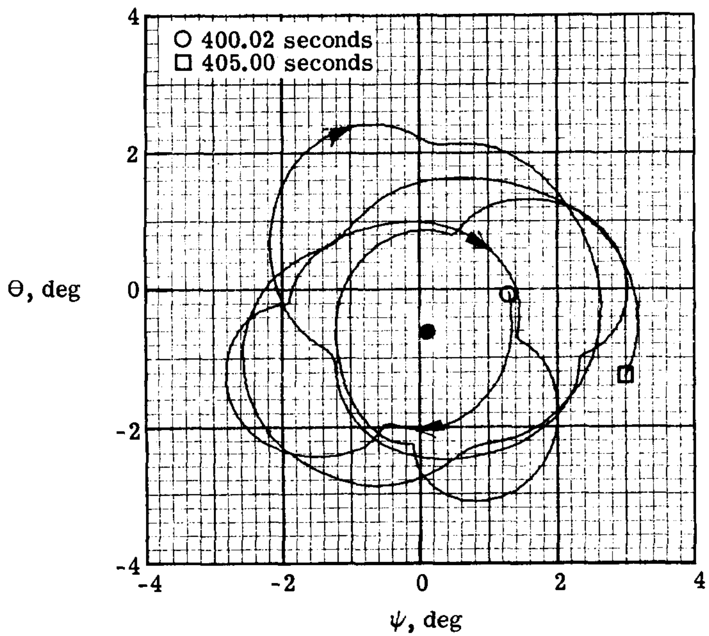


(c) 390 to 395 seconds.

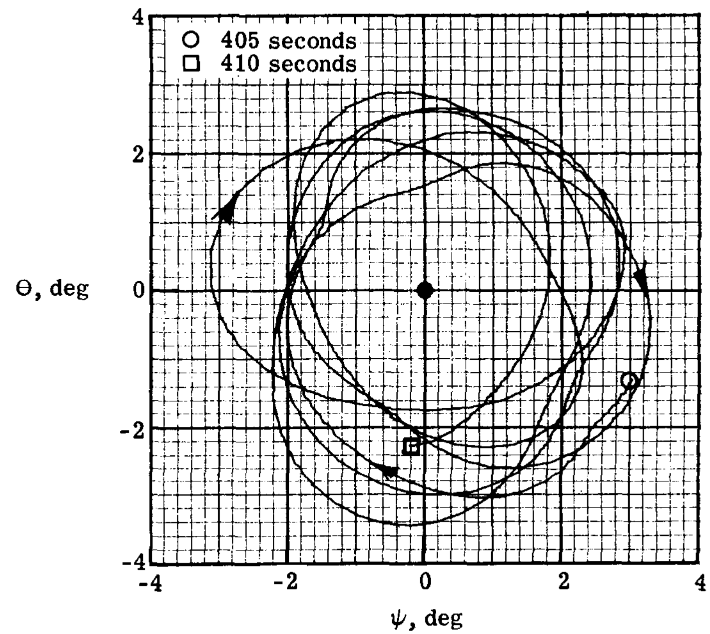


(d) 395 to 400 seconds.

Figure 18.- Continued.



(e) 400 to 405 seconds.



(f) 405 to 410 seconds.

Figure 18.- Concluded.

$$\eta_{max} = \tau_{max} + 1^{o} + \dot{\Omega}\,\Delta t$$

$$\dot{\Omega} = 0.074\,\frac{deg}{sec}$$

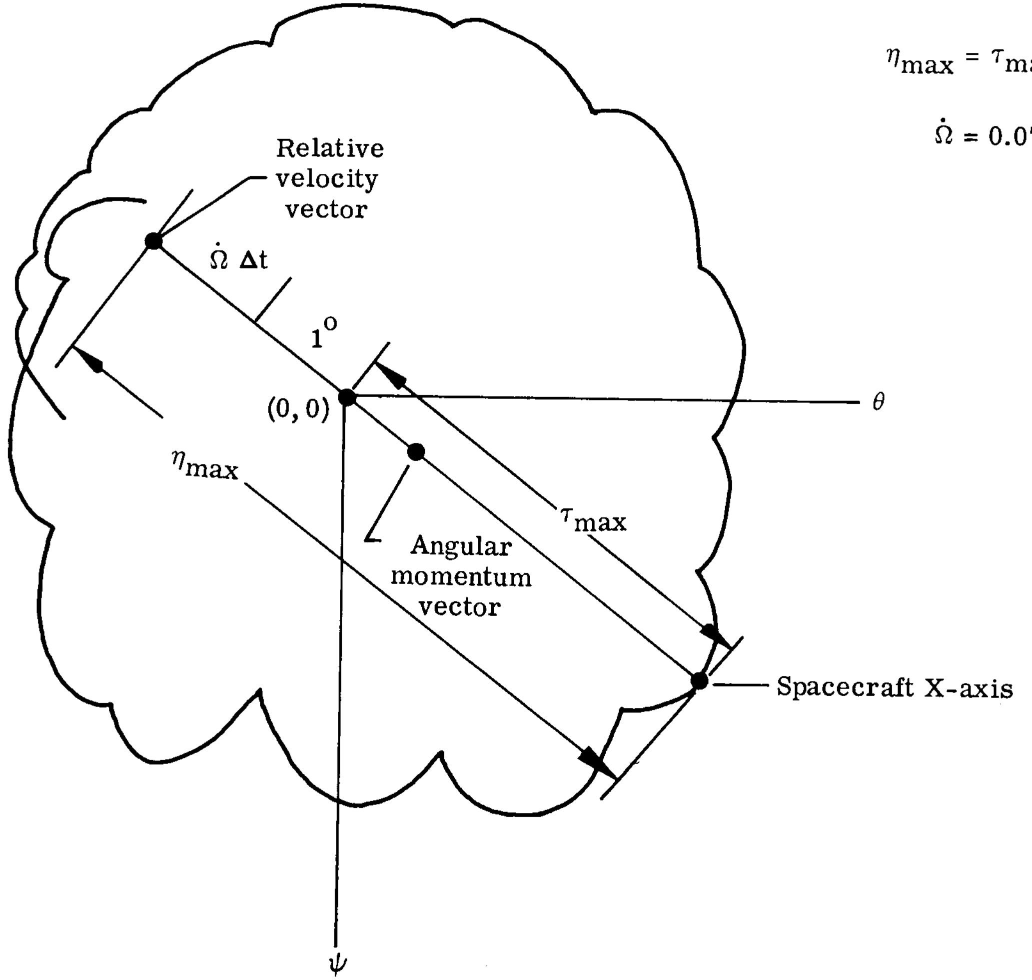


Figure 19.- Illustration of technique for determining η_{max} from inertial-rotation plots.

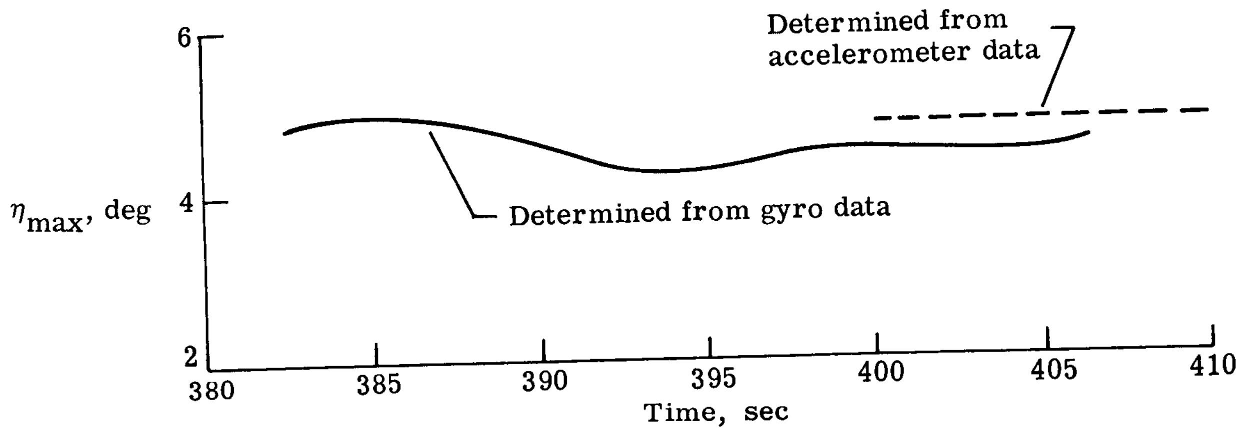


Figure 20.- Maximum total wind angle.

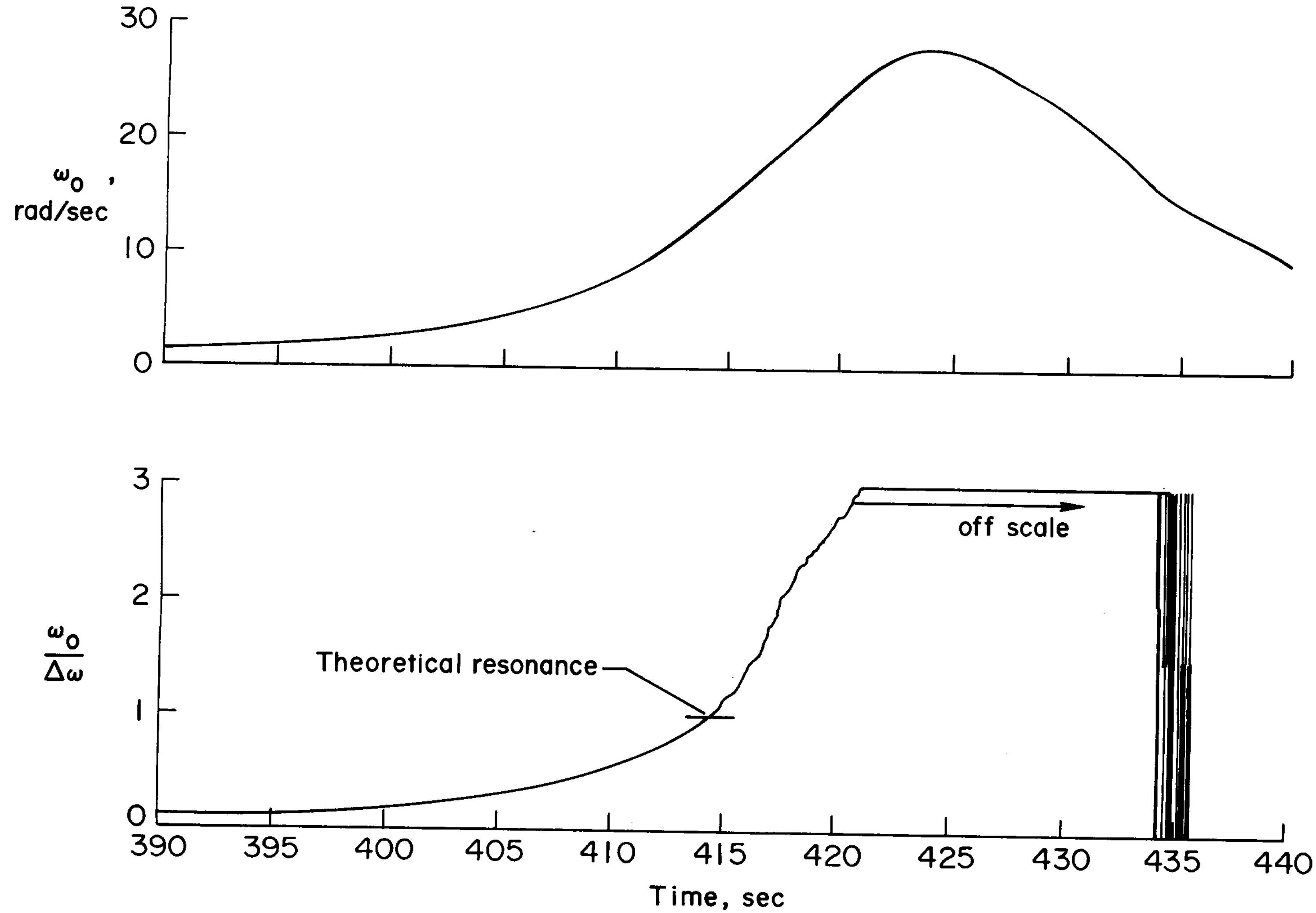


Figure 21.- Spacecraft natural rotational frequency and resonance parameter.

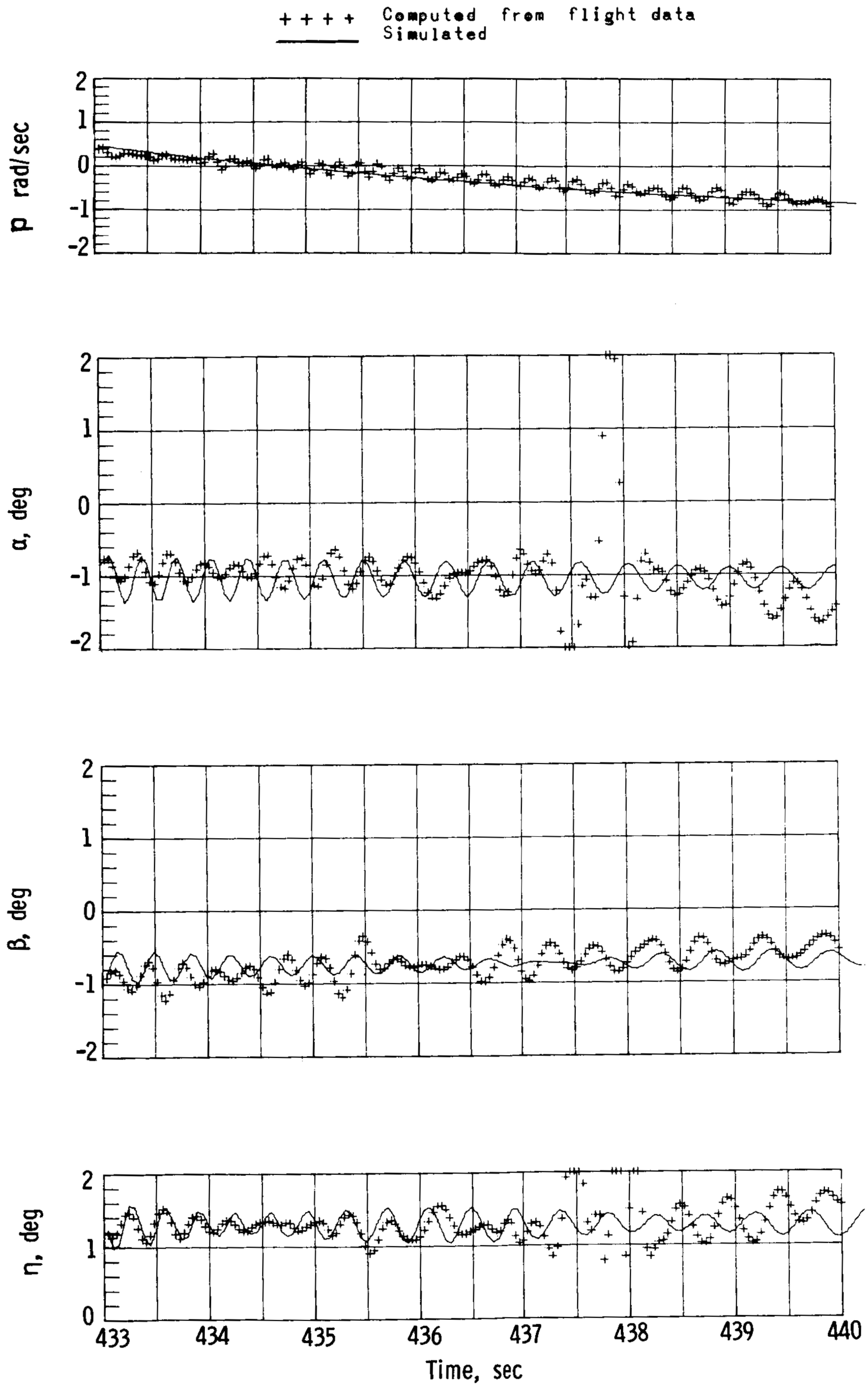


Figure 22.- Comparison between simulated and flight spacecraft motions.