

C. 66-19 030  
C1.



National Aeronautics and  
Space Administration

Lyndon B. Johnson Space Center  
Houston, Texas 77058

MSC-G-R-65-4

# GEMINI PROGRAM MISSION REPORT

# GEMINI V

CLASSIFICATION CHANGED TO  
**UNCLASSIFIED**

SUPPLEMENTAL REPORT 6

BY AUTHORITY OF SCG W3107C

Titan II, -5/1/73, HOAMA, H30 AP3

INERTIAL GUIDANCE SYSTEM

DATE NOV 6 1974

AND COMPUTER ANALYSIS

*Abeyan*

(U)

(NASA-CR-157791) GEMINI 5 SUPPLEMENTAL  
REPORT 6: INERTIAL GUIDANCE SYSTEM AND  
COMPUTER ANALYSIS (IBM Federal Systems Div.,  
Owego, N. Y.) 84 p

RARY COPY



JUN 29 1966

N79-70054

SPACECRAFT CENTER  
HOUSTON, TEXAS

**GROUP 4  
DOWNGRADED  
AT 3 YEAR INTERVALS  
DECLASSIFIED  
AFTER 12 YEARS**



CLASSIFIED DOCUMENT This material contains information affecting the National Defense of the United States within the meaning of the espionage laws, Title 18, U.S.C., Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

AUGUST 1965

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION □ MANNED SPACECRAFT CENTER



00/18 Unclas 16562

## FOREWORD

This report consists of Part A - Gemini V Ascent Postflight Analysis Report, and Part B - Gemini V Reentry Mission Reconstruction Report prepared by:

International Business Machines Corporation  
Federal Systems Division  
Space Guidance Center  
Owego, New York

This report is published as Supplement 6 to the Gemini V Mission Report, MSC-G-R-65-4, by:

Gemini V Mission Evaluation Team  
National Aeronautics and Space Administration  
Manned Spacecraft Center  
Houston, Texas

~~CONFIDENTIAL~~

PART A --  
 GEMINI V  
 ASCENT  
 POSTFLIGHT  
 ANALYSIS  
 REPORT  
 (U)

IBM NO 3-260-6145

COPY NO \_\_\_\_\_

ORIGINATING GROUP Gemini Systems Engineering

CONTENT APPROVED BY  
*H. Pranning*

CLASSIFICATION AND AUTOMATIC REGRADING APPROVED BY  
*H. Pranning*

CONTRACT NO NASA 9-4792

DATE 18 October 1965

Contributors: T. L. Anthony  
 R. B. Jasinski  
 A. D. Melgaard  
 R. F. Miller

**RECLASSIFIED AT 3 YEAR INTERVALS**  
**DECLASSIFIED AFTER 12 YEARS**  
 DOD DIR 5200.10

*[Handwritten signature]*  
 NOTICE: This document contains information affecting the national defense of the United States within the meaning of the Espionage Laws, Title 18, U. S. C., Sections 793 and 794, as amended, the transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

**IBM** FEDERAL SYSTEMS DIVISION  
 SPACE GUIDANCE CENTER  
 OWEGO NEW YORK

~~CONFIDENTIAL~~

## TABLE OF CONTENTS

	<u>Page</u>
List of Tables	A-i
List of Figures	A-ii
I. Introduction	A-1
II. Discussion of Ascent Flight Reconstruction	A-2
A. Gimbal Angle and Attitude Error Behavior	A-3
B. Position and Velocity Comparisons	A-6
C. Platform Azimuth Alignment	A-9
D. IGS Injection Conditions	A-11
E. Navigation Accuracy	A-13
F. IVAR and IVI Operation	A-14
G. IGS Discrettes and Lift-off Synchronization	A-16
III. Conclusions	A-19
IV. Recommendations	A-20
Appendix AA	A-21
GT- 5 Flight Data	
Appendix AB	A-34
Flight Reconstruction Graphs	
References	A-49

LIST OF TABLES

		<u>Page</u>
1	Position and Velocity Comparison	A-7
2	Platform Azimuth Misalignment	A-10
3	IGS Injection Conditions	A-12
4	IVAR Operation	A-15
5	IGS Discrete Events	A-17

LIST OF FIGURES

		<u>Page</u>
1	Pitch Command	A-35
2	Yaw Command	A-36
3	Roll Command	A-37
4	Commanded Pitch Rate	A-38
5	Time-To-Go	A-39
6	X Component of Velocity	A-40
7	Y Component of Velocity	A-41
8	Z Component of Velocity	A-42
9	X Component of Position	A-43
10	Y Component of Position	A-44
11	Z Component of Position	A-45
12	Pitch Steering Parameters	A-46
13	Yaw Steering Parameters	A-47
14	IGS Pitch Steering Parameters from Re- construction Simulation	A-48

## ABSTRACT

This report presents an analysis of the Ascent portion of the GT-5 flight. IGS system performance during the Ascent phase of the mission was near perfect. The results of the analysis indicate that the in-plane system navigation components were within  $1\sigma$  of ideal performance. With the exception of Stage II guidance initiation, the maximum IGS pitch and yaw attitude errors seen during flight were less than  $2.1^\circ$  and  $1^\circ$ , respectively. The yaw attitude error signal anomaly which was observed in the flight at SECO +4 seconds was reproduced in the post-flight reconstruction. No other anomalies were noted.

I. Introduction

This report presents the results of the analysis of the performance of the on-board computer during the Ascent phase of the GT-5 flight.

The purpose of this study was to verify that no anomalies occurred in the computer or its program during the Prelaunch and Ascent phases of the flight. The study was made using the Operational Program interpretive simulation which executes a Gemini computer program tape (magnetic) on the 7090 DPS. The simulation uses fixed point arithmetic and Gemini computer word length. Also, several associated simulation runs were made using the FORTRAN model of the GDC Ascent mode. The implementation of the study is discussed in detail in Reference 1. The results obtained from the analysis of the GT-5 flight are discussed in the sections to follow.



## II. Discussion of Ascent Flight Reconstruction

Appendix AA contains a tabulation of the DAS data obtained from the GT-5 flight. The data was obtained from one telemetry station and, therefore, has several discrete areas where data is incorrect or missing. However, the DAS parameter time histories are sufficiently complete to allow comparison with the flight reconstruction data which is included in graphical form in Appendix AB. The data presented in Appendix AB was derived using the GT-5 Operational Program as simulated on the 7090 DPS. This simulation performs all the Gemini arithmetic and logic operations in a manner identical to the GDC including fixed point arithmetic and parameter scaling. Additional details on the operation of this simulation as well as suggested improvements to the techniques used are described in Reference 1. These improvements have as yet not been implemented since authorization to do so has not been obtained.

The remainder of this section describes and explains the various data obtained from the flight and through mission reconstruction. It is divided into the following general areas of interest:

- A. Gimbal Angle and Attitude Error Behavior
- B. Position and Velocity Comparisons
- C. Platform Azimuth Alignment
- D. IGS Injection Conditions
- E. Navigation Accuracy
- F. IVAR and IVI Operation
- G. IGS Discrettes and Lift-off Synchronization

## II. A. Gimbal Angle and Attitude Error Behavior

Figures 1 through 3 present a comparison of the primary and back-up system attitude errors. Inspection of the IGS attitude errors from lift-off through SECO revealed no unusual or unexpected behavior. The yaw attitude error signal anomaly at SECO +4 seconds which was observed in the flight data was reproduced in the post flight reconstruction.

The differences noted in the Stage I pitch attitude error are believed due to pitch programmer error in the primary system and pitch program start time uncertainties in the back-up system. It is noted that the pitch attitude error signal increases to approximately  $+1.1^\circ$  when Step I of the pitch program occurs. Evaluation of the telemetry data indicates that the IGS started its pitch program at approximately 22.8 seconds. This is .22 seconds before the programmed time of 23.04 seconds but within the anticipated range of  $23.04 \pm .28$  seconds. Also, the DAS data indicates that at 24.15 seconds, the pitch gimbal angle read  $90.036^\circ$ . In the time interval from 22.82 to 24.15 seconds, the IGS would have computed the vehicle should pitch down to  $89.06^\circ$ , resulting in an error signal of  $+1^\circ$ , which agrees closely with the value of  $1.1^\circ$  recorded by the DAS.

At Stage II guidance initiation the IGS pitch attitude error reached a maximum of  $+11.4^\circ$ . This is considerably smaller than the maximum value of  $+23^\circ$  seen on the GT-3 flight and smaller than the GT-4 flight where it reached  $+14^\circ$ . Thus the changes to the pitch program made for the GT-4 and GT-5 missions resulted in a significant improvement.

During Stage II operation, the IGS pitch attitude error signal remains less than one degree after the initial pitch down maneuver is completed at guidance initiate. Examination of Figure I will show that the IGS pitch attitude error signal deviates noticeably from the RGS signal near 223, 293 and 325 seconds. The first deviation at 223 seconds results when the final steering loss terms are included in the guidance computations at 110 seconds before shutdown.

The subsequent deviations directly reflect changes in the pitch attitude of the vehicle. This can readily be verified by examining Figure 14, which shows the pitch steering parameters obtained from the FORTRAN reconstruction run. This plot shows the pitch gimbal angle,  $\theta_b$ , the computed value of vehicle pitch attitude with respect to local horizontal,  $\beta_{PM}$ , and the commanded value of vehicle thrust pitch attitude with respect to local horizontal  $\beta_{PN}$ . The difference between  $\beta_{PN}$  and  $\beta_{PM}$  is used in generating the IGS pitch attitude error signal. As expected,  $\beta_{PN}$  is approximately a monotonic decreasing function (the apparent noise on  $\beta_{PM}$  and  $\beta_{PN}$  results from the linear interpolation at DAS accelerometer data used in the reconstruction).

II. A. (Continued)

The quantity  $\beta_{PM}$  resembles the pitch gimbal angle quite closely although the effects of the rapidly increasing down range position is noticeable late in the flight. With reference to the IGS attitude error signal action beginning at 283 seconds, note that the pitch attitude rate of the vehicle changes at this point and the measured pitch attitude remains nearly constant. Since  $\beta_{PN}$  continues to decrease at a nearly constant rate, the IGS attitude error signal starts to increase positively (pitch down) and changes from approximately  $-0.75^\circ$  at 283 seconds to  $+0.4^\circ$  at 298 seconds. At this time, the vehicle pitches down more rapidly and the measured attitude decreases more rapidly than the commanded attitude. This causes the IGS error signal to decrease. At about 305 seconds, the two attitudes are decreasing at about the same rate and the IGS error signal remains relatively constant until about 320 seconds when the above described sequence of events is approximately duplicated. It is believed that the changes noted in the vehicle pitch attitude rate may be due to the filtering or smoothing used in the primary system which is controlling the vehicle.

The yaw attitude error signal seen in Figure 2 indicates good agreement between the IGS and RGS systems during Stage I operation. During Stage II the behavior of the yaw attitude error signals is very similar to that seen in earlier flights. The difference between the primary and back-up system attitude error in general is less than  $1^\circ$ . As SECO is approached it is noted that the IGS error is changing rapidly, increasing to near  $-1^\circ$  just prior to SECO. This is evidently due to the out-of-plane velocity measured by the IGS which requires a yaw right correction by the launch vehicle to null the component.

The roll attitude error comparison provided in Figure 3 readily illustrates several perturbations which are affecting the roll orientation of the vehicle on the flight. The most obvious are the engine misalignments along the roll axis (note the change in roll error at staging) and the TARS roll gyro drift rates at high acceleration (note the change in IGS roll error between 100 and 150 seconds and 270 to 330 seconds). The affects are somewhat similar to or less than those seen on GT-3 and GT-4.

Inspection of the roll gimbal angle data indicate the vehicle rolled  $12.78^\circ$  during the roll program as compared to  $12.867^\circ$  which was desired.

II. A. (Continued)

Immediately following SECO the IGS pitch attitude error signal increases in the positive direction, going from  $-0.6^\circ$  to a maximum of about  $+4^\circ$  near 343 seconds; then decreases to about  $-5^\circ$  just before separation. This action reflects vehicle attitude changes during this period; the corresponding pitch gimbal angles at the referenced points are  $-13.4$ ,  $-8.9$  and  $-18.4$ . The yaw attitude of the vehicle also changes during this SECO- separation period. At SECO, the yaw gimbal is about  $-0.4^\circ$  and slowly changes to  $-4.4^\circ$  at 345 seconds. It then slowly reverses and returns to  $-3.6^\circ$  at about 352 seconds. The yaw attitude error signal changes to reflect the yaw attitude change for about the first four seconds after SECO, changing from  $-0.86^\circ$  to about  $-2.5^\circ$  at about 336-337 seconds. It then abruptly changes to  $-0.65^\circ$  and remains near this value until the spacecraft attitude error signals are generated at SECO +20 seconds. A program error was found which caused this anomaly. In the Ascent fast loop the difference between measured and commanded yaw gimbal angles ( $\Delta\psi$ ) is multiplied by the variable N22 (sine of roll gimbal angle) when transforming the attitude error signals from the platform frame to the GLV frame. The N22 quantity is computed once every slow loop until the SECO countdown is commenced. It was found that N22 is synonymous with the variable TX which is used in other modes. At SECO plus approximately four seconds, the IVI routine is entered to display the velocity corrections for orbit adjustment (IVAR) and TX is set equal to 100. Since TX is scaled B17 and N22 is scaled B1, the net result is that the value used as N22 in the ascent fast loop becomes very small (.0015). When the measured yaw attitude error  $\Delta\psi$  is multiplied by the "new" value of N22, the result is insignificant and yaw control is lost. During the flight, the yaw attitude error signal dropped to  $-0.65^\circ$ , not zero, because the contribution of other terms (notably  $\psi_0'$ ) used in computing the GLV signal was not affected by the N22 problem. This program error has been corrected and a new tape generated for subsequent flights using MF6.

The attitude error signals generated for the spacecraft at SECO +20 seconds for the orbit adjustment (IVAR) are discussed in Section II-F, IVAR and IVI operation.

## II. B. Position and Velocity Comparisons

Table 1 compares the in-flight DAS navigation data with similar data derived from mission reconstruction using the FORTRAN and Operational Program simulations. Inspection of this data indicates that a bit-for-bit comparison was not obtained in either reconstruction simulation, nor is it immediately obvious that one simulation provides a better reproduction of the flight than the other.

It should be noted that no DAS data was available for this flight from 45 to 60 seconds and from 72 to 86 seconds. The missing data was synthesized by interpolation using the data surrounding the vacant areas. This process was fairly successful, as can be noted by the small errors which are present at 98.028 seconds.

The largest position difference between the flight results and those obtained through reconstruction is seen in the Y component of the FORTRAN Run (183 feet at 359 seconds). Inspection will show that the FORTRAN result is within 13 feet of the Operational Program result. The major contributor to the 183 foot difference appears to be linear interpolation of data between DAS frames.

The reconstructed velocities are within 0.5 fps of the flight values. The velocity differences which exist at the end of the reconstruction are attributable to several factors. These are interpolation of missing data, linear interpolation of data between DAS data frames, differences caused by the fixed point vs. floating point arithmetic of the simulations and different navigation error growth characteristics between the FORTRAN and operational programs. These factors have been discussed in detail in previous post flight analysis reports. Since the velocity and position differences for this flight reconstruction are so small, a detailed analysis to precisely isolate the various error contributions did not seem warranted.

~~CONFIDENTIAL~~

TABLE 1 - POSITION AND VELOCITY COMPARISON

		<u>Position (Feet)</u>			<u>Velocity (fps)</u>		
		<u>X</u>	<u>Y</u>	<u>Z</u>	<u>V<sub>X</sub></u>	<u>V<sub>Y</sub></u>	<u>V<sub>Z</sub></u>
Prior to Platform Release	Flight	-17328	-20909920	-56184	1282.359	0	-395.465
	Fortran	-17324	-20909916	-56178	1282.361	0	-395.463
	Op. Pgm.	-17324	-20909917	-56184	1282.382	0	-395.385
After Platform Release	Flight	-16360	-20909920	-56480	1282.761	-.027	-394.410
	Fortran	-16356	-20909916	-56476	1282.753	-.049	-394.424
	Op. Pgm.	-16356	-20909917	-56481	1282.765	-.047	-394.409
After Lift-off 4.688	Flight	-7188	-20910032	-59172	1282.121	-47.046	-394.058
	Fortran	-7184	-20910031	-59295	1282.106	-47.028	-394.078
	Op. Pgm.	-7182	-20910032	-59301	1282.124	-47.016	-394.057
Before Update 98.028	Flight	160952	-20986120	-94272	3375.961	-1771.695	-333.547
	Fortran	161019	-20986011	-94250	3375.877	-1771.729	-333.642
	Op. Pgm.	161020	-20986016	-94249	3375.961	-1771.555	-333.543
Between Updates 133.707	Flight	332428	-21063236	-105672	6562.203	-2558.500	-255.883
	Fortran	332511	-21063111	-105659	6562.085	-2558.540	-256.023
	Op. Pgm.	332518	-21063118	-105640	6562.241	-2558.304	-255.755
Following Updates 150.624	Flight	462012	-21110436	-109552	8876.695	-3043.601	-203.375
	Fortran	462120	-21110313	-109540	8876.567	-3043.629	-203.251
	Op. Pgm.	462125	-21110321	-109526	8876.722	-3043.361	-203.287

Flight - DAS Flight Data

Fortran - Fortran Flight Reconstruction Results

Op. Pgm. - Operational Program Flight Reconstruction Results

TABLE 1 (Continued)

~~CONFIDENTIAL~~

		Position (Feet)			Velocity (fps)		
		X	Y	Z	V <sub>X</sub>	V <sub>Y</sub>	V <sub>Z</sub>
After	Flight	797060	-21207576	-115908	10717.273	-2503.839	-182.378
Stage II	Fortran	797129	-21207429	-115902	10717.121	-2503.904	-182.543
Initiate	Op. Pgm.	797141	-21207429	-115880	10717.297	-2503.610	-182.296
184.428							
Prior to	Flight	2975732	-21229116	-138212	23331.820	3076.508	-119.121
SECO	Fortran	2975834	-21228945	-138244	23331.563	3076.451	-119.366
323.098	Op. Pgm.	2975882	-21228933	-138186	23331.819	3076.695	-119.047
After	Flight	3282052	-21184852	-139576	25481.652	3960.199	-100.250
SECO	Fortran	3282106	-21184686	-139610	25481.383	3960.116	-100.501
335.572	Op. Pgm.	3282160	-21184672	-139549	25481.650	3960.356	-100.174
Near	Flight	3700972	-21115540	-141192	25419.710	4461.460	-96.320
SECO +20	Fortran	3701014	-21115373	-141225	25419.257	4461.350	-96.580
352.028	Op. Pgm.	3701074	-21115360	-141161	25419.540	4461.607	-96.240
Near	Flight	3893112	-21080928	-141916	25382.078	4690.875	-94.789
SECO +25	Fortran	3893155	-21080758	-141950	25381.636	4690.774	-95.051
359.592	Op. Pgm.	3893217	-21080745	-141884	25381.924	4691.034	-94.707

Flight - DAS Flight Data  
Fortran - Fortran Flight Reconstruction Results  
Op. Pgm. - Operational Program Flight Reconstruction Results

~~CONFIDENTIAL~~

II. C. Platform Azimuth Alignment

Reconstruction of the in-flight DAS data indicated that the platform roll gimbal angle at the time of platform release was almost within one quanta ( $.036^\circ$ ) of the value desired by the IGS. The value read by the GDC was 77.940 degrees (2165 quanta) and the commanded roll gimbal angle was 77.896 degrees.

The in-flight results indicated that both azimuth updates were received and properly used by the GDC. Table 2 lists the platform azimuth alignment values obtained from the flight reconstruction runs. The difference in misalignment estimates after the 140 second update is less than  $6 \text{ sec}$  and would contribute less than a 0.75 ft/sec out-of-plane velocity difference at SECO.



TABLE 2

PLATFORM AZIMUTH ALIGNMENT

<u>Time</u>	<u>Fortran Results (Degrees)</u>	<u>Operational Program Results (Degrees)</u>
Platform Release	+0.04574	+0.04329
105 seconds	-0.27458	-0.27052
145 seconds	-0.26636	-0.26470

Values of  $V_{ZG}$  received by the IGS via DCS from the Burroughs system were -319.5 at 105 seconds and -204.0 at 145 seconds.

Differences between the final Fortran and Operational Program results above is approximately  $6 \text{ sec}$  or equivalently a 0.75 ft/sec out-of-plane velocity error at SECO.

**CONFIDENTIAL**

II. D. IGS Injection Conditions

Table 3 presents the IGS measured injection conditions obtained during the flight and those obtained from the post-flight reconstruction simulations. Column 4 of the table lists the IGS navigation errors as measured by STL. These errors have been combined with the X, Y, and Z velocity and position data from the flight, to derive the actual X, Y, and Z velocity and position achieved in the flight, which is given in Column 4. The insertion parameters quoted in Column 4 were computed from the corrected X, Y, Z data and should thus represent the actual insertion conditions achieved in the flight ( $V_1$  may be in error by 1 to 2 FPS since the reconstruction value for platform misalignment had to be used in its computation). The indicated IGS navigation errors in terms of the insertion parameters are thus 2.7 FPS in total velocity, -1.2 FPS in radial velocity, -3.6 FPS in out-of-plane velocity and -28 feet in altitude.

The IGS targeting quantities were biased to account for anticipated navigation errors of 1.8 FPS in X-velocity, 1.3 FPS in Y-velocity, and zero in Z-velocity. It is noted that the in-plane velocity errors realized exceeded the anticipated errors by .6 FPS in X and .7 FPS in Y-velocity and the out-of-plane velocity error was 3.2 FPS. It is concluded that had a switchover to the IGS been made early in the flight, the IGS would have achieved the desired insertion conditions within the specified tolerances. (The yaw attitude error signal anomaly at SECO +4 seconds would not have significantly affected the out-of-plane velocity since most of the cut-off impulse thrust had been realized when it occurred.)

**CONFIDENTIAL**

~~CONFIDENTIAL~~

TABLE 3 - IGS INJECTION CONDITIONS

(At Approximately SECO +20:354.784)

	IGS Flight Values <sup>(1)</sup>	FORTTRAN Reconstruction <sup>(3)</sup>	Operational Program Reconstruction <sup>(3)</sup>	IGS Navigation Error <sup>(4)</sup>	Corrected IGS Flight Values <sup>(5)</sup>
V <sub>X</sub>	25405.008	25404.545	25404.830	2.4	25402.608
V <sub>Y</sub>	4544.637	4544.542	4544.801	2.0	4542.637
V <sub>Z</sub>	- 95.809	- 96.069	- 95.728	- 3.6	- 99.409
X	3770988	3771042	3771102	490	3770498
Y	- 21103136	- 21102964	- 21102951	115	- 21103251
Z	- 141456	- 141491	- 141425	- 100	- 141556
V	25808.474	25808.002	25808.312		25805.773
R	21437880	21437720	21437712		21437908
V <sub>R</sub>	- 4.224	- 4.109	- 4.247		- 3.258
V <sub>L</sub>	9.421 <sup>(2)</sup>	9.524	9.131		+ 5.812
M	-.000163	-.000159	-.000165		-.000126

- (1) IGS parameters listed were obtained from in-flight DAS data.
- (2) Out-of-plane velocity was calculated using platform misalignment obtained from flight reconstruction data.
- (3) FORTRAN and Operational Program results were obtained from reconstruction of the flight using DAS accelerometer and gimbal angle data.
- (4) IGS navigation data obtained from STL, error defined as IGS-tracking data.
- (5) IGS flight values corrected for navigation errors.

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

II. E. Navigation Accuracy

Table 3 quotes the IGS velocity and position errors at SECO + 20. As can be noted, the worst velocity error is seen along the Z-axis (perpendicular to the orbit plane). From the platform performance standpoint, this flight surpassed the accuracies obtained during Ascent on any previous flight. The in-plane component platform errors (X and Y-axis) were on the order of 2 FPS at SECO and the out-of-plane error was approximately 4 FPS. Thus, platform performance was within  $1 \sigma$  of nominal.

~~CONFIDENTIAL~~

II. F. IVAR and IVI Operation

The attached table lists the IVI and FDI readings following SECO +20 seconds. These readings were obtained from the post flight reconstruction simulation. The roll attitude error is initially saturated (unlimited value is  $89^{\circ}$ ) indicating the spacecraft should be rolled upright. The yaw attitude error is also saturated (unlimited value  $-47^{\circ}$ ). This signal indicates yaw right and is large because the out-of-plane velocity to be gained is comparable to the in-plane velocity to be gained. The out-of-plane velocity is displayed on the Z meter while the spacecraft is rolled over. The pitch attitude error signal is  $-8^{\circ}$  indicating pitch up is required. The astronaut begins to thrust forward at about 358 seconds and completes thrusting at about 366 seconds, gaining about 7 fps. The spacecraft is rolled upright starting at this time and reaches the heads-up position at about 379 seconds. At the completion of the separation maneuver, the IVI indicate a deficiency of 3 fps forward in-plane and a deficiency of 11 fps out-of-plane.

TABLE 4 - IVAR OPERATION

<u>Time</u> <u>(sec)</u>	<u>IVI-X</u> <u>(fps)</u>	<u>IVI-Y</u> <u>(fps)</u>	<u>IVI-Z</u> <u>(fps)</u>	<u><math>\Delta\theta_b</math></u> <u>(Deg)</u>	<u><math>\Delta\psi_b</math></u> <u>(Deg)</u>	<u><math>\Delta\phi_b</math></u> <u>(Deg)</u>
353.9	9	-1	-10	-7.4	-46.9	88.7
355.9	9	-1	-10	-9.3	-48.2	89.5
357.9	8	-2	-10	-10.5	-53.0	90.0
358.7	7	-1	-10	-10.7	-56.2	90.0
359.6	6	-1	-10	-10.9	-60.1	90.1
360.7	5	-1	-10	-11.0	-61.3	90.3
363.5	5	-1	-10	-11.2	-65.4	90.6
364.4	4	-1	-10	-11.1	-66.9	90.6
365.5	4	+1	-10	-10.9	-69.8	81.4
366.5	3	+3	-10	-10.8	-73.4	73.3
367.5	3	4	-10	-10.7	-73.7	65.5
368.3	3	5	-9	-10.6	-74.5	58.7
369.2	3	6	-9	-10.5	-75.3	51.9
370.3	3	7	-8	-10.5	-75.1	44.1
371.3	3	8	-7	-10.5	-74.1	37.3
374.0	3	9	-7	-10.4	-76.2	35.8
375.1	3	9	-6	-10.3	-75.7	32.2
376.1	3	9	-6	-10.2	-75.2	29.0
377.1	3	10	-4	-9.5	-75.3	20.1
378.0	3	11	-3	-9.0	-75.3	12.3
378.8	3	11	-1	-8.4	-75.5	4.5
379.9	3	11	+1	-2.2	-74.7	-5.1
380.2	3	11	+1	-0.8	-75.0	-7.4
381.9	3	11	1	-0.3	-75.1	-6.3
383.6	3	11	1	+0.1	-75.5	-5.3
385.7	3	11	1	+0.9	-74.0	-4.8
388.4	3	11	1	+1.5	-74.4	-4.3
390.5	3	12	0	2.3	-74.9	-1.5
393.2	3	12	0	2.9	-74.8	-1.3
395.3	3	12	0	3.5	-75.6	-1.5

## II. G. IGS Discretes and Lift-off Synchronization

Detailed analysis of IGS time since lift-off, " $t_{DAS}$ " and comparison with range time provides an estimate of lift-off synchronization (See Reference 1 Section IV.G). On this flight the analysis indicated the IGS was  $20 \pm 15$  milliseconds late in the determination of lift-off. An error of 9 milliseconds is known to exist in a program constant used in lift-off determination (See IBM Report #65-554-0042, Reference 3). This error results in an apparent delay in IGS lift-off synchronization. Thus the synchronization accuracy obtained from this flight appears reasonable

Table 5 presents a list of various discrete events issued or controlled by the IGS.

It was determined that the IGS SECO discrete was issued at a  $t_{DAS}$  time of  $333.234 \pm .003$  seconds. The  $t_{DAS}$  time is lagging real time by  $0.020 \pm 0.015$  seconds at lift-off but the analysis indicates that the clock is running fast at about 50 ppm. Therefore, at the time the SECO discrete is issued, about 0.017 seconds have been gained and the corrected time for delivery of the IGS SECO discrete is  $333.237 \pm 0.015$  seconds after lift-off. A preliminary value quoted by Aerospace for RGS SECO time is 333.258 seconds.

Analysis of the IGS velocity data in the area near SECO provides an estimate of  $93 \pm 5$  fps for the Stage II engine cutoff impulse.

TABLE 5 - IGS DISCRETE EVENTS

<u>Time (1)</u> <u>(sec)</u>	<u>Event</u>	<u>Comments</u>
-3.641/-3.22	Platform Release	Based on reconstruction of the IGS position and velocity data in the time period prior to platform release through lift-off.
0	Lift-off	IGS lift-off sync was late by 20 <u>±</u> 15 m seconds.
10.34	Roll Program Initiate	
20.284	Roll Program Termination	
22.802	Start Pitch Step 1	
88.03	Start Pitch Step 2	
104.72	Gain Change	
107.44	Receipt of First Update (Value -319.5 FPS)	Time quoted is DAS time in mode when update is seen on telemetry.
119.28	Start Pitch Step 3	
146.21	Receipt of Second Update (Value -204.0 FPS)	Time quoted is DAS time in mode when update is seen on telemetry.
167.97	Time Stage II Guidance Initiate	Time quoted is the time at which attitude error signals, generated by the IGS Stage II equations, are first sent to the autopilot.

(1) All times are quoted based on GDC clock readings. The times are not corrected for lift-off sync errors.



TABLE 5 (Continued)

<u>Time</u> <u>(sec)</u>	<u>Event</u>	<u>Comments</u>
333.237	IGS SECO (Uncertainty <u>+3.0 msec</u> )	Time quoted is based on the GDC clock reading just after the SECO discrete is issued. Lift-off time synchronization error and clock drift are accounted for in quoted time.
354.72 (1)	IVAR Initiation	Time is again quoted to reflect the time at which IVAR attitude errors are first displayed.

(1) All times are quoted based on GDC clock readings. The times are not corrected for lift-off sync errors.

III. Conclusions

The following conclusions are formed based on the analysis performed and documented in this report:

1. IGS system performance during the Ascent portion of this mission up to SECO + 4 seconds was near perfect. At that time the yaw attitude error signal anomaly appeared (See Section II-A). This was caused by a program error which has since been corrected. Other than this anomaly, no discrepancies were found.
2. IGS navigation errors at SECO + 20 were approximately +2.4, +2.0, and -3.6 FPS on the X, Y, and Z-axes, respectively. This resulted in IGS errors of approximately 2.5 FPS in velocity magnitude and 3.6 FPS in the out-of-plane direction.
3. IMU performance was within 1  $\sigma$  of nominal.
4. With the exception of the attitude errors seen at Stage II guidance initiation, the maximum IGS pitch and yaw attitude error seen during flight were less than 2.1° and 1° respectively.
5. IGS was successful in accepting airborne azimuth updates and reducing what could have been a potential 118 FPS out-of-plane velocity error to one less than 9 FPS. The calculated platform misalignment on this flight was on the order of -.26°.
6. IGS lift-off synchronization was established late by 20 ± 15 milliseconds.

IV. Recommendations

The analysis performed did not result in any recommendations in the GDC analytic equation area. Several recommendations were made as a result of the analysis of the GT-4 flight (Reference 2). These were as follows:

- 1) Sequence  $\eta_X$ ,  $V_{ZG}$ ,  $SF_X$ ,  $SF_Y$ ,  $SF_Z$  and time of IGS SECO by multiplexing the DAS word position now allotted to  $V_{ZG}$ .
- 2) Add IGS SECO discrete to Martin telemetry to be sampled at 400 cps rate.
- 3) Use "START COMP" pushbutton in Ascent mode to eliminate undesirable entry into the Ascent mode after Ascent guidance is completed.

Of these recommendations, the first has been implemented in Math Flow 7.

GT5

ASCENT

TIME	PITCH	YAW	ROLL	SFXP	SFYP	SFZP	VELX	VELY	VELZ	PERR
4.295	90.180	0.036	78.336	804.338	-442.831-592406.734	1282.179	-42.973	-394.084	0.168	
6.695	90.180	0.035	78.300	802.117	-444.000-593448.922	1281.827	-67.657	-393.887	0.211	
9.095	90.180	0.004	78.300	801.251	-444.000-594506.266	1281.458	-93.601	-394.031	0.174	
11.495	90.180	-0.001	80.194	799.655	-443.366-595570.477	1281.172	-120.528	-393.828	0.179	
13.895	90.211	-0.031	83.183	799.452	-444.840-596646.383	1281.039	-148.527	-393.572	0.187	
16.295	90.217	-0.100	86.177	798.791	-447.593-597736.594	1280.757	-177.903	-393.317	0.217	
18.695	90.248	-0.111	89.137	796.499	-453.441-598838.625	1280.319	-208.396	-392.656	0.220	
21.095	90.222	-0.108	90.989	795.814	-458.725-599956.047	1280.027	-240.421	-392.062	0.214	
23.495	90.056	-0.140	91.144	798.048	-462.672-601090.336	1280.014	-274.097	-391.594	0.973	
25.895	88.346	-0.086	91.110	814.908	-466.465-602241.602	1281.458	-309.446	-391.140	0.932	
28.295	86.563	-0.152	91.147	864.977	-470.955-603408.930	1286.046	-346.177	-390.643	0.801	
30.695	84.356	-0.256	91.151	954.014	-476.562-604590.703	1294.863	-384.708	-389.990	0.671	
33.095	82.673	-0.361	91.115	1085.619	-486.268-605785.977	1307.866	-424.430	-388.924	0.573	
35.495	80.935	-0.431	91.185	1261.201	-501.069-606991.328	1325.201	-465.105	-387.380	0.440	
37.895	79.201	-0.532	91.157	1479.724	-517.548-608209.508	1346.859	-507.078	-385.658	0.367	
40.295	77.527	-0.576	91.119	1739.009	-538.073-609440.914	1372.604	21792.281	-383.537	0.391	
42.695	75.952	-0.549	91.085	1366.348	-557.627-610682.852	1402.363	2031.096	-381.343	0.436	
45.095	74.005	-0.500	91.081	2207.606	-572.960-611937.078	1435.688	-2237.224	-379.864	0.563	
47.495	72.106	-0.462	91.072	3791.609	-587.706-613201.492	1502.809	-686.909	-378.465	0.703	
49.895	70.278	-0.429	91.056	5089.038	-602.079-614474.328	1607.891	-734.433	-377.049	0.847	
52.295	68.536	-0.403	91.032	6174.191	-616.027-615755.742	1749.765	-782.779	-375.641	0.993	
54.695	66.880	-0.383	91.000	7047.069	-629.551-617045.734	1928.431	-831.947	-374.242	1.140	
57.095	65.312	-0.369	90.959	7707.671	-642.651-618344.312	2143.889	-881.936	-372.851	1.289	
59.495	63.830	-0.362	90.911	8155.998	-655.326-619651.469	2396.139	-932.746	-371.469	1.439	
61.895	62.436	-0.362	90.854	8392.049	-667.576-620967.187	2685.182	-984.377	-370.095	1.592	
64.295	61.127	-0.368	90.789	8415.824	-679.402-622291.500	3011.016	-1036.830	-368.729	1.746	
66.695	59.906	-0.380	90.717	8227.324	-690.804-623624.391	3373.642	-1090.104	-367.372	1.901	
69.095	58.662	-0.415	90.647	7830.188	-712.015-625006.789	3767.646	-1144.193	-283.561	2.009	
71.495	56.780	-0.557	90.648	8615.279	-4653.932-642081.672	2123.805	-1196.748	31394.994	1.725	
73.895	54.928	-0.681	90.642	9465.834	-7365.437-654220.984	961.625	-1249.297	52725.423	1.499	
76.295	53.086	-0.797	90.631	10382.990	-8745.432-661019.102	323.916	-1301.819	62870.461	1.306	
78.695	51.260	-0.903	90.616	11366.356	-8828.615-662615.234	195.987	-1354.322	62117.445	1.153	
81.095	49.450	-0.997	90.595	12415.932	-7614.983-659009.367	577.837	-1406.806	50466.375	1.039	
83.495	47.654	-1.081	90.569	13531.720	-5104.537-650201.508	1469.466	-1459.271	27917.254	0.965	
85.895	45.875	-1.154	90.539	14713.717	-1297.278-636191.656	2870.874	-1511.716	-5529.924	0.931	
88.295	44.393	-1.034	90.483	15987.150	-765.398-635226.891	2795.500	-1561.519	-1115.245	0.989	
90.695	43.037	-0.936	90.429	17336.206	-876.379-636803.016	2930.630	-1611.056	-347.590	1.100	
93.095	41.999	-1.236	90.425	18725.980	-917.943-638121.820	3069.681	-1663.459	-343.341	1.235	
95.495	40.682	-1.074	90.346	20183.676	-969.015-639438.766	3215.534	-1715.712	-338.147	1.152	
97.895	39.660	-1.202	90.323	21700.832	-1011.869-640763.078	3367.339	-1768.722	-333.766	1.302	
100.295	38.459	-1.263	90.325	23286.872	-1067.061-642088.805	3526.039	-1821.912	-328.160	1.248	
102.695	37.323	-1.114	90.215	24943.178	-1114.599-643413.391	3691.193	-1874.933	-323.437	1.326	
105.095	36.244	-1.062	90.186	26669.935	-1160.220-644738.398	3863.258	-1928.181	-321.140	1.559	
107.495	35.192	-1.087	90.212	28467.252	-1208.038-646064.492	4042.219	-1981.634	-320.941	1.893	
109.895	33.924	-1.165	90.174	30336.395	-1257.174-647397.836	4229.263	-2035.747	-315.923	1.808	

GT5

ASCENT

TIME	PITCH	YAW	ROLL	SFXP	SFYP	SFZP	VELX	VELY	VELZ	PERR
112.295	32.563	-1.149	90.100	32289.917	-1307.240	-648722.906	4424.763	-2089.098	-310.797	1.604
114.695	31.255	-1.423	90.071	34329.878	-1361.692	-650029.469	4628.916	-2140.718	-305.255	1.511
117.095	29.789	-1.586	90.036	36461.803	-1428.266	-651320.031	4841.800	-2190.891	-298.394	1.228
119.495	28.649	-1.521	89.998	38687.293	-1497.859	-652592.102	5064.580	-2239.162	-291.494	1.056
121.895	27.853	-1.271	89.953	41005.887	-1566.983	-653845.750	5297.069	-2285.695	-284.472	1.015
124.295	27.694	-1.134	89.881	43400.039	-1625.505	-655136.258	5536.677	-2335.930	-278.523	1.317
126.695	27.368	-0.995	89.896	45871.790	-1681.372	-656454.680	5784.034	-2388.942	-272.834	1.605
129.095	26.976	-0.973	89.892	48436.969	-1734.450	-657805.203	6040.736	-2445.165	-267.425	1.752
131.495	26.304	-1.083	89.855	51099.316	-1788.859	-659176.664	6306.432	-2503.627	-262.053	1.643
133.895	25.656	-1.139	89.832	53870.238	-1851.507	-660562.977	6583.928	-2563.406	-255.601	1.570
136.295	25.027	-1.145	89.815	56752.827	-1923.455	-661963.781	6872.904	-2624.657	-248.249	1.538
138.695	24.523	-1.064	89.778	59751.345	-1987.780	-663387.000	7172.958	-2688.232	-241.726	1.608
141.095	24.039	-1.125	89.786	62881.274	-2055.814	-664836.336	7486.164	-2754.437	-234.834	1.660
143.495	23.435	-1.154	89.745	66147.991	-2128.551	-666312.398	7813.063	-2823.336	-227.483	1.605
145.895	22.927	-1.115	89.748	69563.960	-2204.625	-667813.023	8155.130	-2894.406	-219.839	1.645
148.295	22.345	-1.134	89.720	73143.260	-2284.528	-669341.312	8513.487	-2968.636	-211.710	1.644
150.695	21.722	-1.190	89.657	99999.000	-2368.541	-670898.234	99999.000	-3045.908	-203.118	1.622
153.095	21.212	-1.186	89.508	80799.529	-2456.969	-672480.828	9278.602	-3125.528	-194.224	1.687
155.495	20.033	-0.082	88.761	81928.356	-2483.330	-672968.648	9390.785	-3097.702	-191.387	1.049
157.895	19.763	-0.242	88.866	83008.700	-2488.359	-673317.883	9497.743	-3056.329	-190.647	1.297
160.295	19.217	-0.253	88.885	83974.836	-2492.369	-673681.070	9592.557	-3016.450	-190.225	1.281
162.695	18.819	-0.290	88.894	85005.941	-2498.492	-674045.602	9694.229	-2976.722	-189.341	1.192
165.095	18.564	-0.326	88.879	86059.520	-2506.211	-674408.992	9798.309	-2936.856	-188.150	1.042
167.495	18.540	-0.314	88.844	87127.841	-2511.683	-674777.898	9903.500	-2897.677	-187.366	2.323
169.895	17.493	-0.243	88.848	88212.534	-2518.520	-675147.687	10010.260	-2858.636	-186.442	11.301
172.295	12.463	-0.213	88.848	89329.282	-2523.369	-675481.664	10120.167	-2816.134	-185.714	6.470
174.695	7.735	-0.216	88.848	90482.887	-2528.239	-675719.641	10233.710	-2764.322	-184.982	2.247
177.095	5.182	-0.211	88.848	91667.014	-2532.111	-675866.664	10350.249	-2703.644	-184.345	-0.054
179.495	4.545	-0.141	88.848	92871.308	-2536.001	-675975.016	10468.733	-2639.265	-183.703	-0.507
181.895	4.080	-0.147	88.848	94092.575	-2539.885	-676072.281	10588.844	-2573.844	-183.062	-0.694
184.295	3.693	-0.106	88.848	95329.499	-2543.782	-676160.344	10710.443	-2507.564	-182.415	-0.764
186.695	3.342	-0.108	88.848	96583.794	-2545.913	-676240.656	10833.699	-2440.618	-181.944	-0.864
189.095	3.026	-0.108	88.848	97857.414	-2547.787	-676312.633	10958.424	-2373.425	-181.411	-0.871
191.495	2.779	-0.074	88.848	99149.794	-2551.358	-676382.555	11085.514	-2304.748	-180.731	-0.969
193.895	2.503	-0.063	88.848	100457.724	-2554.430	-676446.703	11213.894	-2236.337	-180.259	-1.015
196.295	2.219	-0.078	88.854	101780.915	-2556.189	-676503.375	11343.944	-2167.557	-179.874	-0.993
198.695	2.047	-0.107	88.883	103125.090	-2557.104	-676555.508	11475.784	-2098.118	-179.516	-0.939
201.095	1.834	-0.073	88.845	104490.168	-2558.156	-676605.656	11609.643	-2028.517	-179.143	-0.976
203.495	1.621	-0.107	88.848	105872.881	-2561.170	-676650.055	11745.176	-1958.386	-178.575	-0.896
205.895	1.378	-0.073	88.848	107274.891	-2565.044	-676688.836	11882.558	-1887.792	-177.923	-0.849
208.295	1.211	-0.115	88.848	108698.640	-2565.007	-676721.883	12022.030	-1816.657	-177.657	-0.850
210.695	0.952	-0.107	88.848	110147.064	-2568.822	-676751.148	12163.885	-1745.206	-177.006	-0.857
213.095	0.748	-0.108	88.886	111614.273	-2570.941	-676775.727	12307.531	-1673.367	-176.525	-0.794
215.495	0.462	-0.108	88.847	113105.282	-2574.599	-676792.031	12453.470	-1600.733	-175.887	-0.854
217.895	0.254	-0.108	88.848	114618.881	-2578.571	-676803.891	12601.158	-1528.216	-175.328	-0.777

GT5

ASCENT

TIME	PITCH	YAW	ROLL	SFXP	SFYP	SFZP	VELX	VELY	VELZ	PERR
220.295	0.009	-0.108	88.882	116157.726	-2580.850-676807.305	12751.469	-1454.185	-174.749	-0.674	
222.695	-0.167	-0.094	88.879	117720.254	-2583.562-676804.484	12904.441	-1379.848	-174.144	-0.536	
225.095	-0.272	-0.065	88.852	119305.697	-2587.365-676797.172	13060.008	-1304.858	-173.517	-0.364	
227.495	-0.340	-0.033	88.887	120915.908	-2590.235-676789.320	13217.410	-1230.127	-172.954	-0.196	
229.895	-0.450	-0.036	88.884	122555.675	-2593.102-676780.492	13377.693	-1155.317	-172.392	0.049	
232.295	-0.595	-0.038	88.882	124218.806	-2595.009-676765.883	13540.216	-1079.986	-171.923	0.177	
234.695	-0.809	-0.076	88.844	125914.053	-2595.985-676744.734	13705.858	-1004.060	-171.541	0.271	
237.095	-1.204	-0.071	88.886	127637.052	-2596.030-676713.453	13874.182	-927.198	-171.254	0.162	
239.495	-1.512	-0.072	88.884	129390.461	-2598.567-676673.578	14045.063	-849.812	-170.393	0.194	
241.895	-1.942	-0.072	88.884	131175.301	-2602.287-676619.062	14219.490	-770.606	-169.846	0.190	
244.295	-2.442	-0.072	88.884	132991.900	-2606.385-676548.937	14397.188	-689.960	-169.382	0.150	
246.695	-2.813	-0.081	88.880	134842.803	-2608.277-676466.852	14577.920	-608.278	-168.901	0.087	
249.095	-3.203	-0.149	88.849	136726.508	-2611.369-676367.102	14761.839	-524.932	-168.305	-0.063	
251.495	-3.619	-0.144	88.883	138645.801	-2618.225-676253.570	14949.221	-440.264	-167.338	-0.167	
253.895	-3.996	-0.144	88.841	140599.555	-2623.985-676121.383	15139.949	-353.835	-166.479	-0.200	
256.295	-4.223	-0.144	88.849	142595.219	-2628.827-675976.953	15334.774	-266.227	-165.705	-0.146	
258.695	-4.507	-0.144	88.848	144629.184	-2636.309-675816.867	15533.325	-177.118	-164.673	-0.196	
261.095	-4.810	-0.109	88.848	146704.721	-2643.268-675643.914	15735.328	-87.117	-163.961	-0.120	
263.495	-5.262	-0.099	88.848	148823.783	-2649.682-675452.484	15942.351	5.124	-162.962	-0.192	
265.895	-5.775	-0.114	88.848	150987.080	-2655.723-675241.016	16153.998	99.267	-161.865	-0.383	
268.295	-6.071	-0.151	88.844	153199.656	-2660.740-675010.070	16370.000	195.131	-161.073	-0.443	
270.695	-6.345	-0.186	88.810	155460.639	-2670.566-674756.914	16590.751	293.133	-159.804	-0.423	
273.095	-6.621	-0.218	88.812	157771.004	-2679.253-674490.141	16816.340	392.416	-158.643	-0.475	
275.495	-6.861	-0.214	88.812	160136.184	-2690.881-674204.680	17047.303	493.496	-157.194	-0.479	
277.895	-7.067	-0.216	88.812	162558.430	-2702.500-673899.570	17283.872	596.477	-155.742	-0.492	
280.295	-7.426	-0.253	88.775	165043.072	-2716.774-673577.602	17526.578	701.048	-154.028	-0.564	
282.695	-7.947	-0.288	88.776	167584.992	-2730.491-673227.492	17774.024	807.791	-152.331	-0.810	
285.095	-8.136	-0.288	88.776	170192.352	-2748.534-672846.781	18028.957	918.725	-150.407	-0.672	
287.495	-8.172	-0.252	88.776	172870.412	-2765.537-672450.945	18291.796	1030.132	-148.491	-0.431	
289.895	-8.395	-0.252	88.776	175623.746	-2782.604-672041.727	18560.622	1143.192	-146.315	-0.289	
292.295	-8.498	-0.214	88.738	178451.129	-2798.168-671608.828	18837.022	1258.438	-144.453	-0.084	
294.695	-8.571	-0.217	88.741	181365.611	-2812.485-671157.164	19122.092	1375.442	-142.734	0.167	
297.095	-8.768	-0.175	88.740	184366.732	-2829.640-670688.141	19415.720	1494.104	-140.729	0.367	
299.495	-9.364	-0.099	88.740	187460.172	-2842.993-670184.297	19718.477	1616.155	-139.102	0.129	
301.895	-9.902	-0.070	88.726	190651.016	-2854.171-669629.078	20030.878	1743.177	-137.689	-0.093	
304.295	-10.464	-0.071	88.703	193939.580	-2863.352-669022.539	20352.953	1875.167	-136.471	-0.358	
306.695	-10.959	-0.072	88.701	197340.508	-2874.500-668366.312	20686.166	2011.978	-135.056	-0.508	
309.095	-11.230	-0.075	88.666	200851.645	-2883.755-667656.430	21030.302	2154.026	-133.830	-0.491	
311.495	-11.430	-0.114	88.665	204502.701	-2897.348-666907.148	21388.346	2299.838	-132.173	-0.433	
313.895	-11.867	-0.147	88.629	208282.270	-2917.016-666111.656	21759.144	2450.139	-129.914	-0.606	
316.295	-12.111	-0.153	88.632	212215.463	-2938.419-665251.258	22145.223	2606.732	-127.486	-0.606	
318.695	-12.329	-0.222	88.627	216307.801	-2959.406-664338.234	22547.131	2768.455	-125.094	-0.555	
321.095	-12.273	-0.211	88.588	220575.043	-2989.353-663377.617	22966.453	2934.746	-121.820	-0.261	
323.495	-12.291	-0.180	88.556	225045.193	-3018.875-662374.961	23405.791	3105.017	-118.588	-0.099	
325.895	-12.412	-0.213	88.559	229727.650	-3048.287-661313.391	23863.957	3280.166	-115.373	-0.064	

- A-24 -

GT5

ASCENT

TIME	PITCH	YAW	ROLL	SFXP	SFYP	SFZP	VELX	VELY	VELZ	PERR
328.295	-13.009	-0.216	88.525	234631.332	-3084.573	-660167.516	24350.762	3465.307	-111.594	-0.295
330.695	-13.177	-0.251	88.488	239791.664	-3125.990	-658928.016	24856.479	3658.710	-107.199	-0.370
333.095	-13.429	-0.360	88.452	245234.385	-3174.890	-657592.687	25394.487	3861.414	-101.910	-0.575
335.495	-11.808	-1.665	89.333	246268.479	-3188.287	-657335.953	25486.290	3958.847	-100.242	1.088
337.895	-10.037	-2.773	89.982	246307.260	-3191.955	-657330.789	25479.940	4032.295	-99.516	2.910
340.295	-9.007	-3.622	89.515	246349.318	-3196.465	-657324.258	25472.612	4105.587	-98.716	3.958
342.695	-8.860	-4.202	88.041	246383.752	-3201.557	-657318.227	25464.315	4178.796	-97.890	4.098
345.095	-10.341	-4.364	86.738	246401.092	-3203.829	-657315.992	25454.096	4251.453	-97.618	2.610
347.495	-12.423	-4.225	86.903	246406.975	-3204.024	-657315.008	25442.497	4324.285	-96.910	0.616
349.895	-14.817	-3.918	87.595	246411.596	-3203.646	-657313.930	25430.585	4396.941	-96.516	-1.832
352.295	-17.059	-3.556	88.551	246415.164	-3203.043	-657312.945	25418.319	4469.506	-96.276	-5.040
354.695	-18.434	-3.334	89.179	246415.057	-3203.948	-657312.977	25405.496	4541.937	-95.827	-9.165
357.095	-20.134	-2.764	89.731	246425.941	-3205.242	-657309.133	25393.558	4614.726	-95.339	-10.528
359.495	-21.715	-2.048	90.214	246447.873	-3206.923	-657301.391	25382.511	4687.876	-94.811	-10.893
361.895	-22.010	-0.543	90.485	246459.959	-3208.081	-657297.016	25370.271	4760.639	-94.335	-11.391
364.295	-21.826	1.377	90.633	246467.723	-3208.964	-657294.102	25357.389	4833.211	-93.884	-11.035
366.695	-21.868	1.662	71.551	246475.977	-3208.898	-657288.906	25344.348	4905.977	-93.526	-10.925
369.095	-21.593	1.636	45.126	246483.635	-3208.061	-657282.359	25331.037	4978.844	-93.243	-10.503
371.495	-21.730	2.246	39.360	246487.045	-3208.572	-657281.539	25317.090	5051.099	-92.826	-10.473
373.895	-21.897	2.738	35.407	246487.092	-3209.902	-657284.703	25302.595	5122.920	-92.327	-10.471
376.295	-21.082	2.950	18.601	246486.676	-3209.555	-657283.281	25287.845	5195.156	-91.994	-9.487
378.695	-19.951	3.077	0.277	246485.127	-3208.115	-657279.289	25272.774	5267.609	-91.768	-8.185
381.095	-16.042	3.480	-3.968	246485.439	-3208.786	-657281.000	25257.683	5339.442	-91.333	-4.108
383.495	-10.776	3.914	-5.036	246486.875	-3210.831	-657286.531	25242.499	5410.846	-90.762	1.325
385.895	-10.506	4.011	-5.963	246486.557	-3211.372	-657288.680	25226.926	5482.558	-90.338	1.768
388.295	-11.206	4.023	-3.588	246485.117	-3211.043	-657289.023	25211.029	5554.415	-89.999	1.240
390.695	-10.282	4.058	-2.748	246484.750	-3211.346	-657289.242	25195.037	5626.225	-89.597	2.318
393.095	-9.797	4.019	-0.883	246484.971	-3211.958	-657289.016	25178.899	5698.023	-89.166	2.953
395.495	-9.391	3.785	-1.684	246485.000	-3212.821	-657289.000	25162.534	5769.756	-88.707	3.538
397.895	-9.033	3.441	-3.204	246485.000	-3213.935	-657289.000	25145.958	5841.438	-88.221	4.083
400.295	-8.606	3.149	-1.758	246485.000	-3214.250	-657289.000	25129.174	5913.079	-87.815	4.669
402.695	-8.186	2.799	0.144	246485.000	-3214.025	-657289.000	25112.182	5984.678	-87.462	5.244
405.095	-8.626	2.466	2.662	246485.000	-3214.701	-657289.000	25094.985	6056.215	-87.019	4.966
407.495	-9.391	2.116	6.010	246485.000	-3215.929	-657289.000	25077.584	6127.694	-86.521	4.360
409.895	-10.313	1.849	6.168	246485.348	-3215.904	-657288.648	25060.011	6199.163	-86.146	3.605
412.295	-11.565	1.607	5.606	246485.955	-3215.073	-657288.039	25042.258	6270.610	-85.851	2.523
414.695	-12.791	1.174	5.949	246485.705	-3214.893	-657288.289	25024.210	6341.927	-85.489	1.460
417.095	-14.081	0.707	5.921	246484.975	-3215.144	-657289.156	25005.907	6413.135	-85.082	0.336
419.495	-14.332	0.344	5.102	246484.994	-3216.949	-657290.945	24987.478	6484.172	-84.525	0.283
421.895	-15.233	-0.139	6.352	246485.000	-3218.215	-657291.547	24968.841	6555.283	-84.019	-0.455
424.295	-16.328	-0.686	6.677	246485.000	-3218.989	-657291.016	24949.997	6626.463	-83.560	-1.402
426.695	-16.475	-1.132	6.853	246485.730	-3218.519	-657291.000	24931.019	6697.540	-83.224	-1.389
429.095	-16.503	-1.595	7.025	246486.973	-3217.036	-657291.000	24911.884	6768.564	-82.988	-1.267
431.495	-17.217	-1.968	7.321	246487.961	-3217.442	-657291.695	24892.524	6839.449	-82.563	-1.810
433.895	-17.974	-2.305	7.636	246488.930	-3218.859	-657292.891	24872.960	6910.222	-82.038	-2.392

GT5

## ASCENT

TIME	PITCH	YAW	ROLL	SFXP	SFYP	SFZP	VELX	VELY	VELZ	PERR
99999.000	99999.000	99999.000	99999.000	99999.000	99999.000	99999.000	99999.000	99999.000	99999.000	99999.000
438.695	-18.357	-2.631	3.001	246488.848	-3218.849-657292.844	24833.011	7051.840	-81.267	-2.435	
441.095	-18.211	-2.700	-0.235	246487.996	-3218.003-657291.984	24812.647	7122.645	-80.964	-2.118	
443.495	-17.428	-2.826	-2.112	246486.854	-3220.227-657290.969	24792.045	7193.419	-80.356	-1.168	
445.895	-16.687	-2.948	-2.042	246486.014	-3220.999-657291.953	24771.278	7263.916	-79.891	-0.286	
448.295	-15.969	-3.040	-2.393	246485.721	-3221.600-657292.266	24750.359	7334.428	-79.443	0.600	
450.695	-15.262	-3.113	-2.351	246485.969	-3221.985-657292.023	24729.287	7404.945	-79.016	1.485	
453.095	-13.829	-2.567	-1.446	246486.670	-3222.461-657293.336	24708.129	7475.213	-78.575	3.070	
455.495	-12.156	-1.795	-0.148	246487.844	-3222.947-657295.687	24686.868	7545.295	-78.129	4.895	
457.895	-9.940	-1.016	0.046	246487.914	-3223.763-657296.148	24665.124	7615.534	-77.732	7.278	
460.295	-7.294	-0.055	0.050	246487.135	-3224.857-657295.180	24643.090	7685.760	-77.357	10.096	
462.695	-5.040	0.093	-0.034	246487.508	-3224.613-657295.500	24621.034	7756.078	-76.915	12.524	
465.095	-2.717	-0.044	-0.347	246488.785	-3223.242-657296.773	24598.791	7826.448	-76.458	15.025	
467.495	0.05H	0.039	-0.320	246488.082	-3225.777-657296.078	24576.161	7896.199	-75.889	17.980	
469.895	0.873	0.052	-0.340	246487.918	-3227.131-657295.914	24553.440	7966.055	-75.432	18.940	
472.295	0.524	0.038	-0.326	246488.869	-3226.180-657296.859	24530.610	8035.959	-75.080	18.716	
474.695	0.585	-0.199	-0.559	246488.447	-3226.000-657297.109	24507.449	8105.786	-74.693	18.929	
477.095	0.584	-0.607	-0.967	246487.139	-3226.000-657297.008	24484.000	8175.558	-74.298	19.095	
479.495	0.305	-0.685	-1.153	246487.418	-3226.669-657297.664	24460.510	8245.191	-73.836	18.987	
481.895	-0.232	-0.527	-1.191	246488.836	-3227.877-657298.875	24436.932	8314.703	-73.319	18.627	
484.295	-0.554	-0.460	-1.146	246489.246	-3228.247-657299.242	24413.050	8384.233	-72.884	18.495	
486.695	-0.750	-0.427	-1.011	246489.035	-3228.038-657299.031	24388.902	8453.757	-72.505	18.500	
489.095	-0.802	-0.556	-0.989	246488.328	-3228.000-657298.328	24364.508	8523.248	-72.109	18.608	
491.495	-0.733	-0.769	-0.970	246487.117	-3228.000-657297.117	24339.867	8592.709	-71.708	18.823	
493.895	-0.657	-0.892	-0.929	246487.424	-3228.672-657297.422	24315.175	8661.958	-71.242	19.059	
496.295	-0.505	-1.036	-0.893	246488.846	-3229.885-657298.844	24290.391	8731.033	-70.722	19.365	
498.695	-0.359	-1.111	-0.943	246489.246	-3230.249-657299.242	24265.307	8800.133	-70.285	19.679	
501.095	-0.178	-1.158	-1.028	246489.035	-3230.037-657299.031	24239.960	8869.220	-69.903	20.031	
503.495	-0.539	-1.341	-1.124	246489.000	-3230.000-657299.000	24214.435	8938.213	-69.502	19.832	
505.895	-1.105	-1.559	-1.251	246489.000	-3230.000-657299.000	24188.715	9007.126	-69.097	19.427	
508.294	-1.477	-1.814	-1.060	246489.000	-3230.000-657299.672	24162.798	9075.891	-68.694	19.232	
510.694	-1.929	-2.116	-0.754	246489.000	-3230.000-657300.883	24136.685	9144.522	-68.292	18.963	
513.094	-1.213	-1.459	-0.296	246489.000	-3230.678-657301.242	24110.370	9213.168	-67.821	19.838	
515.494	-0.040	-0.440	0.316	246489.000	-3231.893-657301.031	24083.855	9281.798	-67.294	21.166	
517.894	-0.091	-0.416	0.231	246489.000	-3232.249-657301.000	24057.146	9350.328	-66.853	21.281	
520.294	-0.284	-0.511	-0.044	246489.000	-3232.033-657301.000	24030.243	9418.773	-66.469	21.255	
522.694	-0.203	-0.459	0.001	246489.000	-3232.684-657301.680	24003.136	9487.082	-65.999	21.503	
525.094	-0.227	-0.522	0.002	246489.000	-3233.901-657302.898	23975.828	9555.267	-65.471	21.653	
99999.000	99999.000	99999.000	99999.000	99999.000	99999.000	99999.000	99999.000	99999.000	99999.000	
529.894	-0.342	-0.837	0.086	246489.000	-3237.838-657306.836	23920.608	9691.272	-64.263	21.874	
532.294	-0.116	-0.963	0.519	246489.000	-3235.728-657302.305	23892.746	9759.713	-64.064	22.270	
534.694	-0.059	-1.208	0.827	246489.000	-3235.989-657301.086	23864.664	9827.793	-63.628	22.499	
537.094	0.104	-1.159	0.767	246489.000	-3236.083-657301.680	23836.381	9895.620	-63.209	22.817	
539.494	0.296	-1.098	0.700	246489.000	-3236.010-657302.898	23807.901	9963.306	-62.805	23.162	
541.894	0.466	-1.112	0.663	246489.687	-3236.000-657303.242	23779.297	10030.991	-62.394	23.488	

- A-26 -



GT5

ASCENT

TIME	PITCH	YAW	ROLL	SFXP	SFPY	SFZP	VELX	VELY	VELZ	PERR
544.294	0.652	-1.118	0.596	246490.906	-3236.000-657303.023	23750.550	10098.646	-61.979	23.828	
546.694	0.847	-1.151	0.477	246490.559	-3236.689-657303.000	23721.453	10166.200	-61.499	24.206	
549.094	1.052	-1.200	0.325	246489.121	-3237.908-657303.000	23692.051	10233.668	-60.968	24.602	
551.494	1.230	-1.197	0.155	246489.437	-3238.594-657303.000	23662.632	10301.047	-60.488	24.937	
553.894	1.404	-1.184	-0.044	246490.873	-3238.984-657303.000	23633.131	10368.337	-60.036	25.262	
556.294	1.463	-1.188	-0.305	246490.561	-3239.124-657303.000	23603.261	10435.542	-59.607	25.494	
558.694	1.473	-1.188	-0.607	246489.125	-3239.016-657303.000	23573.083	10502.661	-59.201	25.676	
561.094	1.437	-1.171	-0.883	246489.090	-3239.683-657303.336	23542.856	10569.654	-58.721	25.807	
563.494	1.345	-1.146	-1.176	246489.912	-3240.896-657303.945	23512.523	10636.529	-58.188	25.882	
565.894	1.338	-1.165	-1.202	246490.123	-3240.568-657304.117	23481.932	10703.366	-57.804	26.030	
568.294	1.332	-1.196	-1.126	246490.016	-3239.141-657304.016	23451.113	10770.149	-57.528	26.173	
570.694	1.310	-1.175	-1.174	246490.000	-3239.767-657304.672	23420.117	10836.754	-57.049	26.325	
573.094	1.292	-1.145	-1.192	246490.000	-3241.795-657305.883	23388.935	10903.208	-56.431	26.487	
575.494	1.274	-1.199	-1.124	246491.012	-3242.372-657305.906	23357.661	10969.690	-55.955	26.642	
577.894	1.256	-1.278	-1.020	246492.826	-3242.056-657305.086	23326.276	11036.165	-55.566	26.801	
580.294	1.240	-1.276	-0.952	246492.701	-3242.335-657305.539	23294.500	11102.430	-55.120	26.930	
582.694	1.225	-1.262	-0.871	246491.182	-3242.938-657306.852	23262.390	11168.525	-54.643	27.048	
585.094	1.171	-1.211	-0.760	246491.418	-3243.124-657307.906	23230.272	11234.539	-54.204	27.149	
587.494	1.088	-1.125	-0.624	246492.832	-3243.020-657308.906	23198.086	11300.458	-53.792	27.234	
589.894	1.038	-1.026	-0.509	246492.914	-3243.665-657308.914	23165.576	11366.381	-53.308	27.348	
592.294	1.010	-0.911	-0.405	246492.105	-3244.868-657308.094	23132.787	11432.290	-52.769	27.481	
594.694	0.956	-0.760	-0.271	246491.875	-3244.917-657307.867	23099.938	11497.947	-52.315	27.616	
597.094	0.886	-0.576	-0.114	246491.975	-3244.112-657307.969	23066.993	11563.394	-51.921	27.756	
599.494	0.818	-0.387	0.010	246492.000	-3244.535-657308.000	23033.650	11628.924	-51.399	27.836	
601.894	0.742	-0.178	0.128	246492.000	-3245.837-657308.000	23000.059	11694.393	-50.842	27.889	
604.294	0.688	0.068	0.290	246492.000	-3246.247-657308.656	22966.423	11759.719	-50.424	28.026	
606.694	0.640	0.339	0.465	246492.000	-3246.045-657309.859	22932.610	11824.964	-50.035	28.180	
609.094	0.601	0.602	0.606	246491.670	-3246.657-657310.570	22898.581	11890.103	-49.602	28.307	
611.494	0.571	0.878	0.744	246491.070	-3247.858-657310.969	22864.373	11955.143	-49.179	28.439	
613.894	0.534	1.011	0.704	246491.531	-3248.247-657311.117	22829.973	12019.994	-48.755	28.564	
616.294	0.498	1.089	0.583	246492.838	-3248.045-657311.016	22795.385	12084.706	-48.330	28.685	
618.694	0.529	1.060	0.413	246492.590	-3248.000-657311.000	22760.608	12149.458	-47.766	28.864	
621.094	0.589	0.945	0.167	246491.184	-3248.000-657311.000	22725.642	12214.143	-47.141	29.067	
623.494	0.686	0.706	-0.068	246490.750	-3248.657-657311.656	22690.501	12278.666	-46.812	29.342	
625.894	0.818	0.363	-0.338	246490.953	-3249.860-657312.859	22655.177	12343.093	-46.567	29.664	
628.294	0.970	-0.021	-0.652	246491.000	-3250.576-657313.234	22619.660	12407.336	-46.029	29.984	
630.694	1.150	-0.483	-1.001	246491.000	-3250.974-657313.039	22583.956	12471.438	-45.434	30.334	
633.094	1.290	-0.765	-1.032	246491.000	-3251.124-657313.000	22548.124	12535.604	-44.927	30.632	
635.494	1.427	-1.010	-0.946	246491.000	-3251.024-657313.000	22512.131	12599.714	-44.401	30.921	
637.894	1.439	-1.075	-0.792	246491.977	-3251.000-657313.320	22475.885	12663.512	-43.967	31.116	
640.294	1.391	-1.027	-0.522	246493.773	-3251.000-657313.922	22439.441	12727.154	-43.573	31.260	
642.694	1.404	-1.003	-0.278	246493.721	-3251.324-657314.117	22402.802	12790.993	-43.180	31.423	
645.094	1.404	-0.919	0.015	246492.229	-3251.922-657314.016	22365.962	12854.816	-42.816	31.562	
647.494	1.404	-0.973	0.212	246492.398	-3252.770-657314.641	22328.998	12918.167	-42.203	31.722	
649.894	1.404	-1.063	0.387	246493.793	-3253.869-657315.844	22291.868	12981.322	-41.494	31.882	

██████████

GTS

ASCENT

TIME	PITCH	YAW	ROLL	SFXP	SFYP	SF7P	VELX	VELY	VELZ	PERR
652.294	1.354	-0.991	0.591	246494.244	-3254.248	-657315.594	22254.548	13044.676	-41.070	32.004
654.694	1.282	-0.877	0.789	246494.049	-3254.051	-657314.203	22217.055	13107.982	-40.704	32.110
657.094	1.283	-0.932	0.854	246494.000	-3254.646	-657314.391	22179.341	13171.027	-40.256	32.255
659.494	1.301	-1.028	0.860	246494.000	-3255.843	-657315.789	22141.431	13233.954	-39.827	32.407

GTS

ASCENT

TIME	YAWER	PERROR	ZVUPDT	PITRTE	VEL(R)	X(POS)	Y(POS)	Z(POS)	TTSECO
4.295	0.072	0.359	-0.	-0.516	5949.867	-7.693	-20910.009	-59.145	175.000
6.695	0.044	0.396	-0.	-0.516	5949.867	-4.612	-20910.141	-60.092	175.000
9.095	0.068	0.396	0.	-0.516	5949.867	-1.539	-20910.342	-61.038	175.000
11.495	0.010	0.144	-0.	-0.516	5949.867	1.530	-20910.598	-61.982	175.000
13.895	-0.047	0.047	-0.	-0.516	5949.867	4.607	-20910.919	-62.927	175.000
16.295	-0.088	0.036	-0.	-0.516	5949.867	7.677	-20911.311	-63.869	175.000
18.695	-0.105	-0.003	-0.	-0.516	5949.867	10.753	-20911.776	-64.816	175.000
21.095	-0.142	0.251	-0.	-0.516	5949.867	13.823	-20912.313	-65.756	175.000
23.495	-0.121	0.325	-0.	-0.716	5949.867	16.902	-20912.930	-66.699	175.000
25.895	-0.058	0.310	-0.	-0.712	5949.867	19.972	-20913.630	-67.639	175.000
28.295	-0.134	0.310	-0.	-0.709	5949.867	23.054	-20914.417	-68.575	175.000
30.695	-0.177	0.349	-0.	-0.709	5949.867	26.155	-20915.295	-69.514	175.000
33.095	-0.260	0.316	-0.	-0.709	5949.867	29.280	-20916.267	-70.451	175.000
35.495	-0.305	0.349	-0.	-0.709	5949.867	32.438	-20917.331	-71.384	175.000
37.895	-0.349	0.391	-0.	-0.709	5949.867	35.642	-20918.498	-72.310	175.000
40.295	-0.426	0.372	-0.	-0.709	5949.867	38.906	-20919.768	-73.235	115.845
42.695	-0.367	0.310	-0.	-0.709	5949.867	42.230	-20921.140	-74.151	134.069
45.095	-0.283	0.303	-0.	-0.709	5949.867	45.640	-20922.623	-75.065	177.414
47.495	-0.218	0.301	-0.	-0.709	99999.000	49.160	-20924.224	-75.977	175.000
49.895	-0.161	0.292	-0.	-0.709	5949.867	52.793	-20925.941	-76.884	175.000
52.295	-0.111	0.275	-0.	-0.709	5949.867	56.536	-20927.777	-77.787	175.000
54.695	-0.069	0.249	-0.	-0.709	5949.867	60.391	-20929.729	-78.687	175.000
57.095	-0.035	0.214	-0.	-0.709	5949.867	64.357	-20931.799	-79.582	175.000
59.495	-0.009	0.172	-0.	-0.709	5949.867	68.435	-20933.986	-80.474	175.000
61.895	0.010	0.120	-0.	-0.709	5949.867	72.623	-20936.291	-81.362	175.000
64.295	0.021	0.061	-0.	-0.709	5949.867	76.923	-20938.712	-82.246	175.000
66.695	0.025	-0.007	-0.	-0.709	5949.867	81.335	-20941.251	-83.126	175.000
69.095	0.008	-0.068	0.004	-0.532	-4321.394	116.126	-20891.479	-83.563	173.002
71.495	-0.111	0.014	1.710	0.266	-6410.768	11748.286	-754.269	84.553	-594.412
73.895	-0.214	0.066	2.611	0.632	-5430.264	19582.307	12803.564	197.465	-1121.393
76.295	-0.309	0.094	3.110	0.830	-3969.960	23310.869	19249.697	250.707	-1388.190
78.695	-0.394	0.097	3.073	0.783	-2136.111	23039.439	18766.813	245.812	-1401.579
81.095	-0.469	0.074	2.500	0.491	71.282	18768.017	11354.916	182.781	-1161.563
83.495	-0.534	0.026	1.391	-0.047	2652.219	10496.603	-2985.996	61.613	-668.140
85.895	-0.589	-0.048	-0.254	-0.829	5606.701	-1774.803	-24255.926	-117.692	78.690
88.295	-0.476	-0.087	-0.024	-0.630	6166.957	-149.201	-21455.278	-95.006	188.935
90.695	-0.376	-0.131	-0.	-0.514	5949.867	137.863	-20973.718	-91.774	175.000
93.095	-0.667	-0.163	-0.	-0.516	5949.867	145.062	-20977.645	-92.605	175.000
95.495	-0.501	-0.221	-0.	-0.516	5949.867	152.604	-20981.703	-93.422	175.000
97.895	-0.569	-0.201	-0.	-0.516	5949.867	160.502	-20985.884	-94.227	175.000
100.295	-0.624	-0.192	-0.	-0.516	5949.867	168.742	-20990.177	-95.018	175.000
102.695	-0.470	-0.244	-0.	-0.516	5949.867	177.415	-20994.620	-95.801	175.000
105.095	-0.403	-0.282	-116.660	-0.516	5949.867	186.408	-20999.187	-96.852	175.000

107.495	-0.417	-0.305	-320.300	-0.510	5949.867	195.731	-21003.885	-98.105	175.000
109.895	-0.482	-0.323	-320.329	-0.516	5949.867	205.675	-21008.707	-98.865	175.000

GT5

ASCENT

TIME	YAWER	RERROR	ZVUPDT	PITRTE	VEL(R)	X(POS)	Y(POS)	Z(POS)	TTSECO
112.295	-0.419	-0.340	-319.500	-0.516	5949.867	216.060	-21013.658	-99.615	175.000
114.695	-0.716	-0.364	-319.500	-0.516	5949.867	226.874	-21018.714	-100.355	175.000
117.095	-0.837	-0.380	-319.500	-0.516	5949.867	238.264	-21023.924	-101.082	175.000
119.495	-0.789	-0.401	-319.500	-0.412	5949.867	250.168	-21029.242	-101.789	175.000
121.895	-0.585	-0.428	-319.500	-0.234	5949.867	262.605	-21034.678	-102.478	175.000
124.295	-0.402	-0.459	-319.500	-0.247	5949.867	275.604	-21040.225	-103.154	175.000
126.695	-0.227	-0.489	-319.500	-0.235	5949.867	289.190	-21045.895	-103.816	175.000
129.095	-0.240	-0.480	-319.500	-0.235	5949.867	303.373	-21051.695	-104.461	175.000
131.495	-0.376	-0.509	-319.500	-0.235	5949.867	318.150	-21057.616	-105.097	175.000
133.895	-0.414	-0.527	-319.500	-0.235	5949.867	333.637	-21063.702	-105.717	175.000
136.295	-0.365	-0.535	-319.500	-0.235	5949.867	349.809	-21069.943	-106.322	175.000
138.695	-0.324	-0.565	-319.500	-0.235	5949.867	366.664	-21076.317	-106.914	175.000
141.095	-0.367	-0.591	-319.500	-0.235	5949.867	384.253	-21082.846	-107.486	175.000
143.495	-0.358	-0.583	-319.500	-0.235	5949.867	402.600	-21089.537	-108.040	175.000
145.895	-0.390	-0.577	-183.166	-0.235	5949.867	421.755	-21096.400	-108.576	175.000
148.295	-0.397	-0.596	-165.489	-0.235	5949.867	441.772	-21103.438	-109.083	175.000
150.695	-0.386	-0.656	-204.000	-0.235	5949.867	462.641	-21110.651	-109.566	175.000
153.095	-0.421	-0.892	-204.000	-0.235	5949.867	484.443	-21118.058	-110.043	175.000
155.495	0.679	-1.463	-204.000	-0.235	5949.867	506.869	-21125.532	-110.505	175.000
157.895	0.562	-1.408	-204.000	-0.235	5949.867	529.546	-21132.917	-110.964	175.000
160.295	0.509	-1.370	-204.000	-0.235	5949.867	552.408	-21140.189	-111.421	175.000
162.695	0.474	-1.354	-204.000	-0.148	5949.867	575.566	-21147.384	-111.875	175.000
165.095	0.472	-1.367	-204.000	-0.003	5836.923	598.993	-21154.493	-112.328	174.869
167.495	0.428	-1.401	-204.000	-0.145	1351.526	622.629	-21161.493	-112.782	169.563
169.895	-0.163	-1.389	-204.000	-0.117	1581.923	646.524	-21168.399	-113.228	168.111
172.295	-0.100	-1.385	-204.000	-0.117	1568.025	670.682	-21175.212	-113.678	163.956
174.695	-0.089	-1.386	-204.000	-0.116	1549.716	695.103	-21181.906	-114.120	162.014
177.095	-0.061	-1.388	-204.000	-0.116	1527.222	719.808	-21188.472	-114.565	158.542
179.495	-0.020	-1.388	-204.000	-0.117	1503.195	744.786	-21194.881	-115.004	155.756
181.895	0.056	-1.387	-204.000	-0.117	1478.739	770.059	-21201.141	-115.447	153.680
184.295	0.073	-1.387	-204.000	-0.114	1454.081	795.624	-21207.240	-115.884	151.789
186.695	0.019	-1.386	-204.000	-0.119	1429.587	821.454	-21213.168	-116.323	140.027
189.095	0.088	-1.386	-204.000	-0.116	1404.871	847.542	-21218.933	-116.756	149.791
191.495	0.094	-1.353	-204.000	-0.120	1379.955	874.047	-21224.561	-117.189	143.798
193.895	0.078	-1.353	-204.000	-0.120	1355.339	900.821	-21230.012	-117.623	141.459
196.295	0.066	-1.385	-204.000	-0.120	1330.832	927.907	-21235.299	-118.058	139.325
198.695	0.133	-1.384	-204.000	-0.121	1306.278	955.282	-21240.416	-118.490	136.611
201.095	99999.000	-1.381	99999.000	-0.123	1281.946	982.986	-21245.369	-118.921	133.943
203.495	0.099	-1.345	-204.000	-0.125	1257.651	1011.019	-21250.156	-119.349	131.652
205.895	0.131	-1.348	-204.000	-0.125	1233.435	1039.364	-21254.769	-119.778	128.740
208.295	0.058	-1.385	-204.000	-0.126	1209.466	1068.052	-21259.215	-120.202	126.513
210.695	0.029	-1.381	-204.000	-0.128	1185.261	1097.078	-21263.491	-120.631	123.979
213.095	0.106	-1.381	-204.000	-0.126	1161.574	1126.438	-21267.594	-121.056	121.709
215.495	0.069	-1.380	-204.000	-0.131	1137.608	1156.149	-21271.522	-121.478	118.148
217.895	0.070	-1.380	-204.000	-0.129	1114.082	1186.116	-21275.267	-121.897	116.283

GT5

ASCENT

TIME	YAWER	RERROR	ZVUPDT	PITRTE	VEL(R)	X(POS)	Y(POS)	Z(POS)	TTSECO
220.295	0.105	-1.379	-204.000	-0.127	1090.345	1216.605	-21278.850	-122.319	114.600
222.695	0.105	-1.365	-204.000	-0.129	1066.764	1247.411	-21282.252	-122.737	111.906
225.095	0.073	-1.341	-204.000	-0.132	1043.282	1278.590	-21285.477	-123.154	108.832
227.495	0.077	-1.341	-204.000	-0.131	1020.323	1310.115	-21288.520	-123.570	106.858
229.895	0.081	-1.343	-204.000	-0.132	997.772	1342.034	-21291.382	-123.986	104.194
232.295	0.121	-1.378	-204.000	-0.133	975.364	1374.341	-21294.064	-124.399	101.491
234.695	0.157	-1.376	-204.000	-0.131	953.132	1407.038	-21296.563	-124.811	99.421

237.095	C.121	-1.341	-204.000	-0.134	931.031	1440.130	-21298.819	-123.221	90.274
239.495	C.124	-1.339	-204.000	-0.134	908.985	1473.495	-21301.003	-125.632	93.905
241.895	C.127	-1.354	-204.000	-0.134	886.654	1507.445	-21302.949	-126.039	91.523
244.295	C.128	-1.376	-204.000	-0.133	864.190	1541.884	-21304.712	-126.445	89.264
246.695	C.126	-1.375	-204.000	-0.132	841.705	1576.661	-21306.269	-126.854	86.875
249.095	C.096	-1.371	-204.000	-0.131	818.961	1611.865	-21307.630	-127.258	84.553
251.495	C.097	-1.338	-204.000	-0.132	796.152	1647.521	-21308.790	-127.658	82.188
253.895	C.061	-1.377	-204.000	-0.128	773.102	1683.620	-21309.741	-128.059	80.376
256.295	C.070	-1.372	-204.000	-0.132	749.989	1720.192	-21310.483	-128.456	77.331
258.695	C.069	-1.371	-204.000	-0.132	726.927	1757.230	-21311.020	-128.858	74.930
261.095	C.106	-1.370	-204.000	-0.128	704.087	1794.641	-21311.332	-129.246	73.163
263.495	C.104	-1.370	-204.000	-0.129	680.883	1832.698	-21311.428	-129.639	70.618
265.895	C.072	-1.369	-204.000	-0.131	657.536	1871.289	-21311.305	-130.029	67.900
268.295	C.073	-1.371	-204.000	-0.132	634.075	1910.315	-21310.954	-130.418	65.506
270.695	C.038	-1.405	-204.000	-0.131	610.375	1949.868	-21310.368	-130.804	62.952
273.095	C.007	-1.402	-204.000	-0.133	586.896	1989.954	-21309.548	-131.185	60.893
275.495	C.008	-1.401	-204.000	-0.137	563.475	2030.587	-21308.483	-131.565	57.997
277.895	C.044	-1.400	-204.000	-0.138	540.071	2071.793	-21307.177	-131.940	55.739
280.295	C.004	-1.398	-204.000	-0.140	516.800	2113.368	-21305.629	-132.306	53.312
282.695	-0.067	-1.397	-204.000	-0.138	493.338	2155.816	-21303.814	-132.678	51.107
285.095	-0.006	-1.395	-204.000	-0.138	469.102	2198.773	-21301.740	-133.041	48.824
287.495	-0.041	-1.428	-204.000	-0.137	445.832	2242.470	-21299.401	-133.394	45.981
289.895	-0.048	-1.428	-204.000	-0.137	422.715	2286.665	-21296.789	-133.750	44.215
292.295	0.022	-1.427	-204.000	-0.136	400.102	2331.570	-21293.907	-134.100	40.857
294.695	-0.027	-1.462	-204.000	-0.136	377.794	2377.117	-21290.747	-134.443	39.475
297.095	C.016	-1.497	-204.000	-0.135	356.265	2423.352	-21287.304	-134.782	36.144
299.495	C.046	-1.494	-204.000	-0.134	334.521	2470.320	-21283.570	-135.120	34.547
301.895	0.082	-1.494	-204.000	-0.133	311.727	2518.026	-21279.536	-135.452	31.973
304.295	0.118	-1.494	-204.000	-0.132	288.363	2566.469	-21275.202	-135.779	29.415
306.695	0.119	-1.495	-204.000	-0.131	264.370	2615.711	-21270.537	-136.104	26.861
309.095	0.122	-1.531	-204.000	-0.130	239.685	2665.790	-21265.535	-136.430	24.643
311.495	C.076	-1.531	-204.000	-0.129	215.277	2716.678	-21260.194	-136.750	22.005
313.895	0.001	-1.565	-204.000	-0.128	190.824	2768.449	-21254.494	-137.063	19.733
316.295	-0.004	-1.563	-204.000	-0.126	165.685	2821.127	-21248.430	-137.372	17.267
318.695	-0.057	-1.565	-204.000	-0.124	140.596	2874.771	-21241.979	-137.676	14.876
321.095	-0.093	-1.608	-204.000	-0.123	116.029	2929.377	-21235.136	-137.971	12.519
323.495	-0.109	-1.675	-204.000	-0.120	92.590	2984.995	-21227.890	-138.259	10.071
325.895	-0.169	-1.670	-204.000	-0.118	69.791	3041.522	-21220.256	-138.542	7.747

GTS

ASCENT

TIME	YAWER	REKROK	ZVUPDT	PITRTE	VEL(R)	X(POS)	Y(POS)	Z(POS)	TTSECO
328.295	-0.338	-1.698	-204.000	-0.116	46.347	3099.652	-21212.126	-138.814	5.229
330.695	-0.730	-1.701	-204.000	-0.113	22.096	3158.571	-21203.595	-139.077	2.943
333.095	-0.862	-1.665	-204.000	-0.110	-1.653	3218.940	-21194.560	-139.330	0.440
335.495	-2.084	-0.843	-204.000	-0.112	-6.378	3280.063	-21185.162	-139.569	1.808
337.895	-0.818	-0.237	-204.000	-0.112	-3.215	3341.215	-21175.571	-139.811	1.862
340.295	-0.236	-0.697	-204.000	-0.112	-5.164	3402.354	-21165.806	-140.049	1.862
342.695	-0.637	-2.190	-204.000	-0.112	-4.604	3463.473	-21155.866	-140.283	1.862
345.095	-0.677	-3.425	-204.000	-0.112	-4.097	3524.419	-21145.775	-140.517	1.862
347.495	-0.729	-3.294	-204.000	-0.112	-3.673	3585.667	-21135.457	-140.754	1.862
349.895	-0.793	-2.601	-204.000	-0.112	-3.153	3646.747	-21124.987	-140.987	1.862
352.295	-16.012	26.618	-204.000	-0.112	-2.623	3707.741	-21114.351	-141.218	1.862
354.695	-61.683	115.396	-204.000	-0.117	-2.082	3768.714	-21103.542	-141.447	1.862
357.095	-64.668	110.221	-204.000	-0.112	-1.714	3829.674	-21092.555	-141.677	1.862
359.495	-57.513	79.035	-204.000	-0.112	-1.452	3890.620	-21081.388	-141.907	1.862
361.895	-65.136	90.485	-204.000	-0.112	-1.049	3951.521	-21070.049	-142.133	1.862
364.295	-66.761	90.633	-204.000	-0.112	-0.674	4012.385	-21058.537	-142.357	1.862
366.695	-72.765	71.551	-204.000	-0.112	-0.356	4073.226	-21046.849	-142.583	1.862
369.095	-79.364	45.126	-204.000	-0.112	-0.054	4134.042	-21034.987	-142.809	1.862
371.495	-78.685	39.360	-204.000	-0.112	0.587	4194.817	-21022.952	-143.033	1.862
373.895	-76.084	35.407	-204.000	-0.112	1.341	4255.555	-21010.744	-143.255	1.862
376.295	-76.775	18.601	-204.000	-0.112	1.728	4316.267	-20998.361	-143.476	1.862
378.695	-76.895	0.277	-204.000	-0.112	2.070	4376.948	-20985.803	-143.695	1.862

381.095	-70.500	-3.908	-204.000	-0.112	2.102	4431.580	-20973.070	-143.913	1.862
383.495	-76.186	-5.036	-204.000	-0.112	3.379	4498.165	-20960.179	-144.130	1.862
385.895	-76.653	-5.963	-204.000	-0.112	3.933	4558.731	-20947.106	-144.348	1.862
388.295	-77.374	-3.588	-204.000	-0.112	4.496	4619.272	-20933.859	-144.567	1.862
390.695	-76.927	-2.748	-204.000	-0.112	5.005	4679.761	-20920.441	-144.783	1.862
393.095	-76.249	-0.883	-204.000	-0.112	5.484	4740.204	-20906.853	-144.996	1.862
395.495	-77.148	-1.684	-204.000	-0.112	6.018	4800.609	-20893.093	-145.209	1.862
397.895	-78.405	-3.205	-204.000	-0.112	6.553	4860.975	-20879.161	-145.421	1.862
400.295	-78.674	-1.758	-204.000	-0.112	7.066	4921.308	-20865.057	-145.632	1.862
402.695	-78.936	0.144	-204.000	-0.112	7.578	4981.607	-20850.779	-145.841	1.862
405.095	-79.415	2.662	-204.000	-0.112	8.140	5041.853	-20836.330	-146.050	1.862
407.495	-79.849	6.009	-204.000	-0.112	8.719	5102.051	-20821.709	-146.258	1.862
409.895	-79.993	6.168	-204.000	-0.112	9.200	5162.212	-20806.918	-146.465	1.862
412.295	-80.042	5.606	-204.000	-0.112	9.659	5222.333	-20791.956	-146.672	1.862
414.695	-80.620	5.949	-204.000	-0.112	10.182	5282.418	-20776.819	-146.877	1.862
417.095	-81.352	5.921	-204.000	-0.112	10.711	5342.462	-20761.509	-147.082	1.862
419.495	-82.515	6.102	-204.000	-0.112	11.311	5402.442	-20746.038	-147.288	1.862
421.895	-83.313	6.352	-204.000	-0.112	11.853	5462.385	-20730.391	-147.491	1.862
424.295	-84.001	6.677	-204.000	-0.112	12.338	5522.289	-20714.570	-147.692	1.862
426.695	-84.221	6.853	-204.000	-0.112	12.861	5582.153	-20698.578	-147.893	1.862
429.095	-84.156	7.025	-204.000	-0.112	13.393	5641.977	-20682.416	-148.092	1.862
431.495	-84.647	7.321	-204.000	-0.112	13.925	5701.742	-20666.087	-148.290	1.862
433.895	-85.117	7.636	-204.000	-0.112	14.459	5761.454	-20649.591	-148.486	1.862

GTS

ASCENT

TIME	YAWER	REKORR	ZVUPDT	PITRTE	VEL(R)	X(POS)	Y(POS)	Z(POS)	TTSECO
99999.000	99999.000	99999.000	99999.000	99999.000	99999.000	99999.000	99999.000	99999.000	99999.000
438.695	-85.827	3.001	-204.000	-0.112	15.505	5880.740	-20616.083	-148.877	1.862
441.095	-86.170	-0.235	-204.000	-0.112	16.022	5940.313	-20599.073	-149.072	1.862
443.495	-86.404	-2.113	-204.000	-0.112	16.468	5999.844	-20581.894	-149.267	1.862
445.895	-85.966	-2.042	-204.000	-0.112	17.018	6059.315	-20564.547	-149.460	1.862
448.295	-86.445	-2.393	-204.000	-0.112	17.526	6118.740	-20547.029	-149.651	1.862
450.695	-87.274	-2.351	-204.000	-0.112	17.996	6178.120	-20529.340	-149.841	1.862
453.095	-86.791	-1.446	-204.000	-0.112	18.618	6237.417	-20511.492	-150.031	1.862
455.495	-86.199	0.148	-204.000	-0.112	19.280	6296.641	-20493.481	-150.219	1.862
457.895	-85.295	0.046	-204.000	-0.112	19.802	6355.852	-20475.292	-150.407	1.862
460.295	-84.046	0.050	-204.000	-0.112	20.302	6415.022	-20456.932	-150.593	1.862
462.695	-84.278	-0.034	-204.000	-0.112	20.766	6474.165	-20438.393	-150.779	1.862
465.095	-84.995	-0.347	-204.000	-0.112	21.189	6533.276	-20419.678	-150.963	1.862
467.495	-83.385	-0.320	-204.000	-0.112	21.933	6592.305	-20400.806	-151.143	1.862
469.895	-83.518	-0.340	-204.000	-0.112	22.393	6646.250	-20383.412	-151.309	1.862
472.295	-84.269	-0.326	-204.000	-0.112	22.745	6695.071	-20367.510	-151.460	1.862
474.695	-84.737	-0.559	-204.000	-0.112	23.218	6750.883	-20349.166	-151.633	1.862
477.095	-85.223	-0.967	-204.000	-0.112	23.743	6811.300	-20329.158	-151.820	1.862
479.495	-85.576	-1.153	-204.000	-0.112	24.265	6870.358	-20309.399	-151.999	1.862
481.895	-85.840	-1.191	-204.000	-0.112	24.793	6929.072	-20289.566	-152.174	1.862
484.295	-85.595	-1.146	-204.000	-0.112	25.391	6993.107	-20267.702	-152.366	1.862
486.695	-84.924	-1.011	-204.000	-0.112	26.045	7061.432	-20244.164	-152.571	1.862
489.095	-85.448	-0.989	-204.000	-0.112	26.568	7122.898	-20222.783	-152.753	1.862
491.495	-86.320	-0.970	-204.000	-0.112	27.059	7179.639	-20202.824	-152.919	1.862
493.895	-86.138	-0.929	-204.000	-0.112	27.562	7237.713	-20182.225	-153.089	1.862
496.295	-85.824	-0.893	-204.000	-0.112	28.039	7296.043	-20161.353	-153.259	1.862
498.695	-85.915	-0.943	-204.000	-0.112	28.595	7354.315	-20140.313	-153.429	1.862
501.095	-85.971	-1.028	-204.000	-0.112	29.172	7412.528	-20119.108	-153.599	1.862
503.495	-86.483	-1.124	-204.000	-0.112	29.691	7470.676	-20097.739	-153.766	1.862
505.895	-87.185	-1.251	-204.000	-0.112	30.206	7528.758	-20076.205	-153.931	1.862
508.294	-87.185	-1.060	-204.000	-0.112	30.700	7586.775	-20054.509	-154.097	1.862
510.694	-87.045	-0.754	-204.000	-0.112	31.176	7644.725	-20032.648	-154.263	1.862
513.094	-86.888	-0.296	-204.000	-0.112	31.659	7702.620	-20010.619	-154.427	1.862
515.494	-86.578	0.316	-204.000	-0.112	32.134	7760.457	-19988.422	-154.588	1.862
517.894	-86.442	0.231	-204.000	-0.112	32.684	7818.224	-19966.063	-154.749	1.862
520.294	-86.301	-0.044	-204.000	-0.112	33.260	7875.922	-19943.543	-154.909	1.862
522.694	-85.996	0.001	-204.000	-0.112	33.784	7933.566	-19920.854	-155.068	1.862

99999.000	99999.000	0.000	-204.000	-0.112	37.877	8372.303	-19733.473	-156.300	1.862
99999.000	99999.000	0.000	-204.000	-0.112	37.877	8372.303	-19733.473	-156.300	1.862

GT5

ASCENT

TIME	YAWER	ERROR	ZVDPDT	PTRITE	VEL(4)	X(POS)	Y(POS)	Z(POS)	TTSECO
544.294	-87.249	0.596	-204.000	-0.112	38.373	-4449.336	-19709.316	-156.447	1.862
546.694	-87.377	0.477	-204.000	-0.112	38.377	8506.303	-19684.398	-156.595	1.862
549.094	-87.466	0.325	-204.000	-0.112	39.377	8563.203	-19660.518	-156.743	1.862
551.494	-87.336	0.155	-204.000	-0.112	39.924	8620.030	-19635.877	-156.889	1.862
553.894	-87.270	-0.044	-204.000	-0.112	40.447	8676.784	-19611.073	-157.035	1.862
556.294	-87.503	-0.305	-204.000	-0.112	40.972	8733.468	-19586.108	-157.179	1.862
558.694	-87.831	-0.607	-204.000	-0.112	41.439	8790.081	-19560.981	-157.323	1.862
561.094	-87.435	-0.883	-204.000	-0.112	42.011	8846.616	-19535.695	-157.464	1.862
563.494	-86.839	-1.176	-204.000	-0.112	42.607	8903.074	-19510.250	-157.602	1.862
565.894	-87.271	-1.202	-204.000	-0.112	43.076	8959.469	-19484.642	-157.742	1.862
568.294	-87.936	-1.126	-204.000	-0.112	43.519	9015.799	-19458.870	-157.882	1.862
570.694	-87.821	-1.174	-204.000	-0.112	43.995	9072.044	-19432.942	-158.019	1.862
573.094	-87.623	-1.192	-204.000	-0.112	44.456	9128.207	-19406.856	-158.154	1.862
575.494	-87.910	-1.124	-204.000	-0.112	45.018	9184.299	-19380.612	-158.288	1.862
577.894	-88.265	-1.020	-204.000	-0.112	45.617	9240.318	-19354.208	-158.422	1.862
580.294	-88.012	-0.952	-204.000	-0.112	46.074	9291.109	-19330.115	-158.542	1.862
582.694	-87.596	-0.871	-204.000	-0.112	46.502	9337.714	-19307.835	-158.651	1.862
585.094	-87.521	-0.760	-204.000	-0.112	47.073	9390.679	-19282.344	-158.776	1.862
587.494	-87.638	-0.625	-204.000	-0.112	47.548	9448.029	-19254.582	-158.912	1.862
589.894	-87.694	-0.509	-204.000	-0.112	48.029	9503.995	-19227.278	-159.042	1.862
592.294	-87.729	-0.405	-204.000	-0.112	48.465	9559.555	-19199.972	-159.169	1.862
594.694	-87.765	-0.271	-204.000	-0.112	49.053	9621.267	-19169.391	-159.309	1.862
597.094	-87.800	-0.114	-204.000	-0.112	49.758	9687.996	-19136.105	-159.460	1.862
599.494	-87.510	0.010	-204.000	-0.112	50.257	9743.222	-19108.326	-159.582	1.862
601.894	-87.062	0.128	-204.000	-0.112	50.710	9795.303	-19081.898	-159.695	1.862
604.294	-86.876	0.290	-204.000	-0.112	51.218	9851.371	-19053.306	-159.820	1.862
606.694	-86.694	0.465	-204.000	-0.112	51.706	9906.436	-19025.012	-159.942	1.862
609.094	-86.441	0.606	-204.000	-0.112	52.200	9961.429	-18996.555	-160.062	1.862
611.494	-86.187	0.744	-204.000	-0.112	52.693	10016.337	-18967.943	-160.181	1.862
613.894	-85.937	0.704	-204.000	-0.112	53.224	10071.167	-18939.175	-160.298	1.862
616.294	-85.803	0.583	-204.000	-0.112	53.772	10125.917	-18910.250	-160.412	1.862
618.694	-85.880	0.413	-204.000	-0.112	54.260	10180.587	-18881.167	-160.529	1.862
621.094	-86.082	0.167	-204.000	-0.112	54.735	10235.178	-18851.927	-160.645	1.862
623.494	-86.338	-0.068	-204.000	-0.112	55.228	10289.671	-18822.540	-160.757	1.862
625.894	-86.793	-0.338	-204.000	-0.112	55.716	10344.076	-18793.000	-160.868	1.862
628.294	-87.038	-0.652	-204.000	-0.112	56.244	10398.408	-18763.298	-160.978	1.862
630.694	-87.417	-1.001	-204.000	-0.112	56.790	10452.657	-18733.441	-161.087	1.862
633.094	-87.894	-1.032	-204.000	-0.112	57.267	10506.808	-18703.436	-161.197	1.862
635.494	-88.430	-0.946	-204.000	-0.112	57.726	10560.872	-18673.277	-161.307	1.862
637.894	-88.420	-0.792	-204.000	-0.112	58.255	10614.846	-18642.968	-161.411	1.862
640.294	-88.211	-0.522	-204.000	-0.112	58.800	10668.731	-18612.509	-161.513	1.862
642.694	-88.303	-0.278	-204.000	-0.112	59.246	10722.579	-18581.864	-161.619	1.862
645.094	-88.381	0.015	-204.000	-0.112	59.652	10776.361	-18551.055	-161.726	1.862
647.494	-88.369	0.212	-204.000	-0.112	60.189	10829.966	-18520.144	-161.826	1.862
649.894	-88.339	0.387	-204.000	-0.112	60.742	10883.458	-18489.094	-161.924	1.862

GT5

ASCENT

TIME	YAWER	ERROR	ZVDPDT	PTRITE	VEL(4)	X(POS)	Y(POS)	Z(POS)	TTSECO
652.294	-88.494	0.831	-204.000	-0.112	61.214	10936.943	-18457.844	-162.025	1.862

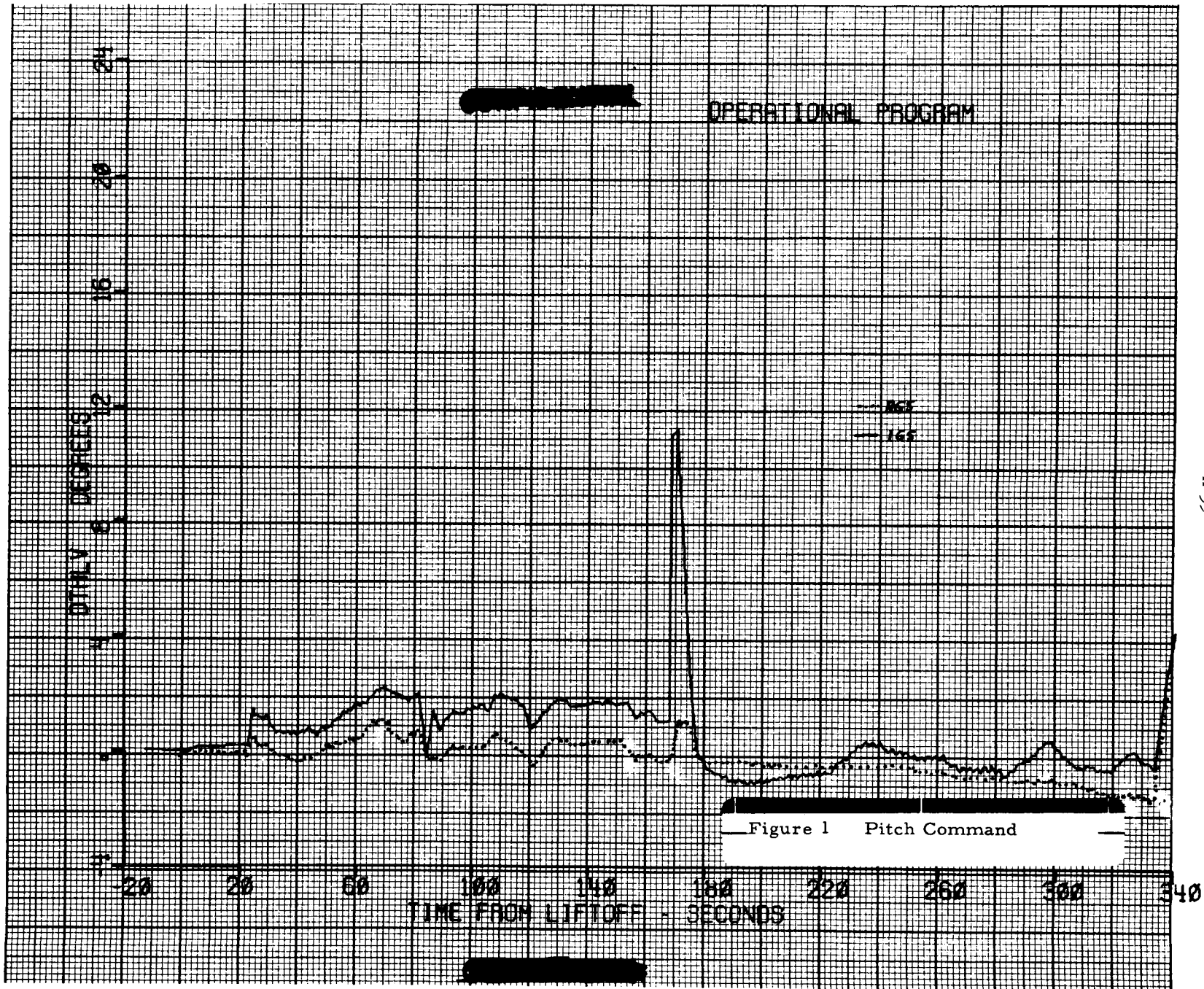
029.094	-88.033	0.789	-204.000	-0.112	01.014	10990.337	-18420.433	-162.123	1.862
657.094	-88.702	0.854	-204.000	-0.112	62.160	11043.640	-18394.895	-162.223	1.862
659.494	-88.763	0.860	-204.000	-0.112	62.644	11096.832	-18363.206	-162.320	1.862

828 LINES OUTPUT THIS JOB.

APPENDIX AB

FLIGHT RECONSTRUCTION GRAPHS





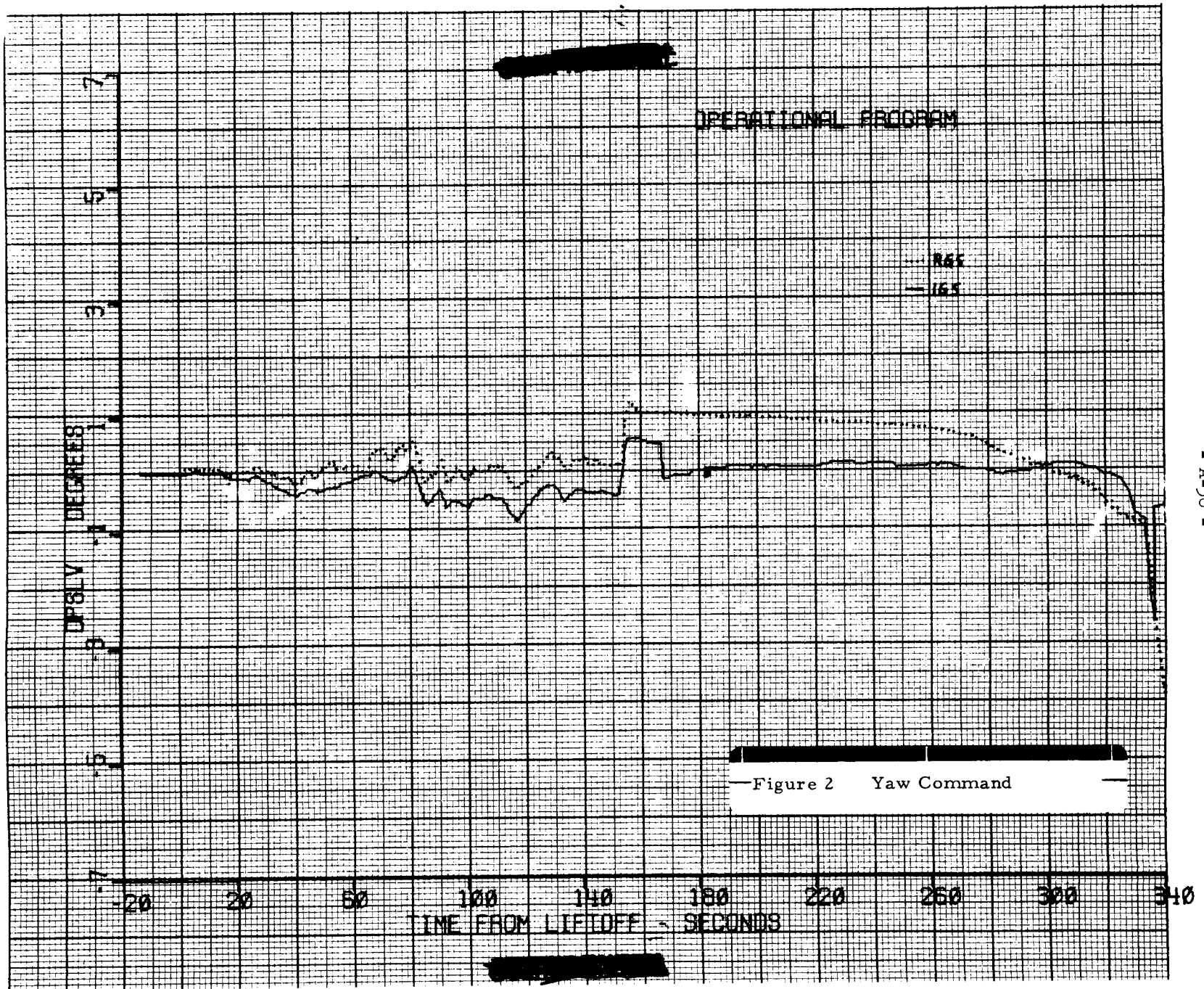




Figure 3 Roll Command

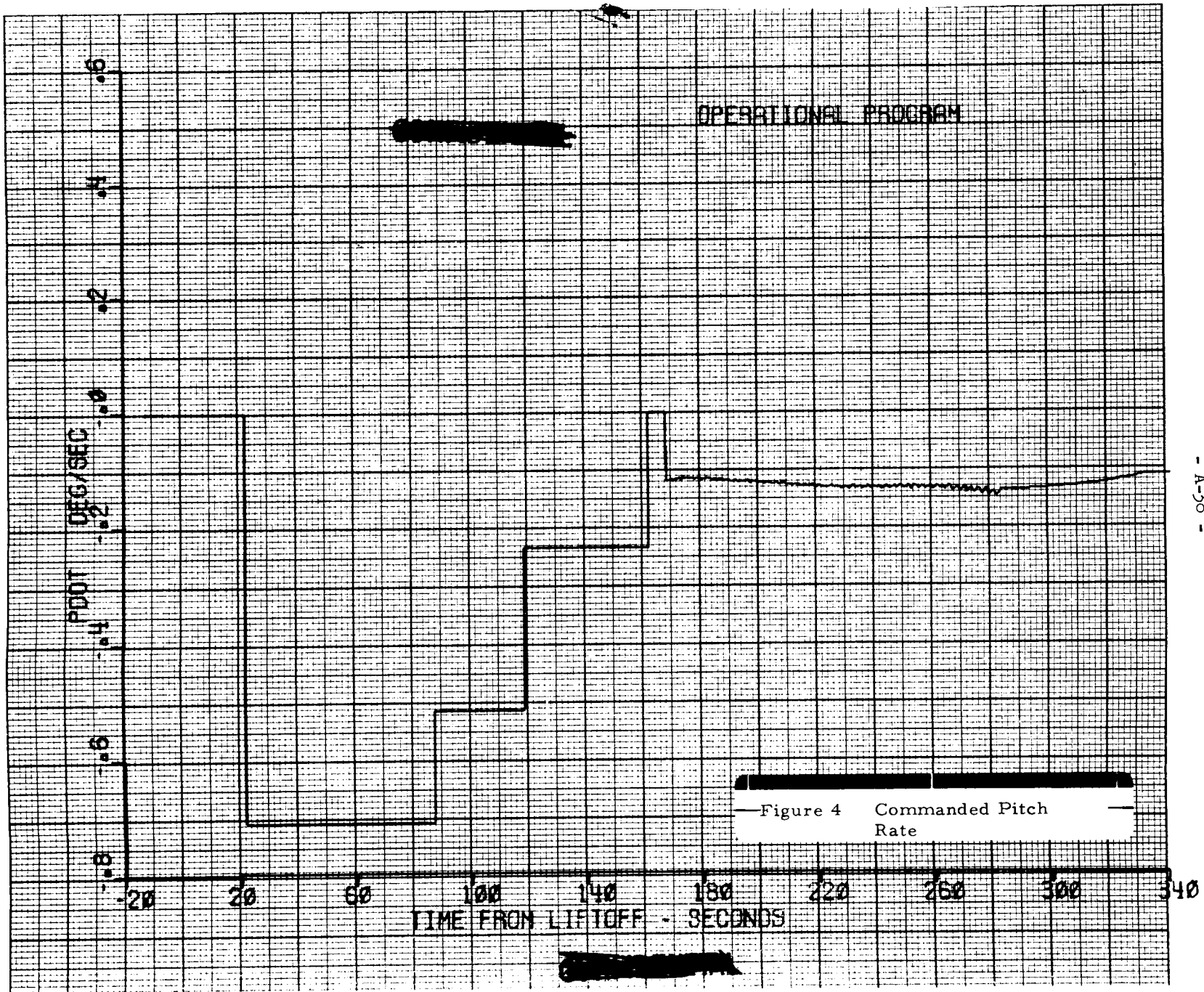
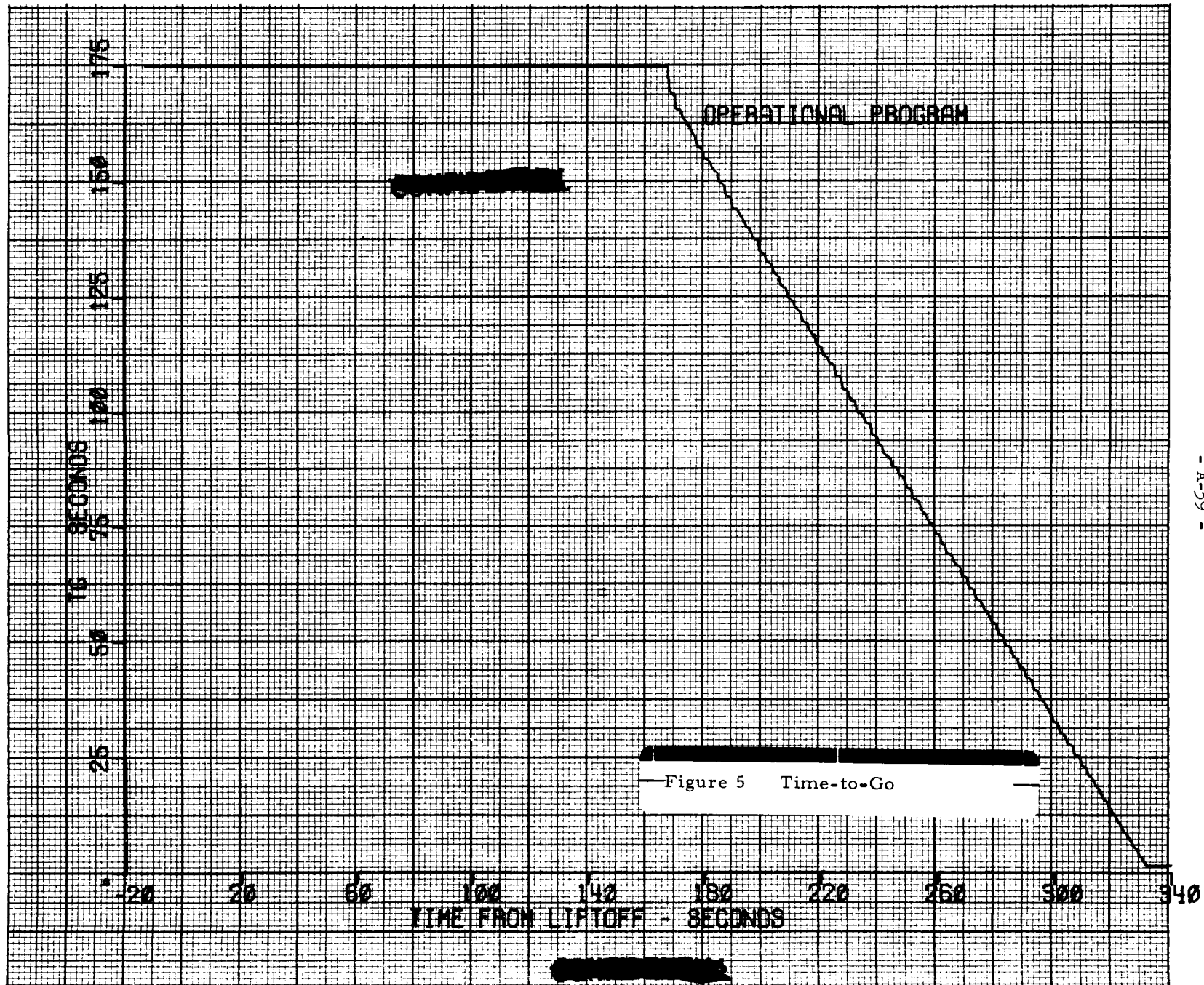


Figure 4 Commanded Pitch Rate



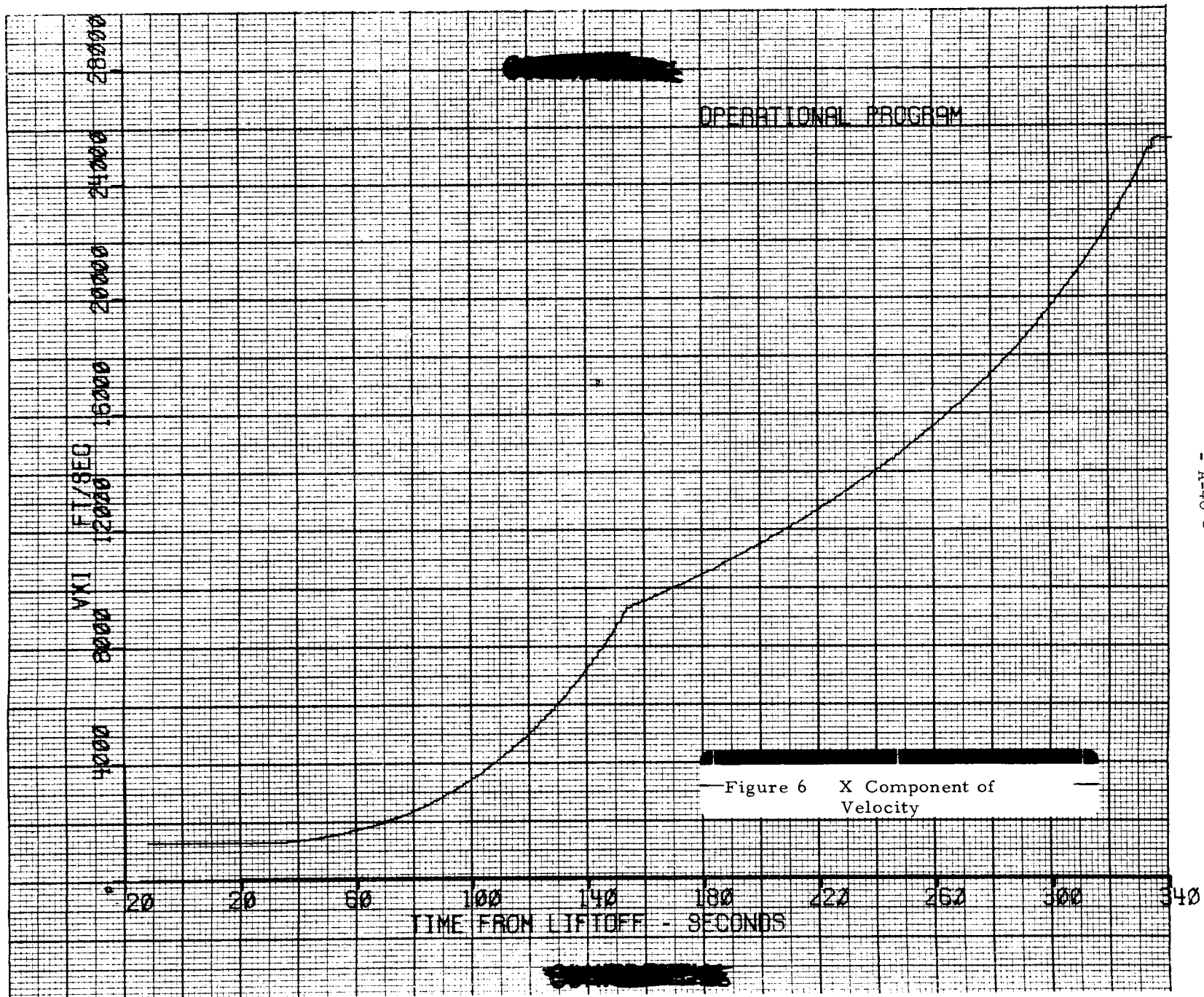
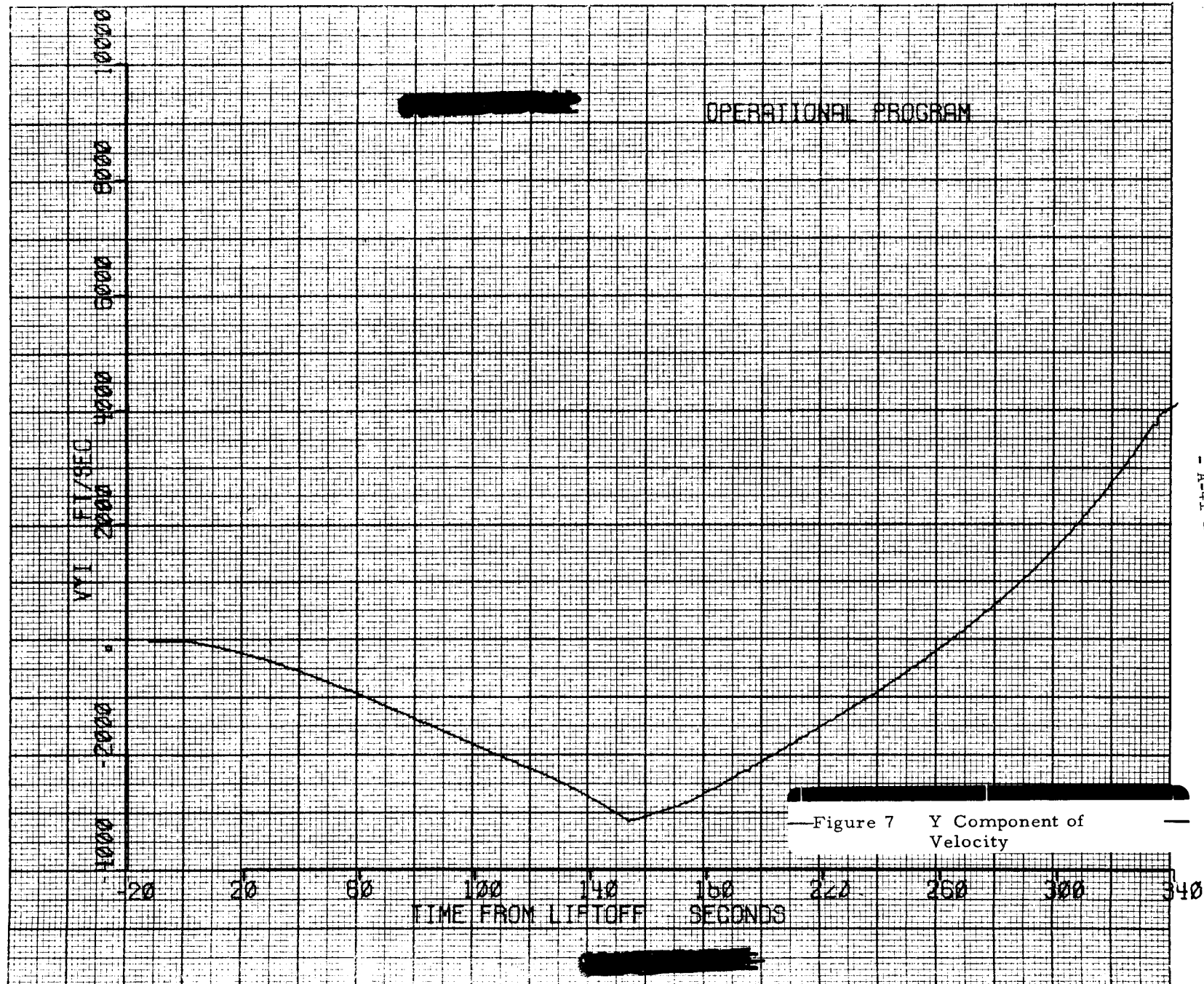
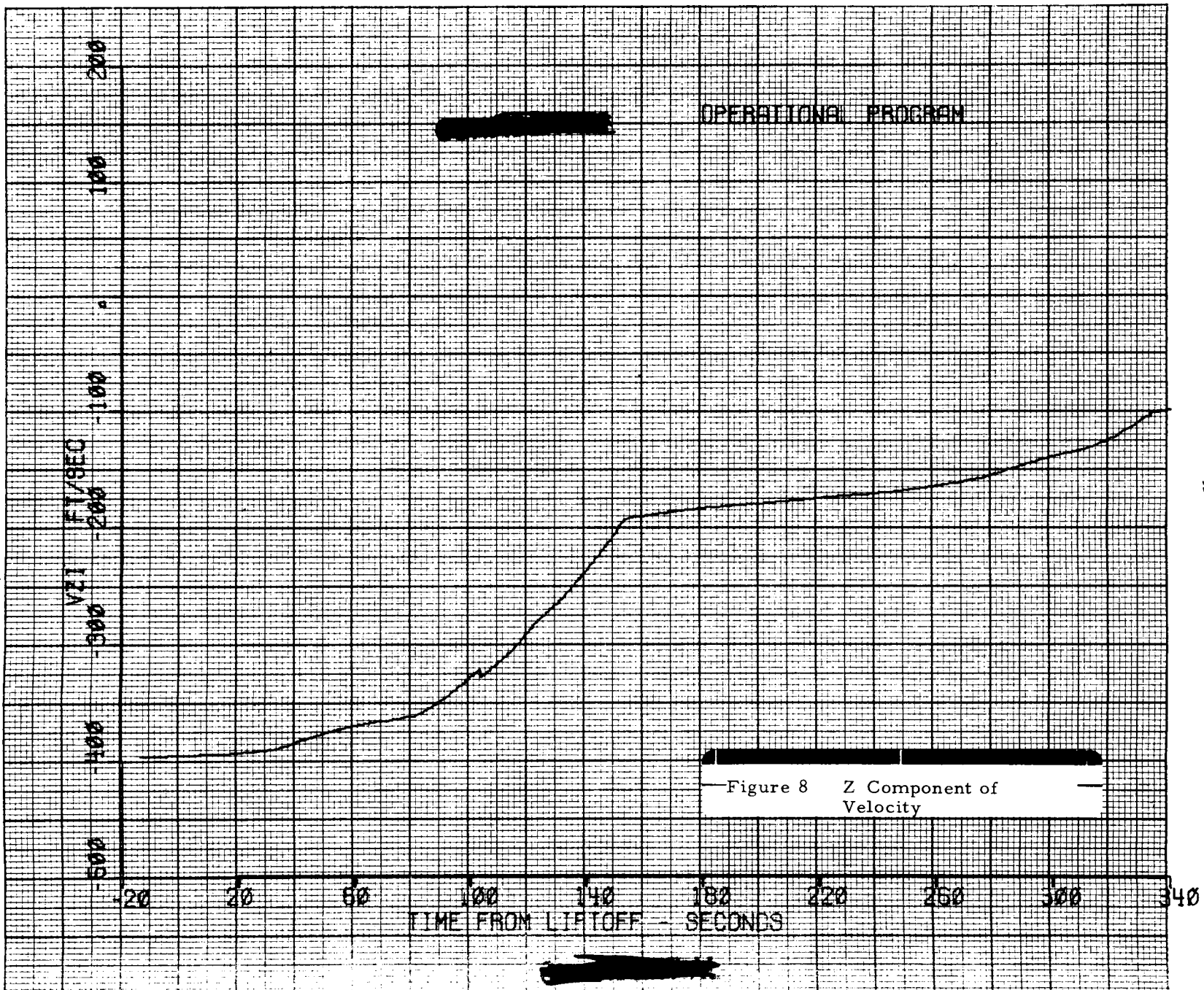
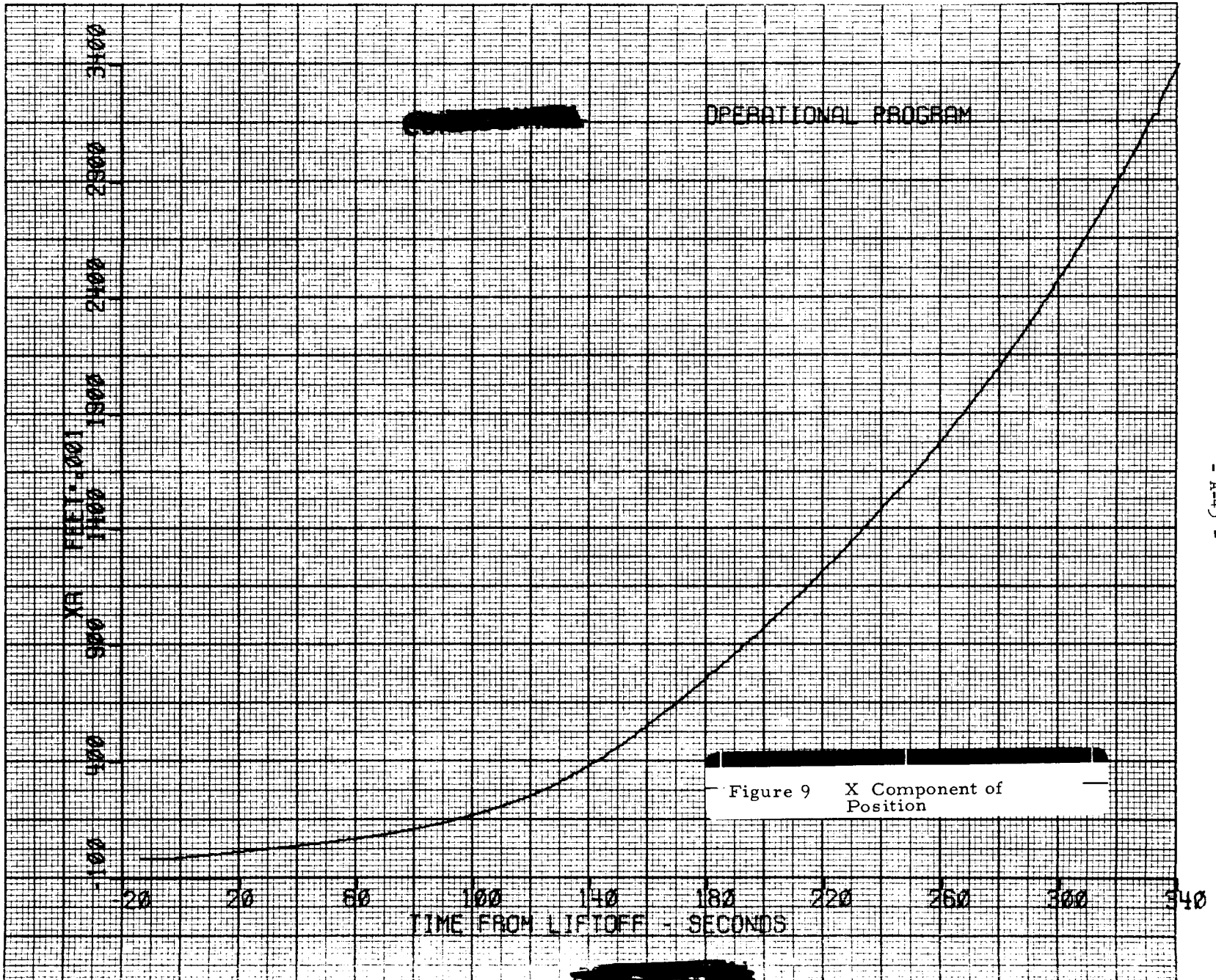


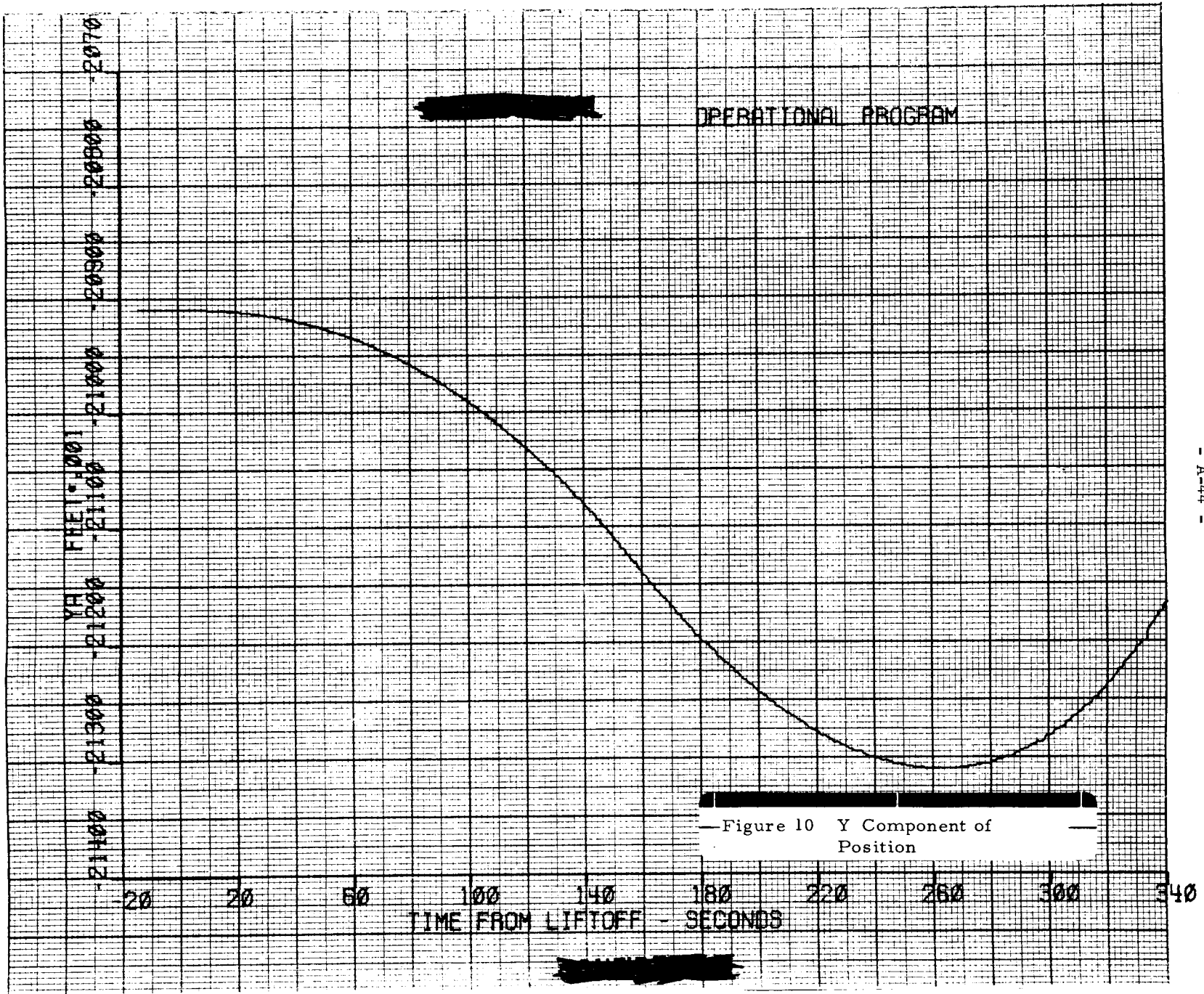
Figure 6 X Component of Velocity

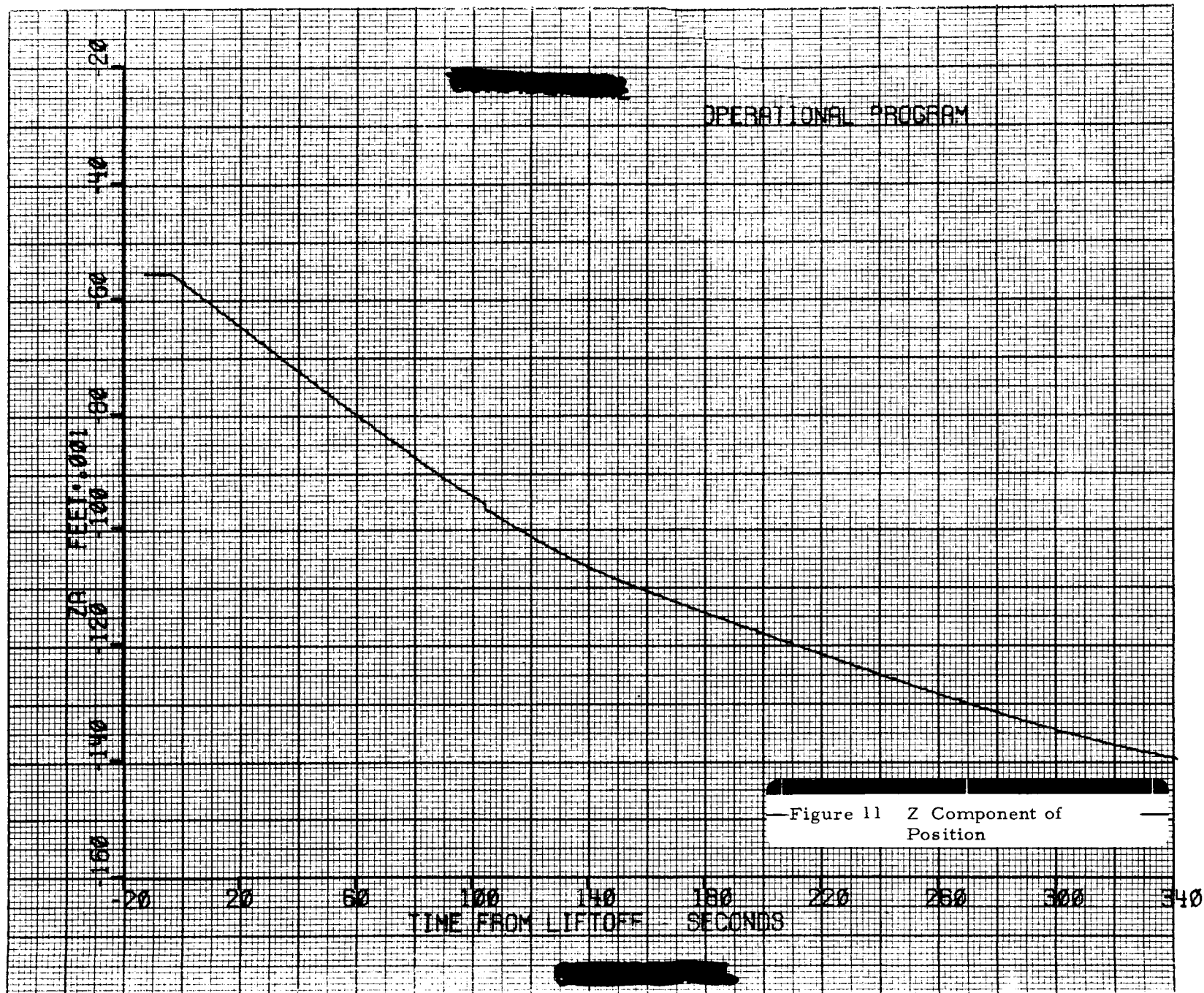


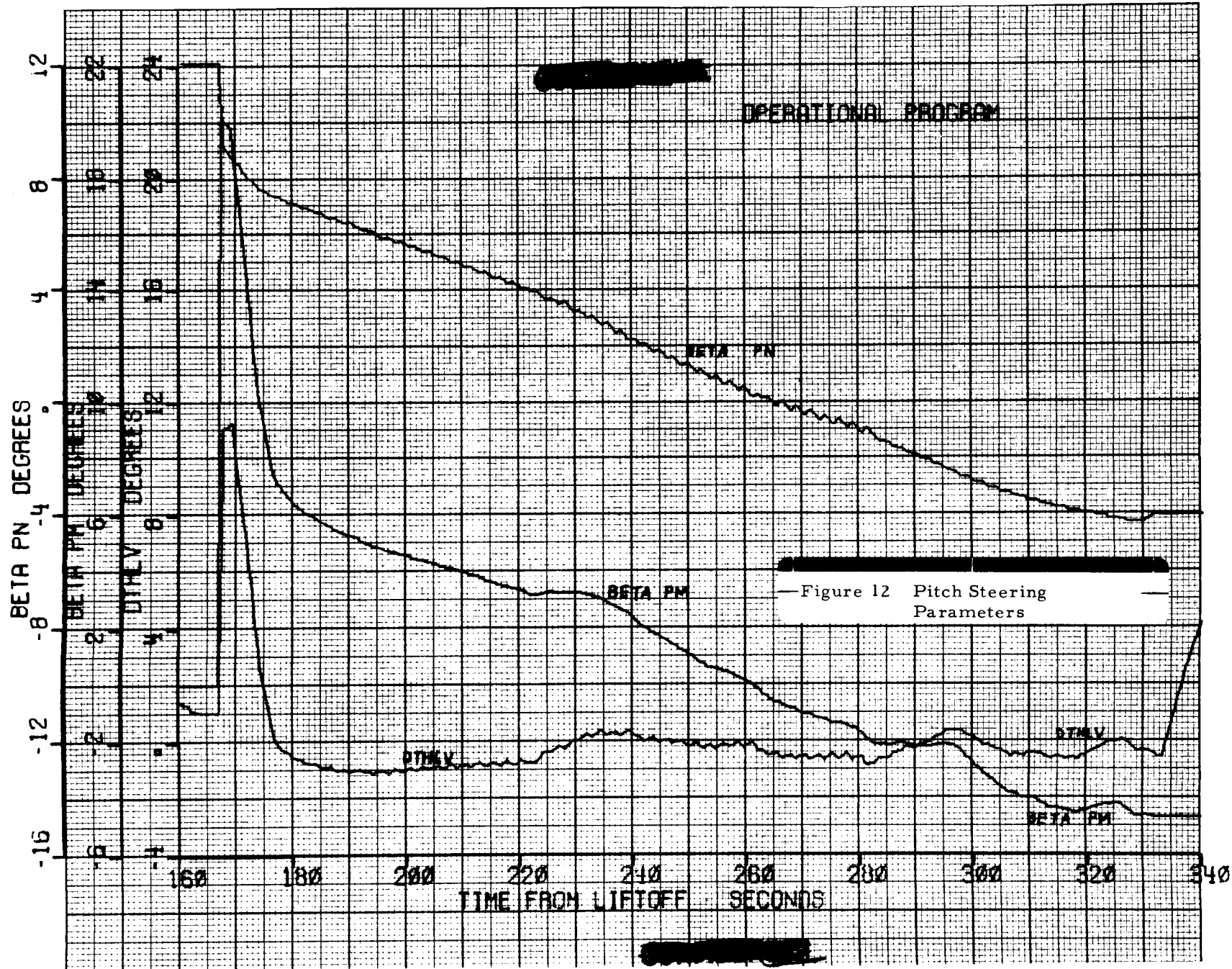












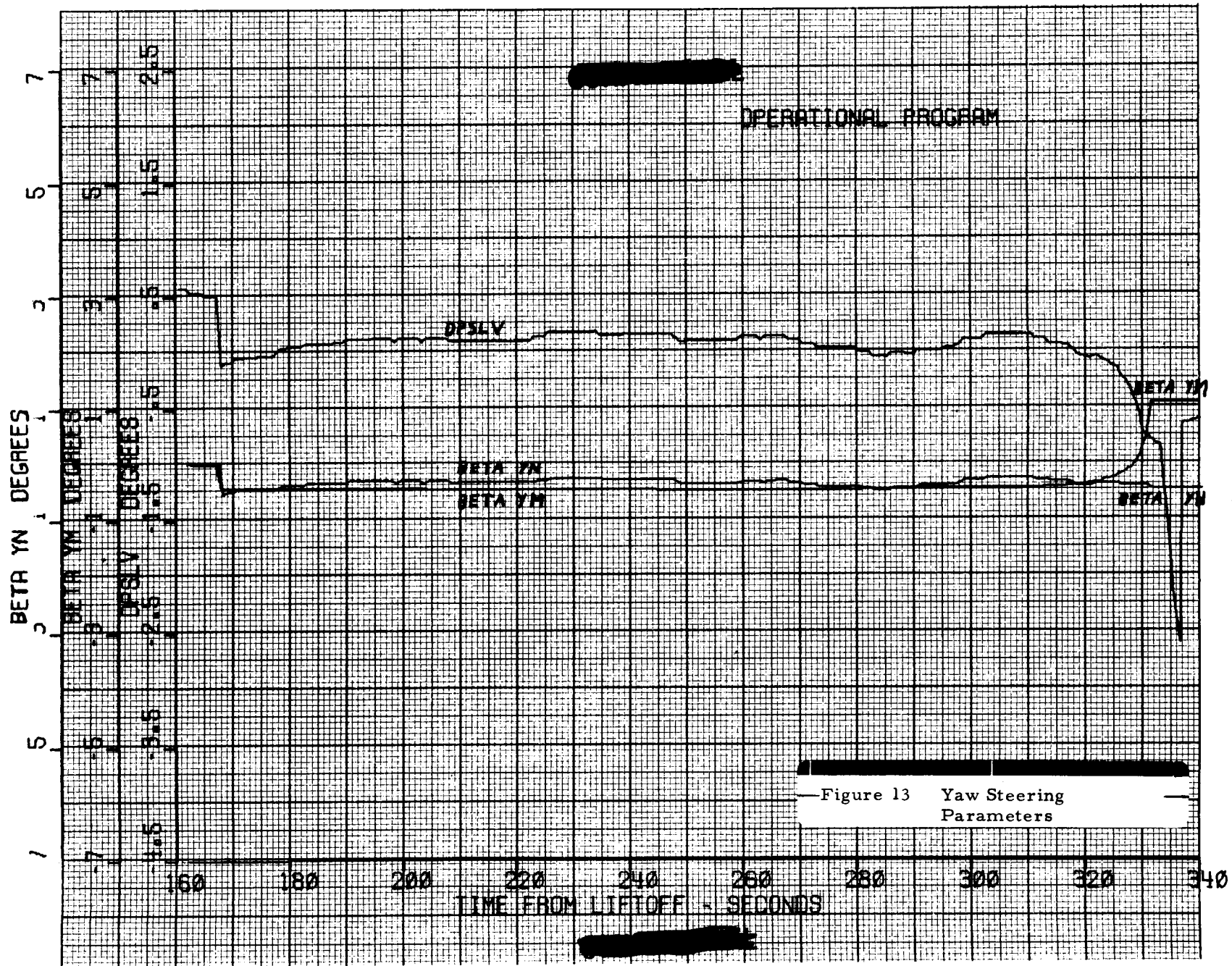
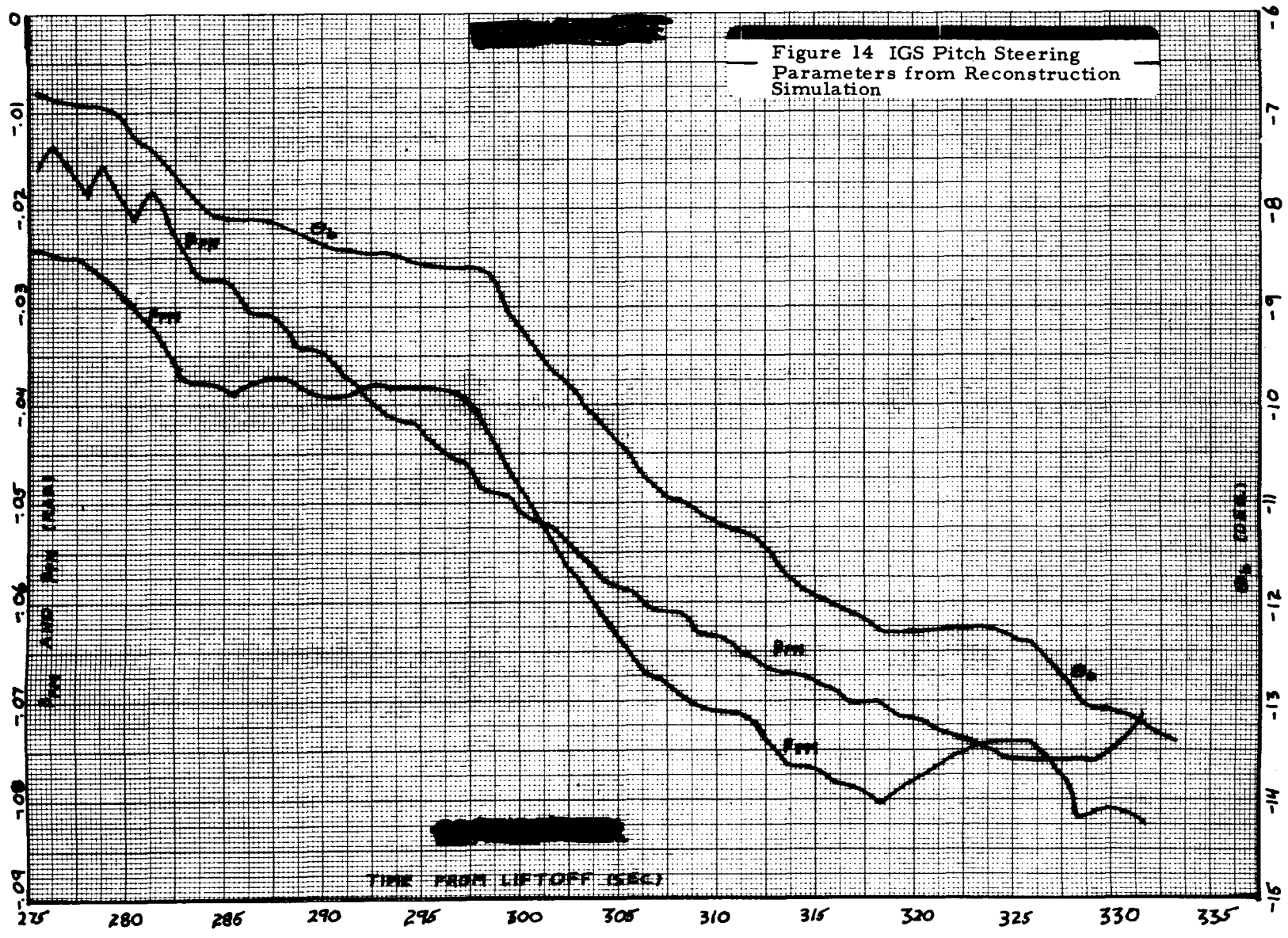
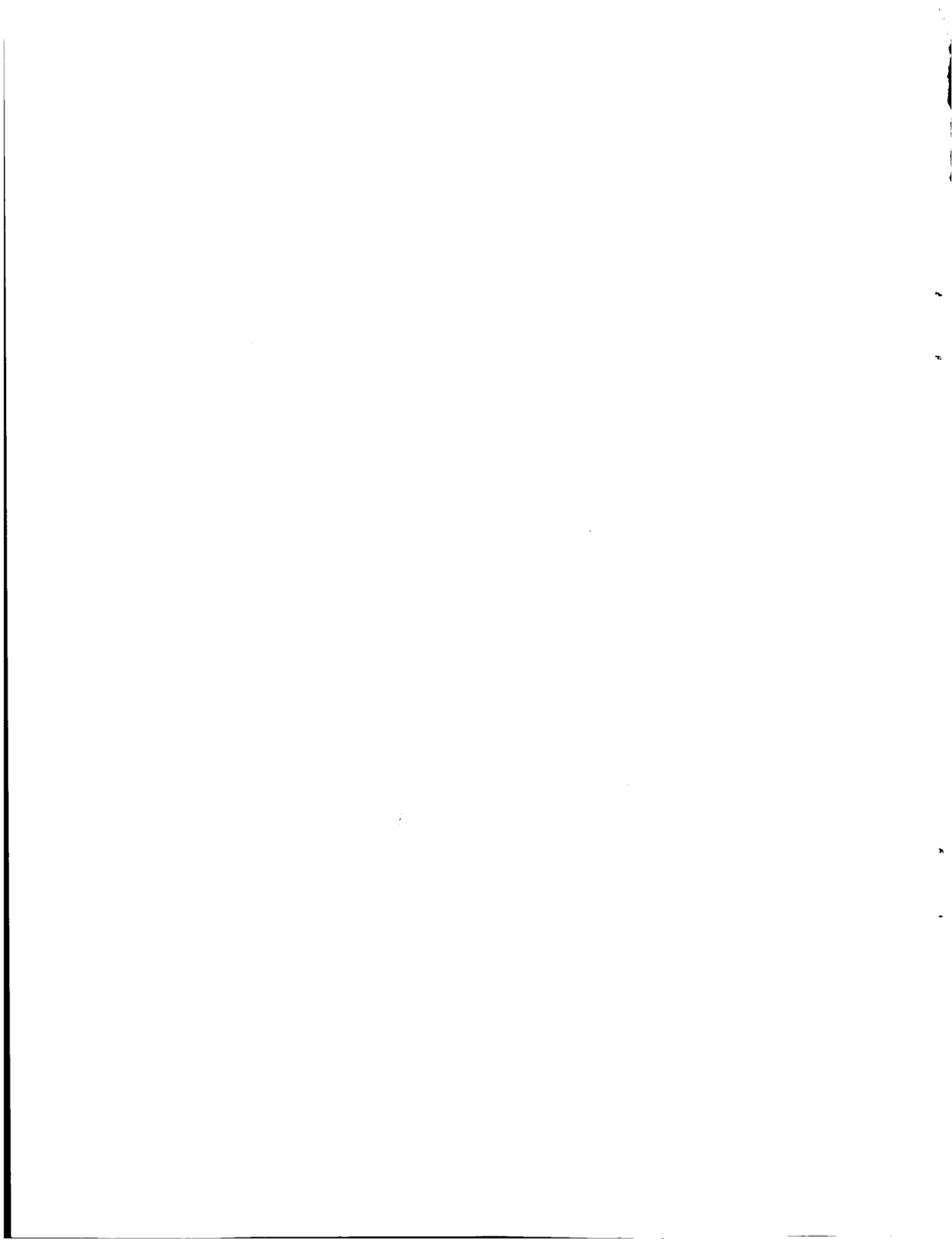


Figure 13 Yaw Steering Parameters



References

1. Gemini GT-3 Ascent Post-Flight Analysis Report, dated 9 April 1965, IBM CD No. 3-260-6096 (CONF.).
2. Gemini GT-4 Ascent Post-Flight Analysis Report, dated 1 July 1965, IBM CD No. 3-260-6118 (CONF.).
3. Ascent Operational Program Math Flow 3 MOD II MVS Analysis, dated 25 May 1965, IBM No. 65-554-0042.





PART B -  
 GEMINI V  
 REENTRY  
 MISSION  
 RECONSTRUCTION  
 REPORT  
 (U)

Prepared by:

N. J. Kemerer  
 J. B. MacPherson

ICM NO 3-260-6142

COPY NO \_\_\_\_\_

ORIGINATING GROUP Gemini System Engineering

CONTENT APPROVED BY

*[Handwritten Signature]*

CLASSIFICATION AND AUTOMATIC REGRADING APPROVED BY

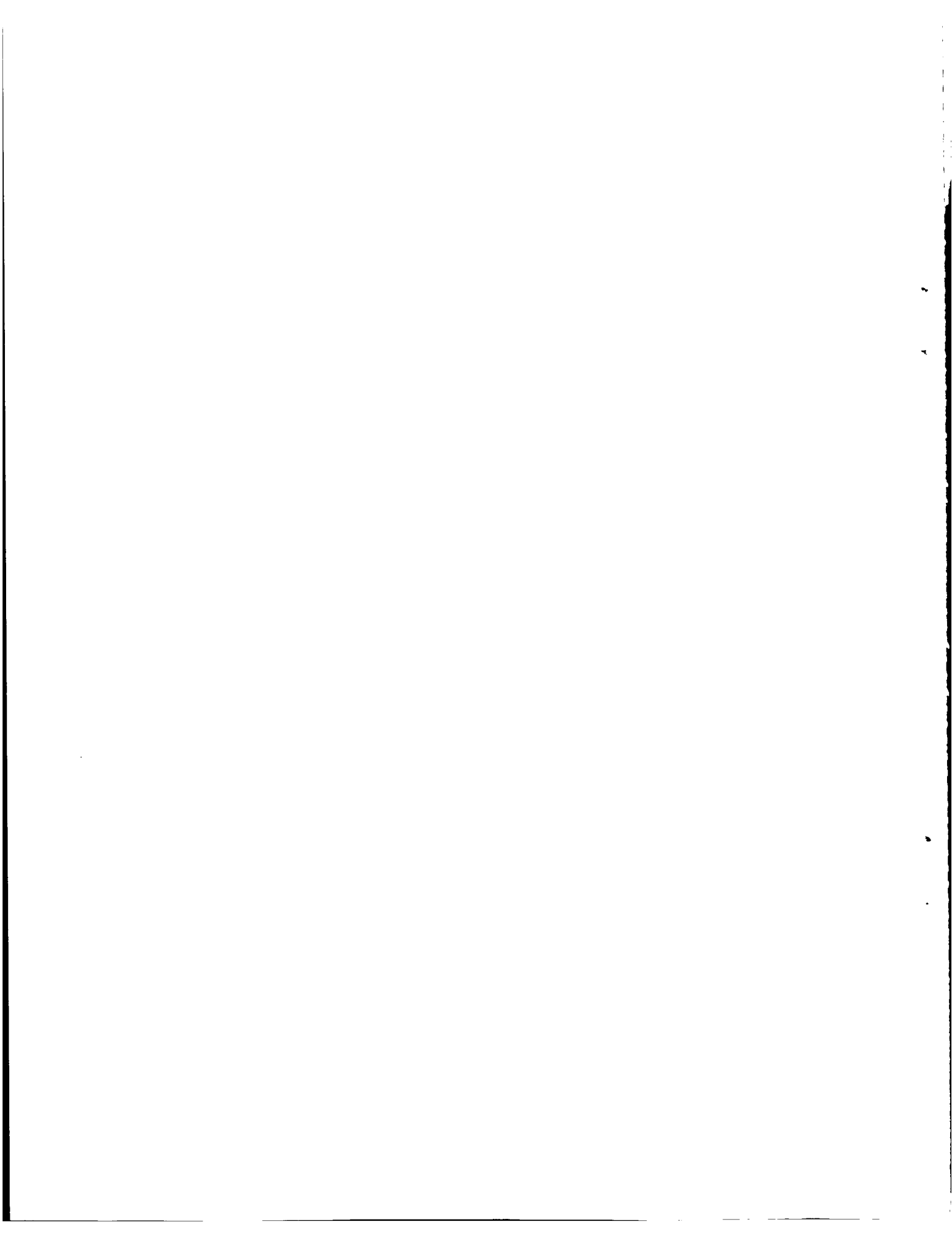
CONTRACT NO NAS 9-4792

DATE 29 September 1965

DOWNGRADED AND UNCLASSIFIED  
 DECLASSIFIED AFTER 12 YEARS  
 EOD 01/01/2000

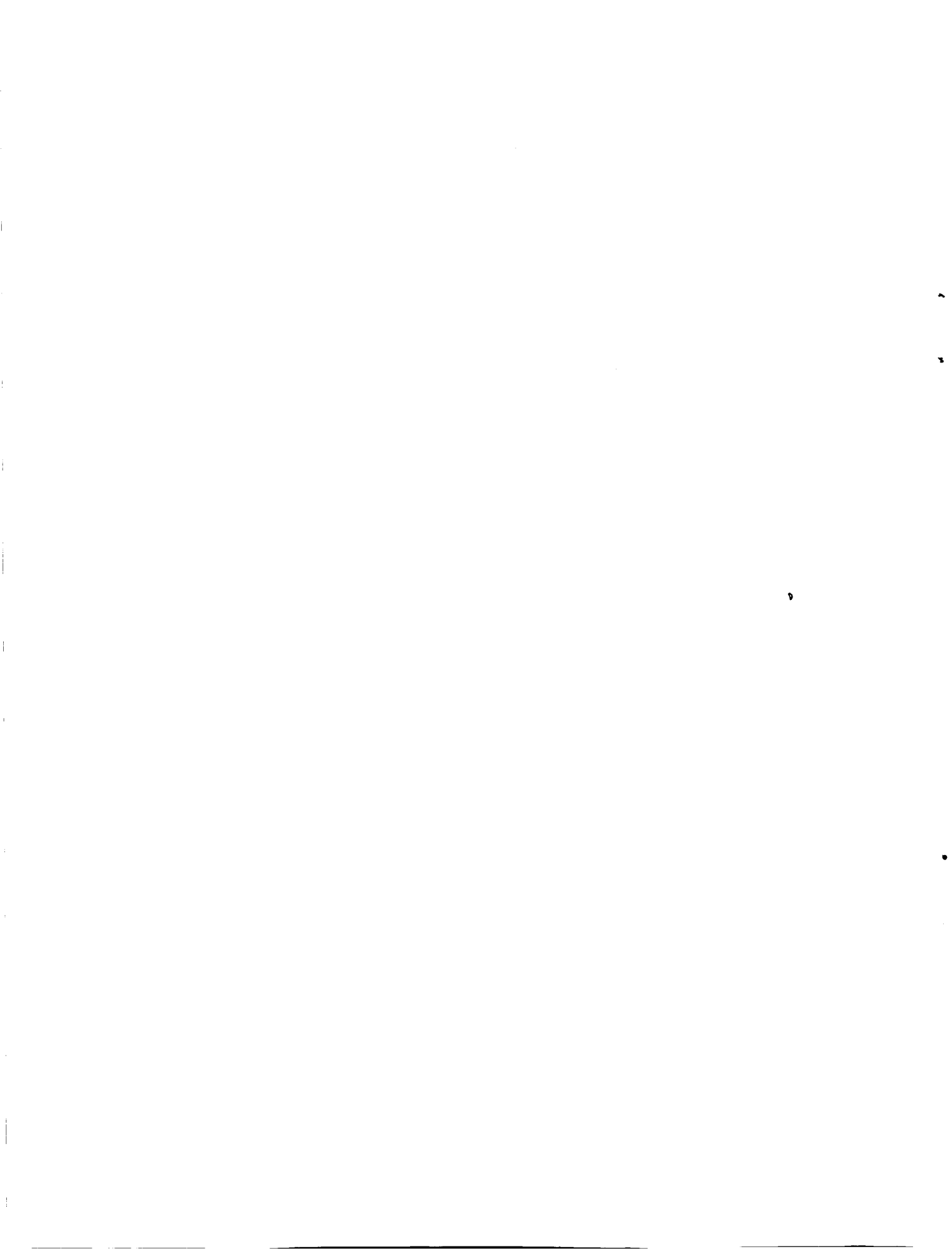
NOTICE: This document contains information affecting the  
 national defense of the United States within the meaning of  
 the Espionage Laws, Title 18, U. S. C., Sections 793 and  
 794. Its transmission or the revelation of its contents in  
 any manner to an unauthorized person is prohibited by law.

**IBM** FEDERAL SYSTEMS DIVISION  
 SPACE GUIDANCE CENTER  
 OWEGO NEW YORK



## TABLE OF CONTENTS

	Page
I. Introduction	B-1
II. Summary	B-1
Appendix BA	B-5
DCS Quantities used in GT-5 Reconstruction	
Appendix BB	B-6
Reconstructed Navigation Data vs. Time	
Reconstructed Guidance Data vs. Time	



## I. INTRODUCTION

This report presents the results of the reconstruction of the Gemini computer operation during GT-5 Re-entry. The purpose of the reconstruction was to verify that the computer navigated properly, and to explain certain anomalies observed in the telemetry guidance data.

The study was made using the operational program simulation, which executes a Gemini program on the 7090 Data Processing System in fixed point arithmetic and 26 bit word length. The accelerometer outputs and roll gimbal angle from the flight telemetry data were used as inputs to the program. In addition, the computation cycle time multiplexed with the flow tag on telemetry was used to allow accurate evaluation of split DAS frames.

The DCS quantities used in the reconstruction are shown for reference in Appendix BA. (Verification of these quantities was performed using readout of the computer memory made available shortly after the flight.) A printout of the entire reconstruction given in Appendix BB.

## II. SUMMARY

A. The values of the six navigation parameters at three key times during Re-entry are shown in the following table: (R/C denotes reconstructed values, and T/M telemetry values)

End of Retro (t = 1672.101)

	$\underline{r_s}$	$\underline{\phi}$	$\underline{\Theta_E}$	$\underline{V_E}$	$\underline{\gamma}$	$\underline{\Psi_E}$
R/C	21,765,746 ft	17.962°	217.571°	23821.070 fps	-.914°	60.564°
T/M	21,765,719 ft	17.962°	217.572°	23821.160 fps	-.914°	60.565°

400,000 ft (t = 2472.101)

	$\underline{r_s}$	$\underline{\phi}$	$\underline{\Theta_E}$	$\underline{V_E}$	$\underline{\gamma}$	$\underline{\Psi_E}$
R/C	21,295,166 ft	32.626°	272.483°	24393.967 fps	-1.666°	89.284°
T/M	21,295,043 ft	32.625°	272.484°	24394.175 fps	-1.665°	89.285°

Termination of Guidance (t = 2887.277)

	$\underline{r_s}$	$\underline{\phi}$	$\underline{\Theta_E}$	$\underline{V_E}$	$\underline{\gamma}$	$\underline{\Psi_E}$
R/C	20,972,290 ft	29.636°	297.995°	1608.586 fps	-35.059°	123.536°
T/M	20,972,083 ft	29.634°	297.997°	1609.097 fps	-35.082°	123.536°

SUMMARY (Continued)

In addition, a complete listing of the reconstruction is given in Appendix B, so that agreement between the reconstructed navigation and the guidance quantities, and the corresponding telemetry quantities can be successfully demonstrated.

Analysis of the reconstructed data suggests two conclusions:

- (1) The Gemini computer used in the GT-5 mission navigated properly, and generated guidance commands consistent with the initial conditions and the navigated trajectory; and
- (2) Certain anomalies in the attitude error signals resulted from the erroneous initial condition input for the quantity  $\Delta \Theta_R$ . These anomalies will now be described.

B. Anomalies in Guidance Data for Reconstructed Mission

- (1) Bank Command Anomaly -

IBM report #65-554-0071, "Effect of Erroneous  $\Delta \Theta_R$  Input on GT-5 Re-entry", dated 3 September 1965 describes the conditions under which a divide overflow in the calculation of the quantity

$$\Delta R = \frac{R_N - R_P}{F_E(D) * R_P} \quad (1)$$

causes spurious bank commands to be calculated from the equation:

$$\cos \beta_1 = 0.5 + K_{B6} \Delta R + K_{B7} (\Delta R)^2 \quad (2)$$

From the telemetry data, one can observe that the divide operation, prior to the overflow, was generating large negative values for  $\Delta R$  which, upon being limited to -0.387 by the program, caused equation (2) to yield a value of

$$\cos \beta_1 = 0$$

whence

$$\beta_1 = 90^\circ$$

and therefore the magnitude of the bank angle was also  $90^\circ$ . The quantity  $\Delta R$ , however, is scaled such that it can get

SUMMARY (Continued)

no larger than -127.99---9. When the quotient exceeded that value, an overflow occurred in such a way that the sign bit was lost and a positive number resulted. This number consistently left  $\Delta R$  at a value larger than 0.629 and thereby caused equation (2) to yield a value of

$$\cos \beta_1 = 1$$

whence

$$|B_c| = \beta_1 = 0^\circ.$$

Therefore, prior to the termination of guidance, the telemetry data shows commanded bank angles of  $0^\circ$  in spite of the fact that the down-range error obviously requires a zero lift command.

This same overflow occurred in the reconstruction during exactly the same computer cycle as the flight computer exhibited it. However, it did not produce the identical results because the Gemini simulator program sets the quotient to zero following a divide overflow; i. e., it sets

$$\Delta R = 0$$

whence

$$\cos \beta_1 = 0.5$$

and therefore

$$|B_c| = \beta_1 = 60^\circ.$$

The effect is seen in Appendix B as a string of  $60^\circ$  bank commands from a time-in-mode of 2849.620 seconds to the termination of closed-loop guidance.

(2) Cross-Range Error Signal Anomaly -

The reconstruction contained an anomaly in the cross-range error signal which was not seen in the digital telemetry, but which may have caused erratic needle behavior in the yaw channel of the ADG just prior to the termination of guidance. This anomaly was caused by a divide overflow in the calculation of the cross-range error

$$\Delta \psi_b = \frac{R_c}{C_{DB}}$$

SUMMARY (Continued)

This quotient is scaled so that it cannot exceed 127.99---9, which is more than adequate for a nominal mission, but under the conditions of the GT-5 Re-entry caused divide overflows:  $R_c$  exceeded -130 n.m. while  $C_{DB}$  approached 1.0.

This fact is demonstrated in Appendix B under the column "DPSBO", which is the cross-range error  $\Delta\psi_b$  referred to above. From a time-in-mode of 2862.254 seconds until the termination of guidance, this quantity shows a value of zero in spite of the fact that the magnitude of  $R_c$  obviously requires a value of -1.0. The value of zero again results from the fact that the Gemini simulator sets a quotient to zero following a divide overflow.

(3) Conclusions and Recommendations -

The reconstruction demonstrates that the Gemini computer navigated properly during the GT-5 mission, and generated guidance commands consistent with the initial conditions and navigated trajectory.

It is recommended that no action be taken regarding the divide overflows observed in the flight, since: (1) they resulted from an attempt to fly the computer to an unrealistic target; (2) no such problem can exist if the initial conditions are realistic; and (3) rescaling the quantities involved results in a degradation of performance under realistic conditions.



APPENDIX BADCS QUANTITIES USED IN GT-5 RECONSTRUCTION

<u>Symbol</u>	<u>Octal Value</u>	<u>Decimal Value</u>
X <sub>ER</sub>	167 353 000	15 657 900 ft
Y <sub>ER</sub>	152 006 000	13 895 400 ft
Z <sub>ER</sub>	056 004 000	6 030 300 ft
$\dot{X}_{ER}$	567 745 000	- 17 414.7 fps
$\dot{Y}_{ER}$	157 515 000	14 291.4 fps
$\dot{Z}_{ER}$	133 372 000	11 710.5 fps
$\Theta_T$	020 402 000	29.55°
$\Theta_T$	243 052 000	292.00°
$\Delta \Theta_R$	140 300 000	172.56°
K <sub>X1</sub>	146 770 000	0.10057 ft/sec/pulse
K <sub>X2</sub>	000 026 000	0.00004 ft/sec/pulse
K <sub>X3</sub>	000 104 000	0.00013 ft/sec/pulse
K <sub>Y1</sub>	777 665 000	- 0.00014 ft/sec/pulse
K <sub>Y2</sub>	777 747 000	- 0.00005 ft/sec/pulse
K <sub>Y3</sub>	144 150 000	0.09785 ft/sec/pulse
K <sub>Z1</sub>	777 770 000	- 0.00002 ft/sec/pulse
K <sub>Z2</sub>	632 617 000	- 0.09885 ft/sec/pulse
K <sub>Z3</sub>	000 021 000	0.00003 ft/sec/pulse
K <sub>X4</sub>	001 463 000	0.02499 pulse/sec
K <sub>Y4</sub>	767 146 000	- 0.13751 pulse/sec
K <sub>Z4</sub>	771 130 000	- 0.10669 pulse/sec
KBA	004 425 000	8.1309°
ACCT	000 400 000	1.0 ft/sec <sup>2</sup>

APPENDIX BB1. Reconstructed Navigation Data vs. Time -

## Definition of Terms :

TDAS	= $t_{DAS}$	:	Computer time-in-mode
TT	= $T_T$	:	Integration time
SFXP	= $SFX'$	:	Accumulated pulse sums, X platform axis
SFYP	= $SFY'$	:	Accumulated pulse sums, Y platform axis
SFZP	= $SFZ'$	:	Accumulated pulse sums, Z platform axis
RS	= $r_s$	:	S/C distance from earth center
PHI	= $\phi$	:	S/C latitude
THETA E	= $\theta_E$	:	S/C earth-referenced longitude
VE	= $V_E$	:	S/C velocity relative to earth
GAMMA	= $\gamma$	:	S/C flight-path-angle
PSIE	= $\psi_E$	:	S/C earth-referenced heading

2. Reconstructed Guidance Data vs. Time -

## Definition of Terms:

PHBI	= $\phi_b$	:	Roll gimbal angle
DTHBO	= $\Delta\theta_b$	:	Computer output to ADG pitch channel, converted to nautical miles
DPSBO	= $\Delta\psi_b$	:	Computer output to ADG yaw channel, converted to units of $R_c/C_{DB}$
DPHBO	= $\Delta\phi_b$	:	Computer output to ADG roll channel, converted to degrees
BA	= $B_A$	:	Actual bank angle
RD	= $R_N - R_P$	:	Down-range error
RC	= $R_C$	:	Cross-range error
BC	= $B_C$	:	Commanded bank angle
RP	= $R_P$	:	Predicted half-lift range
D	= $D$	:	Density-attitude parameter
PSIT	= $\psi_T$	:	S/C heading to target
RT	= $R_T$	:	Range to target

TDAS (SEC)	1. (SEC)	SFXP (COUNTS)	SFYP (COUNTS)	SFZP (COUNTS)	RS (K-FEET)	PHI (DEG)	THETA E (DEG)	VE (FPS)	GAMMA (DEG)	PSIE (DEG)	POINT NO.
1611.989	0.125	30.	-250.	-162.	21785.396	16.074	214.154	24062.354	-0.383	59.448	1.
1612.778	0.875	-36.	-261.	-87.	21785.266	16.100	214.199	24055.955	-0.401	59.459	2.
1613.419	1.500	-92.	-271.	-24.	21785.158	16.120	214.236	24050.521	-0.416	59.468	3.
1614.131	2.250	-158.	-282.	54.	21785.032	16.143	214.276	24044.141	-0.435	59.478	4.
1614.769	2.875	-218.	-292.	124.	21784.910	16.164	214.312	24038.346	-0.452	59.487	5.
1615.414	3.500	-278.	-302.	194.	21784.792	16.185	214.349	24032.562	-0.469	59.496	6.
1616.047	4.125	-339.	-315.	265.	21784.662	16.205	214.385	24026.711	-0.486	59.504	7.
1616.758	4.875	-422.	-321.	331.	21784.510	16.228	214.425	24018.639	-0.502	59.515	8.
1617.396	5.500	-497.	-326.	390.	21784.378	16.248	214.461	24011.350	-0.516	59.525	9.
1618.039	6.125	-573.	-331.	450.	21784.232	16.269	214.497	24003.975	-0.531	59.535	10.
1618.672	6.750	-649.	-338.	511.	21784.092	16.289	214.533	23996.625	-0.546	59.544	11.
1619.385	7.500	-743.	-333.	547.	21783.930	16.312	214.574	23987.404	-0.555	59.558	12.
1620.034	8.125	-829.	-328.	579.	21783.778	16.332	214.611	23978.975	-0.564	59.570	13.
1620.667	8.750	-914.	-322.	612.	21783.622	16.353	214.646	23970.646	-0.572	59.583	14.
1621.378	9.500	-1026.	-310.	660.	21783.452	16.375	214.687	23959.648	-0.585	59.598	15.
1622.017	10.125	-1126.	-300.	703.	21783.294	16.396	214.723	23949.834	-0.596	59.611	16.
1622.661	10.750	-1227.	-289.	747.	21783.130	16.416	214.759	23939.926	-0.607	59.625	17.
1623.294	11.375	-1328.	-277.	792.	21782.964	16.436	214.795	23930.041	-0.619	59.639	18.
1624.005	12.125	-1409.	-257.	856.	21782.782	16.459	214.835	23922.203	-0.635	59.656	19.
1624.648	12.750	-1483.	-239.	913.	21782.608	16.479	214.872	23915.057	-0.650	59.672	20.
1625.281	13.375	-1557.	-219.	971.	21782.436	16.499	214.908	23907.920	-0.665	59.688	21.
1625.992	14.125	-1637.	-199.	1037.	21782.240	16.522	214.948	23900.230	-0.682	59.706	22.
1626.631	14.750	-1709.	-182.	1096.	21782.054	16.542	214.984	23893.330	-0.697	59.721	23.
1627.274	15.375	-1782.	-164.	1156.	21781.868	16.563	215.021	23886.336	-0.712	59.737	24.
1627.907	16.000	-1855.	-145.	1217.	21781.684	16.583	215.056	23879.346	-0.728	59.753	25.
1628.618	16.750	-1927.	-158.	1259.	21781.464	16.605	215.096	23872.533	-0.739	59.762	26.
1629.256	17.375	-1992.	-169.	1297.	21781.266	16.625	215.133	23866.387	-0.750	59.771	27.
1629.899	18.000	-2057.	-181.	1335.	21781.056	16.646	215.169	23860.250	-0.760	59.780	28.
1630.532	18.625	-2123.	-194.	1375.	21780.858	16.666	215.205	23854.035	-0.771	59.788	29.
1631.245	19.375	-2212.	-221.	1424.	21780.622	16.688	215.245	23845.605	-0.784	59.795	30.
1631.886	20.000	-2291.	-246.	1468.	21780.420	16.708	215.281	23838.154	-0.796	59.800	31.
1632.526	20.625	-2372.	-272.	1514.	21780.200	16.729	215.318	23830.508	-0.809	59.806	32.
1633.238	21.375	-2443.	-292.	1553.	21779.968	16.751	215.358	23823.861	-0.820	59.814	33.
1633.876	22.000	-2507.	-310.	1588.	21779.738	16.771	215.394	23817.879	-0.830	59.821	34.
1634.521	22.625	-2571.	-328.	1623.	21779.522	16.791	215.431	23811.908	-0.840	59.829	35.
1635.154	23.250	-2636.	-349.	1660.	21779.300	16.811	215.466	23805.848	-0.850	59.835	36.
1635.864	24.000	-2636.	-349.	1660.	21779.044	16.834	215.506	23806.135	-0.852	59.849	37.
1636.502	24.625	-2636.	-349.	1660.	21778.814	16.854	215.543	23806.389	-0.853	59.861	38.
1637.145	25.250	-2636.	-349.	1660.	21778.594	16.874	215.579	23806.650	-0.854	59.873	39.
1637.777	25.875	-2635.	-349.	1661.	21778.368	16.894	215.615	23807.010	-0.855	59.885	40.
1638.490	26.625	-2635.	-349.	1661.	21778.114	16.916	215.655	23807.303	-0.856	59.899	41.
1639.138	27.250	-2635.	-349.	1661.	21777.880	16.937	215.692	23807.568	-0.857	59.911	42.
1639.771	27.875	-2635.	-350.	1661.	21777.664	16.956	215.728	23807.818	-0.859	59.923	43.
1640.482	28.625	-2635.	-350.	1661.	21777.408	16.979	215.768	23808.109	-0.860	59.937	44.
1641.121	29.250	-2635.	-350.	1661.	21777.180	16.999	215.804	23808.375	-0.861	59.949	45.
1641.767	29.875	-2635.	-350.	1661.	21776.944	17.019	215.841	23808.637	-0.862	59.962	46.
1642.399	30.500	-2636.	-350.	1660.	21776.722	17.039	215.877	23808.787	-0.863	59.974	47.
1643.110	31.250	-2636.	-350.	1660.	21776.460	17.061	215.917	23809.076	-0.864	59.987	48.
1643.748	31.875	-2636.	-350.	1660.	21776.228	17.081	215.953	23809.338	-0.865	60.000	49.
1644.392	32.500	-2636.	-350.	1660.	21776.002	17.101	215.990	23809.605	-0.866	60.012	50.
1645.024	33.125	-2636.	-351.	1660.	21775.772	17.121	216.026	23809.865	-0.867	60.024	51.
1645.738	33.875	-2636.	-351.	1660.	21775.520	17.143	216.066	23810.160	-0.869	60.038	52.
1646.387	34.500	-2636.	-351.	1660.	21775.284	17.164	216.103	23810.430	-0.870	60.051	53.
1647.020	35.125	-2637.	-351.	1661.	21775.056	17.183	216.139	23810.598	-0.871	60.063	54.

B-7

TOAS (SEC)	TT (SEC)	SFXP (COUNTS)	SFYP (COUNTS)	SFZP (COUNTS)	RS (K- FEET)	PHI (DEG)	THETA E (DEG)	VE (FPS)	GAMMA (DEG)	PSIE (DEG)	POINT NO.
1647.730	35.875	-2637.	-351.	1661.	21774.798	17.206	216.179	23810.887	-0.872	60.077	55.
1648.369	36.500	-2637.	-351.	1661.	21774.564	17.226	216.216	23811.158	-0.873	60.089	56.
1649.014	37.125	-2637.	-351.	1661.	21774.334	17.246	216.252	23811.418	-0.875	60.102	57.
1649.646	37.750	-2635.	-350.	1661.	21774.100	17.266	216.288	23811.885	-0.876	60.115	58.
1650.357	38.500	-2635.	-350.	1661.	21773.842	17.288	216.329	23812.186	-0.877	60.129	59.
1650.996	39.125	-2635.	-350.	1661.	21773.612	17.308	216.365	23812.443	-0.878	60.141	60.
1651.641	39.750	-2635.	-350.	1661.	21773.376	17.328	216.402	23812.713	-0.879	60.154	61.
1652.273	40.375	-2636.	-350.	1660.	21773.146	17.347	216.438	23812.871	-0.880	60.166	62.
1652.986	41.125	-2636.	-350.	1660.	21772.878	17.370	216.478	23813.174	-0.881	60.180	63.
1653.636	41.750	-2636.	-350.	1660.	21772.640	17.390	216.515	23813.447	-0.882	60.193	64.
1654.269	42.375	-2634.	-351.	1660.	21772.416	17.410	216.552	23813.916	-0.883	60.205	65.
1654.980	43.125	-2634.	-351.	1660.	21772.154	17.432	216.592	23814.221	-0.885	60.219	66.
1655.619	43.750	-2634.	-351.	1660.	21771.914	17.452	216.628	23814.486	-0.886	60.232	67.
1656.265	44.375	-2634.	-351.	1660.	21771.682	17.472	216.665	23814.750	-0.887	60.245	68.
1656.897	45.000	-2635.	-353.	1661.	21771.446	17.491	216.701	23814.926	-0.888	60.257	69.
1657.880	46.000	-2635.	-353.	1661.	21771.078	17.522	216.757	23815.344	-0.890	60.277	70.
1658.790	46.875	-2635.	-353.	1661.	21770.744	17.550	216.810	23815.736	-0.891	60.295	71.
1659.699	47.750	-2635.	-353.	1661.	21770.410	17.578	216.862	23816.121	-0.893	60.313	72.
1660.887	49.000	-2635.	-353.	1661.	21769.968	17.615	216.929	23816.635	-0.895	60.337	73.
1661.520	49.625	-2636.	-352.	1660.	21769.730	17.635	216.965	23816.801	-0.896	60.350	74.
1662.230	50.375	-2636.	-352.	1660.	21769.462	17.657	217.006	23817.100	-0.897	60.364	75.
1662.868	51.000	-2636.	-352.	1660.	21769.222	17.677	217.042	23817.367	-0.898	60.377	76.
1663.512	51.625	-2636.	-352.	1660.	21768.984	17.697	217.079	23817.643	-0.899	60.390	77.
1664.145	52.250	-2636.	-353.	1660.	21768.744	17.716	217.115	23817.916	-0.900	60.402	78.
1664.857	53.000	-2637.	-353.	1660.	21768.482	17.738	217.156	23818.121	-0.902	60.417	79.
1665.506	53.625	-2637.	-353.	1660.	21768.238	17.758	217.193	23818.398	-0.903	60.430	80.
1666.139	54.250	-2639.	-353.	1659.	21768.000	17.778	217.230	23818.465	-0.904	60.443	81.
1666.851	55.000	-2639.	-353.	1659.	21767.730	17.800	217.270	23818.777	-0.905	60.457	82.
1667.488	55.625	-2639.	-353.	1659.	21767.490	17.820	217.307	23819.047	-0.906	60.470	83.
1668.134	56.250	-2639.	-353.	1659.	21767.248	17.840	217.344	23819.322	-0.907	60.483	84.
1668.767	56.875	-2637.	-354.	1661.	21767.008	17.859	217.380	23819.812	-0.908	60.496	85.
1669.476	57.625	-2637.	-354.	1661.	21766.740	17.881	217.421	23820.119	-0.910	60.510	86.
1670.112	58.250	-2637.	-354.	1661.	21766.494	17.901	217.457	23820.404	-0.911	60.523	87.
1670.754	58.875	-2637.	-354.	1661.	21766.258	17.920	217.494	23820.678	-0.912	60.536	88.
1671.387	59.500	-2636.	-356.	1660.	21766.016	17.940	217.530	23821.053	-0.913	60.549	89.
1671.673	59.750	-2637.	-356.	1660.	21765.908	17.949	217.547	23821.074	-0.913	60.555	90.
1671.700	59.750	-2637.	-356.	1660.	21765.900	17.950	217.549	23821.092	-0.913	60.555	91.
1672.101	60.250	-2639.	-355.	1661.	21765.746	17.962	217.571	23821.070	-0.914	60.564	92.
1688.101	76.250	-2636.	-358.	1656.	21759.574	18.453	218.493	23828.275	-0.941	60.896	93.
1704.101	92.250	-2637.	-361.	1655.	21753.228	18.938	219.420	23835.695	-0.967	61.240	94.
1720.101	108.250	-2636.	-368.	1654.	21746.708	19.419	220.354	23843.322	-0.993	61.594	95.
1736.101	124.250	-2636.	-365.	1651.	21740.016	19.894	221.295	23851.176	-1.018	61.958	96.
1752.101	140.250	-2635.	-368.	1649.	21733.154	20.364	222.242	23859.225	-1.043	62.334	97.
1768.101	156.250	-2636.	-371.	1648.	21726.114	20.829	223.196	23867.492	-1.068	62.720	98.
1784.101	172.250	-2635.	-373.	1647.	21718.922	21.287	224.157	23875.959	-1.092	63.116	99.
1800.101	188.250	-2634.	-374.	1642.	21711.562	21.740	225.125	23884.635	-1.116	63.524	100.
1816.101	204.250	-2635.	-379.	1643.	21704.038	22.186	226.101	23893.510	-1.139	63.942	101.
1832.101	220.250	-2634.	-382.	1640.	21696.356	22.626	227.083	23902.594	-1.162	64.371	102.
1848.101	236.250	-2632.	-383.	1640.	21688.524	23.060	228.073	23911.861	-1.185	64.811	103.
1864.101	252.250	-2632.	-386.	1638.	21680.536	23.486	229.071	23921.330	-1.207	65.262	104.
1880.101	268.250	-2632.	-389.	1636.	21672.398	23.906	230.076	23930.990	-1.229	65.723	105.
1896.101	284.250	-2631.	-390.	1635.	21664.108	24.319	231.089	23940.846	-1.250	66.196	106.
1912.101	300.250	-2632.	-391.	1630.	21655.688	24.724	232.110	23950.885	-1.271	66.679	107.
1928.101	316.250	-2629.	-396.	1629.	21647.106	25.121	233.139	23961.107	-1.292	67.172	108.

CONFIDENTIAL

CONFIDENTIAL

TDAS (SEC)	TT (SEC)	SFXP (COUNTS)	SFYF (COUNTS)	SFZP (COUNTS)	RS (K-FEET)	PHI (DEG)	THETA E (DEG)	VE (FPS)	GAMMA (DEG)	PSIE (DEG)	POINT NO.
1944.101	332.250	-2630.	-398.	1628.	21638.402	25.511	234.175	23971.520	-1.312	67.677	109.
1960.101	348.250	-2629.	-399.	1627.	21629.556	25.892	235.220	23982.098	-1.331	68.192	110.
1976.101	364.250	-2628.	-403.	1622.	21620.566	26.266	236.273	23992.855	-1.350	68.717	111.
1992.101	380.250	-2629.	-405.	1621.	21611.466	26.631	237.334	24003.791	-1.368	69.253	112.
2008.101	396.250	-2628.	-408.	1620.	21602.230	26.987	238.403	24014.885	-1.387	69.800	113.
2024.101	412.250	-2625.	-409.	1619.	21592.872	27.334	239.480	24026.154	-1.404	70.356	114.
2040.101	428.250	-2626.	-412.	1616.	21583.398	27.672	240.565	24037.594	-1.421	70.923	115.
2056.101	444.250	-2626.	-415.	1615.	21573.800	28.001	241.658	24049.186	-1.437	71.500	116.
2072.101	460.250	-2626.	-418.	1612.	21564.092	28.321	242.759	24060.934	-1.453	72.087	117.
2088.101	476.250	-2625.	-421.	1609.	21554.272	28.630	243.869	24072.834	-1.469	72.684	118.
2104.101	492.250	-2624.	-422.	1606.	21544.346	28.930	244.986	24084.885	-1.484	73.290	119.
2120.101	508.250	-2623.	-425.	1605.	21534.326	29.219	246.111	24097.098	-1.498	73.906	120.
2136.101	524.250	-2624.	-428.	1604.	21524.194	29.498	247.244	24109.424	-1.512	74.531	121.
2152.101	540.250	-2622.	-429.	1601.	21513.974	29.767	248.384	24121.908	-1.525	75.165	122.
2168.101	556.250	-2623.	-434.	1597.	21503.652	30.024	249.532	24134.525	-1.538	75.808	123.
2184.101	572.250	-2622.	-435.	1598.	21493.250	30.271	250.687	24147.262	-1.550	76.459	124.
2200.101	588.250	-2620.	-438.	1596.	21482.760	30.506	251.850	24160.135	-1.561	77.119	125.
2216.101	604.250	-2621.	-439.	1593.	21472.186	30.730	253.019	24173.129	-1.572	77.787	126.
2232.101	620.250	-2619.	-440.	1591.	21461.538	30.943	254.196	24186.246	-1.582	78.463	127.
2248.101	636.250	-2619.	-443.	1589.	21450.822	31.143	255.379	24199.490	-1.592	79.146	128.
2264.101	652.250	-2620.	-446.	1586.	21440.024	31.332	256.568	24212.811	-1.601	79.836	129.
2280.101	668.250	-2620.	-449.	1586.	21429.164	31.509	257.764	24226.266	-1.610	80.533	130.
2296.101	684.250	-2618.	-452.	1582.	21418.244	31.673	258.965	24239.801	-1.618	81.236	131.
2312.101	700.250	-2617.	-452.	1581.	21407.264	31.825	260.173	24253.449	-1.625	81.946	132.
2328.101	716.250	-2616.	-456.	1580.	21396.236	31.964	261.385	24267.184	-1.632	82.661	133.
2344.101	732.250	-2617.	-459.	1577.	21385.152	32.090	262.602	24281.002	-1.638	83.382	134.
2360.101	748.250	-2616.	-461.	1576.	21374.022	32.203	263.825	24294.902	-1.644	84.107	135.
2376.101	764.250	-2615.	-462.	1577.	21362.848	32.304	265.051	24308.877	-1.649	84.837	136.
2392.101	780.250	-2614.	-467.	1574.	21351.642	32.391	266.282	24322.920	-1.653	85.571	137.
2408.101	796.250	-2613.	-468.	1571.	21340.400	32.465	267.516	24337.033	-1.657	86.308	138.
2424.101	812.250	-2614.	-471.	1568.	21329.120	32.526	268.754	24351.195	-1.660	87.049	139.
2440.101	828.250	-2613.	-472.	1567.	21317.820	32.573	269.994	24365.422	-1.663	87.792	140.
2456.101	844.250	-2613.	-475.	1563.	21306.502	32.606	271.237	24379.678	-1.664	88.537	141.
2472.101	860.250	-2612.	-478.	1562.	21295.166	32.626	272.483	24393.967	-1.666	89.284	142.
2473.219	861.250	-2612.	-478.	1561.	21294.382	32.627	272.570	24394.891	-1.666	89.336	143.
2474.262	862.375	-2612.	-478.	1561.	21293.640	32.628	272.651	24395.842	-1.666	89.385	144.
2475.246	863.375	-2613.	-477.	1559.	21292.944	32.629	272.727	24396.521	-1.666	89.431	145.
2476.316	864.375	-2613.	-478.	1560.	21292.184	32.629	272.811	24397.574	-1.666	89.481	146.
2477.301	865.375	-2613.	-479.	1561.	21291.482	32.630	272.887	24398.553	-1.666	89.527	147.
2478.369	866.500	-2613.	-479.	1561.	21290.726	32.630	272.971	24399.527	-1.666	89.577	148.
2479.354	867.500	-2613.	-478.	1561.	21290.030	32.631	273.047	24400.418	-1.666	89.623	149.
2480.463	868.500	-2613.	-478.	1561.	21289.240	32.631	273.134	24401.430	-1.666	89.675	150.
2481.400	869.500	-2613.	-478.	1561.	21288.570	32.632	273.207	24402.283	-1.667	89.719	151.
2482.393	870.500	-2613.	-478.	1559.	21287.874	32.632	273.284	24403.020	-1.666	89.765	152.
2483.461	871.500	-2613.	-478.	1559.	21287.116	32.632	273.368	24403.992	-1.666	89.815	153.
2484.453	872.500	-2612.	-478.	1558.	21286.404	32.632	273.445	24404.861	-1.666	89.862	154.
2485.520	873.625	-2613.	-478.	1558.	21285.650	32.632	273.528	24405.779	-1.666	89.912	155.
2486.512	874.625	-2614.	-479.	1558.	21284.940	32.633	273.605	24406.639	-1.667	89.958	156.
2487.621	875.750	-2614.	-479.	1558.	21284.156	32.633	273.692	24407.635	-1.667	90.010	157.
2488.572	876.625	-2614.	-479.	1558.	21283.482	32.633	273.766	24408.514	-1.667	90.054	158.
2489.564	877.625	-2613.	-481.	1559.	21282.772	32.632	273.844	24409.555	-1.667	90.100	159.
2490.632	878.750	-2614.	-481.	1558.	21282.016	32.632	273.927	24410.393	-1.667	90.150	160.
2491.624	879.750	-2615.	-480.	1557.	21281.318	32.632	274.004	24411.162	-1.667	90.197	161.
2492.691	880.750	-2615.	-480.	1557.	21280.556	32.632	274.088	24412.131	-1.667	90.247	162.

CONFIDENTIAL

TDAS (SEC)	TT (SEC)	SFXP (COUNTS)	SFYP (COUNTS)	SFZP (COUNTS)	RS (K- FEET)	PHI (DEG)	THETA E (DEG)	VE (FPS)	GAMMA (DEG)	PSIE (DEG)	POINT NO.
2493.684	881.750	-2614.	-480.	1556.	21279.852	32.632	274.165	24413.000	-1.667	90.293	163.
2494.793	882.875	-2614.	-480.	1556.	21279.060	32.631	274.251	24414.021	-1.667	90.345	164.
2495.744	883.875	-2614.	-480.	1556.	21278.382	32.631	274.325	24414.895	-1.667	90.390	165.
2496.736	884.875	-2614.	-481.	1556.	21277.686	32.630	274.403	24415.795	-1.667	90.436	166.
2497.803	885.875	-2614.	-481.	1556.	21276.924	32.630	274.486	24416.762	-1.667	90.486	167.
2498.795	886.875	-2613.	-481.	1555.	21276.222	32.629	274.564	24417.631	-1.667	90.533	168.
2499.904	888.000	-2613.	-481.	1555.	21275.432	32.628	274.650	24418.650	-1.667	90.585	169.
2500.854	889.000	-2613.	-481.	1555.	21274.758	32.628	274.724	24419.512	-1.667	90.629	170.
2501.839	889.875	-2613.	-482.	1555.	21274.060	32.627	274.801	24420.408	-1.667	90.675	171.
2502.909	891.000	-2614.	-482.	1554.	21273.298	32.626	274.885	24421.248	-1.667	90.725	172.
2503.901	892.000	-2615.	-482.	1553.	21272.590	32.625	274.962	24422.020	-1.667	90.772	173.
2504.968	893.000	-2615.	-482.	1553.	21271.832	32.624	275.046	24422.994	-1.667	90.822	174.
2505.960	894.000	-2614.	-482.	1554.	21271.132	32.623	275.123	24424.049	-1.667	90.868	175.
2507.069	895.125	-2614.	-482.	1554.	21270.344	32.622	275.210	24425.055	-1.667	90.920	176.
2508.021	896.125	-2614.	-482.	1554.	21269.668	32.621	275.284	24425.914	-1.667	90.965	177.
2509.006	897.125	-2616.	-481.	1554.	21268.968	32.620	275.361	24426.729	-1.667	91.011	178.
2510.079	898.125	-2616.	-482.	1553.	21268.204	32.619	275.445	24427.623	-1.667	91.061	179.
2511.071	899.125	-2615.	-483.	1551.	21267.500	32.618	275.522	24428.404	-1.667	91.107	180.
2512.137	900.250	-2615.	-483.	1552.	21266.740	32.616	275.605	24429.467	-1.667	91.157	181.
2513.129	901.250	-2615.	-484.	1553.	21266.038	32.615	275.683	24430.459	-1.667	91.203	182.
2514.238	902.375	-2615.	-484.	1553.	21265.250	32.613	275.769	24431.475	-1.667	91.255	183.
2515.190	903.250	-2615.	-484.	1553.	21264.574	32.612	275.844	24432.344	-1.667	91.300	184.
2516.175	904.250	-2614.	-485.	1552.	21263.874	32.610	275.921	24433.205	-1.666	91.346	185.
2517.245	905.375	-2614.	-486.	1552.	21263.110	32.609	276.004	24434.184	-1.666	91.396	186.
2518.237	906.375	-2614.	-485.	1552.	21262.408	32.607	276.081	24435.094	-1.666	91.443	187.
2519.305	907.375	-2614.	-485.	1551.	21261.644	32.605	276.165	24435.977	-1.666	91.493	188.
2520.297	908.375	-2615.	-485.	1549.	21260.948	32.604	276.243	24436.672	-1.666	91.539	189.
2521.406	909.500	-2615.	-485.	1549.	21260.158	32.602	276.329	24437.684	-1.666	91.591	190.
2522.360	910.500	-2615.	-485.	1549.	21259.482	32.600	276.404	24438.557	-1.666	91.636	191.
2523.345	911.375	-2617.	-486.	1549.	21258.778	32.598	276.481	24439.377	-1.667	91.682	192.
2524.415	912.500	-2617.	-485.	1549.	21258.016	32.596	276.564	24440.352	-1.667	91.732	193.
2525.407	913.500	-2616.	-484.	1548.	21257.314	32.594	276.642	24441.225	-1.666	91.779	194.
2526.479	914.625	-2616.	-485.	1548.	21256.552	32.592	276.725	24442.211	-1.666	91.829	195.
2527.455	915.500	-2616.	-486.	1548.	21255.862	32.589	276.802	24443.107	-1.666	91.874	196.
2528.564	916.625	-2616.	-486.	1548.	21255.066	32.587	276.889	24444.125	-1.666	91.926	197.
2529.518	917.625	-2616.	-486.	1548.	21254.392	32.585	276.963	24444.994	-1.666	91.971	198.
2530.502	918.625	-2616.	-485.	1546.	21253.692	32.583	277.040	24445.725	-1.666	92.017	199.
2531.572	919.625	-2617.	-486.	1546.	21252.928	32.580	277.124	24446.672	-1.666	92.067	200.
2532.564	920.625	-2619.	-487.	1545.	21252.222	32.578	277.201	24447.395	-1.666	92.113	201.
2533.631	921.750	-2618.	-487.	1544.	21251.466	32.575	277.284	24448.326	-1.666	92.163	202.
2534.623	922.750	-2617.	-488.	1543.	21250.768	32.573	277.362	24449.191	-1.665	92.209	203.
2535.732	923.875	-2617.	-488.	1543.	21249.980	32.570	277.448	24450.215	-1.665	92.261	204.
2536.687	924.750	-2617.	-488.	1543.	21249.292	32.567	277.523	24451.092	-1.665	92.306	205.
2537.672	925.750	-2619.	-488.	1543.	21248.592	32.565	277.600	24451.908	-1.666	92.352	206.
2538.740	926.875	-2619.	-488.	1543.	21247.838	32.562	277.683	24452.883	-1.666	92.402	207.
2539.732	927.875	-2620.	-488.	1542.	21247.128	32.559	277.761	24453.672	-1.666	92.449	208.
2540.800	928.875	-2620.	-488.	1541.	21246.374	32.556	277.844	24454.559	-1.665	92.498	209.
2541.792	929.875	-2620.	-489.	1540.	21245.662	32.553	277.922	24455.381	-1.665	92.545	210.
2542.901	931.000	-2620.	-489.	1539.	21244.876	32.550	278.009	24456.320	-1.665	92.597	211.
2543.857	932.000	-2620.	-489.	1539.	21244.196	32.547	278.083	24457.187	-1.665	92.641	212.
2544.842	932.875	-2621.	-489.	1537.	21243.498	32.544	278.160	24457.877	-1.665	92.687	213.
2545.899	934.000	-2621.	-488.	1537.	21242.750	32.541	278.243	24458.857	-1.665	92.737	214.
2546.892	935.000	-2621.	-487.	1537.	21242.040	32.537	278.320	24459.771	-1.665	92.784	215.
2547.958	936.000	-2622.	-487.	1536.	21241.286	32.534	278.404	24460.619	-1.665	92.834	216.

TDAS (SEC)	TT (SEC)	SFXP (COUNTS)	SFYP (COUNTS)	SFZP (COUNTS)	RS (K-Feet)	PHI (DEG)	THETA (DEG)	VE (FPS)	GAMMA (DEG)	PSIE (DEG)	POINT NO.
2548.950	937.000	-2623.	-488.	1535.	21240.580	32.531	278.481	24461.389	-1.665	92.880	217.
2550.060	938.125	-2624.	-488.	1534.	21239.790	32.527	278.568	24462.293	-1.665	92.932	218.
2551.010	939.125	-2624.	-488.	1534.	21239.126	32.524	278.642	24463.162	-1.665	92.976	219.
2552.002	940.125	-2626.	-490.	1532.	21238.414	32.520	278.719	24463.803	-1.665	93.022	220.
2553.071	941.125	-2627.	-490.	1530.	21237.648	32.517	278.803	24464.572	-1.665	93.072	221.
2554.063	942.125	-2628.	-489.	1528.	21236.940	32.513	278.881	24465.271	-1.665	93.119	222.
2555.131	943.250	-2628.	-489.	1528.	21236.182	32.509	278.964	24466.254	-1.665	93.168	223.
2556.123	944.250	-2629.	-489.	1527.	21235.486	32.506	279.041	24467.047	-1.665	93.215	224.
2557.232	945.375	-2629.	-489.	1526.	21234.694	32.501	279.128	24467.977	-1.664	93.267	225.
2558.184	946.250	-2629.	-489.	1525.	21234.018	32.498	279.203	24468.754	-1.664	93.311	226.
2559.176	947.250	-2629.	-490.	1523.	21233.312	32.494	279.280	24469.494	-1.664	93.357	227.
2560.243	948.375	-2631.	-489.	1521.	21232.552	32.490	279.363	24470.223	-1.664	93.407	228.
2561.235	949.375	-2634.	-488.	1518.	21231.844	32.486	279.441	24470.729	-1.664	93.454	229.
2562.305	950.375	-2634.	-488.	1517.	21231.088	32.482	279.525	24471.637	-1.664	93.504	230.
2563.297	951.375	-2634.	-487.	1516.	21230.382	32.478	279.602	24472.465	-1.664	93.550	231.
2564.406	952.500	-2635.	-487.	1514.	21229.590	32.473	279.689	24473.262	-1.664	93.602	232.
2565.362	953.500	-2635.	-487.	1512.	21228.912	32.469	279.763	24473.975	-1.663	93.647	233.
2566.347	954.375	-2637.	-487.	1509.	21228.214	32.465	279.840	24474.523	-1.664	93.693	234.
2567.414	955.500	-2639.	-487.	1508.	21227.456	32.460	279.924	24475.338	-1.664	93.742	235.
2568.406	956.500	-2641.	-486.	1507.	21226.752	32.456	280.001	24476.084	-1.664	93.789	236.
2569.473	957.500	-2641.	-486.	1504.	21225.992	32.451	280.085	24476.801	-1.664	93.839	237.
2570.465	958.500	-2642.	-486.	1500.	21225.286	32.447	280.162	24477.312	-1.663	93.885	238.
2571.574	959.625	-2644.	-486.	1499.	21224.496	32.442	280.249	24478.168	-1.663	93.937	239.
2572.514	960.625	-2645.	-486.	1498.	21223.830	32.438	280.322	24478.912	-1.663	93.980	240.
2573.506	961.625	-2648.	-486.	1496.	21223.124	32.433	280.399	24479.525	-1.664	94.027	241.
2574.574	962.625	-2648.	-486.	1493.	21222.370	32.428	280.483	24480.238	-1.663	94.076	242.
2575.566	963.625	-2648.	-485.	1490.	21221.662	32.423	280.560	24480.893	-1.663	94.123	243.
2576.676	964.750	-2649.	-485.	1488.	21220.874	32.418	280.647	24481.691	-1.663	94.175	244.
2577.630	965.750	-2650.	-485.	1486.	21220.192	32.413	280.721	24482.359	-1.663	94.219	245.
2578.614	966.750	-2653.	-483.	1483.	21219.498	32.409	280.798	24482.875	-1.663	94.265	246.
2579.687	967.750	-2654.	-483.	1479.	21218.738	32.403	280.882	24483.475	-1.663	94.315	247.
2580.679	968.750	-2655.	-482.	1475.	21218.036	32.398	280.959	24483.982	-1.662	94.362	248.
2581.745	969.875	-2657.	-481.	1473.	21217.270	32.393	281.042	24484.711	-1.663	94.412	249.
2582.737	970.875	-2660.	-480.	1470.	21216.564	32.388	281.120	24485.246	-1.663	94.458	250.
2583.847	971.875	-2660.	-479.	1466.	21215.778	32.382	281.207	24485.910	-1.662	94.510	251.
2584.804	972.875	-2660.	-479.	1463.	21215.100	32.377	281.281	24486.525	-1.662	94.554	252.
2585.788	973.875	-2662.	-477.	1458.	21214.404	32.372	281.358	24486.902	-1.662	94.601	253.
2586.859	975.000	-2663.	-477.	1456.	21213.640	32.366	281.441	24487.672	-1.662	94.650	254.
2587.852	976.000	-2665.	-477.	1453.	21212.938	32.361	281.519	24488.240	-1.662	94.697	255.
2588.918	977.000	-2668.	-476.	1448.	21212.182	32.355	281.602	24488.664	-1.662	94.746	256.
2589.910	978.000	-2671.	-474.	1443.	21211.472	32.350	281.679	24489.014	-1.662	94.793	257.
2591.020	979.125	-2672.	-473.	1439.	21210.686	32.344	281.766	24489.637	-1.662	94.845	258.
2591.974	980.000	-2672.	-472.	1435.	21210.012	32.338	281.841	24490.164	-1.661	94.889	259.
2592.958	981.000	-2674.	-470.	1430.	21209.312	32.333	281.917	24490.543	-1.661	94.935	260.
2594.030	982.125	-2676.	-469.	1425.	21208.554	32.326	282.001	24491.002	-1.661	94.985	261.
2595.022	983.125	-2678.	-467.	1420.	21207.846	32.321	282.078	24491.396	-1.661	95.032	262.
2596.089	984.125	-2680.	-466.	1416.	21207.088	32.315	282.161	24491.949	-1.661	95.082	263.
2597.081	985.125	-2683.	-465.	1411.	21206.384	32.309	282.239	24492.291	-1.661	95.128	264.
2598.190	986.250	-2685.	-464.	1405.	21205.598	32.302	282.325	24492.705	-1.661	95.179	265.
2599.145	987.250	-2686.	-463.	1400.	21204.914	32.296	282.399	24493.090	-1.660	95.224	266.
2600.129	988.250	-2689.	-460.	1393.	21204.222	32.290	282.476	24493.260	-1.660	95.270	267.
2601.201	989.250	-2691.	-459.	1387.	21203.458	32.284	282.560	24493.637	-1.660	95.320	268.
2602.193	990.250	-2694.	-458.	1380.	21202.758	32.278	282.637	24493.801	-1.660	95.366	269.
2603.260	991.375	-2696.	-457.	1372.	21201.998	32.271	282.720	24493.994	-1.660	95.416	270.

CONTINUED

CONTINUED

TDAS (SEC)	TT (SEC)	SFXP (COUNTS)	SFYF (COUNTS)	SFZP (COUNTS)	RS (K-FEET)	PHI (DEG)	THETA E (DEG)	VE (FPS)	GAMMA (DEG)	PSIE (DEG)	POINT NO.
2604.252	992.375	-2698.	-455.	1364.	21201.296	32.265	282.797	24494.105	-1.659	95.462	271.
2605.361	993.500	-2701.	-453.	1355.	21200.506	32.258	282.883	24494.207	-1.659	95.514	272.
2606.315	994.375	-2703.	-452.	1347.	21199.834	32.252	282.958	24494.283	-1.659	95.559	273.
2607.300	995.375	-2707.	-449.	1337.	21199.136	32.245	283.035	24494.146	-1.659	95.605	274.
2608.371	996.500	-2710.	-449.	1327.	21198.382	32.239	283.110	24494.113	-1.658	95.654	275.
2609.363	997.500	-2713.	-448.	1317.	21197.668	32.232	283.195	24494.010	-1.658	95.700	276.
2610.434	998.500	-2716.	-446.	1306.	21196.912	32.225	283.279	24493.883	-1.658	95.750	277.
2611.543	999.625	-2721.	-442.	1293.	21196.128	32.218	283.365	24493.551	-1.658	95.803	278.
2612.732	1000.875	-2726.	-441.	1281.	21195.282	32.210	283.457	24493.377	-1.658	95.858	279.
2613.842	1001.875	-2732.	-439.	1268.	21194.498	32.202	283.544	24492.998	-1.658	95.910	280.
2615.031	1003.125	-2736.	-437.	1252.	21193.652	32.194	283.636	24492.490	-1.657	95.965	281.
2616.141	1004.250	-2740.	-434.	1236.	21192.868	32.186	283.723	24491.914	-1.657	96.017	282.
2617.330	1005.375	-2743.	-433.	1220.	21192.026	32.178	283.815	24491.439	-1.656	96.072	283.
2618.439	1006.500	-2747.	-431.	1205.	21191.238	32.170	283.902	24490.949	-1.656	96.124	284.
2619.628	1007.750	-2752.	-429.	1187.	21190.394	32.162	283.994	24490.223	-1.655	96.179	285.
2620.737	1008.875	-2758.	-426.	1170.	21189.620	32.154	284.080	24489.482	-1.655	96.231	286.
2621.847	1009.875	-2762.	-424.	1149.	21188.830	32.146	284.166	24488.443	-1.655	96.282	287.
2623.045	1011.125	-2766.	-421.	1127.	21187.980	32.137	284.259	24487.387	-1.654	96.338	288.
2624.146	1012.250	-2771.	-417.	1105.	21187.206	32.129	284.345	24486.221	-1.653	96.390	289.
2625.336	1013.375	-2776.	-415.	1081.	21186.366	32.120	284.438	24484.939	-1.652	96.445	290.
2626.445	1014.500	-2782.	-412.	1058.	21185.584	32.112	284.524	24483.652	-1.652	96.497	291.
2627.636	1015.750	-2788.	-408.	1031.	21184.742	32.103	284.616	24482.064	-1.651	96.552	292.
2628.745	1016.875	-2795.	-404.	1005.	21183.956	32.095	284.702	24480.463	-1.651	96.604	293.
2629.937	1018.000	-2801.	-399.	977.	21183.122	32.085	284.795	24478.779	-1.650	96.660	294.
2631.046	1019.125	-2808.	-393.	950.	21182.340	32.077	284.881	24477.082	-1.649	96.712	295.
2632.235	1020.375	-2815.	-390.	918.	21181.508	32.068	284.973	24474.992	-1.649	96.768	296.
2633.345	1021.375	-2822.	-386.	888.	21180.718	32.059	285.059	24473.010	-1.648	96.819	297.
2634.531	1022.625	-2830.	-381.	857.	21179.884	32.050	285.151	24470.975	-1.648	96.875	298.
2635.641	1023.750	-2839.	-375.	827.	21179.106	32.041	285.237	24468.951	-1.647	96.927	299.
2636.831	1024.875	-2847.	-371.	792.	21178.270	32.031	285.329	24466.541	-1.647	96.983	300.
2637.940	1026.000	-2856.	-366.	758.	21177.496	32.022	285.415	24464.129	-1.646	97.035	301.
2639.129	1027.250	-2865.	-360.	722.	21176.654	32.013	285.507	24461.609	-1.646	97.091	302.
2640.238	1028.375	-2875.	-354.	687.	21175.872	32.004	285.593	24459.078	-1.646	97.143	303.
2641.428	1029.500	-2884.	-350.	647.	21175.036	31.994	285.685	24456.166	-1.645	97.198	304.
2642.537	1030.625	-2894.	-345.	608.	21174.258	31.984	285.771	24453.264	-1.645	97.250	305.
2643.727	1031.875	-2903.	-339.	565.	21173.424	31.975	285.862	24450.080	-1.644	97.306	306.
2644.836	1032.875	-2912.	-332.	524.	21172.648	31.965	285.949	24447.031	-1.643	97.358	307.
2646.025	1034.125	-2923.	-326.	469.	21171.808	31.955	286.040	24442.672	-1.642	97.414	308.
2647.135	1035.250	-2935.	-319.	417.	21171.030	31.946	286.126	24438.480	-1.641	97.466	309.
2648.244	1036.375	-2948.	-312.	362.	21170.260	31.936	286.212	24433.988	-1.641	97.518	310.
2649.434	1037.500	-2962.	-304.	302.	21169.430	31.926	286.304	24429.072	-1.640	97.574	311.
2650.543	1038.625	-2977.	-296.	245.	21168.650	31.916	286.389	24424.330	-1.640	97.627	312.
2651.733	1039.875	-2991.	-288.	179.	21167.820	31.905	286.481	24418.855	-1.639	97.683	313.
2652.843	1040.875	-3005.	-279.	117.	21167.046	31.896	286.567	24413.676	-1.638	97.735	314.
2654.032	1042.125	-3021.	-270.	47.	21166.220	31.885	286.658	24407.768	-1.637	97.791	315.
2655.142	1043.250	-3036.	-260.	-20.	21165.444	31.875	286.744	24402.100	-1.637	97.844	316.
2656.331	1044.375	-3054.	-249.	-94.	21164.610	31.864	286.836	24395.750	-1.636	97.901	317.
2657.440	1045.500	-3071.	-238.	-163.	21163.846	31.854	286.921	24389.824	-1.636	97.954	318.
2658.630	1046.750	-3091.	-227.	-242.	21163.010	31.843	287.012	24382.951	-1.636	98.010	319.
2659.739	1047.875	-3110.	-215.	-316.	21162.242	31.833	287.097	24376.498	-1.636	98.063	320.
2660.929	1049.000	-3131.	-204.	-401.	21161.412	31.822	287.189	24369.031	-1.635	98.120	321.
2662.038	1050.125	-3152.	-192.	-482.	21160.648	31.812	287.274	24361.865	-1.636	98.173	322.
2663.228	1051.375	-3173.	-181.	-577.	21159.810	31.800	287.365	24353.473	-1.635	98.229	323.
2664.337	1052.375	-3193.	-169.	-667.	21159.048	31.790	287.451	24345.496	-1.634	98.282	324.

CONFIDENTIAL



TDAS (SEC)	TT (SEC)	SFXP (COUNTS)	SFYF (COUNTS)	SFZP (COUNTS)	RS (K-FEET)	PHI (DEG)	THETA E (DEG)	VE (FPS)	GAMMA (DEG)	PSIE (DEG)	POINT NO.
2665.526	1053.625	-3219.	-155.	-767.	21158.222	31.779	287.542	24336.477	-1.635	98.339	325.
2666.636	1054.750	-3244.	-141.	-862.	21157.442	31.768	287.627	24327.881	-1.635	98.393	326.
2667.825	1055.875	-3270.	-126.	-970.	21156.624	31.757	287.718	24318.125	-1.635	98.450	327.
2668.935	1057.000	-3295.	-112.	-1071.	21155.856	31.746	287.803	24308.979	-1.635	98.503	328.
2670.122	1058.250	-3321.	-98.	-1185.	21155.030	31.734	287.894	24298.645	-1.635	98.560	329.
2671.231	1059.375	-3346.	-83.	-1292.	21154.258	31.723	287.978	24288.932	-1.635	98.614	330.
2672.341	1060.375	-3373.	-67.	-1410.	21153.496	31.712	288.064	24278.125	-1.635	98.667	331.
2673.535	1061.625	-3402.	-49.	-1538.	21152.664	31.700	288.155	24266.404	-1.635	98.725	332.
2674.637	1062.750	-3431.	-31.	-1657.	21151.902	31.689	288.239	24255.441	-1.635	98.779	333.
2675.825	1063.875	-3465.	-12.	-1799.	21151.082	31.678	288.329	24242.268	-1.635	98.837	334.
2676.935	1065.000	-3498.	7.	-1932.	21150.318	31.666	288.414	24229.893	-1.636	98.891	335.
2678.124	1066.250	-3533.	29.	-2082.	21149.490	31.654	288.504	24215.930	-1.637	98.950	336.
2679.233	1067.375	-3567.	50.	-2223.	21148.720	31.643	288.589	24202.764	-1.637	99.005	337.
2680.424	1068.500	-3605.	73.	-2385.	21147.898	31.631	288.679	24187.605	-1.638	99.063	338.
2681.533	1069.625	-3641.	95.	-2537.	21147.132	31.619	288.763	24173.357	-1.639	99.118	339.
2682.718	1070.750	-3683.	120.	-2710.	21146.306	31.607	288.854	24157.035	-1.640	99.177	340.
2683.827	1071.875	-3724.	144.	-2872.	21145.538	31.595	288.938	24141.715	-1.641	99.233	341.
2685.013	1073.125	-3766.	170.	-3056.	21144.728	31.583	289.027	24124.369	-1.642	99.292	342.
2686.122	1074.250	-3807.	195.	-3229.	21143.962	31.571	289.111	24108.020	-1.643	99.347	343.
2687.309	1075.375	-3855.	224.	-3431.	21143.134	31.558	289.201	24088.820	-1.645	99.407	344.
2688.418	1076.500	-3900.	252.	-3620.	21142.370	31.547	289.285	24070.852	-1.646	99.463	345.
2689.603	1077.750	-3951.	282.	-3835.	21141.552	31.534	289.374	24050.350	-1.648	99.523	346.
2690.712	1078.750	-3999.	312.	-4037.	21140.784	31.522	289.458	24031.076	-1.650	99.579	347.
2691.896	1080.000	-4054.	345.	-4269.	21139.962	31.509	289.547	24008.869	-1.652	99.640	348.
2693.005	1081.125	-4106.	377.	-4488.	21139.192	31.497	289.630	23987.898	-1.654	99.697	349.
2694.189	1082.250	-4164.	413.	-4734.	21138.376	31.484	289.719	23964.297	-1.656	99.758	350.
2695.299	1083.375	-4219.	448.	-4965.	21137.612	31.472	289.802	23942.115	-1.659	99.816	351.
2696.481	1084.625	-4284.	484.	-5234.	21136.784	31.458	289.891	23916.158	-1.662	99.877	352.
2697.591	1085.625	-4346.	519.	-5488.	21136.018	31.446	289.974	23891.625	-1.665	99.934	353.
2698.700	1086.750	-4411.	556.	-5764.	21135.246	31.434	290.057	23864.945	-1.668	99.992	354.
2699.886	1088.000	-4481.	595.	-6059.	21134.424	31.420	290.145	23836.416	-1.672	100.054	355.
2700.987	1089.125	-4548.	633.	-6334.	21133.656	31.408	290.227	23809.773	-1.676	100.112	356.
2702.178	1090.250	-4623.	677.	-6658.	21132.826	31.394	290.316	23778.381	-1.679	100.175	357.
2703.279	1091.375	-4694.	718.	-6958.	21132.058	31.382	290.397	23749.287	-1.684	100.234	358.
2704.471	1092.500	-4775.	761.	-7300.	21131.230	31.368	290.486	23716.051	-1.688	100.297	359.
2705.572	1093.625	-4851.	801.	-7617.	21130.458	31.355	290.567	23685.229	-1.693	100.355	360.
2706.756	1094.875	-4936.	849.	-7981.	21129.630	31.342	290.655	23649.822	-1.698	100.419	361.
2707.865	1096.000	-5016.	894.	-8322.	21128.846	31.329	290.736	23616.645	-1.703	100.479	362.
2709.048	1097.125	-5107.	943.	-8706.	21128.014	31.315	290.824	23579.199	-1.710	100.543	363.
2710.157	1098.250	-5193.	989.	-9067.	21127.236	31.302	290.905	23543.986	-1.716	100.603	364.
2711.340	1099.375	-5288.	1043.	-9481.	21126.410	31.288	290.992	23503.613	-1.722	100.668	365.
2712.449	1100.500	-5378.	1094.	-9870.	21125.622	31.275	291.073	23465.660	-1.728	100.729	366.
2713.634	1101.750	-5484.	1150.	-10313.	21124.782	31.261	291.159	23422.285	-1.736	100.795	367.
2714.735	1102.875	-5583.	1203.	-10725.	21123.998	31.248	291.240	23381.951	-1.744	100.857	368.
2715.923	1104.000	-5692.	1263.	-11196.	21123.150	31.234	291.326	23335.871	-1.752	100.923	369.
2717.024	1105.125	-5794.	1320.	-11634.	21122.366	31.220	291.406	23293.006	-1.761	100.986	370.
2718.211	1106.250	-5911.	1383.	-12133.	21121.514	31.206	291.492	23244.096	-1.770	101.053	371.
2719.312	1107.375	-6020.	1443.	-12598.	21120.722	31.193	291.572	23198.521	-1.780	101.117	372.
2720.494	1108.625	-6140.	1508.	-13118.	21119.868	31.178	291.657	23147.562	-1.790	101.185	373.
2721.604	1109.750	-6253.	1570.	-13607.	21119.060	31.165	291.736	23099.635	-1.800	101.249	374.
2722.713	1110.750	-6371.	1634.	-14127.	21118.260	31.151	291.816	23048.658	-1.810	101.313	375.
2723.895	1112.000	-6497.	1702.	-14682.	21117.398	31.137	291.901	22994.262	-1.822	101.382	376.
2724.996	1113.125	-6616.	1768.	-15200.	21116.586	31.123	291.979	22943.477	-1.833	101.447	377.
2726.185	1114.250	-6748.	1841.	-15791.	21115.712	31.109	292.064	22885.545	-1.845	101.517	378.

TDAS (SEC)	TT (SEC)	SFXP (COUNTS)	SFYP (COUNTS)	SFZP (COUNTS)	RS (K-Feet)	PHI (DEG)	THETA E (DEG)	VE (FPS)	GAMMA (DEG)	PSIE (DEG)	POINT NO.
2727.286	1115.375	-6871.	1909.	-16339.	21114.902	31.095	292.142	22831.830	-1.858	101.582	379.
2728.475	1116.625	-7010.	1983.	-16971.	21114.018	31.080	292.226	22769.857	-1.871	101.653	380.
2729.576	1117.625	-7140.	2052.	-17558.	21113.198	31.066	292.304	22712.299	-1.884	101.719	381.
2730.758	1118.875	-7285.	2127.	-18220.	21112.312	31.051	292.387	22647.355	-1.898	101.790	382.
2731.867	1120.000	-7423.	2199.	-18843.	21111.474	31.038	292.464	22586.223	-1.913	101.857	383.
2733.051	1121.125	-7576.	2283.	-19545.	21110.584	31.023	292.547	22517.338	-1.929	101.930	384.
2734.160	1122.250	-7720.	2362.	-20204.	21109.738	31.009	292.624	22452.672	-1.944	101.999	385.
2735.344	1123.375	-7881.	2444.	-20948.	21108.838	30.994	292.707	22379.637	-1.962	102.072	386.
2736.453	1124.500	-8033.	2521.	-21647.	21107.986	30.979	292.783	22311.008	-1.979	102.141	387.
2737.638	1125.750	-8200.	2612.	-22429.	21107.068	30.964	292.865	22234.264	-1.997	102.217	388.
2738.747	1126.875	-8358.	2698.	-23162.	21106.212	30.950	292.941	22162.318	-2.016	102.288	389.
2739.933	1128.000	-8530.	2787.	-23966.	21105.284	30.935	293.022	22083.404	-2.037	102.363	390.
2741.042	1129.125	-8691.	2871.	-24719.	21104.408	30.921	293.097	22009.516	-2.057	102.434	391.
2742.230	1130.375	-8865.	2961.	-25548.	21103.470	30.905	293.178	21928.207	-2.078	102.511	392.
2743.340	1131.375	-9028.	3045.	-26322.	21102.580	30.891	293.253	21852.309	-2.100	102.582	393.
2744.521	1132.625	-9213.	3146.	-27237.	21101.634	30.876	293.332	21762.615	-2.122	102.661	394.
2745.631	1133.750	-9387.	3242.	-28097.	21100.734	30.862	293.407	21678.320	-2.144	102.736	395.
2746.740	1134.875	-9573.	3349.	-29055.	21099.834	30.847	293.481	21584.453	-2.165	102.815	396.
2747.927	1136.000	-9772.	3463.	-30080.	21098.856	30.832	293.560	21484.037	-2.189	102.899	397.
2749.028	1137.125	-9958.	3570.	-31032.	21097.952	30.817	293.632	21390.787	-2.213	102.978	398.
2750.212	1138.250	-10153.	3686.	-32111.	21096.974	30.802	293.710	21285.316	-2.236	103.063	399.
2751.313	1139.375	-10336.	3795.	-33116.	21096.056	30.788	293.782	21187.080	-2.258	103.143	400.
2752.497	1140.625	-10538.	3913.	-34235.	21095.066	30.772	293.859	21077.697	-2.283	103.230	401.
2753.599	1141.625	-10727.	4024.	-35277.	21094.136	30.758	293.930	20975.838	-2.308	103.311	402.
2754.781	1142.875	-10934.	4145.	-36452.	21093.132	30.742	294.006	20861.049	-2.335	103.400	403.
2755.883	1144.000	-11128.	4258.	-37548.	21092.192	30.728	294.076	20753.980	-2.361	103.483	404.
2757.063	1145.125	-11347.	4383.	-38820.	21091.182	30.712	294.152	20629.717	-2.390	103.574	405.
2758.165	1146.250	-11553.	4501.	-40007.	21090.230	30.698	294.221	20513.748	-2.418	103.659	406.
2759.346	1147.375	-11781.	4630.	-41347.	21089.208	30.682	294.295	20382.654	-2.449	103.753	407.
2760.447	1148.500	-11995.	4752.	-42597.	21088.242	30.668	294.364	20260.766	-2.479	103.841	408.
2761.625	1149.750	-12226.	4877.	-43976.	21087.208	30.652	294.436	20126.123	-2.512	103.934	409.
2762.727	1150.875	-12442.	4995.	-45266.	21086.236	30.638	294.504	20000.209	-2.545	104.022	410.
2763.909	1152.000	-12686.	5123.	-46727.	21085.184	30.622	294.576	19857.535	-2.581	104.119	411.
2765.011	1153.125	-12915.	5244.	-48089.	21084.190	30.608	294.643	19724.553	-2.618	104.209	412.
2766.197	1154.250	-13166.	5377.	-49617.	21083.118	30.592	294.714	19575.424	-2.658	104.309	413.
2767.299	1155.375	-13400.	5502.	-51036.	21082.118	30.578	294.780	19436.973	-2.697	104.403	414.
2768.486	1156.625	-13659.	5637.	-52628.	21081.024	30.562	294.850	19281.645	-2.740	104.505	415.
2769.588	1157.625	-13901.	5763.	-54105.	21080.004	30.548	294.915	19137.568	-2.783	104.601	416.
2770.697	1158.750	-14153.	5888.	-55682.	21078.970	30.533	294.979	18983.732	-2.827	104.699	417.
2771.877	1160.000	-14421.	6022.	-57361.	21077.862	30.518	295.047	18820.020	-2.876	104.805	418.
2772.979	1161.125	-14673.	6148.	-58929.	21076.820	30.503	295.110	18667.160	-2.924	104.904	419.
2774.167	1162.250	-14950.	6279.	-60729.	21075.684	30.488	295.177	18491.740	-2.976	105.012	420.
2775.269	1163.375	-15208.	6402.	-62398.	21074.620	30.473	295.239	18329.141	-3.027	105.114	421.
2776.456	1164.500	-15492.	6538.	-64281.	21073.468	30.458	295.305	18145.748	-3.082	105.227	422.
2777.558	1165.625	-15757.	6665.	-66027.	21072.388	30.444	295.365	17975.748	-3.137	105.334	423.
2778.745	1166.875	-16047.	6804.	-67978.	21071.212	30.429	295.430	17785.861	-3.198	105.452	424.
2779.847	1167.875	-16316.	6934.	-69788.	21070.116	30.414	295.489	17609.779	-3.257	105.562	425.
2781.026	1169.125	-16592.	7070.	-71794.	21068.930	30.399	295.551	17414.887	-3.317	105.683	426.
2782.128	1170.250	-16851.	7197.	-73667.	21067.818	30.385	295.609	17232.967	-3.376	105.796	427.
2783.312	1171.375	-17124.	7324.	-75763.	21066.612	30.370	295.671	17029.516	-3.438	105.919	428.
2784.413	1172.500	-17378.	7444.	-77714.	21065.482	30.356	295.727	16840.223	-3.499	106.035	429.
2785.599	1173.625	-17643.	7574.	-79896.	21064.264	30.341	295.787	16628.736	-3.561	106.163	430.
2786.700	1174.750	-17890.	7695.	-81924.	21063.124	30.327	295.842	16432.242	-3.623	106.285	431.
2787.887	1176.000	-18144.	7821.	-84208.	21061.884	30.313	295.900	16211.143	-3.685	106.419	432.

CONFIDENTIAL

CONFIDENTIAL

TOAS (SEC)	TT (SEC)	SFXP (COUNTS)	SFYF (COUNTS)	SFZP (COUNTS)	RS (K-FEET)	PHI (DEG)	THETA (DEG)	VE (FPS)	GAMMA (DEG)	PSIE (DEG)	POINT NO.
2788.988	1177.125	-18381.	7938.	-86329.	21060.738	30.299	295.954	16005.896	-3.747	106.545	433.
2790.168	1178.250	-18619.	8053.	-88712.	21059.502	30.284	296.011	15775.488	-3.806	106.681	434.
2791.277	1179.375	-18844.	8163.	-90952.	21058.334	30.271	296.063	15558.984	-3.867	106.813	435.
2792.459	1180.500	-19020.	8250.	-93432.	21057.100	30.256	296.118	15319.848	-3.907	106.947	436.
2793.568	1181.625	-19187.	8332.	-95761.	21055.946	30.243	296.168	15095.314	-3.950	107.076	437.
2794.678	1182.750	-19331.	8403.	-98154.	21054.796	30.230	296.218	14864.799	-3.984	107.204	438.
2795.862	1184.000	-19485.	8479.	-100711.	21053.578	30.216	296.270	14618.555	-4.025	107.345	439.
2796.964	1185.000	-19630.	8550.	-103088.	21052.444	30.203	296.319	14389.674	-4.067	107.479	440.
2798.155	1186.250	-19773.	8614.	-105730.	21051.236	30.189	296.369	14135.342	-4.108	107.624	441.
2799.257	1187.375	-19907.	8675.	-108173.	21050.126	30.176	296.415	13900.227	-4.151	107.763	442.
2800.448	1188.500	-20001.	8694.	-110872.	21048.936	30.162	296.465	13640.611	-4.177	107.899	443.
2801.550	1189.625	-20088.	8712.	-113368.	21047.844	30.150	296.509	13400.572	-4.206	108.028	444.
2802.734	1190.875	-20120.	8645.	-116097.	21046.690	30.137	296.556	13137.963	-4.211	108.135	445.
2803.844	1191.875	-20151.	8581.	-118653.	21045.630	30.124	296.599	12891.992	-4.220	108.237	446.
2805.022	1193.125	-20165.	8401.	-121371.	21044.524	30.112	296.644	12629.557	-4.224	108.297	447.
2806.132	1194.250	-20180.	8230.	-123930.	21043.506	30.100	296.685	12382.445	-4.231	108.355	448.
2807.312	1195.375	-20188.	8021.	-126652.	21042.432	30.087	296.728	12119.393	-4.238	108.405	449.
2808.422	1196.500	-20197.	7823.	-129211.	21041.454	30.076	296.768	11872.045	-4.249	108.451	450.
2809.604	1197.750	-20204.	7658.	-131907.	21040.416	30.064	296.809	11611.924	-4.263	108.522	451.
2810.713	1198.750	-20212.	7502.	-134438.	21039.472	30.053	296.847	11367.691	-4.281	108.590	452.
2811.897	1200.000	-20240.	7442.	-137107.	21038.478	30.042	296.887	11111.018	-4.314	108.717	453.
2813.007	1201.125	-20267.	7385.	-139607.	21037.556	30.031	296.923	10870.609	-4.350	108.839	454.
2814.196	1202.250	-20331.	7381.	-142269.	21036.576	30.020	296.961	10614.941	-4.412	109.005	455.
2815.298	1203.375	-20392.	7376.	-144734.	21035.680	30.009	296.995	10378.238	-4.476	109.163	456.
2816.480	1204.625	-20458.	7369.	-147323.	21034.728	29.998	297.031	10129.736	-4.553	109.336	457.
2817.590	1205.625	-20521.	7361.	-149751.	21033.836	29.988	297.064	9896.746	-4.633	109.504	458.
2818.699	1206.750	-20616.	7370.	-152091.	21032.954	29.979	297.096	9672.305	-4.742	109.683	459.
2819.887	1208.000	-20718.	7380.	-154598.	21031.998	29.968	297.129	9431.973	-4.867	109.882	460.
2820.988	1209.125	-20813.	7390.	-156923.	21031.122	29.959	297.159	9209.238	-4.992	110.076	461.
2822.180	1210.250	-20906.	7382.	-159343.	21030.168	29.948	297.192	8977.500	-5.135	110.276	462.
2823.281	1211.375	-20992.	7373.	-161580.	21029.284	29.939	297.220	8763.416	-5.276	110.468	463.
2824.474	1212.500	-21074.	7348.	-163941.	21028.306	29.929	297.251	8537.570	-5.435	110.670	464.
2825.575	1213.625	-21151.	7324.	-166123.	21027.420	29.920	297.278	8328.988	-5.592	110.865	465.
2826.762	1214.875	-21227.	7280.	-168404.	21026.460	29.911	297.306	8110.998	-5.772	111.065	466.
2827.871	1216.000	-21299.	7237.	-170537.	21025.550	29.902	297.332	7907.283	-5.952	111.260	467.
2829.058	1217.125	-21359.	7183.	-172752.	21024.570	29.893	297.359	7695.990	-6.147	111.465	468.
2830.167	1218.250	-21416.	7132.	-174824.	21023.656	29.885	297.383	7498.506	-6.342	111.666	469.
2831.353	1219.500	-21467.	7069.	-176952.	21022.676	29.876	297.409	7295.918	-6.561	111.875	470.
2832.462	1220.500	-21515.	7009.	-178943.	21021.744	29.868	297.432	7106.551	-6.778	112.080	471.
2833.648	1221.750	-21545.	6940.	-181007.	21020.740	29.859	297.456	6910.566	-7.011	112.298	472.
2834.758	1222.875	-21574.	6874.	-182936.	21019.812	29.852	297.478	6727.578	-7.244	112.510	473.
2835.943	1224.000	-21586.	6791.	-184918.	21018.802	29.843	297.501	6539.791	-7.496	112.727	474.
2837.053	1225.125	-21599.	6712.	-186773.	21017.846	29.836	297.521	6364.209	-7.748	112.940	475.
2838.239	1226.375	-21599.	6615.	-188680.	21016.832	29.828	297.542	6183.912	-8.024	113.156	476.
2839.349	1227.375	-21600.	6523.	-190464.	21015.872	29.821	297.562	6015.430	-8.300	113.368	477.
2840.533	1228.625	-21568.	6409.	-192319.	21014.842	29.813	297.582	5840.355	-8.583	113.583	478.
2841.643	1229.750	-21537.	6302.	-194057.	21013.870	29.806	297.600	5676.527	-8.865	113.794	479.
2842.825	1230.875	-21465.	6148.	-195836.	21012.836	29.799	297.619	5508.492	-9.146	113.977	480.
2843.935	1232.000	-21396.	6003.	-197506.	21011.864	29.793	297.636	5350.920	-9.426	114.158	481.
2845.044	1233.125	-21299.	5802.	-199105.	21010.892	29.786	297.652	5199.291	-9.696	114.273	482.
2846.227	1234.375	-21196.	5587.	-200810.	21009.852	29.779	297.669	5037.771	-10.003	114.401	483.
2847.328	1235.375	-21099.	5385.	-202399.	21008.896	29.773	297.685	4887.365	-10.309	114.526	484.
2848.519	1236.625	-20989.	5166.	-204026.	21007.852	29.767	297.701	4733.654	-10.654	114.647	485.
2849.620	1237.750	-20886.	4962.	-205532.	21006.890	29.761	297.715	4591.527	-10.994	114.763	486.

ORIGINAL

ORIGINAL

TOAS (SEC)	TT (SEC)	SFXP (COUNTS)	SFYP (COUNTS)	SFZP (COUNTS)	RS (K-FEET)	PHI (DEG)	THETA E (DEG)	VE (FPS)	GAMMA (DEG)	PSIE (DEG)	POINT NO.
2850.810	1238.875	-20784.	4738.	-207063.	21005.842	29.755	297.730	4447.385	-11.394	114.869	487.
2851.911	1240.000	-20689.	4529.	-208481.	21004.870	29.750	297.744	4314.076	-11.790	114.970	488.
2853.099	1241.125	-20576.	4322.	-209958.	21003.826	29.744	297.758	4175.871	-12.228	115.096	489.
2854.200	1242.250	-20470.	4130.	-211328.	21002.848	29.739	297.770	4047.920	-12.660	115.220	490.
2855.388	1243.500	-20359.	3930.	-212732.	21001.790	29.734	297.783	3917.434	-13.156	115.351	491.
2856.489	1244.625	-20256.	3743.	-214034.	21000.802	29.729	297.795	3796.703	-13.649	115.478	492.
2857.676	1245.750	-20132.	3555.	-215382.	20999.740	29.724	297.807	3672.359	-14.188	115.625	493.
2858.777	1246.875	-20015.	3380.	-216633.	20998.750	29.719	297.818	3557.271	-14.721	115.771	494.
2859.965	1248.000	-19875.	3214.	-217922.	20997.678	29.714	297.830	3439.576	-15.301	115.954	495.
2861.066	1249.125	-19744.	3059.	-219118.	20996.676	29.710	297.840	3330.709	-15.875	116.134	496.
2862.254	1250.375	-19588.	2905.	-220334.	20995.590	29.705	297.850	3220.797	-16.495	116.334	497.
2863.355	1251.500	-19443.	2762.	-221463.	20994.580	29.701	297.859	3119.146	-17.110	116.534	498.
2864.542	1252.625	-19275.	2624.	-222606.	20993.486	29.697	297.869	3017.168	-17.775	116.763	499.
2865.644	1253.750	-19118.	2495.	-223668.	20992.470	29.693	297.878	2922.812	-18.434	116.989	500.
2866.825	1254.875	-18936.	2361.	-224750.	20991.378	29.689	297.887	2827.316	-19.143	117.229	501.
2867.935	1256.000	-18765.	2234.	-225767.	20990.350	29.686	297.895	2737.986	-19.855	117.469	502.
2869.044	1257.125	-18573.	2115.	-226709.	20989.316	29.682	297.903	2655.863	-20.538	117.702	503.
2870.224	1258.250	-18369.	1989.	-227712.	20988.214	29.678	297.911	2568.947	-21.315	117.970	504.
2871.325	1259.375	-18177.	1870.	-228649.	20987.188	29.675	297.918	2488.176	-22.086	118.235	505.
2872.516	1260.625	-17949.	1752.	-229587.	20986.070	29.672	297.926	2408.080	-22.889	118.521	506.
2873.617	1261.750	-17738.	1641.	-230456.	20985.042	29.668	297.932	2334.322	-23.681	118.802	507.
2874.806	1262.875	-17494.	1530.	-231349.	20983.922	29.665	297.939	2259.148	-24.524	119.118	508.
2875.907	1264.000	-17267.	1426.	-232177.	20982.894	29.662	297.945	2189.912	-25.356	119.431	509.
2877.093	1265.125	-17011.	1320.	-233021.	20981.782	29.659	297.952	2120.039	-26.244	119.772	510.
2878.194	1266.250	-16772.	1221.	-233806.	20980.754	29.656	297.957	2055.547	-27.121	120.114	511.
2879.381	1267.500	-16502.	1119.	-234603.	20979.638	29.653	297.963	1990.713	-28.051	120.480	512.
2880.482	1268.625	-16251.	1024.	-235343.	20978.612	29.651	297.968	1931.061	-28.968	120.847	513.
2881.668	1269.750	-15968.	928.	-236104.	20977.500	29.648	297.973	1870.301	-29.946	121.257	514.
2882.770	1270.875	-15704.	837.	-236812.	20976.476	29.646	297.978	1814.273	-30.910	121.664	515.
2883.956	1272.000	-15411.	745.	-237538.	20975.368	29.643	297.983	1757.570	-31.945	122.118	516.
2885.058	1273.125	-15139.	658.	-238213.	20974.342	29.641	297.987	1705.422	-32.969	122.572	517.
2886.238	1274.375	-14840.	571.	-238894.	20973.250	29.638	297.991	1653.670	-34.051	123.068	518.
2887.277	1275.375	-14576.	493.	-239494.	20972.290	29.636	297.995	1608.586	-35.059	123.536	519.
2888.387	1276.500	-14283.	418.	-240085.	20971.268	29.634	297.999	1564.875	-36.079	124.036	520.
2889.437	1277.500	-14006.	347.	-240645.	20970.298	29.632	298.002	1524.045	-37.100	124.548	521.
2890.468	1278.500	-13733.	277.	-241197.	20969.350	29.630	298.006	1484.305	-38.155	125.096	522.
2891.585	1279.625	-13428.	209.	-241741.	20968.326	29.628	298.009	1445.945	-39.224	125.675	523.
2892.624	1280.750	-13144.	144.	-242248.	20967.382	29.626	298.011	1410.684	-40.271	126.252	524.
2893.740	1281.875	-12833.	79.	-242758.	20966.366	29.624	298.014	1375.914	-41.357	126.876	525.
2894.779	1282.875	-12543.	17.	-243233.	20965.416	29.622	298.017	1344.014	-42.416	127.497	526.
2895.896	1284.000	-12220.	-44.	-243716.	20964.412	29.621	298.020	1311.889	-43.500	128.183	527.
2896.935	1285.000	-11918.	-101.	-244166.	20963.476	29.619	298.022	1282.414	-44.549	128.876	528.
2898.044	1286.125	-11589.	-154.	-244604.	20962.476	29.617	298.025	1254.398	-45.583	129.606	529.
2899.095	1287.125	-11278.	-204.	-245019.	20961.538	29.616	298.027	1228.418	-46.605	130.356	530.
2900.126	1288.250	-10971.	-255.	-245427.	20960.622	29.614	298.029	1203.184	-47.644	131.143	531.
2901.247	1289.375	-10620.	-301.	-245841.	20959.626	29.612	298.031	1177.473	-48.659	132.025	532.
2902.286	1290.375	-10294.	-344.	-246226.	20958.710	29.611	298.033	1153.959	-49.635	132.913	533.
2903.402	1291.500	-9944.	-387.	-246610.	20957.730	29.609	298.035	1131.254	-50.632	133.858	534.
2904.441	1292.500	-9617.	-428.	-246969.	20956.822	29.608	298.036	1110.344	-51.592	134.810	535.

TOAS (SEC)	PHBI (DEG)	DTMBO (N M)	DPSBO	DPHBO (DEG)	BA (DEG)	RD (N M)	RC (N M)	BC (DEG)	RP (N M)	D	PSIT (DEG)	RT (N M)
1611.989	0.	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1612.778	0.	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1613.419	182.304	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1614.131	182.052	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1614.769	181.872	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1615.414	181.656	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1616.047	248.904	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1616.758	345.636	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1617.396	72.432	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1618.039	159.948	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1618.672	178.812	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1619.385	178.956	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1620.034	179.100	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1620.667	179.280	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1621.378	179.532	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1622.017	179.712	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1622.661	179.928	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1623.294	179.856	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1624.005	179.676	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1624.648	179.496	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1625.281	179.352	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1625.992	179.064	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1626.631	178.812	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1627.274	178.524	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1627.907	178.344	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1628.618	178.200	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1629.256	178.056	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1629.899	177.876	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1630.532	177.984	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1631.245	178.164	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1631.886	178.344	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1632.526	178.524	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1633.238	178.380	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1633.876	178.200	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1634.521	178.056	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1635.154	177.768	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1635.864	177.444	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1636.502	177.156	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1637.145	176.832	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1637.777	176.616	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1638.490	176.364	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1639.138	176.148	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1639.771	175.932	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1640.482	175.536	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1641.121	175.140	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1641.767	174.780	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1642.399	174.528	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1643.110	174.276	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1643.748	174.060	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1644.392	173.844	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1645.024	173.844	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1645.738	173.952	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1646.387	174.060	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1647.020	174.204	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.

TOAS (SEC)	PHBI (DEG)	OTHBO (N M)	DPSBO	DPHBO (DEG)	BA (DEG)	RD (N M)	RC (N M)	BC (DEG)	RP (N M)	D	PSIT (DEG)	RT (N M)
1647.730	174.384	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1648.369	174.528	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1649.014	174.672	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1649.646	174.852	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1650.357	175.104	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1650.996	175.320	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1651.641	175.572	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1652.273	175.788	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1652.986	176.004	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1653.636	176.184	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1654.269	176.364	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1654.980	176.544	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1655.619	176.724	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1656.265	176.904	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1656.897	177.084	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1657.880	177.372	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1658.790	177.624	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1659.699	177.912	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1660.887	178.236	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1661.520	178.452	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1662.230	178.704	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1662.868	178.884	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1663.512	179.100	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1664.145	179.280	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1664.857	179.496	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1665.506	179.676	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1666.139	179.856	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1666.851	179.928	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1667.488	179.928	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1668.134	179.928	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1668.767	179.820	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1669.476	179.640	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1670.112	179.460	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1670.754	179.280	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1671.387	179.064	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1671.673	178.956	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1671.700	178.956	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1672.101	178.716	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1688.101	179.856	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1704.101	244.584	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1720.101	287.928	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1736.101	356.256	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1752.101	2.880	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1768.101	4.752	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1784.101	4.500	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1800.101	3.780	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1816.101	1.872	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1832.101	359.388	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1848.101	357.516	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1864.101	357.192	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1880.101	356.652	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1896.101	358.092	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1912.101	0.036	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1928.101	0.972	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.

CONFIDENTIAL

CONFIDENTIAL

TDAS (SEC)	PHBI (DEG)	DTHBO (N M)	DPSBO	DPHBO (DEG)	BA (DEG)	KD (N M)	KC (N M)	BC (DEG)	RP (N M)	D	PSIT (DEG)	RT (N M)
1944.101	0.828	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1960.101	0.684	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1976.101	0.432	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
1992.101	0.396	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2008.101	359.820	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2024.101	359.316	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2040.101	358.632	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2056.101	357.660	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2072.101	356.688	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2088.101	357.264	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2104.101	357.408	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2120.101	357.552	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2136.101	357.660	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2152.101	357.768	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2168.101	357.768	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2184.101	357.732	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2200.101	357.264	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2216.101	356.580	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2232.101	355.968	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2248.101	355.428	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2264.101	354.528	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2280.101	355.248	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2296.101	358.920	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2312.101	359.856	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2328.101	359.856	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2344.101	1.332	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2360.101	1.908	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2376.101	1.908	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2392.101	2.916	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2408.101	2.988	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2424.101	2.844	0.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2440.101	2.232	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2456.101	1.584	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2472.101	0.792	C.	0.	0.	0.	0.	12.50	0.	0.	0.	0.	0.
2473.219	0.756	0.	0.	-0.	7.375	0.	-93.87	-60.000	0.	0.	95.325	1013.62
2474.262	0.720	0.	0.	-0.	7.411	0.	-93.86	-60.000	0.	0.	95.393	1009.55
2475.246	0.684	C.	0.	-0.	7.447	0.	-93.85	-60.000	0.	0.	95.456	1005.70
2476.316	0.612	C.	0.	-0.	7.519	0.	-93.86	-60.000	0.	0.	95.526	1001.50
2477.301	0.576	0.	0.	-0.	7.555	0.	-93.86	-60.000	0.	0.	95.590	997.65
2478.369	0.036	C.	0.	-0.	8.095	0.	-93.85	-60.000	0.	0.	95.660	993.48
2479.354	359.532	0.	0.	-0.	8.599	0.	-93.84	-60.000	0.	0.	95.724	989.62
2480.463	358.812	C.	0.	-0.	9.319	0.	-93.84	-60.000	0.	0.	95.797	985.26
2481.400	356.220	C.	0.	-0.	11.911	0.	-93.84	-60.000	0.	0.	95.859	981.60
2482.393	353.520	0.	0.	-0.	14.611	0.	-93.83	-60.000	0.	0.	95.924	977.72
2483.461	350.100	C.	0.	-0.	18.031	0.	-93.83	-60.000	0.	0.	95.996	973.52
2484.453	346.896	C.	0.	-0.	21.235	0.	-93.83	-60.000	0.	0.	96.061	969.64
2485.520	345.060	0.	0.	-0.	23.071	0.	-93.82	-60.000	0.	0.	96.132	965.47
2486.512	343.476	C.	0.	-0.	24.655	0.	-93.82	-60.000	0.	0.	96.198	961.59
2487.621	341.676	0.	0.	-0.	26.455	0.	-93.82	-60.000	0.	0.	96.273	957.25
2488.572	340.200	C.	0.	-0.	27.931	0.	-93.82	-60.000	0.	0.	96.337	953.50
2489.564	338.724	0.	0.	-0.	29.407	0.	-93.82	-60.000	0.	0.	96.404	949.62
2490.632	336.780	C.	0.	-0.	31.351	0.	-93.82	-60.000	0.	0.	96.476	945.45
2491.624	334.944	C.	0.	-0.	33.187	0.	-93.81	-60.000	0.	0.	96.543	941.57
2492.691	333.468	0.	0.	-0.	34.663	0.	-93.81	-60.000	0.	0.	96.616	937.37

CONFIDENTIAL

CONFIDENTIAL

TDAS (SEC)	PHBI (DEG)	DTHBO (N M)	DPSBO	DPHBO (DEG)	BA (DEG)	KD (N M)	RC (N M)	BC (DEG)	RP (N M)	D	PSIT (DEG)	RT (N M)
2493.684	332.136	C.	0.	-0.	35.995	0.	-93.80	-60.000	0.	0.	96.683	933.49
2494.793	330.624	C.	0.	-0.	37.507	0.	-93.80	-60.000	0.	0.	96.759	929.14
2495.744	329.436	C.	0.	-0.	38.695	0.	-93.80	-60.000	0.	0.	96.825	925.43
2496.736	328.176	C.	0.	-0.	39.955	0.	-93.80	-60.000	0.	0.	96.893	921.54
2497.803	326.772	C.	0.	-0.	41.359	0.	-93.80	-60.000	0.	0.	96.967	917.35
2498.795	323.676	C.	0.	-0.	44.455	0.	-93.79	-60.000	0.	0.	97.036	913.47
2499.904	321.984	C.	0.	-0.	46.147	0.	-93.79	-60.000	0.	0.	97.113	909.12
2500.854	320.652	C.	0.	-0.	47.479	0.	-93.78	-60.000	0.	0.	97.179	905.41
2501.839	319.212	C.	0.	-0.	48.919	0.	-93.79	-60.000	0.	0.	97.248	901.53
2502.909	317.772	0.	0.	-0.	50.359	0.	-93.79	-60.000	0.	0.	97.323	897.35
2503.901	316.440	0.	0.	-0.	51.691	0.	-93.78	-60.000	0.	0.	97.393	893.46
2504.968	314.964	0.	0.	-0.	53.167	0.	-93.78	-60.000	0.	0.	97.469	889.27
2505.960	311.652	0.	0.	-0.	56.479	0.	-93.78	-60.000	0.	0.	97.539	885.39
2507.069	309.924	C.	0.	-0.	58.207	0.	-93.77	-60.000	0.	0.	97.618	881.04
2508.021	308.484	0.	0.	-0.	59.647	0.	-93.77	-60.000	0.	0.	97.686	877.32
2509.006	307.008	C.	0.	-0.	61.123	0.	-93.76	-60.000	0.	0.	97.756	873.46
2510.079	305.460	C.	0.	-0.	62.671	0.	-93.77	-60.000	0.	0.	97.834	869.24
2511.071	303.984	0.	0.	-0.	64.147	0.	-93.77	-60.000	0.	0.	97.906	865.35
2512.137	303.660	0.	0.	-0.	64.471	0.	-93.76	-60.000	0.	0.	97.983	861.19
2513.129	303.408	C.	0.	-0.	64.723	0.	-93.77	-60.000	0.	0.	98.055	857.31
2514.238	303.156	C.	0.	-0.	64.975	0.	-93.76	-60.000	0.	0.	98.136	852.96
2515.190	302.940	C.	0.	-0.	65.191	0.	-93.76	-60.000	0.	0.	98.206	849.21
2516.175	302.724	0.	0.	-0.	65.407	0.	-93.76	-60.000	0.	0.	98.278	845.36
2517.245	302.328	C.	0.	-0.	65.803	0.	-93.76	-60.000	0.	0.	98.357	841.17
2518.237	301.968	C.	0.	-0.	66.163	0.	-93.75	-60.000	0.	0.	98.431	837.29
2519.305	301.644	C.	0.	-0.	66.487	0.	-93.75	-60.000	0.	0.	98.511	833.09
2520.297	301.356	C.	0.	-0.	66.775	0.	-93.75	-60.000	0.	0.	98.585	829.20
2521.406	301.716	0.	0.	-0.	66.415	0.	-93.75	-60.000	0.	0.	98.668	824.86
2522.360	302.076	C.	0.	-0.	66.055	0.	-93.74	-60.000	0.	0.	98.739	821.13
2523.345	302.436	C.	0.	-0.	65.695	0.	-93.75	-60.000	0.	0.	98.815	817.25
2524.415	302.940	0.	0.	-0.	65.191	0.	-93.74	-60.000	0.	0.	98.896	813.06
2525.407	303.408	0.	0.	-0.	64.723	0.	-93.74	-60.000	0.	0.	98.971	809.18
2526.479	303.732	0.	0.	-0.	64.399	0.	-93.73	-60.000	0.	0.	99.053	804.99
2527.455	304.020	C.	0.	-0.	64.111	0.	-93.74	-60.000	0.	0.	99.129	801.14
2528.564	304.236	0.	0.	-0.	63.895	0.	-93.74	-60.000	0.	0.	99.214	796.79
2529.518	304.380	0.	0.	-0.	63.751	0.	-93.74	-60.000	0.	0.	99.288	793.07
2530.502	304.560	0.	0.	-0.	63.571	0.	-93.73	-60.000	0.	0.	99.365	789.21
2531.572	304.740	0.	0.	-0.	63.391	0.	-93.73	-60.000	0.	0.	99.449	785.00
2532.564	304.884	C.	0.	-0.	63.247	0.	-93.73	-60.000	0.	0.	99.527	781.12
2533.631	304.920	0.	0.	-0.	63.211	0.	-93.73	-60.000	0.	0.	99.611	776.95
2534.623	304.956	C.	0.	-0.	63.175	0.	-93.73	-60.000	0.	0.	99.690	773.06
2535.732	304.956	C.	0.	-0.	63.175	0.	-93.73	-60.000	0.	0.	99.778	768.72
2536.687	304.920	C.	0.	-0.	63.211	0.	-93.73	-60.000	0.	0.	99.855	764.95
2537.672	304.920	0.	0.	-0.	63.211	0.	-93.73	-60.000	0.	0.	99.934	761.10
2538.740	304.740	C.	0.	-0.	63.391	0.	-93.72	-60.000	0.	0.	100.020	756.92
2539.732	304.596	C.	0.	-0.	63.535	0.	-93.72	-60.000	0.	0.	100.101	753.04
2540.800	304.380	C.	0.	-0.	63.751	0.	-93.72	-60.000	0.	0.	100.188	748.84
2541.792	304.164	C.	0.	-0.	63.967	0.	-93.72	-60.000	0.	0.	100.270	744.95
2542.901	303.912	0.	0.	-0.	64.219	0.	-93.72	-60.000	0.	0.	100.361	740.61
2543.857	303.660	C.	0.	-0.	64.471	0.	-93.72	-60.000	0.	0.	100.440	736.87
2544.842	303.444	C.	0.	-0.	64.687	0.	-93.72	-60.000	0.	0.	100.523	732.99
2545.899	302.940	0.	0.	-0.	65.191	0.	-93.71	-60.000	0.	0.	100.611	728.85
2546.892	302.472	C.	0.	-0.	65.659	0.	-93.71	-60.000	0.	0.	100.695	724.97
2547.958	301.932	0.	0.	-0.	66.199	0.	-93.71	-60.000	0.	0.	100.786	720.78

CONFIDENTIAL

CONFIDENTIAL



TDAS (SEC)	PHBI (DEG)	OTHBO (N M)	DPSBO	DPHBO (DEG)	BA (DEG)	RD (N M)	RC (N M)	BC (DEG)	RP (N M)	D	PSIT (DEG)	RT (N M)
2548.950	301.464	0.	0.	-0.	66.667	0.	-93.71	-60.000	0.	0.	100.870	716.89
2550.060	300.888	0.	0.	-0.	67.243	0.	-93.71	-60.000	0.	0.	100.965	712.55
2551.010	300.348	0.	0.	-0.	67.783	0.	-93.71	-60.000	0.	0.	101.046	708.83
2552.002	299.772	C.	0.	-0.	68.359	0.	-93.71	-60.000	0.	0.	101.132	704.95
2553.071	299.088	C.	0.	-0.	69.043	0.	-93.71	-60.000	0.	0.	101.225	700.74
2554.063	298.404	C.	0.	-0.	69.727	0.	-93.71	-60.000	0.	0.	101.312	696.86
2555.131	298.728	C.	0.	-0.	69.403	0.	-93.70	-60.000	0.	0.	101.406	692.68
2556.123	299.016	0.	0.	-0.	69.115	0.	-93.70	-60.000	0.	0.	101.494	688.80
2557.232	299.376	0.	0.	-0.	68.755	0.	-93.70	-60.000	0.	0.	101.592	684.46
2558.184	299.844	0.	0.	-0.	68.287	0.	-93.70	-60.000	0.	0.	101.678	680.72
2559.176	300.348	0.	0.	-0.	67.783	0.	-93.70	-60.000	0.	0.	101.767	676.83
2560.243	301.032	0.	0.	-0.	67.099	0.	-93.69	-60.000	0.	0.	101.864	672.66
2561.235	301.680	C.	0.	-0.	66.451	0.	-93.69	-60.000	0.	0.	101.954	668.78
2562.305	302.112	C.	0.	-0.	66.019	0.	-93.69	-60.000	0.	0.	102.053	664.57
2563.297	302.544	0.	0.	-0.	65.587	0.	-93.69	-60.000	0.	0.	102.144	660.69
2564.406	302.976	C.	0.	-0.	65.155	0.	-93.69	-60.000	0.	0.	102.247	656.35
2565.362	303.192	C.	0.	-0.	64.939	0.	-93.68	-60.000	0.	0.	102.336	652.61
2566.347	303.444	0.	0.	-0.	64.687	0.	-93.69	-60.000	0.	0.	102.430	648.74
2567.414	303.696	0.	0.	-0.	64.435	0.	-93.69	-60.000	0.	0.	102.531	644.57
2568.406	304.308	0.	0.	-0.	63.823	0.	-93.68	-60.000	0.	0.	102.625	640.69
2569.473	304.596	0.	0.	-0.	63.535	0.	-93.68	-60.000	0.	0.	102.728	636.49
2570.465	304.812	C.	0.	-0.	63.319	0.	-93.68	-60.000	0.	0.	102.824	632.61
2571.574	305.100	C.	0.	-0.	63.031	0.	-93.68	-60.000	0.	0.	102.932	628.28
2572.514	305.352	0.	0.	-0.	62.779	0.	-93.68	-60.000	0.	0.	103.024	624.61
2573.506	305.640	C.	0.	-0.	62.491	0.	-93.67	-60.000	0.	0.	103.122	620.73
2574.574	305.928	0.	0.	-0.	62.203	0.	-93.67	-60.000	0.	0.	103.228	616.53
2575.566	306.792	0.	0.	-0.	61.339	0.	-93.67	-60.000	0.	0.	103.328	612.65
2576.676	307.332	C.	0.	-0.	60.799	0.	-93.67	-60.000	0.	0.	103.439	608.32
2577.630	307.764	0.	0.	-0.	60.367	0.	-93.67	-60.000	0.	0.	103.536	604.59
2578.614	308.196	C.	0.	-0.	59.935	0.	-93.66	-60.000	0.	0.	103.637	600.74
2579.687	308.520	0.	0.	-0.	59.611	0.	-93.66	-60.000	0.	0.	103.748	596.53
2580.679	308.844	C.	0.	-0.	59.287	0.	-93.66	-60.000	0.	0.	103.851	592.65
2581.745	309.168	C.	0.	-0.	58.963	0.	-93.65	-60.000	0.	0.	103.962	588.50
2582.737	309.852	C.	0.	-0.	58.279	0.	-93.65	-60.000	0.	0.	104.067	584.62
2583.847	310.176	0.	0.	-0.	57.955	0.	-93.65	-60.000	0.	0.	104.186	580.26
2584.804	310.428	0.	0.	-0.	57.703	0.	-93.65	-60.000	0.	0.	104.289	576.52
2585.788	310.716	0.	0.	-0.	57.415	0.	-93.65	-60.000	0.	0.	104.395	572.68
2586.859	311.184	C.	0.	-0.	56.947	0.	-93.64	-60.000	0.	0.	104.512	568.51
2587.852	311.616	0.	0.	-0.	56.515	0.	-93.64	-60.000	0.	0.	104.621	564.63
2588.918	311.904	C.	0.	-0.	56.227	0.	-93.64	-60.000	0.	0.	104.740	560.45
2589.910	312.192	0.	0.	-0.	55.939	0.	-93.63	-60.000	0.	0.	104.851	556.57
2591.020	312.192	0.	0.	-0.	55.939	0.	-93.63	-60.000	0.	0.	104.976	552.25
2591.974	312.192	C.	0.	-0.	55.939	0.	-93.63	-60.000	0.	0.	105.085	548.50
2592.958	312.192	0.	0.	-0.	55.939	0.	-93.62	-60.000	0.	0.	105.198	544.66
2594.030	312.228	C.	0.	-0.	55.903	0.	-93.62	-60.000	0.	0.	105.322	540.49
2595.022	312.228	0.	0.	-0.	55.903	0.	-93.61	-60.000	0.	0.	105.438	536.62
2596.089	311.976	0.	0.	-0.	56.155	0.	-93.61	-60.000	0.	0.	105.565	532.44
2597.081	311.688	0.	0.	-0.	56.443	0.	-93.61	-60.000	0.	0.	105.683	528.57
2598.190	311.184	0.	0.	-0.	56.947	0.	-93.61	-60.000	0.	0.	105.816	524.25
2599.145	310.752	C.	0.	-0.	57.379	0.	-93.60	-60.000	0.	0.	105.933	520.53
2600.129	310.284	0.	0.	-0.	57.847	0.	-93.60	-60.000	0.	0.	106.053	516.70
2601.201	309.564	0.	0.	-0.	58.567	0.	-93.60	-60.000	0.	0.	106.187	512.50
2602.193	308.840	0.	0.	-0.	59.251	0.	-93.60	-60.000	0.	0.	106.311	508.64
2603.260	308.448	0.	0.	-0.	59.683	0.	-93.59	-60.000	0.	0.	106.445	504.49

CONFIDENTIAL

CONFIDENTIAL

TDAS (SEC)	PHB1 (DEG)	DTHBO (N M)	DPSBO	OPHBO (DEG)	BA (DEG)	RD (N M)	RC (N M)	BC (DEG)	RP (N M)	D	PSIT (DEG)	RT (N M)
2604.252	308.016	C.	0.	-0.	60.115	0.	-93.59	-60.000	0.	0.	106.572	500.63
2605.361	307.836	0.	0.	-0.	60.295	0.	-93.58	-60.000	0.	0.	106.715	496.31
2606.315	307.656	0.	0.	-0.	60.475	0.	-93.58	-60.000	0.	0.	106.841	492.58
2607.300	307.512	C.	0.	-0.	60.619	0.	-93.57	-60.000	0.	0.	106.971	488.75
2608.371	307.476	0.	0.	-0.	60.655	0.	-93.57	-60.000	0.	0.	107.113	484.59
2609.363	307.476	C.	0.	-0.	60.655	0.	-93.57	-60.000	0.	0.	107.247	480.73
2610.434	307.512	C.	-0.	0.	60.619	-446.41	-93.57	90.000	913.15	8.767	107.393	476.55
2611.543	307.548	C.	-0.	0.	60.583	-446.95	-93.56	90.000	909.31	8.750	107.547	472.25
2612.732	307.620	C.	-0.	0.	60.511	-449.02	-93.55	90.000	906.67	8.738	107.712	467.63
2613.842	307.620	0.	-0.	0.	60.511	-448.20	-93.55	90.000	901.44	8.715	107.871	463.30
2615.031	307.764	C.	-0.	0.	60.367	-446.94	-93.55	90.000	895.47	8.687	108.041	458.69
2616.141	307.836	C.	-0.	0.	60.295	-447.69	-93.54	90.000	891.84	8.670	108.202	454.39
2617.330	307.944	C.	-0.	0.	60.187	-447.72	-93.54	90.000	887.13	8.648	108.378	449.76
2618.439	308.016	C.	-0.	0.	60.115	-450.34	-93.53	90.000	885.37	8.639	108.544	445.46
2619.628	308.124	C.	-0.	0.	60.007	-451.98	-93.53	90.000	882.31	8.626	108.724	440.86
2620.737	308.160	C.	-0.	0.	59.971	-454.16	-93.52	90.000	880.10	8.616	108.894	436.57
2621.847	308.232	C.	-0.	0.	59.899	-450.06	-93.52	90.000	871.59	8.576	109.069	432.25
2623.045	308.268	0.	-0.	0.	59.863	-448.31	-93.51	90.000	865.10	8.546	109.258	427.62
2624.146	308.268	0.	-0.	0.	59.863	-446.13	-93.51	90.000	858.55	8.515	109.435	423.36
2625.336	308.232	C.	-0.	0.	59.899	-445.69	-93.51	90.000	853.38	8.492	109.630	418.75
2626.445	308.232	C.	-0.	0.	59.899	-447.36	-93.50	90.000	850.68	8.479	109.814	414.46
2627.636	308.124	C.	-0.	0.	60.007	-446.78	-93.49	90.000	845.39	8.455	110.013	409.87
2628.745	308.052	0.	-0.	0.	60.079	-446.97	-93.48	90.000	841.19	8.436	110.203	405.60
2629.937	307.944	0.	-0.	0.	60.187	-447.83	-93.48	90.000	837.31	8.418	110.411	400.98
2631.046	307.548	C.	-0.	0.	60.583	-447.98	-93.46	90.000	833.08	8.399	110.607	396.71
2632.235	307.296	C.	-0.	0.	60.835	-448.66	-93.46	90.000	829.04	8.381	110.820	392.14
2633.345	307.080	C.	-0.	0.	61.051	-449.91	-93.45	90.000	825.89	8.367	111.025	387.85
2634.531	306.900	C.	-0.	0.	61.231	-451.78	-93.44	90.000	823.08	8.355	111.245	383.29
2635.641	306.720	C.	-0.	0.	61.411	-453.33	-93.43	90.000	820.24	8.343	111.455	379.03
2636.831	306.576	C.	-0.	0.	61.555	-455.64	-93.43	90.000	817.82	8.332	111.685	374.44
2637.940	306.458	0.	-0.	0.	61.663	-456.58	-93.42	90.000	814.36	8.317	111.903	370.19
2639.129	306.360	C.	-0.	0.	61.771	-457.75	-93.41	90.000	810.84	8.302	112.140	365.65
2640.238	306.288	C.	-0.	0.	61.843	-458.39	-93.40	90.000	807.10	8.286	112.366	361.40
2641.428	306.108	0.	-0.	0.	62.023	-459.81	-93.40	90.000	803.80	8.272	112.614	356.83
2642.537	305.964	C.	-0.	0.	62.167	-460.69	-93.39	90.000	800.29	8.257	112.848	352.59
2643.727	305.604	0.	-0.	0.	62.527	-461.42	-93.38	90.000	796.32	8.239	113.105	348.06
2644.836	305.316	0.	-0.	0.	62.815	-462.25	-93.37	90.000	792.73	8.223	113.350	343.80
2646.025	304.920	C.	-0.	0.	63.211	-458.91	-93.36	90.000	784.71	8.187	113.617	339.28
2647.135	304.560	0.	-0.	0.	63.571	-456.22	-93.35	90.000	777.62	8.156	113.871	335.06
2648.244	304.200	C.	-0.	0.	63.931	-452.86	-93.34	90.000	769.88	8.121	114.131	330.85
2649.434	303.696	C.	-0.	0.	64.435	-450.42	-93.33	90.000	762.72	8.090	114.416	326.31
2650.543	303.228	C.	-0.	0.	64.903	-451.34	-93.32	90.000	759.27	8.076	114.687	322.11
2651.733	302.760	0.	-0.	0.	65.371	-451.81	-93.30	90.000	755.04	8.058	114.984	317.61
2652.843	302.364	0.	-0.	0.	65.767	-452.98	-93.30	90.000	751.82	8.045	115.270	313.40
2654.032	301.860	0.	-0.	0.	66.271	-453.52	-93.28	90.000	747.65	8.028	115.579	308.92
2655.142	301.392	0.	-0.	0.	66.739	-453.80	-93.27	90.000	743.56	8.011	115.876	304.74
2656.331	300.852	0.	-0.	0.	67.279	-454.88	-93.26	90.000	739.93	7.997	116.203	300.25
2657.440	299.700	C.	-0.	0.	68.431	-456.02	-93.25	90.000	736.69	7.984	116.514	296.08
2658.630	299.160	0.	-0.	0.	68.971	-456.92	-93.23	90.000	732.91	7.970	116.855	291.63
2659.739	298.692	C.	-0.	0.	69.439	-457.97	-93.21	90.000	729.59	7.958	117.181	287.48
2660.929	298.224	C.	-0.	0.	69.907	-458.64	-93.20	90.000	725.55	7.942	117.543	283.03
2662.038	297.792	0.	-0.	0.	70.339	-458.50	-93.19	90.000	721.04	7.924	117.886	278.89
2663.228	297.288	C.	-0.	0.	70.843	-458.27	-93.17	90.000	716.13	7.905	118.264	274.48
2664.337	296.856	C.	-0.	0.	71.275	-457.80	-93.16	90.000	711.26	7.885	118.629	270.34

COMMENTS

TDAS (SEC)	PHBI (DEG)	OTHBO (N M)	OPSBO	DPHBO (DEG)	BA (DEG)	RD (N M)	RC (N M)	BC (DEG)	RP (N M)	D	PSIT (DEG)	RT (N M)
2665.526	297.288	0.	-0.	0.	70.843	-457.63	-93.15	90.000	706.42	7.866	119.027	265.95
2666.636	297.720	0.	-0.	0.	70.411	-457.39	-93.15	90.000	701.82	7.849	119.410	261.86
2667.825	298.260	0.	-0.	0.	69.871	-451.00	-93.12	90.000	690.73	7.834	119.833	257.46
2668.935	298.764	0.	-0.	0.	69.367	-451.89	-93.10	90.000	687.27	7.820	120.238	253.39
2670.122	298.332	0.	-0.	0.	69.799	-452.95	-93.09	90.000	683.66	7.807	120.683	249.06
2671.231	297.936	0.	-0.	0.	70.195	-454.05	-93.07	90.000	680.39	7.795	121.112	245.01
2672.341	297.324	0.	-0.	0.	70.807	-454.03	-93.06	90.000	676.01	7.777	121.557	240.95
2673.535	296.640	0.	-0.	0.	71.491	-454.02	-93.04	90.000	671.30	7.759	122.046	236.63
2674.637	295.992	0.	-0.	0.	72.139	-454.53	-93.02	90.000	667.50	7.745	122.512	232.65
2675.825	295.452	0.	-0.	0.	72.679	-453.67	-93.00	90.000	661.96	7.722	123.033	228.36
2676.935	294.984	0.	-0.	0.	73.147	-453.89	-92.99	90.000	657.84	7.708	123.534	224.38
2678.124	294.480	0.	-0.	0.	73.651	-453.45	-92.96	90.000	652.74	7.689	124.086	220.15
2679.233	294.048	0.	-0.	0.	74.083	-452.92	-92.95	90.000	647.88	7.672	124.620	216.21
2680.424	293.688	0.	-0.	0.	74.443	-452.89	-92.93	90.000	643.16	7.657	125.216	211.99
2681.533	293.364	0.	-0.	0.	74.767	-452.77	-92.91	90.000	638.71	7.642	125.788	208.09
2682.718	293.004	0.	-0.	0.	75.127	-452.20	-92.89	90.000	633.50	7.625	126.423	203.93
2683.827	292.068	0.	-0.	0.	76.063	-451.61	-92.87	90.000	628.58	7.609	127.037	200.07
2685.013	291.744	0.	-0.	0.	76.387	-451.41	-92.85	90.000	623.76	7.594	127.714	195.98
2686.122	291.456	0.	-0.	0.	76.675	-451.03	-92.83	90.000	619.05	7.580	128.374	192.17
2687.309	291.060	0.	-0.	0.	77.071	-450.53	-92.81	90.000	613.93	7.562	129.109	188.11
2688.418	290.664	0.	-0.	0.	77.467	-449.39	-92.79	90.000	608.46	7.545	129.821	184.36
2689.603	290.196	0.	-0.	0.	77.935	-448.06	-92.76	90.000	602.53	7.527	130.607	180.39
2690.712	289.764	0.	-0.	0.	78.367	-446.83	-92.75	90.000	596.96	7.510	131.380	176.67
2691.896	289.260	0.	-0.	0.	78.871	-445.73	-92.72	90.000	591.29	7.493	132.231	172.77
2693.005	288.792	0.	-0.	0.	79.339	-444.81	-92.70	90.000	586.06	7.477	133.063	169.14
2694.189	288.324	0.	-0.	0.	79.807	-443.80	-92.68	90.000	580.44	7.461	133.992	165.29
2695.299	287.856	0.	-0.	0.	80.275	-442.59	-92.66	90.000	574.95	7.446	134.894	161.74
2696.481	287.424	0.	-0.	0.	80.707	-440.88	-92.63	90.000	568.68	7.428	135.895	158.01
2697.591	286.992	0.	-0.	0.	81.139	-439.58	-92.62	90.000	563.06	7.411	136.883	154.53
2698.700	286.596	0.	-0.	0.	81.535	-436.83	-92.59	90.000	556.04	7.390	137.906	151.11
2699.886	286.128	0.	-0.	0.	82.003	-434.53	-92.57	90.000	549.18	7.371	139.045	147.52
2700.987	285.696	0.	-0.	0.	82.435	-434.13	-92.55	90.000	544.54	7.360	140.152	144.23
2702.178	285.192	0.	-0.	0.	82.939	-431.83	-92.53	90.000	537.65	7.340	141.408	140.72
2703.279	284.760	0.	-0.	0.	83.371	-431.11	-92.51	90.000	532.71	7.329	142.616	137.56
2704.471	284.292	0.	-0.	0.	83.839	-429.53	-92.49	90.000	526.54	7.312	143.990	134.18
2705.572	283.896	0.	-0.	0.	84.235	-427.50	-92.47	90.000	520.30	7.297	145.311	131.15
2706.756	283.320	0.	-0.	0.	84.811	-426.17	-92.45	90.000	514.46	7.282	146.792	127.98
2707.865	282.744	0.	-0.	0.	85.387	-424.64	-92.43	90.000	508.69	7.268	148.247	125.07
2709.048	282.384	0.	-0.	0.	85.747	-423.03	-92.41	90.000	502.57	7.253	149.873	122.06
2710.157	282.060	0.	-0.	0.	86.071	-421.59	-92.39	90.000	496.91	7.239	151.461	119.34
2711.340	281.556	0.	-0.	0.	86.575	-419.56	-92.38	90.000	490.38	7.223	153.237	116.53
2712.449	281.052	0.	-0.	0.	87.079	-417.88	-92.36	90.000	484.48	7.208	154.968	114.00
2713.634	280.620	0.	-0.	0.	87.511	-415.52	-92.34	90.000	477.66	7.191	156.889	111.43
2714.735	280.224	0.	-0.	0.	87.907	-413.33	-92.32	90.000	471.32	7.174	158.756	109.14
2715.923	279.720	0.	-0.	0.	88.411	-411.42	-92.31	90.000	464.93	7.159	160.858	106.81
2717.024	279.252	0.	-0.	0.	88.879	-409.44	-92.29	90.000	458.80	7.144	162.874	104.78
2718.211	278.820	0.	-0.	0.	89.311	-407.58	-92.28	90.000	452.47	7.129	165.134	102.74
2719.312	278.424	0.	-0.	0.	89.707	-405.75	-92.27	90.000	446.53	7.115	167.295	100.99
2720.494	278.136	0.	-0.	0.	89.995	-404.09	-92.25	90.000	440.47	7.101	169.684	99.27
2721.604	277.848	0.	-0.	-0.	90.263	-402.78	-92.24	90.000	435.03	7.089	171.997	97.82
2722.713	277.596	0.	-0.	-0.	90.535	-401.02	-92.24	90.000	429.11	7.075	174.384	96.52
2723.895	278.136	0.	-0.	0.	89.995	-399.66	-92.22	90.000	423.38	7.062	176.965	95.33
2724.996	278.640	0.	-0.	0.	89.491	-398.75	-92.22	90.000	418.40	7.053	179.422	94.39
2726.185	278.856	0.	-0.	0.	89.275	-397.08	-92.21	90.000	412.32	7.038	182.131	93.36

CONFIDENTIAL

CONFIDENTIAL

TDAS (SEC)	PHBI (DEG)	DTHBO (N M)	DPSBO	DPHBO (DEG)	BA (DEG)	RD (N M)	RC (N M)	BC (DEG)	RP (N M)	D	PSIT (DEG)	RT (N M)
2727.286	279.000	0.	-0.	0.	89.131	-396.34	-92.21	90.000	407.54	7.029	184.658	92.98
2728.475	278.892	0.	-0.	0.	89.239	-394.56	-92.20	90.000	401.41	7.013	187.404	92.55
2729.576	278.784	0.	-0.	0.	89.347	-392.78	-92.20	90.000	395.58	6.998	189.980	92.34
2730.758	278.316	0.	-0.	0.	89.815	-391.00	-92.20	90.000	389.50	6.982	192.719	92.31
2731.867	277.848	0.	-0.	-0.	90.283	-389.31	-92.20	90.000	383.77	6.967	195.288	92.46
2733.051	277.452	0.	-0.	-0.	90.679	-387.80	-92.21	90.000	377.95	6.953	198.014	92.83
2734.160	277.056	0.	-0.	-0.	91.075	-386.47	-92.21	90.000	372.62	6.938	200.530	93.34
2735.344	276.660	0.	-0.	-0.	91.471	-384.84	-92.22	90.000	366.71	6.923	203.181	94.08
2736.453	276.264	0.	-0.	-0.	91.867	-383.53	-92.23	90.000	361.42	6.908	205.608	94.94
2737.638	275.832	0.	-0.	-0.	92.299	-382.27	-92.24	90.000	355.92	6.893	208.135	96.02
2738.747	275.436	0.	-0.	-0.	92.695	-381.19	-92.25	90.000	350.90	6.879	210.445	97.20
2739.933	275.040	0.	-0.	-0.	93.091	-380.58	-92.27	90.000	346.06	6.868	212.851	98.62
2741.042	274.644	0.	-0.	-0.	93.487	-380.06	-92.29	90.000	341.62	6.857	215.023	100.07
2742.230	275.292	0.	-0.	-0.	92.839	-379.77	-92.31	90.000	337.14	6.848	217.267	101.78
2743.340	275.940	0.	-0.	-0.	92.191	-379.56	-92.33	90.000	333.01	6.839	219.303	103.51
2744.521	276.444	0.	-0.	-0.	91.687	-378.50	-92.36	90.000	327.83	6.821	221.375	105.45
2745.631	276.912	0.	-0.	-0.	91.219	-377.69	-92.39	90.000	323.17	6.803	223.246	107.38
2746.740	277.704	0.	-0.	-0.	90.427	-376.20	-92.42	90.000	317.84	6.776	225.046	109.42
2747.927	278.568	0.	-0.	0.	89.563	-371.92	-92.47	90.000	309.46	6.749	226.897	111.70
2749.028	279.396	0.	-0.	0.	88.735	-368.72	-92.51	90.000	302.48	6.734	228.535	113.89
2750.212	279.828	0.	-0.	0.	88.303	-364.41	-92.56	90.000	294.13	6.713	230.227	116.34
2751.313	280.188	0.	-0.	0.	87.943	-363.00	-92.61	90.000	288.97	6.704	231.728	118.67
2752.497	280.404	0.	-0.	0.	87.727	-360.64	-92.66	90.000	282.64	6.690	233.267	121.24
2753.599	280.584	0.	-0.	0.	87.547	-358.45	-92.72	90.000	276.72	6.676	234.649	123.72
2754.781	280.548	0.	-0.	0.	87.583	-356.27	-92.78	90.000	270.62	6.662	236.054	126.40
2755.883	280.548	0.	-0.	0.	87.583	-354.16	-92.85	90.000	264.85	6.649	237.309	128.95
2757.063	280.476	0.	-0.	0.	87.655	-350.70	-92.93	90.000	257.49	6.628	238.598	131.75
2758.165	279.972	0.	-0.	0.	88.159	-347.70	-93.00	90.000	250.89	6.610	239.744	134.38
2759.346	279.612	0.	-0.	0.	88.519	-344.66	-93.10	90.000	243.99	6.590	240.923	137.25
2760.447	279.288	0.	-0.	0.	88.843	-341.83	-93.18	90.000	237.61	6.572	241.972	139.94
2761.625	278.928	0.	-0.	0.	89.203	-339.98	-93.27	90.000	232.00	6.557	243.043	142.83
2762.727	278.568	0.	-0.	0.	89.563	-338.31	-93.37	90.000	226.83	6.543	244.004	145.57
2763.909	278.208	0.	-0.	0.	89.923	-336.53	-93.48	90.000	221.30	6.527	244.996	148.54
2765.011	277.884	0.	-0.	-0.	90.247	-334.78	-93.59	90.000	216.08	6.512	245.877	151.30
2766.197	277.524	0.	-0.	-0.	90.607	-332.89	-93.71	90.000	210.49	6.496	246.790	154.31
2767.299	277.200	0.	-0.	-0.	90.931	-331.14	-93.84	90.000	205.35	6.479	247.600	157.10
2768.486	276.912	0.	-0.	-0.	91.219	-329.55	-93.97	90.000	200.13	6.463	248.437	160.10
2769.588	276.624	0.	-0.	-0.	91.507	-328.11	-94.11	90.000	195.33	6.448	249.186	162.91
2770.697	276.372	0.	-0.	-0.	91.759	-326.31	-94.26	90.000	190.20	6.430	249.909	165.73
2771.877	276.624	0.	-0.	-0.	91.507	-324.59	-94.41	90.000	184.99	6.412	250.645	168.71
2772.979	276.840	0.	-0.	-0.	91.291	-323.56	-94.57	90.000	180.71	6.399	251.307	171.49
2774.167	276.768	0.	-0.	-0.	91.363	-321.58	-94.75	90.000	175.24	6.377	251.996	174.51
2775.269	276.696	0.	-0.	-0.	91.435	-320.53	-94.92	90.000	171.01	6.363	252.609	177.29
2776.456	276.372	0.	-0.	-0.	91.759	-318.78	-95.12	90.000	165.85	6.342	253.247	180.28
2777.558	276.084	0.	-0.	-0.	92.047	-317.13	-95.32	90.000	161.08	6.323	253.814	183.04
2778.745	276.768	0.	-0.	-0.	91.363	-315.77	-95.54	90.000	156.43	6.305	254.403	185.98
2779.847	277.452	0.	-0.	-0.	90.679	-314.47	-95.76	90.000	152.07	6.287	254.932	188.73
2781.026	278.784	0.	-0.	0.	89.000	-313.28	-96.00	90.000	147.00	6.270	255.000	191.00
2782.128	280.044	0.	-0.	0.	88.087	-312.20	-96.23	90.000	142.00	6.254	255.966	194.00
2783.312	281.340	0.	-0.	0.	86.791	-310.00	-96.50	90.000	137.00	6.235	256.475	197.18
2784.413	282.492	0.	-0.	0.	85.639	-309.53	-96.70	90.000	134.93	6.218	256.931	199.83
2785.599	284.292	0.	-0.	0.	83.839	-308.20	-97.00	90.000	130.52	6.198	257.408	202.67
2786.700	285.948	0.	-0.	0.	82.183	-307.00	-97.33	90.000	126.52	6.179	257.833	205.27
2787.887	287.748	0.	-0.	0.	80.383	-305.70	-97.64	90.000	122.26	6.159	258.276	208.03

CONFIDENTIAL

CONFIDENTIAL

TDAS (SEC)	PHBI (DEG)	OTH80 (N M)	DPS80	DPH80 (DEG)	BA (DEG)	RD (N M)	RC (N M)	BC (DEG)	RP (N M)	D	PSIT (DEG)	RT (N M)
2788.988	289.440	0.	-0.	0.	78.691	-304.59	-97.95	90.000	118.43	6.139	258.673	210.58
2790.168	296.136	0.	-0.	0.	71.995	-303.34	-98.30	90.000	114.31	6.116	259.087	213.29
2791.277	302.580	0.	-0.	0.	65.551	-302.27	-98.64	90.000	110.58	6.094	259.460	215.80
2792.459	304.920	0.	-0.	0.	63.211	-301.41	-98.99	90.000	106.93	6.072	259.848	218.46
2793.568	306.972	0.	-0.	0.	61.159	-300.59	-99.33	90.000	103.55	6.050	260.197	220.90
2794.678	308.988	0.	-0.	0.	59.143	-299.97	-99.68	90.000	100.41	6.030	260.537	223.32
2795.862	310.428	0.	-0.	0.	57.703	-299.34	-100.06	90.000	97.15	6.009	260.886	225.85
2796.964	311.724	0.	-0.	0.	56.407	-299.59	-100.45	90.000	94.97	5.992	261.203	228.20
2798.155	315.468	0.	-0.	0.	52.663	-298.98	-100.86	90.000	91.81	5.971	261.532	230.67
2799.257	318.960	0.	-0.	0.	49.171	-298.67	-101.27	90.000	89.19	5.953	261.827	232.92
2800.448	328.788	0.	-0.	0.	39.343	-298.20	-101.68	90.000	86.24	5.931	262.137	235.35
2801.550	338.076	0.	-0.	0.	30.055	-297.80	-102.06	90.000	83.61	5.911	262.414	237.53
2802.734	351.072	0.	-0.	0.	17.059	-297.55	-102.36	90.000	80.96	5.890	262.701	239.82
2803.844	3.348	0.	-0.	0.	4.783	-297.28	-102.66	90.000	78.47	5.869	262.963	241.97
2805.022	7.992	0.	-0.	0.	0.139	-297.25	-102.79	90.000	76.06	5.849	263.231	244.17
2806.132	12.096	0.	-0.	0.	-3.965	-297.22	-102.93	90.000	73.85	5.830	263.474	246.22
2807.312	10.584	0.	-0.	0.	-2.453	-297.27	-103.03	90.000	71.58	5.811	263.724	248.37
2808.422	9.000	0.	-0.	0.	-0.869	-297.28	-103.13	90.000	69.47	5.793	263.951	250.34
2809.604	359.388	0.	-0.	0.	8.743	-297.33	-103.32	90.000	67.36	5.775	264.183	252.38
2810.713	350.136	0.	-0.	0.	17.995	-297.41	-103.51	90.000	65.43	5.758	264.396	254.30
2811.897	340.056	0.	-0.	0.	28.075	-297.42	-103.93	90.000	63.49	5.741	264.614	256.27
2813.007	330.624	0.	-0.	0.	37.507	-297.38	-104.35	90.000	61.66	5.725	264.812	258.08
2814.196	327.096	0.	-0.	0.	41.035	-297.17	-104.95	90.000	59.62	5.707	265.019	259.99
2815.298	324.036	0.	-0.	0.	44.095	-296.98	-105.53	90.000	57.83	5.690	265.203	261.71
2816.480	320.220	0.	-0.	0.	47.911	-296.80	-106.16	90.000	55.96	5.673	265.396	263.50
2817.590	316.620	0.	-0.	0.	51.511	-296.47	-106.80	90.000	54.08	5.654	265.572	265.18
2818.699	313.020	0.	-0.	0.	55.111	-296.39	-107.48	90.000	52.55	5.640	265.742	266.79
2819.887	311.976	0.	-0.	0.	56.155	-296.19	-108.25	90.000	50.85	5.625	265.918	268.47
2820.988	311.076	0.	-0.	0.	57.055	-295.94	-109.01	90.000	49.29	5.609	266.078	269.99
2822.180	310.752	0.	-0.	0.	57.379	-295.84	-109.80	90.000	47.77	5.595	266.246	271.61
2823.281	310.464	0.	-0.	0.	57.667	-295.56	-110.56	90.000	46.25	5.579	266.396	273.06
2824.474	310.176	0.	-0.	0.	57.955	-295.42	-111.37	90.000	44.77	5.563	266.555	274.61
2825.575	309.924	0.	-0.	0.	58.207	-295.22	-112.16	90.000	43.41	5.549	266.696	275.98
2826.762	309.672	0.	-0.	0.	58.459	-294.95	-112.96	90.000	41.96	5.532	266.845	277.42
2827.871	309.492	0.	-0.	0.	58.639	-294.73	-113.76	90.000	40.66	5.516	266.980	278.73
2829.058	309.240	0.	-0.	0.	58.891	-294.47	-114.61	90.000	39.26	5.498	267.120	280.12
2830.167	308.700	0.	-0.	0.	59.431	-294.27	-115.45	90.000	38.06	5.482	267.247	281.36
2831.353	308.376	0.	-0.	0.	59.755	-293.98	-116.32	90.000	36.77	5.466	267.379	282.64
2832.462	308.088	0.	-0.	0.	60.043	-293.77	-117.19	90.000	35.63	5.450	267.500	283.85
2833.648	309.564	0.	-0.	0.	58.567	-293.47	-118.10	90.000	34.43	5.434	267.625	285.06
2834.758	311.004	0.	-0.	0.	57.127	-293.17	-119.01	90.000	33.32	5.418	267.738	286.17
2835.943	311.220	0.	-0.	0.	56.911	-292.88	-119.94	90.000	32.17	5.401	267.857	287.34
2837.053	311.400	0.	-0.	0.	56.731	-292.50	-120.86	90.000	31.07	5.385	267.964	288.39
2838.239	314.064	0.	-0.	0.	54.067	-292.13	-121.79	90.000	29.94	5.368	268.075	289.47
2839.349	316.620	0.	-0.	0.	51.511	-291.77	-122.72	90.000	28.90	5.353	268.177	290.49
2840.533	326.772	0.	-0.	0.	41.359	-291.30	-123.65	90.000	27.75	5.334	268.282	291.50
2841.643	336.528	0.	-0.	0.	31.603	-290.80	-124.58	90.000	26.66	5.316	268.377	292.43
2842.825	348.660	0.	-0.	0.	19.471	-290.41	-125.38	90.000	25.57	5.297	268.476	293.41
2843.935	0.108	0.	-0.	0.	8.023	-289.95	-126.17	90.000	24.53	5.278	268.566	294.28
2845.044	11.556	0.	-0.	0.	-3.425	-289.77	-126.66	90.000	23.64	5.261	268.654	295.13
2846.227	18.828	0.	-0.	0.	-10.697	-289.48	-127.21	90.000	22.66	5.242	268.743	296.00
2847.328	25.416	0.	-0.	0.	-17.285	-289.13	-127.76	90.000	21.68	5.220	268.825	296.81
2848.519	32.868	0.	-0.	0.	-24.737	-288.92	-128.27	90.000	20.82	5.202	268.910	297.63
2849.620	39.810	0.	-0.	0.	-31.685	-288.59	-128.78	60.000	19.90	5.181	268.986	298.37

CONFIDENTIAL

CONFIDENTIAL

TDAS (SEC)	PHBI (DEG)	DTH80 (N M)	CPS80	DPH80 (DEG)	DA (DEG)	RD (N M)	RC (N M)	BC (DEG)	RP (N M)	D	PSIT (DEG)	RT (N M)
2850.810	43.200	0.	J.	0.	-35.069	-288.48	-129.24	60.000	19.14	5.165	269.065	299.16
2851.911	46.188	0.	-0.	0.	-38.057	-288.34	-129.68	60.000	18.46	5.150	269.136	299.85
2853.099	49.608	0.	-0.	0.	-41.477	-288.11	-130.24	60.000	17.67	5.132	269.210	300.59
2854.200	56.340	0.	-0.	0.	-48.209	-287.91	-130.79	60.000	17.02	5.116	269.276	301.23
2855.388	57.780	0.	-0.	0.	-49.649	-287.63	-131.37	60.000	16.29	5.096	269.345	301.90
2856.489	58.932	0.	-0.	0.	-50.801	-287.39	-131.94	60.000	15.65	5.078	269.407	302.50
2857.676	59.472	C.	-0.	0.	-51.341	-287.05	-132.62	60.000	14.93	5.059	269.472	303.15
2858.777	59.940	0.	-0.	0.	-51.809	-286.75	-133.28	60.000	14.34	5.041	269.529	303.71
2859.965	59.580	C.	-0.	0.	-51.449	-286.42	-134.12	60.000	13.75	5.021	269.590	304.31
2861.066	59.220	0.	-0.	0.	-51.089	-286.02	-134.95	60.000	13.18	5.003	269.645	304.83
2862.254	58.680	0.	0.	0.	-50.549	-285.61	-135.87	60.000	12.65	4.984	269.700	305.37
2863.355	58.212	0.	0.	0.	-50.081	-285.22	-136.80	60.000	12.17	4.968	269.751	305.85
2864.542	57.636	0.	0.	0.	-49.505	-284.80	-137.87	60.000	11.71	4.951	269.804	306.37
2865.644	57.132	C.	0.	0.	-49.001	-284.34	-138.92	60.000	11.29	4.937	269.851	306.82
2866.825	56.628	0.	0.	0.	-48.497	-283.91	-140.05	60.000	10.90	4.919	269.901	307.30
2867.935	56.196	0.	0.	0.	-48.065	-283.42	-141.17	60.000	10.51	4.903	269.946	307.72
2869.044	55.728	0.	0.	0.	-47.597	-282.91	-142.25	60.000	10.13	4.889	269.989	308.12
2870.224	55.044	0.	0.	0.	-46.913	-282.31	-143.51	60.000	9.71	4.873	270.034	308.55
2871.325	54.432	0.	0.	0.	-46.301	-281.75	-144.76	60.000	9.38	4.852	270.074	308.92
2872.516	53.784	C.	0.	0.	-45.653	-281.11	-146.09	60.000	9.05	4.839	270.116	309.30
2873.617	53.172	0.	0.	0.	-45.041	-280.45	-147.40	60.000	8.71	4.819	270.155	309.64
2874.806	52.740	0.	0.	0.	-44.609	-279.80	-148.89	60.000	8.45	4.802	270.194	310.01
2875.907	52.380	0.	0.	0.	-44.249	-279.03	-150.35	60.000	8.13	4.786	270.230	310.32
2877.093	51.948	0.	0.	0.	-43.817	-278.25	-151.95	60.000	7.87	4.767	270.267	310.66
2878.194	51.300	0.	0.	0.	-43.169	-277.39	-153.54	60.000	7.59	4.750	270.301	310.95
2879.381	51.588	0.	0.	0.	-43.457	-276.41	-155.25	60.000	7.25	4.732	270.335	311.24
2880.482	51.840	C.	0.	0.	-43.709	-275.48	-156.95	60.000	7.02	4.716	270.367	311.50
2881.668	52.056	C.	0.	0.	-43.925	-274.42	-158.86	60.000	6.75	4.697	270.399	311.79
2882.770	52.200	C.	0.	0.	-44.069	-273.27	-160.74	60.000	6.46	4.679	270.429	312.03
2883.956	52.308	0.	0.	0.	-44.177	-271.98	-162.85	60.000	6.16	4.659	270.459	312.30
2885.058	52.380	0.	0.	0.	-44.249	-270.67	-164.94	60.000	5.88	4.641	270.487	312.52
2886.238	52.560	0.	0.	0.	-44.429	-270.67	-167.21	0.	5.88	4.623	270.515	312.74
2887.277	52.704	C.	0.	0.	-44.573	-270.67	-169.35	0.	5.88	4.607	270.540	312.93
2888.387	52.848	0.	0.	0.	-44.717	-270.67	-171.62	0.	5.88	4.594	270.565	313.13
2889.437	53.136	C.	0.	0.	-45.005	-270.67	-173.95	0.	5.88	4.583	270.588	313.32
2890.468	53.424	C.	0.	0.	-45.293	-270.67	-176.42	0.	5.88	4.565	270.611	313.49
2891.585	53.820	0.	0.	0.	-45.689	-270.67	-179.02	0.	5.88	4.556	270.634	313.66
2892.624	54.180	0.	0.	0.	-46.049	-270.67	-181.58	0.	5.88	4.541	270.655	313.79
2893.740	54.468	0.	0.	0.	-46.337	-270.67	-184.33	0.	5.88	4.530	270.677	313.95
2894.779	54.756	0.	0.	0.	-46.625	-270.67	-187.07	0.	5.88	4.522	270.697	314.10
2895.896	55.080	0.	0.	0.	-46.949	-270.67	-190.06	0.	5.88	4.508	270.718	314.23
2896.935	55.404	0.	0.	0.	-47.273	-270.67	-193.07	0.	5.88	4.496	270.737	314.37
2898.044	55.584	0.	0.	0.	-47.453	-270.67	-196.19	0.	5.88	4.485	270.757	314.49
2899.095	55.764	0.	0.	0.	-47.633	-270.67	-199.39	0.	5.88	4.476	270.775	314.62
2900.126	55.908	0.	0.	0.	-47.777	-270.67	-202.68	0.	5.88	4.463	270.792	314.71
2901.247	56.196	0.	0.	0.	-48.065	-270.67	-206.34	0.	5.88	4.453	270.811	314.82
2902.286	56.412	0.	0.	0.	-48.281	-270.67	-209.99	0.	5.88	4.437	270.827	314.92
2903.402	56.700	0.	0.	0.	-48.569	-270.67	-213.81	0.	5.88	4.426	270.845	315.02
2904.441	56.916	C.	0.	0.	-48.785	-270.67	-217.61	0.	5.88	4.416	270.861	315.12

CONTINUED

CONTINUED