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2.75 INCH ROCKET/AH-1G HELICOPTER WEAPONS SYSTEM BASELINE INSTR--ETC(U)
APR 72 B TIRABASSI, E TOGNOLA

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1 of 2
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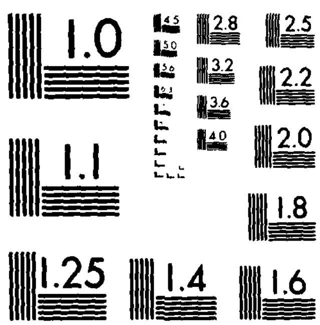

MICROCOPY RESOLUTION TEST CHART

PHOTOGRAPH THIS SHEET

AD A099644

DTIC ACCESSION NUMBER

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INVENTORY

2.75 INCH ROCKET/AH-1G HELICOPTER WEAPONS SYSTEM
BASELINE INSTRUMENTATION TEST REPORT. VOLUME II. APRIL '72

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U. S. ARMY ELECTRONICS COMMAND

Fort Monmouth, New Jersey

AD A099644

2.75 INCH ROCKET/AH-1G HELICOPTER WEAPONS SYSTEM BASELINE INSTRUMENTATION TEST REPORT

VOLUME II

AIRCRAFT INSTALLATION and TEST TECHNICAL AREA
AVIONICS LABORATORY

By
Benjamin Tirabassi and Edmund Tognola

April 1972

TABLE OF CONTENTS

VOLUME II

1.0 Data Format

The output data from the Data Acquisition Unit was recorded on a Leach Model 3200 digital magnetic tape recorder in a bit parallel pulse code modulated (PCM) format as shown in Figure 1.

Recorder Tape Track	Function
1	Not Used
2	Parity
3	Sign
4	Bit 10 (MSB)
5	Bit 9
6	Bit 8
7	Bit 7
8	Word Mark
9	Bit 5
10	Bit 4
11	Bit 3
12	Bit 2
13	Bit 1 (LSB)
14	Bit 6
15	Not Used
16	Range Time (Pulse Amplitude Modulated)

FIG. 1

For ease of presentation, the reproduced data is usually printed in a block format consisting of 120 words as shown in Figure 2. The words are written on the tape in a sequence that occurs by reading the data frame left to right, row by row. The data frame represents one complete sampling cycle by the Data Acquisition Unit (DAU). The DAU transmits the equivalent of 100 data frames per second to the recorder. Words S1 and S2, the synchronization words, are used to determine the frame structure. During the decommutation and formatting process, the computer searches the continuous data stream until the synchronization words are located. The computer then starts with the next data word and blocks the data into the desired 120 word format.

The Phase A and Phase B instrument configurations for the data presented in this volume are indicated in Figure 3 and Figure 4 respectively. The configuration charts list the assigned data words and engineering unit dimensions for each monitored parameter. The required measurements, necessary for performing the data analysis, are shown in Figure 5.

2.0 Recorded Data Conversion

2.1 Sample Octal Printout

A typical octal data listing is shown on pages 6 through 15. The computer printout represents the data recorded as Run #138 on 24 August 1971. The recorded Phase B data extends for a period of 0.52 seconds immediately following the occurrence of event marker #1 which signals the aircraft approach to the rocket release point.

A1	A2	A3	A4	A5	A6	A7	B1	CA	CD	B11	D1
A1	A2	A3	A4	A5	A6	A7	B2	CA	CD	B12	D2
A1	A2	A3	A4	A5	A6	A7	B3	CA	CD	B13	D3
A1	A2	A3	A4	A5	A6	A7	B4	CA	CD	B14	D4
A1	A2	A3	A4	A5	A6	A7	B5	CA	CD	B15	D5
A1	A2	A3	A4	A5	A6	A7	B6	CA	CD	B16	C1
A1	A2	A3	A4	A5	A6	A7	B7	CA	CD	B17	C2
A1	A2	A3	A4	A5	A6	A7	B8	CA	CD	B18	CAL
A1	A2	A3	A4	A5	A6	A7	B9	CA	CD	ET1	ET2
A1	A2	A3	A4	A5	A6	A7	B10	CA	CD	S1	S2

DATA INPUT CHANNELS

WORD	INPUT
A1 – A7	HIGH RATE ANALOG
B1 – B3	SYNCHRO
B4 – B18	LOW RATE ANALOG
D1	FLIGHT TEST RUN CODE
D4	EVENT MARKERS

DAU GENERATED INFORMATION

WORD	FUNCTION
ET1 – ET2	ELAPSED TIME CODE
CAL	CALIBRATION WORD
S1 – S2	SYNCHRONIZATION WORD

NOTE ALL OTHER WORDS ARE UNUSED

FIG. 2 DAU DATA FRAME

PHASE A CONFIGURATION

SENSOR	WORD	DIMENSION
IR Detector (Left)	A1	volts
Lateral Accelerometer	A2	ft/sec^2
Vertical Accelerometer	A3	ft/sec^2
Fore/Aft Accelerometer	A4	ft/sec^2
IR Detector (Right)	A5	volts
Roll Rate	A6	degrees/second
Yaw Rate	A7	degrees/second
Aircraft Pitch	B1	degrees
Aircraft Roll	B2	degrees
Aircraft Yaw	B3	degrees
Pitch Rate	B4	degrees/second
Angle of Attack* (#2LY)	B5	degrees
Angle of Attack (#2LP)	B6	degrees
Angle of Attack (#4RY)	B7	degrees
Angle of Attack (#4RP)	B8	degrees
Angle of Attack (#3NY)	B13	degrees
Angle of Attack (#3NP)	B14	degrees
Angle of Attack (#1LY)	B15	degrees
Angle of Attack (#1LP)	B16	degrees
Angle of Attack (#5RY)	B17	degrees
Angle of Attack (#5RP)	B18	degrees

*Key for Angle of Attack Transmitter Position

L - Left	#1 Outboard
R - Right	#2 Inboard
N - Nose	#3 Nose
Y - Yaw	#4 Inboard
P - Pitch	#5 Outboard

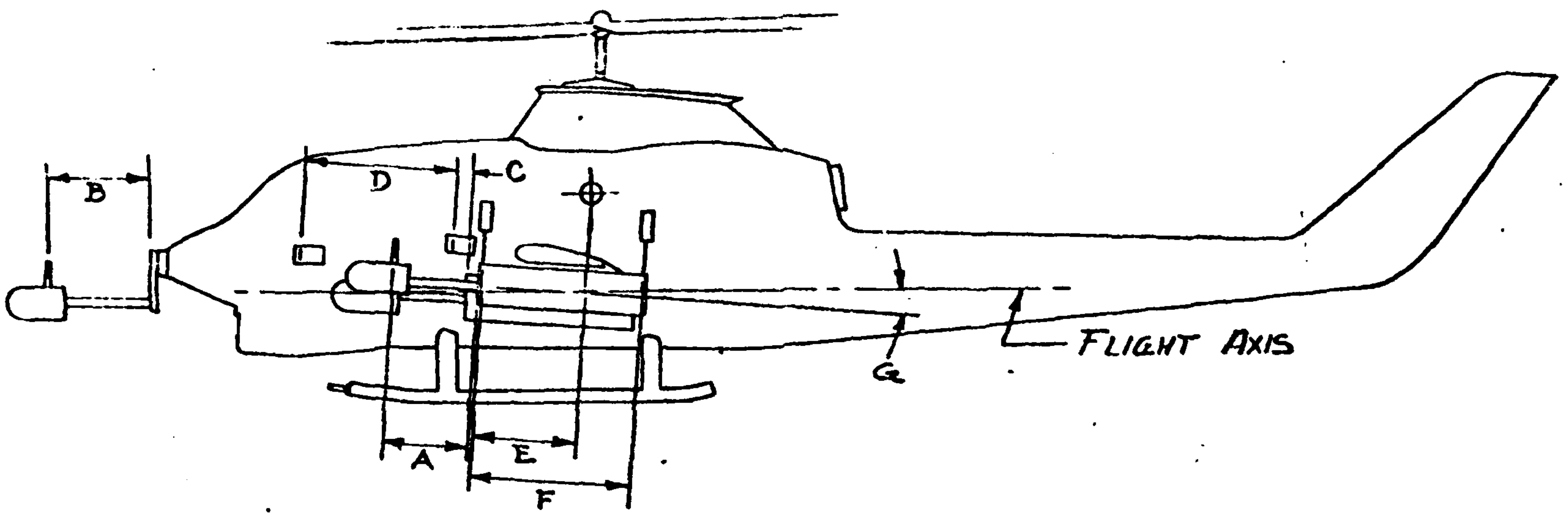
FIG. 3

PHASE B CONFIGURATION

SENSOR	WORD	DIMENSION
IR Detector (Left)	A1	volts
Lateral Accelerometer	A2	ft/sec^2
Vertical Accelerometer	A3	ft/sec^2
Fore/Aft Accelerometer	A4	ft/sec^2
IR Detector (Right)	A5	volts
Roll Rate	A6	degrees/second
Yaw Rate	A7	degrees/second
Aircraft Pitch	B1	degrees
Aircraft Roll	B2	degrees
Aircraft Yaw	B3	degrees
Pitch Rate	B4	degrees/second
LVDT* (LHF)	B5	inches
LVDT (LVF)	B6	inches
LVDT (LHA)	B7	inches
LVDT (LVA)	B3	inches
LVDT (RHF)	B9	inches
LVDT (RVF)	B10	inches
LVDT (RHA)	B11	inches
LVDT (RVA)	B12	inches
Angle of Attack (Nose-Yaw)	B13	degrees
Angle of Attack (Nose-Pitch)	B14	degrees
Angle of Attack (Left-Pitch)	B15	degrees
Angle of Attack (Left-Yaw	B16	degrees
Angle of Attack (Right-Pitch)	B17	degrees
Angle of Attack (Right-Yaw)	B18	degrees

*Key for Linear Variable Differential Transforms
L-Left, H-Horizontal, F-Forward, R-Right, V-Vertical, A-Aft

FIG. 4



DIMENSION	DISTANCE
A	9 3/4 Inches
B	25 Inches
C	4 3/4 Inches
D	60 Inches
E*(Measured from Rotor Shaft)	28 Inches
F*	59 Inches
G	80 Mils
Nose AAT to Outboard AAT	159 Inches
Nose AAT to Inboard AAT	156 Inches
Launcher Length	60 5/8 Inches

*Varies slightly between LVDTs

FIG. 5 SENSOR LOCATION MEASUREMENTS

OCTAL DATA LISTING

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236 0730 02.923

6

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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	4012	[illegible]
[illegible]		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	5412	0015	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	5412	0015		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2041	[illegible]	5412	0015	[illegible]	212
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	0023	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2027	[illegible]	5412	0015	552	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2033	[illegible]	5412	0015	4512	[illegible]
[illegible]	[illegible]	3245	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	[illegible]	1745
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4022	4015	[illegible]	5412	0015	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2021	4036	5412	0015		
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[illegible]	[illegible]	227	[illegible]	1	[illegible]	2022	[illegible]	5412	0015	0023	4000
4035	[illegible]	4232	2012	0010	2011	5015	4003	5412	0015	0552	4000
4036	2027	1244	2027	0010	5015	2012	6122	5412	0015	4437	4000
4034	2033	1209	2042	0010	2017	5004	5047	5412	0015	4056	4000
4036	3029	0272	2053	0010	5020	0802	2011	5412	0015	4011	4000
4036	2024	4313	[illegible]	0010	2017	9007	4050	5412	0015	4012	4000
4033	[illegible]	4317	[illegible]	[illegible]	5015	4017	[illegible]	5412	0015	0777	7745
4034	2017	4277	2054	[illegible]	2012	3026	0004	5412	0015	0062	4060
4035	4303	4270	2060	4011	6007	4053	3015	5412	0015		
4036	4027	1262	2035	[illegible]	2065	1317	6062	5412	0015	2021	212
4035	[illegible]	4287	6343	[illegible]	2003	4041	0002	5412	0015	0023	4000
4035	4131	4224	2036	0010	5002	1043	4003	5412	0015	0552	4000
4034	4137	4213	6313	4011	6041	4342	2043	5412	0015	0435	4000
4035	4251	4175	[illegible]	[illegible]	2000	1037	6052	5412	0015	0057	4000
4036	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1037	2027	5412	0015	0013	[illegible]
4035	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4033	4044	5412	0015	4017	[illegible]
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4036	2772	[illegible]	4057	4011	[illegible]	131	0001	5412	0015	0002	4000
4034	6108	4143	3025	4011	4011	4033	4017	5412	0015		
4034	0124	[illegible]	4147	4011	4003	3032	6052	5412	0015	6010	0212
4039	6142	135	4115	[illegible]	125	1031	[illegible]	5412	0015	4035	4000
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4035	[illegible]	135	0124	[illegible]	[illegible]	1034	4175	5412	0015	0435	4000
4036	[illegible]	[illegible]	0124	[illegible]	[illegible]	1034	6023	5412	0015	1670	4000
4035	[illegible]	[illegible]	122	[illegible]	1037	4035	6034	5412	0015	1013	4000
4035	[illegible]	4151	4115	[illegible]	[illegible]	1033	4021	5412	0015	4612	4000
4035	[illegible]	1107	[illegible]	[illegible]	[illegible]	1133	4303	5412	0015	5001	2000
4036	[illegible]	[illegible]	4474	4011	4034	4327	[illegible]	5412	0015	[illegible]	4000
4035	[illegible]	212	4053	[illegible]	[illegible]	1023	[illegible]	5412	0015		
4035	0257	4225	3051	[illegible]	[illegible]	4017	6062	5412	0015	0001	1212
4036	4115	4314	1437	[illegible]	126	4012	[illegible]	5412	0015	4053	4000
4035	4102	352	225	[illegible]	4012	4006	4003	5412	0015	4553	4000
4036	4114	[illegible]	[illegible]	[illegible]	2000	4003	2086	5412	0015	0435	4000

[illegible]	[illegible]	424	[illegible]	[illegible]	[illegible]	[illegible]	2217	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	2011	[illegible]	[illegible]	[illegible]	2204	5412	0015	[illegible]	4000
[illegible]	[illegible]	[illegible]	2122	[illegible]	6032	[illegible]	[illegible]	5412	[illegible]	4512	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	4744
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	4000
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2027	5412	[illegible]	[illegible]	1745
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]		
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2302	5412	0015	4021	4000
[illegible]	[illegible]	[illegible]	4107	[illegible]	[illegible]	[illegible]	4003	5412	0015	0554	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4017	[illegible]	[illegible]	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	271	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	4011	0023	[illegible]	2200	5412	0015	4611	4000
[illegible]	5337	[illegible]	4132	[illegible]	0026	0016	4923	5412	0015	4612	4000
[illegible]	[illegible]	[illegible]	[illegible]	4011	[illegible]	[illegible]	2042	5412	0015	4775	7745
[illegible]	2247	4254	[illegible]	4011	0031	4912	2003	5412	0015	0002	4000
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[illegible]	[illegible]	[illegible]	[illegible]	4005	0032	4303	0002	5412	0015	0025	4000
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[illegible]	[illegible]	263	[illegible]	[illegible]	0025	[illegible]	2317	5412	0015	[illegible]	4000
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[illegible]	[illegible]	4244	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	0025	4000
[illegible]	[illegible]	[illegible]	5301	[illegible]	[illegible]	[illegible]	4003	5412	[illegible]	0554	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6023	[illegible]	2134	5412	[illegible]	4437	4000
4036	[illegible]	4143	2395	0010	6023	[illegible]	6025	5412	0015	4063	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6013	5412	0015	4611	4000
[illegible]	[illegible]	[illegible]	2333	[illegible]	[illegible]	[illegible]	4011	5412	0015	4612	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2930	5412	[illegible]	1000	2000
[illegible]	[illegible]	[illegible]	6304	4011	[illegible]	[illegible]	2000	5412	[illegible]	0002	4000
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	0025	4000
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[illegible]	[illegible]	4215	0392	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	4321	4974	[illegible]	4055	4327	6015	5412	0015	4612	4000
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2003	5412	0015	[illegible]	4764
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0010	5412	0015	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	5412	0015		
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4000
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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4444	4442	[illegible]	[illegible]	[illegible]	[illegible]	4344	[illegible]	5412	0015	4612	4000
[illegible]	[illegible]	244	[illegible]	[illegible]	[illegible]	[illegible]	4021	5412	0015	0777	7745
4035	[illegible]	[illegible]	[illegible]	4011	[illegible]	4334	4003	5412	0015	5002	4000
4036	4719	3153	3337	4011	4011	3332	4017	5412	0015		
4036	5354	0135	4353	4011	4012	4327	6051	5412	0015	2012	0212
4036	4413	4432	3374	[illegible]	3313	4324	0301	5412	0015	4035	4000
4036	4243	4274	3139	4011	3315	3320	4003	5412	0015	4553	4000
4036	4354	4377	3116	4011	4017	4317	4157	5412	0015	4432	4000
4035	5373	4113	3112	4011	4321	3015	6031	5412	0015	9670	4000
4034	5111	3122	3114	4011	4025	3314	5031	5412	0015	4015	4000
4036	5142	3133	3117	4011	3332	4317	0025	5412	0015	4512	4000
4334	[illegible]	3134	3117	4011	4036	4317	3013	5412	0015	0777	6763
4036	5153	3177	3114	4011	3343	4321	5002	5412	0015	0002	4000
4035	5111	3222	3138	4011	3046	4321	4011	5412	0015		
4036	[illegible]	3253	3376	4011	4347	[illegible]	6051	5412	0015	4090	0212
4035	[illegible]	4257	4955	[illegible]	4347	[illegible]	0301	5412	0015	0045	4000
4036	[illegible]	4313	3004	4011	4344	4321	4003	5412	0015	3554	4000
4036	4142	3329	4042	4011	3037	3320	4000	5412	0015	0433	4000
4036	1373	1329	0026	4011	4330	4314	6115	5412	0015	4672	4000
4035	2139	4342	4712	[illegible]	3315	4311	6007	5412	0015	0015	4000
4036	[illegible]	4341	2310	[illegible]	4303	2306	3002	5412	0015	4012	4000
4035	[illegible]	4335	2712	[illegible]	2006	4390	6007	5412	0015	0777	2000
4035	3143	[illegible]	3332	[illegible]	2321	3342	6010	5412	0015	0002	4000
4035	[illegible]	3343	2930	3010	6032	6312	0015	5412	0015		
4035	[illegible]	333	2335	[illegible]	[illegible]	[illegible]	0061	5412	0015	4061	0212
4036	[illegible]	4322	5945	[illegible]	2347	2347	0001	5412	0015	3025	4000
4035	[illegible]	3277	5932	[illegible]	[illegible]	[illegible]	1034	5412	0015	4595	4000
4035	[illegible]	3335	2155	[illegible]	[illegible]	[illegible]	2140	5412	0015	0433	4000
4035	[illegible]	211	5331	[illegible]	2347	3314	3113	5412	0015	3673	4000
4035	2452	4151	8043	[illegible]	2841	3323	4314	5412	0015	3613	4000
4035	[illegible]	3172	2133	[illegible]	2137	[illegible]	2322	5412	0015	3613	4000
4035	[illegible]	3375	2321	3413	2324	3335	2317	5412	0015	0722	4764
4035	[illegible]	3373	2335	[illegible]	2314	4341	2003	5412	0015	0002	4000
4036	[illegible]	4074	3013	[illegible]	3045	4342	4033	5412	0015		

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5061	5412	[illegible]	[illegible]	212
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	4021	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	4275	[illegible]	[illegible]	4027	[illegible]	[illegible]	5412	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	212
[illegible]	[illegible]	4252	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	4027	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4934	5412	0015	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5002	[illegible]	5412	0015	4672	[illegible]
[illegible]	[illegible]	4245	[illegible]	[illegible]	4017	2003	4063	5412	0015	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2017	[illegible]	[illegible]	[illegible]	4000
[illegible]	5021	3343	[illegible]	[illegible]	[illegible]	5002	6037	5412	0015	7777	7745
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	4017	0375	[illegible]	[illegible]	[illegible]	4000	4021	5412	0015		
4035	0057	4366	2395	[illegible]	2093	4300	6061	5412	0015	5007	0212
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4035	[illegible]	4275	2077	[illegible]	5013	3002	3004	5412	0015	4555	4000
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4033	4014	3075	2072	[illegible]	2024	3310	4063	5412	0015	4012	4060
4036	4009	0061	[illegible]	[illegible]	2023	4011	2033	5412	0015	7777	6763
4036	[illegible]	4063	5145	[illegible]	5520	3315	2003	5412	0015	3002	4000
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4034	2377	0073	6013	[illegible]	2005	3023	6041	5412	0015	2014	0212
4035	5135	0117	[illegible]	[illegible]	3031	4030	[illegible]	5412	0015	5031	4000
4035	2151	0147	4014	[illegible]	4014	4032	[illegible]	5412	0315	4555	4000
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4036	5122	0217	4007	[illegible]	4047	4047	[illegible]	5412	0315	4572	4000
4035	[illegible]	4245	3075	[illegible]	4047	4136	5316	5412	0315	4511	4000
4034	2051	0263	4197	[illegible]	3307	4035	[illegible]	5412	0015	4012	4300
4036	6037	[illegible]	0114	[illegible]	4053	3331	2005	5412	0015	1000	2000
4035	[illegible]	0301	4115	[illegible]	4095	0025	4012	5412	0315	0002	4000
4035	0051	4311	4113	[illegible]	4093	4017	3040	5412	0015		
4034	[illegible]	0302	[illegible]	[illegible]	[illegible]	[illegible]	5062	5412	0015	6025	0212
4034	4151	0314	9375	[illegible]	4047	4300	3041	5412	0015	3025	4000
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4034	[illegible]	4274	[illegible]	[illegible]	[illegible]	2027	[illegible]	5412	[illegible]	4412	4000
4035	3025	0255	[illegible]	[illegible]	2011	4325	4334	5412	0015	4012	4000
4034	6010	4254	6925	[illegible]	4024	0925	0010	5412	0015	7777	6754
4035	6015	4252	2735	[illegible]	[illegible]	2021	[illegible]	5412	0015	0002	4000
4034	2027	0243	6045	[illegible]	5031	2012	4027	5412	0015		
4034	2022	4227	2305	[illegible]	4201	4304	6061	5412	0015	6025	0212

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[illegible]	2222	233	[illegible]	[illegible]	2127	1011	[illegible]	5412	0015	4555	4000
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	4512	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]		
[illegible]	[illegible]	233	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	[illegible]	0212
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4033	[illegible]	5412	0015	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1027	[illegible]	5412	0015	0351	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	4434	4000
[illegible]	[illegible]	127	[illegible]	[illegible]	2105	4024	[illegible]	5412	0015	4573	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4012	4029	[illegible]	5412	[illegible]	4514	4000
[illegible]	[illegible]	75	[illegible]	[illegible]	0016	1023	[illegible]	5412	0015	4511	4000
4036	[illegible]	[illegible]	[illegible]	[illegible]	0023	[illegible]	[illegible]	5412	0015	0777	7745
4035	[illegible]	[illegible]	[illegible]	[illegible]	1027	1023	[illegible]	5412	0015	0002	4000
4035	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1023	[illegible]	5412	0015		
4035	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	5412	0015	2000	0212
4035	[illegible]	2157	112	[illegible]	0140	0023	[illegible]	5412	0015	0043	4000
4034	6351	[illegible]	[illegible]	[illegible]	4041	4021	3074	5412	0015	0007	4000
4034	6032	3224	4377	[illegible]	4035	0020	4074	5412	0015	4434	4000
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4035	4305	3275	[illegible]	[illegible]	1032	0013	5715	5412	0015	4614	4000
4034	6425	4322	[illegible]	[illegible]	4024	4011	4005	5412	0015	[illegible]	4000
0034	4359	[illegible]	[illegible]	[illegible]	0016	4005	[illegible]	5412	0015	0777	6783
4035	[illegible]	[illegible]	[illegible]	[illegible]	4004	[illegible]	[illegible]	5412	0015	0002	4000
4035	[illegible]	[illegible]	307	[illegible]	2003	0001	6007	5412	0015		
4036	[illegible]	[illegible]	[illegible]	[illegible]	2314	2300	[illegible]	5412	0015	[illegible]	0212
4034	[illegible]	4377	2317	[illegible]	6326	2300	[illegible]	5412	0015	0037	4000
4035	[illegible]	4365	2336	0010	5037	2000	[illegible]	5412	0015	[illegible]	4000
4036	4344	[illegible]	2335	4011	2347	2000	4153	5412	0015	4434	4000
0032	[illegible]	[illegible]	2342	[illegible]	2355	[illegible]	[illegible]	5412	0015	4674	4000
4035	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	[illegible]	4000
4035	[illegible]	[illegible]	2347	[illegible]	2760	[illegible]	[illegible]	5412	0015	[illegible]	4000
4035	[illegible]	4231	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	0777	2000
4035	[illegible]	4175	[illegible]	[illegible]	2053	4017	6323	5412	0015	0002	4000
4035	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015		
4035	[illegible]	4134	[illegible]	[illegible]	5037	3025	[illegible]	5412	0015	6001	0212
4036	[illegible]	4125	[illegible]	[illegible]	2027	0031	[illegible]	5412	0015	0020	4000
4035	[illegible]	4113	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	[illegible]	4000
4036	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1033	[illegible]	5412	0015	4434	4000
4034	[illegible]	4126	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	4674	4000
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4034	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2322	5412	0015	4612	4000
4035	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	0777	4764
4035	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4024	[illegible]	5412	0015	[illegible]	4000
4036	[illegible]	255	4123	[illegible]	[illegible]	4022	[illegible]	5412	0015		
1035	[illegible]	265	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	5001	0212
4036	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	[illegible]	4000
4036	[illegible]	[illegible]	[illegible]	[illegible]	4017	[illegible]	[illegible]	5412	0015	4360	4000
[illegible]	[illegible]	[illegible]	4125	[illegible]	[illegible]	[illegible]	4123	5412	0015	[illegible]	4000

[illegible]	[illegible]	[illegible]	4113	[illegible]	[illegible]	[illegible]	4012	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2017	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2022	5412	[illegible]	4512	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	1745
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[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	1024	5412	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	212
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	4000
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4035	[illegible]	[illegible]	2133	[illegible]	[illegible]	[illegible]	4005	5412	0315	[illegible]	4000
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2035	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4314	[illegible]	6016	5412	[illegible]	4011	4000
4036	5133	3153	1123	4011	3025	3331	4021	5412	3315	4611	4000
[illegible]	[illegible]	[illegible]	0040	[illegible]	[illegible]	[illegible]	2021	5412	[illegible]	[illegible]	5763
4036	2123	4245	4153	[illegible]	[illegible]	4030	0007	5412	0315	3002	4000
4030	0109	[illegible]	4052	[illegible]	[illegible]	4030	0037	5412	[illegible]		
4035	2353	[illegible]	4071	[illegible]	[illegible]	4024	[illegible]	5412	0315	2322	0212
4036	5319	4355	376	[illegible]	4356	4321	0001	5412	0315	0023	4000
4036	[illegible]	4355	4477	[illegible]	[illegible]	4014	0004	5412	[illegible]	4056	4000
4035	1052	4341	4374	[illegible]	[illegible]	4035	4143	5412	[illegible]	1435	4000
4035	[illegible]	4327	4353	4011	3345	[illegible]	2053	5412	[illegible]	[illegible]	4000
4035	4137	1274	4353	4011	0337	2305	2021	5412	[illegible]	0613	4000
4035	4154	4244	4042	4011	3325	2011	0037	5412	[illegible]	4611	4000
[illegible]	4170	222	[illegible]	[illegible]	[illegible]	2017	0001	5412	[illegible]	5002	2000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4312	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0031	5412	[illegible]		
4036	[illegible]	[illegible]	5010	4011	2017	2030	6062	5412	[illegible]	2024	0212
[illegible]	[illegible]	[illegible]	2021	[illegible]	[illegible]	4324	0002	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	177	2033	[illegible]	2333	2222	0004	5412	[illegible]	4555	4000
[illegible]	[illegible]	[illegible]	2044	[illegible]	2035	[illegible]	2134	5412	[illegible]	4434	4000
4035	[illegible]	[illegible]	2047	[illegible]	[illegible]	[illegible]	2066	5412	0315	[illegible]	4000
4036	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2014	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	4611	4000
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2114	[illegible]	4303	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	4312	[illegible]	[illegible]	[illegible]	[illegible]	4014	5412	0315		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	0212
4036	[illegible]	747	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4005	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7	[illegible]	[illegible]	5412	[illegible]	3432	4000
4035	4017	[illegible]	4024	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	135	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	4014	4000
4036	[illegible]	4125	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	4611	4000

[illegible]	[illegible]	124	2354?	[illegible]	[illegible]	4322	4321?	5412	0015	0777	1745
[illegible]	2013?	4129?	4074	0012?	[illegible]	0015?	2002?	5412	0015	0002	4000
[illegible]	[illegible]	127	[illegible]	[illegible]	13	[illegible]	[illegible]	5412	0015		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	2004?	212
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	1037?	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4432	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	973?	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	4612	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0777	1745
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	[illegible]	0212
4035?	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	52?	5412	0015	0037	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4005?	5412	0015	4550?	4000
4035	[illegible]	2315?	2011?	[illegible]	2011?	4027?	4105	5412	0015	4432	4000
4035	[illegible]	2317	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	4674?	4000
4035	0143	0302	6031	4011	6026	[illegible]	4407	5412	0015	4614	4000
4034?	4015?	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2344?	5412	0015	4612	4000
4035	[illegible]	4225	5343	4011?	6140?	4005?	2012	5412	0015	4776	5763
4035	4343?	4173?	2044	0013?	6343	3397?	2004	5412	0015	0002	4000
4035	4342	0147	2355	4011	5345?	4014	4024	5412	0015		
4035	4247?	0153	2335	4011	2344	4017	6061	5412	0015	4000	0212
4030?	4250?	4134	5326?	4011	6343	0023?	0002	5412	0015	4021	4000
4035	4244	0135	5015	[illegible]	6037	4027	4005	5412	0015	4560	4000
4035	4020?	4137	6041?	4011	6034	4027	2033	5412	0015	0433?	4000
4035	2003?	4207	4011?	2013?	6026	0032	6010	5412	0015	4672	4000
4038?	2022	4237	4040	4011	2017	4333	0014	5412	0015	4612	4000
4035	6015	4252	0146	4011	2011	4033	6025	5412	0015	4612	4000
4036	2314	0276?	4350?	4011	6002?	4333	2024	5412	0015	0777	2000
4035	2012?	0255	0073	0013?	0001	0031	6002	5412	0015	0002	4000
4034	6047?	0255	0105	4011	0007	4027	0034	5412	0015		
4036	3020?	0236	4116	4011	4014	4024	6061	5412	0015	2000	0212
4036	4021?	0227	4125	4011	4017	4017	0002	5412	0015	1026	4000
4036	4017?	0214	0133?	4011	4022	0016	0004	5412	0015	4562?	4000
4035	0007?	4202?	0127	4011	4024	4011	0142	5412	0015	4434	4000
4034	4008?	4173	4125	4011	4026	0007	4003	5412	0015	4672	4000
4036	2011	4175	2117	0013?	4024	0004	2003	5412	0015	0610	4000
4038	2026	0205?	4117	4011	0023	0001	2024	5412	0015	4612	4000
4035	0013?	0235	0076	4011	4021	0001	2041	5412	0015	0777	4764
4036	6016	0253	0004?	4011	4021	2000	6007?	5412	0015	0002	4000
4036	0040	0319	4000?	4011	4017	4000	4027	5412	0015		
4035	2044?	4333	0034	4011	4017	4000	6061	5412	0015	5004	0212
4336?	6045	4303	0016	4013	0015	4000	0032	5412	0015	4027	4000
4035	6025	4013?	4000?	4011	0015	0002	0034	5412	0015	[illegible]	4000
4037	2011?	4413	2312	0013?	4014	0001	2077?	5412	0015	0435	4000
4035	4035	4370?	5025	4011	4011	4003	4000	5412	0015	4671	4000
4037	4027	0325	6037	4010	4045	4003	2021	5412	0015	0607	4000
4035	0133?	4201?	2047	[illegible]	6001	0002	2012	5412	0015	0613	4000
4036	4134	0221	2355	4000?	5002	0002	2036	5412	0015	1006?	1745
4035	0127	4145	2050?	[illegible]	6007	4000	5010	5412	0015	0002	4000
4036	0106?	4120?	2361?	0013?	0015	4000	4021	5412	0015		

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	2012	0212
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2077	5412	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	777	7745
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	0015		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	212
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5412	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2014	5412	0015	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4035	5412	0015	513	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4003	5412	0015	0777	6763
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2314	4012	5412	0015	0002	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4034	5412	0015		
4035	[illegible]	[illegible]	4314	[illegible]	[illegible]	2322	6064	5412	0015	4925	0212
4036	4305	4247	4327	[illegible]	6007	4323	0002	5412	0015	4022	4000
4034	2003	4232	[illegible]	[illegible]	2014	2017	4005	5412	0015	0357	4000
4034	2012	4215	2027	[illegible]	2017	2314	2074	5412	0015	0435	4000
4034	4001	[illegible]	2035	[illegible]	2027	2034	2043	5412	0015	4672	4000
4035	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2012	5412	0015	1517	4000
4036	[illegible]	[illegible]	[illegible]	[illegible]	2022	[illegible]	0051	5412	0015	0613	4000
4035	2002	4223	5054	[illegible]	2021	4314	0010	5412	0015	0777	2000
4036	2005	0227	2005	[illegible]	2017	4326	0004	5412	0015	9902	4000
4035	2517	4252	2253	[illegible]	6013	1325	4321	5412	0015		
4035	5515	0272	5045	[illegible]	5010	4333	6064	5412	0015	5023	0212
4034	2612	0304	2005	[illegible]	2006	2234	0002	5412	0015	4021	4000
4034	[illegible]	0315	5023	[illegible]	2033	337	4005	5412	0015	1557	4000
4034	[illegible]	[illegible]	[illegible]	[illegible]	2206	4337	2003	5412	0015	4434	4000
4034	4442	4257	[illegible]	[illegible]	[illegible]	4337	6052	5412	0015	4672	4000
4034	[illegible]	4230	2007	[illegible]	[illegible]	[illegible]	4025	5412	0015	4011	4000
4034	[illegible]	4173	4322	[illegible]	4003	4333	4044	5412	0015	0613	4000
4034	2005	4105	4035	[illegible]	4005	4033	3015	5412	0015	1403	4764
4035	2173	4113	[illegible]	[illegible]	4016	2031	0001	5412	0015	0002	4000
4034	4019	6140	3367	[illegible]	0037	4027	4017	5412	0015		
4034	[illegible]	4072	4047	[illegible]	4011	4027	0002	5412	0015	2005	0212
4034	2038	3075	2106	[illegible]	0013	4224	0002	5412	0015	0034	4000
4034	6060	4104	4113	[illegible]	6016	1325	4005	5412	0015	0557	4000
4035	[illegible]	[illegible]	4122	[illegible]	4021	2023	4154	5412	0015	1433	4000
4035	6135	[illegible]	2122	[illegible]	4024	[illegible]	2030	5412	0015	0443	4000
4036	2113	[illegible]	[illegible]	[illegible]	4027	4324	6026	5412	0015	1513	4000
4035	[illegible]	[illegible]	4137	[illegible]	0032	4022	4024	5412	0015	4512	4000
4035	[illegible]	0255	4101	[illegible]	[illegible]	4022	4005	5412	0015	0777	1745
4036	5031	4257	6075	[illegible]	4035	4021	2005	5412	0015	9002	4000
4035	2212	0255	2066	[illegible]	[illegible]	4317	4006	5412	0015		

236 0732 03.323

4034	4003	0271	[illegible]	[illegible]	4003	0315	6001	5412	0015	4003	0212

2.2 Octal to Binary Data Conversion

The computer converts the 12 bit binary words, as recorded on the magnetic tape, into an octal representation during the decommutation and formatting process. It is often necessary to be able to reconstruct the binary word from the octal printout or to determine the octal data word from binary representation indicated on the data acquisition testset. The binary data word is represented by a parity bit, sign bit and ten data bits as indicated below:

Parity. Sign, Bit 10, Bit 9, Bit 8, ... Bit 1.

In order to convert the binary data to an octal form, the bits are divided into groups of three.

(Parity, Sign, Bit 10), (Bit 9, Bit 8, Bit 7), ...

The right most bit of each group is given a weight of 1. The center bit is given a weight of 2 and the left most bit of the group is given a weight of 4. The weights within each group are then added to give the octal representation. As an example the binary data word shown below will be converted into an equivalent octal word:

Binary Data Word: 111011100100

Grouped	(111)	(011)	(100)	(100)
Weighed	(4+2+1)	(0+2+1)	(4+0+0)	(4+0+0)
Octal Data Word	7	3	4	4

The reverse process is used to convert the data from octal to binary. An example is shown below:

Octal	4	1	0	7
	(1 _ _)	(_ _ 1)	(_ _ _)	(1 1 1)
	4 2 1	4 2 1	4 2 1	4 2 1

The weights of the bits are shown below the lines.

The resulting data bits are shown below,

(1 0 0) (0 0 1) (0 0 0) (1 1 1)

and the binary word is 100001000111.

2.3 Binary to Analog Data Conversion

A binary data word is shown below:

Parity, Sign, Bit 10, Bit 9, Bit 8, ... Bit 1.

The data acquisition system converts the analog input into a digital representation with each bit representing 2^{N-1} counts with N being equal to the bit number. System sensitivity is set at 5 volts = 1000 counts. A one (1) in the sign bit position represents a negative analog sense. The following binary data word is reconverted back to the original input voltage as an example:

Data Word	0	0	1	0	0	0	1	0	1	1	1	0
Bit Position	P	S	10	9	8	7	6	5	4	3	2	1

The total number of counts becomes $(0 \times 2^0) + (1 \times 2^1) + (1 \times 2^2) + (1 \times 2^3) + (0 \times 2^4) + (1 \times 2^5) + (0 \times 2^6) + (0 \times 2^7) + (0 \times 2^8) + (1 \times 2^9) = 558$ counts

The analog voltage represented by the binary word is equal to:

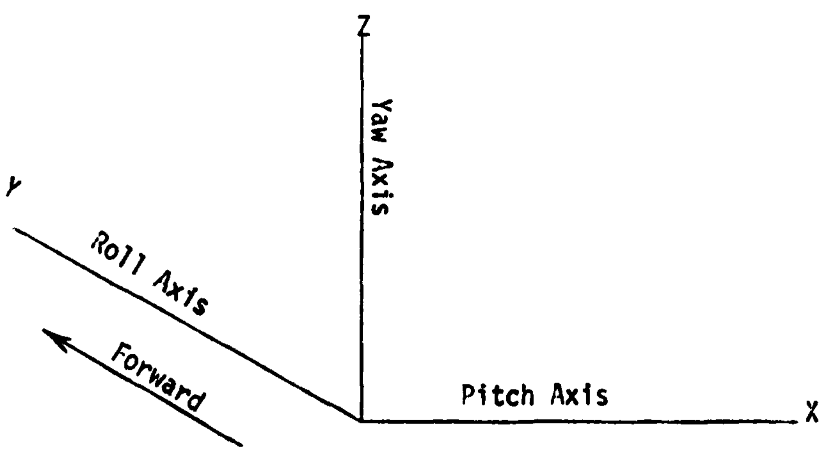
$$558 \text{ counts} \times 5 \frac{\text{mv}}{\text{count}} = +2.790\text{v}$$

The data acquisition system uses an odd parity format. The parity bit becomes a 1 in order to make the number of bits in the word equal to an odd number. The parity bit therefore becomes a bit check on the data word. If the data word has no parity, yet has an even number of bits in the word, then the word is in error and should be disregarded.

The sign bit represents the sign of the analog input to the data acquisition unit and may not be consistant with the desired coordinate system. Therefore, the sense of each transducer must be checked and sign conversion performed by the computer, if the sense is not proper.

2.4 Coordinate Determination

The coordinate system used in the analysis of the flight data is shown below.



The sense of the transducer output voltage is shown below in Figure 6.

Sensor	Sense	Direction
Yaw Gyro	+	CW (Negative Z Axis)
Pitch Gyro	+	Up (Positive X Axis)
Roll	+	CCW (Negative Y Axis)
Yaw Rate Gyro	+	CW (Negative Z Axis)
Pitch Rate Gyro	+	Down (Negative X Axis)
Roll Rate Gyro	+	CCW (Negative Y Axis)
Fore/Aft Accelerometer	+	Fore (Positive Y Axis)
Vertical Accelerometer	+	Down (Negative Z Axis)
Lateral Accelerometer	+	Left (Negative X Axis)
Angle of Attack Transmitters	Maximum	CCW (*)
Linear Variable Differential Transformers (AC #67-15691)		
Left-Vertical-Forward	+	Up (Positive Z Axis)
Left-Vertical-Aft	+	Up (Positive Z Axis)
Right-Vertical-Forward	+	Down (Negative Z Axis)
Right-Vertical-Aft	+	Down (Negative Z Axis)
Right-Horizontal-Aft	+	Right (Positive X Axis)
Right-Horizontal-Forward	+	Right (Positive X Axis)
Left- Horizontal-Forward	+	Left (Negative X Axis)
Left- Horizontal-Aft	+	Left (Negative X Axis)

*Axis alignment varies with configuration
Note: Sense Readings taken at DAU Control Unit.

FIG. 6 SENSOR DATA SENSE

2.5 Transducer Scale Factors

The analog transducer scale factors are shown in Figure 7. The scale factors are used to determine the response of the sensor knowing the analog output.

Sensor Type	Scale Factor
Angle of Attack Transmitters	12.5 degrees/volts*
Linear Variable Differential Transformers	0.32 inch/volt
Accelerometer	1.25 G/volt
Rate Gyros	10 degrees/second/volt
Position Gyros	18 degrees/volt

*Average value for all transducers

FIG. 7 Transducer Scale Factors

2.6 Engineering Units Determination

A representative number of octal data words are converted into engineering units in Figure 8. The word number position can be seen in Figure 2 and the assigned parameter sensor can be determined from Figure 4.

The sample data frame being converted immediately follows the range time printout 236 0732 02.823 on the octal listing. The conversion of the octal word to a binary representation was performed as discussed in paragraph 2.2. The digital counts and analog outputs were determined using the technique discussed in paragraph 2.3. The scale factor for each of the applicable transducers was indicated in Figure 7. The resulting engineering units are shown in Figure 8 and compare with the data frame printout on page 49.

3.0 Engineering Units Printout

3.1 Phase A Data

The data presented on pages 22 through 47 is a segment of the data recorded for a Phase A flight test. The data, from Run #35 (recorded as octal 43), represents the data accumulated for a period of one second during the "straight and level" segment of the flight.

Word	Data Word		Digital Counts	Output @5mv/count (volts)	Scale Factor	Engineering Units	Remarks
	Octal	Binary					
A1	4036	100 000 011 110	30	.150	None	4036	Noise Level, No Trigger or IR Pulse Present
A2	2014	010 000 001 100	12	-.060	$\frac{32.2 ft/sec^2}{.8}$/volt	-2.41 ft/sec^2	Sign Change Required for Proper Coordinates, Channel Calibration .8 volt/g
A3	4314	100 011 001 100	204	1.020	$\frac{32.2 ft/sec^2}{.8}$/volt	41.01 ft/sec^2	Sign Change Required for Proper Coordinates, Channel Calibration .8 volt/g
A4	4074	100 000 111 100	60	.300	$\frac{32.2 ft/sec^2}{.8}$/volt	12.06 ft/sec^2	Channel Calibration .8 volt/g
A5	0010	000 000 001 000	8	.040	None	0010	Noise Level, No Trigger or IR Present
A6	4072	100 000 111 010	58	.290	10°/sec/volt	2.9 deg/sec	Sign Change Required for Proper Coordinates
A7	4030	100 000 011 000	24	.120	10°/sec/volt	1.2 deg/sec	Sign Change Required for Proper Coordinates
B1	6061	110 000 110 001	49	-.245	18°/volt	-4.41 deg	
B2	0002	000 000 000 010	2	.010	18°/volt	+.180 deg	Sign Change Required for Proper Coordinates

FIG. 8 OCTAL TO ENGINEERING UNITS CONVERSION

Word	Data Word		Digital Counts	Output @5mv/count (volts)	Scale Factor	Engineering Units	Remarks
	Octal	Binary					
B3	0003	000 000 000 010	2	.010	18°/volt	+.180 deg	Sign Change Required for Proper Coordinates
B4	4120	100 001 010 000	80	.400	10 deg/sec/volt	+4.00 deg/sec	Sign Change Required for Proper Coordinates
B5	6057	110 000 101 111	47	-.235	.32 in/volt	-.075 in	Sign Change Required for Proper Coordinates
B13	0551	000 101 100 001	361	1.805	12.5°/volt	4.60 deg	2 volts ≈ 0°
B14	0436	000 100 011 110	302	1.510	12.5°/volt	-9.4 deg	2 volts ≈ 0°
D1	0212	000 010 001 010	138			138	Run #138
B6	6013	110 000 001 011	11	-.055	.32 in/volt	-.017	
B9	0007	000 000 000 111	7	+.035	.32 in/volt	.011	
B10	4030	100 000 011 000	24	+.120	.32 in/volt	.038	Sign Change Required for Proper Coordinates

FIG. 8 OCTAL TO ENGINEERING UNITS CONVERSION (CON'T)

ENGINEERING UNITS PRINTOUT (PHASE A)

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	[illegible]	-0.180	43
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	4006	-0.270	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	4006	0.647	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4.[illegible]	2605	4006	-7.772	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	[illegible]	-0.194	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.640	[illegible]	2605	4006	7.985	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	4006	-1.888	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-5.074	2605	4006	-8.743	5763
[illegible]	[illegible]	[illegible]	1.930	4022	-0.580	-0.720	4006	2605	4006	4003	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.720	4	2605	4006		

29.3560

[illegible]	4.340	-19.460	1.120	4022	-0.880	-0.760	-3.150	2605	4006	-0.270	43
-300	3.960	-20.420	-1.120	4022	-0.920	-0.760	-0.180	2605	4006	-0.270	4000
4000	3.050	-21.710	-0.480	4022	-0.960	-0.760	-0.276	2605	4006	0.518	4000
4000	2.090	-23.900	-1.760	4022	-0.920	-0.760	5.000	2605	4006	-7.836	1
4000	3.960	-25.890	-1.280	4022	-0.830	-0.720	-0.322	2605	4006	-0.194	4000
4000	0.0	-25.140	-1.600	4022	-0.760	-0.680	-5.090	2605	4006	9.182	4000
4000	-0.480	-25.750	0.800	4022	-0.560	-0.690	-0.328	2605	4006	-1.888	4000
-300	-1.280	-30.720	0.150	4022	-0.520	-0.680	-6.038	2605	4006	-8.678	2000
4000	-1.930	-30.720	2.730	4022	-0.400	-0.640	4006	2605	4006	4003	4000
4000	-1.930	-30.230	1.930	4022	-0.280	-0.640	4	2605	4005		

29.3640

4000	-1.440	-29.110	4.610	4022	-0.160	-0.640	-3.150	2605	4006	-0.180	43
4000	-1.640	-27.560	5.550	4022	-0.080	-0.640	-0.180	2605	4006	-0.270	4000
4000	-0.160	-26.210	6.270	4022	-0.040	-0.680	-0.276	2605	4006	0.453	4000
-300	0.320	-25.390	9.810	4022	0.0	-0.650	4.560	2605	4006	-7.836	1
4000	0.960	-24.440	10.130	4022	0.0	-0.720	-0.322	2605	4006	-0.259	4000
-300	1.440	-23.960	11.250	4022	-0.040	-0.720	-5.283	2605	4006	8.311	4000
4000	1.760	-23.956	10.450	4022	-0.120	-0.760	-0.328	2605	4006	-1.888	4000
4000	1.760	-24.440	11.580	4022	-0.160	-0.760	-6.038	2605	4006	-8.743	4754
4000	1.120	-25.090	12.220	4022	-0.240	-0.720	4005	2605	4006	4003	4000
-300	0.160	-26.050	10.450	4022	-0.280	-0.720	4	2605	4006		

29.3720

4000	-0.640	-24.960	9.650	4022	-0.360	-0.680	-3.150	2605	4006	-0.270	43
1	-2.090	-27.560	7.550	4022	-0.360	-0.680	-0.190	2605	4006	-0.270	4000
1	-4.320	-28.470	6.110	4022	-0.350	-0.630	-0.270	2605	4006	0.453	4000
-300	-5.420	-29.270	4.340	4022	-0.320	-0.600	5.000	2605	4006	-7.836	1
1	-6.590	-29.750	2.410	4022	-0.280	-0.560	-0.322	2605	4006	-0.453	4000
4000	-6.910	-29.310	1.760	4022	-0.160	-0.520	-5.478	2605	4006	8.311	4000
1	-7.230	-29.790	2.080	4022	-0.080	-0.520	-0.328	2605	4006	-1.888	4000
4009	-6.710	-29.430	1.120	4022	0.0	-0.520	-6.038	2605	4006	-8.743	1746
1	-5.620	-28.950	1.440	4022	0.0	-0.520	4006	2605	4006	4003	4000
4000	-4.180	-27.980	1.120	4022	0.0	-0.520	4	2605	4006		

[illegible].3940

[illegible]	[illegible]	-24.[illegible]	1.760	4022	-0.[illegible]	-0.560	-3.150	2605	4006	-0.180	43
[illegible]	[illegible]	-33.250	2.410	4022	-1.[illegible]	-0.600	-0.180	2605	4006	-0.270	4000
[illegible]	[illegible]	-33.800	4.660	4022	-0.400	-0.600	-0.270	2605	4006	0.453	4000
[illegible]	[illegible]	-33.000	3.960	4022	-[illegible]	-0.640	4.960	2605	4006	-7.772	1
[illegible]	1.370	-33.350	7.070	4022	-0.940	-0.680	-0.322	2605	4006	-0.453	4000
[illegible]	[illegible]	-33.350	[illegible].910	4022	-1.040	-0.680	-5.774	2605	4006	5.118	4000
[illegible]	[illegible]	-23.000	6.750	4022	-1.240	-0.720	-0.328	2605	4006	-1.888	4000
[illegible]	[illegible]	-24.130	5.270	4022	-1.400	-0.720	-6.168	2605	4006	-8.613	7745
2000	4.13[illegible]	-26.050	2.730	4022	-1.480	-0.720	4006	2605	4006	4003	4000
[illegible]	[illegible]	-27.430	3.650	4022	-1.490	-0.720	4	2605	4006		

29.3960

2000	1.430	-33.910	0.490	4022	-1.440	-0.680	-3.150	2605	4006	-0.180	43
2000	3.160	-32.000	-1.930	4022	-1.320	-0.640	-0.090	2605	4006	-0.270	4000
2000	-0.830	-33.130	-3.690	4022	-1.200	-0.600	-0.270	2605	4006	0.453	4000
2000	-1.750	-33.930	-5.460	4022	-1.300	-0.560	5.000	2605	4006	-7.772	1
2000	-2.390	-33.770	-6.750	4022	-0.840	-0.520	-0.322	2605	4006	-0.582	4000
2000	-3.370	-33.130	-6.270	4022	-0.680	-0.480	-5.927	2605	4006	7.925	4000
2000	-3.530	-32.000	-7.390	4022	-0.520	-0.440	-0.328	2605	4006	-2.018	4000
2000	-2.890	-30.070	-6.570	4022	-0.400	-0.440	-6.233	2605	4006	-8.808	5763
2000	-2.250	-27.660	-5.790	4022	-0.320	-0.440	4006	2605	4006	4003	4030
2000	-1.120	-25.416	-6.110	4022	-0.280	-0.440	4	2605	4006		

29.4050

2000	0.0	-23.320	-3.690	4022	-0.280	-0.480	-3.150	2605	4006	-0.180	43
4000	1.130	-21.550	-0.960	4022	-0.360	-0.520	-0.180	2605	4006	-0.270	4000
4000	2.390	-20.580	0.450	4022	-0.440	-0.560	-0.270	2605	4006	0.518	4000
4000	3.210	-20.420	2.730	4022	-0.563	-0.600	5.000	2605	4006	-7.836	1
4000	4.180	-20.910	3.210	4022	-0.600	-0.600	-0.386	2605	4006	-0.582	4000
4000	4.330	-22.030	4.180	4022	-0.340	-0.600	-5.992	2605	4006	7.731	4000
4000	4.590	-23.320	4.500	4022	-0.960	-0.600	-0.262	2605	4006	-2.083	4000
4000	3.590	-25.098	2.570	4022	-1.040	-0.600	-6.363	2605	4006	-8.808	2000
4000	2.090	-26.868	1.280	4022	-1.040	-0.600	4006	2605	4006	4003	4000
4000	0.490	-28.470	1.120	4022	-1.[illegible]	-0.560	4	2605	4006		

29.4140

2000	-0.490	-30.560	1.7[illegible]	4022	[illegible]	-0.520	-3.150	2605	4006	-0.180	43
4000	-1.760	-31.840	0.640	4022	[illegible]	-0.440	-0.180	2605	4006	-0.180	4000
4000	-2.490	-32.970	0.0	4022	[illegible]	-0.400	-0.270	2605	4006	0.519	4000
4000	-3.440	-32.610	-2.2[illegible]	4022	-[illegible]	-0.360	5.000	2605	4006	-7.931	1
4000	-4.820	-33.610	-2.730	4022	-0.760	-0.320	-0.386	2605	4006	-0.582	4000
4000	[illegible]	-33.290	-2.030	4022	-0.640	-0.320	-5.992	2605	4006	7.667	4000
4000	-4.640	-32.176	-2.250	4022	-0.560	-0.280	-0.328	2605	4006	-2.148	4000
4000	-3.370	-30.720	-0.800	4022	-0.520	-0.320	-6.428	2605	4006	-8.743	4764
4000	-1.930	-28.950	1.600	4022	-0.440	-0.320	4006	2605	4006	4003	4000
4000	-0.320	-27.130	2.090	4022	-0.480	-0.360	4	2605	4006		

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	[illegible]	[illegible]	43
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	[illegible]	-0.270	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	4006	-6.095	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	[illegible]	-0.582	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.667	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-2.149	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	4006	-8.743	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4006	2605	4006	4003	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4	2605	[illegible]		

29.4340

4000	-1.400	-26.730	1.330	4022	-0.330	-0.400	-3.150	2605	4006	-0.180	43
2000	-3.570	-23.430	1.360	4022	-0.630	-0.360	-0.180	2605	4006	-0.270	4000
2000	-3.530	-25.750	1.120	4022	-0.520	-0.320	-0.270	2605	4006	0.582	4000
2000	-4.020	-29.910	1.640	4022	-0.320	-0.230	4.560	2605	4006	-8.225	1
2000	-4.020	-29.430	1.120	4022	-0.160	-0.280	-0.322	2605	4006	-0.518	4000
2000	-3.050	-28.730	0.0	4022	-0.040	-0.280	-5.927	2605	4006	7.868	4000
2000	-1.440	-27.820	0.800	4022	0.0	-0.280	-0.328	2605	4006	-2.213	4000
2000	0.160	-26.860	1.120	4022	0.0	-0.280	-6.688	2605	4006	-8.873	7745
2000	1.760	-25.570	1.930	4022	-0.040	-0.320	4006	2605	4006	4003	4000
2000	3.530	-23.960	0.800	4022	-0.120	-0.360	4	2605	4006		

29.4460

2000	4.930	-23.510	1.130	4022	-0.280	-0.400	-3.150	2605	4006	-0.270	43
2000	6.270	-21.070	2.090	4022	-0.430	-0.440	-0.150	2605	4006	-0.270	4000
2000	5.910	-20.420	2.090	4022	-0.640	-0.480	-0.270	2605	4006	0.518	4000
2000	6.910	-19.780	3.050	4022	-0.300	-0.520	4.960	2605	4006	-8.290	1
2000	6.270	-15.620	2.250	4022	-0.920	-0.520	-0.386	2605	4006	-0.582	4000
2000	4.980	-20.130	0.800	4022	-1.040	-0.520	-5.992	2605	4006	7.796	4000
4000	3.690	-20.740	2.730	4022	-1.040	-0.520	-0.328	2605	4006	-2.213	4000
2000	2.090	-22.030	0.970	4022	-0.960	-0.520	-6.753	2605	4006	-8.743	5763
4000	0.320	-23.640	1.600	4022	-0.840	-0.480	4006	2605	4006	4003	4000
2000	0.0	-25.250	1.750	4022	-0.680	-0.440	4	2605	4006		

29.4550

2000	-0.480	-26.730	3.210	4022	-0.520	-0.440	-3.150	2605	4006	-0.180	43
4000	-1.290	-27.940	3.850	4022	-0.320	-0.400	-0.150	2605	4006	-0.270	4000
4000	-1.750	-28.430	5.950	4022	-0.120	-0.360	-0.270	2605	4006	0.453	4000
4000	-2.250	-28.110	7.070	4022	0.0	-0.360	4.560	2605	4006	-9.225	1
4000	-2.410	-28.950	9.570	4022	0.120	-0.360	-0.386	2605	4006	-0.647	4000
4000	-2.250	-28.630	10.130	4022	0.200	-0.320	-6.056	2605	4006	7.296	4000
2000	-1.930	-28.140	9.650	4022	0.290	-0.320	-0.328	2605	4006	-2.140	4000
4000	-1.440	-27.440	9.490	4022	0.320	-0.320	-6.753	2605	4006	-8.808	2000
4000	-1.120	-26.840	9.040	4022	0.320	-0.360	4006	2605	4006	4003	4000
4000	-1.120	-26.210	6.270	4022	0.320	-0.360	4	2605	4006		

29.[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	[illegible]	[illegible]	2605	4006	[illegible]	43
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.200	[illegible]	[illegible]	2605	4006	-0.270	4000
[illegible]	[illegible]	[illegible]	5.610	4022	0.120	[illegible]	-0.270	2605	4006	[illegible]	4000
[illegible]	[illegible]	[illegible]	7.070	4022	0.040	-0.360	4.960	2605	4006	-8.225	1
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.0	-0.360	[illegible]	2605	4006	-0.777	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.0	-0.360	[illegible]	2605	4006	7.796	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	-0.040	-0.320	[illegible]	2605	4006	-2.213	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	-0.120	-0.320	[illegible]	2605	4006	-8.743	4764
[illegible]	[illegible]	-30.230	0.0	4022	-0.120	-0.320	4006	2605	4006	4003	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	-0.120	-0.320	4	2605	4006		

29.4750

4000	-3.860	-29.750	-1.600	4022	-0.160	-0.320	-3.150	2605	4006	-0.130	43
4000	-3.370	-29.470	-0.960	4021	-0.200	-0.320	-0.090	2605	4006	-0.180	4000
4000	-2.890	-26.860	0.0	4022	-0.240	-0.320	-0.270	2605	4006	0.323	4000
4000	-2.090	-25.090	0.800	4022	-0.240	-0.320	5.008	2605	4006	-8.225	1
1	-1.240	-23.000	3.050	4022	-0.320	-0.360	-0.451	2605	4006	-0.971	4000
4000	-0.160	-21.070	4.340	4022	-0.400	-0.360	-6.314	2605	4006	7.796	4000
4000	0.640	-19.940	5.140	4022	-0.480	-0.400	-0.328	2605	4006	-2.213	4000
1	1.930	-19.460	6.270	4022	-0.560	-0.440	-6.753	2605	4006	-8.613	1745
4000	3.050	-20.100	4.300	4022	-0.640	-0.440	4006	2605	4006	4003	4000
1	3.690	-21.340	7.990	4022	-0.720	-0.480	4	2605	4006		

29.4850

4000	3.960	-27.220	3.040	4022	-0.840	-0.480	-3.150	2605	4006	-0.190	43
2000	3.360	-25.890	6.520	4022	-0.880	-0.480	0.0	2605	4006	-0.270	4000
2000	3.050	-26.530	4.500	4022	-0.920	-0.440	-0.270	2605	4006	0.323	4000
2000	1.930	-30.830	5.140	4022	-0.960	-0.440	4.960	2605	4006	-8.225	1
2000	0.320	-32.690	1.120	4022	-0.960	-0.400	-0.451	2605	4006	-1.036	4000
2000	-0.960	-33.290	0.0	4022	-0.920	-0.360	-6.378	2605	4006	7.796	4000
2000	-2.250	-33.290	-4.020	4022	-0.800	-0.320	-0.329	2605	4006	-2.278	4000
2000	-3.210	-32.170	-4.660	4022	-0.630	-0.280	-6.818	2605	4006	-8.743	7745
2000	-4.180	-30.720	-5.790	4022	-0.560	-0.280	4006	2605	4006	4003	4000
2000	-4.500	-28.790	-3.860	4022	-0.400	-0.240	4	2605	4006		

29.4950

2000	-4.180	[illegible]	-3.530	4022	-0.280	-0.240	-3.150	2605	4006	-0.190	43
2000	-3.370	-24.930	-3.530	4022	-0.150	-0.240	0.0	2605	4006	-0.270	4000
4000	-2.410	-23.000	-1.740	4022	-0.120	-0.240	-0.270	2605	4006	0.323	4000
2000	-1.120	-21.550	-2.410	4022	-0.120	-0.230	4.950	2605	4006	-8.290	1
3000	0.0	-20.420	[illegible]	4022	-0.120	-0.320	-0.451	2605	4006	-1.036	4000
2000	1.760	-20.250	1.930	4022	-0.240	-0.360	-6.443	2605	4006	7.796	4000
2000	3.050	-20.420	4.820	4022	-0.320	-0.400	-0.328	2605	4006	-2.408	4000
2000	4.020	-21.550	6.270	4022	-0.480	-0.400	-6.883	2605	4006	-8.678	6763
2000	3.860	-23.150	5.110	4022	-0.600	-0.400	4006	2605	4006	4003	4000
2000	3.210	-24.778	5.730	4022	-0.760	-0.440	4	2605	4006		

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.400	[illegible]	2605	4006	-0.180	43
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.400	0.0	2605	4006	-0.270	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.360	-0.270	2605	4006	0.453	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.320	5.000	2605	4006	-8.290	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.280	[illegible]	2605	4006	-1.036	4000
[illegible]	[illegible]	-33.450	[illegible]	[illegible]	[illegible]	-0.240	[illegible]	2605	4006	7.796	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.200	[illegible]	2605	4006	-2.473	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	-0.440	-0.200	[illegible]	2605	4006	[illegible]	2000
4000	-4.500	[illegible]	[illegible]	4022	-0.350	-0.200	4006	2605	4006	4003	4000
4000	[illegible]	[illegible]	[illegible]	4022	-0.280	-0.200	4	2605	4006		

29.5160

4000	-2.410	-25.270	[illegible]	4022	-0.240	-0.240	-3.150	2605	4006	-0.180	43
4000	-0.300	-27.180	-0.480	4022	-0.243	-0.280	-0.090	2605	4006	-0.270	4000
4000	0.320	-24.610	2.730	4022	-0.280	-0.320	-0.270	2605	4006	0.453	4000
4000	1.760	-22.510	3.050	4022	-0.360	-0.360	4.960	2605	4006	-8.354	1
4000	2.730	-20.910	7.880	4022	-0.440	-0.400	-0.386	2605	4006	-1.036	4000
4000	3.370	-20.100	9.650	4022	[illegible]	-0.440	-6.443	2605	4006	7.960	4000
4000	3.370	-19.780	11.900	4022	-0.600	-0.440	-0.328	2605	4006	-2.535	4300
4000	3.050	-19.790	11.090	4022	-0.720	-0.480	-6.548	2605	4006	-8.678	4764
4000	2.410	-20.420	7.950	4022	-0.760	-0.440	4006	2605	4006	4003	4000
4000	1.440	-21.710	9.490	4022	-0.800	-0.440	4	2605	4006		

29.5260

4000	0.0	-23.160	7.550	4022	-0.800	-0.400	-3.150	2605	4006	-0.270	43
1	-0.800	-24.610	7.550	4022	-0.760	-0.360	0.0	2605	4006	-0.270	4010
1	-1.600	-25.390	6.300	4022	-0.680	-0.320	-0.270	2605	4006	0.453	4000
1	-2.250	-26.960	4.980	4022	-0.560	-0.280	4.960	2605	4006	-8.545	1
4000	-3.370	-27.590	5.300	4022	-0.440	-0.240	-0.386	2605	4006	-1.036	4000
1	-4.340	-28.300	5.620	4022	-0.400	-0.200	-6.443	2605	4006	7.925	4000
4000	-4.980	-28.140	4.830	4022	-0.280	-0.200	-0.328	2605	4006	-2.535	4300
4000	-4.340	-27.660	1.280	4022	-0.280	-0.200	-7.012	2605	4006	-8.613	1749
4000	-3.050	-26.700	1.760	4022	-0.240	-0.210	4006	2605	4006	4003	4000
1	-1.290	-25.570	-0.480	4022	-0.240	-0.248	4	2605	4006		

29.5360

4000	0.0	-24.610	0.0	4022	-0.320	-0.280	-3.150	2605	4006	-0.180	43
2000	1.930	-23.480	-0.430	4022	-0.400	-0.280	0.0	2605	4006	-0.270	4000
2000	3.370	-22.670	0.0	4022	-0.560	-0.320	-0.270	2605	4006	0.358	4000
2000	4.500	-22.340	0.320	4022	-0.720	-0.360	5.000	2605	4006	-8.613	1
2000	5.620	-23.000	[illegible]	4022	-0.880	-0.400	-0.386	2605	4006	-1.101	4000
2000	5.270	-23.540	-0.800	4022	-1.040	-0.440	-6.443	2605	4006	7.985	4000
2000	6.110	-24.280	-2.090	4022	-1.200	-0.440	-0.328	2605	4006	-2.604	4000
2000	5.140	-24.930	-4.340	4022	-1.240	-0.480	-7.012	2605	4006	-8.743	7745
2000	3.690	-25.570	-5.790	4022	-1.230	-0.480	4005	2605	4006	4003	4000
2000	1.930	-25.990	-6.590	4022	-1.260	-0.440	4	2605	4003		

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.440	[illegible]	2605	4006	-0.270	43
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.400	[illegible]	2605	4006	-0.270	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.400	-0.270	2605	4006	0.323	4000
[illegible]	-3.410	-24.770	[illegible]	[illegible]	[illegible]	-0.360	4.960	2605	4006	-8.613	1
[illegible]	-5.050	[illegible]	[illegible]	4022	[illegible]	-0.360	-0.515	2605	4006	-1.165	4000
[illegible]	-3.250	[illegible]	[illegible]	4022	[illegible]	-0.320	-6.507	2605	4006	7.925	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	4006	-2.604	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.360	[illegible]	2605	4006	[illegible]	4763
[illegible]	[illegible]	[illegible]	10.130	4022	0.440	-0.360	4006	2605	4006	4003	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.430	-0.360	4	2605	4006		

29.5560

[illegible]	2.730	[illegible]	15.110	4022	0.440	-0.400	-3.150	2605	4006	-0.270	43
4000	3.210	-26.730	15.250	4022	0.360	-0.400	-0.090	2605	4006	-0.270	4000
4000	2.570	-26.210	14.470	4022	0.240	-0.400	-0.270	2605	4006	0.323	4000
4000	1.760	-25.570	13.510	4022	0.030	-0.400	4.960	2605	4006	-8.549	1
4000	0.480	-24.770	12.700	4022	0.0	-0.400	-3.451	2605	4006	-1.360	4000
4000	-0.490	-24.230	11.420	4022	-0.040	-0.400	-5.572	2605	4006	7.796	4000
4000	-2.090	-23.640	11.420	4022	-0.120	-0.360	-0.328	2605	4006	-2.604	4000
4000	-3.530	-23.640	9.000	4022	-0.080	-0.320	-7.142	2605	4006	-8.743	2000
4000	-5.140	-24.280	9.810	4022	-0.040	-0.280	4006	2605	4006	4003	4000
4000	-6.430	-24.930	9.970	4022	0.0	-0.240	4	2605	4006		

29.5660

4000	-7.330	-26.210	10.290	4022	0.040	-0.240	-3.150	2605	4006	-0.270	43
4000	-7.230	-27.320	7.880	4022	0.120	-0.200	-0.090	2605	4006	-0.270	4000
4000	-6.590	-29.110	7.830	4022	0.200	-0.200	-0.270	2605	4006	0.255	4000
4000	-5.460	-29.750	5.950	4022	0.240	-0.160	4.960	2605	4006	-8.613	1
4000	-4.340	-30.070	3.050	4022	0.200	-0.200	-0.515	2605	4006	-1.489	4000
4000	-3.210	-29.430	2.890	4022	0.080	-0.200	-5.701	2605	4006	7.667	4000
4000	*-1.930	-28.140	0.160	4022	0.0	-0.200	-0.328	2605	4006	-2.604	4000
4000	-0.480	-26.540	0.800	4022	-0.040	-0.240	-7.142	2605	4006	-8.743	4764
1	0.640	-24.770	0.430	4022	-0.480	-0.280	4006	2605	4006	4003	4000
4000	2.090	-23.320	0.640	4022	-0.760	-0.320	4	2605	4006		

29.5760

4000	3.210	-22.610	0.480	4022	-1.000	-0.360	-3.150	2605	4006	-0.180	43
1	3.690	-22.350	0.0	4022	-1.240	-0.400	-0.090	2605	4006	-0.270	4000
4000	3.960	-23.320	-1.280	4022	-1.430	-0.440	-0.270	2605	4006	0.259	4000
1	4.020	-25.090	-3.050	4022	-1.550	-0.480	5.600	2605	4006	-8.613	1
4000	3.860	-27.340	-2.410	4022	-1.610	-0.480	-0.579	2605	4006	-1.554	4000
4000	3.690	-30.070	-4.190	4022	-1.640	-0.520	-6.825	2605	4006	7.667	4000
4000	3.370	-32.330	-3.050	4022	-1.560	-0.480	-0.262	2605	4006	-2.734	4000
4000	2.570	-34.260	-3.210	4022	-1.490	-0.480	-7.207	2605	4006	-8.678	1745
4000	1.280	-35.540	-3.860	4022	-1.320	-0.448	4006	2605	4006	4003	4000
1	0.0	-35.700	-2.890	4022	-1.160	-0.400	4	2605	4006		

29.[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.360	-3.150	2605	4006	-0.180	43
[illegible]	[illegible]	[illegible]	-6.420	[illegible]	[illegible]	-0.320	[illegible]	2605	4006	-0.270	[illegible]
[illegible]	[illegible]	[illegible]	-5.620	[illegible]	[illegible]	-0.280	[illegible]	2605	4006	0.259	[illegible]
[illegible]	[illegible]	[illegible]	-5.590	[illegible]	[illegible]	-0.280	[illegible]	2605	4006	[illegible]	1
[illegible]	[illegible]	[illegible]	-5.950	[illegible]	-0.120	-0.280	[illegible]	2605	4006	-1.554	[illegible]
[illegible]	[illegible]	[illegible]	-3.210	[illegible]	[illegible]	-0.280	[illegible]	2605	4006	7.603	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	4006	-2.775	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	4006	[illegible]	7745
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.120	[illegible]	4006	2605	4006	4003	[illegible]
[illegible]	[illegible]	[illegible]	12.540	[illegible]	[illegible]	-0.360	4	2605	4006		

29.5940

2000	3.750	-30.420	14.430	4022	0.0	-0.360	-3.150	2605	4006	-0.270	43
2000	3.370	-22.510	13.990	4022	-0.040	-0.400	-0.090	2605	4006	-0.270	4000
2000	3.210	-25.250	11.740	4022	-0.160	-0.400	-0.270	2605	4006	0.323	4000
2000	2.390	-27.340	8.360	4022	-0.230	-0.400	4.960	2605	4006	-8.613	1
2000	2.090	-25.430	5.620	4022	-0.440	-0.360	-0.515	2605	4006	-1.554	4000
4000	0.900	-31.360	5.620	4022	-0.520	-0.360	-6.894	2605	4006	7.603	4000
2000	-0.490	-31.840	4.190	4022	-0.560	-0.320	-0.262	2605	4006	-2.795	4008
4000	-2.410	-33.000	0.540	4022	-0.630	-0.280	-7.402	2605	4006	-5.484	5763
2000	-4.340	-31.680	-0.800	4022	-0.550	-0.200	4006	2605	4006	4003	4000
2000	-5.730	-30.720	-2.730	4022	-0.480	-0.160	4	2605	4006		

29.6050

2000	-6.750	-29.750	-4.660	4022	-0.350	-0.120	-3.150	2605	4006	-0.180	43
4000	-6.910	-26.530	-6.270	4022	-0.280	-0.120	-0.090	2605	4006	-0.270	4000
4000	-6.270	-27.130	-4.340	4022	-0.200	-0.120	-0.270	2605	4006	0.323	4000
4000	-4.650	-26.210	-4.650	4022	-0.160	-0.120	5.000	2605	4006	-8.678	1
4000	-3.350	-25.570	-1.600	4022	-0.120	-0.160	-0.579	2605	4006	-1.554	4000
2000	-1.120	-25.090	0.0	4022	-0.160	-0.200	-6.894	2605	4006	7.667	4000
4000	0.490	-24.770	3.050	4022	-0.240	-0.280	-0.262	2605	4006	-2.864	4000
4000	2.250	-24.610	4.660	4022	-0.360	-0.280	-7.467	2605	4006	-8.743	2000
4000	3.370	-25.090	7.230	4022	-0.520	-0.360	4006	2605	4006	4003	4000
4000	3.460	-26.050	6.430	4022	-0.680	-0.400	4	2605	4006		

29.6160

4000	2.540	-26.540	4.820	4022	-0.880	-0.440	-3.150	2605	4006	-0.270	43
4000	3.210	-26.360	0.480	4022	-1.040	-0.440	-0.090	2605	4006	-0.270	4000
4000	2.390	-26.360	-2.250	4022	-1.160	-0.440	-0.270	2605	4006	0.323	4000
4000	3.360	-26.860	-3.690	4022	-1.240	-0.400	4.960	2605	4006	-8.743	1
4000	0.0	-27.190	-3.690	4022	-1.200	-0.360	-0.515	2605	4006	-1.554	4000
4000	-1.290	-27.320	-2.250	4022	-1.080	-0.360	-6.894	2605	4006	7.796	4000
4000	-2.730	-26.700	0.480	4022	-0.960	-0.280	-0.262	2605	4006	-2.864	4000
4000	-3.690	-26.540	1.120	4022	[illegible]	-0.280	-7.532	2605	4006	-8.678	4784
4000	-4.020	-26.800	3.210	4022	[illegible]	-0.240	4000	2605	4006	4003	4000
4000	-3.860	-26.860	5.300	4022	[illegible]	[illegible]	[illegible]	2605	4006		

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.240	[illegible]	2605	4006	-0.270	43
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.240	[illegible]	2605	4006	-0.270	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.280	[illegible]	2605	4006	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.320	[illegible]	2605	4006	[illegible]	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.360	[illegible]	2605	4006	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.360	[illegible]	2605	4006	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.400	[illegible]	2605	4006	-2.864	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.400	[illegible]	2605	4006	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	5.620	[illegible]	-3.750	-0.440	4006	2605	4006	4003	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.440	4	2605	4006		

29.6350

4000	2.730	-19.620	3.370	4022	-1.040	-0.400	-3.150	2605	4006	-0.180	43
2000	1.440	-19.620	1.230	4022	-1.080	-0.400	-0.050	2605	4006	-0.270	4000
2000	0.0	-20.100	0.640	4022	-1.000	-0.360	-0.270	2605	4006	0.194	4000
2000	-0.800	-20.910	1.760	4022	-0.920	-0.360	5.000	2605	4006	-8.808	1
2000	-2.090	-22.510	2.410	4022	-0.760	-0.320	-0.575	2605	4006	-1.594	4000
2000	-3.210	-24.440	4.340	4022	-0.600	-0.280	-6.894	2605	4006	7.796	4000
2000	-4.020	-26.370	5.300	4022	-0.360	-0.280	-0.393	2605	4006	-2.864	4000
2000	-4.120	-26.140	5.720	4022	-0.160	-0.280	-7.557	2605	4006	-8.873	7745
2000	-3.860	-25.590	5.440	4022	0.0	-0.280	4006	2605	4006	4003	4000
2000	-3.370	-30.720	4.020	4022	0.040	-0.280	4	2605	4006		

29.6460

2000	-2.410	-31.360	3.370	4022	3.160	-0.280	-3.150	2605	4006	-0.180	43
4000	-1.120	-31.200	2.410	4022	3.200	-0.280	0.0	2605	4006	-0.270	4000
2000	-0.320	-30.720	2.090	4022	3.200	-0.280	-0.270	2605	4006	0.194	4000
2000	0.0	-30.070	0.960	4022	0.120	-0.320	5.000	2605	4006	-8.743	1
2000	0.160	-28.790	1.120	4022	0.040	-0.320	-0.644	2605	4006	-1.619	4000
2000	0.0	-27.660	-1.930	4022	0.0	-0.360	-7.023	2605	4006	7.796	4000
2000	0.0	-26.050	-0.980	4022	-0.120	-0.360	-0.393	2605	4006	-2.064	4000
2000	0.0	-24.610	-1.930	4022	-0.200	-0.400	-7.532	2605	4006	-9.002	5763
2000	-0.480	-23.640	0.0	4022	-0.280	-0.400	4006	2605	4006	4003	4000
2000	-0.300	-23.320	0.480	4022	-0.320	-0.400	4	2605	4006		

29.[illegible]

2000	-1.760	-27.320	3.530	4022	-0.320	-0.440	-3.150	2605	4006	-0.270	43
4000	-1.760	-24.280	5.300	4022	-0.320	-0.440	-0.050	2605	4006	-0.270	4000
4000	-2.410	-25.730	8.040	4022	-0.240	-0.440	-0.270	2605	4006	0.129	4000
4000	-2.890	-27.500	9.140	4022	-0.120	-0.440	4.960	2605	4006	-8.678	1
4000	-3.050	-29.110	7.550	4022	-0.080	-0.440	-0.579	2605	4006	-1.683	4000
4000	-2.890	-29.910	8.360	4022	0.0	-0.400	-7.152	2605	4006	7.798	4000
4000	-2.410	-30.070	6.110	4022	0.0	-0.400	-0.393	2605	4006	-2.864	4000
4000	-1.930	-29.430	5.620	4022	0.0	-0.400	-7.467	2605	4006	-8.808	2000
4000	-1.120	-28.140	6.110	4022	0.0	-0.360	4006	2605	4006	4003	4000
4000	-0.320	-26.050	7.550	4022	0.0	-0.360	4	2605	4006		

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.360	-3.150	2605	4006	-0.180	43
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.360	0.0	2605	4006	-0.270	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.360	-0.270	2605	4006	0.044	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.400	4.960	2605	4006	-8.613	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.440	-0.644	2605	4006	-1.748	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.440	-7.280	2605	4006	7.731	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.480	-0.393	2605	4006	-2.864	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.480	-7.597	2605	4006	-8.873	4764
[illegible]	[illegible]	[illegible]	5.790	4022	-1.000	-0.480	4006	2605	4006	4003	4000
4000	[illegible]	-30.430	[illegible]	4022	-1.000	-0.480	4	2605	4006		

29.6760

1	[illegible]	-33.490	3.050	4022	-1.000	-0.440	-3.150	2605	4006	-0.180	43
4000	[illegible]	-34.100	-3.300	4022	-0.960	-0.400	0.0	2605	4006	-0.270	4000
4000	-3.050	-34.260	-2.730	4022	-0.880	-0.360	-0.270	2605	4006	0.129	4000
4000	-4.340	-33.610	-6.520	4022	-0.760	-0.320	5.000	2605	4006	-8.549	1
1	-5.460	-31.840	-9.550	4022	-0.640	-0.280	-0.579	2605	4006	-1.813	4000
4000	-5.950	-29.590	-13.900	4022	-0.520	-0.240	-7.365	2605	4006	7.667	4000
1	-5.790	-27.020	-13.510	4022	-0.400	-0.240	-0.328	2605	4006	-2.929	4000
4000	-4.980	-23.960	-12.360	4022	-0.280	-0.240	-7.662	2605	4006	-8.873	1745
4000	-4.020	-21.230	-10.130	4022	-0.160	-0.240	4006	2605	4006	4003	4000
4000	-2.410	-15.620	-3.690	4022	-0.120	-0.280	4	2605	4006		

29.6860

1	-0.300	-23.990	-4.130	4022	-0.120	-0.320	-3.150	2605	4006	-0.180	43
2000	0.320	-19.330	-1.750	4022	-0.200	-0.400	0.0	2605	4006	-0.270	4000
2000	1.760	-20.740	1.120	4022	-0.280	-0.440	-0.270	2605	4006	0.194	4000
2000	3.050	-23.160	1.120	4021	-0.440	-0.480	4.960	2605	4006	-8.484	4000
2000	3.900	-25.890	3.370	4022	-0.600	-0.520	-0.644	2605	4006	-1.813	4000
2000	4.340	-28.300	0.0	4022	-0.760	-0.560	-7.280	2605	4006	7.603	4000
2000	4.130	-30.560	0.320	4022	-0.880	-0.560	-0.393	2605	4006	-3.059	4000
2000	3.530	-32.000	-2.250	4022	-0.960	-0.520	-7.667	2605	4006	-8.937	7745
2000	2.090	-32.650	0.0	4022	-1.000	-0.520	4006	2605	4006	4003	4000
2000	3.420	-32.970	-0.320	4022	-1.000	-0.440	4	2605	4006		

29.6960

2000	-1.440	-31.490	0.970	4022	-0.920	-0.400	-3.150	2605	4006	-0.180	43
2000	-3.370	-31.680	-0.160	4022	-0.870	-0.360	0.0	2605	4006	-0.270	4000
2000	-4.380	-30.400	0.0	4022	-0.600	-0.280	-0.360	2605	4006	0.259	4000
2000	-5.520	-28.790	-2.390	4022	-0.440	-0.280	4.960	2605	4006	-8.549	4000
2000	-5.730	-27.860	0.320	4022	-0.240	-0.240	-0.579	2605	4006	-1.813	4000
2000	-4.980	-25.250	1.280	4022	-0.040	-0.240	-7.280	2605	4006	7.603	4000
2000	-3.690	-23.960	4.020	4022	0.0[illegible]	-0.240	-0.393	2605	4006	-3.059	4000
2000	-1.930	-23.160	9.520	4022	0.080	-0.240	-7.727	2605	4006	-8.808	6763
4000	-0.160	-22.840	13.020	4022	0.120	-0.280	4006	2605	4006	4003	4000
2000	0.300	-23.000	15.600	4022	0.040	-0.280	4	2605	4006		

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	[illegible]	-3.240	2605	4006	-0.270	43
[illegible]	[illegible]	-24.120	[illegible]	[illegible]	[illegible]	[illegible]	0.0	2605	4006	-0.270	4000
[illegible]	[illegible]	-24.770	15.440	[illegible]	-0.320	-0.400	-0.270	2605	4006	0.259	4000
[illegible]	[illegible]	-25.250	11.030	4022	-0.560	-0.440	4.520	2605	4006	-8.678	4000
[illegible]	[illegible]	-25.250	8.690	4022	-0.760	-0.440	-0.575	2605	4006	-1.743	4000
[illegible]	[illegible]	-25.250	6.440	[illegible]	-0.920	-0.440	-7.216	2605	4006	7.667	4000
[illegible]	[illegible]	-24.930	3.410	[illegible]	-1.000	-0.400	[illegible]	2605	4006	-2.994	4000
[illegible]	[illegible]	[illegible]	1.250	[illegible]	-1.080	-0.360	-7.727	2605	4006	-8.273	2000
[illegible]	-1.000	-25.090	2.410	4022	-1.080	-0.360	4006	2605	4006	4003	4000
[illegible]	[illegible]	[illegible]	3.290	[illegible]	-1.000	-0.320	4	2605	4006		

29.7140

4000	-4.220	-25.730	1.120	4022	-0.320	-0.320	-3.150	2605	4006	-0.180	43
4000	-4.500	-26.703	0.0	4022	-0.800	-0.280	0.0	2605	4006	-0.270	4000
4000	-4.500	-27.500	-0.640	4022	-0.640	-0.280	-0.360	2605	4006	0.194	4000
4000	-3.690	-28.300	-2.730	4022	-0.520	-0.280	4.960	2605	4006	-8.808	4000
4000	-2.250	-28.790	-1.930	4022	-0.440	-0.320	-0.644	2605	4006	-1.748	4000
4000	-0.480	-28.790	-2.890	4022	-0.400	-0.360	-7.216	2605	4006	7.731	4000
4000	1.120	-28.630	-1.760	4022	-0.400	-0.360	-0.459	2605	4006	-3.059	4000
4000	2.570	-27.820	-1.600	4022	-0.440	-0.400	-7.727	2605	4006	-9.002	4764
4000	3.960	-26.700	-1.760	4022	-0.560	-0.440	4006	2605	4006	4003	4000
4000	4.340	-25.090	-1.760	4022	-0.680	-0.440	4	2605	4006		

29.7260

4000	4.180	-23.160	-3.530	4022	-0.300	-0.480	-3.150	2605	4006	-0.180	43
4000	3.460	-21.550	-4.580	4022	-0.920	-0.480	0.0	2605	4006	-0.180	4000
4000	3.370	-20.260	-5.140	4022	-0.960	-0.520	-0.360	2605	4006	0.129	4000
4000	2.890	-19.620	-5.460	4022	-0.960	-0.520	5.000	2605	4006	-8.808	4000
4000	2.250	-15.620	-3.690	4022	-0.920	-0.520	-0.644	2605	4006	-1.683	4000
4000	1.280	-20.580	-1.280	4022	-0.800	-0.520	-7.216	2605	4006	7.731	4000
4000	0.150	-22.350	2.090	4022	-0.640	-0.520	-0.459	2605	4006	-2.994	4000
4000	-0.490	-24.773	3.690	4022	-0.490	-0.520	-7.662	2605	4006	-9.132	1746
1	-1.440	-27.020	6.910	4022	-0.280	-0.480	4006	2605	4006	4003	4000
1	-1.440	-26.950	6.750	4022	-0.120	-0.480	4	2605	4006		

29.7340

1	-1.280	-30.230	6.910	4022	0.0	-0.440	-3.240	2605	4006	-0.180	43
2000	-0.800	-30.723	9.330	4022	0.040	-0.440	0.0	2605	4006	-0.270	4000
2000	0.0	-30.070	10.610	4022	0.120	-0.440	-0.360	2605	4006	0.129	4000
2000	0.640	-29.950	12.230	4022	0.200	-0.440	4.520	2605	4006	-8.808	4000
2000	1.120	-27.560	14.950	4022	0.200	-0.400	-0.515	2605	4006	-1.913	4000
2000	1.120	-25.990	13.350	4022	0.200	-0.400	-7.216	2605	4006	7.667	4000
2000	0.800	-24.280	13.670	4022	0.160	-0.400	-0.459	2605	4006	-2.929	4000
2000	0.640	-22.670	12.700	4022	0.080	-0.400	-7.662	2605	4006	-9.201	7785
2000	0.320	-21.230	10.770	4022	0.040	-0.440	4006	2605	4006	4003	4000
2000	0.0	-20.580	10.130	4022	0.0	-0.440	4	2605	4006		

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	4022	0.0	[illegible]	[illegible]	2605	4006	-0.180	43
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.0	[illegible]	[illegible]	2605	4006	-0.270	4000
[illegible]	-1.440	[illegible]	[illegible]	4022	0.0	-0.400	-0.270	2605	4006	0.129	4000
[illegible]	[illegible]	-24.440	[illegible]	4022	0.0	-0.400	4.960	2605	4006	-8.808	4000
4000	[illegible]	[illegible]	[illegible]	4022	0.0	[illegible]	-1.708	2605	4006	-1.943	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.0	-0.360	[illegible]	2605	4006	7.603	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.0	-0.320	[illegible]	2605	4006	-2.994	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.0	[illegible]	-7.597	2605	4006	-9.196	3753
2000	-5.140	-30.890	-3.320	4022	0.0	-0.280	4006	2605	4006	4003	4000
2000	[illegible]	-30.400	-3.460	4022	0.0	-0.260	4	2605	4006		

29.7550

2000	-4.130	-29.110	-5.460	4022	0.0	-0.280	-3.240	2605	4006	-0.180	43
4000	-3.370	-27.340	-5.770	4022	-0.090	-0.320	0.0	2605	4006	-0.270	4000
2000	-2.570	-25.090	-3.860	4022	-0.160	-0.320	-0.360	2605	4006	0.129	4000
4000	-1.440	-23.160	-3.370	4022	-0.240	-0.360	5.000	2605	4006	-8.808	4000
4000	0.0	-22.030	-3.500	4021	-0.320	-0.400	-0.708	2605	4006	-2.137	4000
4000	1.280	-21.390	-0.950	4022	-0.440	-0.440	-7.280	2605	4006	7.538	4000
4000	3.050	-21.550	0.800	4022	-0.520	-0.520	-0.393	2605	4006	-2.994	4000
4000	4.500	-22.670	1.120	4022	-0.500	-0.520	-7.662	2605	4006	-9.002	2000
4000	5.620	-24.440	2.030	4022	-0.720	-0.600	4006	2605	4006	4003	4000
4000	5.270	-26.860	2.250	4022	-0.840	-0.600	4	2605	4006		

29.7650

4000	6.430	-29.270	3.530	4022	-0.920	-0.640	-3.150	2605	4006	-0.270	43
4000	5.350	-31.520	2.410	4022	-0.960	-0.440	0.0	2605	4006	-0.270	4000
4000	4.550	-33.130	4.020	4022	-0.960	-0.600	-0.360	2605	4006	0.125	4000
4000	2.890	-33.930	1.120	4022	-0.920	-0.600	5.000	2605	4006	-9.743	4000
4000	0.800	-33.930	0.0	4022	-0.800	-0.560	-0.708	2605	4006	-2.202	4000
4000	-0.960	-32.970	-2.090	4022	-0.640	-0.520	-7.745	2605	4006	7.538	4000
4000	-2.890	-31.200	-4.980	4022	-0.440	-0.440	-0.393	2605	4006	-3.059	4000
4000	-4.180	-28.950	-4.650	4022	-0.160	-0.440	-7.662	2605	4006	-8.937	4764
4000	-4.920	-26.370	-4.660	4022	0.0	-0.360	4006	2605	4006	4003	4000
4000	-4.660	-24.120	-3.050	4022	0.240	-0.320	4	2605	4006		

29.7760

4000	-4.020	-22.350	1.440	4022	0.480	-0.320	-3.240	2605	4006	-0.180	43
1	-3.050	-21.070	3.370	4022	0.600	-0.320	0.0	2605	4006	-0.270	4000
1	-1.930	-20.420	9.200	4022	0.680	-0.320	-0.360	2605	4006	0.125	4000
1	-0.480	-20.580	9.570	4022	0.680	-0.360	4.960	2605	4006	-8.743	4000
1	0.640	-21.070	9.490	4022	0.600	-0.400	-0.773	2605	4006	-2.137	4000
4000	2.410	-22.030	9.650	4022	0.440	-0.440	-7.280	2605	4006	7.538	4000
4000	3.370	-23.000	9.150	4022	0.200	-0.480	-0.393	2605	4006	-3.125	4000
1	4.020	-23.640	7.550	4022	0.0	-0.520	-7.662	2605	4006	-8.873	1746
4000	4.180	-24.440	5.300	4022	-0.240	-0.520	4006	2605	4006	4003	4000
1	3.950	-24.930	2.410	4022	-0.440	-0.520	5003	2605	4006		

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.440	-3.240	2605	4006	-0.180	43
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.440	0.0	2605	4006	-0.270	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.440	-0.360	2605	4006	0.129	4000
2000	[illegible]	-28.140	[illegible]	4022	[illegible]	-0.400	5.000	2605	4006	-3.743	4000
2000	-3.210	[illegible]	[illegible]	4022	-0.720	-0.360	-0.708	2605	4006	-2.202	4000
2000	-4.320	[illegible]	[illegible]	4022	[illegible]	-0.360	-7.215	2605	4006	7.539	4000
2000	[illegible]	[illegible]	[illegible]	4022	-0.440	-0.320	-0.393	2605	4006	-3.255	4000
2000	[illegible]	[illegible]	-4.040	4022	-0.240	-0.320	-7.727	2605	4006	-3.808	7745
2000	-3.690	-33.330	-7.990	4022	-0.160	-0.320	4006	2605	4006	4003	4000
2000	-3.990	[illegible]	-4.330	4022	-0.040	-0.320	4	2605	4006		

29.7940

2000	-1.330	-29.750	-3.390	4022	0.0	-0.360	-3.240	2605	4006	-0.270	43
2000	-1.120	-27.820	-1.690	4022	0.0	-0.360	0.0	2605	4006	-0.270	4000
2000	-0.320	-25.570	-0.480	4022	0.0	-0.360	-0.360	2605	4006	0.064	4000
2000	0.160	-23.320	0.160	4022	0.0	-0.400	4.960	2605	4006	-9.808	4000
2000	0.640	-21.710	2.730	4022	-0.040	-0.440	-0.708	2605	4006	-2.137	4000
2000	1.120	-20.740	1.600	4022	-0.080	-0.480	-7.216	2605	4006	7.683	4000
2000	1.290	-20.580	1.600	4022	-0.120	-0.480	-0.393	2605	4006	-3.255	4000
2000	1.600	-21.230	2.090	4022	-0.160	-0.520	-7.792	2605	4006	-9.132	6763
2000	1.440	-22.510	2.890	4022	-0.160	-0.520	4006	2605	4006	4003	4000
2000	1.120	-24.290	5.620	4022	-0.160	-0.520	4	2605	4006		

29.8040

2000	0.640	[illegible]	5.300	23	-0.120	-0.520	-3.240	2605	4006	-0.270	43
4000	0.150	[illegible]	5.790	4022	-0.080	-0.480	0.0	2605	4006	-0.270	4000
4000	-0.480	[illegible]	[illegible]	4022	-0.080	-0.480	-0.360	2605	4006	0.064	4000
4000	-1.440	-30.400	7.730	4022	-0.040	-0.440	4.960	2605	4006	-9.937	4000
4000	-2.250	-30.560	9.200	4022	-0.040	-0.440	-0.708	2605	4006	-2.872	4000
4000	-1.930	-29.910	6.110	4022	-0.040	-0.400	-7.152	2605	4006	7.731	4000
4000	-1.440	-28.790	5.950	4022	-0.040	-0.400	-0.393	2605	4006	-3.255	4000
4000	-0.800	-27.340	5.790	4022	0.0	-0.400	-7.792	2605	4006	-9.002	4000
4000	-0.160	-25.410	6.750	4022	0.0	-0.400	4006	2605	4006	4003	4000
4000	0.160	-23.480	6.110	4022	0.0	-0.440	4	2605	4006		

[illegible]

4000	1.170	-21.710	[illegible]	4022	-0.040	-0.440	-3.240	2605	4006	-0.180	43
4000	1.930	-20.260	[illegible]	4022	-0.040	-0.440	0.0	2605	4006	-0.180	4000
4000	2.730	-19.300	7.550	4022	[illegible]	-0.440	-0.360	2605	4006	0.0	4000
4000	[illegible]	[illegible]	[illegible]	4022	-0.120	-0.480	4.960	2605	4006	-9.937	4000
4000	[illegible]	[illegible]	[illegible]	4022	-0.200	-0.480	-0.708	2605	4006	-2.007	4000
4000	3.530	-19.620	[illegible]	4022	-0.280	-0.480	-7.216	2605	4006	7.731	4000
4000	2.890	-20.740	5.620	4022	-0.280	-0.480	-0.459	2605	4006	-3.328	4000
4000	2.090	-22.030	2.250	4022	-0.320	-0.480	-7.792	2605	4006	-9.937	4764
4000	0.640	-23.800	1.130	4022	-0.360	-0.440	4006	2605	4006	4003	4000
4000	[illegible]	-25.570	-0.960	4022	-0.320	-0.440	4	2605	4006		

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-3.240	2605	[illegible]	-0.180	43
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	2605	[illegible]	-0.270	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.360	-0.360	2605	[illegible]	-0.064	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	-0.360	5.000	2605	[illegible]	-8.973	4000
4000	[illegible]	[illegible]	-3.630	4022	0.040	-0.360	-0.579	2605	[illegible]	-2.072	4000
[illegible]	[illegible]	[illegible]	-1.750	[illegible]	0.160	-0.360	-7.214	2605	[illegible]	7.731	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.240	-0.400	-0.393	2605	[illegible]	-3.255	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.400	-7.792	2605	4006	-9.132	1746
4000	-0.140	[illegible]	3.960	4022	0.280	-0.440	4006	2605	4006	4003	4000
4000	[illegible]	[illegible]	2.410	4022	0.200	-0.520	4	2605	4005		

29.9360

4000	1.330	-28.790	4.420	4022	0.120	-0.520	-3.240	2605	4006	-0.180	43
2000	3.050	-27.380	3.850	4022	0.0	-0.560	0.0	2605	4006	-0.270	4000
2000	3.370	-26.360	5.300	4022	0.0	-0.600	-0.360	2605	4006	-0.129	4000
2000	3.050	-25.570	7.720	4022	-0.120	-0.600	4.960	2605	4006	-8.873	4000
2000	2.090	-24.770	6.430	4022	-0.160	-0.600	-0.773	2605	4006	-2.137	4000
2000	0.640	-23.640	9.160	4022	-0.160	-0.600	-7.280	2605	4006	7.538	4000
2000	-0.640	-23.160	9.520	4022	-0.120	-0.560	-0.393	2605	4006	-3.255	4030
2000	-2.250	-23.150	9.840	4022	-0.040	-0.520	-7.857	2605	4006	-9.002	7745
2000	-3.860	-23.640	10.450	4022	0.040	-0.490	4006	2605	4006	4003	4000
2000	-5.390	-24.330	10.610	4022	0.200	-0.440	4	2605	4006		

29.8460

2000	-6.270	-26.210	10.450	4022	0.400	-0.400	-3.240	2605	4006	-0.270	43
2000	-6.430	-27.340	10.450	4022	0.560	-0.360	0.0	2605	4005	-0.270	4000
2000	-5.950	-25.300	8.680	4022	0.640	-0.320	-0.360	2605	4006	-0.194	4030
2000	-4.980	-26.790	10.130	4022	0.720	-0.320	4.960	2605	4005	-8.937	4000
2000	-4.180	-28.470	11.420	4022	0.760	-0.320	-0.773	2605	4006	-2.202	4030
2000	-3.210	-27.500	10.610	23	0.680	-0.320	-7.345	2605	4006	7.474	4000
2000	-2.030	-25.990	11.420	23	0.550	-0.320	-0.393	2605	4006	-3.320	4000
4000	-0.640	-24.120	9.490	4022	0.360	0.360	-7.857	2605	4006	-8.937	6763
2000	0.320	-22.190	9.160	4022	0.160	-0.400	4006	2605	4006	4003	4000
4000	1.600	-20.580	7.550	4022	0.0	-0.440	4	2605	4006		

29.8560

2000	2.730	-19.940	5.790	4021	-0.280	-0.440	-3.240	2605	4006	-0.160	43
4000	3.530	-19.940	5.790	4022	-0.520	-0.480	0.0	2605	4006	-0.270	4000
4000	3.940	-21.070	3.690	4022	-0.720	-0.520	-0.360	2605	4005	-0.259	4000
4000	3.690	-23.160	3.210	4022	-0.920	-0.560	4.960	2605	4006	-9.873	4000
4000	2.490	-25.330	1.120	4022	-1.080	-0.600	-0.837	2605	4006	-2.202	4000
4000	2.090	-25.470	-0.320	4022	-1.160	-0.560	-7.409	2605	4006	7.409	4000
4000	0.640	-31.200	-3.860	4022	-1.200	-0.520	-0.393	2605	4006	-3.320	4000
2000	-0.640	-33.130	-6.110	4022	-1.200	-0.520	-7.792	2605	4006	-9.196	2000
4000	-2.410	-34.100	-8.840	4022	-1.080	-0.640	4006	2605	4006	4003	4000
4000	-3.690	-33.930	-12.380	4022	-0.960	-0.440	4	2605	4006		

[illegible]											
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.400	-3.240	2605	4006	-0.180	43
4000	-3.5??	[illegible]	-14.44?	4022	-0.44?	-0.360	0.0	2605	4006	-0.180	4000
4000	[illegible]	-28.220	-13.670	4022	-0.440	-0.320	-0.360	2605	4005	-0.194	4000
4000	[illegible]	-26.540	-11.670	4022	[illegible]	-0.320	5.000	2605	4005	-4.673	4000
4000	-4.130	[illegible]	[illegible]	4022	-0.360	-0.320	-0.837	2605	4006	-2.202	4000
4000	[illegible]	[illegible]	-7.390	4022	-0.340	-0.360	-7.409	2605	4005	7.345	4000
4000	[illegible]	[illegible]	[illegible]	4022	0.0	-0.400	-0.459	2605	4005	-3.320	4000
4000	[illegible]	[illegible]	[illegible]	4022	0.0	-0.480	-7.922	2605	4005	-9.002	4764
4000	2.730	-20.260	1.930	4022	-0.360	-0.520	4006	2605	4005	4003	4000
4000	4.440	[illegible]	4.440	4022	-0.360	-0.560	4003	2605	4006		
29.3760											
4000	5.350	-23.160	7.390	4022	-0.320	-0.600	-3.240	2605	4006	-0.270	43
4000	6.530	-25.410	7.720	4022	-0.440	-0.600	0.0	2605	4006	-0.270	4000
4000	6.270	-27.180	7.550	4022	-0.600	-0.600	-0.360	2605	4006	-0.129	4000
1	4.990	-28.790	5.790	4022	-0.720	-0.600	4.960	2605	4006	-8.937	4000
4000	3.210	-29.750	4.190	4022	-0.800	-0.600	-0.837	2605	4006	-2.282	4000
4000	1.120	-30.400	3.860	4022	-0.800	-0.520	-7.409	2605	4006	7.345	4000
1	-0.640	-30.560	1.600	4022	-0.720	-0.480	-0.455	2605	4006	-3.385	4000
1	-2.730	-30.560	0.160	4022	-0.600	-0.400	-7.857	2605	4006	-9.002	1746
1	-4.820	-29.590	1.600	4022	-0.440	-0.360	4006	2605	4006	4	4000
1	-6.590	-28.950	-0.160	4022	-0.200	-0.280	4	2605	4006		
29.8360											
1	-7.550	-17.320	1.120	4022	0.0	-0.240	-3.240	2605	4006	-0.180	43
2000	-7.230	-25.540	1.750	4022	0.240	-0.240	0.0	2605	4006	-0.270	4000
2000	-6.270	-25.730	4.530	4022	0.440	-0.240	-0.360	2605	4005	-0.194	4000
2000	-4.920	-23.330	7.550	4022	0.560	-0.240	4.920	2605	4006	-9.002	4000
2000	-3.050	-24.290	9.320	4022	0.600	-0.280	-0.837	2605	4006	-2.137	4000
2000	-1.120	-23.960	3.840	4022	0.560	-0.280	-7.345	2605	4006	7.345	4000
2000	0.320	-23.150	11.900	4022	0.440	-0.360	-0.459	2605	4005	-3.320	4000
2000	1.930	-22.510	10.930	4022	0.200	-0.400	-7.922	2605	4006	-9.261	7745
2000	3.050	-22.190	9.810	4022	0.0	-0.440	4006	2605	4005	4	4000
2000	3.960	-21.710	9.810	4022	-0.240	-0.440	4	2605	4005		
29.[illegible]											
2000	4.320	-21.390	5.790	4022	-0.560	-0.480	-3.240	2605	4006	-0.270	43
4000	3.370	-21.710	4.020	4022	-0.760	-0.480	0.0	2605	4006	-0.270	4000
2000	2.250	-22.350	1.230	4022	-0.960	-0.480	-0.360	2605	4006	-0.194	4000
4000	3.640	-23.370	0.0	4022	-1.120	-0.480	5.000	2605	4006	-9.196	4000
2000	-0.640	-24.410	0.0	4022	-1.160	-0.440	-0.773	2605	4006	-2.137	4000
2000	-1.760	-24.210	-1.440	4022	-1.120	-0.440	-7.280	2605	4006	7.474	4000
2000	-2.410	-25.140	-1.910	4022	-1.000	-0.400	-0.524	2605	4006	-3.320	4000
2000	-2.730	-29.750	-3.690	4011	-0.880	-0.360	-7.922	2605	4006	-9.261	6763
2000	-2.730	-30.720	-2.710	4022	-0.760	-0.360	4006	2605	4006	4	4008
2000	-2.410	-30.550	-3.530	4022	-0.600	-0.360	4	2605	4006		

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-3.240	2605	4006	[illegible]	+3
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	2605	4006	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.400	[illegible]	2605	4006	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	4022	-0.280	-0.400	[illegible]	2605	4006	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.440	[illegible]	2605	4006	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.320	-0.440	[illegible]	2605	4006	7.474	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.430	-0.590	2605	4005	-3.320	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.400	-0.520	-7.857	2605	4006	-9.196	[illegible]
[illegible]	[illegible]	[illegible]	2.410	4022	[illegible]	-0.520	4006	2605	4006	4	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	-0.440	-0.520	4	2605	4006		

29.9160

4000	2.570	-19.740	3.050	4022	-0.400	-0.520	-3.240	2605	4006	-0.270	+3
4000	1.740	-21.710	3.210	4022	-0.360	-0.520	0.0	2605	4006	-0.270	4000
4000	0.480	-23.640	3.690	4022	-0.280	-0.480	-0.360	2605	4006	-0.323	4000
4000	-0.160	-25.990	1.930	4022	-0.200	-0.480	4.960	2605	4006	-9.132	4000
4000	-0.900	-27.660	4.820	4022	-0.120	-0.440	-0.837	2605	4006	-2.072	4000
4000	-1.280	-29.110	4.660	4022	-0.040	-0.400	-7.345	2605	4006	7.474	4000
4000	-1.760	-29.910	5.620	4022	0.0	-0.430	-0.590	2605	4006	-3.320	4000
4000	-1.930	-29.590	5.270	4022	0.040	-0.350	-7.857	2605	4006	-9.391	4754
4000	-1.750	-28.530	6.310	4022	0.120	-0.360	4006	2605	4006	4	4000
4000	-1.290	-27.650	7.880	4022	0.120	-0.360	4	2605	4006		

29.9250

4000	-0.640	-26.370	9.490	4022	0.120	-0.360	-3.240	2605	4006	-0.130	+3
1	0.0	-25.090	10.770	4022	0.080	-0.400	0.0	2605	4006	-0.270	4000
1	0.640	-24.120	9.490	4022	0.040	-0.440	-0.360	2605	4006	-0.323	4000
1	1.600	-23.000	9.490	4022	0.0	-0.440	4.960	2605	4006	-9.132	4000
4000	2.070	-22.670	3.660	4022	-0.040	-0.440	-0.837	2605	4006	-2.137	4000
4000	2.090	-22.670	7.550	4022	-0.120	-0.480	-7.345	2605	4006	7.409	4000
1	1.440	-22.510	9.320	4022	-0.200	-0.440	-0.590	2605	4006	-3.320	4000
4000	0.640	-23.030	6.270	4021	-0.240	-0.440	-7.857	2605	4006	-9.196	1746
4000	-1.490	-23.450	7.070	4022	-0.280	-0.440	4006	2605	4006	4	4002
1	-1.760	-24.290	4.660	4022	-0.240	-0.400	4	2605	4006		

29.3760

4000	-3.370	-25.090	3.530	4022	-0.240	-0.360	-3.240	2605	4006	-0.270	+3
2000	-5.140	-25.390	2.410	4022	-0.160	-0.320	-0.090	2605	4006	-0.270	4000
2000	-6.750	-26.360	-0.480	4022	-0.080	-0.280	-0.360	2605	4006	-0.323	4000
2000	-7.390	-27.140	-1.280	4022	0.0	-0.280	4.960	2605	4006	-9.092	4000
2000	-7.550	-28.950	-0.640	4022	0.040	-0.280	-0.337	2605	4006	-2.072	4000
2000	-6.750	-29.430	-2.250	4022	0.120	-0.280	-7.474	2605	4006	7.345	4000
2000	-5.620	-29.750	-1.460	4022	0.200	-0.280	-0.456	2605	4006	-3.320	4000
2000	-4.020	-29.750	0.0	4022	0.200	-0.280	-7.857	2605	4006	-9.196	7745
2000	-2.410	-29.110	0.960	4022	0.120	-0.320	4006	2605	4006	4	4000
2000	-0.480	-27.980	1.760	4022	0.040	-0.360	4	2605	4006		

29.[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-3.240	2605	4006	-0.270	43
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.090	2605	4006	-0.270	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	[illegible]	-0.450	2605	4006	-0.323	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.520	4.960	2605	4006	-9.873	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	[illegible]	[illegible]	2605	4006	-2.137	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	-0.920	[illegible]	-7.534	2605	4006	7.260	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	-1.040	[illegible]	[illegible]	2605	4006	-3.395	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	-1.080	-0.360	-7.922	2605	4006	-9.067	6763
[illegible]	[illegible]	[illegible]	[illegible]	4022	-1.000	-0.520	4006	2605	4006	4	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.440	4	2605	4006		

29.2560

4000	[illegible]	-34.490	-0.160	4022	-0.720	-0.440	-3.240	2605	4006	-0.270	43
4000	-2.570	-36.560	-1.120	4022	-0.490	-0.360	-0.090	2605	4006	-0.270	4000
4000	-3.530	-30.880	-1.120	4022	-0.240	-0.320	-0.360	2605	4006	-0.323	4000
4000	-4.020	-31.040	[illegible]	4022	0.0	-0.280	5.000	2605	4006	-8.808	4000
4000	-4.180	-30.560	-0.150	4022	0.120	-0.260	-0.902	2605	4006	-2.137	4000
4000	-3.530	-29.590	-1.120	4022	0.280	-0.240	-7.538	2605	4006	7.216	4000
4000	-2.250	-27.980	-0.160	4022	0.360	-0.240	-0.656	2605	4006	-3.395	4000
4000	-0.640	-25.570	-0.900	4022	0.350	-0.230	-7.922	2605	4006	-9.132	2000
4000	0.640	-23.000	0.160	4022	0.280	-0.280	4006	2605	4006	4	4000
4000	1.930	-20.740	2.410	4022	0.160	-0.320	4	2605	4006		

29.9460

4000	3.330	-19.300	5.300	4022	0.0	-0.360	-3.240	2605	4006	-0.180	43
4000	4.020	-19.490	6.270	4022	-0.080	-0.400	0.0	2605	4006	-0.270	4000
4000	4.660	-19.550	6.430	4022	-0.240	-0.440	-0.450	2605	4006	-0.259	4000
4000	4.320	-19.330	7.390	4022	-0.400	-0.440	5.000	2605	4006	-8.743	4000
4000	4.190	-21.370	5.620	4022	-0.520	-0.480	-0.902	2605	4006	-2.137	4000
4000	3.050	-23.320	3.210	4022	-0.600	-0.440	-7.538	2605	4006	7.216	4000
4000	1.600	-25.370	1.120	4022	-0.600	-0.440	-0.656	2605	4006	-3.395	4000
4000	0.0	-27.820	-1.600	4022	-0.600	-0.400	-7.922	2605	4006	-9.132	4764
4000	-1.600	-30.070	-1.600	4022	-0.560	-0.360	4006	2605	4006	4	4000
4000	-3.210	-32.000	-1.280	4022	-0.440	-0.280	4	2605	4006		

29.9760

4000	-4.660	-19.290	-3.050	4022	-0.350	-0.240	-3.240	2605	4006	-0.130	43
4000	-5.520	-22.930	-3.860	4022	-0.200	-0.160	0.0	2605	4006	-0.270	4000
[illegible]	-6.590	-22.450	-5.300	4022	-0.090	-0.120	-0.360	2605	4006	-0.194	4000
4000	[illegible]	-22.330	-4.750	4022	0.0	-0.120	5.000	2605	4006	-5.808	4000
[illegible]	[illegible]	-20.720	-5.270	4022	0.040	-0.120	-2.837	2605	4006	-2.137	4000
4000	-5.620	-24.470	-6.430	4022	0.120	-0.120	-7.538	2605	4006	7.280	4000
4000	-3.860	-26.210	-5.620	4022	0.150	-0.160	-0.590	2605	4006	-3.385	4000
4000	-1.600	-24.120	-2.730	4022	0.160	-0.200	-7.922	2605	4006	-9.067	1746
[illegible]	0.320	-22.350	0.480	4022	0.080	-0.280	4006	2605	4006	4	4000
4000	7.250	-21.390	4.190	4022	0.0	-0.320	4	2605	4006		

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-3.240	2605	[illegible]	-0.270	43
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	2605	[illegible]	-0.270	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.400	[illegible]	-0.450	2605	[illegible]	-0.194	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.540	[illegible]	4.560	2605	4006	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	[illegible]	-0.837	2605	4006	-2.137	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	4006	7.345	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.720	[illegible]	[illegible]	2605	4006	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.540	-0.440	[illegible]	2605	4006	[illegible]	7745
[illegible]	[illegible]	[illegible]	[illegible]	4022	-0.520	-0.360	4006	2505	4006	4	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	[illegible]	4	2605	4006		

29.9950

2000	-4.550	[illegible]	4.500	4022	-0.080	-0.280	-3.240	2605	4006	-0.180	43
2000	-5.460	[illegible]	6.270	4022	0.040	-0.240	0.0	2605	4006	-0.270	4000
2000	-5.620	-24.930	5.140	4022	0.280	-0.200	-0.450	2605	4006	-0.194	4000
2000	-4.820	-23.960	6.590	4022	0.440	-0.200	4.560	2605	4006	-9.132	4010
2000	-3.370	-23.150	6.910	4022	0.600	-0.200	-0.837	2605	4006	-2.072	4000
2000	-1.280	-22.840	7.230	4022	0.600	-0.200	-7.474	2605	4006	7.345	4000
4000	0.480	-22.190	9.320	4022	0.600	-0.240	-0.656	2605	4006	-3.320	4030
2000	2.250	-22.030	9.150	4022	0.480	-0.280	-7.922	2605	4006	-9.326	6763
2000	3.690	-22.190	8.200	4022	0.280	-0.280	4006	2605	4006	4	4000
2000	4.660	-22.030	6.750	4022	0.080	-0.320	4	2605	4006		

30.0060

2000	5.140	[illegible]	4.180	4022	-0.120	-0.360	-3.240	2605	4006	-0.270	43
4000	4.980	-21.710	1.930	4022	-0.360	-0.360	0.0	2605	4006	-0.270	4000
4001	3.360	-21.550	-1.440	4022	-0.600	-0.400	-0.360	2605	4006	-0.194	4000
4000	2.250	-21.710	-4.340	4022	-0.800	-0.400	5.000	2605	4006	-9.196	4000
4000	0.480	-21.870	-5.440	4021	-0.920	-0.400	-0.837	2605	4006	-2.072	4000
4000	-0.300	-22.670	-7.330	4022	-0.920	-0.360	-7.474	2605	4006	7.345	4000
4000	-2.090	-23.640	-5.110	4022	-0.840	-0.360	-0.721	2605	4006	-3.255	4000
4000	-2.730	-25.250	-4.660	4022	-0.680	-0.320	-7.857	2605	4006	-9.455	2000
4000	-3.210	[illegible]	-3.210	4022	-0.520	-0.320	4006	2605	4006	4	4000
4000	-3.050	-25.470	-0.960	4022	-0.280	-0.320	4	2605	4006		

30.0160

4000	-2.730	-29.750	1.130	4022	-0.040	-0.320	-3.240	2605	4006	-0.180	43
4000	-1.760	-30.440	2.730	4022	0.040	-0.320	0.0	2605	4006	-0.270	4000
4000	-0.480	-31.350	4.820	4022	0.200	-0.360	-0.450	2605	4006	-0.194	4000
4000	0.640	-31.360	5.620	4022	0.280	-0.400	4.560	2605	4006	-9.196	4000
4000	1.760	-30.720	6.430	4022	0.320	-0.400	-0.902	2605	4006	-2.072	4000
4000	2.410	-29.430	7.550	4022	0.320	-0.440	-7.538	2605	4006	7.280	4010
4000	2.730	-27.920	5.790	4022	0.280	-0.440	-0.721	2605	4006	-3.255	4000
4000	2.090	-25.730	5.300	4022	0.280	-0.440	-7.792	2605	4006	-9.326	4764
4000	1.120	-23.540	4.500	4022	0.200	-0.440	4006	2605	4006	4	4000
4000	0.0	-22.030	4.340	4022	0.200	-0.400	4	2605	4006		

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-3.240	2605	[illegible]	-0.270	43
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	2605	[illegible]	-0.270	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.360	-0.450	2605	4006	-0.194	4000
4000	[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.320	5.000	2605	4006	-9.132	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.280	-0.902	2605	4006	-2.072	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.280	-7.538	2605	4006	7.280	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.280	-0.721	2605	4006	-3.190	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.280	-7.792	2605	4006	-9.196	1746
4000	[illegible]	[illegible]	12.060	4022	0.680	-0.280	4006	2605	4006	4	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.600	-0.280	4	2605	4005		

30.0360

4000	-1.600	-33.430	9.600	4022	0.490	-0.280	-3.240	2605	4006	-0.180	43
2000	-0.960	-27.130	6.910	4022	0.320	-0.280	0.0	2605	4006	-0.270	4000
2000	-0.480	-24.440	6.270	4022	0.160	-0.280	-0.360	2605	4006	-0.194	4000
2000	0.0	-21.710	5.910	4022	0.0	-0.320	4.560	2605	4006	-9.067	4000
2000	0.430	-19.790	5.790	4022	-0.120	-0.320	-0.902	2605	4006	-2.202	4000
2000	1.120	-19.330	6.270	4022	-0.280	-0.360	-7.538	2605	4006	7.216	4000
2000	1.290	-16.170	4.990	4022	-0.440	-0.360	-0.721	2605	4006	-3.255	4000
2000	1.280	-19.460	3.210	4022	-0.520	-0.360	-7.792	2605	4006	-9.196	7745
2000	0.930	-21.390	3.210	4022	-0.600	-0.400	7	2605	4006	4	4000
2000	0.320	-24.280	-0.320	4022	-0.600	-0.400	4	2605	4005		

30.0460

2000	0.0	-17.560	-2.090	4022	-0.640	-0.430	-3.240	2605	4006	-0.270	43
2000	-0.370	-30.720	-2.410	4022	-0.640	-0.360	0.0	2605	4006	-0.270	4000
4000	-0.400	-33.290	-6.270	4022	-0.640	-0.360	-0.450	2605	4006	-0.194	4000
2000	-1.400	-34.930	-5.910	4022	-0.630	-0.320	5.000	2605	4006	-8.937	4000
2000	-2.570	-35.540	-9.490	4022	-0.600	-0.320	-0.902	2605	4006	-2.202	4000
2000	-3.530	-34.930	-12.220	4022	-0.560	-0.280	-7.538	2605	4006	7.280	4000
2000	-4.130	-33.290	-13.830	4022	-0.490	-0.280	-0.721	2605	4006	-3.320	4000
2000	-3.690	-30.090	-14.470	4022	-0.440	-0.280	-7.792	2605	4006	-9.261	6763
2000	-2.570	-27.420	-13.670	4022	-0.360	-0.280	4006	2605	4006	4	4000
2000	-1.230	-24.770	-11.740	4022	-0.320	-0.280	4	2605	4006		

30.0560

2000	0.0	-21.710	-9.810	4022	-0.290	-0.360	-3.240	2605	4006	-0.270	43
4000	1.440	-19.460	-6.590	4022	-0.240	-0.400	0.0	2605	4006	-0.270	4000
4000	3.050	-18.170	0.160	4022	-0.280	-0.440	-0.450	2605	4006	-0.064	4000
4000	4.340	-18.170	3.210	4022	-0.290	-0.480	5.000	2605	4006	-3.808	4000
4000	5.460	-19.460	7.720	4022	-0.320	-0.520	-0.902	2605	4006	-2.202	4000
4000	6.430	-20.420	9.030	4022	-0.400	-0.560	-7.538	2605	4006	7.280	4000
4000	6.430	-22.510	10.610	4022	-0.480	-0.560	-0.787	2605	4006	-3.320	4000
4000	5.300	-24.930	10.610	4022	-0.520	-0.560	-7.857	2605	4006	-9.132	2000
4000	3.530	-26.860	7.070	4022	-0.560	-0.520	4066	2605	4006	4	4000
4000	1.600	-23.300	5.140	4022	-0.560	-0.480	4	2605	4006		

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	[illegible]	-[illegible].240	2605	4006	-0.180	43
[illegible]	-2.4[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.320	0.0	2605	4006	-0.270	4000
[illegible]	[illegible]	-31.360	0.600	4022	-0.200	-0.240	-0.450	2605	4006	0.064	4000
[illegible]	-7.270	-3[illegible].500	2.630	4022	0.0	-0.160	[illegible].000	2605	4006	-3.873	4000
[illegible]	-[illegible].680	-30.720	0.0	4022	0.120	-0.120	-0.902	2605	4006	-2.202	4000
4000	-[illegible].320	-2[illegible].750	-1.440	4022	0.320	-0.040	-7.539	2605	4006	7.230	4000
[illegible]	-[illegible].640	-28.790	-1.440	4022	0.440	-0.040	-0.721	2605	4006	-3.320	4000
4000	-7.720	-27.600	0.0	4022	0.4[illegible]	-0.040	-7.792	2605	4006	-9.261	4764
4000	-5.620	-26.050	0.0	4022	0.600	-0.040	4006	2605	4006	4	4000
4000	-3.050	-24.1[illegible]	0.800	4022	0.560	-0.080	4	2605	4006		

30.0760

4000	-0.800	-23.030	4.030	4022	0.440	-0.120	-3.150	2605	4006	-0.270	43
4000	0.800	-22.030	5.300	4022	0.150	-0.200	0.0	2605	4006	-0.270	4000
4000	2.570	-20.910	7.550	4022	0.0	-0.280	-0.450	2605	4006	0.064	4000
4000	4.130	-20.420	6.270	4022	-0.360	-0.320	4.960	2605	4006	-9.002	4000
4000	5.140	-20.580	7.070	4022	-0.720	-0.360	-0.837	2605	4006	-2.137	4000
1	5.620	-21.390	5.460	4022	-1.060	-0.440	-7.474	2605	4006	7.345	4000
4000	5.140	-22.510	1.760	4022	-1.320	-0.440	-0.721	2605	4006	-3.320	4000
4000	4.340	-23.480	-0.320	4022	-1.480	-0.440	-7.857	2605	4006	-9.261	1746
4000	3.050	-24.330	-1.440	4022	-1.600	-0.440	4006	2605	4006	4	4000
4000	1.600	-26.540	-3.050	4022	-1.600	-0.440	4	2605	4006		

30.0960

4000	0.0	-27.980	-0.800	4022	-1.520	-0.360	-3.150	2605	4006	-0.180	43
2000	-1.120	-28.750	-0.640	4022	-1.360	-0.320	0.0	2605	4006	-0.270	4000
2000	-2.890	-29.750	-0.160	4022	-1.120	-0.280	-0.450	2605	4006	0.064	4000
2000	-4.180	-30.070	0.960	4022	-0.880	-0.240	4.960	2605	4006	-9.132	4000
2000	-4.930	-29.750	-0.320	4022	-0.560	-0.200	-0.773	2605	4006	-2.072	4000
2000	-4.980	-29.790	-0.480	4022	-0.280	-0.200	-7.474	2605	4006	7.474	4000
2000	-4.320	-27.500	0.800	4022	-0.040	-0.160	-0.787	2605	4006	-3.320	4000
2000	-2.570	-26.210	0.0	4021	0.080	-0.160	-7.922	2605	4006	-9.132	7745
2000	-0.960	-24.510	3.210	4022	0.240	-0.200	4006	2605	4006	4	4000
200	0.480	-22.490	4.500	4022	0.280	-0.200	4	2605	4006		

30.0960

2000	1.930	-22.190	5.670	4022	0.280	-0.240	-3.150	2605	4006	-0.180	43
2000	3.050	-21.230	7.550	4022	0.200	-0.280	0.0	2605	4006	-0.270	4000
2000	3.860	-20.740	6.430	4022	0.080	-0.280	-0.450	2605	4006	0.0	4000
2000	4.660	-20.530	4.960	4022	0.0	-0.320	4.960	2605	4006	-9.261	4000
2000	5.140	-20.420	3.560	4022	-0.200	-0.320	-0.837	2605	4006	-2.072	4000
2000	5.300	-20.740	2.250	4022	-0.400	-0.320	-7.474	2605	4006	7.538	4000
2000	4.980	-21.230	1.600	4022	-0.520	-0.360	-0.721	2605	4006	-3.320	4000
2000	4.180	-22.350	0.480	4022	-0.640	-0.320	-7.922	2605	4006	-9.261	6763
2000	2.390	-23.160	1.930	4022	-0.720	-0.320	4006	2605	4006	4	4000
4000	1.440	-24.280	3.050	4022	-0.760	-0.320	4	2605	4006		

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.720	[illegible]	[illegible]	2605	[illegible]	[illegible]	43
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.600	[illegible]	[illegible]	2605	[illegible]	[illegible]	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.440	[illegible]	[illegible]	2605	4006	-0.064	4000
4000	-1.120	-27.340	[illegible]	4022	-0.320	[illegible]	4.960	2605	4006	-9.261	4000
4000	-0.800	-27.500	[illegible]	[illegible]	-0.160	[illegible]	[illegible]	2605	4006	-2.072	4000
4000	[illegible]	[illegible]	[illegible]	4022	0.0	-0.280	[illegible]	2605	4006	7.539	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.040	[illegible]	[illegible]	2605	4006	[illegible]	4000
4000	0.320	[illegible]	[illegible]	4022	0.200	-0.280	[illegible]	2605	4006	-9.196	2000
4000	0.800	[illegible]	[illegible]	4022	0.280	-0.280	4006	2605	4006	4	4000
[illegible]	0.600	-26.700	[illegible]	[illegible]	0.280	-0.280	[illegible]	2605	4006		

30.1160

4000	0.160	-26.210	5.270	4022	0.280	-0.280	-3.240	2605	4006	-0.270	43
4000	-0.320	-25.250	4.660	4022	0.280	-0.280	0.0	2605	4006	-0.270	4000
4000	-1.440	-24.120	2.410	4022	0.240	-0.240	-0.360	2605	4006	-0.129	4000
4000	-2.410	-23.160	-0.480	4022	0.240	-0.240	5.000	2605	4006	-9.261	4000
4000	-3.690	-22.510	0.160	4022	0.200	-0.200	-0.837	2605	4006	-2.137	4000
4000	-4.550	-22.350	0.160	4022	0.200	-0.200	-7.538	2605	4006	7.538	4000
4000	-5.300	-22.840	-0.320	4022	0.200	-0.200	-0.721	2605	4006	-3.320	4000
4000	-5.790	-23.800	1.760	4022	0.240	-0.160	-7.727	2605	4006	-9.132	4764
4000	-6.270	-25.410	2.890	4022	0.280	-0.160	4006	2605	4006	4	4000
4000	-5.950	-27.340	1.930	4022	0.280	-0.160	4	2605	4006		

30.1260

4000	-4.980	-29.410	3.370	4022	0.320	-0.320	-3.240	2605	4006	-0.180	43
1	-3.210	-30.720	1.440	4022	0.290	-0.200	0.0	2605	4006	-0.180	4000
4000	-1.600	-31.520	3.050	4022	0.160	-0.240	-0.450	2605	4006	-0.129	4000
4000	-0.160	-31.360	2.250	4022	0.0	-0.280	4.960	2605	4006	-9.261	4000
4000	0.900	-30.230	2.890	4022	-0.080	-0.280	-0.837	2605	4006	-2.197	4000
4000	2.250	-28.470	4.980	4022	-0.280	-0.320	-7.603	2605	4006	7.474	4000
4000	3.370	-26.050	4.180	4022	-0.520	-0.360	-0.656	2605	4006	-3.255	4000
4000	3.690	-23.480	6.750	4022	-0.680	-0.360	-7.727	2605	4006	-9.196	1746
1	3.370	-21.300	6.270	4022	-0.840	-0.360	4006	2605	4006	4	4000
1	2.730	-19.940	5.110	4022	-0.920	-0.360	4	2605	4006		

30.1350

1	1.760	-19.620	5.950	4022	-0.960	-0.400	-3.240	2605	4006	-0.180	43
2000	1.120	-20.250	4.980	4022	-0.920	-0.360	0.0	2605	4006	-0.270	4000
2000	0.320	-21.710	5.460	4022	-0.840	-0.360	-0.450	2605	4006	-0.064	4000
2000	0.0	-24.440	3.690	4022	-0.690	-0.320	4.960	2605	4006	-3.261	4000
2000	-0.800	-27.340	3.490	4022	-0.520	-0.280	-0.837	2605	4006	-2.202	4000
2000	-1.440	-30.070	2.350	4022	-0.320	-0.280	-7.603	2605	4006	7.474	4000
2000	-2.250	-32.650	1.120	4022	-0.120	-0.240	-0.656	2605	4006	-3.255	4000
2000	-3.090	-34.100	1.760	4022	0.0	-0.200	-7.727	2605	4006	-9.132	7745
2000	-3.690	-34.420	0.800	4022	0.0	-0.160	4006	2605	4006	4	4000
2000	-3.530	-33.450	-1.750	4022	0.040	-0.160	4	2605	4006		

30.1450?

[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.120	-3.240	2605	4006	-0.190	43
[illegible]	[illegible]	[illegible]	[illegible]	4022	[illegible]	-0.140?	0.0	2605	4006	-0.270	4000
3000?	[illegible]	[illegible]	-3.240	4022	0.0	-0.160	-0.450	2605	4006	-0.064	4000
[illegible]	[illegible]	-21.550	-4.940	4022	0.0	-0.200	5.000	2605	4006	-9.196	4000
[illegible]	[illegible]	-18.990?	-2.990?	4022	-0.040?	-0.240	-0.773	2605	4006	-2.137	4000
[illegible]	[illegible]	-17.310?	[illegible]	4022	-0.200?	-0.240?	-7.603	2605	4006	7.474	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	-0.280?	-0.280	-0.721	2605	4006	-3.255	4000
3000?	2.770?	[illegible]	[illegible]	4022	-0.360?	-0.320	-7.727	2605	4006	-8.273	5763
2000?	3.370	[illegible]	5.400	4022	-0.440	-0.360	4006	2605	4006	4	4000
[illegible]	3.690	[illegible]	3.530	4022	-0.520	-0.400	4	2605	4006		

30.1560

2000	3.370	-23.960	2.410	4022	-0.600	-0.400	-3.240	2605	4006	-0.270	43
4000	3.050	-26.370	3.690	4022	-0.640	-0.400	0.0	2605	4006	-0.270	4000
4000	2.410	-28.630	0.960	4022	-0.640	-0.360	-0.450	2605	4006	0.064	4000
4000	0.960	-30.400	2.090	4022	-0.640	-0.320	5.000	2605	4006	-9.196	4000
4000	-0.480	-31.680	1.120	4022	-0.600	-0.280	-0.773	2605	4006	-2.202	4000
4000	-2.410	-32.650	-0.480	4022	-0.520	-0.200	-7.538	2605	4005	7.476	4000
4000	-4.180	-32.910	-2.250	4022	-0.400	-0.160	-0.656	2605	4006	-3.320	4000
4000	-5.450	-32.650	-5.620	4022	-0.280	-0.120	-7.792	2605	4006	-9.196	2030
4000	-6.270	-31.520	-6.270	4022	-0.120	-0.080	4005	2605	4006	4	4000
4000	-6.270	-30.560	-8.680	4022	0.0	-0.080	4	2605	4006		

30.1660

4000	-5.620	-29.110	-7.720	4022	0.0	-0.120	-3.150	2605	4006	-0.180	43
4000	-4.180	-27.340	-5.460	4022	0.080	-0.120	0.0	2605	4006	-0.270	4000
4000	-2.410	-25.570	-2.250	4022	0.120	-0.160	-0.450	2605	4006	0.194	4000
4000	-0.480	-24.280	1.600	4022	0.120	-0.200	5.000	2605	4006	-9.261	4000
4000	0.640	-23.480	5.140	4022	0.040	-0.240	-0.708	2605	4006	-2.137	4000
4000	2.250	-23.160	7.230	4022	0.0	-0.280	-7.538	2605	4006	7.538	4000
4000	3.530	-22.840	9.970	4022	-0.120	-0.360	-0.656	2605	4006	-3.320	4000
4000	4.530	-22.840	9.910	4022	-0.280	-0.400	-7.792	2605	4006	-9.132	4764
4000	4.990	-23.160	7.720	4022	-0.440	-0.440	4006	2605	4006	4	4000
4000	4.990	-23.640	6.590	4022	-0.600	-0.440	4	2605	4006		

30.1760

4000	4.340	-24.170	3.530	4022	-0.720	-0.440	-3.240	2605	4006	-0.270	43
4000	3.050	-24.280	6.590	4022	-0.800	-0.440	0.0	2605	4006	-0.270	4000
1	1.440	-24.930	5.300	4022	-0.800	-0.400	-0.450	2605	4006	0.194	4000
4000	-0.160	-25.570	5.140	4022	-0.720	-0.360	4.960	2605	4006	-9.261	4000
1	-2.090	-26.050	5.300	4022	-0.600	-0.280	-0.708	2605	4006	-2.072	4000
1	-3.690	-26.540	4.530	4022	-0.440	-0.280	-7.474	2605	4006	7.538	4000
4000	-4.980	-26.540	5.620	4022	-0.280	-0.240	-0.656	2605	4006	-3.320	4000
4000	-5.460	-26.700	3.530	4022	-0.120	-0.200	-7.857	2605	4006	-9.132	1766
1	-4.990	-26.860	2.410	4022	0.0	-0.200	4006	2605	4006	4	4000
4000	-3.690	-26.370	4.500	4022	0.120	-0.160	4	2605	4006		

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.2[illegible]	-0.200	-3.240	2605	4006	-0.180	43
[illegible]	[illegible]	-24.9[illegible]	[illegible]	[illegible]	0.240	-0.200	0.0	2605	4006	-0.270	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.200	-0.240	-0.450	2605	4006	0.194	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.340	-0.280	5.000	2605	4006	-9.261	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.0	-0.280	-0.708	2605	4006	-2.072	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	-0.200	-0.320	-7.409	2605	4006	7.538	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	-0.400	-0.360	-0.721	2605	4006	-3.320	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	-0.600	-0.360	-7.857	2605	4006	-9.196	7745
[illegible]	[illegible]	-19.7[illegible]	-1.440	4022	-0.720	-0.400	7	2605	4006	4	4000
[illegible]	[illegible]	[illegible]	-2.250	4022	-0.600	-0.400	4	2605	4006		

30.1960

2000	1.370	-23.350	-1.760	4022	-0.840	-0.400	-3.240	2605	4006	-0.270	43
2000	1.280	-24.280	-2.570	4022	-0.840	-0.400	0.0	2605	4006	-0.270	4000
2000	0.160	-24.370	-3.690	4022	-0.760	-0.360	-0.450	2605	4006	0.194	4000
2000	-0.490	-25.140	-1.760	4022	-0.640	-0.360	5.000	2605	4006	-9.132	4000
2000	-1.440	-25.430	-3.210	4022	-0.480	-0.360	-0.708	2605	4006	-2.072	4000
2000	-1.930	-30.230	-2.730	4022	-0.320	-0.320	-7.538	2605	4006	7.550	4000
2000	-1.930	-30.070	0.0	4022	-0.120	-0.320	-0.721	2605	4006	-3.320	4000
2000	-1.600	-25.590	0.480	4022	0.0	-0.320	-7.857	2605	4006	-9.261	6763
2000	-1.120	-26.790	3.360	4022	0.080	-0.320	4006	2605	4006	4	4000
2000	-3.320	-27.998	6.270	4022	0.200	-0.320	4	2605	4006		

30.2360

2000	0.0	-27.140	6.270	4022	0.280	-0.320	-3.240	2605	4006	-0.180	43
4000	0.320	-26.370	7.550	4022	0.360	-0.360	0.0	2605	4006	-0.270	4000
4000	0.320	-25.570	5.950	4022	0.360	-0.360	-0.450	2605	4006	0.194	4000
4000	0.490	-24.770	5.750	4022	0.360	-0.360	4.968	2605	4006	-9.067	4000
4000	0.490	-24.120	4.110	4022	0.280	-0.400	-0.773	2605	4006	-2.137	4000
4000	0.480	-23.480	6.430	4022	0.240	-0.400	-7.603	2605	4006	7.474	4000
4000	0.160	-22.840	7.720	4022	0.200	-0.360	-0.721	2605	4006	-3.320	4000
4000	-0.160	-22.670	9.490	4022	0.160	-0.360	-7.922	2605	4006	-9.196	2000
4000	-1.280	-22.670	10.930	4022	0.120	-0.360	4006	2605	4006	4	4000
4000	-2.570	-23.320	11.740	4022	0.120	-0.320	4	2605	4006		

30.2160

4000	-4.[illegible]	-24.120	12.540	4022	0.120	-0.320	-3.240	2605	4006	[illegible]	43
4000	-4.[illegible]	-25.090	11.090	4022	0.160	-0.280	0.0	2605	4006	[illegible]	4000
4000	-5.[illegible]	-26.370	10.130	4022	0.160	-0.280	-0.450	2605	4006	[illegible]	4000
4000	-4.[illegible]	-27.500	9.610	4022	0.200	-0.280	4.960	2605	4006	-8.937	4000
4000	-4.320	-27.140	9.150	4022	0.240	-0.280	-0.837	2605	4006	-2.[illegible]	4000
4000	-4.020	-28.300	7.550	4022	0.240	-0.280	-7.667	2605	4006	7.345	4000
4000	-2.890	-27.500	5.790	4022	0.200	-0.280	-0.656	2605	4006	-3.320	4000
4000	-1.760	-26.700	8.040	4022	0.160	-0.280	-7.922	2605	4006	-9.002	4764
4000	-0.800	-25.570	8.200	4022	0.120	-0.280	4006	2605	4006	4	4000
1	-0.160	-24.120	7.860	4022	0.0	-0.280	4	2605	4006		

30.2260

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.040	-0.280	-3.240	2605	4006	-0.180	43
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.700	-0.320	0.0	2605	4006	-0.270	4000
[illegible]	1.600	[illegible]	3.370	[illegible]	-0.360	-0.320	-0.450	2605	4006	0.194	4000
4000	2.340	-21.230	1.760	4022	-0.520	-0.340	5.000	2605	4006	-8.808	4000
[illegible]	1.410	[illegible]	-1.750	4022	-0.640	-0.260	-0.837	2605	4006	-2.331	4000
[illegible]	2.250	[illegible]	[illegible]	4022	-0.760	-0.400	-7.796	2605	4006	7.280	4000
[illegible]	1.440	[illegible]	[illegible]	[illegible]	-0.840	-0.400	[illegible]	2605	4006	-3.320	4000
[illegible]	[illegible]	[illegible]	-3.370	[illegible]	-0.920	-0.360	-7.922	2605	4006	-8.937	1746
[illegible]	0.0	-31.040	-3.690	4022	-0.880	-0.360	4006	2605	4006	4	4000
[illegible]	[illegible]	[illegible]	-4.590	4022	-0.840	-0.360	4	2605	4006		

30.2360

4000	-1.600	-34.100	-7.680	4022	-0.760	-0.320	-3.150	2605	4006	-0.180	43
2000	-2.410	-34.260	-8.580	4022	-0.640	-0.320	0.0	2605	4006	-0.270	4000
2000	-2.730	-33.450	-11.420	4022	-0.560	-0.280	-0.450	2605	4006	0.194	4000
2000	-2.410	-31.840	-9.970	4022	-0.480	-0.280	5.000	2605	4006	-8.678	4000
2000	-1.760	-29.590	-11.740	4022	-0.400	-0.280	-0.837	2605	4006	-2.331	4000
2000	-0.800	-26.540	-9.810	4022	-0.320	-0.280	-7.796	2605	4006	7.345	4000
2000	0.0	-23.160	-5.140	4022	-0.280	-0.280	-0.590	2605	4006	-3.320	4000
2000	0.480	-20.740	-4.180	4022	-0.280	-0.320	-7.922	2605	4006	-8.743	7745
2000	1.280	-18.650	1.120	4022	-0.240	-0.360	4066	2605	4006	4	4000
2000	2.250	-17.530	4.190	4022	-0.240	-0.360	4	2605	4006		

30.2460

2000	3.050	-17.370	5.140	4022	-0.240	-0.400	-3.240	2605	4006	-0.270	43
2000	3.690	-16.010	8.680	4022	-0.280	-0.440	0.0	2605	4006	-0.270	4000
2000	4.020	-19.780	7.720	4022	-0.280	-0.440	-0.450	2605	4006	0.259	4000
2000	4.020	-21.670	7.550	4022	-0.320	-0.440	4.960	2605	4006	-8.613	4000
2000	3.370	-24.120	6.910	4022	-0.320	-0.400	-0.837	2605	4006	-2.331	4000
2000	2.250	-26.370	6.430	4022	-0.360	-0.360	-7.731	2605	4006	7.409	4000
2000	0.800	-28.470	5.790	4022	-0.360	-0.320	-0.590	2605	4006	-3.320	4000
2000	-0.640	-30.400	5.300	4022	-0.360	-0.280	-7.857	2605	4006	-8.987	6763
4000	-2.410	-31.680	4.020	4022	-0.320	-0.200	4006	2605	4006	4	4000
2000	-3.860	-32.170	2.890	4022	-0.280	-0.160	4	2605	4006		

30.2560

2000	-5.140	-31.680	-0.490	4022	-0.280	-0.120	-3.240	2605	4006	-0.180	43
4000	-6.110	-30.980	-3.050	4022	-0.200	-0.080	0.0	2605	4006	-0.270	4000
4000	-6.270	-29.430	-4.980	4022	-0.160	-0.040	-0.450	2605	4006	0.259	4000
4000	-5.620	-27.660	-5.140	4022	-0.080	-0.080	4.968	2605	4006	-8.613	4000
4000	-4.660	-25.570	-3.370	4022	-0.040	-0.080	-0.708	2605	4006	-2.396	4000
4000	-3.050	-23.960	0.0	4022	-0.040	-0.120	-7.667	2605	4006	7.538	4000
4000	-1.600	-22.840	3.690	4022	-0.040	-0.120	-0.524	2605	4006	-3.320	4000
4000	-0.160	-22.350	5.300	4022	-0.120	-0.200	-7.857	2605	4006	-8.808	2030
4000	0.648	-22.030	6.380	4022	-0.240	-0.240	4006	2605	4006	4	4000
4000	1.760	-22.190	6.270	4022	-0.360	-0.280	4	2605	4006		

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	4006	-0.270	43
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	2605	4006	-0.270	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.760	[illegible]	-0.450	2605	4006	0.259	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.800	[illegible]	4.960	2605	4006	-8.678	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.360	-0.579	2605	4006	-2.266	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	4006	7.667	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.524	2605	4006	-3.320	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.240	-7.792	2605	4006	-8.873	4764
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.640	-0.200	4006	2605	4006	4	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.200	4	2605	4006		

30.2750

[illegible]	[illegible]	-17.500	[illegible]	4022	-0.360	-0.200	-3.150	2605	4006	-0.180	43
[illegible]	[illegible]	[illegible]	-1.760	4022	-0.200	-0.230	0.0	2605	4006	-0.270	4000
4000	-2.690	[illegible]	-0.320	4022	-0.040	-0.200	-0.450	2605	4006	0.259	4000
4000	-1.440	-25.090	1.760	4022	0.0	-0.200	4.960	2605	4006	-8.678	4000
1	0.0	-24.280	4.820	4022	0.0	-0.240	-0.579	2605	4006	-2.202	4000
4000	1.630	-23.490	6.040	4022	0.0	-0.240	-7.538	2605	4006	7.796	4000
1	3.050	-22.510	8.260	4022	0.0	-0.280	-0.524	2605	4006	-3.320	4000
1	4.020	-21.550	7.720	4022	-0.120	-0.320	-7.857	2605	4006	-8.808	1746
1	4.820	-20.420	7.720	4022	-0.240	-0.360	4006	2605	4006	4	4000
1	5.330	-19.620	5.460	4022	-0.400	-0.360	4	2605	4006		

30.2950

4000	[illegible]	-19.140	[illegible]	4022	-0.560	-0.360	-3.150	2605	4006	-0.270	43
2000	[illegible]	-19.140	[illegible]	4022	-0.680	-0.360	0.0	2605	4006	-0.270	4000
2000	[illegible]	-19.780	[illegible]	4022	-0.760	-0.360	-0.450	2605	4006	0.259	4000
2000	7.250	-20.740	[illegible]	4022	-0.900	-0.360	5.000	2605	4006	-8.613	4000
2000	[illegible]	-22.190	[illegible]	4022	-0.760	-0.320	-0.644	2605	4006	-2.202	4000
2000	-1.120	-23.960	[illegible]	4022	-0.680	-0.280	-7.538	2605	4006	7.925	4000
2000	[illegible]	-25.570	1.750	4022	-0.560	-0.280	-0.524	2605	4006	-3.235	4000
2000	-2.890	-27.180	1.930	4022	-0.400	-0.240	-7.857	2605	4006	-8.873	7745
2000	-3.210	-28.300	2.410	4022	-0.208	-0.240	4006	2605	4006	4	4000
2000	[illegible]	-28.790	3.530	4022	0.0	-0.240	4	2605	4006		

30.2960

2000	-2.250	-29.270	4.660	4022	0.040	-0.200	-3.150	2605	4006	-0.180	43
2000	[illegible]	-29.430	6.750	4022	0.160	-0.240	0.0	2605	4006	-0.270	4000
4000	[illegible]	-25.110	8.200	4022	0.240	-0.240	-0.450	2605	4006	0.323	4000
2000	[illegible]	-28.690	[illegible]	4022	0.240	-0.240	4.960	2605	4006	-8.613	4000
4000	[illegible]	-27.820	[illegible]	4022	0.200	-0.280	-0.579	2605	4006	-2.202	4000
2000	[illegible]	[illegible]	5.300	4022	0.160	-0.280	-7.538	2605	4006	7.925	4000
2000	0.800	-25.570	2.730	4022	[illegible]	-0.280	-0.524	2605	4006	-3.198	4000
2000	0.960	-24.280	0.800	4022	0.0	-0.320	-7.792	2605	4006	-8.808	6763
2000	0.480	-23.320	0.0	4022	0.0	-0.320	4006	2605	4006	4	4000
2000	0.0	-22.676	0.0	4022	0.0	-0.320	4	2605	4006		

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2605	4006	-0.270	43
[illegible]	[illegible]	-22.670	[illegible]	[illegible]	0.0	-0.280	0.0	2605	4006	-0.270	4000
4000	[illegible]	-23.320	[illegible]	[illegible]	0.0	-0.280	[illegible]	2605	4006	0.259	4000
4000	[illegible]	-24.930	[illegible]	[illegible]	[illegible]	-0.280	5.000	2605	4006	-8.613	4000
4000	-4.320	-25.540	[illegible]	[illegible]	[illegible]	-0.280	[illegible]	2605	4006	-2.266	4000
[illegible]	[illegible]	-26.140	[illegible]	[illegible]	[illegible]	-0.280	-7.533	2605	4006	7.925	[illegible]
[illegible]	-3.680	[illegible]	[illegible]	[illegible]	0.200	-0.280	[illegible]	2605	4006	-3.190	[illegible]
[illegible]	-2.410	-30.230	[illegible]	[illegible]	0.200	-0.280	-7.727	2605	4006	-8.937	2000
4000	-1.440	-30.560	4.660	4022	0.200	-0.280	4006	2605	4006	4	4000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.120	-0.280	4	2605	4006		

30.3160

4000	0.0	-23.300	5.790	4022	0.040	-0.280	-3.150	2605	4006	-0.270	43
4000	0.160	-26.370	6.750	4022	0.0	-0.280	0.0	2605	4006	-0.270	4000
4000	0.640	-24.440	6.910	4022	-0.040	-0.320	-0.450	2605	4006	0.259	4000
4000	1.120	-22.510	7.720	4022	-0.160	-0.320	4.960	2605	4006	-8.545	4000
4000	1.600	-20.740	7.230	4022	-0.240	-0.360	-0.579	2605	4006	-2.266	4000
4000	2.090	-15.940	6.110	4022	-0.360	-0.360	-7.538	2605	4006	7.925	4000
4000	2.410	-20.260	5.270	4022	-0.440	-0.360	-0.524	2605	4006	-3.190	4000
4000	2.570	-21.550	4.660	4022	-0.490	-0.360	-7.662	2605	4006	-8.743	4764
4000	2.570	-23.490	5.300	4022	-0.520	-0.360	4066	2605	4006	4	4000
4000	2.090	-26.210	5.460	4022	-0.520	-0.360	4	2605	4006		

30.3260

4000	1.290	-25.950	4.190	4022	-0.520	-0.360	-3.150	2605	4006	-0.180	43
4000	0.430	-31.360	3.570	4022	-0.520	-0.320	0.0	2605	4006	-0.270	4000
1	0.0	-33.450	0.0	4022	-0.520	-0.320	-0.450	2605	4006	0.323	4000
1	-0.960	-34.260	-1.930	4022	-0.520	-0.280	5.000	2605	4006	-8.549	4000
1	-1.630	-33.930	-4.980	4022	-0.480	-0.280	-0.579	2605	4006	-2.266	4000
4000	-2.250	-32.810	-6.110	4022	-0.440	-0.280	-7.538	2605	4006	7.925	4000
4000	-2.730	-30.800	-7.550	4022	-0.400	-0.240	-0.526	2605	4006	-3.125	4000
1	-2.890	-28.300	-6.590	4022	-0.320	-0.240	-7.662	2605	4006	-8.404	1746
4000	-2.570	-25.570	-6.530	4022	-0.260	-0.240	4006	2605	4006	4	4000
1	-1.760	-22.840	-5.140	4022	-0.150	-0.240	4	2605	4006		

30.3360

4000	-0.490	-20.740	-3.370	4022	-0.120	-0.280	-3.150	2605	4006	-0.270	43
2000	0.160	-15.620	-1.760	4022	-0.040	-0.280	0.0	2605	4006	-0.270	4000
2000	0.960	-16.910	0.160	4022	-0.090	-0.320	-0.450	2605	4006	0.388	4000
2000	1.760	-19.140	1.600	4022	-0.120	-0.360	4.960	2605	4006	-8.549	4000
2000	2.930	-20.100	1.600	4022	-0.150	-0.360	-0.644	2605	4006	-2.202	4000
2000	3.350	-21.710	2.730	4022	-0.240	-0.400	-7.603	2605	4006	7.860	4000
2000	4.180	-23.640	3.860	4022	-0.280	-0.400	-0.524	2605	4006	-3.190	4000
2000	3.690	-25.570	3.690	4022	-0.320	-0.400	-7.662	2605	4006	-8.678	7745
2000	2.410	-27.340	2.410	4022	-0.360	-0.400	4006	2605	4006	4	4000
2000	[illegible]	-29.110	2.090	4022	-0.360	-0.360	4	2605	4006		

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	4022	-0.280	-0.320	-3.150	2605	4006	-0.180	43
[illegible]	[illegible]	[illegible]	[illegible]	4022	-0.240	-0.240	0.0	2605	4006	-0.180	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	-0.120	-0.240	-0.450	2605	4006	0.518	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.0	-0.200	5.000	2605	4006	-5.678	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.040	-0.160	-0.579	2605	4006	-2.202	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.160	-0.120	[illegible]	2605	4006	7.960	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.240	-0.120	-0.524	2605	4006	-3.190	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.320	-0.160	-7.662	2605	4006	-8.549	6763
[illegible]	-2.090	[illegible]	[illegible]	4022	0.280	-0.160	4006	2605	4006	4	4000
[illegible]	[illegible]	[illegible]	[illegible]	4022	0.240	-0.200	4	2605	4006		

30.3550

2000	3.300	-23.640	4.110	4022	0.120	-0.240	-3.150	2605	4006	-0.270	43
4000	2.250	-22.350	6.750	4022	0.0	-0.280	0.0	2605	4006	-0.270	4000
4000	3.050	-21.550	7.830	4022	-0.120	-0.320	-0.450	2605	4006	0.518	4000
4000	3.860	-21.390	7.550	4022	-0.360	-0.360	4.960	2605	4006	-8.808	4000
4000	4.130	-21.230	8.200	4022	-0.560	-0.400	-0.644	2605	4006	-2.202	4000
4000	4.180	-21.710	7.550	4022	-0.720	-0.400	-7.538	2605	4006	7.989	4000
4000	3.530	-22.510	7.390	4022	-0.800	-0.400	-0.524	2605	4006	-3.125	4000
4000	2.250	-23.640	8.040	4022	-0.840	-0.400	-7.597	2605	4006	-8.613	2000
4000	3.800	-25.090	5.140	4022	-0.840	-0.360	4006	2605	4006	4	4000
4000	-0.160	-26.210	4.500	4022	-0.760	-0.320	4	2605	4006		

30.3650

4000	-1.280	-27.190	3.370	4022	-0.640	-0.280	-3.150	2605	4006	-0.180	43
4000	-2.410	-26.140	4.130	4022	-0.480	-0.280	0.0	2605	4006	-0.270	4000
4000	-3.050	-26.300	4.130	4022	-0.320	-0.240	-0.450	2605	4006	0.518	4000
4000	-3.370	-26.140	3.210	4022	-0.120	-0.200	4.960	2605	4006	-9.002	4000
4000	-3.050	-27.500	1.630	4022	0.0	-0.200	-0.579	2605	4006	-2.137	4000
4000	-2.730	-26.210	3.210	4022	0.080	-0.200	-7.409	2605	4006	8.054	4000
4000	-2.090	-25.090	1.930	4022	0.160	-0.200	-0.524	2605	4006	-3.059	4000
4000	-1.120	-23.800	3.370	4022	0.200	-0.200	-7.597	2605	4006	-8.549	4764
4000	0.0	-22.510	3.050	4022	0.200	-0.240	4006	2605	4006	4	4000
4000	3.800	-21.550	2.410	4022	0.120	-0.240	4	2605	4006		

30.3760

4000	1.930	-20.740	1.760	4022	0.0	-0.280	-3.150	2605	4006	-0.180	43
4000	2.890	-20.420	1.933	4022	0.0	-0.280	0.0	2605	4006	-0.270	4000
4000	3.690	-20.420	-0.480	4022	-0.120	-0.320	-0.450	2605	4006	0.518	4000
1	4.340	-20.310	0.540	4022	-0.280	-0.360	5.000	2605	4006	-9.067	4000
4000	4.340	-21.870	-0.160	4022	-0.400	-0.360	-0.644	2605	4006	-2.072	4000
4000	3.690	-23.000	-1.120	4022	-0.480	-0.360	-7.280	2605	4006	8.118	4000
4000	2.570	-24.120	-1.600	4022	-0.520	-0.360	-0.524	2605	4006	-3.059	4000
1	1.120	-25.250	-2.410	4022	-0.560	-0.360	-7.662	2605	4006	-8.613	1748
4000	0.0	-25.890	-3.530	4022	-0.520	-0.360	4006	2605	4006	4	4000
4000	-0.960	-26.370	-2.090	4022	-0.440	-0.320	4	2605	4006		

The analysis presented in paragraph 4.1 was performed on the data shown in the engineering units printout plus the data recorded in the succeeding two second period.

The data from the entire run is available on IBM compatible 9 track tape. Small representative samples were printed in engineering units in order to verify that the data was recorded, decommutated, converted and formatted properly.

3.2 Phase B Data

The engineering units printout shown on pages 49 through 62 is from a Phase B test flight flown on 24 August 1971. The sample of data shown represents the data collected for a period of approximately 1/2 second.

The fourth engineering units data frame on page 49 is the sample data frame converted from the octal data as described in paragraph 2.6.

The data used for the analysis, performed in paragraph 4.2 and 4.3, on the LVDTs and accelerometers was part of a "straight and level" flight from Run 138.

4.0 Subsystem Validation

The following paragraphs present an analysis of retrieved data samples employing various statistical techniques for the purpose of verifying the performance of the airborne instrumentation.

Statistical operations were performed to obtain the data averages, RMS values, frequency spectrum profiles (Fourier analysis) and correlation between sensor data for the angle of attack transmitters, linear variable differential transformers and the inertial reference system accelerometers. The relative tracking of the above mentioned sensors is illustrated in X-Y plots of the retrieved data.

Analysis was performed on the trigger and IR detector data to determine the firing delay characteristics of the rocket system and the average velocity of the 2.75" Rockets.

All statistical calculations were performed on an IBM 360 computer.

4.1 Angle of Attack Transmitter Analysis

A sample of the data used for the analysis of the angle of attack transmitters (AAT) for Run 35 is shown on pages 22 through 47 . The data upon which the analysis was performed was recorded during a Phase A Configuration 2 flight on June 23, 1971. The sample was retrieved during a one second period. The analysis was performed upon this data and the data in the succeeding two second interval.

ENGINEERING UNITS PRINTOUT (PHASE E)

2.7930

4036	5.42	-41.21	16.48	4011	-1.300	-0.850	-4.500	5412	15	0.0	212
4035	3.41	-38.00	15.29	4011	-1.400	-0.750	-0.180	5412	15	-0.03	4000
4035	2.81	-35.58	15.38	4011	-1.500	-0.550	-0.090	5412	15	4.47	4000
4035	1.00	-32.97	14.87	4011	-1.550	-0.350	-3.700	5412	15	-9.52	I
4035	0.0	-31.16	12.86	4011	-1.500	-0.300	-0.017	5412	15	-0.32	4000
4035	-3.01	-30.15	10.45	10	-1.400	-0.050	-0.025	5412	15	-2.77	4000
4036	-3.61	-30.96	7.84	4011	-1.250	0.0	0.032	5412	15	2.21	4000
4035	-4.22	-32.37	5.83	4011	-1.100	0.0	-0.045	5412	15	-5.18	2000
4035	-3.82	-36.19	3.92	10	-0.900	0.150	-0.014	5412	15	I	4000
4035	-3.41	-40.81	1.60	10	-0.650	0.100	-0.030	5412	15		

2.8030

4035	-3.82	-44.43	-0.60	10	-0.450	0.150	-4.500	5412	15	-0.01	212
4035	-4.02	-45.03	-3.21	10	-0.250	0.100	-0.180	5412	15	-0.04	4000
4036	-6.03	-47.24	-5.02	10	0.0	0.0	-0.180	5412	15	4.53	4000
4036	-11.46	-45.23	-6.03	10	0.100	0.0	4.750	5412	15	-9.39	I
4036	-13.26	-41.82	-6.83	10	0.350	0.0	0.009	5412	15	-0.32	4000
4035	-15.07	-35.18	-8.24	10	0.500	0.0	-0.024	5412	15	-2.77	4000
4036	-12.46	-29.15	-9.04	10	0.600	-0.100	0.006	5412	15	2.28	4000
4036	-7.43	-20.70	-9.24	10	0.700	-0.150	-0.035	5412	15	-5.18	4764
4036	-1.60	-15.48	-8.24	10	0.700	-0.190	-0.011	5412	15	I	4000
4036	1.40	-12.26	-6.43	10	0.650	-0.300	-0.030	5412	15		

2.8130

4036	3.01	-11.25	-4.82	10	0.500	-0.300	-4.500	5412	15	-0.01	212
4036	4.82	-10.45	-3.61	10	0.250	-0.500	-0.180	5412	15	-0.04	4000
4036	10.05	-12.46	-1.80	10	0.0	-0.650	-0.180	5412	15	4.53	4000
4035	15.07	-14.47	0.0	4011	0.0	-0.750	-0.250	5412	15	-9.39	I
37	20.70	-18.09	2.21	10	-0.800	-0.950	0.050	5412	15	-0.26	4000
4036	23.12	-23.92	4.22	10	-1.250	-1.050	-0.019	5412	15	-2.71	4000
4036	23.92	-28.05	6.43	10	-1.750	-1.250	-0.032	5412	15	2.28	4300
4036	20.10	-32.37	8.24	4011	-2.200	-1.350	-0.020	5412	15	-5.12	1745
4036	15.28	-35.78	9.65	4011	-2.550	-1.300	0.007	5412	15	I	4000
4036	8.24	-39.40	11.05	4011	-2.800	-1.350	-0.051	5412	15		

2.8230

4036	2.41	-41.01	12.06	10	-2.900	-1.200	-4.410	5412	15	-0.03	212
4036	-5.83	-40.61	12.26	4011	-2.800	-0.950	-0.180	5412	15	-0.03	4000
4036	-10.45	-39.80	11.05	10	-2.600	-0.750	-0.180	5412	15	4.60	4000
4036	-15.07	-39.60	9.04	4011	-2.250	-0.350	-4.000	5412	15	-9.39	I
4036	-18.29	-41.82	7.23	4011	-1.750	-0.050	0.075	5412	15	-0.19	4000
4036	-21.71	-41.41	6.23	4011	-1.300	0.250	-0.017	5412	15	[illegible]	[illegible]
37	-22.71	-40.41	4.62	10	-0.750	0.550	-0.060	5412	15	2.28	[illegible]
4036	-18.89	-39.00	2.01	10	-0.200	0.750	0.0	5412	15	-5.18	7745
4036	-13.06	-35.38	-0.40	4011	0.100	0.950	0.011	5412	15	I	4000
4036	-7.84	-33.17	-6.03	4011	0.550	0.950	-0.038	5412	15		

2.8330

4036	-2.21	-30.96	-4.42	10	0.850	0.850	-4.410	5412	15	-0.03	212
4035	-0.60	-29.75	-5.42	4011	1.050	0.650	-0.180	5412	15	-0.02	4000
403.	0.0	-27.94	-7.03	4011	1.150	0.300	-0.180	5412	15	4.60	4000
403.	0.60	-26.74	-8.84	4011	1.150	0.050	4.800	5412	15	-9.52	1
4036	1.20	-28.34	-9.65	10	1.100	-0.300	0.087	5412	15	-0.26	4000
4036	1.80	-28.75	-9.44	4011	0.950	-0.650	-0.022	5412	15	-2.64	4000
4036	3.01	-29.35	-8.64	10	0.750	-1.000	-0.070	5412	15	2.28	4000
4036	3.82	-31.16	-7.64	10	0.600	-1.350	0.015	5412	15	-5.25	6763
4021	4.42	-32.97	-6.43	10	0.350	-1.550	0.0	5412	15	1	4000
4036	2.21	-33.97	-5.02	4011	0.050	-1.750	-0.019	5412	15		

2.8430

4036	0.20	-33.17	-2.61	10	-0.100	-1.800	-4.500	5412	15	-0.02	212
4036	-1.20	-30.36	0.20	10	-0.350	-1.800	-0.180	5412	15	-0.03	4000
4036	0.0	-28.34	3.01	10	-0.550	-1.650	-0.180	5412	15	4.60	4000
4035	1.80	-25.73	5.42	10	-0.750	-1.700	-3.150	5412	15	-9.58	1
4035	2.21	-22.31	7.64	4011	-0.850	-1.650	0.059	5412	15	-0.26	4000
4035	2.21	-18.09	9.85	4011	-1.050	-1.500	-0.038	5412	15	-2.58	4000
4035	2.21	-15.88	12.06	4011	-1.100	-1.350	-0.047	5412	15	2.21	4000
4036	1.40	-14.07	14.47	4011	-1.250	-1.300	0.023	5412	15	-5.12	2000
4036	3.41	-14.27	15.88	4011	-1.300	-1.100	0.003	5412	15	1	4000
4035	4.62	-13.87	16.68	4011	-1.350	-1.050	-0.023	5412	15		

2.8530

4035	8.24	-18.69	16.28	4011	-1.400	-0.950	-4.500	5412	15	-0.01	212
4035	11.66	-22.31	16.08	4011	-1.450	-0.850	-0.180	5412	15	-0.05	4000
4036	12.86	-28.75	15.68	4011	-1.500	-0.850	-0.180	5412	15	4.93	4000
4036	11.66	-34.78	15.28	4011	-1.500	-0.750	-4.158	5412	15	-9.58	1
4036	10.25	-39.60	14.27	4011	-1.500	-0.800	0.029	5412	15	-0.32	4000
4036	7.84	-42.22	12.26	10	-1.450	-0.750	-0.029	5412	15	-2.51	4000
4035	5.42	-44.23	9.55	10	-1.350	-0.750	-0.017	5412	15	2.28	4000
4035	2.21	-43.83	7.07	4011	-1.250	-0.750	0.0	5412	15	-5.12	4764
4036	-1.80	-43.42	4.82	4011	-1.050	-0.600	-0.004	5412	15	1	4000
4036	-8.24	-40.61	2.81	4011	-0.750	-0.550	-0.009	5412	15		

2.8630

4035	-12.66	-40.01	0.60	10	-0.450	-0.450	-4.410	5412	15	0.0	212
4036	-17.29	-36.19	-1.00	10	-0.050	-0.350	-0.180	5412	15	-0.05	4000
4036	-17.09	-34.78	-3.41	10	0.300	-0.300	-0.180	5412	15	4.47	4000
4036	-15.48	-34.78	-5.42	10	0.650	-0.150	4.200	5412	15	-9.58	1
4035	-12.46	-36.39	-6.23	10	1.100	-0.200	0.022	5412	15	-0.32	4000
4036	-9.24	-36.99	-7.23	10	1.450	-0.200	0.011	5412	15	-2.98	4000
4036	-3.41	-39.00	-8.24	10	1.700	-0.250	0.012	5412	15	2.21	4000
[illegible]	0.40	-39.20	-9.04	10	1.850	-0.500	-0.010	5412	15	-5.12	1796
[illegible]	3.41	-37.79	-9.24	10	1.900	-0.400	-0.009	5412	15	1	4000
[illegible]	2.01	-32.97	-8.24	10	1.800	-0.900	-0.020	5412	15		

2.9730

4035	2.21	-29.55	-6.43	10	1.600	-1.150	-4.410	5412	15	-0.00	212
4035	0.0	-22.92	-4.42	10	1.350	-1.350	-0.180	5412	15	-0.03	4000
4036	-1.40	-20.30	-2.21	10	0.950	-1.600	-0.270	5412	15	4.47	4000
34	-2.21	-17.59	0.0	10	0.950	-1.700	0.050	5412	15	-9.52	4000
4035	-0.50	-15.49	3.21	4011	0.250	-1.850	0.004	5412	15	-0.32	4000
4035	-1.40	-15.07	6.83	4011	0.0	-1.900	0.016	5412	15	-2.64	4000
4036	0.20	-15.07	10.05	4011	-0.300	-1.750	0.033	5412	15	2.21	4000
4036	-1.20	-17.09	13.06	4011	-0.550	-1.750	-0.038	5412	15	-5.12	7745
4035	-1.40	-17.89	15.07	4011	-0.750	-1.550	0.0	5412	15	1	4000
4036	-2.01	-24.32	16.68	4011	-0.900	-1.350	-0.052	5412	15		

2.8830

4035	-2.01	-31.36	19.10	4011	-1.000	-1.150	-4.500	5412	15	-0.00	212
4035	-1.80	-33.57	20.70	4011	-1.100	-0.850	-0.180	5412	15	-0.04	4000
4035	3.82	-37.39	21.31	4011	-1.200	-0.700	-0.180	5412	15	4.47	4000
4036	6.63	-40.01	20.91	4011	-1.250	-0.450	-5.900	5412	15	-9.45	4000
4035	9.44	-40.91	19.50	4011	-1.350	-0.300	-0.011	5412	15	-0.32	4000
4035	6.83	-42.42	17.49	10	-1.200	-0.200	-0.008	5412	15	-2.83	4000
4035	2.81	-42.62	16.88	4011	-1.400	-0.050	0.033	5412	15	2.21	4000
4036	-1.80	-41.41	14.27	4011	-1.350	0.0	-0.065	5412	15	-5.12	6763
4036	-3.82	-39.20	11.86	4011	-1.350	0.0	-0.009	5412	15	1	4000
4036	-5.42	-40.41	7.86	4011	-1.200	0.050	-0.030	5412	15		

2.8930

4035	-6.23	-41.01	4.22	4011	-1.050	0.050	-4.500	5412	15	-0.00	212
4035	-7.84	-42.62	0.60	4011	-0.800	0.150	-0.180	5412	15	-0.04	4000
4035	-9.44	-43.63	-1.40	4011	-0.500	0.100	-0.180	5412	15	4.47	4000
4035	-12.06	-43.02	-4.02	10	-0.200	0.150	4.800	5412	15	-9.33	4000
4035	-12.86	-42.62	-7.03	4011	0.050	0.150	0.001	5412	15	-0.32	4000
4036	-13.47	-38.60	-10.25	10	0.350	0.100	-0.019	5412	15	-2.90	4000
4035	-10.05	-36.99	-12.46	10	0.600	0.150	0.012	5412	15	2.21	4000
4036	-6.63	-31.36	-13.06	10	0.800	0.0	-0.043	5412	15	-5.12	2000
4036	0.0	-27.14	-13.47	10	0.900	0.0	-0.014	5412	15	1	4000
4036	5.22	-21.71	-13.87	10	0.900	-0.150	-0.023	5412	15		

2.9030

4036	12.46	-17.49	-14.07	10	0.800	-0.350	-4.410	5412	15	-0.01	212
4036	9.44	-14.47	-13.06	10	0.650	-0.550	-0.180	5412	15	-0.03	4000
4035	7.64	-12.66	-11.05	10	0.350	-0.850	-0.270	5412	15	4.47	4000
4036	7.03	-10.25	-8.04	10	0.0	-1.100	2.800	5412	15	-9.26	4000
4036	9.24	-9.24	-5.42	10	-0.300	-1.350	0.037	5412	15	-0.19	4000
4036	11.46	-11.25	-3.01	10	-0.750	[illegible]	-0.027	5412	15	-2.90	4000
[illegible]	12.86	-15.68	-0.40	10	-1.150	-1.650	[illegible]	5412	15	2.21	4000
4036	13.47	-21.51	2.01	[illegible]	-1.550	-1.850	-0.031	5412	15	-5.18	4764
4036	14.07	-28.14	7.03	4005	-1.900	-1.800	0.007	5412	15	1	4000
4036	13.26	-33.57	10.45	4011	-2.200	-1.750	-0.051	5412	15		

2.9130

4035	9.44	-37.19	13.06	4011	-2.400	-1.650	-4.410	5412	15	-0.02	212
4036	3.01	-39.80	14.27	10	-2.550	-1.350	-0.180	5412	15	-0.03	4000
4036	-2.21	-43.02	15.07	4011	-2.550	-1.150	-0.270	5412	15	4.53	4000
4036	-8.24	-43.42	15.88	4011	-2.450	-0.800	-7.050	5412	15	-9.26	4000
4036	-10.85	-43.63	15.68	4011	-2.250	-0.450	0.066	5412	15	-0.19	4000
4036	-16.08	-40.01	14.87	4011	-1.950	-0.150	-0.024	5412	15	-2.83	4000
4036	-17.29	-37.19	12.66	10	-1.700	0.150	-0.048	5412	15	2.21	4000
4035	-17.09	-33.37	10.65	4011	-1.300	0.400	0.007	5412	15	-5.12	1745
4036	-14.87	-31.96	8.04	10	-0.900	0.700	0.014	5412	15	2	4000
4036	-12.86	-30.36	5.83	4000	-0.500	0.850	-0.047	5412	15		

2.9230

4036	-8.44	-30.36	3.01	10	-0.050	0.850	-4.500	5412	15	-0.03	212
4036	-4.62	-30.36	0.40	10	0.150	0.900	-0.180	5412	15	-0.03	4000
4036	0.40	-30.96	-2.01	10	0.450	0.700	-0.270	5412	15	4.53	4000
4036	4.62	-32.97	-4.62	10	0.650	0.500	4.100	5412	15	-9.33	4000
4036	5.42	-35.38	-6.83	10	0.750	0.200	0.088	5412	15	-0.19	4000
4036	5.21	-37.39	-8.84	10	0.800	-0.100	-0.014	5412	15	-2.77	4000
4036	4.02	-40.81	-10.05	10	0.750	-0.350	-0.065	5412	15	2.21	4000
4033	3.21	-40.61	-10.25	10	0.650	-0.750	0.011	5412	15	-5.12	7745
4036	3.01	-38.40	-10.25	10	0.500	-1.100	0.001	5412	15	2	4000
4036	-0.80	-36.99	-9.65	4011	0.350	-1.350	-0.020	5412	15		

2.9330

4036	-4.62	-35.78	-9.04	10	0.250	-1.550	-4.500	5412	15	-0.03	212
4036	-9.85	-31.96	-7.03	10	0.150	-1.650	-0.180	5412	15	-0.03	4000
4036	-13.06	-30.15	-4.82	10	0.100	-1.750	-0.270	5412	15	4.59	4000
4036	-14.27	-27.34	-2.21	4011	0.050	-1.700	0.150	5412	15	-9.45	4000
4036	-9.85	-25.15	-0.20	10	0.0	-1.550	0.067	5412	15	-0.26	4000
4036	-4.22	-23.32	1.40	10	0.0	-1.550	-0.037	5412	15	-2.64	4000
4036	2.21	-21.11	4.27	4011	0.0	-1.350	-0.050	5412	15	2.21	4000
4036	7.44	-19.30	6.83	4011	-0.050	-1.350	0.012	5412	15	-5.18	6763
4036	11.00	-20.10	9.65	4011	-0.200	-1.250	0.001	5412	15	2	4000
4036	14.07	-19.90	12.26	4011	-0.450	-1.200	-0.023	5412	15		

2.9430

4036	16.88	-19.30	14.27	4011	-0.150	-1.300	-4.500	5412	15	-0.01	212
4035	19.70	-18.89	15.68	4011	-1.050	-1.250	-0.180	5412	15	-0.05	4000
4035	21.71	-18.49	16.48	4011	-1.450	-1.350	-0.270	5412	15	4.47	4000
4035	19.90	-18.69	16.88	4011	-1.800	-1.400	-6.250	5412	15	-9.45	4000
4036	16.08	-19.90	16.88	4011	-2.100	-1.400	0.030	5412	15	-0.32	4000
4036	11.06	-21.11	16.48	4005	-2.350	-1.500	-0.045	5412	15	-2.64	4000
4035	4.22	-23.32	15.48	4011	-2.500	-1.350	-0.027	5412	15	2.21	4000
4035	-1.20	-22.31	14.07	4011	-2.450	-1.350	0.004	5412	15	-9.29	2000
4035	-5.02	-24.32	12.06	4011	-2.300	-1.150	-0.001	5412	15	2	4000
4035	-9.65	-27.74	10.25	10	-2.000	-0.950	-0.017	5412	15		

2.9530

4035	-11.05	-33.37	8.24	4011	-1.550	-0.750	-4.500	5412	15	0.00	212
4036	-13.87	-41.01	6.23	4011	-1.100	-0.500	-0.180	5412	15	-0.06	4000
4035	-13.26	-47.06	4.42	10	-0.500	-0.300	-0.270	5412	15	4.67	4000
4036	-14.47	-51.67	2.21	4011	0.0	-0.150	2.300	5412	15	-9.45	4000
4036	-12.66	-55.49	0.0	10	0.450	0.0	3.024	5412	15	-0.32	4000
4035	-9.04	-55.89	-1.80	7	0.950	0.0	3.006	5412	15	-2.64	4000
4036	-4.02	-55.69	-3.61	4011	1.300	0.0	3.006	5412	15	2.21	4000
4035	1.00	-53.07	-5.22	4011	1.550	-0.130	-0.007	5412	15	-5.12	4764
4035	5.62	-48.45	-6.23	10	1.750	-0.300	-0.009	5412	15	2	4000
4035	6.03	-42.02	-7.43	10	1.750	-0.450	-3.023	5412	15		

2.9630

4035	3.61	-35.98	-8.44	10	1.700	-0.750	-4.500	5412	15	0.0	212
4036	0.8	-29.15	-7.43	10	1.550	-0.950	-0.180	5412	15	-0.06	4000
4035	-3.21	-23.32	-6.43	10	1.400	-1.150	-0.270	5412	15	4.47	4000
37	-5.62	-16.28	-5.42	10	1.150	-1.350	2.958	5412	15	-9.39	4000
4035	-6.03	-14.07	-4.22	10	0.950	-1.450	0.014	5412	15	-0.32	4000
4036	-5.62	-12.66	-2.41	10	0.650	-1.550	0.027	5412	15	-2.71	4000
4035	-5.62	-15.48	0.0	4011	0.450	-1.550	0.028	5412	15	2.21	4000
4035	-4.02	-17.09	2.21	10	0.200	-1.550	-0.035	5412	15	-5.18	1745
4035	-2.21	-22.51	5.22	4011	0.0	-1.550	-0.001	5412	15	2	4000
4036	-1.60	-26.33	7.84	10	-0.100	-1.450	-0.049	5412	15		

2.9730

4036	0.20	-30.76	10.25	4011	-0.300	-1.450	-4.500	5412	15	-0.00	212
4035	1.80	-34.58	12.26	4011	-0.400	-1.300	-0.180	5412	15	-0.03	4000
4036	2.81	-36.59	14.27	4011	-0.550	-1.200	-0.270	5412	15	4.40	4000
4034	2.81	-36.79	15.88	4011	-0.750	-1.150	-5.050	5412	15	-9.39	4000
4036	4.22	-37.19	16.88	4011	-0.850	-0.950	-0.011	5412	15	-0.32	4000
4036	3.01	-37.59	17.68	4011	-0.950	-0.850	-0.009	5412	15	-2.77	4000
4036	6.23	-37.79	18.09	4011	-1.100	-0.700	0.030	5412	15	2.21	4000
4035	6.03	-35.98	17.69	4011	-1.200	-0.550	-0.052	5412	15	-5.05	7745
4036	7.84	-34.58	16.28	4011	-1.250	-0.500	-0.004	5412	15	2	4000
4036	4.42	-32.16	13.87	4011	-1.300	-0.300	-0.041	5412	15		

2.9830

4036	2.21	-31.56	11.86	4011	-1.300	-0.300	-4.500	5412	15	-0.01	212
4035	-2.01	-32.37	9.85	4006	-1.300	-0.150	-0.180	5412	15	-0.03	4000
4035	-3.01	-34.38	7.64	4011	-1.200	-0.050	-0.270	5412	15	4.40	4000
4038	-5.42	-35.38	5.02	10	-1.050	0.0	0.750	5412	15	-9.39	4000
4035	-7.03	-38.00	0.0	4011	-0.900	0.0	-0.004	5412	15	-0.32	4000
4038	-8.04	-42.02	-8.20	10	-0.700	0.0	-0.027	5412	15	-2.77	4000
4036	-8.64	-44.23	-2.21	10	-0.450	0.050	0.022	5412	15	2.21	4000
4035	-9.24	-45.43	-3.82	4011	-0.150	0.050	-0.087	5412	15	-5.12	6763
4038	[illegible]	-45.03	-5.42	10	0.050	0.0	-0.024	5412	15	2	4000
4035	-12.26	-43.83	-7.43	10	0.350	0.050	-0.030	5412	15		

2.9930

4035	-12.06	-39.40	-9.04	10	0.650	0.0	-4.410	5412	15	-0.01	212
4036	-10.45	-33.37	-9.85	10	0.800	0.0	-0.180	5412	15	-0.03	4000
4035	-5.22	-27.34	-9.85	10	0.950	-0.050	-0.270	5412	15	4.40	4000
4035	-0.60	-22.71	-9.44	4011	0.950	-0.200	4.600	5412	15	-9.33	4000
4036	4.42	-19.30	-9.04	10	0.950	-0.250	0.033	5412	15	0.0	4000
4036	7.84	-16.28	-7.43	10	0.800	-0.500	-0.017	5412	15	-2.77	4000
4035	12.05	-13.06	-5.42	10	0.500	-0.650	-0.014	5412	15	2.21	4000
4036	13.87	-10.65	-3.01	10	0.100	-0.800	-0.037	5412	15	-5.18	2000
4035	14.47	-10.25	-0.80	4011	-0.200	-1.050	0.0	5412	15	2	4000
4035	12.06	-11.25	1.00	10	-0.650	-1.150	-0.041	5412	15		

3.0030

4036	12.46	-14.67	3.01	4011	-1.150	-1.350	-4.500	5412	15	-0.02	212
4036	11.46	-18.09	5.22	10	-1.600	-1.400	-0.180	5412	15	-0.03	4000
4036	13.47	-23.92	7.84	10	-2.000	-1.400	-0.270	5412	15	4.53	4000
4036	10.45	-28.34	10.05	10	-2.350	-1.400	-4.300	5412	15	-9.39	4000
4036	8.64	-34.78	11.25	4011	-2.550	-1.250	0.062	5412	15	-0.26	4000
4036	4.22	-42.02	12.06	10	-2.650	-1.150	-0.022	5412	15	-2.71	4000
4036	0.0	-47.45	12.26	4011	-2.600	-0.900	-0.045	5412	15	2.28	4000
4036	-4.82	-49.66	11.86	10	-2.350	-0.600	-0.004	5412	15	-5.12	4764
4036	-11.05	-51.67	11.05	4011	-2.150	-0.350	0.012	5412	15	2	4000
4036	-15.08	-48.45	9.24	10	-1.800	0.0	-0.044	5412	15		

3.0130

4036	-18.09	-44.83	7.03	4011	-1.350	0.150	-4.410	5412	15	-0.03	212
4036	-18.29	-40.41	4.82	10	-0.950	0.450	-0.180	5412	15	-0.03	4000
4036	-14.87	-36.19	2.41	4011	-0.500	0.750	-0.270	5412	15	4.93	4000
4036	-11.05	-30.76	0.40	10	-0.050	0.800	0.350	5412	15	-9.45	4000
4036	-6.23	-25.93	-1.20	10	0.150	0.950	0.000	5412	15	-0.26	4000
4035	-5.42	-22.[illegible]	-3.41	10	0.450	0.800	-0.024	5412	15	-2.71	4000
4036	-5.22	-19.90	-5.02	10	0.700	0.650	-0.065	5412	15	2.21	4000
4036	-2.61	-19.50	-6.63	10	0.850	0.450	0.007	5412	15	-5.12	1745
4036	0.0	-22.32	-8.24	10	0.920	0.100	0.007	5412	15	2	4000
4036	1.00	-26.33	-9.04	10	0.950	-0.050	-0.028	5412	15		

3.0230

4036	3.01	-29.75	-9.44	10	0.850	-0.450	-4.410	5412	15	-0.03	212
4036	4.42	-31.76	-9.24	10	0.750	-0.800	-0.090	5412	15	-0.09	4000
4036	5.02	-37.79	-9.04	10	0.600	-1.100	-0.270	5412	15	4.40	4000
4036	3.01	-40.41	-7.84	10	0.350	-1.400	3.150	5412	15	-9.58	4000
4036	0.0	-43.83	-5.83	10	0.150	-1.500	0.075	5412	15	-0.26	4000
37	-4.42	-43.22	-3.01	10	0.0	-1.650	-0.022	5412	15	-2.90	4000
4036	-5.42	-39.00	0.0	10	-0.100	-1.650	-0.060	5412	15	2.21	4000
4036	-5.42	-32.97	2.21	4011	-0.250	-1.550	0.026	5412	15	-9.22	7749
4036	-4.02	-27.34	4.42	4011	-0.350	-1.500	0.004	5412	15	2	4000
4036	-1.00	-23.12	6.23	4011	-0.450	-1.300	-0.023	5412	15		

3.0330

4036	0.80	-18.69	3.64	4011	-0.500	-1.150	-4.410	5412	15	-0.01	212
4036	2.21	-13.26	11.25	10	-0.550	-1.000	-0.090	5412	15	-0.05	4000
4036	7.03	-12.06	12.86	4011	-0.650	-0.800	-0.270	5412	15	4.47	4000
4036	8.24	-12.66	14.07	4011	-0.750	-0.750	-5.950	5412	15	-9.65	4000
4036	11.25	-14.47	14.87	4011	-0.850	-0.650	0.040	5412	15	-0.32	4000
4036	14.67	-16.48	15.28	4011	-1.050	-0.700	-0.040	5412	15	-2.51	4000
4036	19.70	-18.29	15.89	4011	-1.300	-0.750	-0.034	5412	15	2.21	4000
4036	20.91	-22.11	15.88	4011	-1.500	-0.750	0.017	5412	15	-5.12	6763
4036	23.12	-25.53	15.28	4011	-1.750	-0.950	-0.003	5412	15	2	4000
4035	14.67	-30.36	13.87	4011	-1.900	-0.850	-0.014	5412	15		

3.0430

4036	8.24	-34.38	12.46	4011	-1.950	-0.950	-4.410	5412	15	0.0	212
4035	2.41	-36.79	10.65	4011	-1.950	-0.950	-0.090	5412	15	-0.06	4000
4036	-1.40	-39.20	8.94	4011	-1.800	-0.850	-0.270	5412	15	4.40	4000
4036	-6.83	-41.82	6.83	4011	-1.550	-0.800	0.0	5412	15	-9.58	4000
4035	-11.86	-42.22	4.42	4011	-1.200	-0.600	0.020	5412	15	-0.45	4000
4035	-17.69	-45.43	2.01	4011	-0.650	-0.490	-0.011	5412	15	-2.51	4000
4035	-20.10	-45.23	0.0	10	-0.150	-0.300	-0.003	5412	15	2.21	4000
4035	-21.11	-44.63	-2.01	4011	0.300	0.0	-0.010	5412	15	-5.12	2000
4035	-18.09	-44.23	-3.61	10	0.850	0.0	-0.012	5412	15	2	4000
4035	-11.86	-45.03	-4.92	10	1.300	0.100	-0.020	5412	15		

3.0530

4035	-4.62	-44.23	-5.83	10	1.750	0.100	-4.410	5412	15	0.0	212
4035	0.40	-42.22	-7.43	10	1.950	0.0	-0.090	5412	15	-0.03	4000
4035	5.02	-38.40	-8.44	10	2.100	-0.050	-0.360	5412	15	4.34	4000
4035	6.05	-34.78	-9.04	10	2.050	-0.350	4.800	5412	15	-9.58	4000
4035	5.62	-27.54	-8.24	10	1.950	-0.600	0.017	5412	15	-0.52	4000
4035	1.00	-21.11	-7.03	10	1.650	-0.950	0.019	5412	15	-2.64	4000
4036	-2.01	-16.58	-5.42	10	1.350	-1.250	0.028	5412	15	2.15	4000
4035	-4.22	-12.26	-3.41	10	1.000	-1.450	-0.023	5412	15	-5.12	4764
4036	-4.22	-11.25	-1.00	10	0.600	-1.650	-0.004	5412	15	2	4000
4036	-2.61	-12.06	1.60	10	0.250	-1.700	-0.043	5412	15		

3.0630

4035	-0.60	-16.08	5.22	4011	0.0	-1.750	-4.410	5412	15	0.0	212
4036	0.40	-19.70	8.64	4011	-0.250	-1.750	-0.090	5412	15	-0.03	4000
4035	2.21	-26.74	11.46	4011	-0.450	-1.550	-0.270	5412	15	4.34	4000
4036	-1.40	-30.56	14.27	4011	-0.650	-1.550	-4.350	5412	15	-9.52	4000
4036	-3.41	-34.18	15.88	4011	-0.750	-1.300	0.0	5412	15	-0.52	4000
4036	-3.82	-38.00	17.89	10	-0.900	-1.050	0.000	5412	15	-2.77	4000
4036	-3.41	-40.61	19.90	4011	-0.950	-0.850	0.036	5412	15	2.15	4000
4036	2.[illegible]	-41.61	21.[illegible]	4011	-1.050	-0.550	-0.045	5412	15	-5.12	1745
4036	3.82	-39.80	21.11	4011	-1.100	-0.400	-0.004	5412	15	2	4000
4035	5.83	-38.20	19.50	7	-1.150	-0.200	-0.044	5412	15		

3.0730

4036	5.42	-32.37	17.69	4011	-1.150	-0.050	-4.410	5412	15	0.0	212
4035	1.40	-30.96	15.88	4011	-1.100	0.0	-0.090	5412	15	-0.04	4000
4036	-1.80	-30.76	13.47	4011	-1.050	0.0	-0.270	5412	15	4.27	4000
4036	-3.82	-29.95	11.46	4011	-0.950	0.0	-1.350	5412	15	-9.39	4000
4035	-2.61	-31.56	8.24	4011	-0.850	0.100	-0.006	5412	15	-0.45	4000
4036	-0.20	-33.37	4.82	4011	-0.750	0.150	-0.017	5412	15	-2.83	4000
4036	2.81	-40.21	1.40	4011	-0.550	0.050	0.024	5412	15	2.15	4000
4036	3.21	-45.64	-1.00	10	-0.400	0.100	-0.048	5412	15	-5.12	7745
4036	0.60	-50.66	-3.82	4011	-0.100	0.0	-0.015	5412	15	2	4000
4035	-3.01	-50.86	-6.43	4011	0.0	0.0	-0.027	5412	15		

3.0830

4035	-9.44	-49.46	-9.24	4011	0.150	0.0	-4.410	5412	15	-0.01	212
4036	-11.46	-45.86	-11.46	10	0.356	-0.150	-0.090	5412	15	-0.03	4000
4036	-12.86	-38.08	-12.66	10	0.550	-0.100	-0.360	5412	15	4.34	4000
4036	-11.46	-30.56	-13.67	10	0.750	-0.200	6.100	5412	15	-9.33	4000
4036	-8.64	-21.31	-13.06	4036	0.900	-0.250	0.016	5412	15	-0.45	4000
4035	-4.82	-16.48	-12.66	10	0.950	-0.300	-0.027	5412	15	-2.83	4000
4033	-2.41	-12.26	-11.86	4011	1.000	-0.400	-0.004	5412	15	2.21	4000
4036	0.0	-9.85	-9.85	10	0.950	-0.450	-0.041	5412	15	-5.12	6763
4036	2.81	-10.25	-7.43	4011	0.800	-0.650	-0.004	5412	15	2	4000
4036	7.04	-9.65	-4.62	4011	0.600	-0.850	-0.035	5412	15		

3.0930

4036	12.66	-11.06	-2.21	4011	0.250	-0.950	-4.410	5412	15	-0.02	212
4036	18.69	-15.08	0.0	10	-0.050	-1.200	-0.090	5412	15	-0.04	4000
4035	21.11	-20.70	2.41	4011	-0.450	-1.300	-0.360	5412	15	4.34	4000
20	20.10	-25.33	6.03	4011	-1.000	-1.500	-3.200	5412	15	-9.33	4000
4036	17.49	-28.75	9.44	4011	-1.350	-1.550	0.051	5412	15	-0.45	4000
4035	14.67	-33.17	12.46	4011	-1.890	-1.500	-0.022	5412	15	-2.77	4000
4036	10.65	-35.98	14.27	4011	-2.350	-1.450	-0.039	5412	15	2.21	4000
4036	6.23	-39.00	15.28	4011	-2.550	-1.250	-0.007	5412	15	-5.18	2000
4036	-1.20	-38.00	15.63	4011	-2.650	-1.050	0.015	5412	15	2	4000
4035	-9.85	-40.41	15.07	4011	-2.550	-0.750	-0.051	5412	15		

3.1030

4036	-16.08	-39.00	14.07	4011	-2.350	-0.350	-4.500	5412	15	-0.03	212
4036	-21.11	-39.40	12.26	10	-1.950	0.0	-0.090	5412	15	-0.03	4000
4036	-23.32	-38.40	9.85	4011	-1.550	0.350	-0.360	5412	15	4.34	4000
4036	-20.70	-37.79	7.43	4011	-0.950	0.650	-2.600	5412	15	-9.39	4000
4036	-17.29	-36.19	4.82	10	-0.400	0.900	0.079	5412	15	-0.19	4000
4036	-9.65	-38.20	2.21	10	0.0	1.150	-0.082	5412	15	-2.71	4000
4036	-4.22	-36.59	-0.40	10	0.450	1.100	-0.058	5412	15	2.21	4000
4036	1.60	-36.19	-3.21	7	0.800	1.100	0.012	5412	15	-5.12	4700
4036	2.61	-34.18	-5.83	10	1.100	0.850	0.012	5412	15	2	4000
4036	4.62	-31.16	-7.45	10	1.250	0.500	-0.096	5412	15		

3.1130

4036	3.61	-30.36	-9.04	10	1.250	0.200	-4.410	5412	15	-0.03	212
4036	3.41	-31.16	-10.05	10	1.200	-0.150	-0.090	5412	15	-0.03	4000
37	3.61	-31.16	-11.05	10	1.150	-0.450	-0.450	5412	15	4.36	4000
4035	2.41	-31.16	-11.25	10	0.950	-0.850	5.500	5412	15	-9.58	4000
4036	1.00	-31.96	-10.65	10	0.750	-1.200	0.083	5412	15	-0.39	4000
4035	-1.00	-33.57	-9.24	10	0.600	-1.350	-0.022	5412	15	-2.71	4000
37	-4.02	-34.78	-7.23	10	0.400	-1.550	-0.068	5412	15	2.21	4000
4035	-7.43	-36.79	-5.02	10	0.300	-1.550	0.012	5412	15	-5.18	1745
37	-10.25	-36.99	-3.01	10	0.200	-1.500	0.003	5412	15	2	4000
4036	-9.04	-34.38	-0.40	10	0.100	-1.550	-0.023	5412	15		

3.1230

4036	-5.42	-31.16	1.40	10	0.0	-1.400	-4.410	5412	15	-0.02	212
4036	1.40	-28.34	4.22	10	0.0	-1.350	-0.090	5412	15	-0.03	4000
4036	4.82	-23.52	7.03	10	-0.050	-1.150	-0.360	5412	15	4.60	4000
4036	7.23	-21.11	9.44	4011	-0.150	-1.100	-4.950	5412	15	-9.52	4000
4036	6.63	-17.49	11.86	10	-0.300	-1.000	0.050	5412	15	-0.52	4000
4036	8.64	-15.07	13.87	4011	-0.500	-0.900	-0.050	5412	15	-2.58	4000
4036	9.44	-12.26	15.28	10	-0.700	-0.950	-0.043	5412	15	2.28	4000
4036	13.06	-11.25	16.68	4011	-0.950	-0.850	0.014	5412	15	-5.12	7745
4036	14.67	-11.46	17.49	4011	-1.150	-0.950	0.0	5412	15	2	4000
4036	15.88	-13.26	17.49	4011	-1.400	-0.950	-0.017	5412	15		

3.1330

4035	13.67	-17.29	16.28	4011	-1.550	-0.900	-4.500	5412	15	0.0	212
4035	11.25	-22.31	14.87	4011	-1.600	-0.950	-0.090	5412	15	-0.06	4000
4036	8.24	-25.53	13.87	4011	-1.650	-0.850	-0.360	5412	15	4.28	4000
4036	5.22	-29.75	12.66	10	-1.450	-0.800	-3.000	5412	15	-9.52	4000
31	1.40	-33.97	10.65	4011	-1.900	-0.750	0.029	5412	15	-0.58	4000
4035	-1.00	-38.20	8.04	4011	-1.300	-0.550	[illegible]	5412	15	-2.58	4000
4036	-4.22	-57.22	5.83	4011	-1.000	-0.450	-0.008	5412	15	2.15	4000
34	-8.04	-45.64	4.42	4011	-0.700	-0.250	0.001	5412	15	-5.12	6763
4035	-11.46	-48.05	3.21	4011	-0.200	-0.150	-0.011	5412	15	2	4000
4035	-13.47	-51.06	1.40	4011	0.150	-0.050	-0.011	5412	15		

3.1430

4036	-15.68	-50.46	-0.40	10	0.600	0.0	-4.410	5412	15	0.00	212
4036	-13.87	-51.27	-3.01	4011	1.100	0.0	-0.180	5412	15	-0.05	4000
4035	-10.85	-49.25	-4.82	10	1.550	0.0	-0.360	5412	15	4.21	4000
4035	-7.23	-49.05	-5.83	4011	1.950	0.0	5.350	5412	15	-9.52	4000
32	-3.82	-44.63	-6.83	10	2.250	-0.100	0.027	5412	15	-0.58	4000
4035	-0.80	-40.81	[illegible]	10	2.350	-0.150	0.024	5412	15	-2.64	4000
4036	-0.80	-36.19	-7.04	10	2.400	-0.400	0.017	5412	15	2.21	4000
4036	0.80	-30.76	-7.03	10	2.350	-0.550	-0.020	5412	15	-5.12	2000
4035	0.00	-25.30	-6.23	10	2.150	-0.750	-0.030	5412	15	2	4000
4035	0.80	-21.51	-4.42	4011	1.850	-0.950	-0.038	5412	15		

3.1530

4035	0.20	-18.49	-2.81	10	1.550	-1.050	-4.500	5412	15	-0.00	212
4036	0.0	-17.09	-0.60	4011	1.150	-1.250	-0.180	5412	15	-0.03	4000
4035	0.0	-15.07	1.20	4011	0.750	-1.300	-0.360	5412	15	4.14	4000
4036	-1.00	-15.88	3.82	10	0.350	-1.350	-1.300	5412	15	-9.52	4000
4036	-1.80	-17.29	6.03	4011	0.050	-1.450	0.0	5412	15	-0.55	4000
4036	-1.20	-20.30	8.04	4011	-0.100	-1.350	0.011	5412	15	-2.77	4000
4036	-1.40	-22.11	10.65	10	-0.300	-1.350	0.028	5412	15	2.21	4000
4036	0.20	-25.73	12.66	4011	-0.450	-1.200	-0.049	5412	15	-5.12	4764
4035	1.00	-28.95	14.87	4011	-0.550	-1.000	0.0	5412	15	2	4000
4036	1.20	-34.78	16.68	4011	-0.600	-0.900	-0.049	5412	15		

3.1630

4035	3.01	-36.39	17.69	4011	-0.700	-0.700	-4.500	5412	15	-0.00	212
4036	5.42	-38.80	18.49	4011	-0.750	-0.550	-0.180	5412	15	-0.03	4000
4036	5.82	-41.01	18.29	4011	-0.750	-0.350	-0.360	5412	15	4.14	4000
37	6.03	-39.40	17.09	4011	-0.800	-0.200	-4.150	5412	15	-9.45	4000
4035	3.41	-40.21	15.48	4005	-0.800	-0.150	-0.016	5412	15	-0.52	4000
4035	0.20	-41.02	13.87	4011	-0.850	0.0	-0.024	5412	15	-2.83	4000
4036	-3.61	-38.40	12.06	4011	-0.850	0.0	0.028	5412	15	2.21	4000
4036	-4.42	-38.00	9.85	4011	-0.800	0.150	-0.043	5412	15	-4.14	1749
4036	-4.82	-36.39	7.23	10	-0.700	0.250	-0.011	5412	15	2	4000
4036	-5.42	-38.00	4.22	10	-0.950	0.250	-0.031	5412	15		

3.1730

4036	-8.44	-39.00	1.00	10	-0.350	0.400	-4.500	5412	15	-0.01	212
4036	-9.65	-41.61	-1.20	10	-0.050	0.400	-0.180	5412	15	-0.04	4000
4035	-12.06	-41.61	-3.41	10	0.150	0.450	-0.380	5412	15	4.08	4000
4036	-13.07	-41.21	-5.42	10	0.450	0.500	4.950	5412	15	-9.39	4000
4036	-14.47	-39.20	-7.64	10	0.750	0.450	0.008	5412	15	-0.45	4000
4036	-15.46	-39.40	-9.44	10	1.000	0.500	-0.019	5412	15	-2.83	4000
4036	-7.23	-34.78	-10.45	4011	1.200	0.350	0.004	5412	15	2.28	4000
4035	-1.60	-29.75	-11.25	10	1.300	0.250	-0.041	5412	15	-5.12	7745
4036	3.81	-29.12	-11.44	4011	1.350	0.150	-0.011	5412	15	2	4000
4036	6.23	-19.90	-11.05	10	1.250	0.0	-0.030	5412	15		

3.1830

4036	5.42	-15.88	-9.65	4011	1.150	-0.150	-4.410	5412	15	-0.02	212
4036	4.08	-13.47	-7.04	10	0.850	-0.400	-0.090	5412	15	-0.08	4000
4036	5.42	-9.04	-5.42	4011	0.550	-0.650	-0.450	5412	15	4.21	4000
4036	7.43	-8.04	-3.82	10	0.150	-0.800	1.050	5412	15	-9.39	4000
4036	11.05	-9.85	-0.80	4011	-0.200	-1.050	0.046	5412	15	-0.32	4000
4036	16.40	-13.47	1.20	4011	-0.600	-1.100	-0.022	5412	15	-2.77	4000
4036	18.29	-20.91	3.82	4011	-1.050	-1.250	-0.027	5412	15	2.20	4000
4036	20.60	-20.95	6.03	4011	-1.450	-1.250	-0.020	5412	15	-5.12	[illegible]
4036	16.60	-33.17	8.64	4011	-1.750	-1.200	0.011	5412	15	2	4000
4036	19.07	-39.40	10.05	4011	-2.050	-1.200	-0.049	5412	15		

3.1930

4035	8.64	-43.42	11.46	4011	-2.200	-1.000	-4.500	5412	15	-0.03	212
4036	2.81	-47.65	12.46	4011	-2.300	-0.850	-0.090	5412	15	-0.03	4000
4036	-3.01	-47.65	12.66	4011	-2.300	-0.600	-0.360	5412	15	4.27	4000
4036	-8.44	-45.23	12.06	4005	-2.150	-0.250	-4.950	5412	15	-9.45	4000
4036	-14.47	-43.22	10.25	4011	-1.850	0.0	0.069	5412	15	-0.32	4000
4036	-19.10	-37.79	8.64	4011	-1.550	0.250	-0.027	5412	15	-2.64	4000
4035	-22.71	-32.97	6.83	4011	-1.050	0.450	-0.050	5412	15	2.28	4000
4036	-24.12	-29.35	4.82	10	-0.550	0.750	0.001	5412	15	-5.31	2000
4035	-26.32	-24.12	2.61	10	-0.100	1.050	0.015	5412	15	2	4000
4036	-21.31	-23.32	0.20	10	0.350	1.100	-0.039	5412	15		

3.2030

4036	-15.48	-20.50	-1.60	4011	0.750	1.200	-4.500	5412	15	-0.03	212
4036	-8.06	-22.31	-3.41	10	1.100	1.100	-0.180	5412	15	-0.03	4000
4036	-0.80	-25.53	-5.42	10	1.350	0.900	-0.360	5412	15	4.27	4000
4036	3.61	-29.15	-6.63	10	1.450	0.700	4.600	5412	15	-9.52	4000
4036	6.43	-33.77	-7.84	10	1.500	0.300	0.087	5412	15	-0.32	4000
4036	9.24	-38.40	-8.64	10	1.400	0.0	-0.019	5412	15	-2.64	4000
4036	9.44	-41.61	-8.04	10	1.150	-0.350	-0.063	5412	15	2.28	4000
4036	10.85	-43.02	-8.64	10	0.900	-0.800	0.020	5412	15	-5.12	4764
4036	8.24	-41.41	-8.04	10	0.600	-1.050	0.004	5412	15	2	4000
4036	6.23	-40.61	-6.23	10	0.300	-1.400	-0.019	5412	15		

3.2130

4036	0.40	-36.59	-4.42	10	0.0	-1.550	-4.410	5412	15	-0.02	212
4036	-3.21	-33.57	-2.21	10	-0.100	-1.600	-0.180	5412	15	-0.03	4000
4036	-6.23	-29.15	0.0	10	-0.300	-1.600	-0.450	5412	15	4.21	4000
4034	-5.42	-25.33	1.80	10	-0.350	-1.500	-1.750	5412	15	-9.65	4000
4036	-3.01	-22.51	4.02	10	-0.400	-1.400	0.059	5412	15	-0.32	4000
4036	-0.60	-18.89	6.43	4011	-0.400	-1.200	-0.030	5412	15	-2.90	4000
4036	0.0	-17.09	8.54	10	-0.400	-1.050	-0.067	5412	15	2.20	4009
4024	1.00	-16.88	10.45	4011	-0.400	-0.900	0.026	5412	15	-5.12	1745
4036	2.41	-16.88	12.06	10	-0.450	-0.700	0.0	5412	15	2	4000
4036	4.42	-17.49	13.47	4011	-0.550	-0.650	-0.022	5412	15		

3.2230

4036	7.64	-15.88	14.67	10	-0.650	-0.550	-4.500	5412	15	-0.00	212
4036	11.25	-18.29	15.48	10	-0.800	-0.550	-0.090	5412	15	-0.05	4000
4036	13.47	-19.50	15.88	4011	-0.950	-0.600	-0.360	5412	15	4.14	4000
4035	14.87	-23.92	15.28	4011	-1.100	-0.550	-4.650	5412	15	-9.65	4000
4036	11.25	-27.74	14.67	4011	-1.200	-0.700	0.025	5412	15	-0.32	4000
4036	7.84	-31.96	13.47	4011	-1.290	-0.650	-0.087	5412	15	-2.31	4000
4035	3.21	-34.38	12.06	10	-1.250	-0.650	-0.026	5412	15	2.21	4000
4036	1.00	-38.00	10.08	4011	-1.190	-0.690	-0.084	5412	15	[illegible]	7060
4035	-1.40	-40.08	7.04	4011	-1.000	-0.550	-0.809	5412	15	2	4000
4036	-1.00	-44.03	5.42	4011	-0.750	-0.500	-0.014	5412	15		

3.2330

4036	-3.21	-45.84	3.21	4011	-0.500	-0.350	-4.410	5412	15	0.00	212
4036	-5.42	-47.65	1.20	10	-0.150	-0.200	-0.180	5412	15	-0.05	4000
4036	-9.04	-46.24	0.0	10	0.100	-0.150	-0.450	5412	15	4.14	4000
4036	-9.65	-44.43	-1.80	4011	0.450	0.0	3.450	5412	15	-9.65	4000
4035	-10.85	-41.61	-3.21	10	0.800	-0.050	0.020	5412	15	-0.32	4000
4035	-7.03	-39.00	-5.02	4011	1.100	0.0	0.004	5412	15	-2.58	4000
4036	-5.83	-34.78	-6.23	10	1.400	-0.100	0.009	5412	15	2.21	4000
4035	-5.62	-29.95	-7.03	4011	1.600	-0.300	-0.015	5412	15	-5.05	6763
4035	-6.43	-24.12	-7.23	10	1.750	-0.350	-0.009	5412	15	2	4000
4035	-6.83	-20.70	-9.04	4011	1.850	-0.600	-0.031	5412	15		

3.2430

4035	-7.84	-18.29	-5.83	4011	1.800	-0.750	-4.410	5412	15	0.0	212
4035	-8.04	-18.49	-4.42	4011	1.750	-0.950	-0.180	5412	15	-0.03	4000
4035	-7.23	-18.09	-2.61	10	1.550	-1.150	-0.450	5412	15	4.14	4000
4035	-3.21	-22.31	-0.20	4011	1.400	-1.150	1.350	5412	15	-9.58	4000
4035	0.0	-27.14	1.80	10	1.100	-1.300	0.012	5412	15	-0.45	4000
4035	3.61	-31.96	4.82	4011	0.750	-1.350	0.022	5412	15	-2.71	4000
4035	2.01	-34.18	7.64	4011	0.450	-1.350	0.033	5412	15	2.21	4000
4035	2.41	-38.20	9.65	4011	0.100	-1.350	-0.031	5412	15	-5.12	2000
4035	0.0	-36.39	11.86	10	-0.050	-1.250	-0.003	5412	15	2	4000
4035	-1.40	-34.78	13.87	4011	-0.350	-1.150	-0.044	5412	15		

3.2530

4035	-3.21	-31.76	15.68	4011	-0.600	-1.000	-4.410	5412	15	0.0	212
4036	-3.41	-30.36	17.09	4011	-0.750	-0.750	-0.180	5412	15	-0.03	4000
4036	-3.01	-28.14	17.69	4011	-0.900	-0.700	-0.360	5412	15	4.14	4000
4035	-1.40	-26.13	17.49	4011	-1.000	-0.450	-4.900	5412	15	-9.52	4000
4036	0.0	-24.12	17.09	4011	-1.000	-0.350	-0.004	5412	15	-0.45	4000
4036	1.80	-25.13	15.88	10	-1.000	-0.200	-0.004	5412	15	-2.83	4000
4035	1.00	-26.74	14.27	4011	-0.950	-0.050	0.032	5412	15	2.21	4000
4035	1.60	-31.78	12.46	4011	-0.850	-0.050	-0.051	5412	15	-5.12	4764
4036	2.01	-34.38	10.45	4011	-0.890	0.0	-0.022	5412	15	2	4000
4036	6.43	-40.21	8.04	4011	-0.750	0.0	-0.036	5412	15		

3.2630

4035	7.23	-44.03	5.62	4011	-0.750	0.0	-4.410	5412	15	-0.01	212
4036	7.43	-48.05	2.01	10	-0.700	0.0	-0.180	5412	15	-0.04	4000
4035	4.22	-52.07	0.0	4011	-0.650	-0.100	-0.360	5412	15	4.14	4000
37	0.60	-53.68	-2.01	10	-0.600	-0.050	3.150	5412	15	-9.45	4000
4035	-5.83	-49.86	-4.22	4011	-0.450	-0.150	0.0	5412	15	-0.39	4000
37	-12.66	-42.02	-6.23	10	[illegible]	-0.150	-0.027	5412	15	-2.90	4000
4035	-17.69	-35.58	-7.84	10	[illegible]	-0.100	0.016	5412	15	2.15	4000
4036	-18.49	-29.15	-9.04	4000	0.100	-0.100	-0.046	5412	15	-5.10	1740
4035	-17.49	-20.30	-9.45	10	0.350	0.0	-0.012	5412	15	2	4000
4036	-15.07	[illegible]	-10.25	10	0.650	0.0	-0.027	5412	15		

3.2730

4036	-8.84	-11.86	-10.45	10	0.850	0.0	-4.410	5412	15	-0.01	212
4036	-2.81	-10.05	-10.05	10	0.950	0.0	-0.180	5412	15	-0.04	4000
4036	1.80	-10.85	-8.84	10	1.000	-0.200	-0.450	5412	15	4.14	4000
4036	7.03	-13.26	-6.63	10	0.900	-0.300	3.150	5412	15	-9.33	4000
4036	11.25	-15.07	-4.62	4011	0.650	-0.550	0.033	5412	15	-0.45	4000
4036	16.48	-17.49	-3.01	10	0.300	-0.800	-0.027	5412	15	-2.90	4000
4036	18.49	-19.50	-1.40	4011	0.0	-1.300	-0.017	5412	15	2.15	4000
4036	19.90	-23.72	0.60	10	-0.550	-1.300	-0.024	5412	15	-5.12	7745
4036	17.29	-26.53	3.61	10	-0.950	-1.450	0.007	5412	15	2	4000
4036	14.87	-31.16	6.83	4011	-1.550	-1.550	-0.046	5412	15		

3.2830

4036	12.06	-33.77	9.24	4011	-1.950	-1.600	-4.410	5412	15	-0.02	212
4036	8.84	-36.19	10.45	4011	-2.200	-1.500	-0.180	5412	15	-0.06	4000
4036	0.80	-38.40	11.25	10	-2.350	-1.350	-0.450	5412	15	4.21	4000
4036	-5.22	-40.21	12.06	4011	-2.350	-1.050	-5.150	5412	15	-9.39	4000
4036	-10.45	-41.21	12.26	4011	-2.200	-0.750	0.066	5412	15	-0.39	4000
4035	-13.26	-41.82	11.66	4011	-1.950	-0.350	-0.019	5412	15	-2.90	4000
4036	-15.88	-42.22	9.85	4011	-1.550	0.0	-0.047	5412	15	2.15	4000
4036	-16.68	-41.21	7.64	4011	-1.150	0.250	0.004	5412	15	-5.12	6763
4036	-15.88	-39.40	5.03	4011	-0.750	0.600	0.015	5412	15	2	4000
4036	-12.46	-36.59	4.22	10	-0.250	0.800	-0.047	5412	15		

3.2930

4035	-6.23	-35.38	2.41	4011	0.0	0.900	-4.410	5412	15	-0.03	212
4036	-1.20	-33.57	0.0	10	0.350	0.950	-0.180	5412	15	-0.03	4000
4036	0.60	-30.96	-2.21	4011	0.600	0.750	-0.450	5412	15	4.21	4000
4036	2.01	-28.34	-4.62	10	0.750	0.600	3.008	5412	15	-9.45	4000
4036	0.20	-24.93	-5.83	10	0.900	0.300	0.082	5412	15	-0.45	4000
4036	0.60	-24.73	-6.83	10	0.950	0.0	-0.016	5412	15	-2.90	4000
4036	-0.20	-26.74	-8.04	10	0.900	-0.200	-0.066	5412	15	2.15	4000
4035	0.0	-28.95	-8.84	10	0.850	-0.600	0.012	5412	15	-5.12	2000
4036	1.00	-30.30	[illegible]	10	0.750	-0.800	0.006	5412	15	2	4000
4036	3.01	-34.18	-8.04	10	0.550	-1.100	-0.027	5412	15		

3.3030

4036	2.61	-37.39	-7.43	10	0.400	-1.350	-4.410	5412	15	-0.03	212
4036	2.01	-39.40	-5.83	10	0.300	-1.400	-0.180	5412	15	-0.03	4000
4036	-2.41	-41.21	-3.82	10	0.150	-1.550	-0.450	5412	15	4.21	4000
4036	-5.02	-37.60	-1.80	10	0.0	-1.550	0.150	5412	15	-9.52	4000
4036	-6.83	-35.18	0.0	10	0.0	-1.550	0.067	5412	15	-0.45	4000
4036	-4.02	-30.50	1.40	10	-0.050	-1.550	-0.033	5412	15	-2.77	4000
4036	-1.40	-24.73	3.61	4011	-0.150	-1.350	-0.058	5412	15	2.15	4000
4036	1.00	-20.30	6.03	4011	-0.250	-1.350	0.020	5412	15	-5.18	4764
4035	0.60	-15.07	8.44	4011	-0.300	-1.250	0.001	5412	15	2	4000
4036	1.80	-12.86	11.05	10	-0.350	-1.150	-0.023	5412	15		

3.3130

4036	1.40	-11.66	12.66	10	-0.450	-1.150	-4.590	5412	15	-3.31	212
4036	4.82	-12.46	14.07	4011	-0.550	-1.000	-0.180	5412	15	-0.04	4000
4036	6.43	-13.67	15.07	10	-0.700	-1.050	-0.450	5412	15	4.21	4000
4035	11.66	-15.88	16.08	4011	-0.850	-0.950	-5.400	5412	15	-9.58	4000
4035	13.87	-20.70	16.48	4011	-1.000	-0.950	0.038	5412	15	-0.52	4000
4036	15.07	-26.74	15.89	10	-1.150	-1.000	-0.035	5412	15	-2.64	4000
4035	13.47	-31.76	14.27	4011	-1.300	-0.900	-0.027	5412	15	2.21	4000
4036	9.85	-34.98	13.06	10	-1.400	-0.900	0.007	5412	15	-5.12	1745
4036	5.02	-35.18	12.26	10	-1.450	-0.850	-0.007	5412	15	2	4000
4036	2.01	-36.39	10.85	4011	-1.450	-0.750	-0.009	5412	15		

3.3230

4036	-0.60	-37.19	8.84	10	-1.350	-0.700	-4.410	5412	15	0.00	212
4036	-2.01	-38.00	6.23	4011	-1.150	-0.500	-0.090	5412	15	-0.06	4000
4036	-4.62	-38.60	4.22	10	-0.850	-0.450	-0.450	5412	15	4.27	4000
4035	-7.23	-40.81	2.81	10	-0.500	-0.350	1.700	5412	15	-9.52	4000
4036	-11.25	-40.81	1.40	10	-0.050	-0.200	0.025	5412	15	-0.52	4000
4036	-13.06	-40.81	-0.20	4011	0.300	-0.250	0.003	5412	15	-2.06	4000
4036	-13.47	-42.02	-3.01	4011	0.750	-0.150	0.001	5412	15	2.15	4000
4035	-9.65	-43.63	-5.42	4011	1.200	-0.200	-0.015	5412	15	-5.12	7745
4036	-5.62	-44.03	-6.23	10	1.550	-0.250	-0.014	5412	15	2	4000
4036	-1.00	-42.62	-6.23	10	1.800	-0.350	-0.023	5412	15		

3.3330

4036	2.01	-41.01	-6.43	10	1.950	-0.550	-4.410	5412	15	0.00	212
4036	1.20	-38.80	-6.63	4011	2.050	-0.500	-0.180	5412	15	-0.03	4000
4036	-1.20	-35.38	-6.63	4011	1.950	-0.850	-0.450	5412	15	4.21	4000
4035	-3.82	-30.56	-5.42	4011	1.800	-1.050	3.000	5412	15	-9.52	4000
4036	-6.63	-26.35	-3.61	10	1.550	-1.150	0.012	5412	15	-0.58	4000
4035	-6.23	-22.11	-1.60	4011	1.350	-1.350	0.017	5412	15	-2.83	4000
4035	-6.43	-18.69	0.0	4011	1.050	-1.350	0.028	5412	15	2.15	4000
4035	-4.62	-18.29	1.20	4011	0.750	-1.400	-0.038	5412	15	-5.12	6763
4035	-4.02	-16.60	3.41	4011	0.500	-1.400	0.0	5412	15	2	4000
4036	-3.01	-19.10	4.42	4011	0.250	-1.300	-0.047	5412	15		

3.3430

4035	-1.40	-20.30	8.04	4011	0.0	-1.300	-4.410	5412	15	0.0	212
4035	-0.20	-21.31	10.65	4011	-0.100	-1.150	-0.180	5412	15	-0.02	4000
4035	2.21	-25.53	12.46	10	-0.300	-1.100	-0.450	5412	15	4.14	4000
4035	5.42	-28.14	13.87	4011	-0.500	-1.000	-4.550	5412	15	-9.52	4000
4035	7.43	-31.76	15.07	4011	-0.700	-0.900	-0.008	5412	15	-0.58	4000
4035	10.65	-32.37	16.08	4011	-0.850	-0.900	-0.003	5412	15	-2.90	4000
4035	9.65	-33.97	16.88	4011	-1.050	-0.750	0.035	5412	15	2.15	4000
4035	8.44	-36.29	17.09	4011	-1.200	-0.750	-0.040	5412	15	-5.12	2000
4035	5.22	-33.77	16.08	4011	-1.350	-0.650	-0.003	5412	15	2	4000
4035	1.20	-35.90	14.27	10	-1.400	-0.500	-0.059	5412	15		

The angle of attack data was corrected prior to the analysis for the mounting alignment of the AAT pods. The engineering units listing is in an uncorrected form.

4.1.1 Data Statistics

Results of the angle of attack statistical analyses are shown in Figures 9 and 10.

Due to the physical mounting of the angle of attack transmitters, correction factors have been applied to the data in order to compensate for the mounting offsets. The nose pod was pitched upward by 8 mils and was angled to the right by 7.5 mils. These offsets were converted to correction factors of 0.450 degrees for the nose pitch and 0.421 degrees for the nose yaw. The correction factor for the nose pitch was subtracted from the data and the correction factor for the nose yaw sensor was added to the sensor data prior to the analysis. The four launcher pods were all pitched upward by 80 mils. This offset,equivalent to 4.499 degrees, was subtracted from the pitch angle of attack readings.

The mean values for each of the pitch angle of attack transmitters and the pitch gyro are shown in Figure 9. These values indicate the average reading for the sensors over the period of the sample.

The root-mean-square (RMS) values for each of the parameters were calculated to indicate the degree of excursion of the data. The RMS values for the sensors fell in a range within 0.1 of the absolute value of the mean values. This indicates that most of the data samples fell within a very narrow range of mean value.

The standard deviation was calculated in order to provide a measure of the data dispersion. For a normal distribution, the standard deviation or $\pm\sigma$ indicates the range in which 68.2% of the samples were located about the mean. For the angle of attack sensor in the Pitch #1 position, 68.2% of the samples were within ±.9150° of the mean value (-5.7427°).

A two sigma value (2σ), or twice the value of the standard deviation, indicates the data band in which 95.5% of the samples fell. A 3σ value indicates the data band in which 99.7% of the values were located. For the above example, this would indicate that 95.5% of the value are within ±1.830° of the mean and 99.7% are within ±2.745° of the mean. It will be shown later in the Fourier Analysis Section that the predominant portion of the data excursion is cyclic and in fact these deviation measurements are accurate vibratory motion induced sensor readings.

The variance, which is equal to the square of the standard deviation,is a measure of the range of the data and presented in Figure 9.

A N G L E   O F   A T T A C K   S E N S O R S

	PITCH 1	PITCH 2	PITCH 3	PITCH 4	PITCH 5	GYRO PITCH
MEAN						
	-5.7427	-10.7303	-9.4395	-11.4433	-6.9189	-3.239
RMS VALUE						
	5.9151	10.9465	9.5009	11.4337	6.9742	3.240
STANDARD DEVIATION						
	0.9150	1.1972	1.0198	0.9625	0.8768	0.071
VARIANCE						
	0.8372	1.4333	1.0399	0.9265	0.7688	0.005

CORRELATION COEFFICIENTS

PITCH 1	1.0000					
PITCH 2	0.9864	1.0000				
PITCH 3	0.8631	0.8982	1.0000			
PITCH 4	0.9474	0.9583	0.8871	1.0000		
PITCH 5	0.9415	0.9623	0.9383	0.9804	1.0000	
GYRO PITCH	-0.3477	-0.3950	-0.5566	-0.3853	-0.4374	1.0000

FIG. 3

A N G L E   O F   A T T A C K   S E N S O R S

	YAW 1	YAW 2	YAW 3	YAW 4	YAW 5	GYRO YAW
	7.8251	-0.5072	1.1862	-0.3629	-8.5897	-0.927
RMS VALUE	7.8463	0.6458	1.4740	0.4839	8.6057	1.122
STANDARD DEVIATION	0.5750	0.3958	0.8750	0.3202	0.5244	0.632
VARIANCE	0.3318	0.1598	0.7656	0.1025	0.2750	0.399

CORRELATION COEFFICIENTS

YAW 1	1.0000					
YAW 2	0.9056	1.0000				
YAW 3	0.8224	0.7870	1.0000			
YAW 4	0.8881	0.8870	0.9036	1.0000		
YAW 5	0.8338	0.8458	0.9274	0.9253	1.0000	
GYRO YAW	0.1576	0.0339	-0.1037	0.0628	-0.1403	1.0000

FIG. 10

Similar data analysis is presented for the yaw angle of attack transmitters and the yaw gyro which is shown in Figure 10.

4.1.2 Data Correlation

A computer program was written to assess the degree of correlation between data signals and calculate correlation coefficients to measure data confidence level. The results of the analysis are shown in Figures 9 and 10 for the pitch and yaw sensors, respectively. The correlation between the pitch angle of attacks was very good with a .8631 coefficient between Pitch #1 and Pitch #3 being the lowest. Pitch #3 was located on the nose of the aircraft and sensed the airflow approximately 0.12 seconds earlier then the launcher sensors. This would be a contributing factor to the lower correlation factor.

The lowest correlation factor between the pitch sensors #1, 2, 4, 5 was 0.9415 and the highest factor was 0.9864. The high correlation between these sensors indicates that the angle of attack transmitters were responding to the airflow and the relative tracking movements of the individual sensors were in near perfect agreement.

The correlation between the gyro pitch and the angle of attacks was very poor. This indicates that the helicopter flight profile was not effected by the cyclic change in airflow pattern. Reviewing the engineering units printout shows that the pilot was able to maintain his pitch attitude even though abrupt changes in the airflow occurred.

Identical information is available for the yaw angle of attack in Figure 10. From the mean values, it can be seen that the airflow around the aircraft was almost symmetrical and indicates a streamlining effect with relative wind flowing down and outboard of the fuselage.

4.1.3 Frequency Spectrum Determination

A standard computer subroutine was used to analyze the frequency content of the various recordings. This operation calculates the Fourier coefficients over one cycle. Based on previous observations, the fundamental frequency of these signals is 11 Hertz (period equals .09 seconds) and corresponds to the natural helicopter rotor frequency. Since the data acquisition system records at a rate of 100 samples per second, then 9 data points are necessary for a calculation. For each parameter, separate calculations were made for consecutive blocks of nine data points. The results of these calculations are shown on pages 67 through 74.

The accuracy of each DC component can be verified by checking the 9 appropriate data points. Since the AC variations of these signals are quite low, then the Fourier coefficients are correspondingly low. It can be noticed in the pitch calculations for data points 181 to 189, there was a significant increase in the magnitude of the coefficients. Referring to the plot of the pitch signals in Figure 11, it is seen

FOURIER COEFFICIENTS. 11 HZ FUNDAMENTAL: PITCH SENSORS

	VARIABLE	FROM	TO	DC	COS1	COS2	COS3	COS4	SIN1	SIN2	SIN3	SIN4
#1 Pitch	1	1	9	-4.9302	0.1235	0.0414	0.0216	0.0508	0.1607	0.0662	0.0373	-0.0201
#2 Pitch	2	1	9	-10.1041	0.2352	0.1135	0.1289	0.1166	0.3980	0.1244	0.0763	-0.0243
#3 Pitch	3	1	9	-8.3006	-0.0591	0.0396	0.0360	0.0622	0.0512	0.0616	0.0373	0.0104
#4 Pitch	4	1	9	-10.7031	0.0146	0.0564	0.0792	0.0800	0.2271	0.0716	0.0375	0.0321
#5 Pitch	5	1	9	-6.4909	-0.0055	0.0438	0.0289	0.0267	0.1414	0.0206	0.0250	-0.0083
Gyro Pitch	6	1	9	-3.1500	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
	1	10	18	-5.3477	0.1650	0.0337	0.0718	0.0603	0.2048	0.0698	0.0250	0.0145
	2	10	18	-10.7484	0.1444	0.0628	0.0429	0.0724	0.1911	0.0818	0.0246	0.0021
	3	10	18	-8.7109	-0.0283	0.0133	0.0143	0.0367	0.0359	0.0064	-0.0002	0.0081
	4	10	18	-11.3025	0.0242	0.0376	0.0289	0.0450	0.0863	0.0183	0.0250	0.0070
	5	10	18	-6.7987	-0.0278	0.0387	0.0218	0.0540	0.1602	0.0492	0.0127	0.0016
	6	10	18	-3.1500	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
	1	19	27	-5.8731	0.1721	0.0409	0.0574	0.0677	0.1921	0.0821	0.0248	0.0020
	2	19	27	-11.1852	0.1023	0.0450	0.0580	0.0461	0.2208	0.0479	0.0369	0.0129
	3	19	27	-9.0488	-0.0111	-0.0025	0.0499	0.0136	0.0093	0.0142	0.0125	0.0049
	4	19	27	-11.6987	0.0234	0.0727	0.0361	0.0556	0.1786	0.0775	0.0375	0.0114
	5	19	27	-7.1823	0.0115	0.0447	0.0361	0.0522	0.1272	0.0156	0.0375	0.0010
	6	19	27	-3.1500	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
	1	28	36	-6.1824	0.0493	0.0251	0.0214	0.0335	0.1360	0.0297	0.0125	0.0058
	2	28	36	-11.6218	0.1074	0.0181	0.0356	0.0679	0.2022	0.0196	0.0123	0.0033
	3	28	36	-9.1210	-0.0439	-0.0264	-0.0072	0.0056	-0.1595	-0.0489	-0.0125	-0.0015
	4	28	36	-12.0959	-0.0374	0.0451	0.0217	0.0355	0.0677	-0.0102	0.0375	-0.0029
	5	28	36	-7.4134	-0.0335	0.0404	0.0289	0.0147	0.0830	0.0450	-0.0000	-0.0005
	6	28	36	-3.1560	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
	1	37	45	-6.4559	0.0898	0.0084	0.0360	0.0748	0.2538	0.0313	0.0373	0.0020
	2	37	45	-11.7505	0.0386	0.0059	-0.0073	-0.0015	0.0388	-0.0200	-0.0123	0.0156
	3	37	45	-9.2218	0.0352	0.0106	0.0289	0.0192	-0.0360	-0.0067	-0.0000	-0.0087
	4	37	45	-12.1753	-0.0502	-0.0084	-0.0072	0.0152	0.0049	-0.0093	0.0125	-0.0143
	5	37	45	-7.5437	-0.0606	0.0148	0.0508	0.0458	0.0917	0.0278	0.0125	0.0212
	6	37	45	-3.2008	-0.0100	-0.0100	-0.0100	-0.0100	0.0221	0.0310	0.0173	-0.0430
	1	46	54	-6.6359	0.0161	-0.0246	0.0000	0.0086	0.0912	0.0090	-0.0000	-0.0072
	2	46	54	-11.7935	0.0323	0.0239	0.0143	0.0081	0.1210	0.0245	0.0248	0.0148
	3	46	54	-9.3442	0.0035	0.0120	0.0429	0.0278	-0.0091	-0.0140	0.0246	-0.0049
	4	46	54	-12.3270	0.0110	0.0025	0.0361	-0.0136	0.0377	0.0241	-0.0125	-0.0137
	5	46	54	-7.7972	-0.0064	0.0183	0.0217	0.0097	0.0360	0.0067	0.0375	0.0081
	6	46	54	-3.2400	-0.0000	0.0000	0.0000	0.0000	0.0000	0.0	-0.0000	-0.0000
	1	55	63	-6.6071	-0.0158	-0.0233	-0.0072	0.0174	0.0360	0.0067	-0.0375	0.0081
	2	55	63	-11.9081	0.0216	0.0213	-0.0001	0.0214	0.1403	0.0205	0.0248	-0.0084
	3	55	63	-9.4593	0.0383	-0.0195	0.0070	-0.0185	-0.2093	-0.0602	-0.0375	-0.0004
	4	55	63	-12.3920	-0.0319	0.0013	-0.0072	0.0089	0.0267	-0.0076	-0.0125	0.0032
	5	55	63	-7.8406	-0.0064	0.0183	0.0000	0.0097	0.0360	0.0067	-0.0000	0.0081
	6	55	63	-3.2400	-0.0000	0.0000	0.0000	0.0000	0.0000	0.0	-0.0000	-0.0000
	1	64	72	-6.6287	-0.0382	0.0196	-0.0072	0.0186	0.0628	-0.0009	-0.0125	0.0114
	2	64	72	-12.0227	-0.0047	-0.0205	0.0071	0.0038	0.0263	-0.0075	-0.0123	0.0031
	3	64	72	-9.4808	0.1700	0.0378	0.0072	0.0079	-0.1001	-0.0233	-0.0121	0.0023
	4	64	72	-12.3487	-0.0599	-0.0020	-0.0072	-0.0031	-0.0502	-0.0116	0.0125	0.0011
	5	64	72	-7.7972	-0.0807	0.0018	0.0000	-0.0078	-0.0142	-0.0049	-0.0250	0.0093
	6	64	72	-3.2400	-0.0000	0.0000	0.0000	0.0000	0.0000	0.0	-0.0000	-0.0000
	1	73	81	-6.6287	-0.0353	-0.0106	-0.0072	-0.0192	0.0459	-0.0119	-0.0125	-0.0203
	2	73	81	-12.0372	-0.0001	0.0003	0.0000	0.0002	0.0715	0.0132	-0.0000	0.0162
	3	73	81	-9.6175	0.1463	0.0718	0.0359	0.0405	0.0560	0.0523	0.0125	-0.0037
	4	73	81	-12.3053	0.0047	0.0208	-0.0072	-0.0038	-0.1086	0.0128	-0.0125	0.0089
	5	73	81	-7.7960	-0.0072	-0.0072	-0.0072	-0.0072	-0.0311	-0.0159	0.0125	-0.0224
	6	73	81	-3.2100	0.0048	-0.0253	0.0000	-0.0135	0.0499	0.0092	-0.0000	0.0113
	1	82	90	-6.6789	-0.0589	0.0232	0.0000	0.0137	0.1267	0.0155	-0.0000	0.0008
	2	82	90	-12.0943	-0.0379	0.0195	0.0574	0.0193	0.1619	0.0220	0.0002	0.0090

3	82	90	-9.5167	0.0277	-0.0387	-0.0646	-0.0537	-0.2497	-0.0904	-0.0375	-0.0218
4	82	90	-12.3703	0.0327	0.0242	0.0144	0.0081	0.0503	0.0116	0.0250	-0.0012
5	82	90	-7.8189	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
6	82	90	-3.2200	0.0306	0.0069	-0.0200	-0.0376	0.0000	-0.0000	-0.0000	-0.0000
1	91	99	-6.7653	-0.0704	-0.0048	0.0000	0.0105	-0.0062	-0.0408	-0.0250	0.0024
2	91	99	-12.0799	-0.0674	-0.0343	-0.0213	-0.0270	-0.0326	-0.0332	-0.0123	-0.0006
3	91	99	-9.0632	0.0131	0.0099	-0.0214	-0.0063	-0.0499	-0.0113	0.0125	0.0010
4	91	99	-12.2837	0.0152	-0.0502	-0.0289	-0.0084	-0.0863	-0.0183	-0.0250	-0.0071
5	91	99	-7.7467	-0.0170	-0.0009	-0.0289	-0.0255	-0.0863	-0.0183	-0.0250	-0.0071
6	91	99	-3.1800	-0.0388	-0.0047	0.0000	-0.0165	-0.0325	-0.0265	-0.0000	0.0060
1	100	108	-6.6647	-0.0796	0.0273	0.0071	0.0090	0.0091	0.0140	0.0123	0.0048
2	100	108	-11.9009	-0.1249	-0.0025	-0.0287	-0.0450	-0.0946	-0.0321	-0.0000	-0.0120
3	100	108	-9.3512	0.2015	0.0530	0.0503	0.0475	0.0795	0.0714	0.0125	-0.0081
4	100	108	-12.1537	-0.0404	-0.0147	0.0144	0.0335	0.0404	0.0302	-0.0000	0.0273
5	100	108	-7.6235	-0.0899	-0.0142	0.0219	0.0167	0.0093	0.0142	0.0125	0.0049
6	100	108	-3.1900	0.0100	0.0100	0.0100	0.0100	0.0567	-0.0036	0.0173	-0.0084
1	109	117	-6.7865	-0.0768	0.0135	0.0000	0.0203	0.0483	-0.0057	-0.0000	0.0205
2	109	117	-11.9155	-0.0237	0.0338	0.0286	0.0329	0.1088	0.0372	0.0248	0.0028
3	109	117	-9.4666	0.1033	0.0285	0.0143	-0.0024	0.0277	0.0425	-0.0002	0.0147
4	109	117	-12.4784	0.0604	0.0276	0.0146	0.0200	0.0018	0.0174	0.0248	-0.0214
5	109	117	-7.8406	0.0183	0.0097	0.0000	-0.0063	-0.0218	-0.0017	0.0250	-0.0175
6	109	117	-3.1800	0.0223	-0.0341	0.0300	0.0118	0.0129	0.0197	0.0173	0.0068
1	118	126	-6.7438	-0.1084	-0.0016	-0.0214	-0.0196	-0.0808	-0.0274	-0.0125	-0.0212
2	118	126	-11.9656	-0.1236	-0.0246	0.0143	-0.0024	-0.0018	-0.0174	-0.0248	0.0213
3	118	126	-9.4735	0.1392	-0.0252	-0.0214	-0.0059	-0.0841	-0.0089	-0.0371	-0.0288
4	118	126	-12.4712	0.0135	-0.0114	-0.0143	-0.0024	-0.0766	-0.0041	0.0248	-0.0021
5	118	126	-7.8189	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
6	118	126	-3.1500	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
1	127	135	-6.5085	-0.1020	-0.0199	-0.0431	-0.0294	-0.1452	-0.0440	-0.0250	-0.0108
2	127	135	-11.7793	-0.1411	-0.0509	-0.0212	-0.0444	-0.1534	-0.0577	-0.0371	-0.0158
3	127	135	-8.8904	-0.0334	-0.0495	-0.0648	-0.0248	-0.0453	-0.0209	-0.0125	-0.0131
4	127	135	-12.3631	0.0789	-0.0528	-0.0578	-0.0261	-0.1333	-0.0566	-0.0250	0.0016
5	127	135	-7.7537	0.0473	-0.0517	-0.0436	-0.0173	-0.1069	-0.0644	-0.0000	0.0049
6	127	135	-3.2100	-0.0031	-0.0476	0.0000	0.0206	0.0173	-0.0173	-0.0000	0.0173
1	136	144	-6.1969	-0.0912	-0.0172	-0.0288	-0.0429	-0.1643	-0.0398	-0.0248	0.0125
2	136	144	-11.3498	-0.1134	-0.0475	-0.0428	-0.0325	-0.2115	-0.0336	-0.0244	-0.0081
3	136	144	-9.0127	0.1410	0.0257	0.0144	0.0276	0.1062	0.0639	-0.0000	-0.0048
4	136	144	-11.9442	-0.0217	-0.0217	-0.0217	-0.0217	-0.0410	0.0026	-0.0125	0.0060
5	136	144	-7.5001	-0.0081	-0.0327	0.0072	-0.0242	-0.0546	-0.0351	0.0125	-0.0191
6	136	144	-3.2300	-0.0100	-0.0100	0.0200	-0.0100	-0.0173	0.0173	-0.0000	-0.0173
1	145	153	-5.9000	-0.0710	-0.0046	0.0000	0.0105	-0.0410	0.0026	0.0250	0.0060
2	145	153	-11.1421	-0.0111	-0.0025	0.0072	0.0136	0.0093	0.0142	0.0125	0.0049
3	145	153	-8.9551	0.0623	-0.0116	0.0216	0.0140	0.1359	0.0299	0.0123	0.0060
4	145	153	-11.9442	0.0687	-0.0298	0.0000	0.0044	-0.0656	-0.0668	-0.0250	-0.0012
5	145	153	-7.4207	0.0111	0.0025	-0.0072	-0.0136	-0.1098	-0.0374	0.0125	-0.0027
6	145	153	-3.2100	-0.0476	0.0206	0.0000	-0.0031	0.0173	-0.0173	-0.0000	0.0173
1	154	162	-6.0099	-0.1072	-0.0241	-0.0001	0.0233	-0.0756	0.0459	0.0002	0.0094
2	154	162	-11.1351	-0.1110	0.0284	-0.0001	0.0179	-0.0174	0.0214	0.0248	0.0018
3	154	162	-9.3223	0.0651	0.0647	0.0647	0.0649	0.3130	0.0568	0.0373	0.0059
4	154	162	-11.8865	0.0632	0.0140	0.0072	0.0311	0.0311	0.0159	-0.0125	0.0224
5	154	162	-7.3846	0.0463	0.0131	0.0217	0.0056	0.0267	-0.0076	-0.0125	0.0032
6	154	162	-3.2200	-0.0153	-0.0035	-0.0200	0.0188	0.0265	-0.0060	-0.0300	-0.0326
1	163	171	-6.2181	-0.0285	0.0133	0.0144	0.0369	0.0296	0.0601	0.0250	-0.0070
2	163	171	-11.4429	-0.0383	0.0361	0.0503	0.0668	0.0865	0.0680	0.0371	0.0183
3	163	171	-9.7470	0.0944	0.0124	0.0361	0.0222	0.1673	0.0130	0.0125	-0.0049
4	163	171	-12.2907	0.1051	0.0962	0.1081	0.0803	0.2694	0.0861	0.0375	0.0043
5	163	171	-7.6958	0.0973	0.0637	0.0506	0.0563	0.2341	0.0801	0.0375	-0.0040
6	163	171	-3.2400	-0.0000	0.0000	0.0000	0.0000	0.0000	0.0	-0.0000	-0.0000
1	172	180	-6.5585	-0.0013	-0.0089	0.0289	0.0319	-0.0174	0.0218	0.0250	0.0017
2	172	180	-11.8794	0.0177	0.0262	0.0144	0.0420	0.0091	0.0140	-0.0246	0.0048
3	172	180	-9.0490	-0.1347	-0.1921	-0.2089	-0.1912	-0.6308	-0.2812	-0.1370	-0.0246

4	172	180	-12.8388	0.0815	0.0237	0.0289	0.0248	0.0912	0.0090	-0.0000	-0.0072
5	172	180	-8.0428	0.0759	-0.0226	-0.0361	0.0116	-0.0595	-0.0258	-0.0375	-0.0038
6	172	180	-3.2900	0.0200	0.0200	-0.0100	0.0200	0.0394	0.0137	0.0173	-0.0257
1	181	189	-6.1680	-0.0605	-0.1757	-0.1870	-0.1739	-0.6873	-0.2396	-0.0995	-0.0384
2	181	189	-11.0563	-0.2409	-0.2569	-0.2506	-0.2323	-0.9277	-0.3051	-0.1364	-0.0471
3	181	189	-7.2929	-0.2101	-0.1277	-0.1297	-0.1376	-0.2253	-0.1980	-0.0749	-0.0478
4	181	189	-12.0020	-0.2215	-0.1891	-0.2236	-0.2387	-0.6133	-0.2861	-0.1374	-0.0481
5	181	189	-6.7336	-0.2548	-0.2142	-0.2387	-0.2477	-0.5936	-0.3088	-0.1378	-0.0285
6	181	189	-3.3300	-0.0300	0.3000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
1	190	198	-4.6931	-0.0967	-0.1281	-0.1512	-0.1519	-0.5163	-0.1589	-0.0876	-0.0536
2	190	198	-5.0903	-0.1732	-0.1909	-0.1432	-0.1403	-0.5705	-0.1778	-0.0745	-0.0166
3	190	198	-6.6310	-0.0795	0.0272	0.0071	0.0092	0.1907	0.0319	0.0123	-0.0093
4	190	198	-10.3282	-0.1997	-0.1038	-0.1227	-0.1025	-0.1921	-0.1150	-0.0874	-0.0355
5	190	198	-5.4750	-0.0336	-0.0497	-0.0217	-0.0250	-0.0453	-0.0209	-0.0125	-0.0131
6	190	198	-3.2800	-0.0288	0.0053	-0.0200	-0.0065	-0.0152	-0.0439	-0.0000	0.0233
1	199	207	-3.9164	-0.0089	-0.0591	-0.0216	-0.0410	-0.1408	-0.0206	0.0127	0.0082
2	199	207	-8.3642	0.0303	0.0002	0.0000	-0.0001	-0.0629	0.0334	-0.0000	0.0218
3	199	207	-6.7893	-0.0659	0.0162	-0.0287	0.0067	0.0671	-0.0103	-0.0000	-0.0030
4	199	207	-10.0035	0.0009	0.0255	0.0072	0.0170	0.0770	0.0040	0.0125	0.0021
5	199	207	-5.5039	0.0535	0.0203	0.0072	0.0128	0.0578	0.0084	0.0125	0.0256
6	199	207	-3.3300	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
1	208	216	-3.8809	0.0450	0.0043	0.0372	0.0374	0.0093	0.0142	0.0125	0.0049
2	208	216	-8.5291	0.0422	0.0176	0.0142	0.0262	-0.0049	0.0093	0.0250	0.0142
3	208	216	-6.8324	-0.0411	0.0075	0.0144	-0.0094	0.0248	-0.0248	-0.0000	0.0248
4	208	216	-10.0323	0.0208	-0.0038	-0.0072	0.0047	0.0175	-0.0218	0.0125	-0.0018
5	208	216	-5.6339	0.0318	-0.0013	0.0072	-0.0089	0.0453	0.0209	0.0125	0.0131
6	208	216	-3.2900	-0.0100	-0.0100	-0.0100	-0.0100	-0.0430	-0.0221	0.0173	-0.0310
1	217	225	-4.2115	0.0945	0.0126	0.0362	0.0223	-0.0148	-0.0049	0.0123	0.0091
2	217	225	-8.7082	0.0180	0.0096	0.0000	-0.0062	-0.0312	0.0166	-0.0000	0.0108
3	217	225	-6.9258	-0.0468	0.0514	0.0429	0.0173	0.1318	0.0390	-0.0000	0.0200
4	217	225	-9.9818	0.0199	-0.0294	-0.0144	-0.0122	0.0125	-0.0125	-0.0000	0.0125
5	217	225	-5.6555	0.0136	-0.0111	-0.0144	-0.0025	0.0235	0.0192	-0.0000	-0.0044
6	217	225	-3.2400	-0.0000	0.0000	0.0000	0.0000	0.0000	0.0	-0.0000	-0.0000
1	226	234	-4.3411	0.0510	0.0339	0.0144	0.0017	0.0186	0.0284	0.0250	0.0099
2	226	234	-8.8940	0.0600	0.0275	0.0358	0.0200	0.0200	0.0452	0.0123	-0.0118
3	226	234	-7.1133	-0.0969	0.0430	0.0147	0.0325	0.1545	0.0582	-0.0000	0.0157
4	226	234	-9.9746	-0.0161	0.0246	0.0217	-0.0086	0.0813	0.0275	0.0125	0.0212
5	226	234	-5.7280	0.0241	0.0082	-0.0073	0.0331	0.0456	0.0209	0.0127	0.0134
6	226	234	-3.2400	-0.0000	0.0000	0.0000	0.0000	0.0000	0.0	-0.0000	-0.0000
1	235	243	-4.6716	0.1136	0.0474	0.0430	0.0326	0.0780	0.0541	0.0248	0.0136
2	235	243	-9.2308	0.1109	0.0608	0.0286	0.0216	0.0634	0.0491	0.0002	0.0226
3	235	243	-7.4589	-0.0507	0.0560	0.0360	0.0377	0.1276	0.0655	0.0123	0.0124
4	235	243	-10.2129	0.0119	0.0290	0.0217	0.0034	0.1048	0.0467	0.0125	0.0169
5	235	243	-5.8732	0.0352	0.0136	0.0072	0.0192	0.0995	-0.0085	0.0125	0.0146
6	235	243	-3.2300	0.0200	0.0200	0.0200	0.0200	0.0000	0.0	-0.0000	-0.0000
1	244	252	-5.0309	0.1441	0.0374	0.0359	0.0554	0.0685	0.0398	0.0125	0.0088
2	244	252	-9.6388	0.1278	0.0619	0.0572	0.0470	0.0774	0.0539	0.0248	0.0135
3	244	252	-7.6386	-0.0704	-0.0043	0.0000	0.0103	-0.0125	0.0125	-0.0000	-0.0125
4	244	252	-10.3573	-0.0319	0.0013	0.0361	0.0089	0.0738	0.0308	-0.0125	-0.0055
5	244	252	-5.9887	0.0059	-0.0016	0.0144	0.0391	0.0485	-0.0059	-0.0000	0.0207
6	244	252	-3.2400	-0.0000	0.0000	0.0000	0.0000	0.0000	0.0	-0.0000	-0.0000
1	253	261	-5.1532	0.0599	0.0020	0.0072	0.0031	0.0218	0.0017	0.0125	0.0174
2	253	261	-9.9608	0.0992	0.0330	0.0286	0.0182	0.0309	0.0157	0.0248	0.0223
3	253	261	-7.6746	-0.0496	-0.0383	0.0143	0.0152	0.0233	0.0191	0.0002	-0.0042
4	253	261	-10.4512	-0.0247	0.0086	-0.0217	0.0161	0.0043	0.0235	-0.0375	0.0191
5	253	261	-6.0537	-0.0039	0.0047	0.0361	0.0209	0.0218	0.0017	0.0125	0.0174
6	253	261	-3.2400	-0.0000	0.0000	0.0000	0.0000	0.0000	0.0	-0.0000	-0.0000
1	262	270	-5.2755	0.1201	0.0296	0.0216	0.0232	0.0766	0.0041	0.0127	0.0020
2	262	270	-10.1113	0.1212	-0.0092	0.0071	0.0173	-0.0140	-0.0049	0.0123	0.0091
3	262	270	-7.8328	-0.0674	0.0074	0.0216	0.0383	0.0402	0.0299	0.0373	0.0272
4	262	270	-10.4942	-0.0309	0.0266	0.0000	0.0257	0.0497	0.0115	0.0250	-0.0013

5	262	270	-6.1404	-0.0039	0.0047	-0.0072	0.0208	0.0688	0.0400	0.0125	0.0087
6	262	270	-3.2600	0.0035	-0.0188	0.0200	0.0153	0.0060	0.0326	-0.0000	0.0265
1	271	279	-5.5420	0.2111	0.0470	0.0720	0.0659	0.2596	0.0718	0.0250	-0.0007
2	271	279	-10.3547	0.1617	0.0467	0.0571	0.0492	0.0898	0.0412	0.0246	0.0259
3	271	279	-7.9466	-0.0427	-0.0010	0.0000	0.0223	-0.0268	0.0401	-0.0000	0.0300
4	271	279	-10.5874	-0.0047	-0.0208	0.0072	0.0038	0.0453	0.0209	0.0125	0.0131
5	271	279	-6.2158	0.0072	0.0072	0.0072	0.0072	0.0410	-0.0026	0.0125	-0.0061
6	271	279	-3.3300	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
1	280	289	-5.6425	0.0427	0.0013	-0.0431	-0.0224	-0.0542	-0.0348	-0.0250	-0.0181
2	280	298	-10.4978	0.0740	-0.0001	-0.0358	-0.0312	-0.0091	-0.0140	-0.0123	-0.0049
3	280	289	-7.5737	-0.1848	-0.0943	-0.0862	-0.0879	-0.3263	-0.0945	-0.0497	-0.0298
4	290	289	-10.7030	-0.0285	0.0133	0.0144	0.0369	0.0360	0.0067	-0.0000	0.0081
5	280	288	-6.2632	-0.0025	0.0136	0.0072	-0.0111	0.0392	-0.0201	-0.0125	0.0157
6	290	298	-3.3400	0.0100	0.0100	-0.0200	0.0100	0.0173	-0.0173	-0.0000	0.0173
1	289	297	-5.0596	0.0679	-0.0718	-0.0863	-0.0611	-0.1011	-0.0729	-0.0248	-0.0094
2	289	297	-10.0395	0.0395	-0.1167	-0.1073	-0.1378	-0.1598	-0.0982	-0.0620	-0.0129
3	299	297	-7.1346	-0.0715	-0.0301	-0.0073	-0.0064	-0.0172	0.0215	-0.0123	0.0017
4	289	297	-10.6020	-0.0499	-0.0251	-0.0216	-0.0334	-0.0579	-0.0698	-0.0373	0.0256
5	289	297	-6.1693	-0.0807	0.0018	0.0000	-0.0078	0.0108	-0.0300	-0.0250	0.0343
6	289	297	-3.4200	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000

FOURIER COEFFICIENTS. 11 Hz FUNDAMENTAL: YAW SENSORS

VARIABLE		FROM	TO	DC	COS1	COS2	COS3	COS4	SIN1	SIN2	SIN3	SIN4
#1 Yaw	1	1	9	7.9889	-0.0426	-0.0010	0.0213	0.0223	0.3408	0.0225	0.0123	0.0166
#2 Yaw	2	1	9	-0.3504	-0.0205	0.0038	-0.0142	-0.0046	0.0355	0.0066	-0.0000	0.0080
#3 Yaw	3	1	9	0.9254	0.0605	0.0273	0.0359	0.0198	-0.0267	0.0076	0.0125	-0.0032
#4 Yaw	4	1	9	-0.3133	0.0039	-0.0048	0.0073	-0.0211	-0.0221	-0.0017	-0.0127	-0.0177
#5 Yaw	5	1	9	-8.7357	0.0047	0.0208	-0.0289	-0.0039	0.0366	-0.0261	0.0500	-0.0253
Gyro Yaw	6	1	9	-0.2700	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
	1	10	18	7.8102	0.0251	0.0167	0.0071	0.0009	-0.0092	-0.0140	-0.0123	-0.0049
	2	10	18	-0.4079	0.0461	0.0129	0.0214	0.0054	0.0267	-0.0076	-0.0125	0.0032
	3	10	18	0.8460	0.1157	0.0086	0.0070	0.0267	0.0218	0.0017	0.0125	0.0175
	4	10	18	-0.3280	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
	5	10	18	-8.7141	-0.0472	-0.0384	-0.0504	-0.0227	-0.0686	-0.0400	0.0624	-0.0089
	6	10	18	-0.2700	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
	1	19	27	7.7601	0.1124	0.0220	0.0144	0.0159	0.1536	0.0578	0.0000	0.0156
	2	19	27	-0.5005	0.0531	0.0203	0.0286	0.0126	0.0571	0.0085	0.0495	0.0253
	3	19	27	0.7453	0.0738	0.0167	0.0217	0.0175	0.0216	0.0019	0.0125	0.0173
	4	19	27	-0.2987	-0.0073	-0.0073	-0.0073	-0.0073	-0.0416	0.0027	-0.0127	0.0062
	5	19	27	-8.6997	0.0228	-0.0006	0.0001	0.0644	-0.0758	-0.0153	0.0498	0.0605
	6	19	27	-0.2700	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
	1	28	36	7.7242	0.0012	0.0251	0.0287	0.0168	0.0946	0.0321	0.0000	0.0119
	2	28	36	-0.5864	0.0434	0.0264	0.0071	-0.0055	0.0158	0.0222	0.0123	-0.0312
	3	28	36	0.6159	0.0987	0.0077	0.0214	0.0012	0.0174	-0.0218	0.0125	-0.0017
	4	28	36	-0.3640	0.0330	0.0244	0.0363	0.0083	-0.0032	0.0267	0.0125	-0.0076
	5	28	36	-8.8293	0.0969	0.0946	-0.0216	-0.0186	0.0220	0.0631	0.0377	-0.0334
	6	28	36	-0.2800	-0.0153	-0.0035	0.0100	0.0188	0.0129	0.0197	0.0173	0.0068
	1	37	45	7.6167	0.0411	-0.0075	0.0072	0.0094	0.0996	0.0228	0.0125	-0.0023
	2	37	45	-0.6652	0.0181	0.0099	0.0646	-0.0063	0.0745	-0.0133	-0.0125	0.0236
	3	37	45	0.5727	0.0400	0.0314	0.0217	0.0153	0.0093	0.0142	0.0125	0.0049
	4	37	45	-0.4223	0.0073	0.0073	0.0073	0.0073	-0.0416	0.0027	-0.0127	0.0062
	5	37	45	-9.0092	0.1237	0.0249	-0.0143	0.0021	-0.1615	0.0279	-0.0248	0.0023
	6	37	45	-0.3400	0.0012	0.0353	0.0100	0.0235	0.0068	-0.0129	0.0173	-0.0197
	1	46	54	7.5451	0.0207	-0.0036	0.0358	0.0049	0.2064	0.0427	0.0123	0.0222
	2	46	54	-0.7511	0.0002	-0.0002	0.0431	-0.0000	0.0963	-0.0116	-0.0000	0.0410
	3	46	54	0.3286	0.0990	0.0331	0.0071	0.0182	0.1125	0.0102	0.0123	0.0103
	4	46	54	-0.4150	-0.0163	0.0250	0.0220	-0.0087	0.0094	0.0144	0.0127	0.0050
	5	46	54	-9.0379	-0.0040	0.0046	-0.1153	0.0207	0.0216	0.0019	-0.0250	0.0172
	6	46	54	-0.3600	-0.0000	0.0000	0.0000	0.0000	0.0	-0.0000	-0.0000	-0.0000
	1	55	63	7.3592	-0.0205	0.0038	0.0071	-0.0046	0.1355	0.0296	0.0123	0.0061
	2	55	63	-0.8444	0.0070	0.0074	-0.0142	0.0073	0.0592	0.0255	-0.0000	0.0039
	3	55	63	0.1419	0.0640	0.0227	0.0001	-0.0007	0.0233	0.0191	0.0002	-0.0042
	4	55	63	-0.5974	0.0477	0.0390	0.0291	0.0227	0.0510	0.0118	0.0254	-0.0011
	5	55	63	-9.2035	-0.0048	-0.0205	-0.0361	0.0040	-0.0948	0.0293	-0.0125	-0.0630
	6	55	63	-0.3800	-0.0053	0.0065	-0.0100	0.0288	0.0302	0.0024	0.0173	0.0242
	1	64	72	7.2945	0.0135	-0.0112	-0.0142	-0.0026	0.0483	-0.0057	0.0000	0.0205
	2	64	72	-0.9731	0.0208	-0.0038	0.0144	0.0047	0.0360	0.0067	-0.0000	0.0082
	3	64	72	0.2424	0.0221	0.0050	-0.0144	-0.0271	-0.0186	-0.0284	-0.0250	-0.0099
	4	64	72	-0.6953	0.0314	0.0155	0.0220	0.0404	0.0329	0.0336	0.0127	0.0007
	5	64	72	-9.2323	0.0988	0.0810	-0.0070	-0.0075	-0.0739	0.0635	-0.0125	-0.0121
	6	64	72	-0.4200	-0.0000	0.0000	0.0600	0.0000	0.0000	-0.0000	-0.0000	-0.0000
	1	73	81	7.4594	-0.0989	-0.0334	-0.0288	-0.0184	-0.0061	-0.0405	-0.0248	0.0025
	2	73	81	-0.8300	-0.0011	-0.0253	-0.0287	-0.0169	0.0049	-0.0091	-0.0246	-0.0140
	3	73	81	0.3933	0.0689	-0.0043	0.0070	0.0211	0.0761	0.0036	0.0125	0.0020
	4	73	81	-0.7139	-0.0073	-0.0070	0.0146	-0.0074	-0.0412	0.0026	0.0252	0.0062
	5	73	81	-9.1604	0.0283	-0.0131	-0.0789	-0.0368	-0.0728	-0.0633	-0.0870	-0.0280
	6	73	81	-0.4400	-0.0188	0.0153	-0.0100	0.0035	-0.0068	0.0129	-0.0173	0.0197
	1	82	90	7.4521	-0.0222	0.0428	0.0001	0.0011	0.1260	0.0156	-0.0002	0.0010
	2	82	90	-0.7654	-0.0135	0.0108	-0.0072	0.0024	0.0764	0.0039	0.0125	0.0020

3	82	90	0.6016	-0.0289	-0.0289	-0.0289	-0.0289	-0.0000	0.0000	0.0000	0.0000
4	82	90	-0.6763	0.0456	-0.0124	-0.0073	-0.0116	-0.0219	-0.0019	-0.0127	-0.0175
5	82	90	-9.0882	0.0925	-0.0801	-0.0430	-0.0770	-0.1405	-0.0533	-0.0498	-0.0249
6	82	90	-0.4580	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
1	91	99	7.7816	-0.1751	-0.0614	-0.0717	-0.0634	-0.1366	-0.0795	-0.0248	-0.0174
2	91	99	-0.6364	-0.0585	-0.0662	-0.0502	-0.0257	-0.0109	-0.0315	-0.0373	0.0169
3	91	99	0.6952	-0.0025	0.0134	-0.0142	-0.0109	-0.0140	-0.0049	-0.0246	0.0091
4	91	99	-0.5313	-0.0147	-0.0147	-0.0147	-0.0147	0.0000	-0.0000	-0.0000	-0.0000
5	91	99	-8.9078	0.0544	-0.0129	-0.0861	-0.0845	-0.0568	-0.0963	-0.0498	0.0330
6	91	99	-0.4500	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
1	100	108	8.0178	-0.1054	-0.0152	-0.0286	-0.0087	-0.0419	-0.0474	-0.0248	-0.0054
2	100	108	-0.6151	-0.0009	-0.0255	0.0144	-0.0170	-0.0049	0.3093	0.0250	0.0142
3	100	108	0.9255	-0.0289	-0.0289	-0.0289	-0.0289	-0.0000	0.0	0.0000	0.0000
4	100	108	-0.5240	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
5	100	108	-8.6061	-0.0182	0.0214	-0.0071	-0.0679	0.0399	0.0067	-0.0373	0.0077
6	100	108	-0.4500	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
1	109	117	8.0679	-0.0788	0.0271	0.0287	0.0091	0.0375	0.0240	0.0246	-0.0135
2	109	117	-0.5079	-0.0655	0.0042	0.0142	-0.0210	0.0049	-0.0098	-0.0246	-0.0140
3	109	117	0.9400	0.0000	0.0000	-0.0000	-0.0000	-0.0000	0.0	0.0000	0.0000
4	109	117	-0.4734	0.0144	0.0144	-0.0289	0.0144	0.0000	-0.0000	-0.0000	-0.0000
5	109	117	-8.6349	0.1100	-0.0048	0.0000	0.0378	-0.0205	-0.0128	-0.0250	0.0452
6	109	117	-0.4500	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
1	118	126	7.8959	-0.0792	0.0273	0.0073	0.0009	0.0091	0.0140	0.0123	0.0068
2	118	126	-0.5384	-0.0244	0.0004	0.0214	0.0144	0.0324	0.0331	0.0125	0.0067
3	118	126	1.0692	-0.0707	-0.0047	-0.0082	0.0105	0.1312	0.0388	0.0000	-0.0288
4	118	126	-0.4517	0.0112	0.0025	-0.0073	-0.0138	-0.0094	-0.0144	-0.0127	-0.0030
5	118	126	-8.6275	0.0763	-0.0392	0.0143	-0.0369	-0.0903	-0.0427	-0.0999	[illegible]
6	118	126	-0.5088	0.0288	-0.0053	0.0208	0.0065	0.0499	0.0092	-0.0000	0.0113
1	127	135	7.8960	-0.1250	0.0143	0.0072	0.0034	-0.0173	0.0216	-0.0125	0.0019
2	127	135	-0.5364	-0.0763	0.0135	0.0001	0.0201	0.0233	0.0198	0.0002	-0.0042
3	127	135	0.8100	0.0280	0.0034	0.0217	0.0119	0.0770	0.0040	0.0125	0.0021
4	127	135	-0.4223	0.0290	0.0290	0.0073	0.0290	0.1011	0.0232	0.0127	-0.0023
5	127	135	-8.6133	0.1418	0.0509	0.0861	0.0447	0.3550	0.1041	0.0999	0.0112
6	127	135	-0.5400	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
1	136	144	7.6025	-0.1295	0.0827	0.0644	0.0468	0.0552	0.0868	0.0373	0.0287
2	136	144	-0.6509	-0.0697	0.0288	0.0286	0.0272	0.0541	0.0346	0.0248	0.0180
3	136	144	0.9538	-0.0920	-0.0492	-0.0361	-0.0415	-0.0510	-0.0615	-0.0375	-0.0105
4	136	144	-0.5314	0.0075	0.0072	-0.0146	0.0073	0.0227	-0.0314	0.0252	-0.0160
5	136	144	-8.9660	0.0714	0.0298	-0.0146	0.0064	-0.0010	-0.0500	-0.0498	-0.0116
6	136	144	-0.5900	0.0288	-0.0053	0.0200	0.0065	0.0499	0.0092	-0.0000	0.0113
1	145	153	7.4098	-0.0983	-0.0497	-0.0429	-0.0663	-0.2890	-0.0072	-0.0496	-0.0216
2	145	153	-0.8372	-0.0302	-0.0374	-0.0008	0.0029	-0.0356	-0.0068	-0.0002	-0.0001
3	145	153	1.3281	-0.0000	-0.0443	-0.0431	-0.0207	0.0174	-0.0218	-0.0250	-0.0017
4	145	153	-0.4589	-0.0032	-0.0119	-0.0276	-0.0282	-0.0394	-0.0144	-0.0127	-0.0050
5	145	153	-8.7646	0.0216	0.0217	-0.0433	0.0217	-0.0311	-0.0159	-0.0250	-0.0284
6	145	153	-0.6300	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
1	154	162	7.8173	-0.0643	-0.0227	-0.0080	0.0007	-0.1047	-0.0137	-0.0246	0.0165
2	154	162	-0.6580	-0.0973	-0.0053	-0.0073	-0.0150	-0.0918	-0.0587	-0.0123	-0.0044
3	154	162	1.4724	-0.0790	-0.0373	-0.0144	-0.0137	-0.0421	-0.0476	-0.0250	-0.0055
4	154	162	-0.3641	-0.0072	-0.0072	-0.0072	-0.0072	-0.0061	-0.0410	0.0125	0.0026
5	154	162	-8.5865	-0.0030	-0.0596	-0.0287	-0.0021	0.0394	0.0413	0.0496	-0.0351
6	154	162	-0.7100	0.0200	0.0200	0.0200	0.0200	0.0000	0.0	-0.0000	-0.0000
1	163	171	7.9605	-0.0360	-0.0356	-0.0572	-0.0357	-0.2114	-0.0384	-0.0240	-0.0079
2	163	171	-0.5648	0.0038	-0.0046	0.0071	-0.0285	0.0032	-0.0263	-0.0123	0.0075
3	163	171	2.1629	-0.2518	-0.1034	-0.1226	-0.0981	-0.3578	-0.1719	-0.0622	-0.0012
4	163	171	-0.2693	-0.0147	-0.0147	-0.0147	-0.0147	0.0000	-0.0000	-0.0000	-0.0000
5	163	171	-8.5125	0.0554	-0.0665	0.0070	0.0327	0.0231	-0.0435	[illegible]	[illegible]
6	163	171	[illegible]	0.0200	[illegible]	[illegible]	[illegible]	[illegible]	0.0	[illegible]	[illegible]
1	172	180	8.4320	-0.0081	-0.0971	-0.0571	-0.0506	-0.1911	[illegible]	[illegible]	[illegible]
2	[illegible]	180	-0.3700	[illegible]	-0.0045	[illegible]	[illegible]	-0.1772	[illegible]	[illegible]	[illegible]
3	172	180	3.2495	-0.2920	-0.1182	-0.0884	-0.0640	-0.2421	-0.0937	-0.0498	-0.0012

4	172	180	0.1382	-0.0726	-0.0727	-0.0500	-0.0730	-0.1387	-0.0002	-0.0627	-0.0177
5	172	180	-7.6490	-0.1653	-0.1238	-0.1072	-0.1001	-0.2076	-0.1371	-0.0248	-0.0045
6	172	180	-C.8800	0.0353	0.0235	0.0100	0.0012	0.0129	0.0197	0.0173	0.0068
1	181	189	9.1631	-0.1463	-0.1129	-0.1002	-0.1058	-C.4963	-0.0975	-0.0743	-0.0105
2	181	189	0.1647	-0.1764	-0.0866	-0.0787	-0.0800	-0.2938	-0.0780	-0.0620	-0.0076
3	181	189	3.3000	-0.0197	0.0294	0.0143	0.0120	0.0780	0.0541	0.0248	C.0136
4	181	189	0.5023	-0.0466	-0.0133	0.0220	-0.0055	0.0745	C.0309	-0.0127	-0.0055
5	181	189	-7.2821	-0.0376	-0.0282	-0.0144	0.0445	0.0890	-0.0082	C.C500	0.0148
6	181	189	-C.9300	0.0135	-0.3088	0.0000	0.0253	0.0233	0.0152	-C.0000	0.0439
1	190	198	9.4354	0.0294	0.0537	0.0359	0.0456	0.0233	0.0191	0.0371	-0.0042
2	190	198	0.5294	-0.0323	-0.0241	-0.0141	-0.0079	-0.1025	0.0036	0.0002	-0.0053
3	190	198	2.9255	-0.0210	0.0203	0.0431	0.0441	0.0417	0.0473	0.0250	0.0056
4	190	198	0.3787	-0.0387	C.0196	0.0147	0.0187	0.0921	C.0090	C.0000	-0.0074
5	190	198	-7.3899	-0.0163	-0.0064	0.0287	0.0661	0.0582	-0.0245	0.0997	-0.0077
6	190	198	-0.9900	-0.0000	0.0	0.0000	0.0000	0.0000	C.0	-0.0000	-C.0000
1	199	207	8.8912	0.0985	0.0498	0.0430	0.0664	C.0184	0.0282	0.0248	C.0098
2	199	207	C.5008	0.0322	0.0238	0.0142	0.0080	-0.0129	C.0446	0.0246	0.0206
3	199	207	2.6810	-0.0172	0.0156	0.0503	0.0233	0.0449	C.0206	0.0125	0.0132
4	199	207	0.2256	-0.0200	0.0296	0.0144	0.0124	0.0601	0.0259	0.0000	0.0039
5	199	207	-7.6778	0.0071	0.0550	0.0578	-0.0188	0.1898	0.0760	-0.0250	-0.0387
6	199	207	-1.0400	0.0288	-0.0053	0.0200	0.0065	0.0499	0.0092	-0.0000	0.0113
1	208	216	8.4185	0.1596	0.0604	0.0214	0.0382	C.0324	0.0331	0.0125	0.0087
2	208	216	0.1999	0.0082	0.0305	0.0358	0.0317	0.0152	0.0550	0.0373	0.0022
3	208	216	2.3647	-0.0095	0.0481	0.0433	0.0474	0.0464	0.0708	0.0250	C.0244
4	208	216	0.1090	-0.0472	0.0518	0.0000	0.0174	0.0787	0.0544	0.0250	0.0138
5	208	216	-7.8362	-0.0362	0.0225	0.0000	0.0780	0.0926	0.0265	0.0250	-C.0206
6	208	216	-1.1900	0.0065	0.0288	-0.0100	-0.0053	0.0627	0.0289	0.0173	[illegible]
1	217	225	8.0607	0.1337	0.0436	0.0399	0.0421	C.C762	0.0038	0.0121	0.0021
2	217	225	0.0498	-0.0218	-0.0049	0.0142	0.0267	0.0183	0.0280	0.0246	C.0097
3	217	225	1.9977	-0.0277	0.0386	0.0430	0.0534	C.0780	0.0541	0.0248	C.0136
4	217	225	-0.1016	-0.0548	0.0382	0.0146	0.0287	0.0745	0.0311	0.0252	-0.0053
5	217	225	-8.0881	-0.0017	0.0388	0.0142	0.0060	0.0117	0.1142	-0.0008	C.0280
6	217	225	-1.3300	0.0353	0.0236	0.0100	0.0012	0.0129	0.0197	0.0173	C.0068
1	226	234	7.7456	0.0990	0.0332	0.0287	0.0185	0.0990	0.0257	C.0000	0.0037
2	226	234	-0.2501	0.0605	0.0275	0.0164	0.0198	0.0484	0.0555	0.0250	[illegible]
3	226	234	1.4723	0.0320	0.0406	0.0503	0.0567	0.0563	0.0526	0.0125	-0.0037
4	226	234	-0.2254	-0.0828	-0.0072	0.0291	0.0243	0.0506	0.0119	0.0250	-0.0012
5	226	234	-8.1168	-0.0857	-0.0023	0.0002	0.0447	0.0655	0.0666	-0.0497	0.0011
6	226	234	-1.5000	0.0388	0.0047	0.0000	0.0165	0.0326	0.0265	-0.0000	-0.0068
1	235	243	7.5310	0.0594	0.0023	0.0072	0.0030	0.0216	0.0019	0.0125	0.0173
2	235	243	-0.5434	0.0527	0.0200	0.0071	0.0126	0.0323	0.0329	0.0123	0.0006
3	235	243	1.2273	-0.0[illegible]	0.0289	0.0143	0.0129	0.0061	0.0405	0.0248	-C.0025
4	235	243	-0.4733	-0.0167	0.0416	0.0147	0.0487	0.0505	0.0117	0.0254	-0.0013
5	235	243	-8.4621	-0.0669	0.1284	0.0432	0.0024	0.0669	0.0841	0.0498	-0.0283
6	235	243	-1.6800	0.0388	0.0047	0.0000	0.0165	0.0326	0.0265	-0.0000	-0.0068
1	244	252	7.4377	0.0603	0.0272	-0.0071	0.0199	0.0450	0.0209	0.0123	0.0129
2	244	252	-0.6795	0.0205	-0.0038	0.0142	0.0946	-C.0355	-0.0066	-0.0000	-C.0000
3	244	252	0.6027	0.0933	0.0515	0.0287	0.0279	0.0604	0.0756	0.0497	0.0153
4	244	252	-0.5387	-0.0225	-0.0051	0.0147	0.0276	C.0000	-0.0000	-0.0000	-C.0000
5	244	252	-8.7645	0.0107	0.0505	0.0000	-0.0395	0.0697	0.0287	-0.0000	C.0715
6	244	252	-1.9400	0.0100	0.0100	0.0100	0.0100	0.0567	-0.0036	0.0173	-0.0086
1	253	261	7.1229	0.1725	0.0493	0.0287	0.0355	0.0374	0.0237	0.0246	-0.0138
2	253	261	-0.8588	0.0975	0.0717	0.0214	0.0241	0.0436	0.0066	0.0125	-0.0160
3	253	261	0.4080	0.0016	0.0489	0.0360	0.0415	0.0323	0.0329	0.0123	0.0006
4	253	261	-0.6631	0.0011	0.0257	0.0291	0.0172	0.0235	0.0192	-0.0000	-0.0063
5	253	261	-8.9580	-0.0450	-0.0355	0.0002	0.0371	0.0135	0.0375	-0.0246	0.0248
6	253	261	-1.9800	0.0047	0.0146	0.0388	0.0388	0.0129	0.0197	0.0173	[illegible]
[illegible]	[illegible]	[illegible]	7.0[illegible]	[illegible]	0.03[illegible]	0.02[illegible]	[illegible]	0.07[illegible]	0.05[illegible]	0.024[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	-0.9[illegible]	-0.00[illegible]	0.0297	[illegible]	[illegible]	0.0447	[illegible]	0.01[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	0.21[illegible]	0.04[illegible]	-0.00[illegible]	0.01[illegible]	0.0[illegible]	-0.0395	-0.02[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	-0.7[illegible]	-0.0135	-0.0372	-0.01[illegible]	[illegible]	-0.0219	[illegible]	0.0232	-0.01[illegible]

5	262	270	-9.0956	-0.0333	0.0402	0.0720	0.0147	0.0076	-0.0034	0.0266	0.0265
6	262	270	-2.0700	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
1	271	279	6.9296	0.1117	-0.0031	-0.0141	-0.0010	-0.0059	-0.0507	-0.0248	0.0027
2	271	279	-1.0520	[illegible]	-0.0267	-0.0213	-0.0256	-0.0683	-0.0395	-0.0123	[illegible]
3	271	279	0.3647	0.0235	-0.0336	-0.0287	-0.0328	-0.1089	-0.0370	-0.0250	-0.0026
4	271	279	-0.8237	-0.0073	-0.0073	-0.0073	-0.0073	-0.0416	0.0027	-0.0127	0.0062
5	271	279	-9.0309	-0.0297	-0.0543	0.0287	-0.0457	-0.1765	-0.0268	-0.0250	0.0002
6	271	279	-2.0700	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
1	280	288	7.2229	0.0556	0.0155	-0.0073	-0.0078	0.0700	-0.0366	-0.0123	0.0049
2	280	288	-0.9162	0.0205	-0.0038	-0.0071	0.0046	0.0172	-0.0215	0.0123	-0.0017
3	280	288	0.8965	-0.0030	-0.1183	-0.1079	-0.1164	-0.3781	-0.1233	-0.0625	-0.0068
4	280	288	-0.6047	-0.0760	-0.0423	-0.0293	-0.0347	-0.1471	-0.0444	-0.0254	-0.0110
5	280	288	-8.7572	-0.1042	-0.0227	-0.0287	-0.0891	-0.0807	-0.0603	-0.0000	-0.0547
6	280	288	-2.0700	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000
1	289	297	7.9964	-0.0966	-0.1068	-0.1361	-0.1210	-0.1516	-0.1340	-0.0622	-0.0199
2	289	297	-0.5794	0.0059	-0.0598	-0.0646	-0.0751	-0.1364	-0.0793	-0.0622	-0.0173
3	289	297	1.4251	0.0416	-0.0077	-0.0144	0.0094	-0.0000	0.0	0.0000	0.0000
4	289	297	-0.3640	-0.0571	-0.0326	-0.0290	-0.0414	-0.1152	-0.0615	-0.0252	-0.0220
5	289	297	[illegible]	[illegible]	0.0081	0.0217	-0.0258	-0.1190	0.0427	-0.0622	-0.0254
6	289	297	-2.0100	[illegible]	-0.0047	0.0000	-0.0165	-0.0326	-0.0265	-0.0000	[illegible]

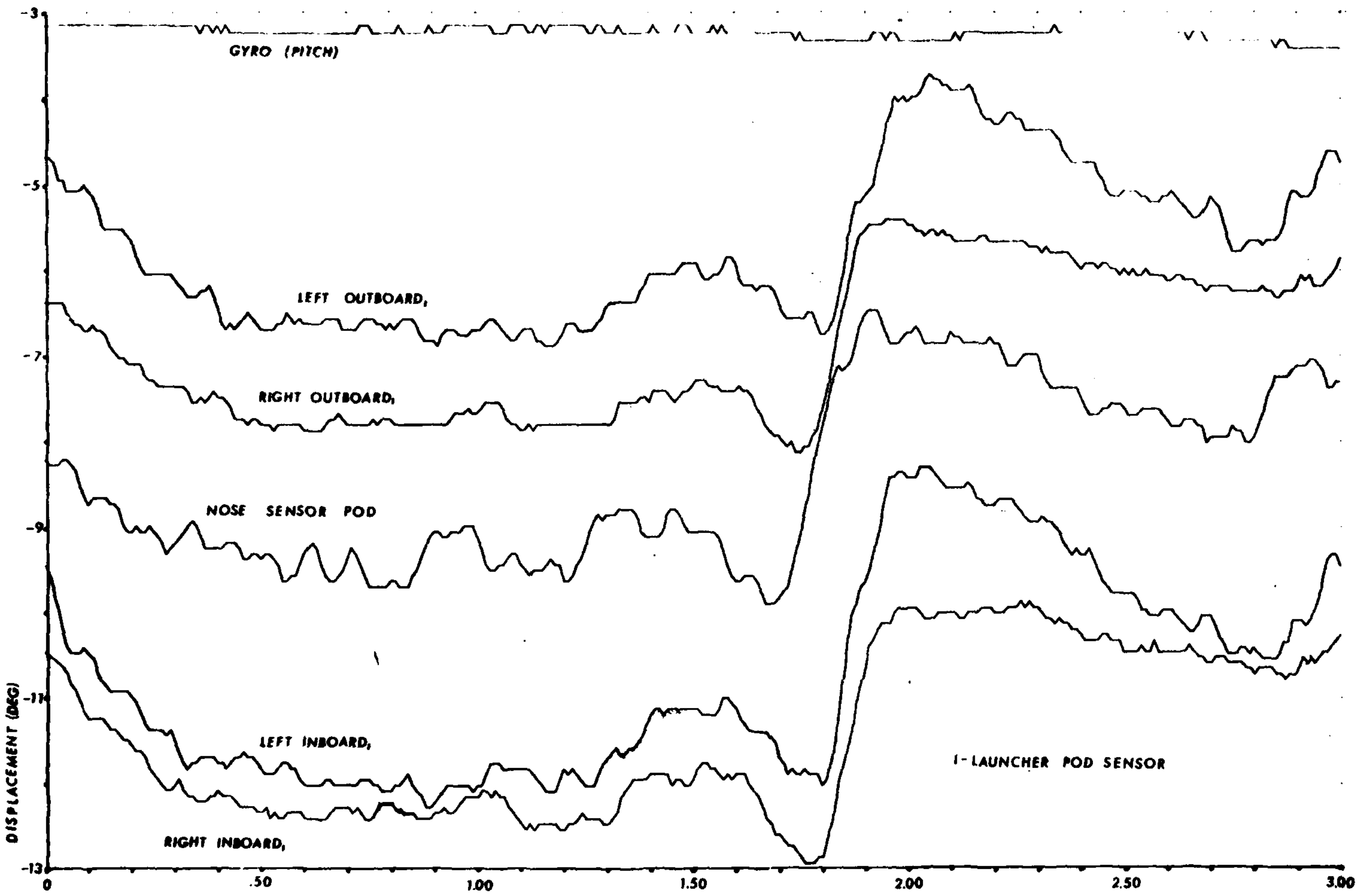


FIG. 11

PITCH ANGLE of ATTACK DATA

that there was a pronounced change in amplitude at 1.8 seconds. Since this appears as a ramp signal in the calculation, the Fourier analysis should and did produce a relatively high value for the fundamental and all its harmonics. Due to the number of data points available in one cycle of the signal, calculation of any harmonics above the 4th would be meaningless.

It should also be noted that the gyro pitch (Pitch 6) harmonic coefficient was at or near zero for every calculation. To confirm this result, refer to Figure 11 and observe that there was virtually no variation in this signal.

4.1.4 Relative Data Tracking

The developed computer program that was written to perform that analysis on the various sensors also produced a punched card file of the data points under consideration. These cards were run on a digital plotting system for viewing of the data. The results of the gyro pitch and pitch angle of attacks are shown in Figure 11.

The plots show exactly what was indicated by reviewing the data in paragraphs 4.1.1 through 4.1.3. Examining the plots, it can be seen that the aircraft was at a very steady pitch down angle which tends to verify a standard deviation of .071. The consistent relative tracking of the sensor dictates the existance of the high correlation coefficient previously calculated. It can be seen that the nose angle of attack sensors led the others by about 0.12 seconds. This was due to the nose sensor being located 13 feet ahead of the launcher sensors. The abrupt change in the airflow at approximately 1.8 seconds would justify the high frequency coefficients calculated during that period.

The yaw gyro and the yaw angle of attack plots are shown in Figures 12 and 13. A review of the plots shows that the analysis presented in Figure 10 is realistic.

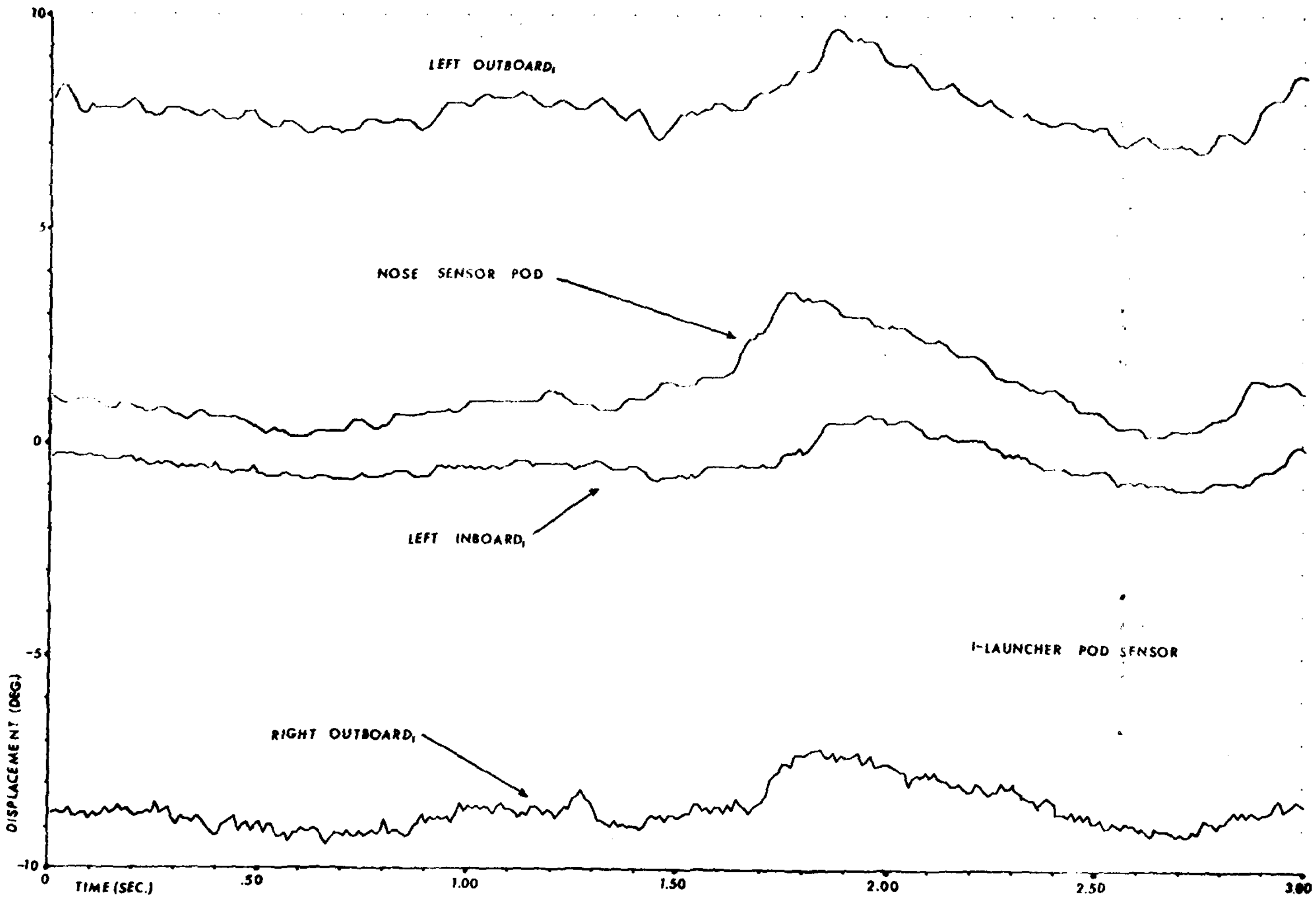
The plots of the Angle of Attack Transmitters were accomplished with corrected data to adjust for the pod offsets as discussed in paragraph 4.1.1.

4.2 Linear Variable Differential Transformer Analysis

A segment (500 milliseconds) of the raw octal data used in the analysis of the LVDTs is presented on pages 6 through 15. The data, from Run 138, was retrieved on 24 August 1971 on aircraft #67-15691 in a Phase B configuration. The analysis was performed on data accumulated in a three second period immediately following the occurrence of Event Marker #1 (0001 in word D4). The engineering units data listing shows the data frames for the first 0.500 seconds of the three second period (Pg 49-52).

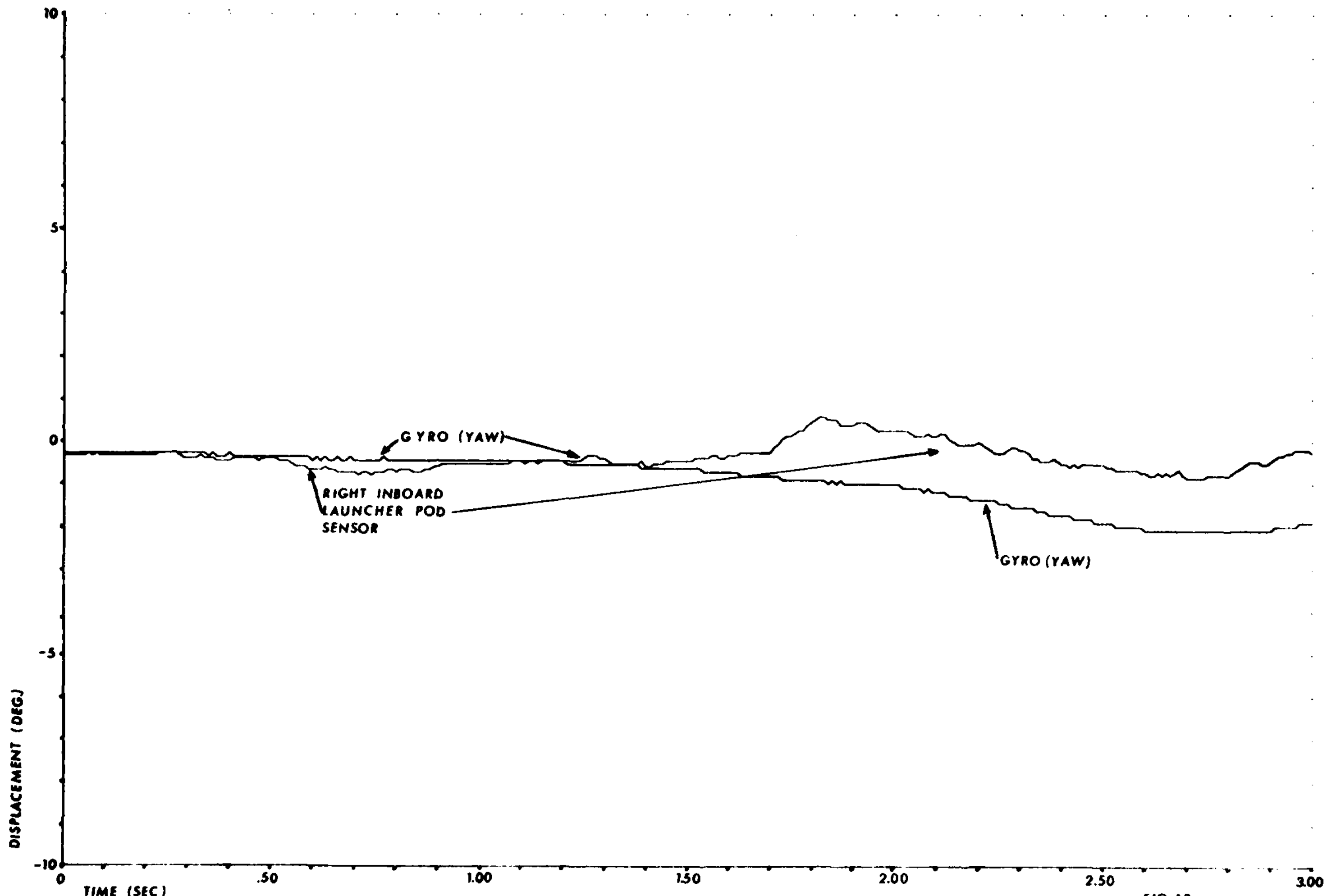
4.2.1 Data Statistics

The analysis of the horizontal and vertical LVDT data is shown in Figures 14 and 15 respectively.



YAW ANGLE of ATTACK DATA

FIG. 12



YAW ANGLE of ATTACK DATA

FIG 13

LVDT ANALYSIS

	LHELVDT	LHALVDT	RHELVDT	RHALVDT
MEAN	0.0349	-0.0141	-0.0015	-0.0123
RMS VALUE	0.0472	0.0386	0.0095	0.0176
STANDARD DEVIATION	0.0319	0.0363	0.0094	0.0126
VARIANCE	0.0010	0.0014	0.0001	0.0002

CORRELATION COEFFECIENTS

LHELVDT	1.0000			
LHALVDT	-0.9542	1.0000		
RHELVDT	0.6354	-0.6201	1.0000	
RHALVDT	-0.8860	0.9165	-0.6923	1.0000

FIG. 14

L V D T   A N A L Y S I S

	LVELVDT	LVALVDT	RVELVDT	RVALVDT
MEAN	-0.0157	-0.0144	-0.0316	-0.0272
RMS VALUE	0.0243	0.0293	0.0340	0.0285
STANDARD DEVIATION	0.0186	0.0243	0.0124	0.0096
VARIANCE	0.0003	0.0006	0.0002	0.0001

CORRELATION COEFFECIENTS

LVELVDT	1.0000			
LVALVDT	-0.4399	1.0000		
RVELVDT	-0.4376	0.4575	1.0000	
RVALVDT	-0.1086	0.0712	-0.3072	1.0000

FIG. 15

The low mean data values indicate that the sensors were accurately nulled prior to the test flight and remained nulled throughout the sampled time.

From the standard deviation it can be determined that 95.5% of the samples for the left/horizontal/forward LVDT are within ±.0638 inches of the mean. Therefore it can be stated during the sampled period, a straight and level flight, the left forward position of the rocket launcher was moving approximately 0.12 inches in the horizontal plane.

4.2.2 Data Correlation

The correlation, as shown in Figure 14, between the horizontal LVDT sensors indicates that the movement in the yaw plane was mainly a rotational motion. The left fore and aft LVDTs have a correlation factor of -.9542 indicating that the front and back of the launchers were moving simultaneously in opposite directions. The motion of the left and right launcher correlates quite well with the forward LVDTs, having a correlation coefficient of +.6354 and the aft LVDTs, having a coefficient of .9165.

The correlation coefficients for the vertical LVDTs are shown in Figure 15. The coefficients between the fore and aft sensors were negative defining a pitching motion as expected. The coefficients were -.3 and -.4 for the right and left sides respectively and the low correlation figure indicates a combination of translation as well as pitch motion in the vertical plane. The launcher is supported at multiple points and therefore the vertical movement is not a simply described motion.

4.2.3 Frequency Spectrum Analysis

Calculations of the Fourier coefficients for the LVDTs were performed on the sensor data. The resultant coefficients are tabulated on pages 82 through 85 .

The data indicates that there was significant harmonic content in the sampled data. To determine the significance of the harmonics of the 11 Hertz fundamental, the data could be normalized by dividing each of the coefficients by the DC values or the coefficient of the fundamental. For the LVDT #2 (left/vertical/forward), the coefficients for the multiples were large compared to the coefficients of the other data and in relation to its fundamental and DC values. This would indicate several significant harmonics were present in the data.

The coefficients for LVDT #5 (right/horizontal/forward) are approximately 100 times smaller, which can be misleading unless they are compared with the DC and 11 Hz coefficients. The results indicate that the harmonic content was as great as that of LVDT #2.

FOURIER COEFFICIENTS, 11 HZ FUNDAMENTAL LVOTIS

VARIABLE	FROM	TO	DC	COS1	COS2	COS3	COS4	SIN1	SIN2	SIN3	SIN4
LHF 1	1	9	0.0349	-0.0012	-0.0043	0.0040	0.0005	0.0607	0.0103	0.0004	0.0003
LHA 3	1	9	-0.0149	0.0030	0.0002	-0.0021	0.0001	-0.0574	-0.0074	-0.0002	-0.0034
RHF 5	1	9	-0.0015	0.0010	-0.0030	0.0017	0.0009	0.0052	0.0049	0.0071	0.0003
RHA 7	1	9	-0.0139	-0.0033	0.0064	0.0009	-0.0040	-0.0155	0.0014	0.0019	0.0025
LVF 2	1	9	-0.0132	-0.0020	-0.0090	0.0027	-0.0024	-0.0177	0.0144	-0.0035	0.0009
LVA 4	1	9	-0.0124	-0.0166	0.0015	-0.0019	-0.0016	0.0325	-0.0022	0.0010	0.0007
RVF 6	1	9	-0.0307	-0.0103	0.0022	-0.0063	0.0011	0.0042	-0.0037	-0.0079	-0.0009
RVA 8	1	9	-0.0377	0.0031	-0.0104	0.0050	0.0030	0.0043	-0.0043	0.0060	-0.0017
1	10	18	0.0353	-0.0145	-0.0105	0.0083	0.0013	0.0411	0.0050	0.0029	0.0003
3	10	18	-0.0156	0.0110	-0.0005	-0.0011	-0.0018	-0.0513	-0.0015	-0.0019	-0.0015
5	10	18	-0.0006	0.0025	-0.0027	-0.0004	0.0012	0.0072	0.0044	0.0058	0.0001
7	10	18	-0.0120	0.0000	0.0024	-0.0017	-0.0008	-0.0159	0.0015	-0.0017	0.0006
2	10	18	-0.0149	0.0009	-0.0158	0.0115	0.0022	-0.0158	0.0092	0.0008	0.0014
4	10	18	-0.0131	-0.0134	-0.0043	0.0104	-0.0037	0.0266	0.0048	-0.0023	-0.0010
6	10	18	-0.0337	-0.0126	0.0067	0.0007	-0.0000	0.0034	-0.0065	-0.0092	-0.0007
8	10	18	-0.0373	0.0063	-0.0045	-0.0013	-0.0001	0.0085	-0.0057	0.0027	-0.0021
1	19	27	0.0360	-0.0188	-0.0101	0.0033	-0.0014	0.0399	0.0020	0.0038	0.0004
3	19	27	-0.0158	0.0203	0.0025	-0.0016	0.0005	-0.0477	-0.0012	-0.0004	-0.0009
5	19	27	-0.0015	-0.0012	-0.0040	-0.0053	0.0008	0.0070	0.0016	0.0023	-0.0002
7	19	27	-0.0128	0.0022	0.0018	-0.0006	-0.0016	-0.0129	0.0036	-0.0002	-0.0004
2	19	27	-0.0144	0.0052	-0.0163	0.0029	-0.0012	-0.0158	0.0027	0.0025	-0.0005
4	19	27	-0.0131	-0.0248	0.0019	0.0004	0.0005	[illegible]	-0.0013	0.0019	-0.0022
6	19	27	-0.0311	-0.0120	0.0089	0.0054	-0.0011	0.0007	-0.0032	-0.0094	0.0012
8	19	27	-0.0370	0.0030	-0.0065	-0.0010	0.0045	0.0064	-0.0100	0.0037	0.0093
1	28	36	0.0351	-0.0250	-0.0114	0.0026	-0.0003	0.0334	-0.0031	0.0064	0.0004
3	28	36	-0.0154	0.0269	-0.0009	0.0008	0.0017	-0.0407	0.0001	-0.0021	-0.0003
5	28	36	-0.0007	-0.0012	-0.0048	-0.0067	-0.0006	0.0069	0.0013	-0.0004	0.0002
7	28	36	-0.0116	0.0064	-0.0006	0.0019	-0.0002	-0.0121	0.0040	0.0002	0.0005
2	28	36	-0.0158	0.0078	-0.0199	0.0068	0.0015	-0.0170	-0.0051	0.0079	0.0003
4	28	36	-0.0149	-0.0286	-0.0046	0.0019	0.0032	0.0163	0.0032	-0.0025	-0.0027
6	28	36	-0.0327	-0.0113	0.0094	0.0107	0.0010	-0.0009	-0.0018	-0.0035	0.0008
8	28	36	-0.0382	0.0049	0.0003	-0.0071	0.0001	0.0079	-0.0101	0.0004	0.0016
1	37	45	0.0356	-0.0273	-0.0076	-0.0039	-0.0010	0.0288	-0.0059	0.0044	-0.0000
3	37	45	-0.0150	0.0352	0.0008	-0.0003	0.0013	-0.0373	-0.0009	-0.0006	0.0004
5	37	45	-0.0016	-0.0031	-0.0042	-0.0048	-0.0003	0.0083	-0.0026	-0.0010	0.0001
7	37	45	-0.0123	0.0090	-0.0024	0.0007	0.0001	-0.0126	0.0031	-0.0019	-0.0010
2	37	45	-0.0151	0.0092	-0.0124	-0.0056	-0.0031	-0.0137	-0.0087	0.0065	-0.0025
4	37	45	-0.0118	-0.0319	0.0019	-0.0016	0.0063	0.0093	-0.0014	-0.0004	-0.0008
6	37	45	-0.0319	-0.0114	0.0075	0.0059	0.0082	-0.0020	0.0034	-0.0010	0.0009
8	37	45	-0.0367	0.0052	0.0009	-0.0037	0.0003	0.0052	-0.0105	0.0017	0.0026
1	46	54	0.0366	-0.0354	-0.0064	-0.0026	0.0017	0.0197	-0.0090	0.0048	0.0002
3	46	54	-0.0168	0.0391	-0.0007	0.0078	-0.0004	-0.0283	0.0019	-0.0002	0.0014
5	46	54	-0.0033	-0.0053	0.0030	-0.0013	-0.0050	0.0139	-0.0023	-0.0059	-0.0030
7	46	54	-0.0131	0.0134	-0.0039	0.0021	0.0015	-0.0133	0.0038	0.0006	-0.0020
2	46	54	-0.0152	0.0124	-0.0133	-0.0018	0.0009	-0.0114	-0.0177	0.0069	-0.0005
4	46	54	-0.0140	-0.0330	-0.0055	0.0023	0.0031	0.0060	0.0009	-0.0013	0.0013
6	46	54	-0.0319	-0.0102	0.0078	0.0072	0.0001	-0.0061	0.0077	0.0040	-0.0006
8	46	54	-0.0390	0.0016	0.0075	-0.0047	-0.0034	0.0055	-0.0054	-0.0035	0.0024
1	55	63	0.0344	-0.0395	-0.0022	-0.0094	-0.0013	0.0157	-0.0114	-0.0004	-0.0017
3	55	63	-0.0154	0.0432	0.0011	-0.0096	-0.0004	-0.0179	-0.0022	-0.0017	0.0018
5	55	63	-0.0014	-0.0063	-0.0034	-0.0002	0.0003	0.0082	-0.0054	-0.0046	0.0003
7	55	63	-0.0124	0.0119	-0.0030	0.0014	0.0010	-0.0115	0.0019	0.0002	-0.0005
2	55	63	-0.0159	0.0118	-0.0027	-0.0123	-0.0038	-0.0080	-0.0144	-0.0008	0.0001
4	55	63	-0.0122	-0.0330	0.0041	-0.0021	0.0003	-0.0039	-0.0026	-0.0010	0.0025
6	55	63	-0.0310	-0.0081	0.0059	0.0038	-0.0007	-0.0065	0.0061	0.0067	-0.0018
8	55	63	-0.0364	0.0002	0.0086	-0.0009	-0.0075	0.0046	-0.0064	-0.0019	0.0000

1	64	72	0.0354	-0.0393	0.0013	-0.0021	0.0007	0.0066	-0.0095	-0.0010	0.0001
3	64	72	-0.0153	0.0481	-0.0007	0.0013	-0.0014	-0.0101	0.0010	-0.0004	-0.0004
5	64	72	-0.0017	-0.0071	-0.0011	0.0007	-0.0017	0.0075	-0.0060	-0.0054	-0.0008
7	64	72	-0.0123	0.0154	-0.0051	0.0017	0.0003	-0.0082	0.0004	0.0013	0.0006
2	64	72	-0.0157	0.0127	0.0014	-0.0037	0.0012	-0.0085	-0.0174	0.0004	0.0007
4	64	72	-0.0146	-0.0750	-0.0023	0.0012	-0.0004	-0.0043	-0.0007	-0.0013	0.0019
6	64	72	-0.0317	-0.0056	0.0013	0.0010	-0.0000	-0.0098	0.0105	0.0075	-0.0016
8	64	72	-0.0283	-0.0030	0.0132	-0.0007	-0.0032	0.0060	-0.0002	-0.0054	-0.0015
1	73	81	0.0351	-0.0429	0.0071	-0.0066	-0.0002	0.0019	-0.0083	-0.0054	0.0003
3	73	81	-0.0153	0.0515	0.0012	-0.0003	-0.0021	-0.0042	0.0001	0.0013	-0.0003
5	73	81	-0.0014	-0.0068	0.0032	0.0051	-0.0001	0.0043	-0.0065	-0.0035	0.0001
7	73	81	-0.0121	0.0129	-0.0013	-0.0002	-0.0002	-0.0066	0.0002	0.0012	0.0016
2	73	81	-0.0164	0.0142	0.0101	-0.0082	-0.0020	-0.0046	-0.0135	-0.0069	0.0021
4	73	81	-0.0133	-0.0294	0.0033	-0.0030	-0.0071	-0.0117	-0.0030	0.0004	0.0030
6	73	81	-0.0309	-0.0061	0.0013	-0.0041	0.0008	-0.0101	0.0072	0.0075	-0.0012
8	73	81	-0.0348	-0.0003	0.0094	0.0021	-0.0004	0.0026	0.0000	-0.0010	-0.0025
1	82	90	0.0348	-0.0412	0.0056	0.0008	-0.0001	-0.0067	-0.0068	-0.0045	0.0004
3	82	90	-0.0153	0.0433	-0.0026	0.0013	-0.0007	0.0038	0.0011	0.0004	-0.0026
5	82	90	-0.0010	-0.0120	0.0016	0.0063	0.0010	0.0077	-0.0044	-0.0006	-0.0006
7	82	90	-0.0122	0.0153	-0.0025	-0.0011	-0.0004	-0.0025	-0.0052	0.0031	0.0002
2	82	90	-0.0161	0.0149	0.0096	-0.0009	0.0015	-0.0019	-0.0141	-0.0063	0.0005
4	82	90	-0.0134	-0.0312	-0.0042	0.0011	-0.0033	-0.0167	0.0001	-0.0015	-0.0017
6	82	90	-0.0300	-0.0022	-0.0050	-0.0097	-0.0002	-0.0102	0.0093	0.0029	0.0010
8	82	90	-0.0386	-0.0051	0.0081	0.0019	0.0027	0.0033	0.0083	-0.0040	-0.0037
1	91	99	0.0350	-0.0444	0.0103	0.0007	-0.0016	-0.0123	-0.0028	-0.0065	0.0008
3	91	99	-0.0168	0.0494	0.0024	-0.0012	0.0012	0.0134	-0.0003	0.0013	-0.0016
5	91	99	-0.0004	-0.0105	0.0031	0.0054	0.0025	0.0027	-0.0055	0.0064	0.0005
7	91	99	-0.0137	0.0186	-0.0024	-0.0013	-0.0012	-0.0002	-0.0032	0.0015	-0.0002
2	91	99	-0.0169	0.0139	0.0160	-0.0001	-0.0020	-0.0005	-0.0022	-0.0090	-0.0006
4	91	99	-0.0129	-0.0246	0.0036	-0.0048	-0.0024	-0.0234	-0.0004	0.0002	-0.0036
6	91	99	-0.0318	-0.0038	-0.0050	-0.0132	-0.0031	-0.0091	0.0058	-0.0048	0.0010
8	91	99	-0.0354	-0.0050	0.0049	0.0054	0.0041	0.0024	0.0058	0.0010	-0.0001
1	100	108	0.0349	-0.0391	0.0057	0.0061	0.0004	-0.0210	-0.0001	-0.0013	0.0007
3	100	108	-0.0154	0.0498	-0.0013	0.0018	0.0041	0.0227	0.0012	0.0004	-0.0002
5	100	108	-0.0009	-0.0126	0.0046	0.0001	-0.0002	0.0034	-0.0013	0.0056	-0.0007
7	100	108	-0.0132	0.0177	-0.0014	-0.0011	-0.0009	0.0053	-0.0042	-0.0004	-0.0014
2	100	108	-0.0157	0.0148	0.0154	0.0110	0.0014	0.0034	-0.0024	-0.0025	-0.0005
4	100	108	-0.0134	-0.0240	-0.0025	0.0008	0.0041	-0.0244	0.0005	-0.0025	-0.0034
6	100	108	-0.0304	0.0003	-0.0107	-0.0042	-0.0010	-0.0103	0.0033	-0.0073	0.0021
8	100	108	-0.0379	-0.0046	0.0026	0.0022	0.0036	0.0024	0.0103	0.0027	0.0016
1	109	117	0.0351	-0.0374	0.0095	0.0036	-0.0018	-0.0251	0.0084	-0.0012	-0.0005
3	109	117	-0.0150	0.0435	0.0027	-0.0007	0.0016	0.0295	-0.0001	-0.0012	0.0008
5	109	117	-0.0002	-0.0106	0.0060	-0.0009	0.0017	-0.0002	0.0007	0.0056	0.0003
7	109	117	-0.0136	0.0196	0.0005	-0.0004	0.0012	0.0055	-0.0028	-0.0006	-0.0008
2	109	117	-0.0171	0.0128	0.0153	0.0061	-0.0002	0.0069	0.0117	-0.0048	-0.0009
4	109	117	-0.0139	-0.0138	0.0025	-0.0048	0.0009	-0.0306	-0.0004	-0.0021	-0.0016
6	109	117	-0.0322	-0.0006	-0.0094	-0.0014	-0.0027	-0.0102	-0.0010	-0.0060	0.0006
8	109	117	-0.0350	-0.0019	0.0010	0.0003	0.0006	0.0008	0.0065	0.0060	0.0029
1	118	126	0.0360	-0.0275	0.0054	0.0043	0.0007	-0.0346	0.0043	0.0048	-0.0004
3	118	126	-0.0159	0.0356	0.0015	0.0019	0.0039	0.0392	0.0008	0.0013	0.0026
5	118	126	-0.0012	-0.0128	0.0047	-0.0031	0.0004	-0.0021	-0.0001	0.0035	0.0014
7	118	126	-0.0129	0.0132	0.0047	0.0006	0.0024	0.0119	-0.0018	-0.0013	-0.0006
2	118	126	-0.0147	0.0200	0.0117	0.0090	0.0029	0.0075	0.0029	0.0090	0.0000
4	118	126	-0.0144	-0.0102	-0.0019	0.0028	0.0037	-0.0314	-0.0014	0.0006	0.0017
6	118	126	-0.0328	0.0009	-0.0102	0.0018	-0.0009	-0.0079	-0.0035	-0.0073	-0.0003
8	118	126	-0.0388	-0.0050	-0.0061	0.0011	-0.0013	0.0011	0.0092	0.0018	0.0017
1	127	135	0.0337	-0.0248	0.0028	0.0023	-0.0000	-0.0386	0.0114	0.0033	-0.0007
3	127	135	-0.0150	0.0307	0.0008	-0.0010	-0.0014	0.0473	-0.0001	-0.0013	0.0011
5	127	135	-0.0010	-0.0069	0.0025	-0.0053	-0.0002	-0.0026	0.0041	0.0004	0.0009
7	127	135	-0.0131	0.0135	0.0004	-0.0002	-0.0006	0.0111	-0.0034	-0.0023	0.0005
2	127	135	-0.0176	0.0107	0.0096	0.0099	0.0019	0.0101	0.0206	0.0033	-0.0005

4	127	135	-0.0159	-0.0031	-0.0011	-0.0036	-0.0024	-0.0330	0.0002	-0.0037	0.0020
6	127	135	-0.0333	0.0036	-0.0083	0.0063	-0.0013	-0.0082	-0.0073	-0.0052	-0.0002
8	127	135	-0.0367	0.0019	-0.0035	-0.0040	-0.0026	0.0008	0.0034	0.0038	0.0009
1	136	144	0.0363	-0.0123	0.0003	-0.0027	0.0003	-0.0455	0.0044	0.0099	0.0008
3	136	144	-0.0131	0.0231	-0.0021	0.0024	0.0037	0.0533	0.0031	-0.0009	-0.0005
5	136	144	-0.0001	-0.0033	0.0012	-0.0344	-0.0013	-0.0063	0.0062	-0.0017	-0.0032
7	136	144	-0.0130	0.0137	0.0023	0.0033	0.0021	0.0129	0.0014	-0.0012	0.0025
2	136	144	-0.0140	0.0142	0.0079	0.0010	0.0050	0.0147	0.0092	0.0137	0.0020
4	136	144	-0.0141	0.0025	-0.0025	0.0044	0.0007	-0.0327	-0.0001	0.0004	0.0039
6	136	144	-0.0312	0.0030	-0.0044	0.0032	0.0011	-0.0057	-0.0089	-0.0006	-0.0003
8	136	144	-0.0372	-0.0008	-0.0107	-0.0051	-0.0017	-0.0037	0.0059	0.0015	-0.0008
1	145	153	0.0343	-0.0034	-0.0039	-0.0053	0.0004	-0.0442	0.0105	0.0027	0.0004
3	145	153	-0.0142	0.0066	0.0039	0.0019	-0.0005	0.0546	0.0022	0.0004	-0.0004
5	145	153	-0.0019	-0.0052	-0.0020	-0.0041	-0.0008	-0.0058	0.0040	-0.0040	-0.0006
7	145	153	-0.0129	0.0048	0.0034	0.0031	0.0015	0.0159	0.0011	-0.0000	0.0009
2	145	153	-0.0167	0.0100	-0.0045	-0.0030	0.0002	0.0127	0.0201	0.0052	-0.0001
4	145	153	-0.0153	0.0075	0.0005	-0.0007	-0.0050	-0.0336	0.0043	-0.0031	0.0016
6	145	153	-0.0340	0.0035	0.0022	0.0087	-0.0003	-0.0042	-0.0098	0.0050	0.0002
8	145	153	-0.0374	0.0017	-0.0075	-0.0072	-0.0046	-0.0056	-0.0022	-0.0013	-0.0017
1	154	162	0.0371	0.0057	-0.0073	-0.0094	-0.0022	-0.0454	0.0024	0.0040	0.0010
3	154	162	-0.0151	0.0044	0.0017	0.0038	-0.0008	0.0565	0.0001	0.0012	0.0002
5	154	162	-0.0010	-0.0065	-0.0039	-0.0007	0.0001	-0.0079	0.0040	-0.0050	-0.0001
7	154	162	-0.0128	0.0065	0.0055	0.0014	-0.0006	0.0193	0.0023	0.0010	0.0015
2	154	162	-0.0133	0.0105	-0.0031	-0.0097	0.0016	0.0146	0.0073	0.0087	0.0013
4	154	162	-0.0157	0.0120	0.0004	0.0043	-0.0011	-0.0304	-0.0018	0.0025	0.0020
6	154	162	-0.0310	0.0121	0.0058	0.0047	0.0015	-0.0009	-0.0083	0.0065	0.0018
8	154	162	-0.0391	-0.0094	-0.0136	-0.0022	0.0003	-0.0053	-0.0012	-0.0065	-0.0022
1	163	171	0.0352	0.0074	-0.0114	-0.0052	-0.0010	-0.0469	0.0066	-0.0033	-0.0001
3	163	171	-0.0136	-0.0048	-0.0007	-0.0001	0.0002	0.0552	0.0028	0.0021	-0.0016
5	163	171	-0.0010	-0.0017	-0.0057	-0.0003	-0.0023	-0.0100	0.0020	-0.0064	-0.0002
7	163	171	-0.0124	0.0027	0.0032	0.0028	-0.0002	0.0172	0.0036	0.0002	0.0008
2	163	171	-0.0170	-0.0017	-0.0177	-0.0033	-0.0013	0.0168	0.0103	-0.0035	0.0016
4	163	171	-0.0162	0.0201	-0.0032	-0.0021	-0.0056	-0.0224	0.0009	0.0002	-0.0046
6	163	171	-0.0318	0.0106	0.0063	0.0024	0.0034	-0.0043	-0.0055	0.0092	0.0006
8	163	171	-0.0377	-0.0038	-0.0079	-0.0033	-0.0003	-0.0046	-0.0065	-0.0035	-0.0019
1	172	180	0.0342	0.0154	-0.0091	-0.0072	-0.0023	-0.0401	-0.0059	-0.0033	0.0013
3	172	180	-0.0124	-0.0171	0.0018	0.0014	0.0043	0.0486	0.0001	0.0021	-0.0006
5	172	180	-0.0017	-0.0010	-0.0075	0.0047	0.0015	-0.0114	0.0098	-0.0046	0.0001
7	172	180	-0.0127	-0.0046	0.0041	0.0009	0.0011	0.0160	0.0051	0.0015	-0.0005
2	172	180	-0.0134	0.0008	-0.0123	-0.0099	-0.0022	0.0183	-0.0029	0.0010	-0.0021
4	172	180	-0.0138	0.0261	-0.0026	0.0028	0.0015	-0.0253	-0.0020	0.0037	-0.0027
6	172	180	-0.0311	0.0100	0.0143	-0.0016	0.0014	-0.0000	-0.0061	0.0081	0.0014
8	172	180	-0.0369	-0.0034	-0.0080	0.0039	0.0044	-0.0053	-0.0072	-0.0067	0.0010
1	181	189	0.0340	0.0218	-0.0140	-0.0020	-0.0018	-0.0343	-0.0024	-0.0081	-0.0017
3	181	189	-0.0133	-0.0255	0.0011	-0.0013	0.0021	0.0427	0.0037	-0.0000	-0.0003
5	181	189	0.0008	-0.0027	-0.0045	0.0029	0.0005	-0.0094	-0.0020	-0.0015	-0.0018
7	181	189	-0.0140	-0.0048	-0.0005	0.0000	-0.0008	0.0185	0.0041	0.0019	-0.0017
2	181	189	-0.0166	-0.0042	-0.0237	-0.0051	-0.0014	0.0166	0.0019	-0.0100	0.0003
4	181	189	-0.0177	0.0273	-0.0019	-0.0043	0.0006	-0.0166	0.0029	-0.0017	-0.0036
6	181	189	-0.0314	0.0121	0.0109	-0.0056	0.0010	-0.0011	-0.0009	0.0060	0.0014
8	181	189	-0.0373	-0.0049	0.0011	-0.0003	0.0014	-0.0070	-0.0112	-0.0037	0.0022
1	190	198	0.0329	0.0306	-0.0071	-0.0036	-0.0028	-0.0307	-0.0101	-0.0062	-0.0014
3	190	198	-0.0110	-0.0311	0.0023	0.0000	0.0028	0.0400	0.0008	0.0019	0.0024
5	190	198	-0.0019	0.0004	-0.0061	0.0066	0.0011	-0.0120	-0.0031	0.0033	-0.0003
7	190	198	-0.0112	-0.0048	0.0001	-0.0008	0.0016	0.0174	0.0052	0.0013	-0.0012
2	190	198	-0.0141	-0.0057	-0.0106	-0.0062	-0.0013	0.0157	-0.0128	-0.0058	-0.0014
4	190	198	-0.0149	0.0340	0.0007	0.0002	0.0050	-0.0121	-0.0040	0.0008	0.0017
6	190	198	-0.0311	0.0095	0.0122	-0.0079	-0.0026	0.0015	0.0062	0.0002	0.0007
8	190	198	-0.0380	-0.0040	-0.0023	0.0063	0.0009	-0.0046	-0.0106	-0.0025	0.0032
1	199	207	0.0332	0.0331	-0.0090	0.0064	0.0012	-0.0294	-0.0079	-0.0054	-0.0001
3	199	207	-0.0124	-0.0463	-0.0005	0.0001	0.0001	0.0304	0.0035	-0.0013	0.0020

5	199	207	-0.0038	0.0031	-0.0020	0.0041	-0.0014	-0.0093	-0.0051	0.0052	0.0001
7	199	207	-0.0124	-0.0122	-0.0023	-0.0009	0.0019	0.0133	0.0040	-0.0000	-0.0000
2	199	207	-0.0179	-0.0135	-0.0176	0.0072	0.0017	0.0141	-0.0114	-0.0075	-0.0026
4	199	207	-0.0162	0.0319	-0.0023	-0.0024	0.0028	-0.0064	0.0012	-0.0046	0.0041
6	199	207	-0.0320	0.0039	0.0089	-0.0097	-0.0013	0.0031	0.0089	-0.0052	-0.0022
8	199	207	-0.0371	-0.0017	0.0077	0.0018	-0.0026	-0.0061	-0.0089	0.0012	0.0007
1	208	216	0.0337	0.0334	0.0016	0.0017	-0.0003	-0.0144	-0.0111	-0.0017	-0.0038
3	208	216	-0.0111	-0.0444	-0.0015	-0.0003	-0.0021	0.0199	0.0074	0.0004	0.0014
5	208	216	-0.0016	0.0060	-0.0029	-0.0001	-0.0004	-0.0025	-0.0056	0.0064	0.0034
7	208	216	-0.0123	-0.0130	-0.0039	-0.0037	-0.0012	0.0113	0.0020	-0.0013	-0.0001
2	208	216	-0.0163	-0.0148	-0.0029	-0.0003	-0.0026	0.0139	-0.0143	-0.0048	0.0002
4	208	216	-0.0147	0.0368	0.0031	-0.0017	0.0004	-0.0026	-0.0033	0.0012	0.0041
6	208	216	-0.0316	0.0069	0.0075	-0.0074	0.0006	0.0061	0.0057	-0.0062	-0.0005
8	208	216	-0.0374	-0.0032	0.0055	0.0059	-0.0006	-0.0042	-0.0077	0.0062	-0.0002
1	217	225	0.0337	0.0425	0.0001	0.0060	0.0008	-0.0092	-0.0112	0.0000	-0.0006
3	217	225	-0.0119	-0.0510	-0.0009	0.0002	-0.0013	0.0112	0.0037	-0.0012	0.0005
5	217	225	-0.0023	0.0035	-0.0010	-0.0007	0.0005	-0.0082	-0.0065	0.0054	0.0000
7	217	225	-0.0107	-0.0127	-0.0030	-0.0027	0.0010	0.0090	0.0010	-0.0008	0.0013
2	217	225	-0.0174	-0.0171	-0.0049	0.0074	0.0020	0.0125	-0.0166	-0.0057	-0.0012
4	217	225	-0.0171	0.0310	-0.0002	0.0024	-0.0022	0.0066	0.0014	-0.0031	0.0017
6	217	225	-0.0310	0.0089	0.0040	-0.0017	-0.0002	0.0051	0.0130	-0.0094	-0.0013
8	217	225	-0.0369	-0.0010	0.0108	-0.0008	-0.0041	-0.0053	0.0004	0.0013	-0.0019
1	226	234	0.0341	0.0436	0.0112	0.0079	0.0043	0.0009	-0.0114	0.0033	0.0010
3	226	234	-0.0120	-0.0534	0.0002	0.0003	-0.0011	0.0085	-0.0009	0.0002	-0.0007
5	226	234	-0.0028	0.0072	0.0018	-0.0056	-0.0007	-0.0037	-0.0058	0.0031	-0.0004
7	226	234	-0.0103	-0.0142	-0.0052	-0.0023	-0.0010	0.0039	0.0002	-0.0010	0.0004
2	226	234	-0.0149	-0.0145	0.0085	0.0059	0.0011	0.0054	-0.0150	0.0033	-0.0002
4	226	234	-0.0141	0.0330	0.0025	0.0021	-0.0015	0.0123	-0.0015	0.0017	0.0001
6	226	234	-0.0319	0.0037	-0.0020	0.0079	0.0023	0.0078	0.0112	-0.0093	-0.0012
8	226	234	-0.0381	-0.0003	0.0095	0.0011	0.0008	-0.0004	-0.0012	0.0031	-0.0007
1	235	243	0.0336	0.0404	0.0060	0.0038	0.0012	0.0110	-0.0078	0.0046	0.0003
3	235	243	-0.0119	-0.0493	-0.0054	-0.0004	-0.0030	-0.0095	0.0006	-0.0015	-0.0020
5	235	243	-0.0021	0.0056	0.0042	-0.0076	-0.0011	-0.0021	-0.0054	-0.0019	-0.0004
7	235	243	-0.0103	-0.0138	-0.0039	0.0003	-0.0003	0.0021	-0.0032	-0.0021	0.0005
2	235	243	-0.0168	-0.0199	0.0084	0.0074	0.0018	0.0041	-0.0127	0.0064	0.0011
4	235	243	-0.0167	0.0279	0.0009	0.0033	-0.0035	0.0162	0.0033	-0.0027	-0.0025
6	235	243	-0.0319	0.0044	-0.0059	0.0096	0.0018	0.0071	0.0102	-0.0019	0.0002
8	235	243	-0.0376	0.0036	0.0103	-0.0064	-0.0009	-0.0009	0.0044	0.0023	-0.0022
1	244	252	0.0354	0.0378	0.0148	-0.0011	0.0011	0.0142	-0.0035	0.0073	0.0014
3	244	252	-0.0134	-0.0482	0.0005	0.0004	-0.0005	-0.0166	-0.0009	0.0008	-0.0005
5	244	252	-0.0016	[illegible]	0.0029	-0.0061	-0.0012	-0.0025	-0.0049	-0.0040	-0.0002
7	244	252	-0.0111	-0.0147	-0.0019	0.0011	-0.0014	0.0004	-0.0024	-0.0019	-0.0005
2	244	252	-0.0151	-0.0138	0.0162	-0.0016	-0.0027	-0.0005	-0.0097	0.0096	0.0029
4	244	252	-0.0158	0.0247	0.0037	-0.0006	-0.0010	0.0229	-0.0023	0.0033	-0.0009
6	244	252	-0.0319	0.0014	-0.0044	0.0096	0.0023	0.0085	0.0075	0.0035	-0.0009
8	244	252	-0.0367	0.0053	0.0052	-0.0020	0.0032	-0.0007	0.0058	0.0027	-0.0016

4.2.4 Relative Data Tracking

Profiles of the vertical and horizontal LVDTs are shown in the data plots, Figures 16 through 23. The 11 Hz fundamental frequency is apparent in all figures.

Examining Figures 13 and 20, it is apparent that the harmonic content was considerable for the LVDTs as was discussed in paragraph 4.2.3.

The degree of movement of the launchers can be determined by calculating the magnitude of the peak values from the plots.

The curve connecting the positive peaks of the LVDT (LVA) data plotted in Figure 21 and the negative peaks of the LVDT (LVF) data plotted in Figure 20 were parallel consistantly over the interval of time shown. This parallel envelope movement indicates that translational motion of the launcher occurred during the normal flight. The plot indicates that the launcher translated approximately .014" (See Figure 24).

The peaks described within the envelope indicate that the front of the launcher peaked in one direction, while the rear of the launcher peaked in the opposite direction. This indicates a significant amount of rotational motion. From the curves it was determined that the launcher oscillated within approximately a 1 mil excursion. The combination of the translational and rotational motion caused a complex launcher motion that would result in low correlation coefficient for the LVDTs.

The rotational velocity of the launcher pod can be calculated from the slope of the LVDT curve. The calculation for the left launcher indicates the launcher rotates at a rate of approximately 100 mils/second.

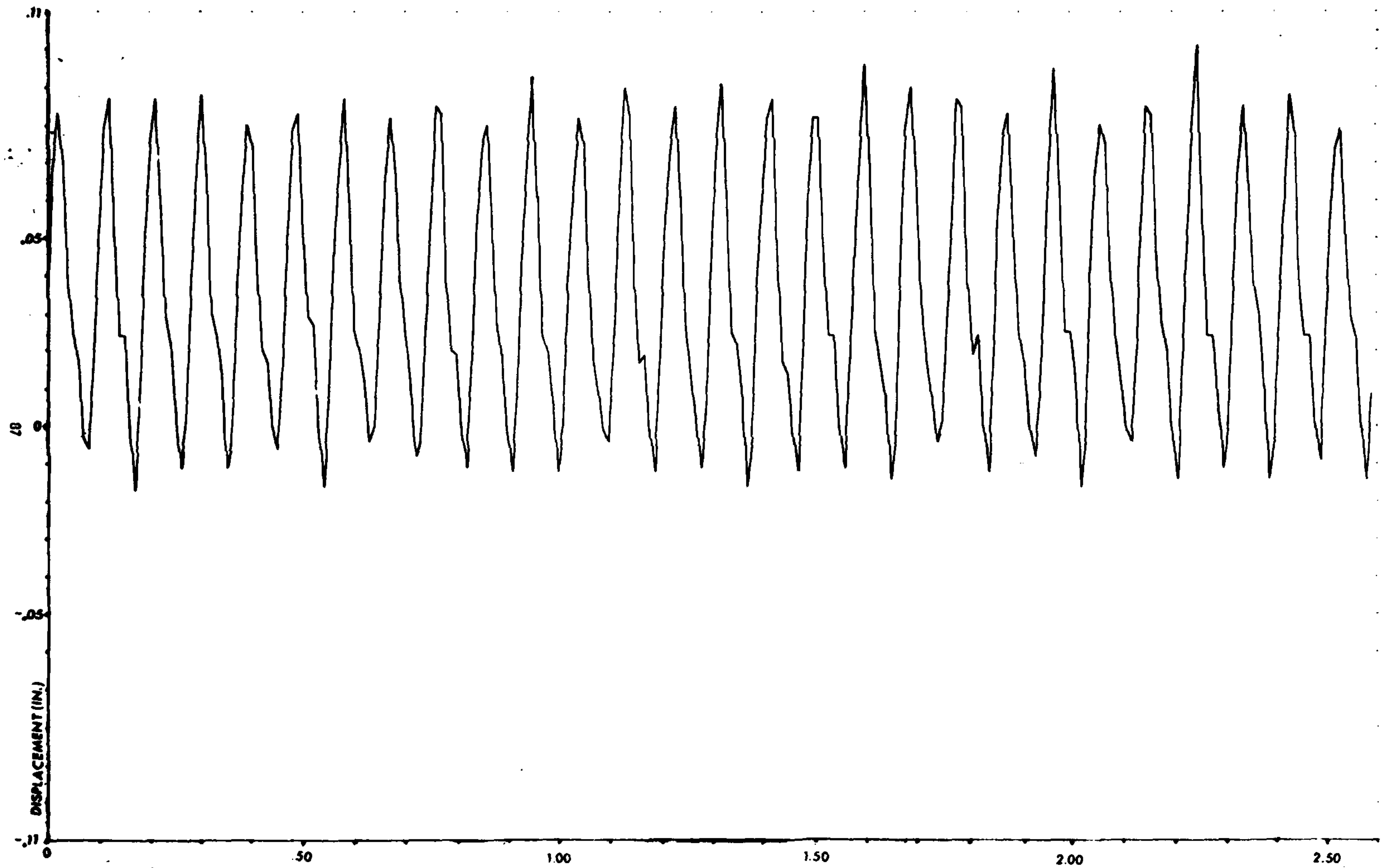
4.3 Accelerometer Analysis

The data used for the analysis of the accelerometers is shown in the data frame of the engineering units printout, pages 49 through 55. The flight data was described in paragraph 4.2. The accelerometers are sampled 10 times per frame/1000 times per second and the analysis was performed on the first 260 data points. This data was retrieved in 0.260 seconds, all of which is presented in the first 26 data frames of engineering units printout.

4.3.1 Data Statistics

The accelerometer data analysis is presented in Figure 25.

It can be seen from the data that the mean values for the lateral and fore/aft accelerometers were -0.2336 and +2.9330 ft/sec^2 respectively, indicating a lack of predominant acceleration in the left, right, fore or aft direction. This was consistant with the known straight and level flight profile. The high RMS and standard deviation indicates that the



TIME (SEC.)

LVDT (L H F)

FIG. 16

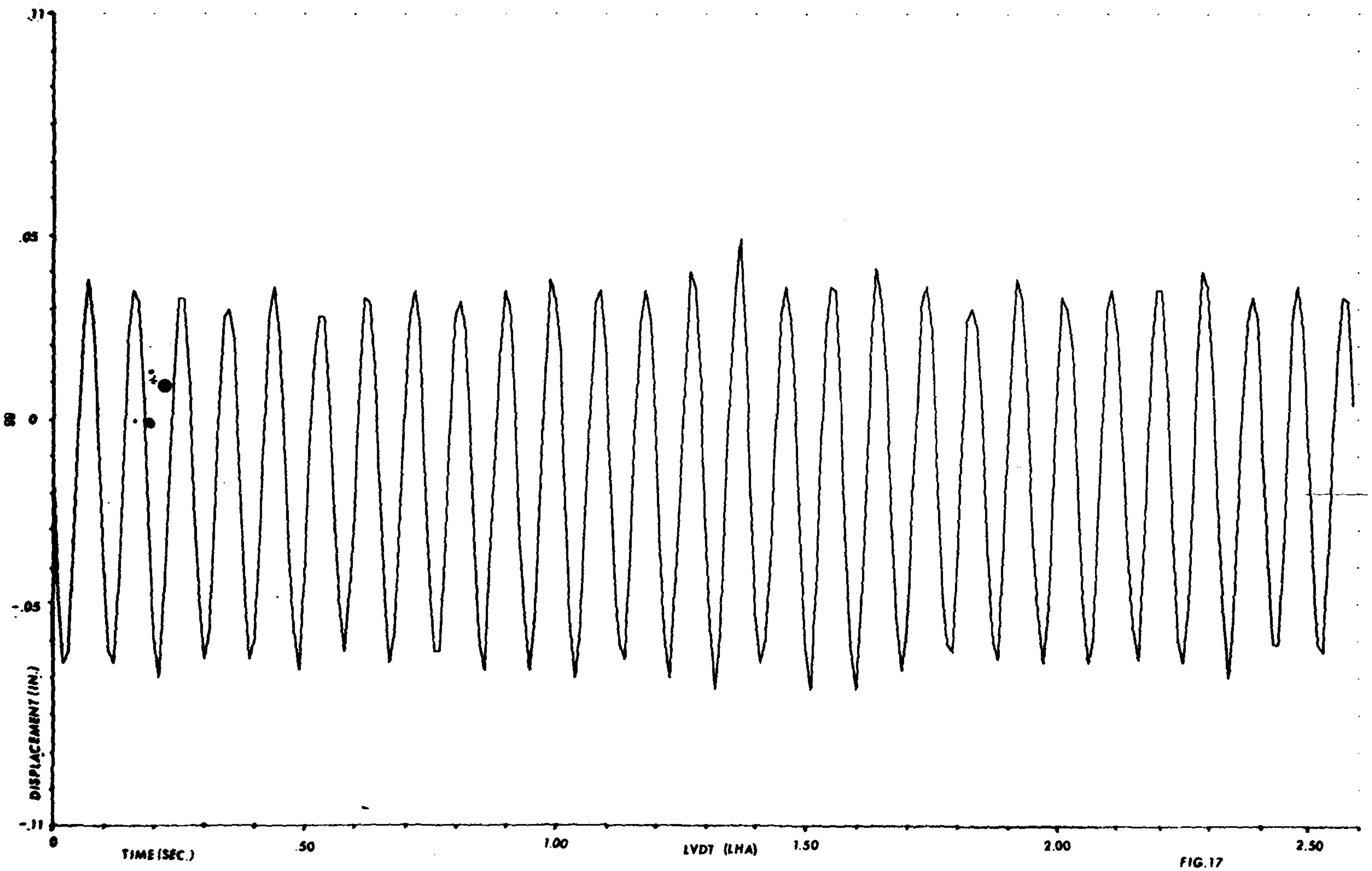
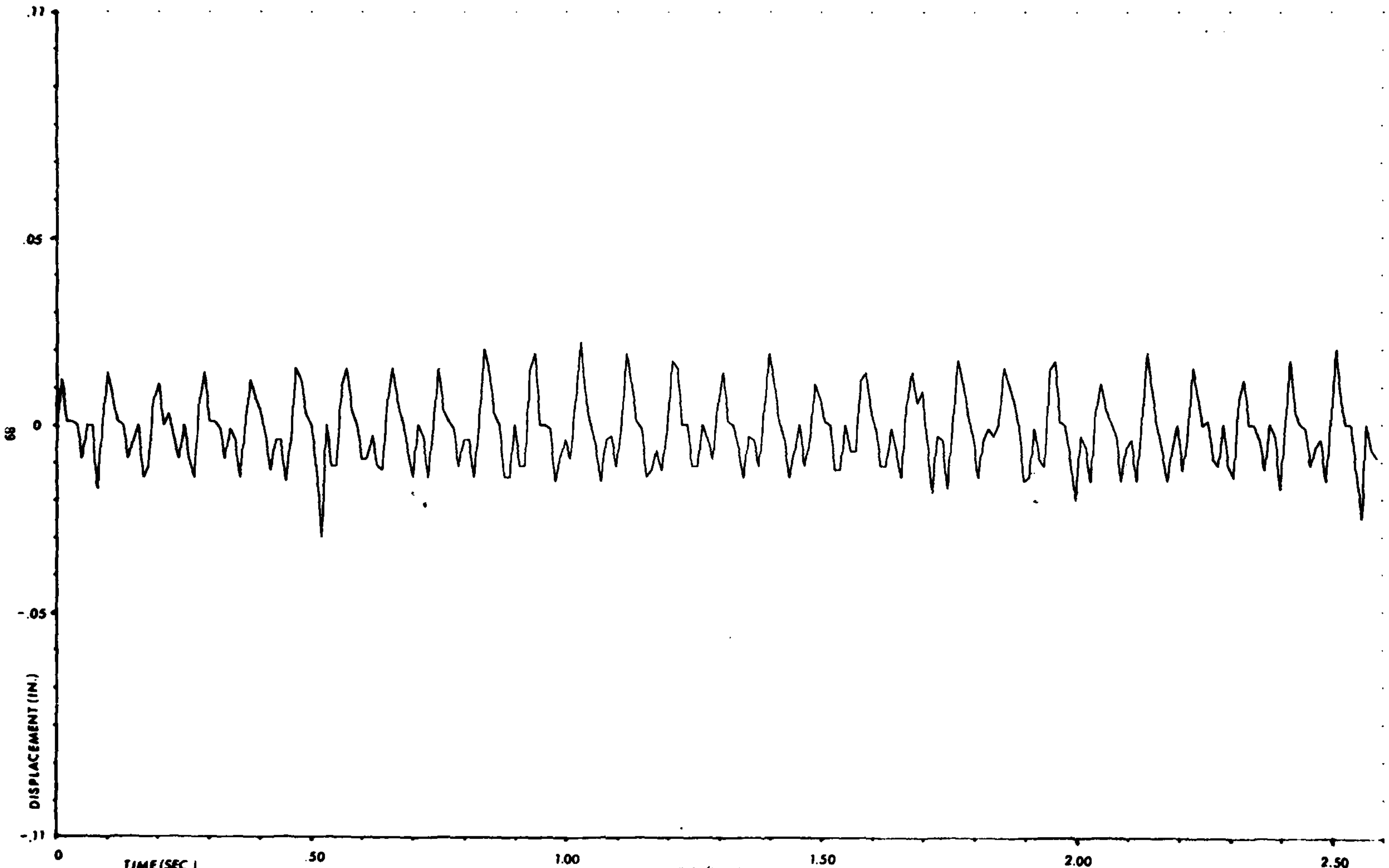

.11
.05
0
-.05
-.11
DISPLACEMENT (IN.)
0
.50
1.00
1.50
2.00
2.50
TIME (SEC.)
LVDT (LHA)

FIG. 17



LVDT (RHF)

FIG. 18

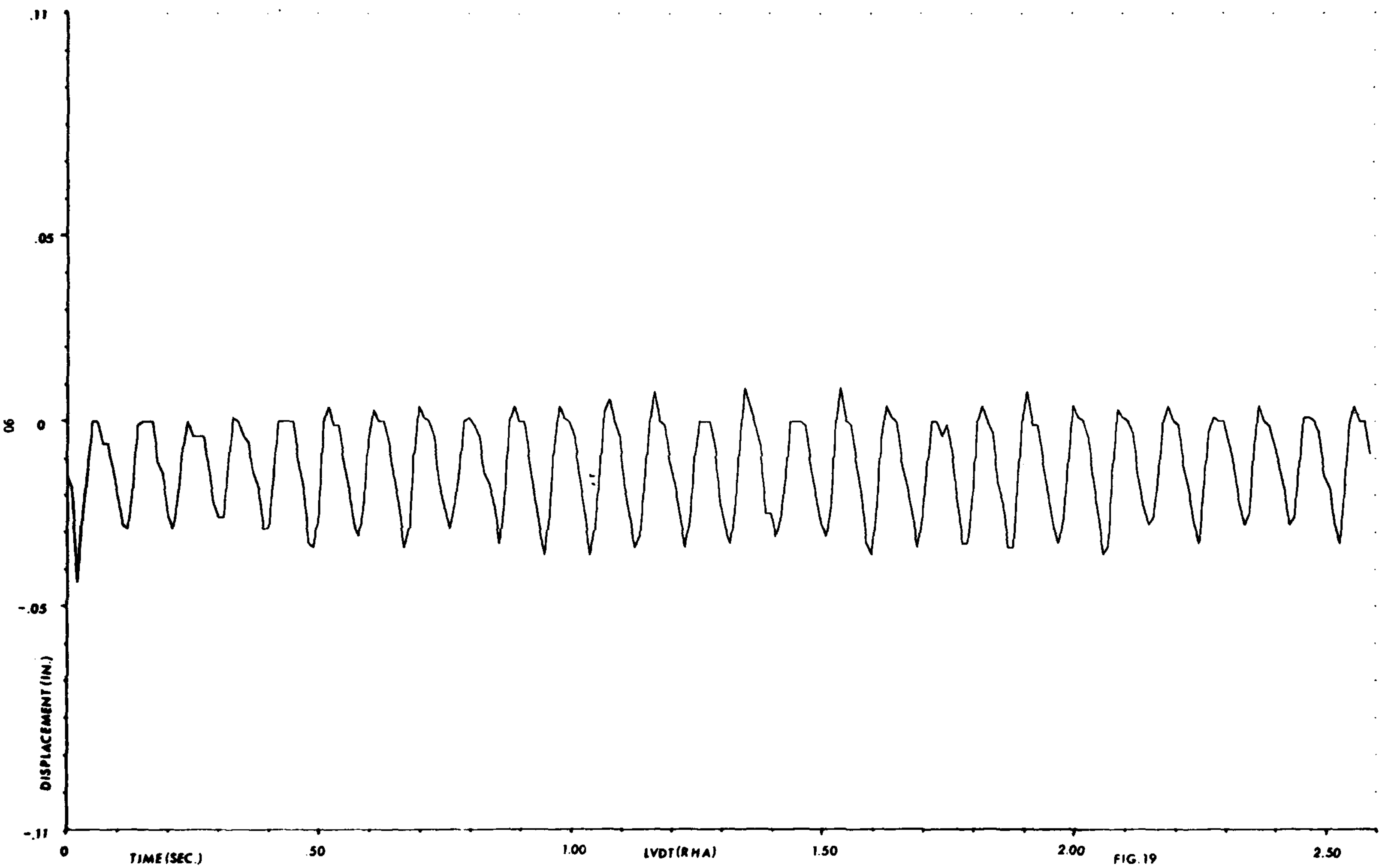
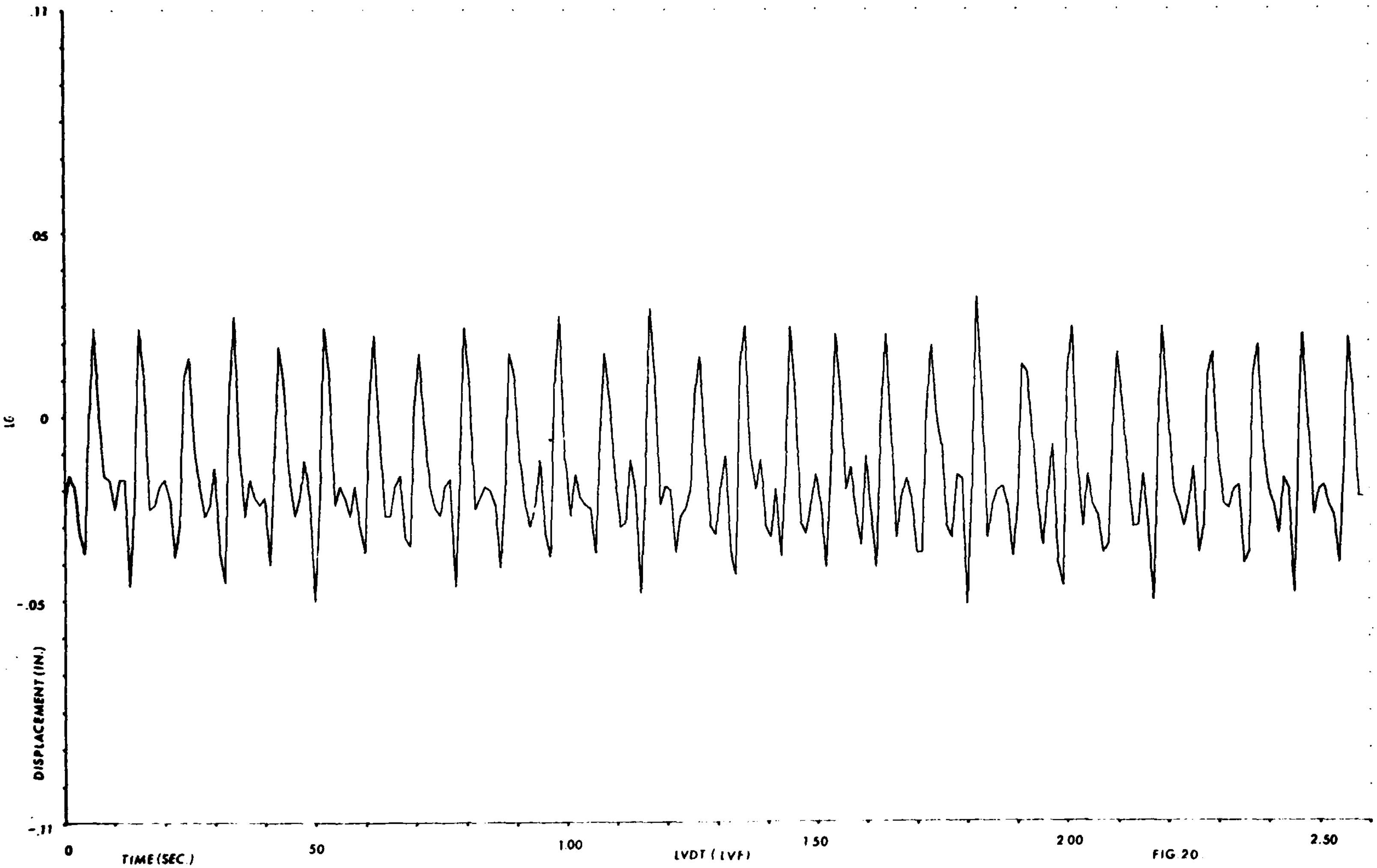
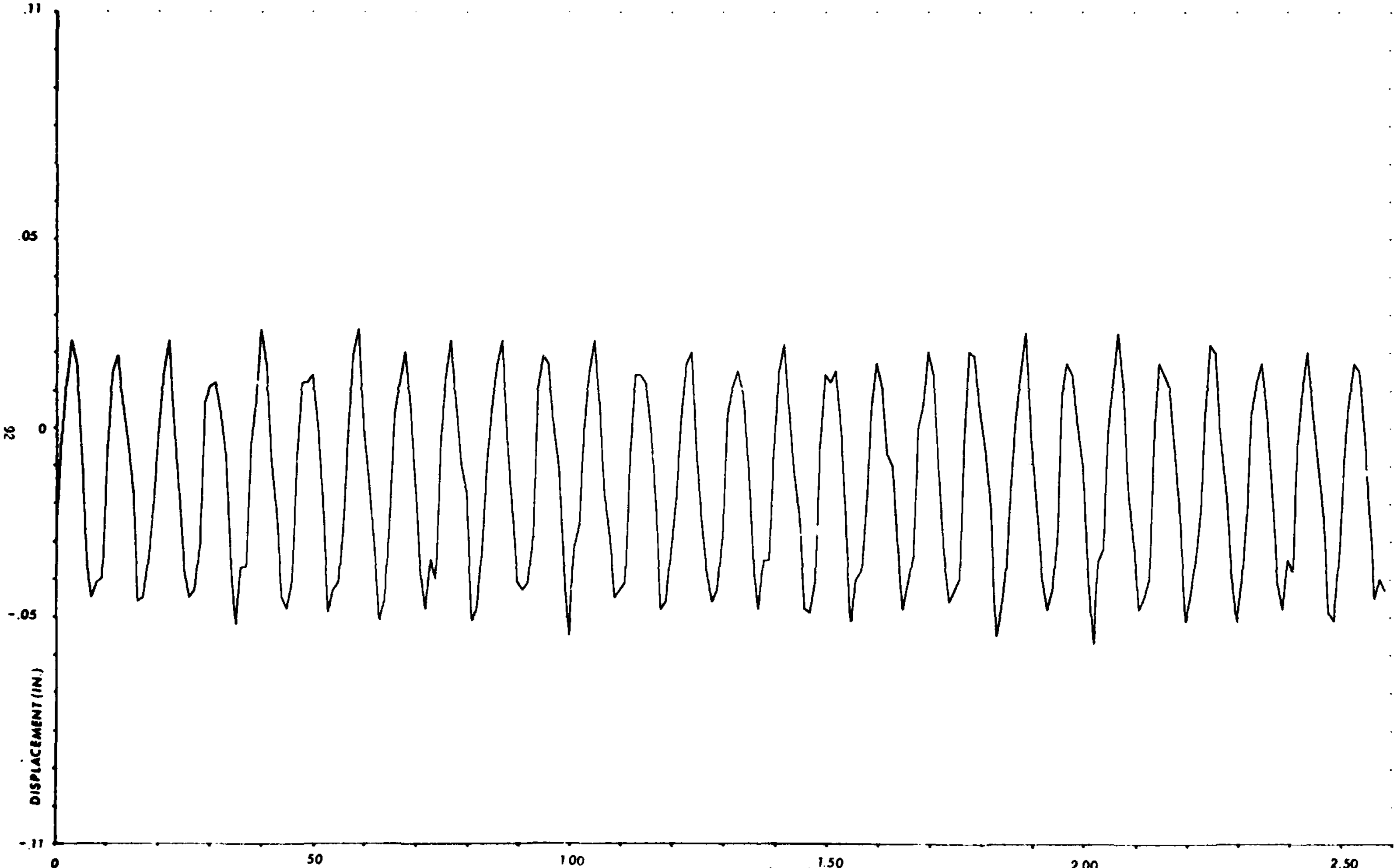

.11
.05
0
-.05
-.11
DISPLACEMENT (IN.)
0
TIME (SEC.)
.50
1.00
LVDT (RHA)
1.50
2.00
2.50

FIG. 19



LVDT (LVF)

FIG 20



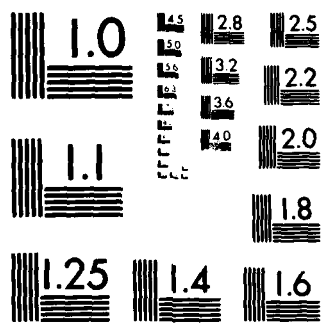
LVDT (LVA)

FIG.21

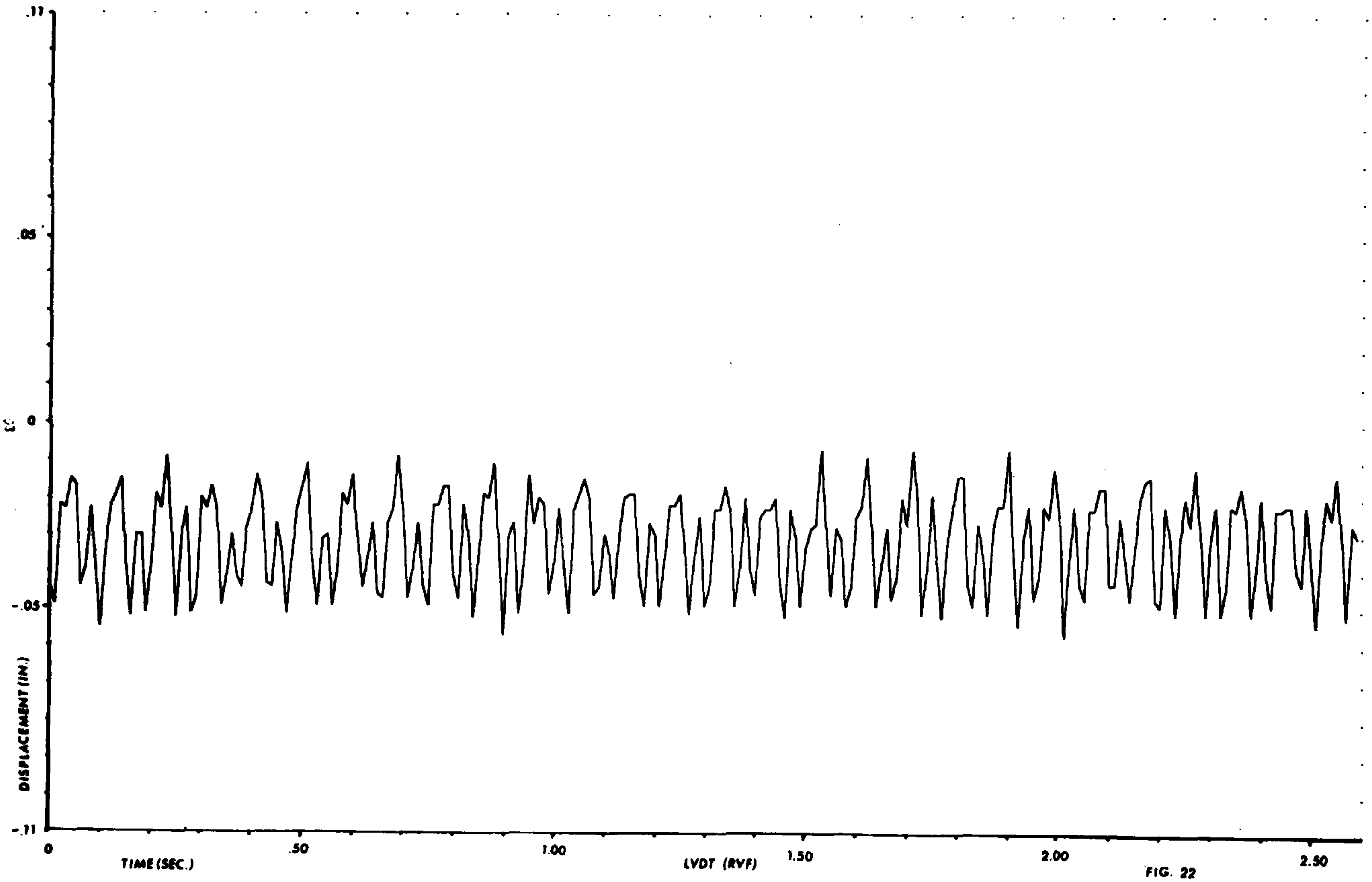
AD-A099 644 ARMY ELECTRONICS COMMAND FORT MONMOUTH N J AVIONICS LAB F/6 19/7
2.75 INCH ROCKET/AH-1G HELICOPTER WEAPONS SYSTEM BASELINE INSTR--ETC(U)
APR 72 B TIRABASSI, E TOGNOLA
UNCLASSIFIED NL

2 of 2

END
DATE FILMED
7-81
DTIC

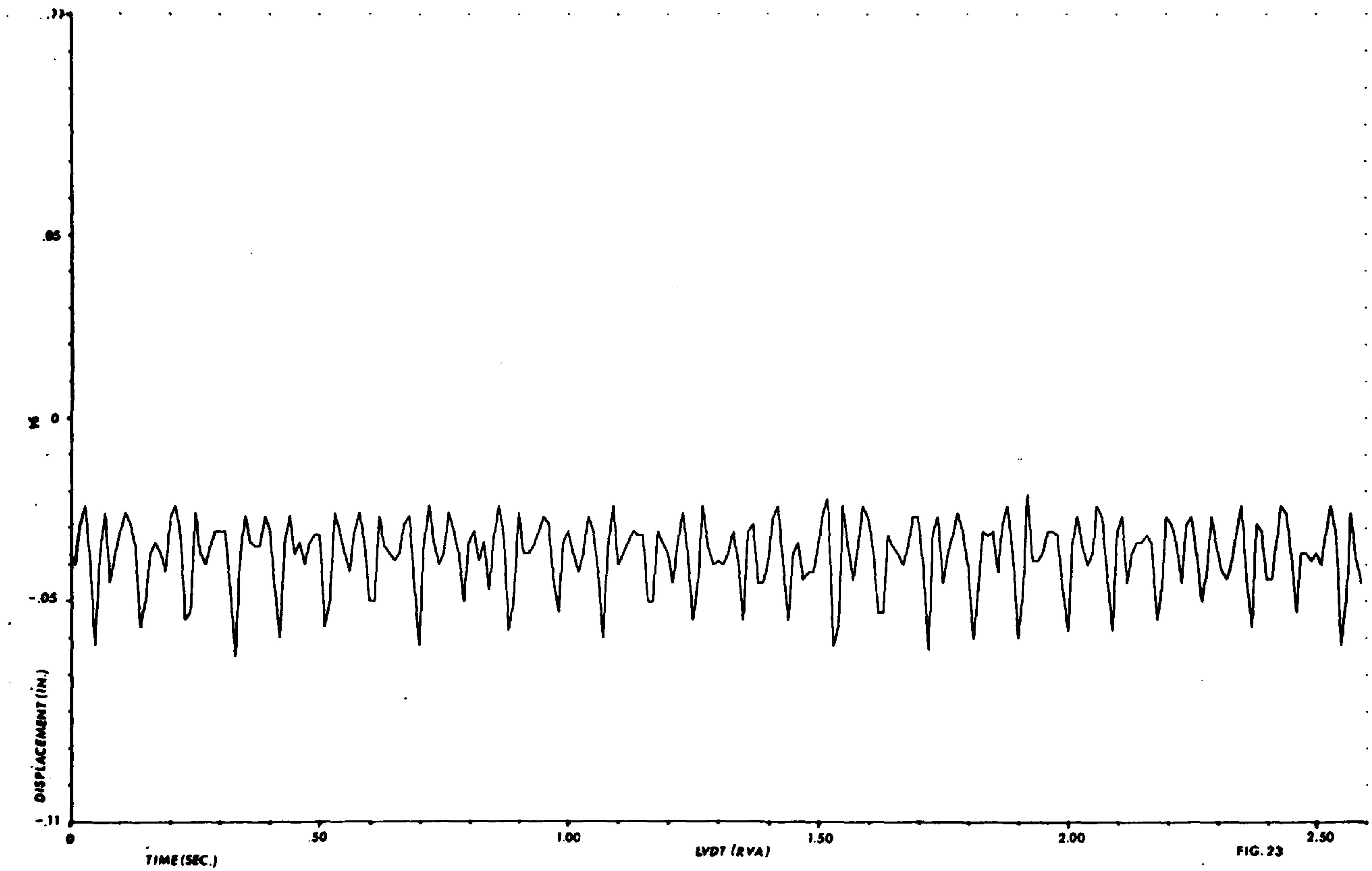


MICROCOPY RESOLUTION TEST CHART



.11
.05
0
-.05
-.11
DISPLACEMENT (IN.)
0
.50
1.00
1.50
2.00
2.50
TIME (SEC.)
LVDT (RVF)

FIG. 22



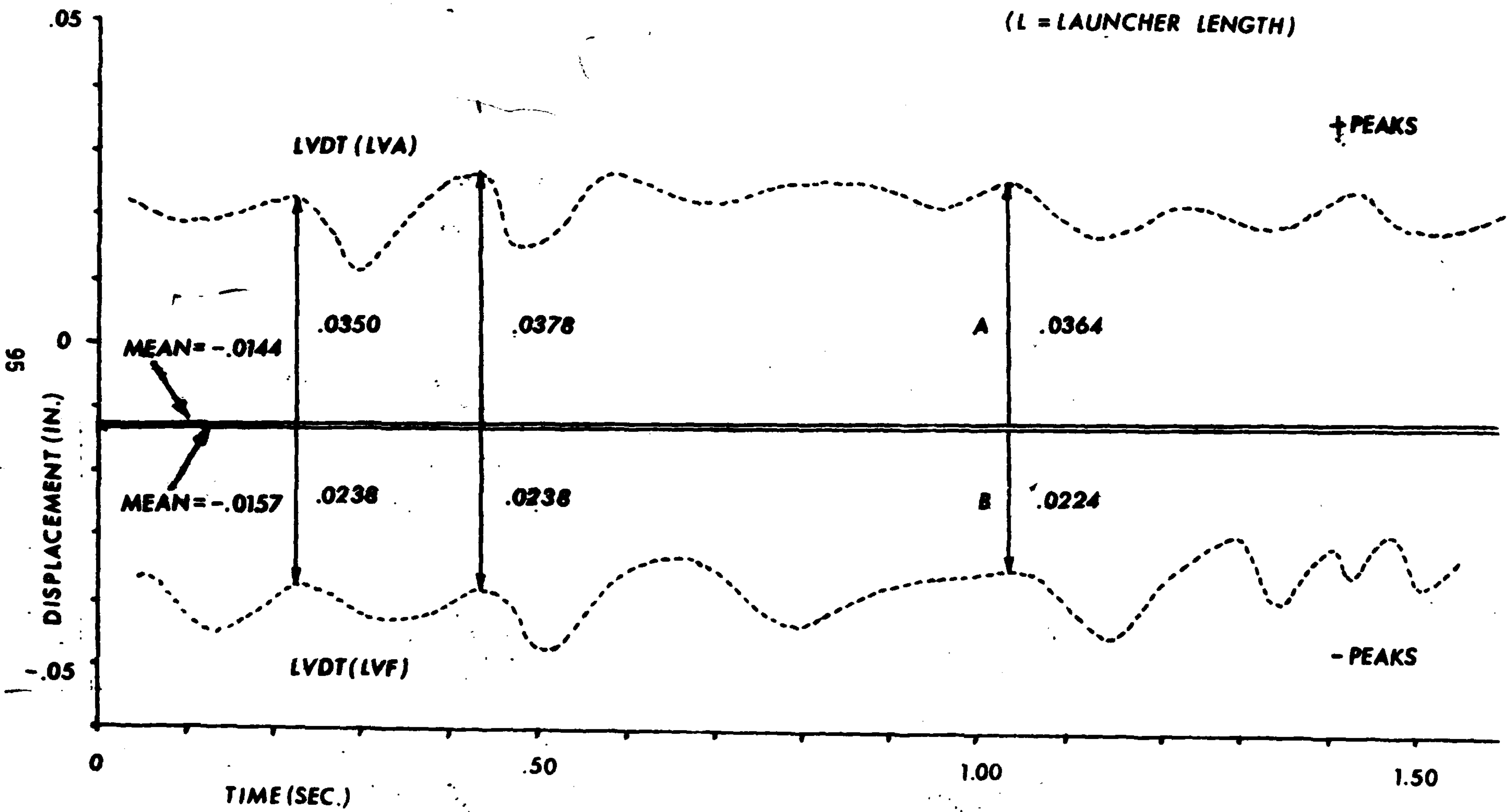
.11
.05
0
-.05
-.11
DISPLACEMENT (IN.)
0
.50
1.00
1.50
2.00
2.50
TIME (SEC.)
LVDT (RVA)

FIG. 23

TRANSLATION (IN.) = A − B

$$\text{ROTATION (MILS)} = \frac{A + B}{L} \times 1000$$

(L = LAUNCHER LENGTH)



LAUNCHER TRANSLATIONAL MOTION

FIG. 24

ACCELEROMETER ANALYSIS

	ACCLR	ACCUD	ACCFA
MEAN	-0.2336	-33.4476	2.9330
RMS VALUE	10.7855	32.4141	9.6412
STANDARD DEVIATION	10.7830	11.1194	9.5196
VARIANCE	116.2737	123.6191	90.6233

FIG. 25.

aircraft was experiencing considerable acceleration in all directions (about 1/3g) but was cyclic as shown by the low mean value.

The RMS value for the vertical accelerometer (ACCUD) was 32.4141 ft/sec^2, consistant with the normal gravity vector.

4.3.2 Frequency Spectrum Analysis

The Fourier coefficients for the accelerometer data are shown on pages 98 through 103.

It can be seen that the harmonic content of the data is significant up to approximately 55 Hz.

4.3.3 Relative Data Tracking

The relative data tracking of the accelerometer data is shown in Figures 26 , 27, and 28. The accelerometer data was sampled on a DAU high rate channel (1000 samples/second) and therefore many more points per cycle were available for analysis. Only the first 260 data points (0.26 seconds) were plotted.

It can be seen from the plots that the acceleration was cyclic and did vary over a considerable range.

4.4 Trigger and IR Detector Analysis

The data for the analysis of the trigger and IR detector analyses is presented on pages 107 thru 116 . The data was retrieved during the Phase B flight on 24 August 1971, previously described in paragraph 4.2.

The trigger pulse was indicated on channels A1 and A5 by a pulse of approximately 1.5 volts with a duration of approximately 1.5 ms. The rear IR detector produced a -1.5 volt pulse when the IR in the plume of the rocket was detected. The forward IRs produced a -0.5 volt pulse when the IR was sensed.

To determine the delay characteristics of the rocket system and the average velocity of the launched rocket, the A1 and A5 channels were monitored for the pulse and the times of occurrence noted. The A1 channel monitored the left detectors and the A5 channel monitored the right side detectors.

4.4.1 System Delay Characteristics

The octal reading for channels A1 and A5 of 4036 and 4011 respectively represent the ambient analog noise level on the channels. The channels were monitored for the trigger pulse represented by a significantly larger voltage level.

FOURIER COEFFICIENTS FOR ACCFA, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 1
FOURIER COS AND SIN COEFFICIENTS

2.5277	-0.1704	2.1462	-14.1407	-0.5126	-0.1591	0.1159	[illegible]	[illegible]	[illegible]	[illegible]	0.0084
0.0	-2.2751	-2.4256	0.1275	-0.5333	0.1562	-0.0622	[illegible]	0.2335	[illegible]	[illegible]	[illegible]
-0.0491	0.1111	0.0559	0.0746	0.0239	0.0772	0.0786	-0.1702	0.0272	0.0326	[illegible]	0.0095
0.0286	-0.0383	-0.1157	-0.1297	-0.1714	0.4269	0.1673	0.0713	0.0969	0.0711	[illegible]	0.0394
0.0337	0.0110	0.0234	0.0065	0.0485	0.0704	0.0337	0.0574	0.0229	0.0482	0.0464	0.0370
0.0505	0.0857	0.0171	0.0392	0.0164	0.0815	0.0384	[illegible]	0.0437	0.0347	[illegible]	0.0177
0.0501	0.0337	0.0491	0.0159	-0.0020	0.0035	0.0182	0.0577	0.0454	0.0444		
0.0066	0.0282	-0.0095	0.0100	0.0301	-0.0128	-0.0045	0.0041	-0.0041	0.0039		

FOURIER COEFFICIENTS FOR ACCFA, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 92
FOURIER COS AND SIN COEFFICIENTS

3.1498	-1.2228	0.3830	-10.7796	-0.6824	-0.0508	0.2383	0.0547	0.1340	-0.2559	-0.1904	-0.0957
0.0	-1.6757	-0.7494	-6.5390	-2.2579	-0.5660	-0.3547	-0.2381	-0.1288	-0.3416	-0.3369	-0.1494
-0.1032	-0.1228	0.0005	0.0122	-0.3723	-0.1823	-0.2375	-0.0536	-0.0891	-0.1219	-0.1293	-0.0957
-0.2482	-0.2475	-0.1925	-0.1468	0.0724	0.0352	-0.1129	-0.1490	-0.0996	-0.1219	-0.0985	-0.0506
-0.0879	-0.0934	-0.1265	-0.0611	-0.0399	-0.0492	-0.1193	-0.1248	-0.0772	-0.0931	-0.0531	-0.0963
-0.0796	-0.1000	-0.1075	-0.0535	-0.0298	-0.0626	-0.0494	-0.0303	-0.0364	-0.0502	-0.0398	-0.0391
-0.0703	-0.1037	-0.0555	-0.0730	-0.0991	-0.0815	-0.0954	-0.0725	-0.0957	-0.0895		
0.0255	-0.0104	-0.0278	0.0093	-0.0179	-0.0079	-0.0019	-0.0126	-0.0165	0.0043		

FOURIER COEFFICIENTS FOR ACCFA, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 183
FOURIER COS AND SIN COEFFICIENTS

3.5909	0.2310	2.5176	-9.2185	-0.6511	-0.3279	0.0473	-0.7341	-0.2089	0.0769	0.0209	-0.0594
0.0	-2.4485	-1.7275	-0.4360	-1.0442	0.3429	0.2496	-0.0676	-0.1037	0.0192	-0.0300	0.0393
0.0636	-0.1953	-0.0194	0.0317	0.1984	-0.1711	0.0207	0.0564	-0.1048	-0.0713	0.0365	-0.0356
[illegible]	0.1330	0.0758	[illegible]	0.3017	-0.1299	-0.2295	[illegible]	0.0302	-0.1436	[illegible]	0.0055

-0.0679	0.0291	-0.0144	-0.1173	0.0263	0.0397	-0.0940	-0.0232	0.0293	-0.0800	-0.0764	0.0608
-0.1911	-0.0279	0.0515	-0.0241	-0.0287	0.0397	-0.0150	-0.0856	-0.0349	0.0595	-0.0395	-0.0775
-0.0054	-0.0755	-0.0040	0.0441	-0.0750	-0.0631	0.0286	-0.0185	-0.1092	0.0093		
0.0321	-0.0337	-0.1358	0.0378	0.0294	-0.0319	-0.0514	0.0500	-0.0542	-0.0520		

FOURIER COEFFICIENTS FOR ACCEA, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 274
FOURIER COS AND SIN COEFFICIENTS

3.1102	-1.0276	0.7123	-5.4264	0.7490	0.0569	0.0174	-0.0959	-0.2310	0.0901	0.0144	-0.0353
0.0	-1.8787	-0.3443	-12.5198	-2.3317	-0.4478	-0.1016	-0.3633	-0.2263	-0.3462	-0.1509	-0.1342
0.0453	-0.0361	-0.0590	-0.1305	0.0984	0.0742	0.0335	-0.1374	-0.1049	-0.0404	-0.0939	-0.0700
-0.0931	-0.2345	-0.2129	-0.3782	-0.1749	-0.1451	-0.0930	0.0106	-0.0765	-0.0513	-0.0699	-0.0057
-0.0667	-0.0256	-0.0025	-0.0959	-0.0620	-0.0368	-0.1021	-0.0674	-0.0550	-0.0987	-0.0690	-0.0674
0.0004	-0.0513	-0.0633	-0.0421	-0.0081	-0.0456	-0.0358	-0.0317	-0.0246	-0.0528	-0.0187	-0.0352
-0.0632	-0.0910	-0.0671	-0.1026	-0.0587	-0.0685	-0.0655	-0.0691	-0.0750	-0.0402		
-0.0230	-0.0440	0.0103	0.0295	-0.0489	-0.0216	-0.0199	0.0195	-0.0075	-0.0252		

FOURIER COEFFICIENTS FOR ACCEA, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 365
FOURIER COS AND SIN COEFFICIENTS

3.3123	0.2871	2.2977	-1.5220	0.4198	-0.7136	-0.2915	-0.2406	0.0129	-0.1991	-0.2356	-0.0466
0.0	-2.3937	-0.5794	-12.4189	-1.3498	-0.0023	0.1876	-0.0078	-0.2427	0.1917	0.0054	-0.0846
-0.1340	-0.0267	-0.0342	0.0249	-0.3259	-0.1781	-0.1855	-0.0561	-0.0901	-0.0779	-0.0469	-0.0728
-0.1327	-0.0949	-0.0983	-0.2063	-0.0714	-0.1420	-0.0564	-0.0954	-0.0195	-0.0108	-0.0179	-0.0439
-0.0527	-0.0667	-0.0997	-0.1042	-0.1184	-0.0999	-0.0928	-0.0577	-0.1043	-0.0780	-0.0977	-0.0347
-0.0349	-0.0261	-0.0367	-0.0559	-0.0083	-0.0315	-0.0174	0.0144	-0.0345	-0.0327	0.0132	0.0382
-0.1033	-0.0552	-0.0995	-0.0486	-0.0753	-0.0999	-0.0779	-0.0786	-0.0591	-0.0941		
0.0068	0.0095	-0.0092	-0.0112	-0.0027	-0.0074	0.0209	0.0277	0.0078	-0.0147		

FOURIER COEFFICIENTS FOR ACCEA, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 456
FOURIER COS AND SIN COEFFICIENTS

2.8235	-0.7560	0.5580	2.7175	2.1282	0.0653	-0.2543	0.1624	-0.0059	-0.1594	-0.1956	-0.1318
0.0	-2.1401	0.5804	-13.0767	-1.2445	-0.5837	-0.4110	-0.5190	-0.5399	0.0602	-0.1181	-0.1779

FOURIER COEFFICIENTS FOR ACCLR, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 1
FOURIER COS AND SIN COEFFICIENTS

-0.6881	-0.6527	3.0535	-4.1542	-3.2953	-13.2634	0.2075	1.6170	0.1552	0.2201	-1.4619	-0.2214
0.0	0.3606	-1.3223	5.7315	2.7365	-1.7637	0.1447	2.0843	2.5551	0.7145	1.3510	1.6960
0.5728	-0.4497	0.7272	0.3974	0.6103	0.4283	0.3524	0.4240	0.1943	0.1561	0.3424	0.2079
1.3351	0.2023	0.4955	0.2221	0.1052	0.2127	0.4019	0.1772	0.1762	0.0079	0.2102	[illegible]
0.1322	0.2466	0.2259	0.2393	0.3486	0.2493	0.2063	0.2628	0.2095	0.3130	0.2605	0.2429
0.1326	0.2256	0.1514	0.2074	0.1226	0.1433	0.2350	0.1938	0.0723	0.2044	0.0169	0.0819
0.2526	0.3047	0.1315	0.2679	0.2150	0.2776	0.2675	0.1946	0.2669	0.0948		
0.0735	0.0827	0.0098	0.0997	-0.1465	0.0518	0.1598	0.1327	0.0981	0.2671		

FOURIER COEFFICIENTS FOR ACCLR, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 92
FOURIER COS AND SIN COEFFICIENTS

0.2782	0.6238	4.7397	-4.3863	-3.0612	-9.8069	1.9768	-0.2725	-0.8564	-0.9888	-1.3770	-0.3544
0.0	0.6228	0.5019	4.5414	7.7926	-2.9742	-1.0852	-1.9554	-0.7963	0.7654	-0.3367	-2.1342
-0.7166	-0.5867	-0.3175	-0.5773	-0.5155	-0.4213	-0.4569	-0.4145	-0.3632	-0.3295	-0.3686	-0.0974
5.8970	-1.6386	-0.0810	-0.5312	-0.2363	-0.7011	-0.2620	-0.2827	-0.4119	-0.2108	-0.4135	-0.3564
-0.2636	-0.2208	-0.3239	-0.2970	-0.3247	-0.3587	-0.3115	-0.1862	-0.2970	-0.2310	-0.2360	-0.3276
-0.1507	-0.2197	-0.2164	-0.1185	-0.0754	-0.1252	-0.0745	-0.2970	-0.2125	-0.0069	-0.0731	-0.1063
-0.2578	-0.2513	-0.3290	-0.2415	-0.5221	-0.2113	-0.3033	-0.3668	-0.2081	-0.1387		
-0.0637	-0.1188	-0.0452	-0.1434	0.0174	-0.1293	-0.0675	0.0321	0.0096	-0.0338		

FOURIER COEFFICIENTS FOR ACCLR, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 183
FOURIER COS AND SIN COEFFICIENTS

-0.3849	-0.6632	2.5869	-7.4160	-5.2277	-0.9911	-0.1163	2.1227	-0.7399	-0.3569	0.9190	0.7089
0.0	0.6510	1.3568	2.2945	-0.2953	-8.1424	0.4880	2.2289	-0.1355	0.3091	0.1972	-0.6221
-0.0316	1.0290	-0.1855	0.2723	0.0931	0.1199	0.2017	-0.0461	0.1877	0.0954	0.0419	-0.0837
-1.4900	-0.3972	0.1144	0.1792	0.0811	0.4501	0.4698	0.0711	0.0788	0.1164	-0.0441	0.0062

0.0669	0.1421	0.1107	0.0458	0.1246	0.0991	0.0384	0.0787	0.1141	0.1578	0.0173	0.0458
-0.0310	-0.0548	0.0923	0.0506	-0.0034	-0.0531	0.0872	-0.0496	0.0682	-0.0008	-0.0783	-0.1145

0.1204	0.0483	0.1124	0.1525	0.1314	0.1461	0.0913	0.0924	0.1385	0.0389
0.0330	0.0747	0.0551	-0.0583	0.0047	0.0139	-0.0215	-0.0321	-0.1959	-0.7654

FOURIER COEFFICIENTS FOR ACCLR, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 274
FOURIER COS AND SIN COEFFICIENTS

-0.0779	0.0277	3.7443	-6.1137	-2.4111	-4.1943	1.0334	-0.9373	-1.2308	-1.8748	0.0302	0.5344
0.0	0.3092	1.0545	0.2043	1.3886	-8.4858	3.6849	-0.1941	-1.2381	-0.8641	-0.5411	-0.2591
0.0597	0.5034	0.2227	0.5025	-0.0329	0.0449	0.0144	-0.3254	-0.3839	-0.0694	-0.0080	-0.0303
-1.1516	0.9053	-0.2445	-0.0617	0.0802	0.0432	-0.0349	0.0348	-0.2786	-0.2884	-0.1442	-0.1524
0.0289	-0.0651	0.0290	-0.0248	0.0374	-0.0937	-0.0645	-0.1763	-0.1768	-0.0408	-0.0786	0.0269
-0.1305	0.0135	-0.1413	0.1297	0.0597	-0.0917	0.0010	0.1135	0.0423	-0.0920	0.0462	-0.1046
-0.1143	-0.0135	-0.0209	-0.0123	-0.0233	-0.2044	-0.0721	-0.0332	0.0066	-0.0956		
-0.0569	-0.0091	-0.1472	0.0755	0.1409	0.1322	0.2597	0.1225	0.1805	0.2827		

FOURIER COEFFICIENTS FOR ACCLR, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 365
FOURIER COS AND SIN COEFFICIENTS

-0.5901	-1.2061	1.9970	-5.9140	-3.0689	6.0925	-3.2560	0.3177	1.3532	-0.0121	-1.0755	-1.3205
0.0	0.4166	3.0253	-3.1137	-0.9720	-5.9289	-0.0469	1.1814	-1.1340	-0.5251	1.4571	1.0637
1.1302	-0.2440	0.2551	0.3410	-0.1776	0.0048	-0.2409	0.1546	0.0365	0.1549	0.1596	-0.1301
0.3843	0.0240	0.0983	-0.5135	0.0217	-0.0291	-0.6101	-0.0226	-0.2515	-0.0107	-0.0337	-0.2641
-0.0040	0.0996	-0.1091	0.2295	-0.0365	-0.1057	0.0629	-0.2402	0.0565	-0.1267	0.0573	0.1130
-0.0619	-0.0379	-0.1777	-0.0351	-0.0627	-0.0548	-0.1435	0.0496	-0.0122	0.0359	0.0856	-0.1434
0.0733	-0.0858	-0.2365	-0.2558	-0.0375	-0.1346	-0.0512	-0.1522	0.1205	0.0211		
-0.0760	-0.0650	-0.1649	-0.0889	-0.0925	0.0096	0.0472	-0.0966	-0.0285	-0.3714		

FOURIER COEFFICIENTS FOR ACCLR, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 456
FOURIER COS AND SIN COEFFICIENTS

[illegible]	-0.[illegible]	2.1011	-4.[illegible]	-2.3717	8.9692	0.1965	-2.1044	0.4901	0.6406	-0.6148	-0.5352
[illegible]	0.[illegible]	2.9909	-4.[illegible]	-2.0190	-2.5422	2.4241	-0.2152	0.1268	0.2734	0.7099	-0.2939

FOURIER COEFFICIENTS FOR ACCUD, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 1
FOURIER COS AND SIN COEFFICIENTS

-30.9533	-1.1338	0.5619	-1.9765	3.3140	-0.8097	-0.4504	-0.9932	-0.1481	-0.2585	0.4949	0.2026
0.0	0.5334	-0.9504	12.9443	6.2392	8.6959	-0.7283	-1.7305	-1.0405	-0.3422	-0.1254	-0.4275
-0.1195	-0.2723	0.1499	0.0666	-0.1963	-0.5240	-0.4459	-0.5794	-0.2732	0.2279	-0.2466	-0.1725
-0.4111	-0.1592	-0.3952	0.2453	-0.7016	-0.0627	-0.0374	-0.1517	-0.1707	-0.1122	-0.2250	-0.1259
0.2603	-0.2298	-0.1213	-0.3145	-0.1547	-0.2644	-0.1577	-0.1575	-0.2745	-0.1228	-0.0642	-0.1440
-0.1074	-0.0614	-0.1357	-0.1525	-0.0493	-0.0857	0.0108	-0.0265	0.0554	0.3472	-0.0432	0.0209
-0.1396	-0.1360	-0.0671	-0.2761	-0.1349	-0.0632	-0.0903	-0.0793	-0.0492	0.0394		
-0.0949	0.1312	0.1062	0.0838	-0.0175	-0.0851	-0.0301	0.0279	-0.0760	-0.2320		

FOURIER COEFFICIENTS FOR ACCUD, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 92
FOURIER COS AND SIN COEFFICIENTS

-30.6902	0.9050	4.8108	-3.9784	5.5866	-0.4069	-7.1859	-0.1416	0.1046	-0.2059	0.3441	-0.2724
0.0	1.2543	0.1742	7.5532	4.6775	-1.9815	0.0645	3.5005	1.2189	1.0171	1.0639	1.0904
0.0504	0.1347	0.1281	-0.0656	0.1015	-0.0990	-0.0203	0.2605	0.1091	0.0678	0.3480	0.1159
0.9373	0.5355	1.0293	0.5035	0.8048	0.1913	0.2321	0.2323	0.2009	0.1637	0.2550	0.1916
0.1360	0.2085	0.2051	0.0263	0.2194	0.1285	0.0642	0.1115	0.2122	0.3016	0.4003	-0.0246
0.0965	0.1706	0.1920	0.1550	0.0502	0.0622	0.1344	-0.0080	-0.0066	0.2376	0.1621	-0.0796
0.1192	0.2326	0.1332	0.2521	0.1849	0.1403	0.1135	0.1097	-0.0238	0.2400		
0.1946	0.3900	-0.0068	0.2242	-0.0250	0.0526	0.0084	0.1021	-0.3656	-0.0550		

FOURIER COEFFICIENTS FOR ACCUD, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 183
FOURIER COS AND SIN COEFFICIENTS

-30.9629	-0.0999	1.0541	-7.0015	-0.4775	-4.1134	1.9784	-3.7999	-0.5767	0.0571	-0.5857	-0.5130
0.0	0.5371	-0.1706	8.2844	5.8457	-0.2682	-2.4986	-2.4286	-0.3634	-0.7939	-0.1406	-0.0472
-0.0451	0.1338	-0.2366	-0.1807	-0.0169	0.1874	0.2208	0.0440	-0.1751	-0.0349	-0.1627	0.0885
-0.2381	-0.6443	-0.0235	0.0537	-0.0123	0.0527	-0.0270	0.1448	-0.1403	-0.1813	-0.0318	-0.0185

0.0317	-0.1230	-0.0948	-0.1584	-0.2425	0.0111	0.0948	0.0984	0.0334	-0.0702	-0.1079	0.0347
0.0477	-0.0963	-0.1082	-0.2152	0.0976	0.0550	0.0023	-0.0241	0.0141	-0.0142	-0.0995	0.0131
-0.1509	0.0557	0.1222	-0.0132	-0.1103	-0.0538	-0.0423	-0.0526	-0.2324	-0.0954		
0.1347	0.0793	-0.1451	-0.0221	-0.0248	0.0883	0.0107	-0.0250	-0.0634	0.2298		

FOURIER COEFFICIENTS FOR ACCUD, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 274
FOURIER COS AND SIN COEFFICIENTS

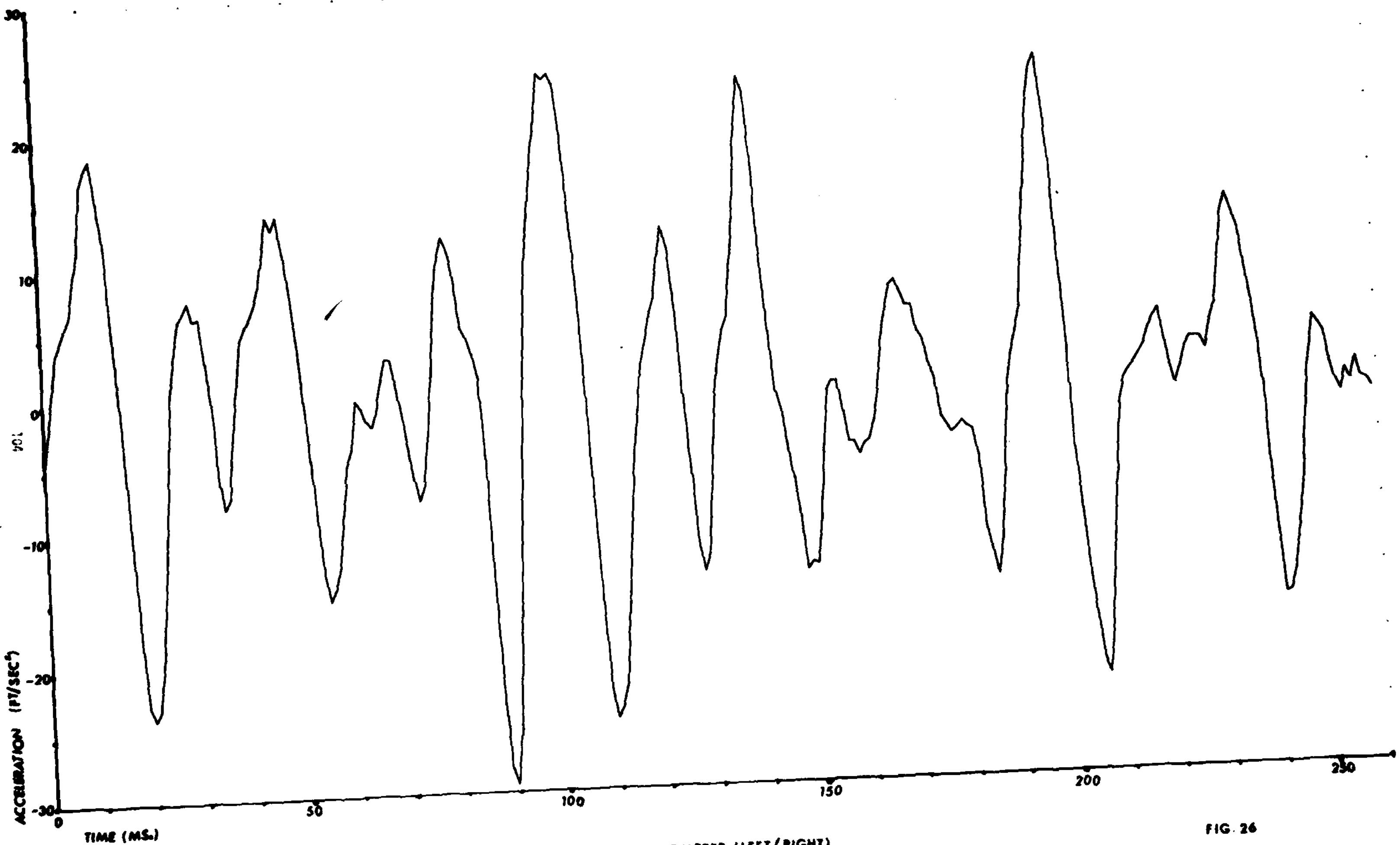
-30.7713	0.0915	4.0833	-8.8641	-0.1599	-0.4544	-2.5433	-0.4409	0.0948	-0.3697	-0.0777	-0.4320
0.0	1.1455	1.4770	3.0513	7.8394	-3.5950	-6.7720	-3.0135	-0.0531	-0.3920	-0.0758	-0.6383
-3.5917	-0.1379	-0.3454	0.2316	-0.0212	-0.1928	0.0651	-0.1320	-0.1313	-0.0726	-0.1954	-0.0051
-0.1725	-0.0873	-0.5078	0.0915	0.0450	0.2259	-0.0919	-0.1467	-0.1744	-0.0311	-0.0948	-0.1769
-0.1788	-0.0193	0.0240	-0.0701	-0.1468	-0.0852	-0.2389	-0.0463	-0.0679	-0.1344	-0.0979	-0.0777
-0.0515	-0.0765	-0.0491	-0.0484	-0.1499	0.0044	-0.1265	-0.0969	0.0065	-0.1906	0.0140	-0.1329
-0.1595	-0.0047	-0.0251	-0.0659	-0.0670	-0.0580	-0.0089	0.0105	-0.0390	-0.3706		
-0.0666	-0.0077	-0.0635	-0.0726	-0.2078	-0.0616	0.0240	-0.0171	-0.1417	-0.2417		

FOURIER COEFFICIENTS FOR ACCUD, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 365
FOURIER COS AND SIN COEFFICIENTS

-30.7733	-0.7881	1.2942	-9.4709	-4.5855	3.4038	5.5004	-1.2701	-0.4797	-0.2992	0.7729	-0.1196
0.0	0.6274	0.9471	0.7146	4.9635	-8.4016	-0.6281	-2.8476	-1.0637	-0.4693	-0.3982	-0.3599
-0.0565	-0.1933	0.1819	-0.0910	-0.3760	0.2873	-0.2193	0.2116	-0.0711	-0.0015	-0.0869	0.0593
-0.2385	0.0154	0.0303	0.2969	0.0426	-0.1090	-0.1294	-0.1711	-0.1205	-0.2002	-0.0436	-0.0685
-0.0444	0.0001	-0.1456	0.0915	-0.1000	-0.1458	-0.0975	-0.0961	0.0671	-0.0258	-0.1785	0.0454
-0.1969	-0.0181	-0.0490	-0.2903	-0.0915	0.0379	0.0107	0.0296	0.0247	0.0583	0.0632	0.0491
-0.1071	0.0413	-0.0605	0.0471	0.0558	-0.0549	-0.0544	-0.0912	0.1374	-0.1046		
-0.0775	0.0950	0.0761	-0.0627	-0.0380	-0.1659	-0.1877	0.0144	0.0049	0.0585		

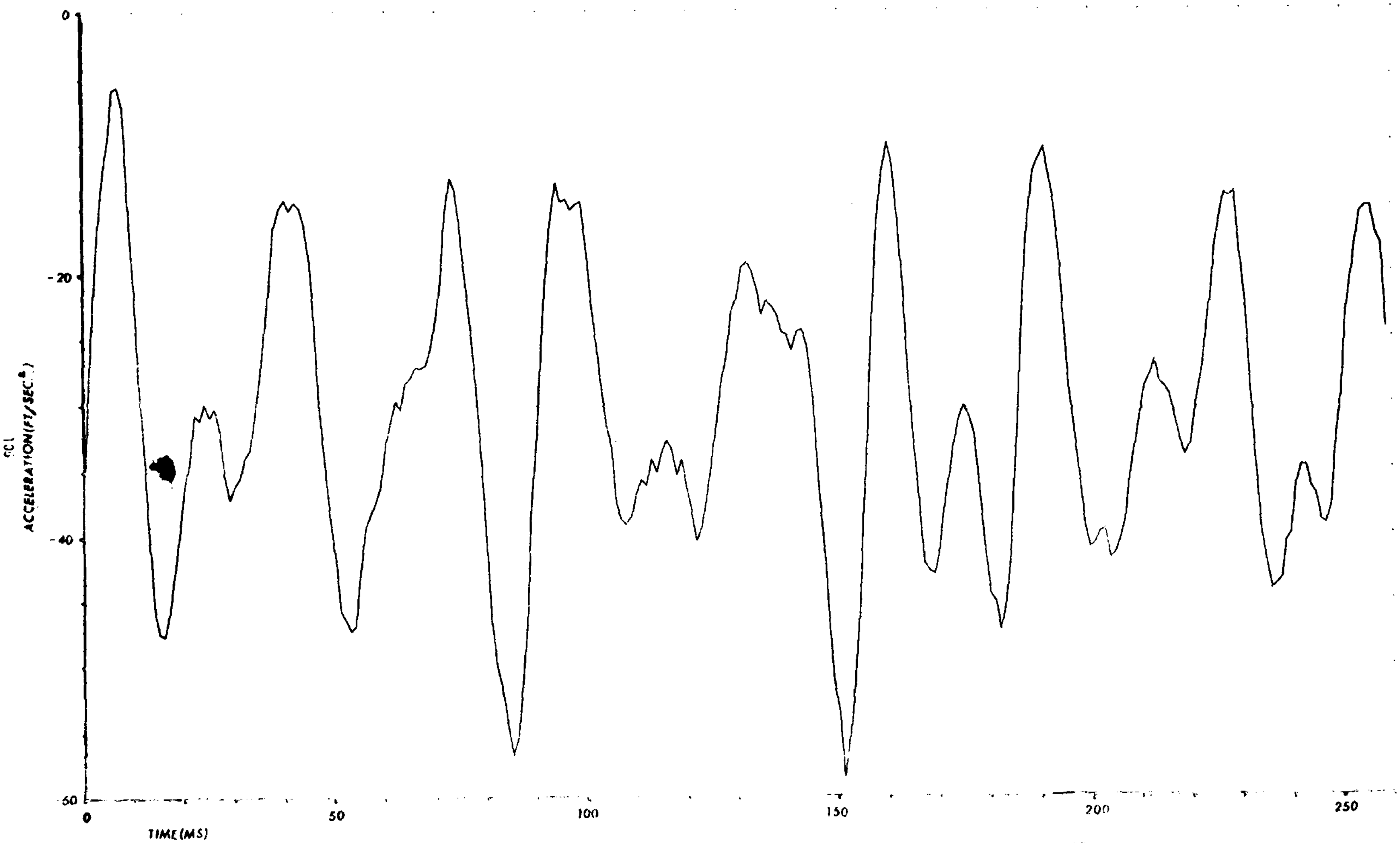
FOURIER COEFFICIENTS FOR ACCUD, 11 HZ FUNDAMENTAL, STARTING WITH NUMBER 456
FOURIER COS AND SIN COEFFICIENTS

-31.2321	-1.1216	1.8598	-10.3862	-8.9885	2.8263	1.5272	2.9691	1.0300	0.9842	1.1481	0.5683
0.0	0.7863	2.3462	-4.9695	2.6917	-2.9138	-1.3452	-1.3793	0.2691	-0.1012	0.1755	0.2639



ACCELEROMETER (LEFT/RIGHT)

FIG. 26



ACCELEROMETER (VERTICAL) A

FIG. 22

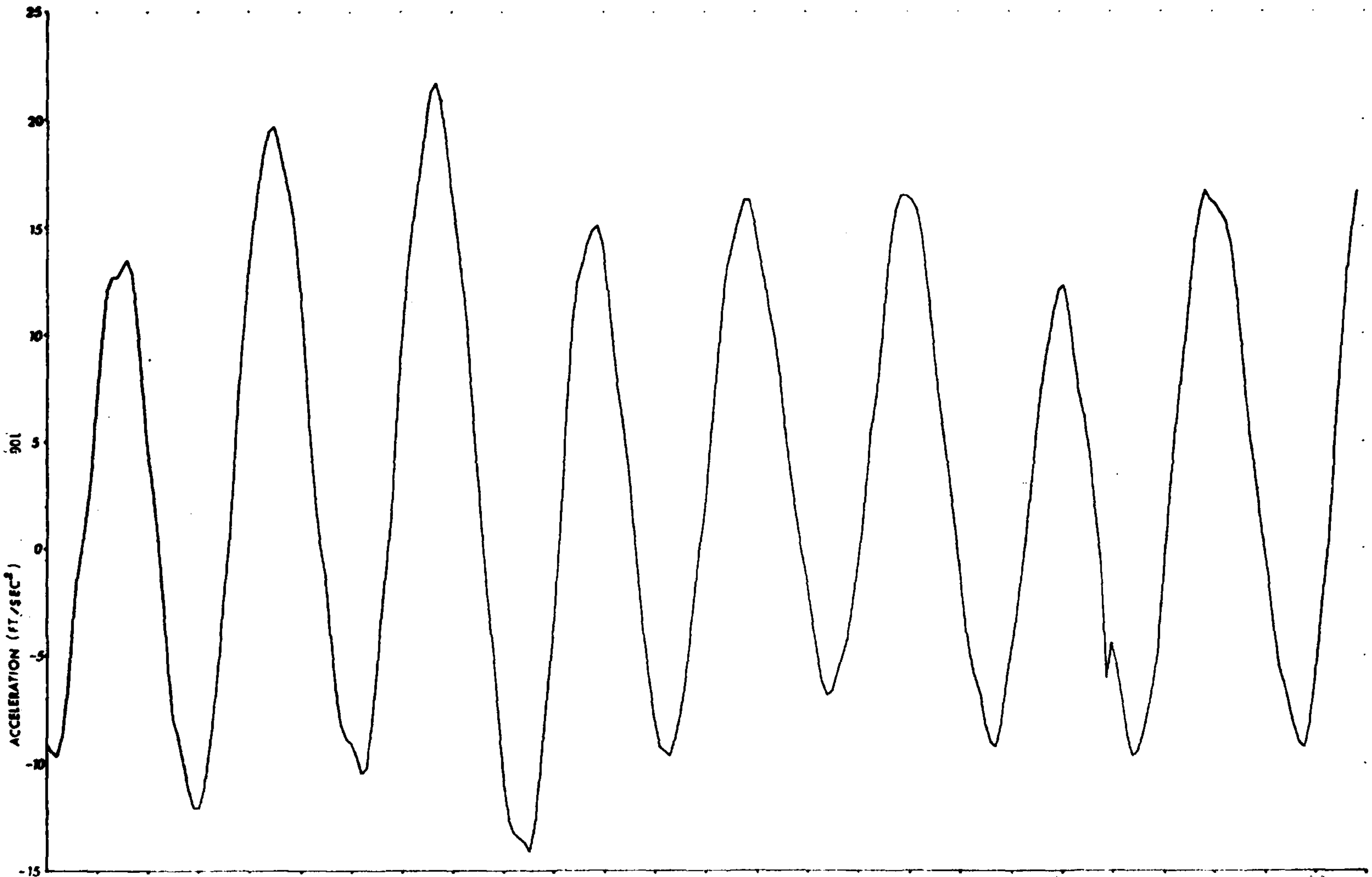


FIG. 28
ACCELEROMETER (FORE/AFT)

IR DETECTOR & TRIGGER PULSE DATA

11.5910

4036	2.61	-20.30	11.05	4011	0.300	-1.600	-4.410	5412	15	-0.00	212
4035	2.21	-23.52	13.97	4011	0.050	-1.400	-0.270	5412	15	-0.03	4000
4036	0.0	-25.93	16.29	4011	-0.050	-1.300	0.0	5412	15	6.22	4000
4036	0.0	-31.36	18.69	10	-0.150	-1.050	-5.450	5412	15	-9.45	4000
4036	-3.01	-34.58	20.10	4011	-0.250	-0.750	0.0	5412	15	0.26	4000
4036	-1.80	-37.79	20.50	4011	-0.300	-0.600	0.006	5412	15	-2.13	4000
4035	0.40	-36.99	20.33	4011	-0.350	-0.350	0.036	5412	15	2.99	4000
4036	4.02	-38.20	19.90	4011	-0.400	-0.150	-0.048	5412	15	-5.31	2000
4035	6.03	-36.59	18.69	4011	-0.400	-0.050	-0.003	5412	15	20	4000
31	5.42	-35.98	16.58	4011	0.0	0.050	-0.043	5412	15		

11.6010

4027	1.40	-37.59	14.47	4011	-0.350	0.050	-4.410	5412	15	-0.00	212
4036	-0.40	-36.79	12.86	4011	-0.350	0.150	-0.270	5412	15	[illegible]	4000
4036	-3.41	-37.79	9.24	4011	-0.200	0.150	0.0	5412	15	6.22	4000
4036	-4.62	-41.88	6.23	10	-0.050	0.250	1.600	5412	15	-9.39	4000
4036	-4.02	-43.22	2.81	4011	0.0	0.300	-0.006	5412	15	0.26	4000
4035	-4.62	-48.25	-0.20	10	0.200	0.250	-0.017	5412	15	-2.13	4000
4036	-7.43	-48.45	-3.21	10	0.400	0.300	0.027	5412	15	2.99	4000
4036	-8.24	-49.05	-6.23	10	0.700	0.250	-0.048	5412	15	-5.31	4764
4036	-9.44	-48.05	-9.65	10	0.950	0.250	-0.015	5412	15	20	4000
4036	-9.44	-45.03	-11.05	10	1.200	0.300	-0.027	5412	15		

11.6110

4036	-8.64	-37.79	-12.66	10	1.550	0.150	-4.410	5412	15	-0.01	212
4036	-8.04	-29.55	-13.47	10	1.600	0.150	-0.270	5412	15	-0.03	4000
4036	-7.43	-22.51	-14.27	10	1.750	0.050	0.0	5412	15	6.28	4000
37	-3.82	-15.68	-14.27	10	1.750	0.0	6.350	5412	15	-9.33	4000
4036	-2.21	-10.85	-13.26	10	1.750	-0.100	0.017	5412	15	0.39	4000
4036	0.80	-8.04	-11.05	10	1.600	-0.350	-0.030	5412	15	-2.13	4000
4036	4.62	-4.02	-8.44	10	1.450	-0.450	-0.008	5412	15	2.99	4000
4036	10.45	-5.83	-6.03	10	1.250	-0.750	-0.046	5412	15	-5.31	1745
4036	14.87	-6.23	-3.41	10	0.750	-1.000	-0.001	5412	15	20	4000
4036	18.29	-13.47	-0.60	10	0.350	-1.150	-0.039	5412	15		

11.6210

4036	19.10	-20.70	2.41	10	0.0	-1.400	-4.320	5412	15	-0.02	212
4036	18.69	-27.34	6.43	10	-0.500	-1.490	-0.270	5412	15	-0.03	4000
4036	18.09	-31.56	9.85	4011	-0.950	-1.550	0.0	5412	15	6.28	4000
4036	18.89	-35.78	12.26	4011	-1.450	-1.550	-5.000	5412	15	-9.33	4000
4033	15.07	-37.19	13.67	10	-1.750	-1.350	0.064	5412	15	0.39	4000
4036	10.25	-40.81	14.87	4011	-2.000	-1.200	-0.024	5412	15	-2.13	4000
4036	6.00	-41.21	15.88	4011	-2.150	-0.850	-0.035	5412	15	3.00	4000
4036	-6.83	-45.43	18.48	4011	-2.050	-0.550	0.0	5412	15	-5.31	7700
37	-13.67	-45.03	15.48	4011	-1.850	-0.150	0.012	5412	15	20	4000
4036	-21.11	-42.42	13.47	10	-1.550	0.200	-0.049	5412	15		

11.6310

450	-23.12	-40.01	10.45	4011	-1.000	0.500	-4.410	5412	15	-0.03	212
450	-23.72	-38.20	7.64	4011	-0.530	0.900	-0.270	5412	15	-0.03	4000
37	-20.50	-34.38	4.62	4011	0.0	1.150	0.0	5412	15	6.28	4000
4036	-14.07	-36.39	1.80	4011	0.550	1.300	0.700	5412	15	-9.39	4000
4036	-6.83	-34.78	-0.40	10	1.050	1.450	0.083	5412	15	0.39	4000
37	-1.40	-35.18	-3.21	4011	1.500	1.350	-0.012	5412	15	-2.06	4000
4036	0.80	-30.76	-5.42	10	1.800	1.200	-0.057	5412	15	3.06	4000
4036	2.01	-32.37	-7.84	10	2.050	0.900	0.015	5412	15	-5.38	6763
4036	4.22	-32.16	-9.65	10	2.150	0.450	0.007	5412	15	20	4000
4036	6.23	-34.58	-10.65	4011	2.100	0.150	-0.033	5412	15		

11.6410

4036	5.63	-33.17	-11.05	10	1.950	-0.250	-4.410	5412	15	-0.03	212
[illegible]	[illegible]	-31.96	-11.05	10	1.750	-0.650	-0.270	5412	15	[illegible]	4000
[illegible]	2.21	-33.77	-10.85	10	1.500	-0.950	0.0	5412	15	6.28	4000
4036	-0.40	-36.57	-9.65	4011	1.250	-1.300	4.400	5412	15	-9.92	4000
4036	-2.61	-37.39	-8.04	10	1.050	-1.400	0.082	5412	15	0.30	4000
[illegible]	[illegible]	[illegible]	-5.42	4011	[illegible]	[illegible]	[illegible]	5412	15	[illegible]	4000
4035	-6.23	-37.79	-2.61	4011	0.750	[illegible]	[illegible]	5412	15	2.99	4000
[illegible]	[illegible]	-36.59	0.0	10	0.600	-1.300	0.012	5412	15	-5.28	2000
4036	-1.20	-33.57	1.40	4011	0.500	-1.400	0.003	5412	15	20	4000
4035	1.40	-30.15	3.82	4011	0.400	-1.200	-0.027	5412	15		

11.6510

4035	2.21	-24.73	6.29	10	0.300	-1.150	-4.420	5412	15	-0.02	212
4036	3.01	-20.50	9.44	10	0.150	-0.950	-0.270	5412	15	-0.04	4000
4036	4.22	-15.40	12.26	10	0.0	-0.800	0.0	5412	15	6.28	4000
4036	8.84	-12.66	14.67	4011	-0.100	-0.800	-5.700	5412	15	-9.52	4000
4035	11.40	-9.44	16.00	10	-0.300	-0.700	0.040	5412	15	0.39	4000
4035	15.08	-7.64	17.09	4011	-0.550	-0.750	-0.053	5412	15	-1.93	4000
4036	15.48	-6.43	17.49	4011	-0.800	-0.750	-0.042	5412	15	-2.99	4000
4035	12.06	-10.05	17.89	4011	-1.000	-0.750	0.011	5412	15	-5.44	4764
4036	8.44	-13.07	17.69	4011	-1.150	-0.850	0.0	5412	15	20	4000
4033	5.62	-15.69	17.09	4011	-1.250	-0.750	-0.019	5412	15		

11.6610

4035	2.61	-23.52	15.68	4011	-1.250	-0.800	-4.320	5412	15	0.0	212
4036	2.21	-27.74	13.87	4011	-1.200	-0.700	-0.270	5412	15	-0.06	4000
4036	1.60	-35.18	11.66	4011	-1.050	-0.550	0.0	5412	15	6.22	4000
4036	1.40	-42.42	9.85	4011	-0.800	-0.450	-0.750	5412	15	-9.52	4000
4036	0.0	-50.46	8.04	10	-0.550	-0.250	0.030	5412	15	0.32	4000
4036	-3.02	-55.09	6.23	4011	[illegible]	[illegible]	[illegible]	5412	15	[illegible]	4000
4036	-9.24	-57.70	3.82	4011	0.200	0.0	[illegible]	5412	15	2.99	4000
4036	-14.07	-50.10	1.20	10	0.650	0.150	[illegible]	5412	15	-5.32	1740
[illegible]	-14.67	-57.50	-0.80	10	1.100	0.150	[illegible]	5412	15	20	4000
[illegible]	-11.44	-53.60	-2.01	10	1.450	0.300	[illegible]	5412	15		

11.6710

4036	-6.63	-49.86	-4.42	10	1.900	0.250	-4.410	5412	15	0.00	212
4036	-2.21	-46.24	-5.62	10	2.250	0.150	-0.270	5412	15	-0.04	4000
4035	-0.20	-40.41	-7.43	10	2.590	0.050	0.0	5412	15	6.22	4000
4035	0.0	-36.19	-8.64	10	2.700	-0.050	6.050	5412	15	-9.45	4000
4035	-1.80	-31.76	-9.04	10	2.930	-0.200	0.024	5412	15	0.32	4000
4036	-3.21	-27.14	-7.84	10	2.750	-0.450	0.027	5412	15	-1.93	4000
4036	-5.62	-22.92	-7.03	10	2.650	-0.700	0.020	5412	15	2.93	4000
4036	-3.01	-19.70	-6.03	10	2.450	-0.800	-0.026	5412	15	-5.38	7745
4035	-2.21	-17.89	-4.42	4005	2.150	-1.050	-0.004	5412	15	20	4000
4035	0.80	-17.89	-2.21	4011	1.850	-1.100	-0.041	5412	15		

11.6810

4035	1.40	-18.29	0.20	4011	1.500	-1.250	-4.320	5412	15	0.0	212
4035	3.01	-19.70	3.41	4011	1.100	-1.350	-0.270	5412	15	[illegible]	4000
4036	1.40	-20.30	6.23	4011	0.750	-1.300	0.0	5412	15	6.15	4000
4035	2.01	-24.32	8.66	4011	0.450	-1.350	-2.450	5412	15	-9.39	4000
4035	-1.40	-24.93	11.46	4011	0.200	-1.250	-0.003	5412	15	0.39	4000
4035	-1.20	-27.30	13.87	4011	0.0	-1.150	0.003	5412	15	[illegible]	[illegible]
4035	0.0	-30.36	16.40	4011	-0.100	-1.050	0.032	5412	15	2.93	4000
4035	0.80	-32.77	18.49	4011	-0.200	-0.800	-0.057	5412	15	-5.18	6763
4036	5.80	-35.58	19.50	4011	-0.300	-0.700	0.0	5412	15	20	4000
4036	6.63	-37.19	19.70	4011	-0.350	-0.450	-0.069	5412	15		

11.6910

4036	9.46	-40.41	19.30	4011	-0.400	-0.350	-4.320	5412	15	-0.00	212
4036	8.64	-40.21	18.29	4011	-0.400	-0.200	-0.270	5412	15	-0.03	4000
4035	4.22	-40.41	17.09	4011	-0.450	-0.050	0.0	5412	15	6.15	4000
4036	1.00	-40.01	15.28	4011	-0.450	0.0	-2.550	5412	15	-9.39	4000
4036	-1.00	-38.00	12.86	4011	-0.400	0.050	-0.016	5412	15	0.45	4000
4035	-3.21	-37.79	9.24	4011	-0.350	0.100	-0.027	5412	15	-2.06	4000
4035	-6.23	-37.39	6.83	4011	-0.250	0.150	0.039	5412	15	2.93	4000
4036	-7.84	-40.81	4.22	4011	-0.100	0.300	-0.046	5412	15	-5.25	2000
4036	-9.05	-41.82	1.80	4011	0.050	0.300	-0.014	5412	15	20	4000
4036	-11.05	-43.02	-0.40	10	0.250	0.400	-0.030	5412	15		

11.7010

4036	-14.67	-43.22	-3.01	4011	0.650	0.450	-4.320	5412	15	-0.01	212
4035	-17.49	-44.03	-5.42	10	1.000	0.450	-0.270	5412	15	-0.04	4000
4036	-17.89	-43.83	-7.64	10	1.300	0.550	0.0	5412	15	6.15	4000
4036	-15.48	-42.42	-9.44	10	1.600	0.450	6.550	5412	15	-9.33	4000
4036	-11.64	-36.79	-11.05	10	1.850	0.450	0.022	5412	15	0.39	4000
4036	-3.01	-30.30	-12.06	10	1.950	0.350	-0.017	5412	15	[illegible]	[illegible]
4036	2.41	-23.92	-12.06	10	2.000	0.200	0.008	5412	15	2.99	4000
[illegible]	7.04	-20.70	-11.48	10	1.950	0.100	-0.040	5412	15	-5.25	[illegible]
[illegible]	9.84	-17.00	-9.85	10	1.750	-0.050	-0.011	5412	15	20	4000
4035	11.23	-12.86	-8.04	10	1.450	-0.250	-0.033	5412	15		

11.7110

4036	10.95	-7.23	-6.23	10	1.050	-0.550	-4.320	5412	15	-0.01	212
37	11.86	-5.42	-3.82	10	0.550	-0.850	-0.360	5412	15	-0.04	4000
4036	11.86	-6.83	-1.40	10	0.100	-0.950	0.0	5412	15	6.22	4000
4036	13.06	-12.66	1.00	10	-0.350	-1.250	-0.350	5412	15	-9.33	4000
4035	14.67	-16.08	3.82	4011	-0.850	-1.350	0.048	5412	15	0.52	4000
4036	16.28	-21.51	6.43	10	-1.300	-1.400	-0.024	5412	15	-2.00	4000
4036	15.28	-27.56	8.84	10	-1.650	-1.400	-0.030	5412	15	3.06	4000
4036	13.26	-34.78	11.05	10	-1.950	-1.250	-0.023	5412	15	-5.25	1745
4036	9.44	-41.01	12.86	4011	-2.100	-1.150	0.007	5412	15	20	4000
4036	4.62	-47.24	13.47	4011	-2.150	-0.850	-0.049	5412	15		

11.7210

4035	-3.01	-50.46	13.47	10	-2.050	-0.550	-4.320	5412	15	-0.03	212
4036	-7.04	-50.28	12.06	4011	-1.800	-0.300	-0.360	5412	15	-0.02	4000
4036	-15.00	-48.85	11.46	10	-1.550	0.0	0.0	5412	15	6.20	4000
4036	-17.49	-43.83	9.89	4011	-1.150	0.300	-3.350	5412	15	-9.33	4000
4036	-18.29	-39.00	8.04	4011	-0.750	0.650	0.070	5412	15	0.45	4000
4036	-19.00	-35.70	5.62	4011	-0.200	0.900	-0.027	5412	15	-1.90	4000
4036	-14.47	-30.76	3.01	4011	0.150	1.050	-0.053	5412	15	3.06	4000
4036	-11.06	-26.74	0.0	10	0.600	1.250	0.004	5412	15	-5.31	1745
4036	-9.44	-23.92	-1.80	4011	1.000	1.200	0.007	5412	15	20	4000
4035	-7.05	-23.12	-3.61	10	1.350	1.150	-0.033	5412	15		

11.7310

4036	-6.49	-22.51	-5.89	10	1.550	0.950	-4.320	5412	15	-0.03	212
4036	-3.01	-24.93	-7.43	4011	1.700	0.700	-0.360	5412	15	-0.02	4000
4036	-0.20	-28.75	-9.04	10	1.750	0.450	0.0	5412	15	6.20	4000
4036	4.62	-34.30	-9.85	10	1.650	0.050	5.950	5412	15	-9.39	4000
4036	6.29	-37.29	-9.44	10	1.590	-0.150	0.000	5412	15	0.45	4000
4036	8.04	-42.22	-9.24	10	1.350	-0.500	-0.016	5412	15	-1.87	4000
4036	6.23	-43.83	-8.24	10	1.100	-0.850	[illegible]	5412	15	3.06	4000
4036	1.80	-45.03	-7.64	4011	0.900	-1.000	0.020	5412	15	-5.18	6763
4036	-4.02	-41.02	-5.89	10	0.700	-1.200	0.006	5412	15	20	4000
4036	-7.43	-39.40	-3.41	10	0.500	-1.300	-0.022	5412	15		

11.7410

4036	-10.65	-34.38	-0.80	10	0.350	-1.200	-4.320	5412	15	-0.02	212
4036	-6.63	-20.34	1.20	4011	0.150	-1.200	-0.450	5412	15	-0.04	4000
4036	-2.01	-24.12	3.82	4011	0.050	-1.000	0.0	5412	15	6.22	4000
4036	2.41	-15.80	6.29	4011	0.0	-0.900	-3.050	5412	15	-9.52	4000
4035	4.62	-13.47	8.44	4011	0.0	-0.750	0.058	5412	15	0.39	4000
4036	[illegible]	-12.06	10.65	4011	-0.100	[illegible]	[illegible]	5412	15	-1.07	4000
4036	9.84	-12.86	12.66	4011	-0.250	-0.550	-0.002	5412	15	2.99	4000
4036	11.46	-12.66	14.67	4011	-0.350	-0.400	0.017	5412	15	-5.09	2000
4036	11.06	-12.86	16.08	10	-0.400	-0.450	0.004	5412	15	20	4000
4035	10.00	-14.67	16.40	4011	-0.050	-0.400	-0.023	5412	15		

11.7510

4036	18.09	-16.60	16.08	4011	-1.050	-0.400	-4.320	5412	15	-0.01	212
4036	19.10	-21.71	15.69	4011	-1.350	-0.500	-0.450	5412	15	-0.05	4000
4035	14.27	-25.93	15.68	4011	-1.550	-0.450	0.0	5412	15	6.15	4000
4036	11.46	-31.96	15.28	4011	-1.650	-0.500	-3.300	5412	15	-9.45	4000
4035	7.84	-35.18	13.87	4011	-1.700	-0.450	0.024	5412	15	0.39	4000
4036	4.62	-39.40	11.66	10	-1.550	-0.350	-0.030	5412	15	-1.87	4000
4036	0.0	-43.22	8.64	10	-1.350	-0.300	-0.024	5412	15	2.99	4000
4036	-6.03	-46.04	6.23	10	-1.100	-0.100	-0.006	5412	15	-5.25	4764
4036	-11.86	-49.25	4.22	10	-0.600	0.0	-0.004	5412	15	20	4000
4035	-15.07	-51.27	1.80	4011	-0.150	0.150	-0.001	5412	15		

11.7610

4035	-17.69	-49.46	0.0	10	0.250	0.400	-4.320	5412	15	-0.00	212
4036	-14.87	-48.25	-2.61	10	0.750	0.500	-0.360	5412	15	-0.05	4000
4036	-11.08	-46.04	-4.62	10	1.200	0.700	0.0	5412	15	6.09	4000
4036	-5.82	-44.43	-6.03	10	1.700	0.650	5.350	5412	15	-9.45	4000
4030	-3.01	-38.80	-6.23	10	2.000	0.550	0.024	5412	15	0.26	4000
4036	-0.00	-35.38	-7.23	10	2.200	0.500	0.014	5412	15	-1.95	4000
4036	-1.00	-30.36	-8.04	4011	2.350	0.200	0.012	5412	15	2.99	4000
4036	-1.80	-26.74	-8.24	10	2.350	0.0	-0.021	5412	15	-5.18	1745
4036	-5.62	-21.51	-7.43	10	2.300	-0.200	-0.006	5412	15	20	4000
4036	-6.23	-18.09	-6.03	10	2.100	-0.500	-0.031	5412	15		

11.7710

4036	-6.23	-16.28	-3.82	10	1.850	-0.650	-4.320	5412	15	-0.01	212
4036	-2.81	-17.49	-1.60	10	1.550	-0.850	-0.360	5412	15	-0.03	4000
4035	0.0	-19.50	0.80	4011	1.250	-0.950	0.0	5412	15	6.02	4000
4036	0.40	-25.13	3.82	10	0.950	-1.000	-0.150	5412	15	-9.30	4000
4036	1.00	-28.75	6.63	10	0.600	-1.000	0.011	5412	15	0.19	4000
4036	0.80	-32.97	9.05	4011	0.300	-0.900	0.022	5412	15	-2.00	4000
4035	-0.80	-33.57	13.06	4011	0.0	-0.850	0.036	5412	15	2.99	4000
4036	-1.60	-34.78	15.48	4011	-0.150	-0.650	-0.045	5412	15	-5.18	7745
4036	-1.00	-34.18	17.29	4011	-0.350	-0.450	0.0	5412	15	20	4000
4036	0.0	-34.38	18.69	4011	-0.550	-0.300	-0.055	5412	15		

11.7810

4033	2.61	-32.37	18.49	4011	-0.700	-0.050	-4.320	5412	15	-0.01	212
4035	4.62	-30.15	19.10	4011	-0.800	0.0	-0.360	5412	15	-0.06	4000
4035	6.63	-28.75	18.89	4011	-0.900	0.150	0.0	5412	15	6.02	4000
4035	7.23	-27.14	17.89	4011	-0.900	0.300	-3.750	5412	15	-9.33	4000
4035	4.82	-29.15	15.88	4011	-0.900	0.350	-0.011	5412	15	0.32	4000
[illegible]	3.21	-28.95	13.07	4011	-0.900	0.450	[illegible]	5412	15	-2.13	4000
[illegible]	3.01	-31.96	11.44	4011	-0.850	0.450	0.004	5412	15	2.99	4000
[illegible]	3.41	-37.99	9.44	4011	-0.800	0.900	-0.002	5412	15	-5.25	6763
[illegible]	3.41	-41.41	7.23	4011	-0.700	0.500	-0.004	5412	15	20	4000
[illegible]	2.01	-47.05	4.22	4011	-0.600	0.450	-0.033	5412	15		

111

11.7910

4035	0.60	-53.07	1.00	4011	-0.450	0.500	-4.320	5412	15	-0.01	212
4035	-1.80	-56.89	-1.60	10	-0.250	0.450	-0.360	5412	15	-0.04	4000
4035	-8.44	-56.49	-4.02	4011	-0.050	0.500	0.0	5412	15	6.02	4000
4035	-15.07	-51.06	-6.23	4011	0.100	0.550	5.100	5412	15	-9.33	4000
34	-19.90	-45.03	-8.04	4011	0.450	0.550	0.0	5412	15	0.45	4000
4035	-21.31	-37.79	-9.65	10	0.700	0.650	-0.030	5412	15	-2.13	4000
4035	-19.50	-28.14	-10.85	10	1.000	0.650	0.017	5412	15	2.99	4000
4035	-14.67	-20.70	-11.25	10	1.250	0.750	-0.046	5412	15	-5.18	2000
4035	-9.24	-15.28	-11.05	10	1.450	0.750	-0.020	5412	15	20	4000
4035	-0.80	-11.05	-10.45	10	1.550	0.600	-0.027	5412	15		

11.8010

4035	4.42	-10.05	-9.85	10	1.550	0.550	-4.230	5412	15	-0.01	212
4036	9.09	-9.85	-8.04	10	1.450	0.250	-0.360	5412	15	-0.04	4000
4035	13.47	-11.05	-7.23	10	1.200	0.0	0.0	5412	15	6.02	4000
4035	17.49	-12.66	-5.02	10	0.800	-0.200	2.350	5412	15	-9.20	4000
4035	20.50	-15.80	-2.61	10	0.250	-0.550	0.035	5412	15	0.45	4000
4035	22.31	-20.30	0.0	4011	-0.150	-0.750	-0.025	5412	15	-2.13	4000
4036	23.52	-22.92	3.21	4011	-0.800	-1.100	-0.017	5412	15	3.06	4000
4036	24.52	-27.74	6.03	10	-1.400	-1.200	-0.023	5412	15	-5.25	4764
4036	21.71	-31.96	9.04	4011	-1.950	-1.250	0.004	5412	15	20	4000
4036	14.07	-34.78	11.46	4011	-2.350	-1.250	-0.049	5412	15		

112

11.8110

4036	6.65	-39.20	13.06	4011	-2.600	-1.050	-4.320	5412	15	-0.01	212
4036	-1.40	-41.82	14.07	4011	-2.650	-0.850	-0.360	5412	15	-0.03	4000
4036	-9.04	-43.89	14.27	4011	-2.550	-0.500	0.0	5412	15	6.15	4000
4036	-16.08	-45.23	13.47	4011	-2.250	-0.050	-5.150	5412	15	-9.20	4000
4036	-21.91	-45.64	12.46	4011	-1.800	0.250	0.069	5412	15	0.45	4000
4035	-22.51	-46.04	10.85	4011	-1.350	0.750	-0.014	5412	15	-2.06	4000
4036	-22.31	-43.42	8.64	4011	-0.750	1.100	-0.050	5412	15	2.99	4000
4036	-17.49	-40.41	6.23	10	-0.150	1.450	0.007	5412	15	-5.18	1745
4036	-13.47	-37.19	3.41	10	0.300	1.700	0.006	5412	15	20	4000
4036	-8.04	-34.58	0.60	10	0.800	1.750	-0.047	5412	15		

11.8210

4036	-4.22	-30.76	-1.40	10	1.150	1.800	-4.230	5412	15	-0.02	212
4036	-1.60	-26.53	-4.02	10	1.500	1.550	-0.360	5412	15	-0.09	4000
4036	0.0	-23.32	-6.23	10	1.650	1.300	0.0	5412	15	6.15	4000
4035	2.21	-22.71	-8.04	10	1.750	1.000	5.600	5412	15	-9.39	4000
37	3.41	-24.93	-9.44	10	1.700	0.550	0.087	5412	15	0.45	4000
4035	4.02	-27.34	-10.65	10	1.000	0.200	-0.026	5412	15	-2.00	4000
37	6.03	-29.15	-12.46	7	1.400	-0.050	-0.079	5412	15	2.99	4000
4035	7.43	-33.57	-11.05	4011	1.200	-0.450	0.009	5412	15	-5.25	1749
37	7.04	-38.40	-10.25	10	1.000	-0.700	0.0	5412	15	20	4000
4036	0.25	-43.22	-9.44	10	0.750	-1.000	-0.023	5412	15		

11.8310

4036	0.0	-45.23	-7.23	10	0.600	-1.100	-4.320	5412	15	-0.02	212
4036	-6.23	-46.44	-4.82	4011	0.400	-1.250	-0.450	5412	15	-0.32	4000
4036	-8.24	-44.03	-2.21	4011	0.300	-1.250	0.0	5412	15	6.09	4000
4036	-6.63	-39.20	0.0	4011	0.150	-1.150	-0.750	5412	15	-9.33	4000
4036	-4.42	-32.57	2.61	4011	0.150	-1.100	0.064	5412	15	0.45	4000
4036	-1.40	-25.33	5.62	4011	0.050	-0.900	-0.038	5412	15	-1.93	4000
4036	-1.60	-19.10	8.84	10	0.050	-0.800	-0.058	5412	15	2.93	4000
4036	0.0	-13.06	11.46	4011	0.0	-0.700	0.014	5412	15	-5.25	6763
4036	1.80	-8.44	13.87	4011	0.0	-0.500	0.003	5412	15	20	4000
4036	3.41	-7.84	15.68	4011	0.0	-0.450	).028	5412	15		

11.8410

4036	6.03	-7.44	17.69	4011	-0.100	-0.350	-4.320	5412	15	[illegible]	212
37	[illegible]	[illegible]	19.18	4011	-0.300	-0.350	-0.450	5412	15	[illegible]	4000
4036	15.40	-11.66	19.90	4011	-0.500	-0.350	0.0	5412	15	[illegible]	4000
4030	19.30	-16.08	19.70	4011	-0.700	-0.300	-5.500	5412	15	-9.33	4000
4036	20.30	-22.11	19.30	4011	-0.900	-0.350	0.035	5412	15	0.32	4000
4036	18.29	-29.25	18.09	4011	-1.100	-0.350	-0.038	5412	15	-1.87	4000
4036	14.47	-34.58	17.09	4011	-1.300	-0.350	-0.024	5412	15	2.93	4000
4036	9.04	-37.19	15.48	4011	-1.350	-0.350	0.007	5412	15	-5.25	2000
4036	4.62	-39.80	13.47	4011	-1.400	-0.200	0.0	5412	15	20	4000
4036	0.20	-43.42	11.05	4011	-1.250	-0.150	-0.020	5412	15		

11.8510

4035	-3.01	-46.06	8.24	4011	-1.050	0.0	-4.230	5412	15	0.0	212
4036	-7.43	-45.64	5.22	10	-0.650	0.050	-0.450	5412	15	-0.05	4000
4036	-13.06	-46.86	2.61	10	-0.200	0.150	0.0	5412	15	6.09	4000
4036	-15.28	-47.65	0.0	10	0.150	0.400	3.900	5412	15	-9.33	4000
4036	-18.49	-44.43	-2.61	10	0.750	0.450	0.029	5412	15	0.26	4000
4036	-17.49	-44.43	-5.83	10	1.300	0.600	0.001	5412	15	-1.87	4000
4036	-13.86	-43.02	-8.24	10	1.900	0.650	0.008	5412	15	2.86	4000
4036	-7.64	-40.48	-10.05	10	2.350	0.600	-0.006	5412	15	-4.99	4764
4036	-0.60	-37.39	-11.25	10	2.650	0.550	-0.003	5412	15	20	4000
37	2.61	-33.57	-11.25	10	2.900	0.300	-0.033	5412	15		

11.8610

4036	4.02	-32.37	-11.05	10	2.950	0.100	-4.230	5412	15	-0.01	212
4036	3.41	-25.93	-10.65	10	2.650	-0.100	-0.450	5412	15	-0.02	4000
4036	1.60	-22.92	-9.44	10	2.600	-0.450	0.0	5412	15	6.09	4000
4036	-0.40	-19.30	-7.64	10	2.350	-0.700	4.300	5412	15	-9.33	4000
4036	-2.01	-18.29	-4.82	10	1.950	-1.000	0.016	5412	15	0.26	4000
4036	-2.81	-18.20	-1.20	10	1.900	-1.150	0.014	5412	15	-1.90	4000
4036	-2.01	-20.50	2.21	10	1.200	-1.300	0.027	5412	15	2.86	4000
4036	-0.20	-23.12	5.62	10	0.800	-1.350	-0.032	5412	15	-4.99	1746
4036	1.40	-26.13	8.04	10	0.500	-1.300	0.004	5412	15	20	4000
4036	1.40	-26.94	12.06	4011	0.250	-1.250	-0.057	5412	15		

11.8710

4036	-1.20	-26.94	15.68	4011	0.0	-1.050	-4.230	5412	15	-0.01	212
4036	-1.20	-28.14	19.30	4011	-0.050	-0.800	-0.450	5412	15	-0.01	4000
4036	-2.81	-30.56	22.31	4011	-0.200	-0.600	0.0	5412	15	6.02	4000
4036	-1.20	-29.95	23.72	4011	-0.300	-0.250	-6.850	5412	15	-9.33	4000
4035	0.0	-27.14	23.92	4011	-0.400	-0.050	-0.006	5412	15	0.26	4000
4036	2.21	-23.92	23.12	4011	-0.500	0.150	-0.012	5412	15	-2.06	4000
4036	5.02	-25.53	22.31	4011	-0.550	0.350	0.028	5412	15	2.93	4000
4036	5.62	-26.13	21.51	4011	-0.650	0.500	-0.060	5412	15	-4.99	7745
4035	3.21	-28.14	19.90	10	-0.700	0.700	0.0	5412	15	20	4000
4036	1.40	-31.16	16.68	4011	-0.750	0.700	-0.049	5412	15		

11.8010

4035	1.20	-33.57	12.86	4011	-0.700	0.750	-4.230	5412	15	-0.01	212
4036	0.80	-39.40	9.65	4011	-0.650	0.850	-0.450	5412	15	-0.02	4000
4036	1.40	-46.44	6.83	4011	-0.550	0.800	0.0	5412	15	6.02	4000
4035	0.00	-55.09	3.41	10	-0.400	0.900	3.200	5412	15	-9.26	4000
4036	-1.40	-60.51	-0.20	4011	-0.150	0.800	0.0	5412	15	0.26	4000
4036	-0.40	-61.32	-4.22	4011	0.0	0.850	-0.025	5412	15	-2.19	4000
4036	-13.47	-59.71	-7.84	4011	0.350	0.900	0.014	5412	15	2.93	4000
4035	-19.10	-54.08	-10.65	10	0.750	0.850	-0.026	5412	15	-4.99	8783
4036	-19.50	-46.44	-12.66	10	1.050	0.950	-0.017	5412	15	20	4000
4036	-18.49	-32.16	-14.47	10	1.400	0.850	-0.030	5412	15		

11.8910

4035	-19.40	-21.11	-15.08	10	1.700	0.900	-4.230	5412	15	-0.01	212
34	-10.65	-8.64	-16.28	10	1.900	0.900	-0.450	5412	15	-0.02	4000
4035	-6.43	-3.01	-15.40	4011	2.000	0.750	0.0	5412	15	6.09	4000
4035	-5.83	0.0	-13.67	10	2.000	0.650	6.450	5412	15	-9.20	4000
4036	-2.81	1.00	-11.05	4011	1.900	0.350	0.055	5412	15	0.59	4000
4035	1.20	0.40	-9.04	10	1.600	0.100	-0.032	5412	15	-2.13	4000
4035	8.04	-1.20	-4.69	4011	1.250	-0.650	-0.029	5412	15	2.93	4000
4035	17.49	-6.24	-3.61	4011	0.750	-0.400	-0.023	5412	15	-4.92	2000
4035	27.24	-10.09	0.0	10	0.200	-0.650	0.0	5412	15	20	4000
4035	31.96	-26.94	4.02	4011	-0.350	-0.950	-0.046	5412	15		

11.9010

4035	34.18	-35.98	8.24	4011	-1.000	-1.150	-4.230	5412	15	-0.01	212
4035	31.96	-38.60	11.66	4011	-1.650	-1.200	-0.360	5412	15	-0.02	4000
4035	25.93	-43.22	13.06	4011	-2.250	-1.250	0.0	5412	15	6.22	4000
4035	16.60	-45.05	14.27	4011	-2.650	-1.090	-7.050	5412	15	-9.20	4000
4035	4.62	-41.41	16.40	4011	-3.000	-0.850	0.061	5412	15	0.52	4000
4035	[illegible]	-39.80	17.09	4011	-3.150	[illegible]	[illegible]	5412	15	[illegible]	4000
4036	-12.65	-34.70	18.09	2415	-2.950	-0.850	-0.069	5412	15	2.93	4000
[illegible]	-10.20	-32.97	16.28	4411	-2.600	0.250	0.021	5412	15	-4.92	4784
[illegible]	-21.01	-29.55	13.47	2000	-2.300	0.800	0.011	5412	15	20	4000
4036	[illegible]	-26.35	10.65	7	-1.700	1.200	-0.049	5412	15		

11.9110

4035	-28.34	-27.54	8.64	2420	-0.950	1.600	-4.230	5412	15	-0.02	212
4035	-27.54	-26.53	6.03	6421	-0.250	1.950	-0.360	5412	15	-0.01	4000
4036	-22.11	-27.94	2.21	1	0.300	2.100	0.0	5412	15	6.22	4000
4036	-17.09	-30.56	-0.80	7	0.850	2.250	2.350	5412	15	-9.26	4000
4036	-9.44	-31.36	-3.41	10	1.350	2.100	0.087	5412	15	0.32	4000
2410	-3.61	-33.97	-5.22	4011	1.650	1.900	-0.027	5412	15	-1.93	4000
2410	0.40	-35.98	-6.83	4011	1.850	1.650	-0.055	5412	15	2.99	4000
4033	3.82	-38.40	-8.84	10	1.950	1.200	0.038	5412	15	-4.92	1745
2410	7.03	-40.01	-10.45	4011	1.850	0.850	0.006	5412	15	4021	4000
6412	7.84	-39.80	-11.05	4011	1.600	0.400	-0.038	5412	15		

11.9210

4027	6.43	-39.40	-10.65	4011	1.400	0.0	-4.230	5412	15	-0.02	212
4033	2.21	-35.08	-9.44	4011	1.100	-0.250	-0.450	5412	15	-0.01	4000
4036	1.60	-36.39	-7.64	4011	0.800	-0.600	0.0	5412	15	6.22	4000
4036	-2.01	-32.37	-5.03	4011	0.500	-0.700	2.800	5412	15	-9.33	4000
4036	-3.21	-28.75	-3.82	4011	0.200	-0.850	0.079	5412	15	0.45	4000
4036	-3.82	-27.34	-1.20	4011	0.0	-0.900	-0.032	5412	15	-1.87	4000
4036	-3.21	-25.73	1.80	4011	-0.150	-0.800	-0.052	5412	15	3.38	4000
37	-0.80	-22.92	5.22	4011	-0.300	-0.800	0.044	5412	15	-5.18	7745
37	3.61	-21.51	8.44	4011	-0.450	-0.650	0.007	5412	15	4021	4000
4036	5.22	-16.88	11.86	4011	-0.600	-0.550	-0.054	5412	15		

11.9310

4036	6.23	-18.28	13.87	4011	-0.750	-0.500	-4.230	5412	15	-0.02	212
4036	4.82	-15.68	16.28	4011	-0.850	-0.350	-0.450	5412	15	0.00	4000
4036	4.82	-16.08	18.49	4011	-1.050	-0.300	0.0	5412	15	6.15	4000
4036	5.42	-14.27	20.70	4011	-1.200	-0.150	-7.050	5412	15	-9.33	4000
4036	7.84	-11.86	22.31	4011	-1.400	-0.100	0.040	5412	15	0.86	4000
4036	13.87	-16.88	23.12	4011	-1.550	-0.050	-0.070	5412	15	-2.13	4009
4036	13.47	-17.89	22.71	4011	-1.650	0.0	-0.024	5412	15	3.97	4000
4036	13.06	-24.12	22.11	4011	-1.750	0.0	0.052	5412	15	-5.30	6763
37	9.44	-26.94	21.51	4011	-1.750	0.0	-0.011	5412	15	4021	4000
4036	6.03	-29.75	19.90	4011	-1.750	0.050	-0.051	5412	15		

11.9410

4036	0.80	-33.57	17.49	4011	-1.650	0.100	-4.230	5412	15	-0.02	212
4036	-3.41	-35.18	14.87	4011	-1.500	0.290	-0.450	5412	15	0.03	4000
4036	0.0	-39.60	12.66	4011	-1.250	0.250	0.0	5412	15	6.15	4000
4036	1.40	-41.61	10.45	4011	-1.000	0.350	0.350	5412	15	-9.33	4000
4036	3.41	-45.64	8.04	4011	-0.650	0.400	0.033	5412	15	-0.58	4000
4036	-1.00	-43.83	5.83	4011	-0.300	0.390	-0.033	5412	15	-2.36	4000
4036	-2.41	-46.04	4.22	4011	0.0	0.490	0.0	5412	15	4.80	4000
4036	2.01	-45.43	2.81	4011	0.400	0.300	0.061	5412	15	-5.76	2000
4036	-0.80	-40.84	0.0	4011	0.780	0.290	0.0	5412	15	4021	4000
4036	-0.44	-40.01	-1.40	4011	1.090	0.190	-0.092	5412	15		

11.9510

4036	-12.86	-38.20	-1.00	4011	1.300	0.0	-4.230	5412	15	-0.02	212
4036	-5.42	-35.78	-1.00	4011	1.450	0.0	-0.450	5412	15	0.07	4000
37	-9.44	-25.93	-1.20	4012	1.550	-0.250	0.0	5412	15	6.09	4000
37	-3.01	-24.12	-1.80	2102	1.800	-0.350	4.350	5412	15	-9.20	4000
37	-6.23	-12.66	2.21	6111	1.600	-0.450	0.040	5412	15	-1.29	4000
6070	-3.01	-20.70	3.82	2022	1.550	-0.650	-0.035	5412	15	-7.71	4000
6070	-3.82	-16.08	5.42	4085	1.400	-0.650	0.016	5412	15	5.73	4000
4022	-5.83	-23.92	7.43	2856	1.250	-0.750	0.066	5412	15	-6.09	4764
32	-3.01	-20.30	9.24	6111	1.000	-0.750	0.011	5412	15	4021	4000
4036	-2.21	-28.75	12.26	6020	0.750	-0.750	-0.145	5412	15		

11.9610

37	-0.40	-29.55	14.07	4	0.400	-0.750	-4.230	5412	15	-0.02	212
4036	-5.41	[illegible]	17.08	4011	0.150	-0.650	-0.300	5412	15	[illegible]	4000
37	4.02	[illegible]	18.09	4011	-0.100	-0.600	0.0	5412	15	[illegible]	4000
37	9.02	[illegible]	21.11	4011	-0.300	[illegible]	-5.130	5412	15	[illegible]	4000
37	6.23	[illegible]	21.71	4011	-0.400	[illegible]	0.050	5412	15	[illegible]	4000
[illegible]	[illegible]	[illegible]	21.71	4011	[illegible]	-0.200	[illegible]	5412	15	-2.71	4000
29	1.40	[illegible]	22.51	4011	-0.900	0.0	0.026	5412	15	6.25	4000
37	0.60	[illegible]	22.92	4011	-0.990	0.0	0.002	5412	15	-6.20	1748
4036	-1.00	-28.55	21.11	4011	-0.950	0.050	0.0	5412	15	4021	4000
37	-6.02	-30.15	20.30	4011	-0.950	0.150	-0.102	5412	15		

11.9710

37	3.21	-29.99	17.49	4011	-0.050	0.150	-4.230	5412	15	-0.01	212
37	-2.01	-30.96	15.28	4011	-0.800	0.300	-0.360	5412	15	0.05	4000
37	7.04	-43.02	12.06	4011	-0.750	0.300	0.0	5412	15	6.02	4000
4036	-2.01	-38.58	11.25	4011	-0.400	0.300	0.050	5412	15	-9.00	4000
37	4.02	[illegible]	8.04	4011	-0.350	0.300	0.003	5412	15	-2.78	4000
4036	-6.23	-44.23	7.83	4011	-0.450	0.300	-0.001	5412	15	-2.90	4000
4036	-1.40	-47.20	5.42	4011	-0.350	0.370	-0.001	5412	15	6.77	4000
37	-3.02	[illegible]	3.01	4011	-0.200	0.300	0.036	5412	15	-6.61	7746
4036	-10.45	-46.80	0.0	4011	[illegible]	0.300	-0.020	5412	15	4021	4000
37	-8.04	-39.20	-1.40	4011	0.0	0.350	-0.049	5412	15		

11.9810

37	-12.06	-37.19	-2.41	4011	0.200	0.350	-4.230	5412	15	0.08	212
37	-11.05	[illegible]	-3.61	4011	0.350	0.400	-0.360	5412	15	[illegible]	4000
4036	-1.20	-25.13	-6.23	4011	0.550	0.400	0.0	5412	15	6.02	4000
37	-6.23	-19.90	-7.04	4011	0.600	0.400	4.150	5412	15	[illegible]	4000
37	8.24	-17.89	-7.03	4011	0.650	0.400	0.043	5412	15	-3.30	4000
[illegible]	[illegible]	[illegible]	[illegible]	4011	[illegible]	[illegible]	[illegible]	5412	15	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	-3.43	4011	[illegible]	[illegible]	[illegible]	5412	15	7.10	4000
[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]	[illegible]	[illegible]	5412	15	[illegible]	[illegible]
[illegible]	[illegible]	-12.06	-4.82	4011	[illegible]	[illegible]	[illegible]	5412	15	4021	4000
[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]	[illegible]	[illegible]	5412	15		

The trigger was detected in the data frame, time 11.6310, on channel A1.

In the data frame time, 11.9010, the IR detector sensed the rocket plume indicating that a rocket had cleared the right launcher. In the following frame, it is indicated that a rocket had cleared the left launcher.

To determine the rocket egress delay characteristic the time difference between the trigger and the first IR pulse was obtained.

DELAY = IR#1 - TRIGGER

DELAY (right side) = 11.907 seconds - 11.631 seconds

= .276 seconds

DELAY (left side) = 11.916 seconds - 11.631 seconds

= .285 seconds

This delay time was found to be typical of most firing runs.

4.4.2 Rocket Velocity Determination

The forward IR was located 60±1 inches forward of the rear detector. Therefore the average velocity can be obtained by determining the time taken to traverse the distance.

The occurrence of the 2nd IR pulse was indicated in data frame time 11.951.

The average velocity of the rocket fired from the left launcher is determined below.

$$\text{VELOCITY} = \frac{5 \text{ ft}}{\text{Time (IR \#2) - Time (IR \#1)}}$$

$$= \frac{5}{11.956 - 11.916}$$

$$= \frac{5}{.040} = 125 \text{ ft/sec}$$

The average velocity of the rocket fired from the right launcher is determined below.

$$\text{VELOCITY} = \frac{5 \text{ ft}}{11.954 - 11.907}$$

$$= \frac{5}{.047} = 107 \text{ ft/sec}$$

These values were found to be typical of most firing runs.

AT

LM