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Naval Surface Warfare Center**

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**Summary of a Full Scale Maneuvering Trial
on the USNS Observation Island (T-AGM 23)**

By

Paul J. Kopp
and Grant A. Rossignol



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Abstract

The U.S. Coast Guard has undertaken a program to improve their capability for the prediction of full scale ship maneuvering performance. Model scale experiments have been conducted to provide the necessary hydrodynamic coefficients to the maneuvering performance computer models. Full scale trials were needed to provide validation of the computer predictions. The Carderock Division, Naval Surface Warfare Center (CARDEROCKDIV) was tasked to conduct maneuvering trials on the USNS Observation Island (T-AGM 23). The trial was performed in March 1991 during a shakedown cruise from Portland, Oregon to Honolulu, Hawaii. Open ocean position tracking was provided by GPS signals recorded by the ship's computer systems. The position data was then correlated in time with the data collected by CARDEROCKDIV computers.

Administrative Information

This work was funded by the U.S. Coast Guard Research and Development Center, under Military Interdepartmental Purchase Request (MIPR) number Z51100-1-E33637. It is identified at CARDEROCKDIV by Job Order Number 1-1561-054.

Introduction

In the late 1980's, the U.S. Coast Guard determined that more accurate ship maneuvering performance assessment methods were needed. They proceeded to develop a model test plan which included tests at the Rotating Arm Facility of the David Taylor Model Basin (DTMB) [1, 2]¹. All of the model tests performed would be used to provide hydrodynamic into computer programs for maneuvering simulation and performance prediction. In order to verify and validate the computer models, full scale trials were required. The Carderock Division, Naval Surface Warfare Center (CARDEROCKDIV), Code 561 was tasked to arrange for time on-board one of the two Mariner class vessels operated by the U.S. Navy and perform maneuvering trials.

In late 1990, after discussions with the U.S. Air Force (USAF), Cobra Judy Project office, a window of opportunity for a trial, with dedicated time for standard maneuvers, became available.

¹References in brackets are listed at the end of this report.

The USNS Observation Island (T-AGM 23) would be coming out of routine maintenance at a Portland ship yard and transiting from Portland, Oregon to Honolulu, Hawaii. During the transit, CARDEROCKDIV would be allowed to perform various maneuvers. Prior to the trial, CARDEROCKDIV would instrument the ship with motion sensors and collect motions data. CARDEROCKDIV would also be allowed to tie into the ship gyro compass, inertial navigation (INS) heading, and wind speed and direction anemometer. The USAF, operating the ship's onboard computer systems, would record GPS positioning data to be supplied to CARDEROCKDIV upon completion of the trial.

Ship Characteristics

The Mariner class vessels were designed in the late 1940's by the U.S. Maritime Administration for use in commercial shipping and to meet needs anticipated by the Military Sealift Command [3]. The Observation Island was launched in January 1954 as a Mariner class merchant vessel (Maritime Administration C4-S-1A design) under the name Empire State Mariner. In November 1954, she was laid up in the National Defense Reserve Fleet (NDRF) and subsequently transferred to the U.S. Navy in September 1956. At that time, the ship was converted to a missile test ship for the Polaris SLBM program and re-commissioned in 1958. She was decommissioned again in September 1972 and laid up in the NDRF. She was selected in August 1977 for conversion to a missile range instrumentation and tracking ship and the conversion took place between 1979 and 1981. The Observation Island is currently operated by the Military Sealift Command (MSC) for the U.S. Air Force in the Pacific Ocean and is designated T-AGM 23. Principal characteristics of the Observation Island are listed in Table 1 [4]. Figure 1 shows a photograph of the Observation Island.

Trial Conditions

The trial was held between May 4 and May 9, 1991 on the Observation Island (T-AGM 23). The draft mark readings, indicating trim and mean draft, were recorded dockside prior to departure and upon arrival. The readings taken are given in Table 2. The sea conditions

encountered during the trial were reported to be mild, usually sea state 2 and no greater than sea state 3.

Data Summary

During the trial, two separate and independent sets of data were collected. The position data was recorded by USAF contractors using on board computer systems and GPS satellite signals. CARDEROCKDIV recorded the ship heading, rudder activity, and ship motions. Nearly sixty collection runs were made during the trial covering steady turning with pull outs, crash back, acceleration, zig-zag, and APU (bow thruster) assisted turning maneuvers in the open ocean. A commented summary of runs is given in Table 3.

All of the position data was collected by the USAF contractors from GPS signals and recorded to 9-track magnetic tapes using a CDC computer system. Five files were received from the USAF in late 1992 after several earlier attempts by CARDEROCKDIV to retrieve the position data from the tapes failed. The contractors operating the computer systems for the controlling USAF project office stated that the original tapes appeared to be damaged. Each of the five files finally obtained, contained four channels of data, time in seconds past midnight (Zulu time), latitude in degrees north, longitude in degrees west, and height. The data was recorded at one sample per second. Table 4 summarizes the contents of the data files, as reported to CARDEROCKDIV by the USAF.

CARDEROCKDIV personnel used a desktop PC based data collection system to acquire eleven channels at a sampling interval of 0.333 seconds. The channels collected were, heading from the gyro compass, heading from the inertial navigation system, rudder angle, wind speed and direction, pitch, roll, and yaw angles, and vertical, transverse, and lateral acceleration.

Once the position data was obtained from the USAF, the task of correlating the position time histories and the time histories collected by the CARDEROCKDIV computers remained. This was complicated by the fact that each set of data used both a different sampling rate and time reference (for runs 24 through 39). Also, since some of the position data was missing due to the

original damaged tapes, it was not guaranteed that there would be a position time history with each run collected or that it would start or end at the same time as actually conducted. The Coast Guard desired to have the ship speed over ground and the instantaneous drift angle, which was obtained from manipulation of the latitude and longitude values in time [5, 6]. An automated procedure was developed to perform the required calculations and corrections and write out a run data file that contained the combined set of data and the new channels for position, speed, and direction of travel. Drift angle can be computed from the difference between the direction of travel and ship heading angle. The format for the final run data files is ASCII and can be imported directly into most spreadsheet programs for data plotting or analysis. No attempt has been made to filter the raw data or correct bad data points.

Appendix A contains position plots for all data runs which could be correlated with the GPS position data provided to CARDEROCKDIV. The initial position point, regardless of its actual starting time in relation to the CARDEROCKDIV collected data, is given by the origin of the plot. Each speed calibration run also includes a plot of ship speed over ground, as computed from the GPS data. Appendix B list the *statistical summary from the data collected by CARDEROCKDIV during the trial.*

The entire set of data is organized onto seven 3 1/2" high density floppy disks in MS-DOS format. The data is logically grouped, with collections of data files compressed on the disks using the public domain PKZIP program (version 2.04g) by PKWARE. The first disk contains the five data files received from the USAF, compressed into a file named TAPES.ZIP. These will expand into approximately 3.5MB of disk space. All of the CARDEROCKDIV collected data (in ASCII form) is compressed into three named DTRC-1.ZIP, DTRC-2.ZIP, and DTRC-3.ZIP. These will expand into approximately 13MB of disk space. The combined data files are compressed into three files named DATA-1.ZIP, DATA-2.ZIP, and DATA-3.ZIP. These will expand into approximately 15MB of disk space. Table 5 lists the contents of each of the compressed files.

Summary

In May of 1991, CARDEROCKDIV conducted a maneuvering trial on the USNS Observation Island (T-AGM 23), a Mariner class vessel. The trial was conducted in the Pacific ocean during a transit from Portland, Oregon to Honolulu, Hawaii. Several standard maneuvers were conducted, including steady turning with pull outs, zig-zags, and bow thruster assisted turns. Ship motions and heading were recorded by CARDEROCKDIV personnel, and ship position data (via GPS) was recorded by the ship's on board computers. The two sets of data were correlated in time and combined into unified data files. The complete, correlated data is presented graphically and summarized in tables of statistical values (minimum, maximum, etc.), and is provided on seven high density 3 1/2" floppy disks.

Acknowledgments

The authors would like to thank the U.S. Air Force, Cobra Judy Project office, for arranging the time on board the USNS Observation Island. The trial was conducted by Mr. Rossignol with the aid of Mr. Richard Bishop. The authors would also like to thank Mr. Robert Sedat, of the U.S. Coast Guard Research and Development Center, for his patience during the long wait for the delivery of the position data by the U.S. Air Force, and the subsequent correlation with the CARDEROCKDIV collected data.

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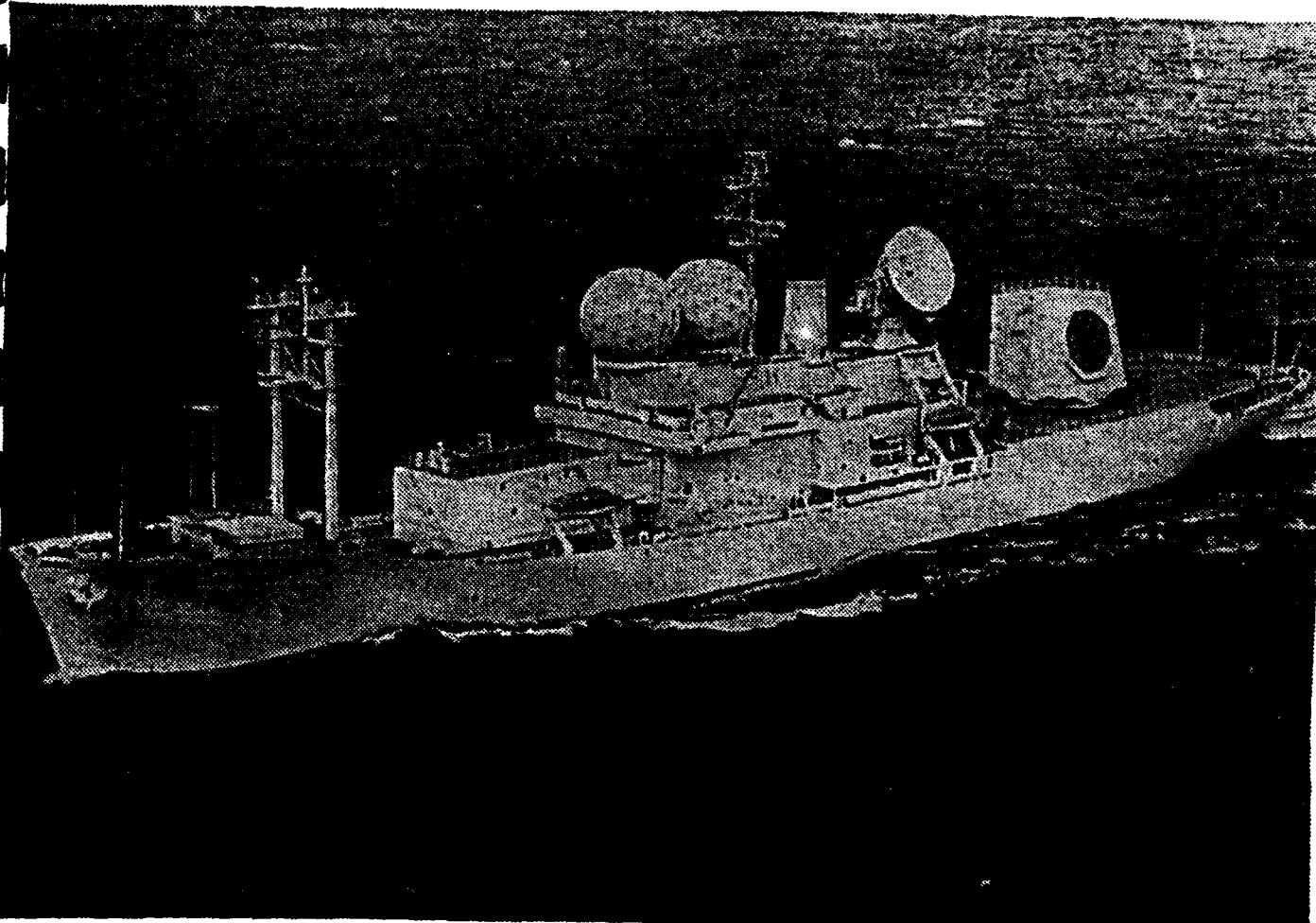


Figure 1. Photograph of the USNS Observation Island (T-AGM 23)

Table 1. Ship Characteristics

Lpp (ft/m)	563 / 171.7
Beam (ft/m)	76 / 23.2
Draft (ft/m)	29 / 8.8
Displacement (LTSW, full load)	17015
Propulsion System	General Electric steam turbin, single shaft
Builder	New York Ship Building, Camden, N.J.
Data Launched	15 Aug 1953

Table 2. Trial Conditions

Departure: Portland, Oregon 3 May 1991	
Forward Draft Marks (ft/m)	25.25 / 7.7
Aft Draft Marks (ft/m)	28.0 / 8.5
Mean Draft (ft/m)	26.625 / 8.11
Arrival: Honolulu, Hawaii 9 May, 1991	
Forward Draft Marks (ft/m)	24.0 / 7.3
Aft Draft Marks (ft/m)	26.75 / 8.15
Mean Draft (ft/m)	25.542 / 7.78

Table 3. Summary of Trial Runs Performed

Run	Type of Manuever	Nominal Ship Speed (knots)	Rudder (deg)	Initial Course (deg)	Date	Start Time Zulu	Length (min)	Tape File	Position Recorded	Comments
24	rudder check	-	-	-	April 26	2148	0.5	-	-	
25	rudder check	-	-	-	"	2151	20	-	-	
26	check out	-	-	-	April 27	1139	0.7	-	-	
27	check out	-	-	-	May 3	1653	2.8	-	-	
28	river transit	-	-	-	May 4	1234	5	-	-	Runs 24-28 not included in final data
29	speed cal test	7	-	224	"	941	5	tape 1	n	
30	speed cal test	10	-	224	"	951	5	"	n	
31	speed cal test	14	-	224	"	1002	5	"	n	
32	speed cal test	17	-	224	"	1014	5	"	n	
33	speed cal test	20	-	224	"	1025	5	"	n	
34	speed cal test	7	-	44	"	1115	5	"	y	
35	speed cal test	10	-	44	"	1127	5	"	y	
36	speed cal test	14	-	44	"	1138	5	"	y	
37	speed cal test	17	-	44	"	1151	5	"	y	
38	speed cal test	20	-	44	"	1202	5	"	y	
39	turning test	10	r12	230	May 5	1424	9.5	"	n	Runs 24-39 are local time, NOT ZULU
40	turning test	10	r12	230	"	2142	20	tape 5	n	
41	turning test	10	r12	50	"	2243	20	"	y	position data does not show a circle
42	turning test	17	r12	50	"	2352	20	"	y	partial position data
43	turning test	17	r12	230	May 6	37	10.9	tape 2	n	
44	turning test	17	18	230	"	455	20	"	y	
45	turning test	17	18	50	"	536	20	"	y	
46	turning test	20	18	230	"	623	20	"	y	
47	turning test	20	18	50	"	700	20	"	y	bad position data
48	turning test	20	r12	50	"	731	20	"	y	
49	turning test	20	r12	230	"	802	20	"	y	

Table 3. (Continued)

Run	Type of Maneuver	Nominal Ship Speed (knots)	Rudder (deg)	Initial Course (deg)	Date	Start Time Zulu	Length (min)	Tape File	Position Recorded	Comments
51	turning test	10	130	270	"	2337	20	"	n	
52	turning test	10	r30	90	May 7	17	20	-	n	
53	turning test	10	130	90	"	44	19.2	-	n	
54	apu maneuvers ¹	7	0	230	"	1855	5.3	tape 3	y	
55	apu maneuvers	7	0	230	"	1908	5.3	"	y	
56	apu maneuvers	7	0	50	"	1929	5.3	"	y	
57	apu maneuvers	7	0	50	"	1937	5.4	"	y	
58	apu maneuvers	7	r10	50	"	1959	20	"	y	
59	apu maneuvers	7	0	50	"	2023	20	"	y	
60	apu maneuvers	7	0	60	"		1.6	"	y	spiky position data
61	apu maneuvers	7	0	50	"	2051	6.2	"	y	
62	apu maneuvers	7	0	50	"	2100	17.4	"	y	
63	apu maneuvers	7	130	50	"	2126	10.7	"	y	
64	apu maneuvers	7	130	230	"	2141	10.7	"	y	
65	apu maneuvers	7	r30	50	"	2155	12.2	"	y	
66	apu maneuvers	7	r30	230	"	2213	10	"	y	
67	turning test	7	r30	50	May 8	3	9.4	"	y	partial position data, spiky
68	turning test	7	r30	230	"	15	11.7	"	n	
69	turning test	7	130	50	"	33	9.6	"	n	
70	turning test	7	130	230	"	49	10.3	"	y	
71	acceleration	10 → 20	0	230	"	1846	14.9	tape 4	y	

Table 3. (Continued)

Run	Type of Maneuver	Nominal Ship Speed (knots)	Rudder (deg)	Initial Course (deg)	Date	Start Time Zulu	Length (min)	Tape File	Position Recorded	Comments
72	crash back	20 → 0	0	230	"	1941	16.5	"	y	
73	acceleration	10 → 20	0	50	"	1906	14.5	"	y	
74	10/10 zig-zag	20	r10	50	"	2000	7.7	"	y	
75	10/10 zig-zag	20	110	50	"	2013	8.1	"	y	
76	10/10 zig-zag	20	r10	230	"	2028	9	"	y	
77	10/10 zig-zag	20	110	230	"	2040	8.1	"	y	
78	10/10 zig-zag	10	r10	230	"	2206	7.4	"	y	
79	10/10 zig-zag	10	110	230	"	2219	12.1	"	y	
80	10/10 zig-zag	10	110	230	"	2233	13.6	"	y	
81	10/10 zig-zag	10	r10	50	"	2305	10.8	"	y	
82	10/10 zig-zag	10	110	50	"	2320	11.6	"	y	
83	20/20 zig-zag	10	r20	50	"	2339	13.2	"	y	last half of maneuver accelerates
84	20/20 zig-zag	10	120	50	"	2354	19.7	"	y	questionable position data
85	20/20 zig-zag	10	r20	230	May 9	15	14.2	"	n	
86	20/20 zig-zag	10	120	230	"	36	11.8	"	n	
87	20/20 zig-zag	10	r20	230	"	51	7.4	"	n	
88	20/20 zig-zag	10	r20	50	"	102	10.3	"	n	

¹APU maneuvers were generally steady turns performed with the aid of the bow thruster.

Table 4. Summary of Position Data Files

Tape Number	Zulu Time	Julian Day / Date
1	17:49:56 to 19:17:33	124 / May 4
2	04:29:06 to 13:30:42	126 / May 6
3	18:29:34 to 01:54:00	127-128 / May 7-8
4	18:37:55 to 00:42:09	128-129 / May 8-9
5	22:51:46 to 00:08:46	tape not labeled

Table 5. Listing of Compressed Data Files

Searching ZIP: TAPES.ZIP

Length	Method	Size	Ratio	Date	Time	CRC-32	Attr	Name
210320	DeflatN	51947	76%	10-26-92	13:06	090a7dbb	--w-	TAPE1.DAT
1299800	DeflatN	311505	77%	10-26-92	22:19	eeae80f1	--w-	TAPE2.DAT
939240	DeflatN	206872	78%	10-27-92	20:57	98911cb7	--w-	TAPE3.DAT
874080	DeflatN	207331	77%	10-28-92	14:53	e5607fa8	--w-	TAPE4.DAT
184840	DeflatN	39018	79%	10-28-92	16:40	d993b78b	--w-	TAPE5.DAT
3508280		816673	77%					5

Searching ZIP: DTRC-1.ZIP

Length	Method	Size	Ratio	Date	Time	CRC-32	Attr	Name
96998	DeflatN	18924	81%	11-23-92	11:39	1bb0a3a2	--w-	DR29.ASC
97000	DeflatN	20466	79%	11-23-92	11:39	fd45e08a	--w-	DR30.ASC
97000	DeflatN	20924	79%	11-23-92	11:40	8b162a91	--w-	DR31.ASC
97000	DeflatN	19761	80%	11-23-92	11:41	07475f33	--w-	DR32.ASC
97000	DeflatN	19949	80%	11-23-92	11:41	75c2d6f6	--w-	DR33.ASC
97000	DeflatN	19581	80%	11-23-92	17:22	f9d8c9fc	--w-	DR34.ASC
97000	DeflatN	18638	81%	11-23-92	17:22	bc407dc	--w-	DR35.ASC
97000	DeflatN	18340	82%	11-23-92	17:23	36f72d5a	--w-	DR36.ASC
97000	DeflatN	20714	79%	11-23-92	17:24	ebbd73f0	--w-	DR37.ASC
97000	DeflatN	19972	80%	11-23-92	17:23	b9f3d296	--w-	DR38.ASC
182877	DeflatN	41481	78%	11-23-92	17:25	fe6d6a56	--w-	DR39.ASC
380816	DeflatN	87055	78%	11-23-92	17:26	fd6da4d3	--w-	DR40.ASC
380816	DeflatN	86978	78%	11-23-92	17:27	ac10ffa9	--w-	DR41.ASC
380816	DeflatN	93241	76%	11-23-92	17:29	3c8ced9a	--w-	DR42.ASC
209036	DeflatN	51202	76%	11-23-92	17:30	ec1e77ab	--w-	DR43.ASC
380795	DeflatN	91714	76%	11-23-92	17:31	398f6c6c	--w-	DR44.ASC
380816	DeflatN	91082	77%	11-23-92	17:33	cda6aad0	--w-	DR45.ASC
380816	DeflatN	94231	76%	11-23-92	17:34	9467aeda	--w-	DR46.ASC
380816	DeflatN	94729	76%	11-23-92	17:36	ed8bb031	--w-	DR47.ASC
380816	DeflatN	93892	76%	11-23-92	17:37	0ef55147	--w-	DR48.ASC
380816	DeflatN	95017	76%	11-23-92	17:39	36f88d36	--w-	DR49.ASC
4789234		1117891	77%					21

Searching ZIP: DTRC-2.ZIP

Length	Method	Size	Ratio	Date	Time	CRC-32	Attr	Name
380816	DeflatN	88386	77%	11-24-92	12:47	188d4f3e	--w-	DR50.ASC
380816	DeflatN	89125	77%	11-25-92	11:33	d7c10b60	--w-	DR51.ASC
380816	DeflatN	88219	77%	11-25-92	11:35	3ebc9c83	--w-	DR52.ASC
366431	DeflatN	84771	77%	11-25-92	11:37	8131f7b8	--w-	DR53.ASC
103193	DeflatN	23802	77%	11-25-92	11:38	7728f6f6	--w-	DR54.ASC
102670	DeflatN	25131	76%	11-25-92	11:40	ef033725	--w-	DR55.ASC
101830	DeflatN	24082	77%	11-25-92	12:02	66dead86	--w-	DR56.ASC
104350	DeflatN	24157	77%	11-25-92	12:03	ca41f536	--w-	DR57.ASC
380816	DeflatN	88553	77%	11-25-92	12:04	5cc30542	--w-	DR58.ASC
380816	DeflatN	83175	79%	11-25-92	12:06	07308c7f	--w-	DR59.ASC
32425	DeflatN	7663	77%	11-25-92	12:06	c8fb095c	--w-	DR60.ASC
120206	DeflatN	27231	78%	11-25-92	12:06	cd5c2ac7	--w-	DR61.ASC
331466	DeflatN	69736	79%	11-25-92	12:08	c3d960ba	--w-	DR62.ASC
204731	DeflatN	48965	77%	11-25-92	12:09	d97107c4	--w-	DR63.ASC
205256	DeflatN	51019	76%	11-25-92	12:10	757981bb	--w-	DR64.ASC
232871	DeflatN	56392	76%	11-25-92	12:11	5e5872db	--w-	DR65.ASC
190871	DeflatN	46553	76%	11-25-92	12:15	53563d96	--w-	DR66.ASC
180883	DeflatN	45712	75%	11-25-92	12:25	35318af1	--w-	DR67.ASC
224156	DeflatN	54231	76%	11-25-92	12:27	859a4d5c	--w-	DR68.ASC
183626	DeflatN	45774	76%	11-25-92	12:28	8a224206	--w-	DR69.ASC
196751	DeflatN	47912	76%	11-25-92	12:28	f54c354e	--w-	DR70.ASC
4785796		1120589	77%					21

Table 5. (Continued)

Searching ZIP: DTRC-3.ZIP

Length	Method	Size	Ratio	Date	Time	CRC-32	Attr	Name
284316	DeflatN	64678	78%	11-25-92	12:32	8da98eed	--w-	DR71.ASC
314141	DeflatN	73320	77%	11-25-92	12:34	2c8e08f9	--w-	DR72.ASC
276131	DeflatN	66208	77%	11-25-92	12:36	90f25960	--w-	DR73.ASC
147611	DeflatN	38271	75%	11-25-92	12:37	a3e00625	--w-	DR74.ASC
155486	DeflatN	40782	74%	11-25-92	12:41	1b3e91c0	--w-	DR75.ASC
172391	DeflatN	43945	75%	11-25-92	12:42	4790e51e	--w-	DR76.ASC
155381	DeflatN	41680	74%	11-25-92	12:43	924ddb40	--w-	DR77.ASC
141836	DeflatN	36052	75%	11-25-92	12:44	fe780ff0	--w-	DR78.ASC
231401	DeflatN	57154	76%	11-25-92	12:45	b3cd079d	--w-	DR79.ASC
259856	DeflatN	65109	75%	11-25-92	12:46	fcd9b74d	--w-	DR80.ASC
206621	DeflatN	49062	77%	11-25-92	12:47	230dd563	--w-	DR81.ASC
221321	DeflatN	52544	77%	11-25-92	12:49	a8935046	--w-	DR82.ASC
225246	DeflatN	61257	76%	11-25-92	12:51	8ff6cef0	--w-	DR83.ASC
375986	DeflatN	92463	76%	11-25-92	12:52	8bbbe5f2	--w-	DR84.ASC
270776	DeflatN	69983	75%	11-25-92	12:54	fbae317d	--w-	DR85.ASC
226466	DeflatN	58781	75%	11-25-92	12:55	0144365f	--w-	DR86.ASC
142256	DeflatN	36646	75%	11-25-92	12:56	56fdf4ad	--w-	DR87.ASC
196961	DeflatN	50409	75%	11-25-92	12:57	7a490294	--w-	DR88.ASC
-----	-----	-----	-----	-----	-----	-----	-----	-----
4030183		998344	76%					18

Searching ZIP: DATA-1.ZIP

Length	Method	Size	Ratio	Date	Time	CRC-32	Attr	Name
84692	DeflatN	17494	80%	04-12-93	15:52	5806897d	--w-	RUN29.PRN
84320	DeflatN	18897	78%	04-12-93	15:55	c19e800f	--w-	RUN30.PRN
84195	DeflatN	19341	78%	04-12-93	15:57	b96c7275	--w-	RUN31.PRN
83462	DeflatN	18249	79%	04-12-93	15:59	261e1515	--w-	RUN32.PRN
82454	DeflatN	18365	78%	04-12-93	16:02	df7bbe0f	--w-	RUN33.PRN
124146	DeflatN	26283	79%	04-12-93	15:53	4511065c	--w-	RUN34.PRN
124496	DeflatN	25382	80%	04-12-93	15:56	335b3ef6	--w-	RUN35.PRN
124681	DeflatN	24807	81%	04-12-93	15:58	700aed20	--w-	RUN36.PRN
125546	DeflatN	27921	78%	04-12-93	16:01	1fb4f960	--w-	RUN37.PRN
125379	DeflatN	27299	79%	04-12-93	16:04	fd57180c	--w-	RUN38.PRN
161065	DeflatN	39340	76%	04-12-93	16:05	09e8129a	--w-	RUN39.PRN
336376	DeflatN	83098	76%	05-16-93	19:25	8508aff8	--w-	RUN40.PRN
450641	DeflatN	97726	79%	05-16-93	19:28	e49d2ad2	--w-	RUN41.PRN
422271	DeflatN	100932	77%	05-16-93	19:31	b2334498	--w-	RUN42.PRN
184362	DeflatN	48479	74%	04-12-93	16:12	866bf1e7	--w-	RUN43.PRN
509098	DeflatN	120963	77%	04-12-93	16:18	a9c94c41	--w-	RUN44.PRN
505212	DeflatN	121281	76%	04-12-93	16:24	7bda07c1	--w-	RUN45.PRN
509977	DeflatN	124747	76%	04-12-93	16:44	b1b774ad	--w-	RUN46.PRN
504435	DeflatN	121994	76%	04-12-93	16:49	1547fca0	--w-	RUN47.PRN
503574	DeflatN	123297	76%	04-14-93	08:42	632a2e4a	--w-	RUN48.PRN
508981	DeflatN	125056	76%	04-14-93	08:52	1b981572	--w-	RUN49.PRN
-----	-----	-----	-----	-----	-----	-----	-----	-----
5639363		1330951	77%					21

Table 5. (Continued)

Searching ZIP: DATA-2.ZIP

Length	Method	Size	Ratio	Date	Time	CRC-32	Attr	Name
339243	DeflatN	84748	76%	04-14-93	08:57	2d148921	--w-	RUN50. PRN
340221	DeflatN	84759	76%	04-14-93	09:07	bf69f126	--w-	RUN51. PRN
336046	DeflatN	84620	75%	05-16-93	20:08	d4be70d6	--w-	RUN52. PRN
324610	DeflatN	80375	76%	05-16-93	20:10	3763b1c6	--w-	RUN53. PRN
136171	DeflatN	30815	78%	04-14-93	09:17	0f82bd21	--w-	RUN54. PRN
133702	DeflatN	31702	77%	04-14-93	09:20	b044bc38	--w-	RUN55. PRN
130890	DeflatN	30667	77%	04-14-93	09:25	d6abac3f	--w-	RUN56. PRN
134067	DeflatN	30831	78%	04-14-93	09:29	d4215d53	--w-	RUN57. PRN
498578	DeflatN	115217	77%	04-14-93	09:36	33b73c82	--w-	RUN58. PRN
494062	DeflatN	108678	79%	04-14-93	09:44	797ea9e2	--w-	RUN59. PRN
39237	DeflatN	9019	78%	04-14-93	09:46	0c127724	--w-	RUN60. PRN
153856	DeflatN	34970	78%	04-14-93	09:53	6a996d13	--w-	RUN61. PRN
427737	DeflatN	90505	79%	04-14-93	10:05	1c6ea6e6	--w-	RUN62. PRN
268604	DeflatN	62585	77%	04-14-93	10:20	bff8a3a8	--w-	RUN63. PRN
269981	DeflatN	64330	77%	04-14-93	10:29	0efe63ae	--w-	RUN64. PRN
303722	DeflatN	71390	77%	04-14-93	10:38	5ef92d44	--w-	RUN65. PRN
249261	DeflatN	58708	77%	04-14-93	10:44	583f25f4	--w-	RUN66. PRN
235093	DeflatN	57400	76%	05-16-93	20:14	611d85dd	--w-	RUN67. PRN
199560	DeflatN	51571	75%	05-16-93	20:18	96f25568	--w-	RUN68. PRN
162747	DeflatN	43279	74%	05-16-93	20:21	a13f4d4e	--w-	RUN69. PRN
174767	DeflatN	45483	74%	05-16-93	20:26	463e860e	--w-	RUN70. PRN
5352155		1271652	77%					21

Searching ZIP: DATA-3.ZIP

Length	Method	Size	Ratio	Date	Time	CRC-32	Attr	Name
378947	DeflatN	86606	78%	04-14-93	11:26	5f806fed	--w-	RUN71. PRN
417727	DeflatN	93479	78%	04-14-93	11:35	78e6725b	--w-	RUN72. PRN
355695	DeflatN	87232	76%	04-14-93	11:31	c836d1a2	--w-	RUN73. PRN
190671	DeflatN	49205	75%	04-14-93	11:44	7fe46b86	--w-	RUN74. PRN
201195	DeflatN	52346	74%	04-14-93	11:47	dc0d87c2	--w-	RUN75. PRN
228859	DeflatN	57859	75%	04-14-93	11:50	7b9ad210	--w-	RUN76. PRN
206803	DeflatN	54263	74%	04-14-93	11:55	7e1e6032	--w-	RUN77. PRN
188926	DeflatN	46388	76%	04-14-93	11:58	ac3dec7e	--w-	RUN78. PRN
310696	DeflatN	74626	76%	04-14-93	12:02	418dc310	--w-	RUN79. PRN
349535	DeflatN	84932	76%	04-14-93	12:07	930d53cd	--w-	RUN80. PRN
268542	DeflatN	64315	77%	04-14-93	12:22	948d6d58	--w-	RUN81. PRN
287507	DeflatN	68246	77%	04-14-93	13:32	c5cf6fe5	--w-	RUN82. PRN
328651	DeflatN	80304	76%	04-14-93	13:36	9d61a242	--w-	RUN83. PRN
411720	DeflatN	99210	76%	04-14-93	13:40	381a9e31	--w-	RUN84. PRN
242987	DeflatN	66392	73%	04-14-93	13:46	c5b08690	--w-	RUN85. PRN
202934	DeflatN	55685	73%	04-14-93	13:50	31c7a23b	--w-	RUN86. PRN
124401	DeflatN	34428	73%	04-14-93	13:53	7fd9cd13	--w-	RUN87. PRN
174928	DeflatN	47730	73%	04-14-93	13:56	1d40e5d7	--w-	RUN88. PRN
4870724		1203246	76%					18

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References

1. Kopp, Paul J., Richard C. Bishop, and Lewis E. Motter, "Experimental Study of the Rudder Flow Field And Its Effect on Hull Forces", DTRC/SHD-1341-1, August 1990.
2. Kopp, Paul J., "Captive Model Rotating Arm Test on the Bare Hull T-AG(S) 38 Represented by Model 4414", DTRC/SHD-1341-02, February 1991.
3. Russo, Vito L., and E. Kemper Sullivan, "Design of the Mariner-Type Ship", Transactions of the Society of Naval Architect and Marine Engineers, Volume 61, 1953.
4. Jane's Fighting Ships: 1993-94", Captain Richard Sharpe RN, Editor, 96th Edition.
5. Maloney, Elbert S., "Dutton's Navigation & Piloting", 13th Edition, Naval Institute Press, 1979.
6. Bowdich, Nathaniel, "American Practical Navigator; An Epitome of Navigation: Volume 1", Published by the U.S. Defense Mapping Agency Hydrographic Center, 1977.

Appendix A - Data Plots

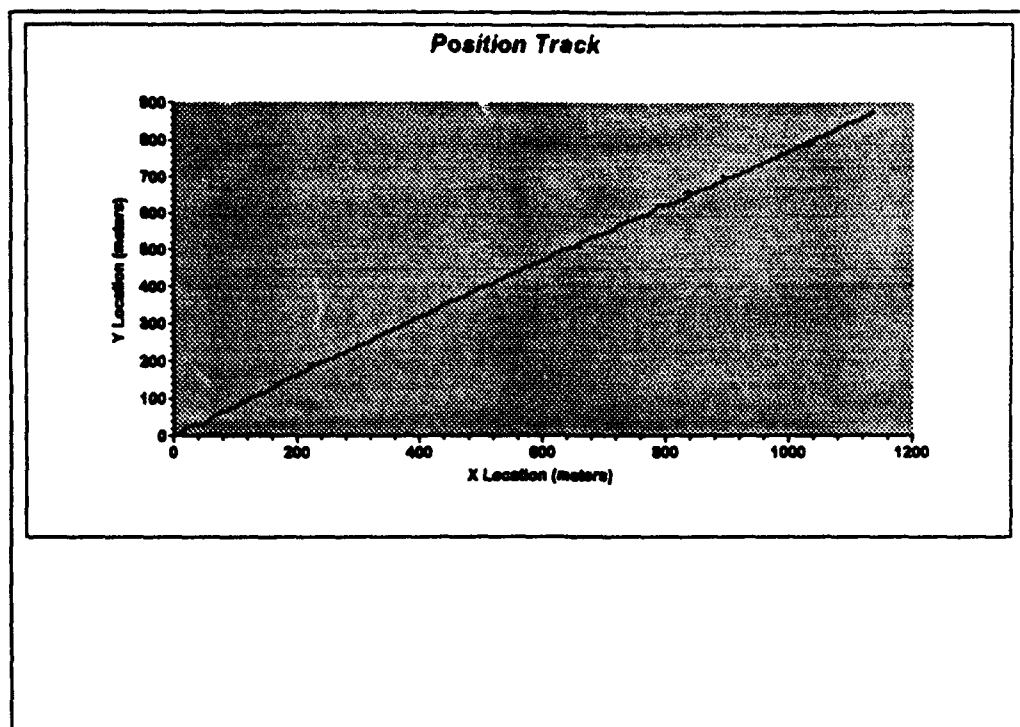


Figure A1. Run 34 Position Plot

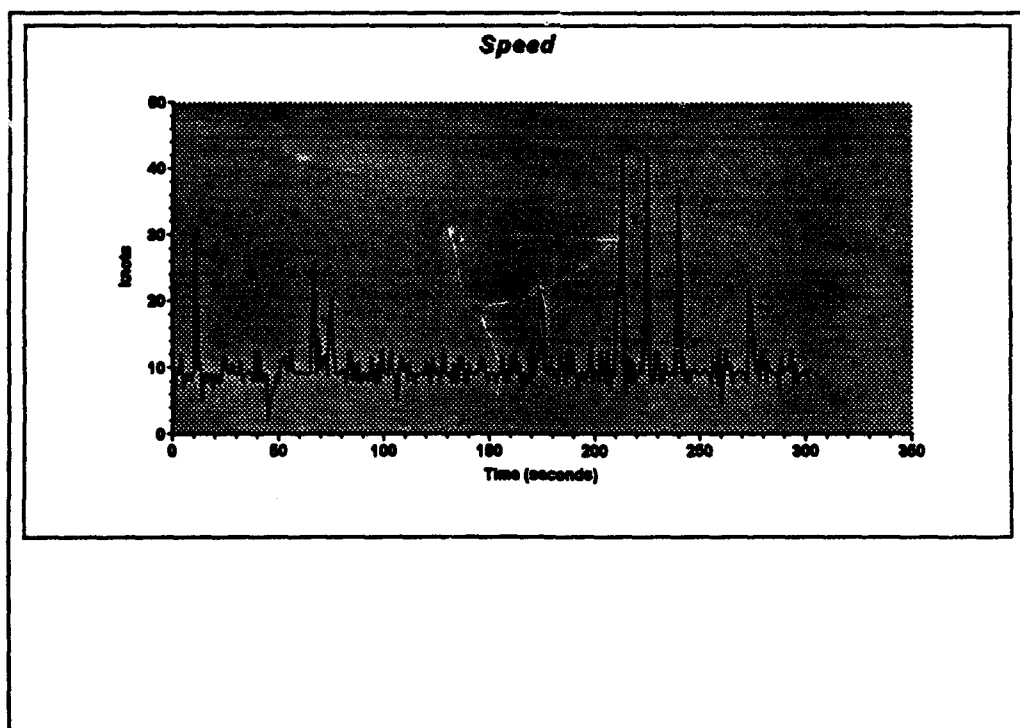


Figure A2. Run 34 Ship Speed Plot

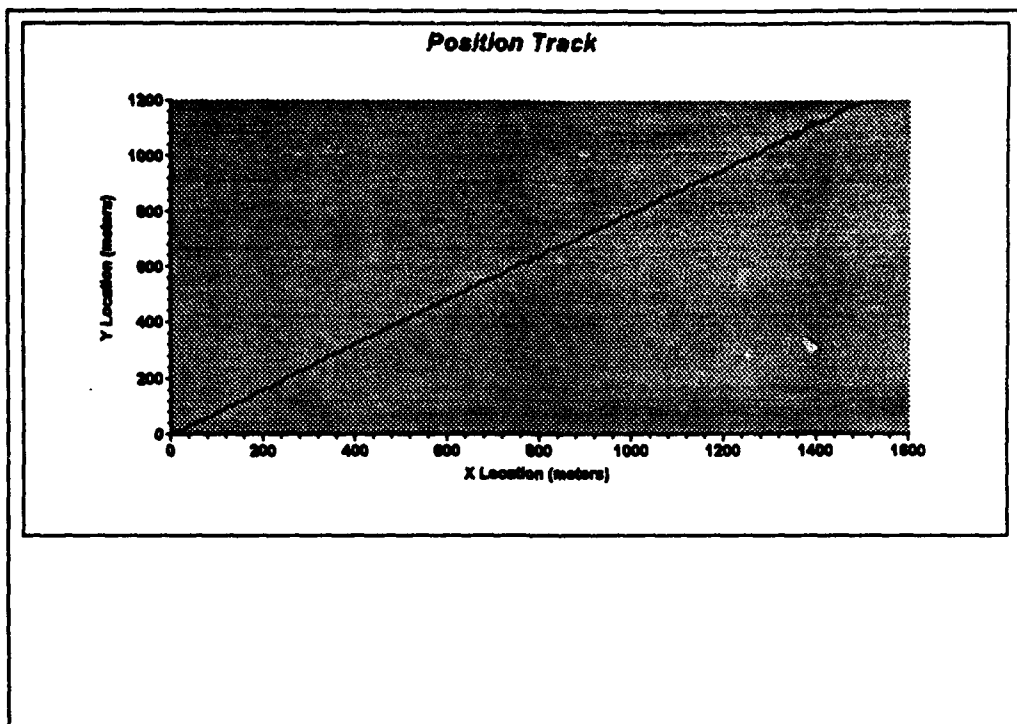


Figure A3. Run 35 Position Plot

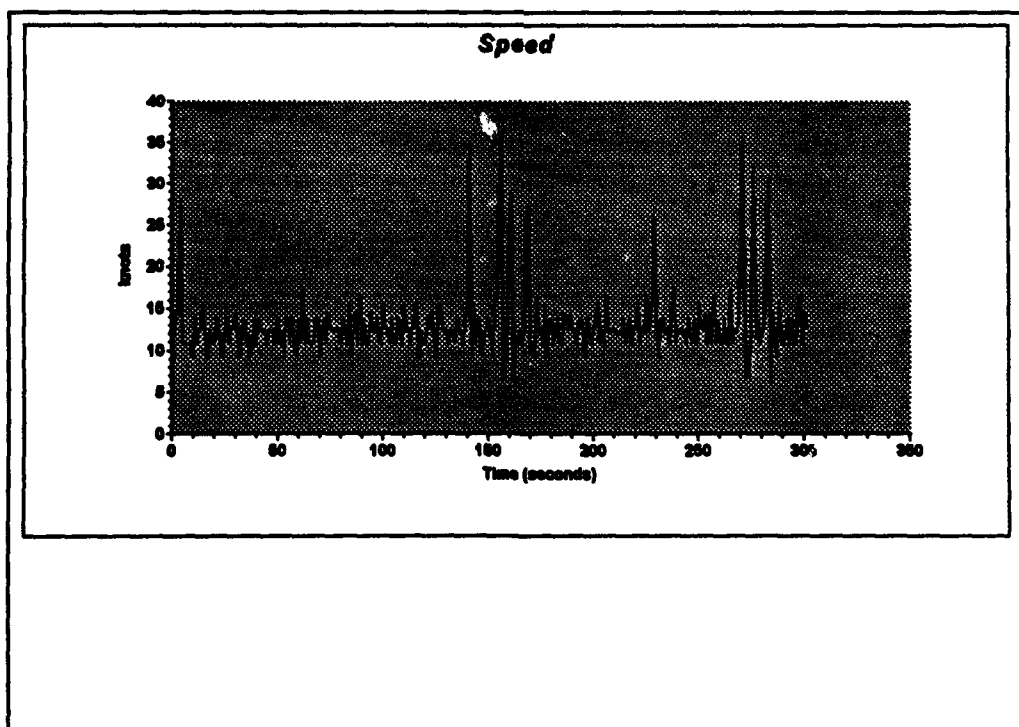


Figure A4. Run 35 Ship Speed Plot

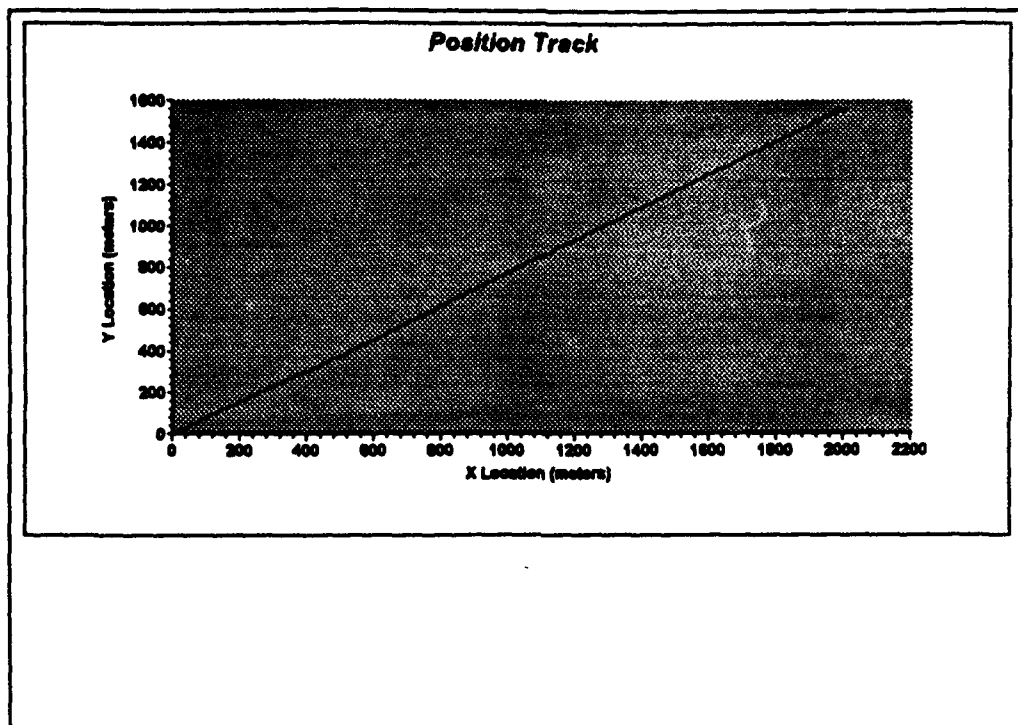


Figure A5. Run 36 Position Plot

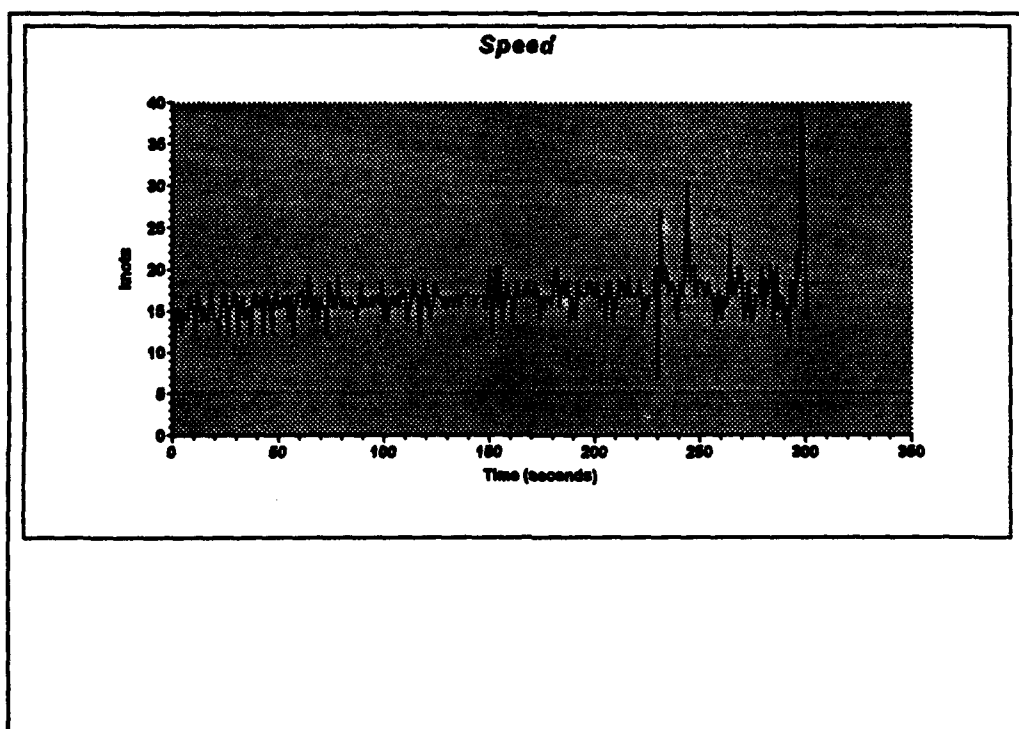


Figure A6. Run 36 Ship Speed Plot

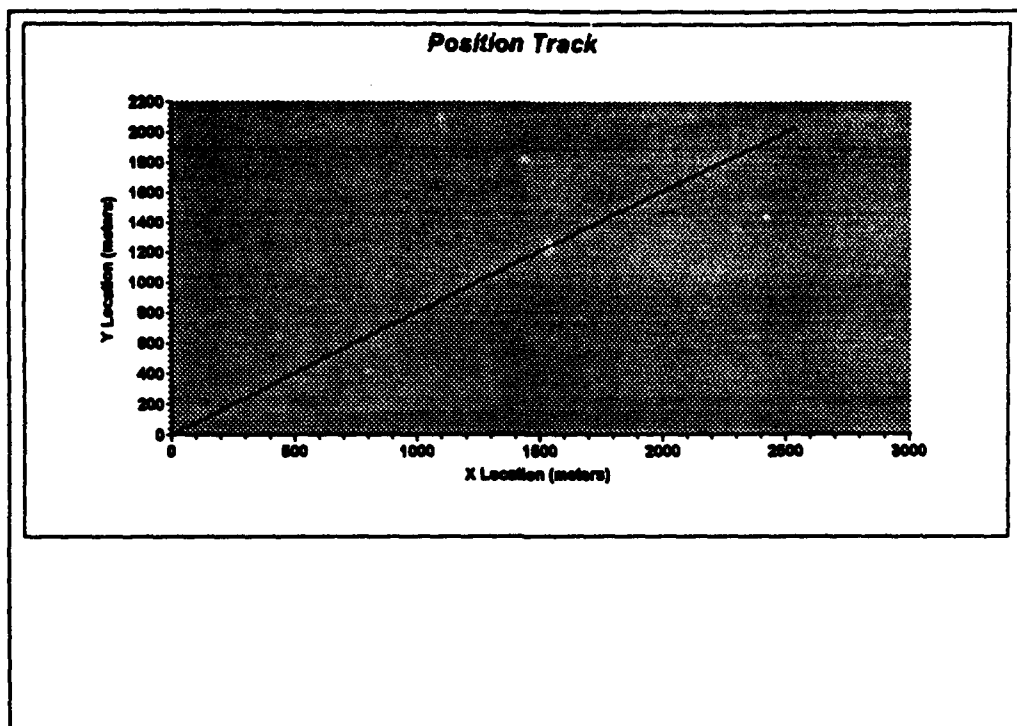


Figure A7. Run 37 Position Plot

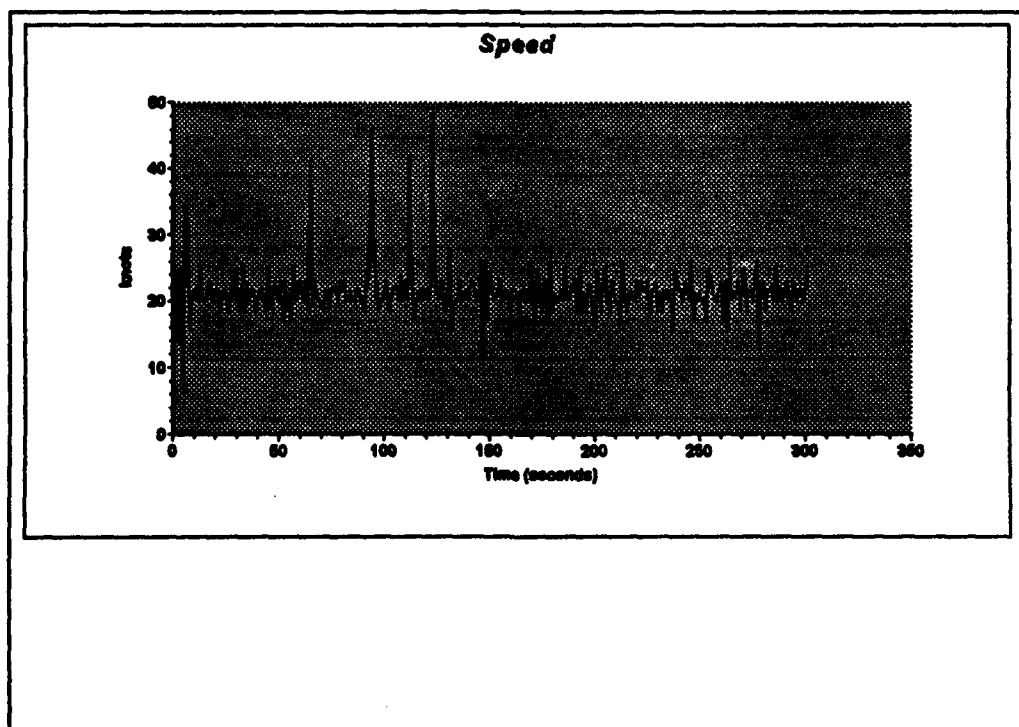


Figure A8. Run 37 Ship Speed Plot

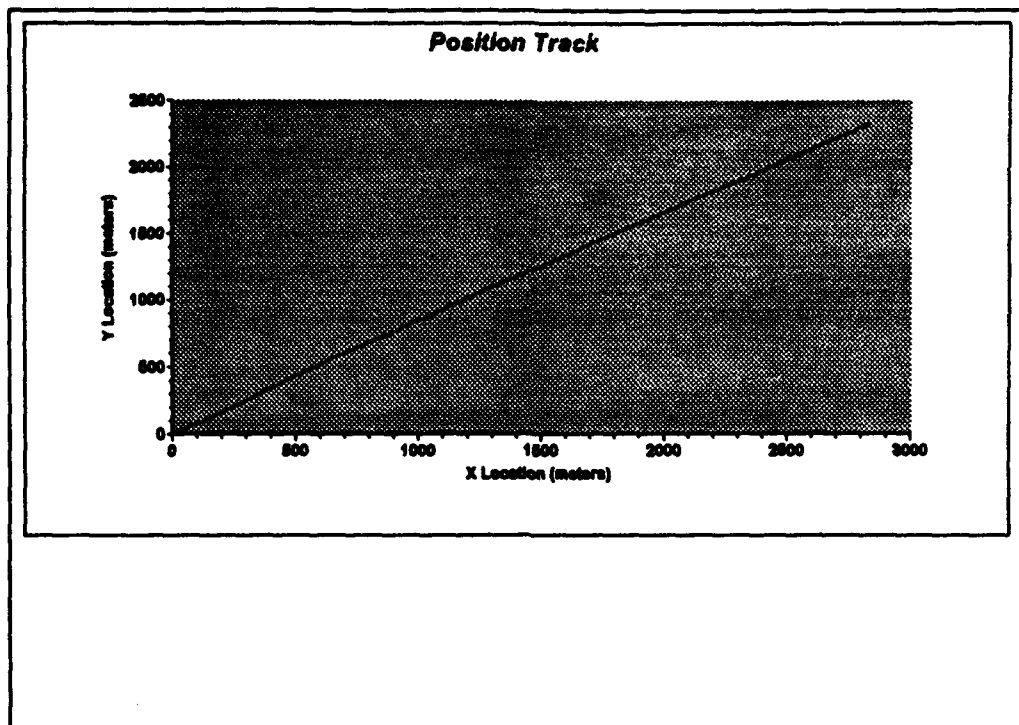


Figure A9. Run 38 Position Plot

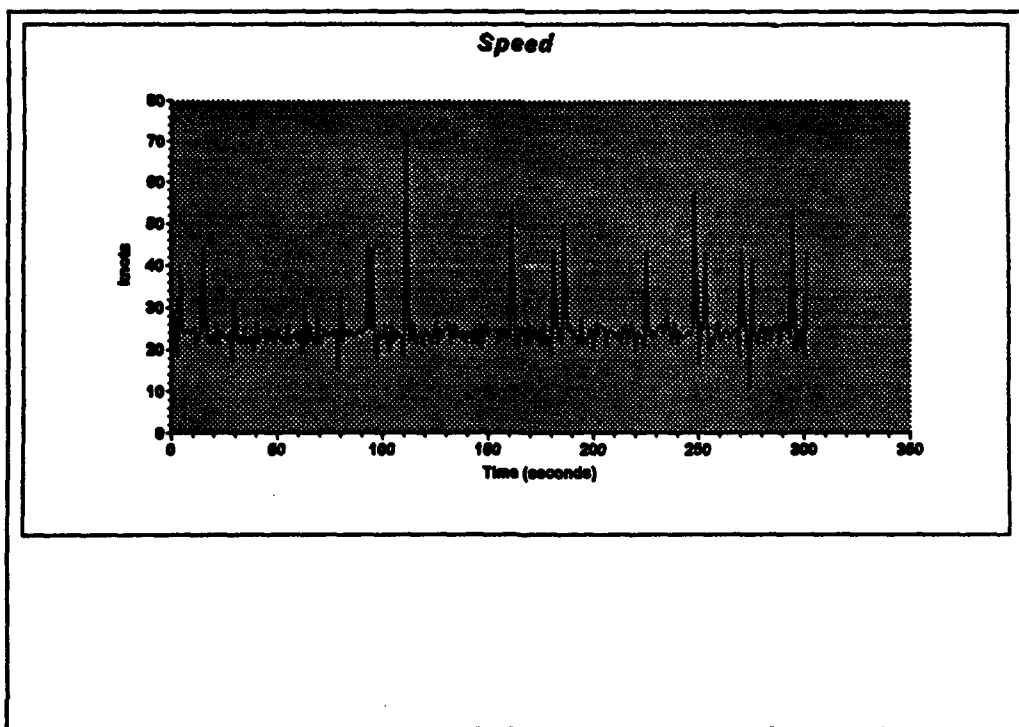


Figure A10. Run 38 Ship Speed Plot

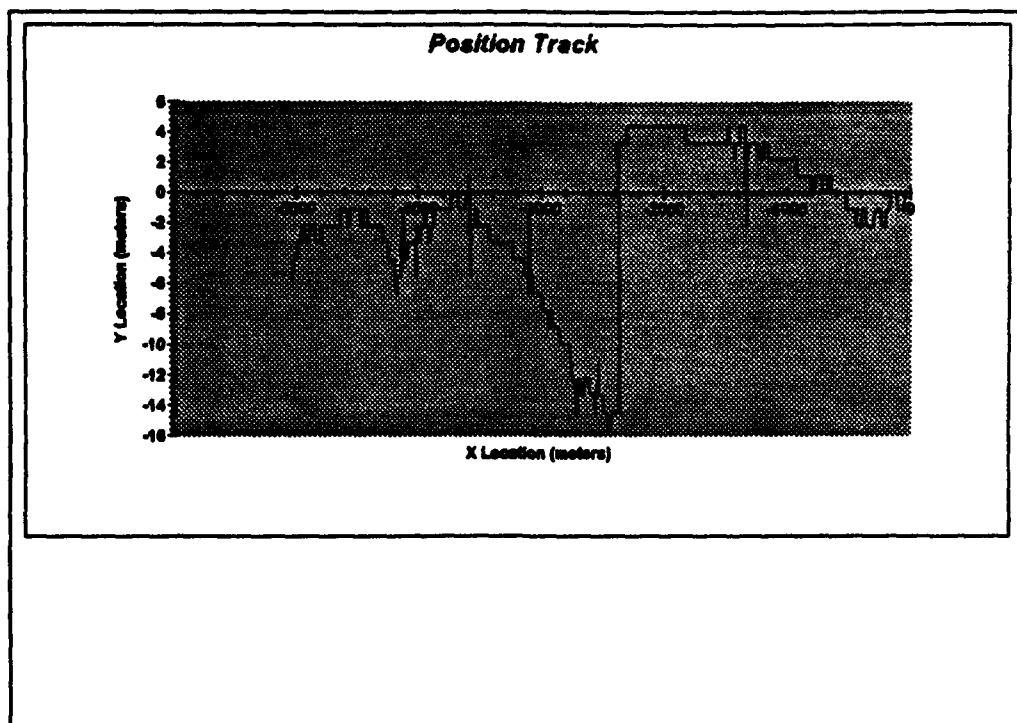


Figure A11. Run 41 Position Plot

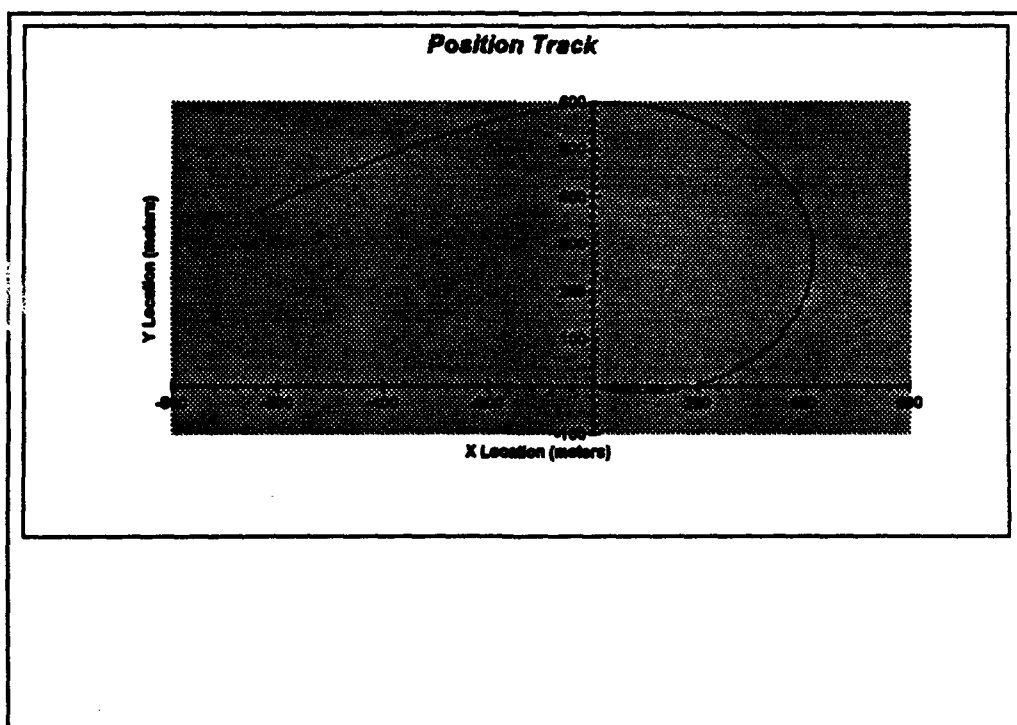


Figure A12. Run 42 Position Plot

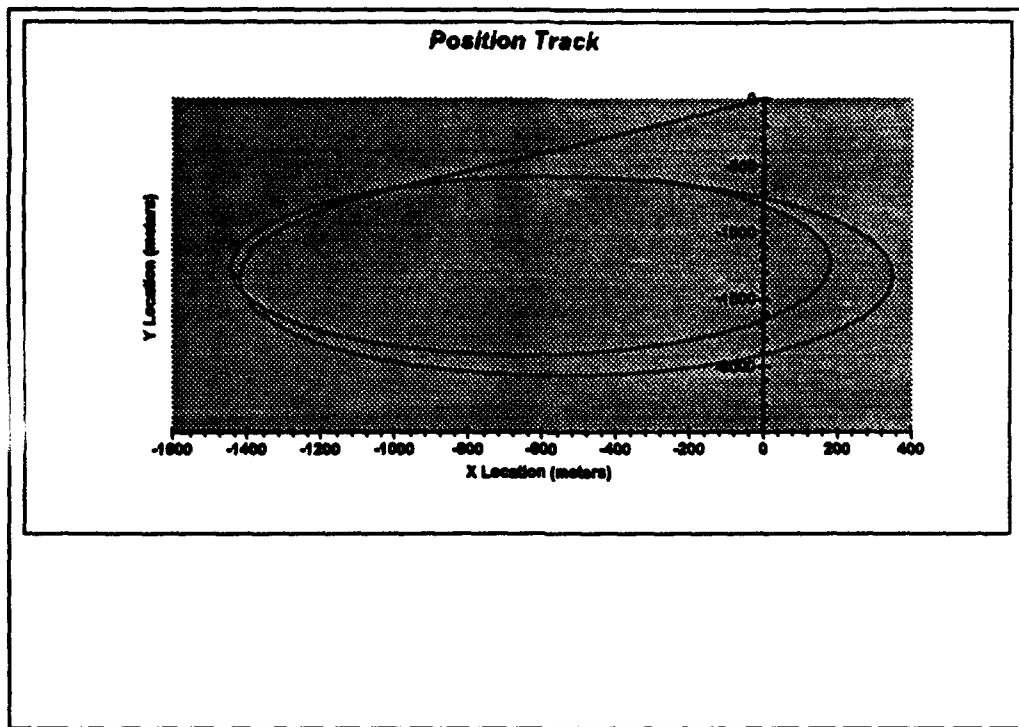


Figure A13. Run 44 Position Plot

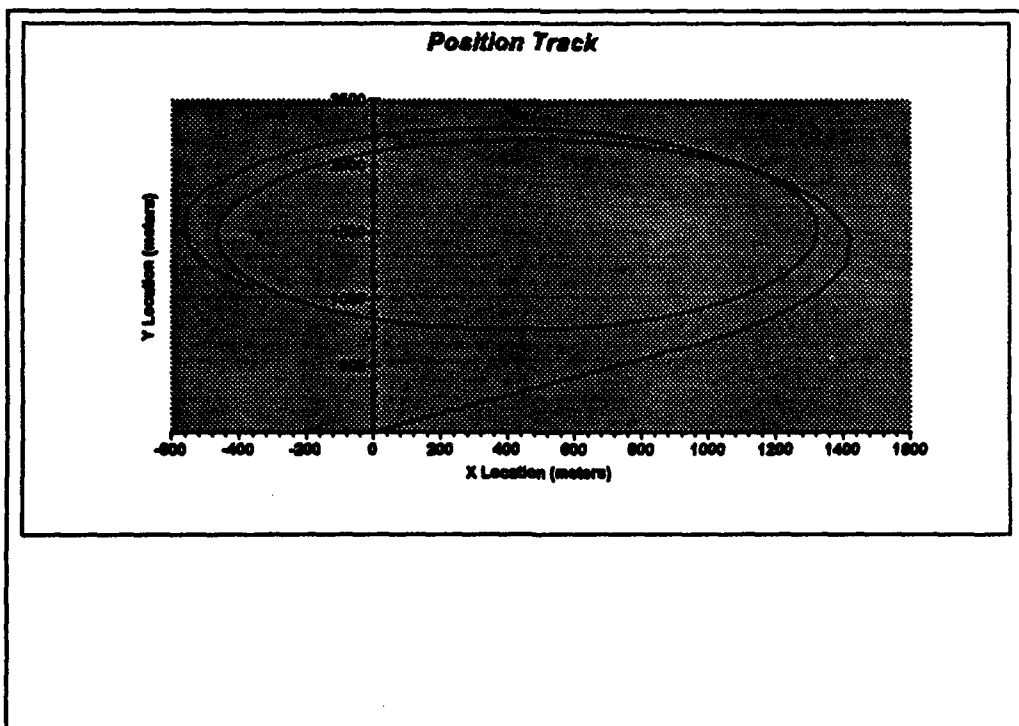


Figure A14. Run 45 Position Plot

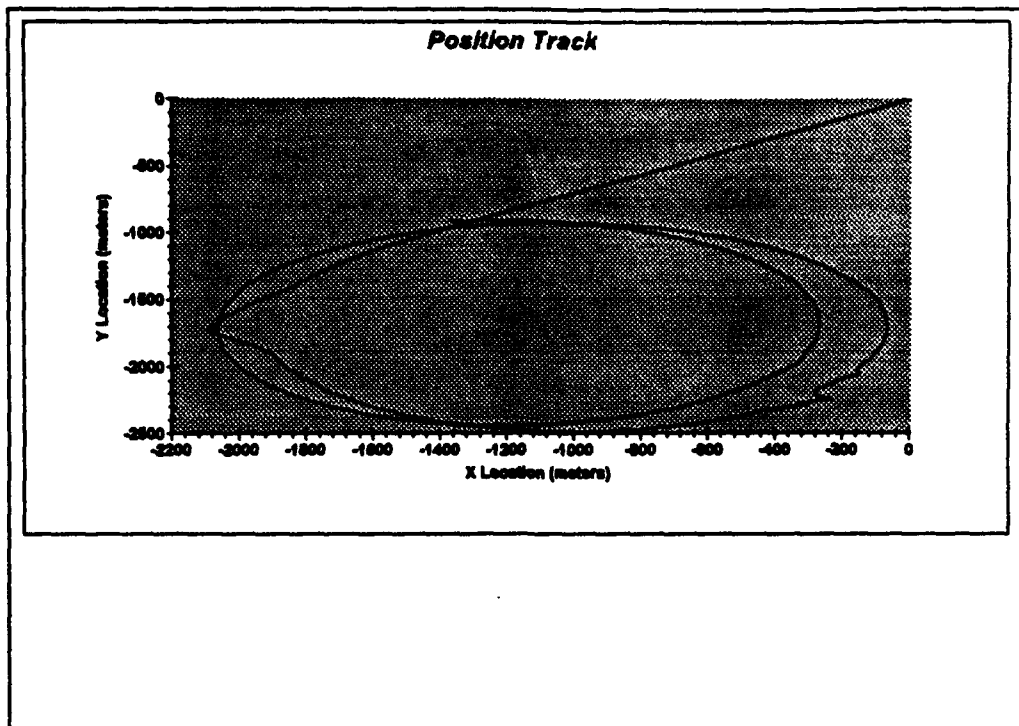


Figure A15. Run 46 Position Plot

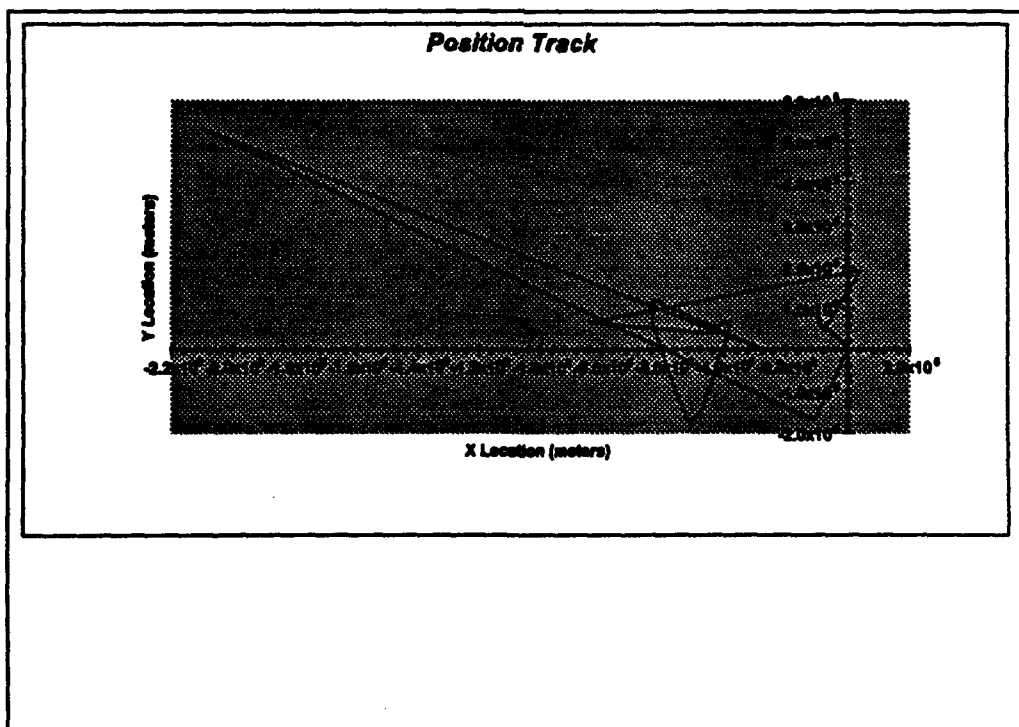


Figure A16. Run 47 Position Plot

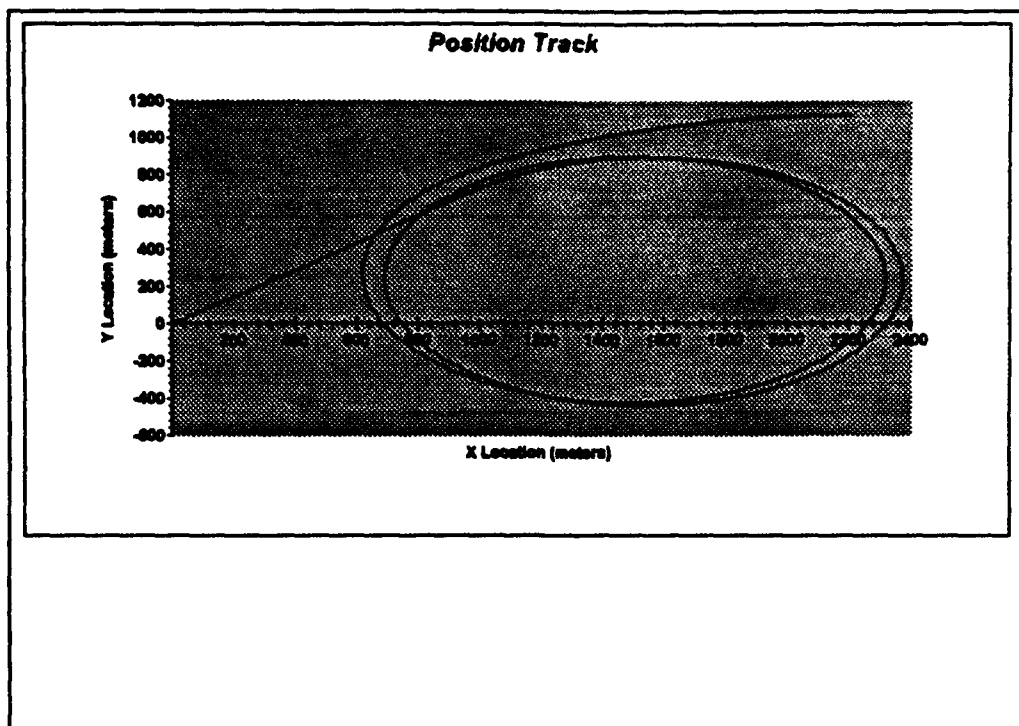


Figure A17. Run 48 Position Plot

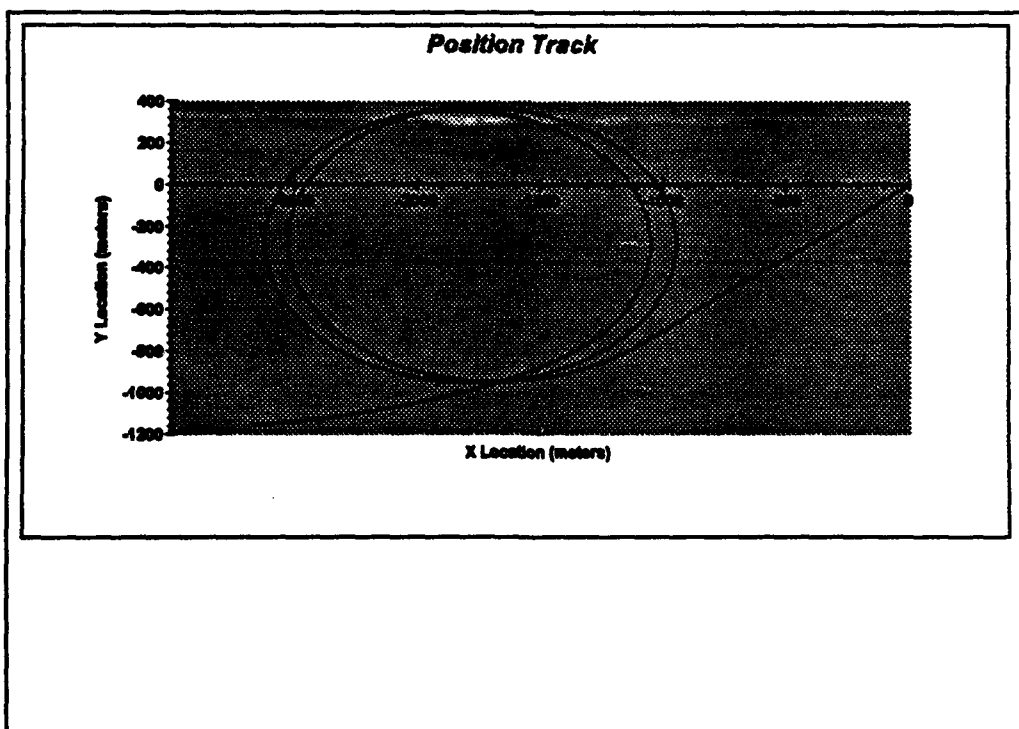


Figure A18. Run 49 Position Plot

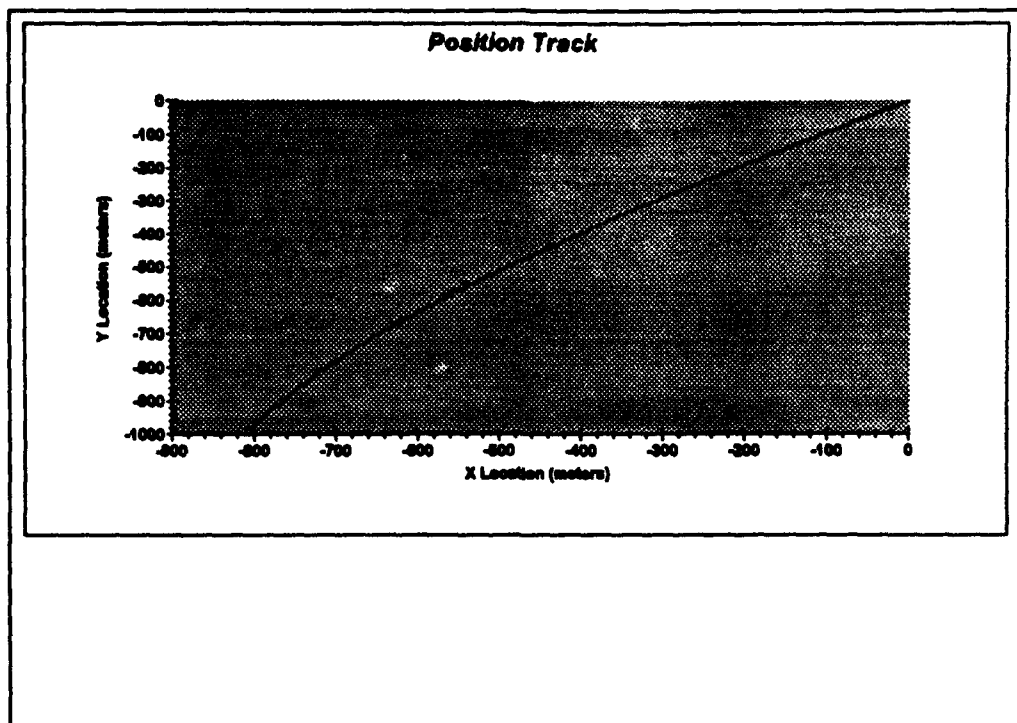


Figure A19. Run 54 Position Plot

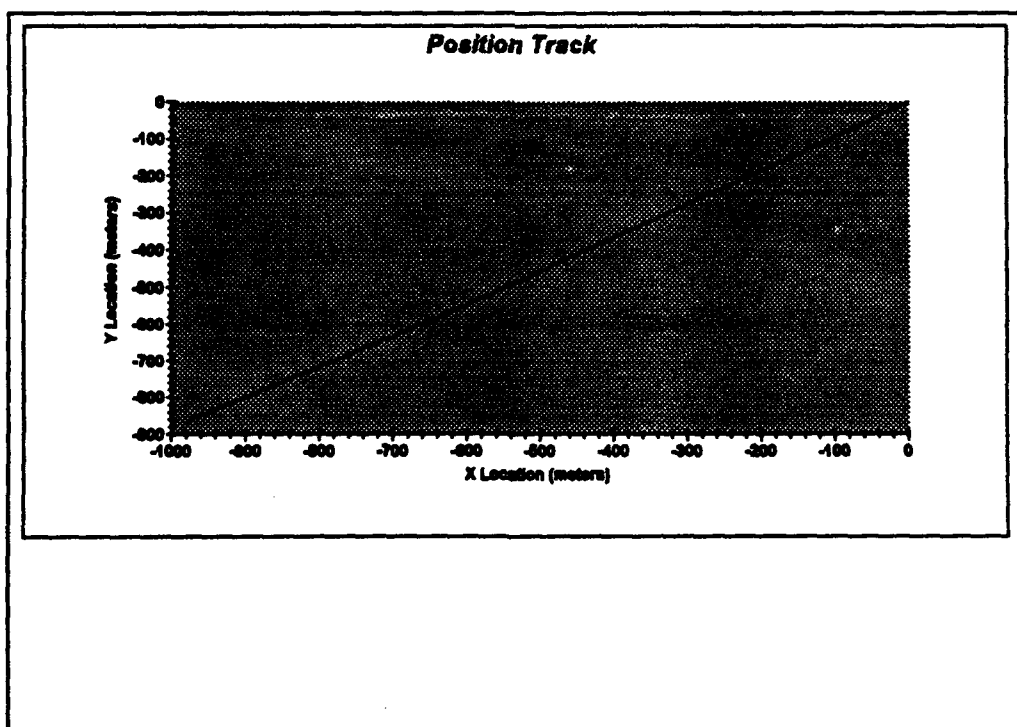


Figure A20. Run 55 Position Plot

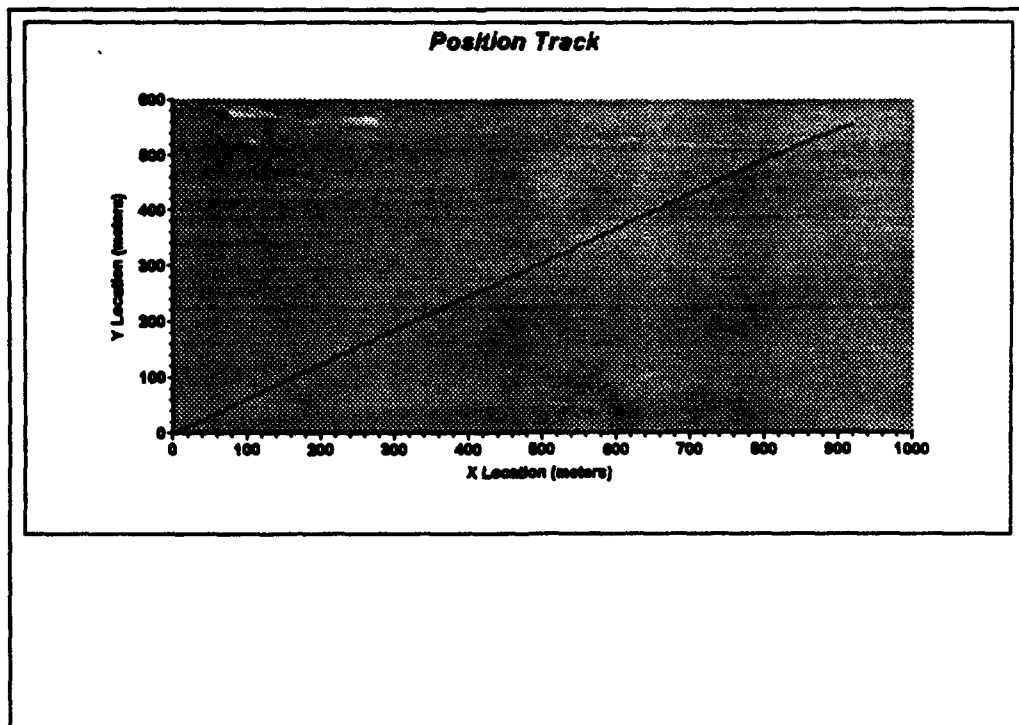


Figure A21. Run 56 Position Plot

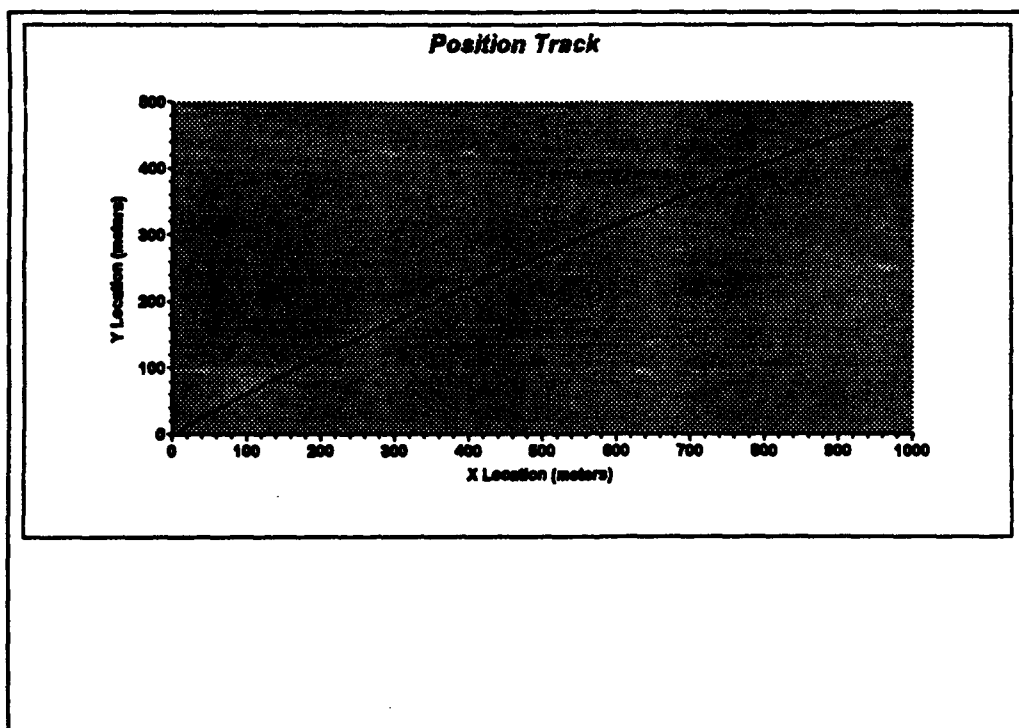


Figure A22. Run 57 Position Plot

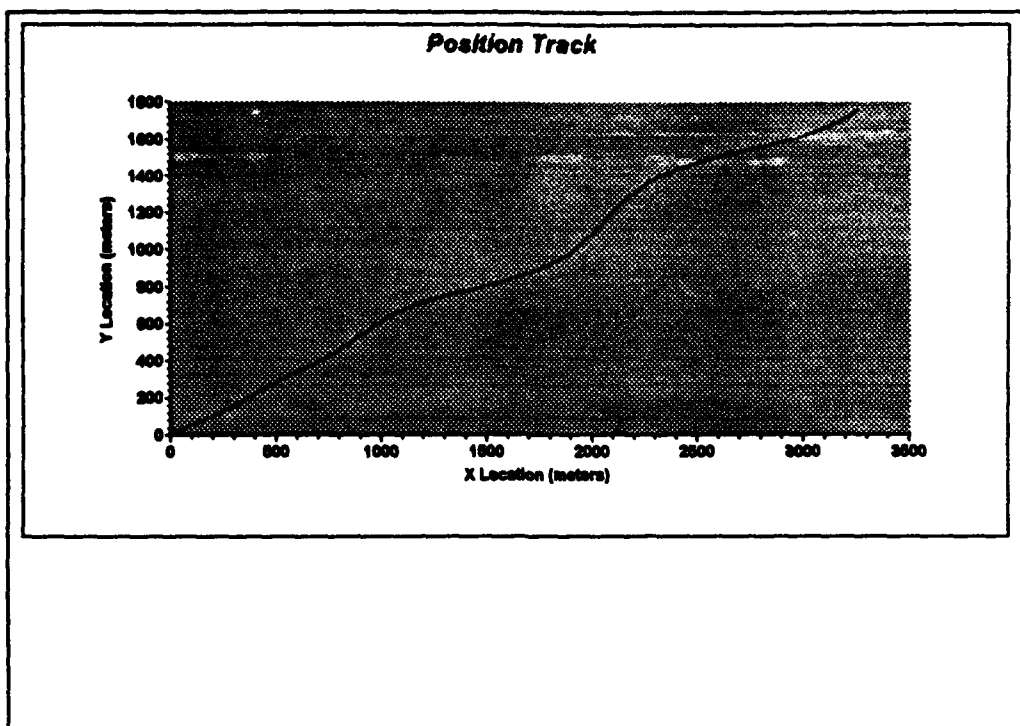


Figure A23. Run 58 Position Plot

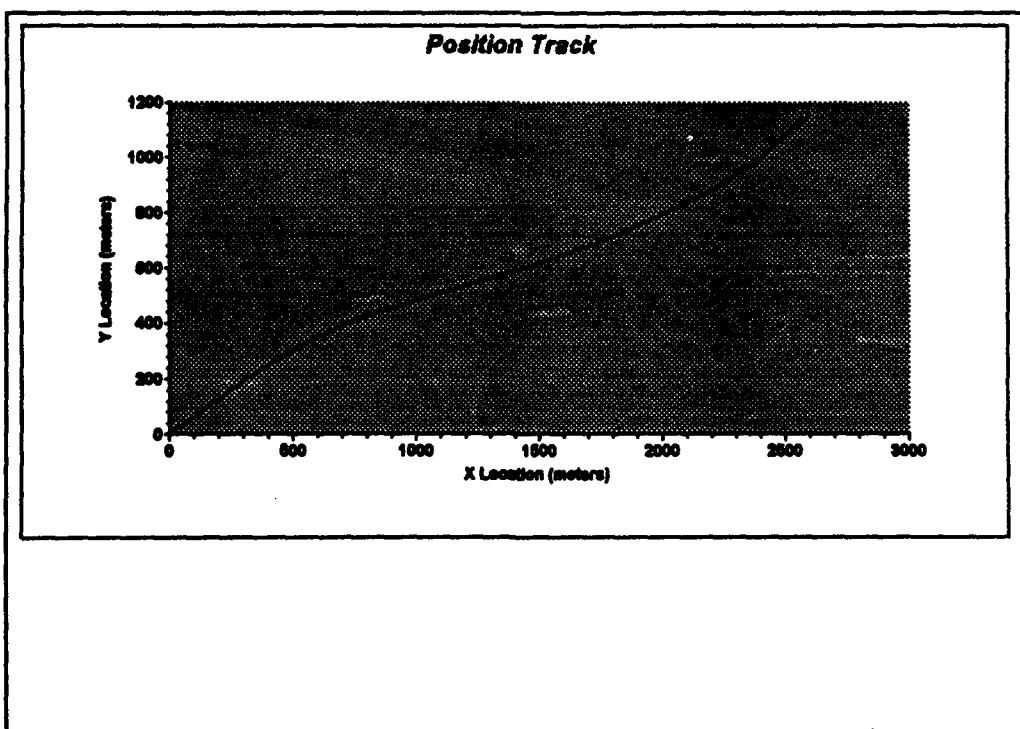


Figure A24. Run 59 Position Plot

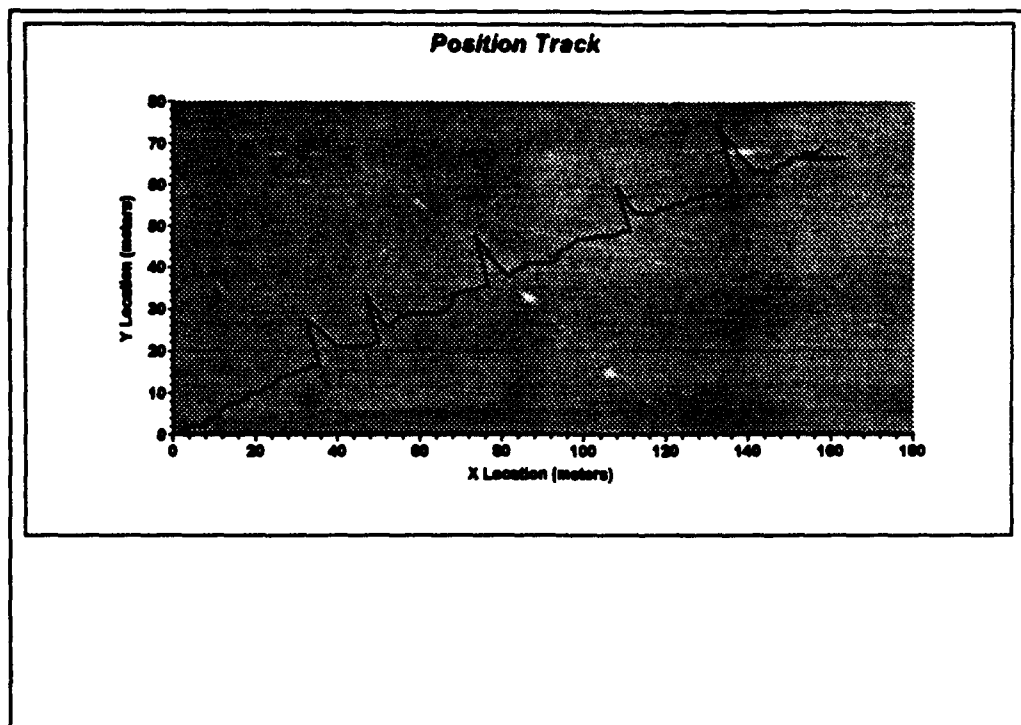


Figure A25. Run 60 Position Plot

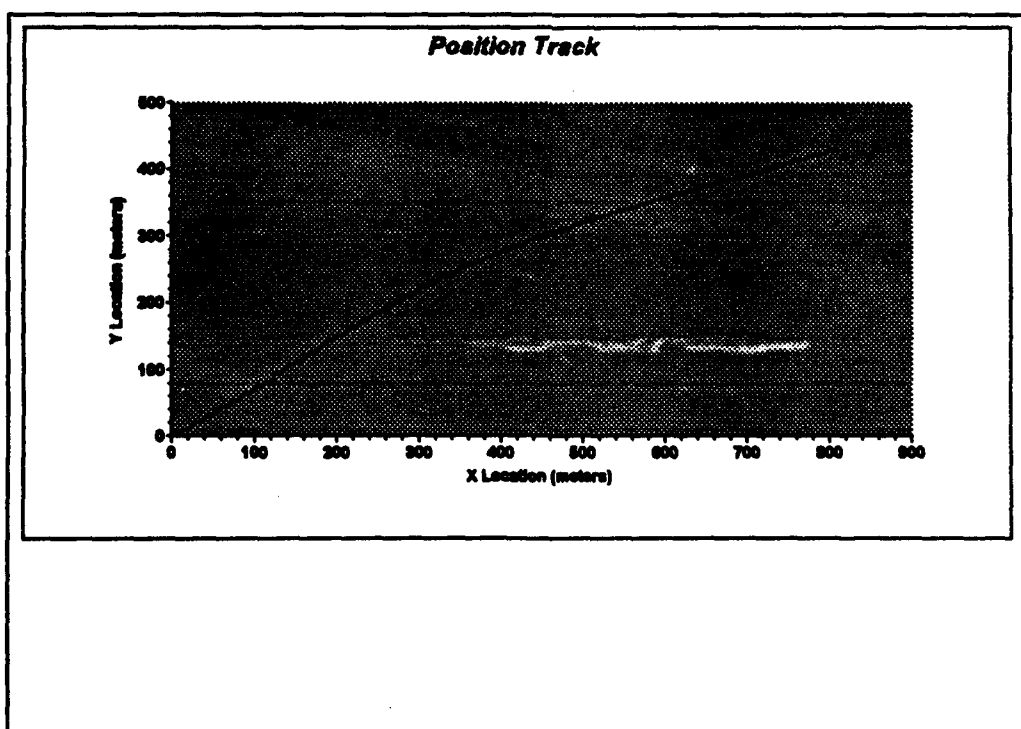


Figure A26. Run 61 Position Plot

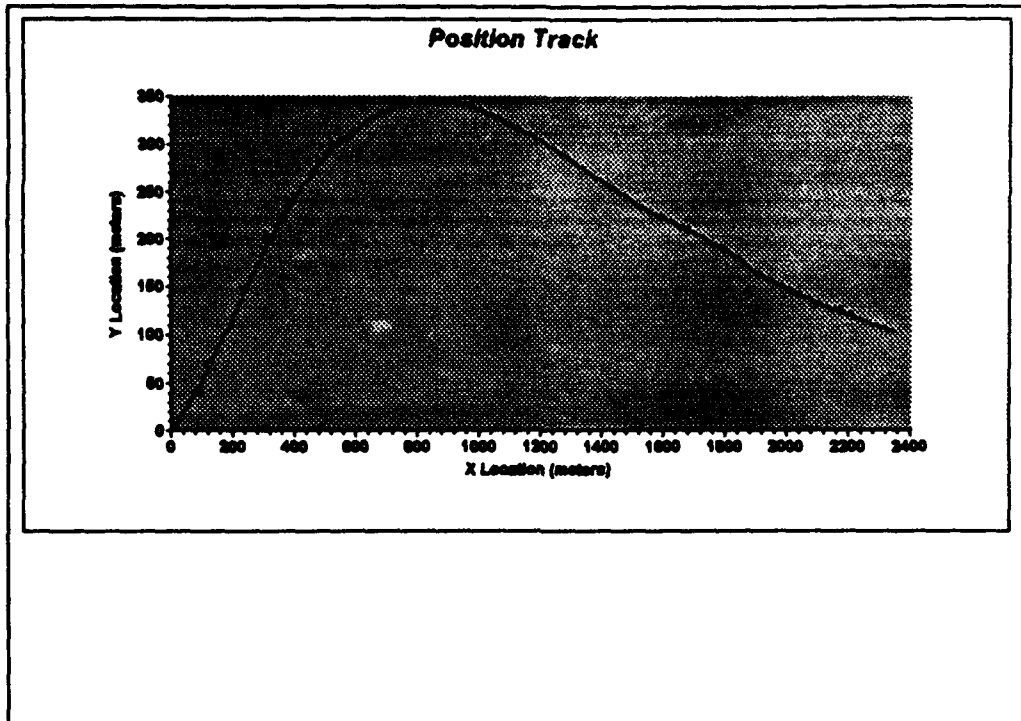


Figure A27. Run 62 Position Plot

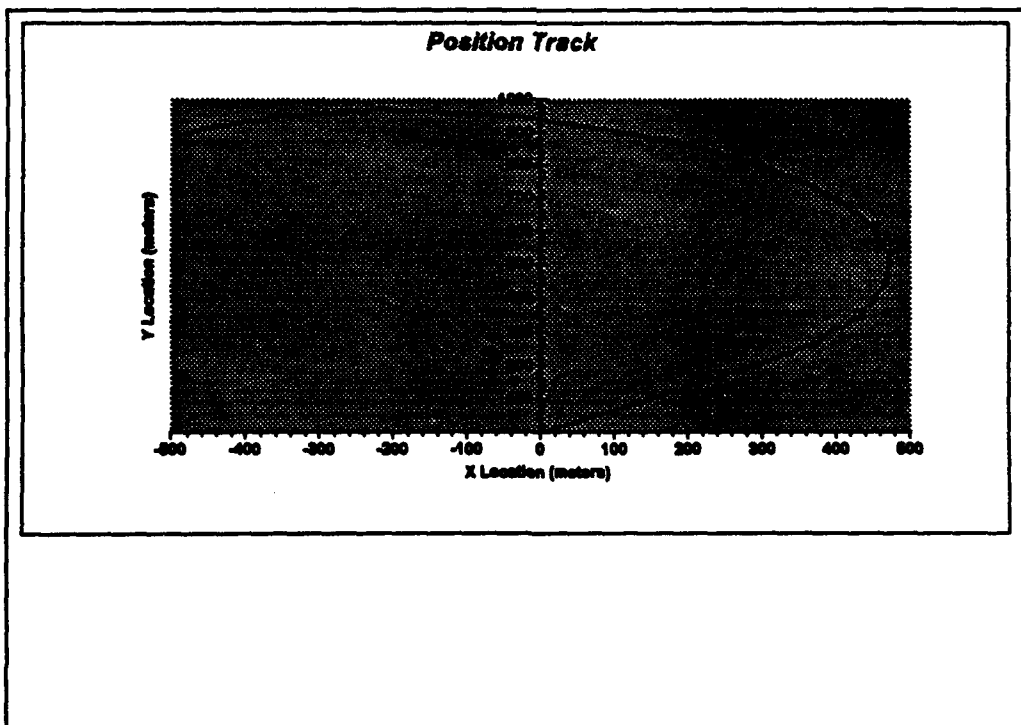


Figure A28. Run 63 Position Plot

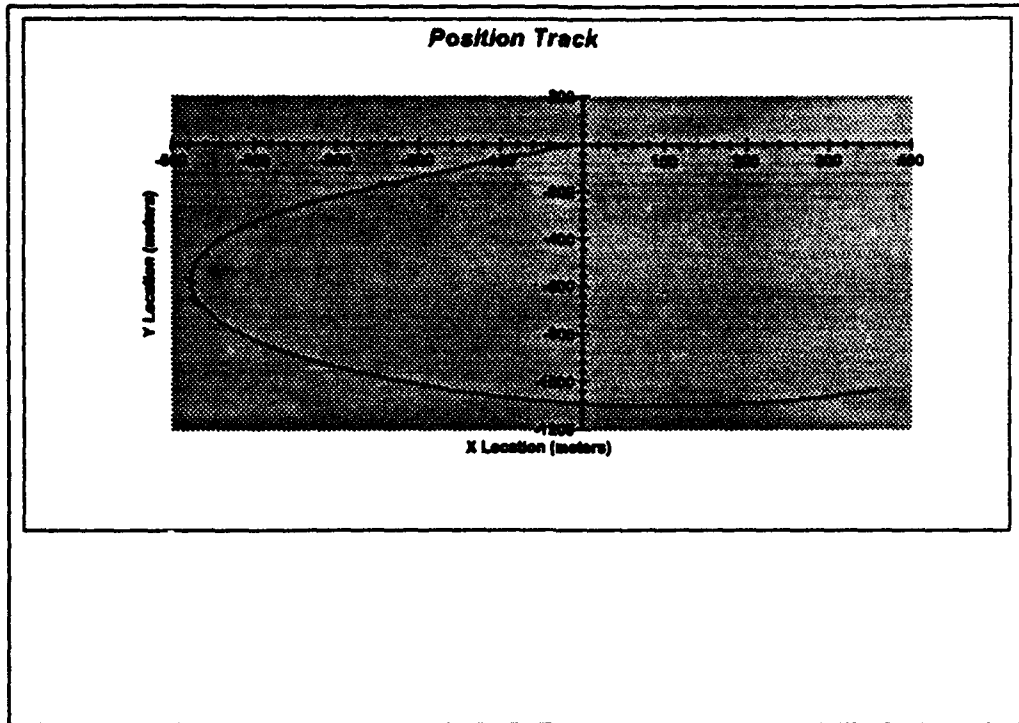


Figure A29. Run 64 Position Plot

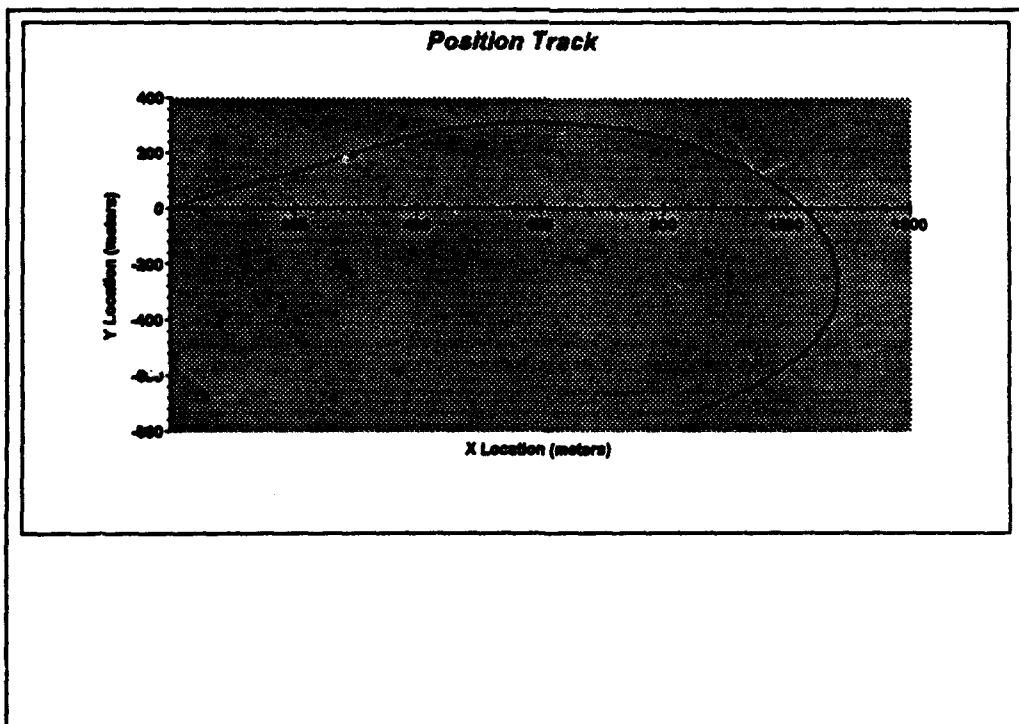


Figure A30. Run 65 Position Plot

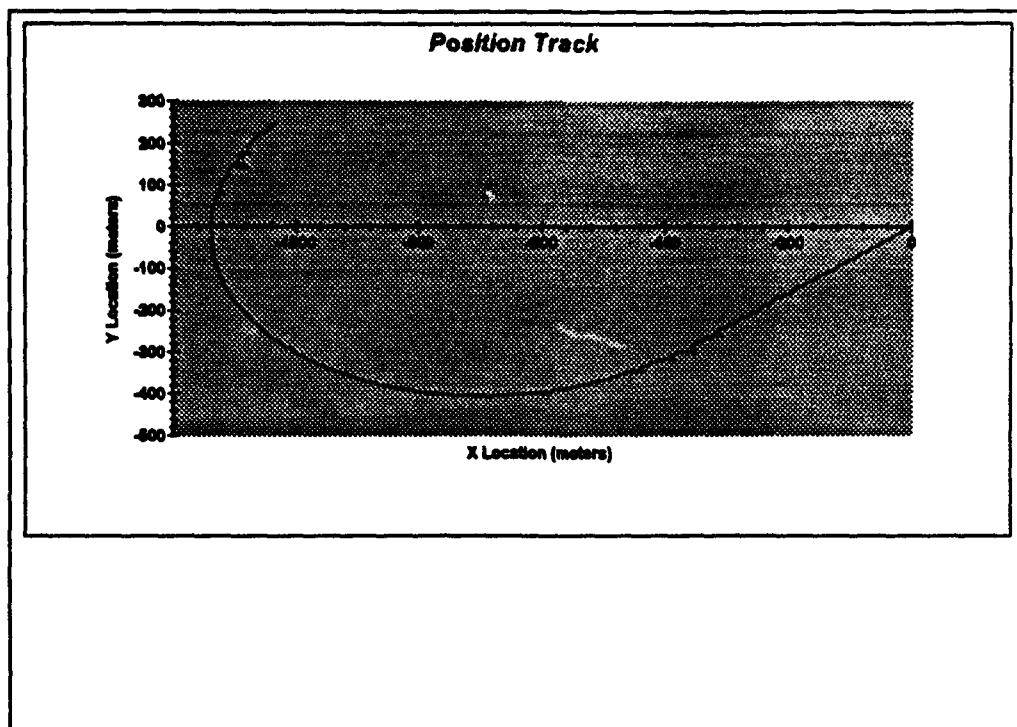


Figure A31. Run 66 Position Plot

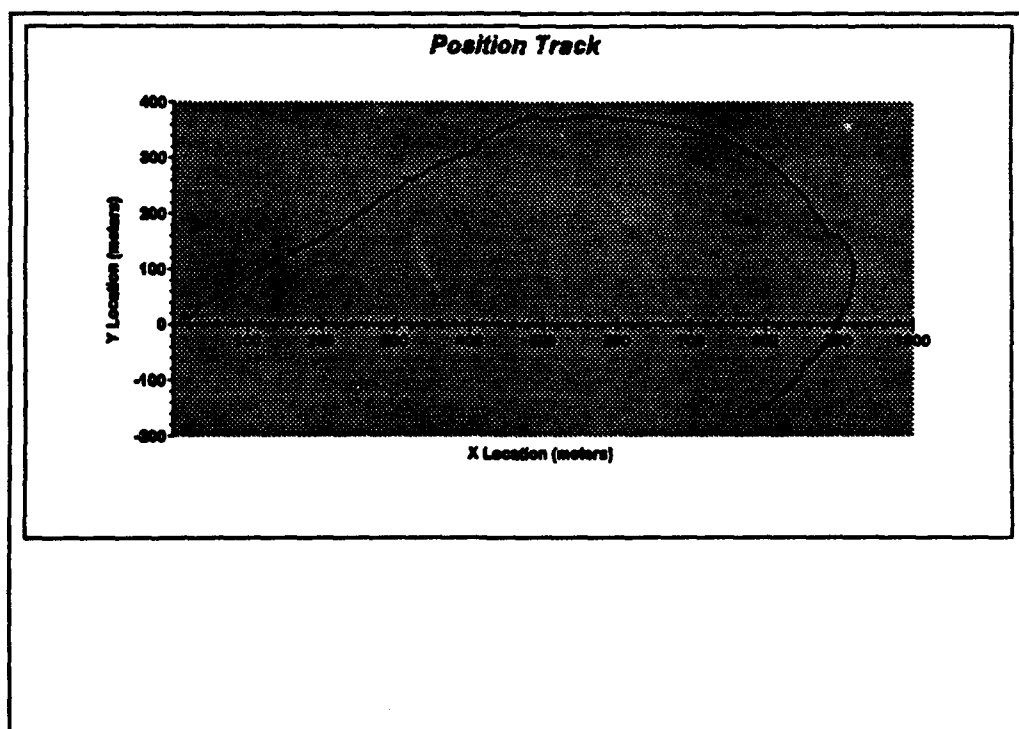


Figure A32. Run 67 Position Plot

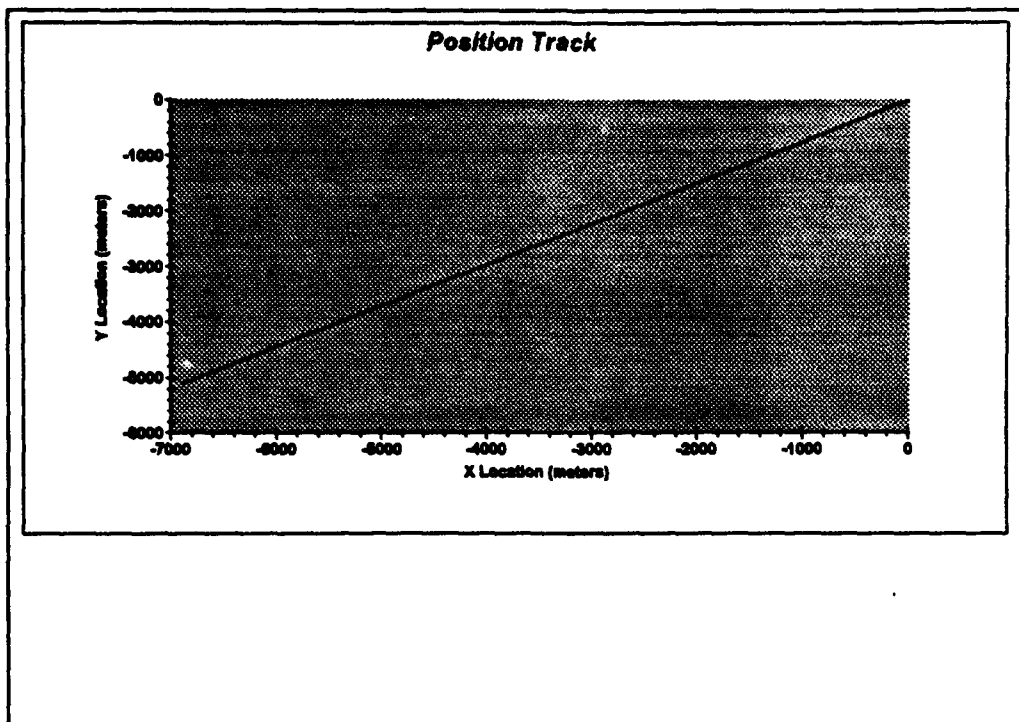


Figure A33. Run 71 Position Plot

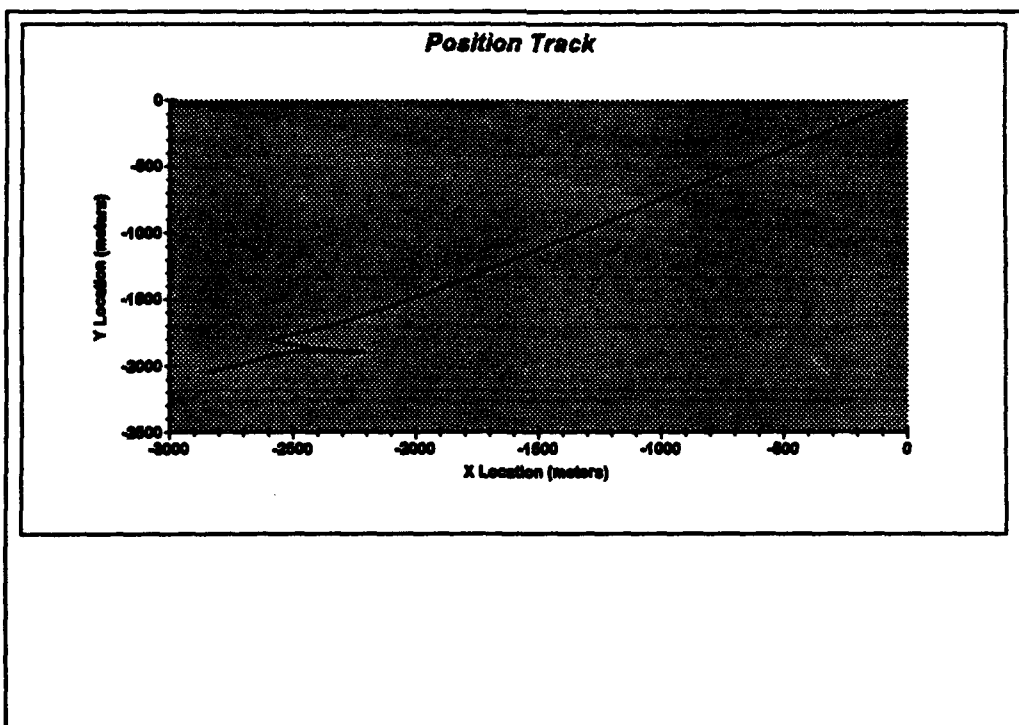


Figure A34. Run 72 Position Plot

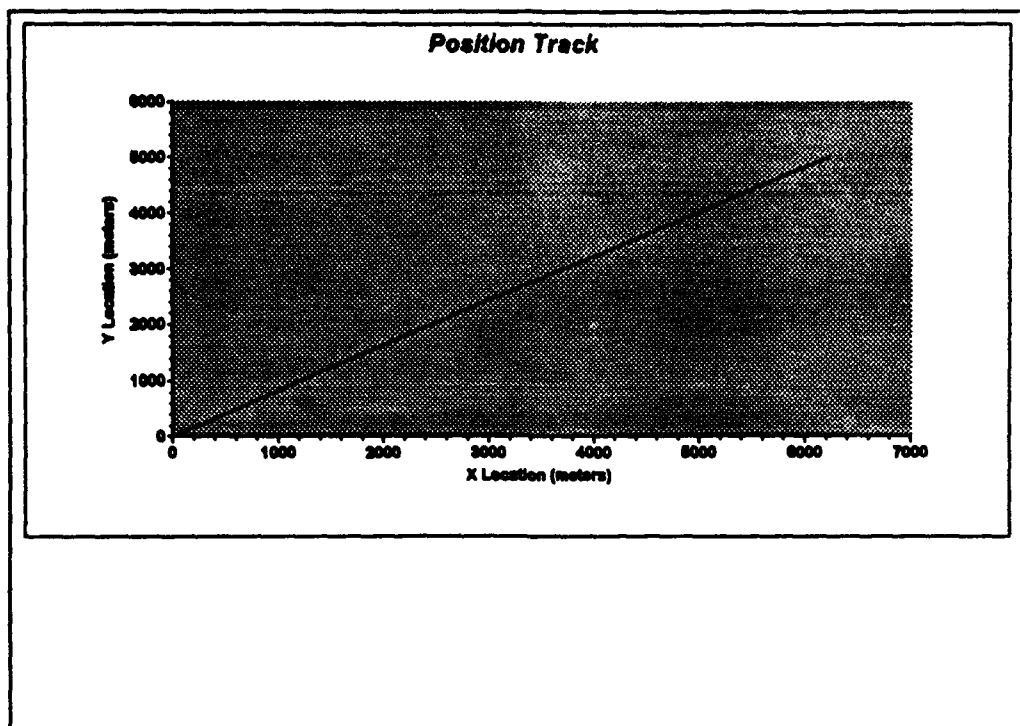


Figure A35. Run 73 Position Plot

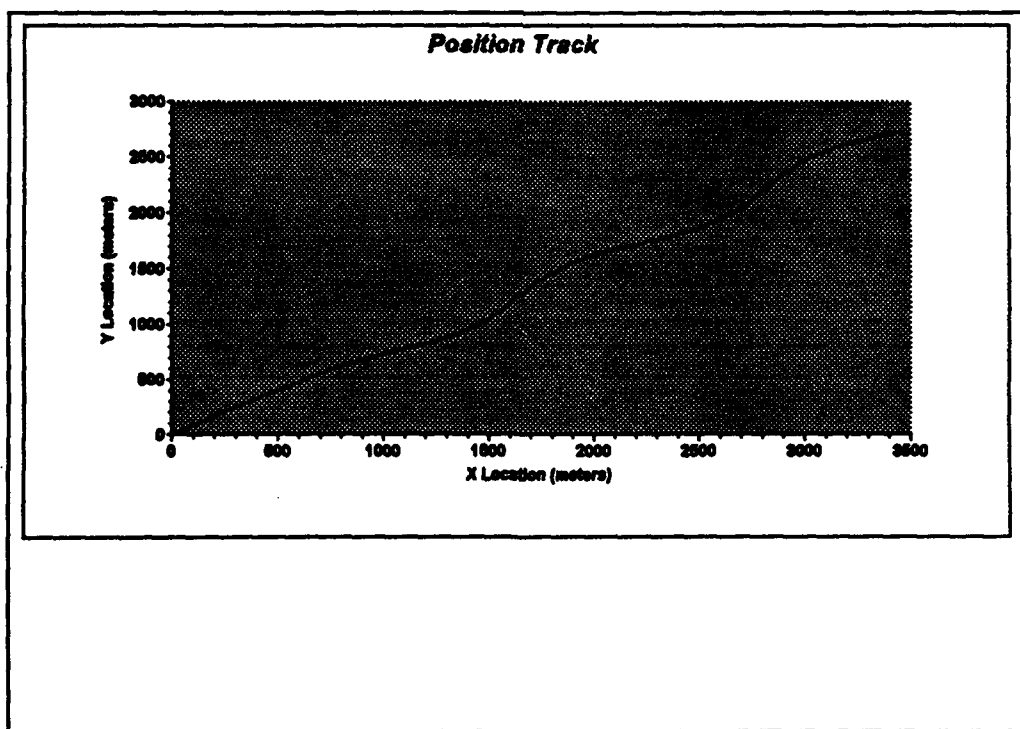


Figure A36. Run 74 Position Plot

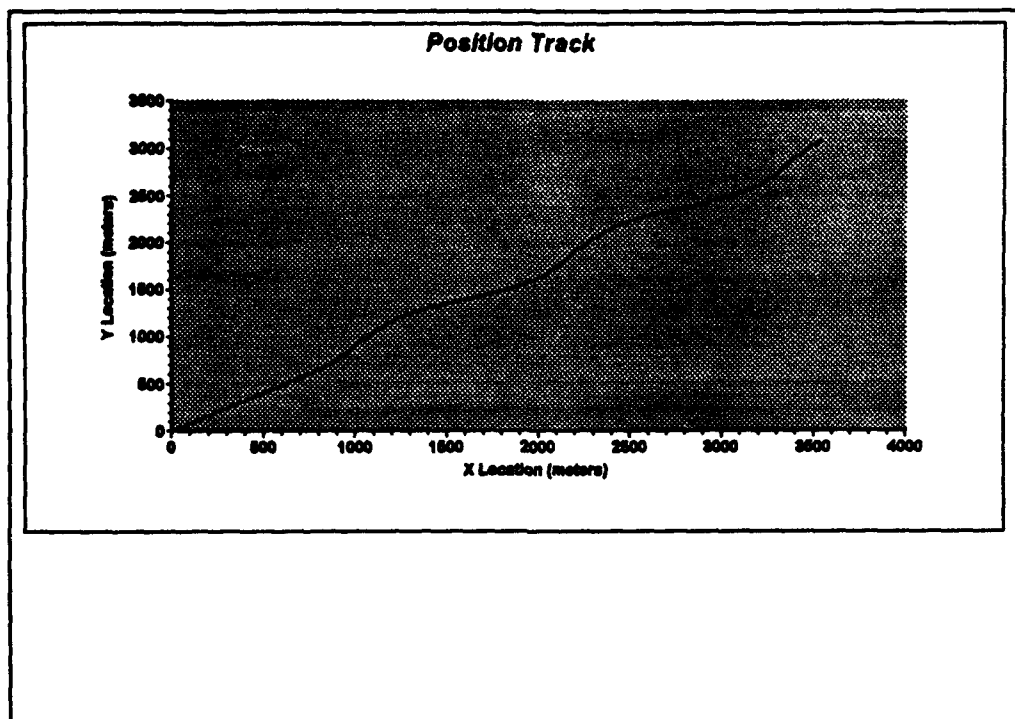


Figure A37. Run 75 Position Plot

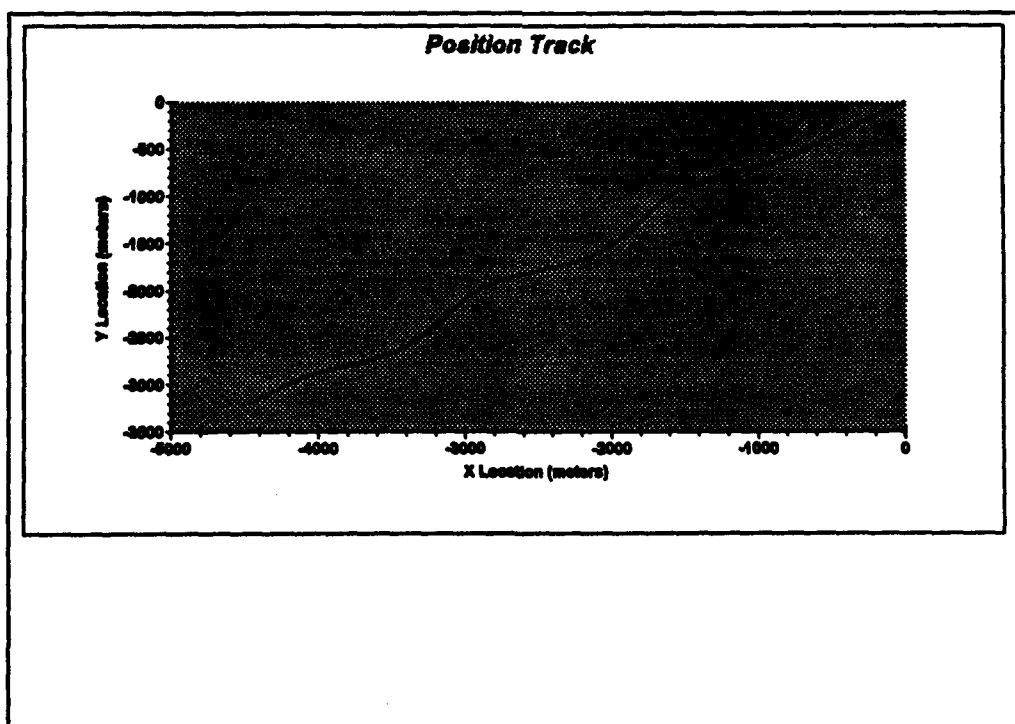


Figure A38. Run 76 Position Plot

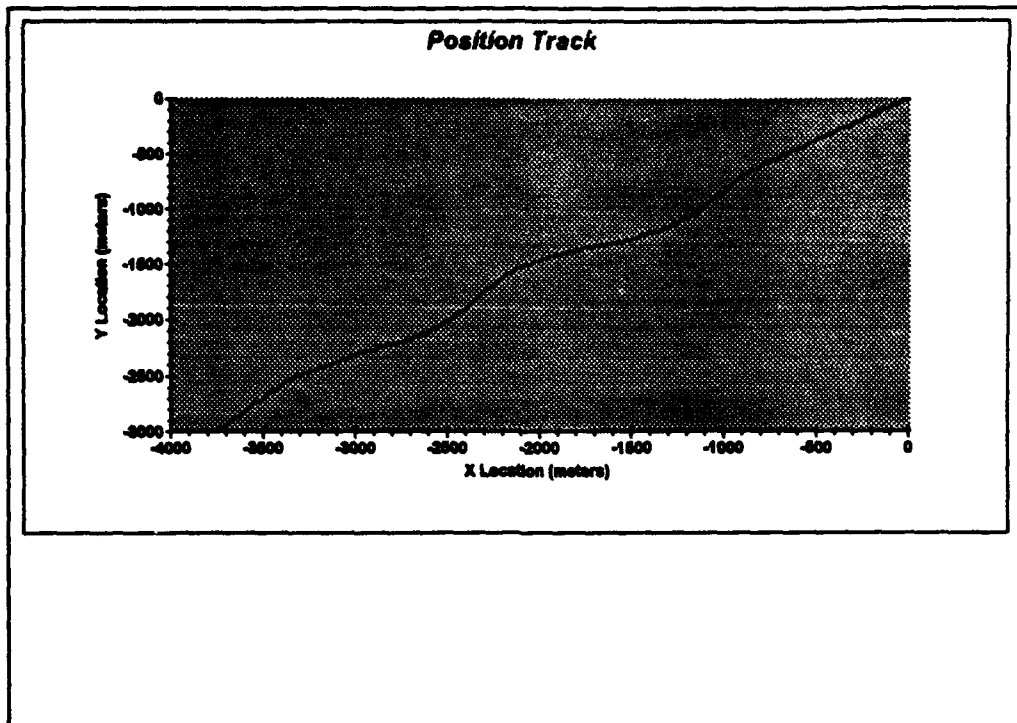


Figure A39. Run 77 Position Plot

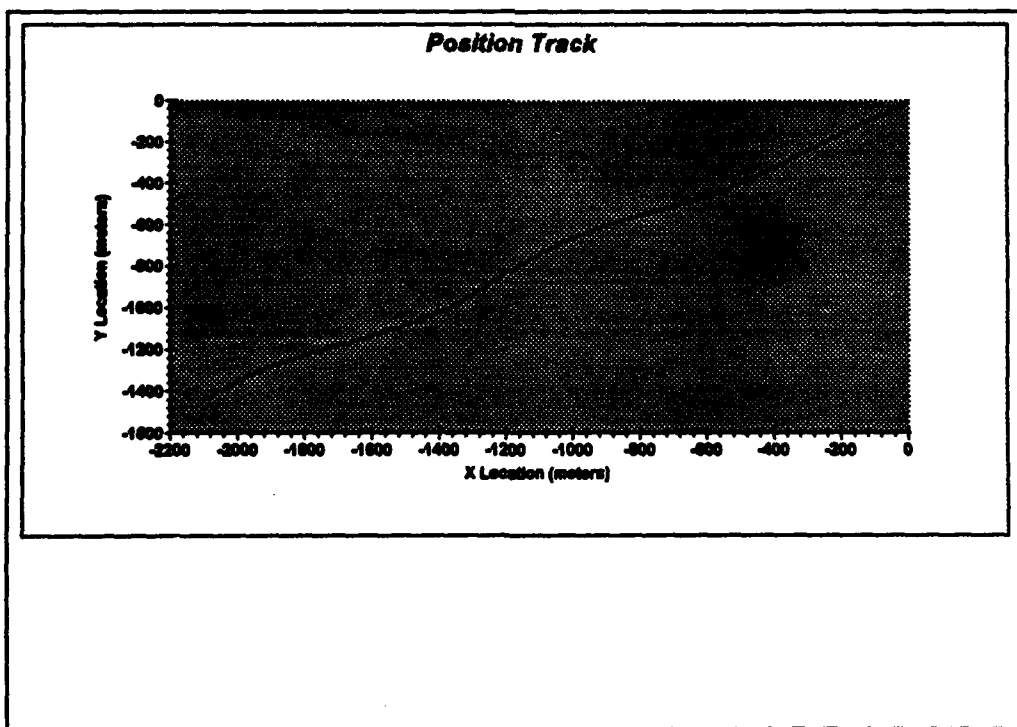


Figure A40. Run 78 Position Plot

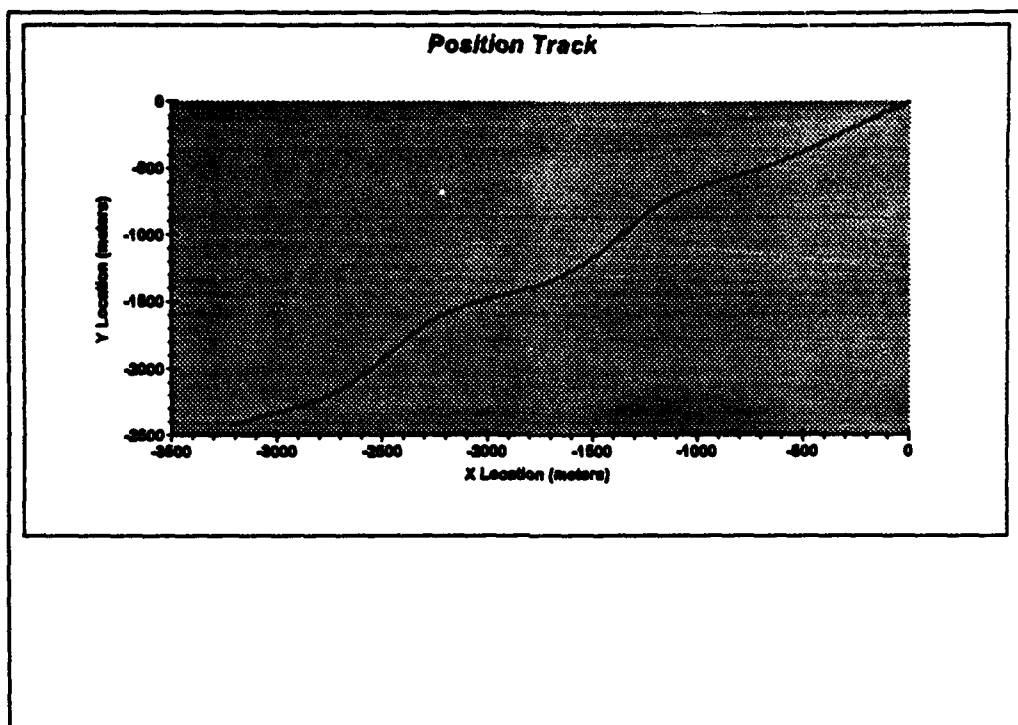


Figure A41. Run 79 Position Plot

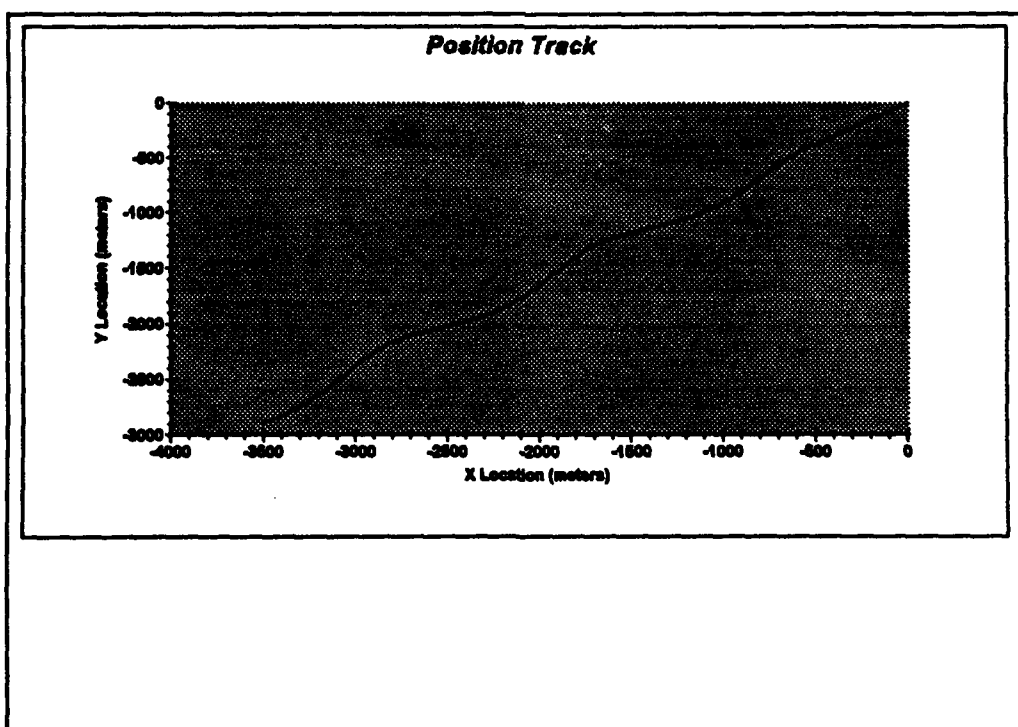


Figure A42. Run 80 Position Plot

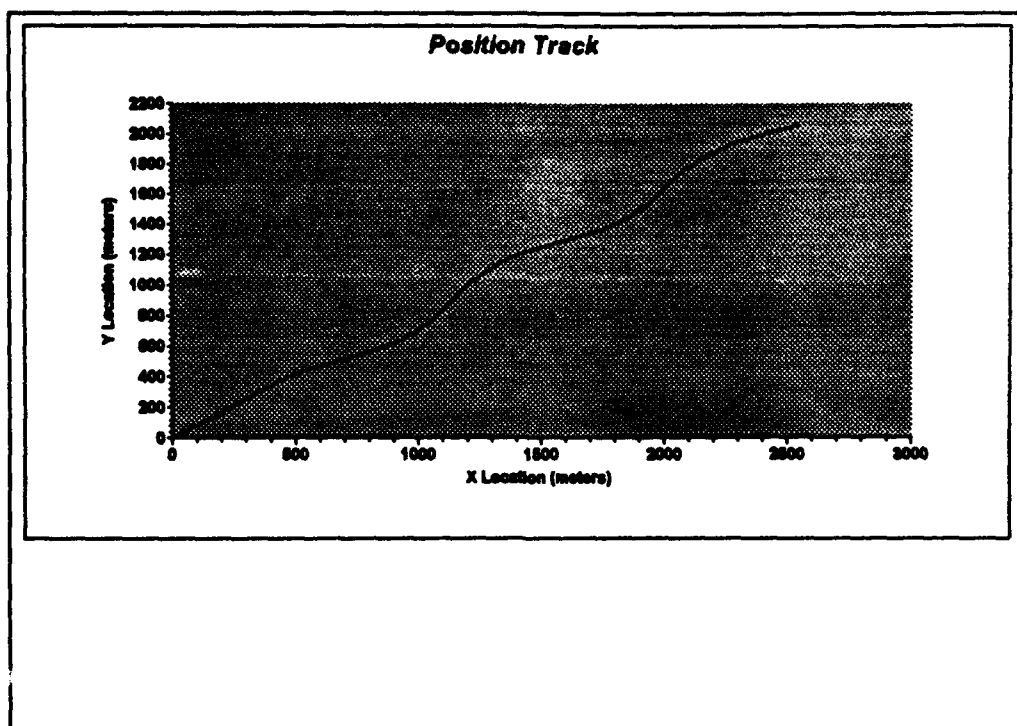


Figure A43. Run 81 Position Plot

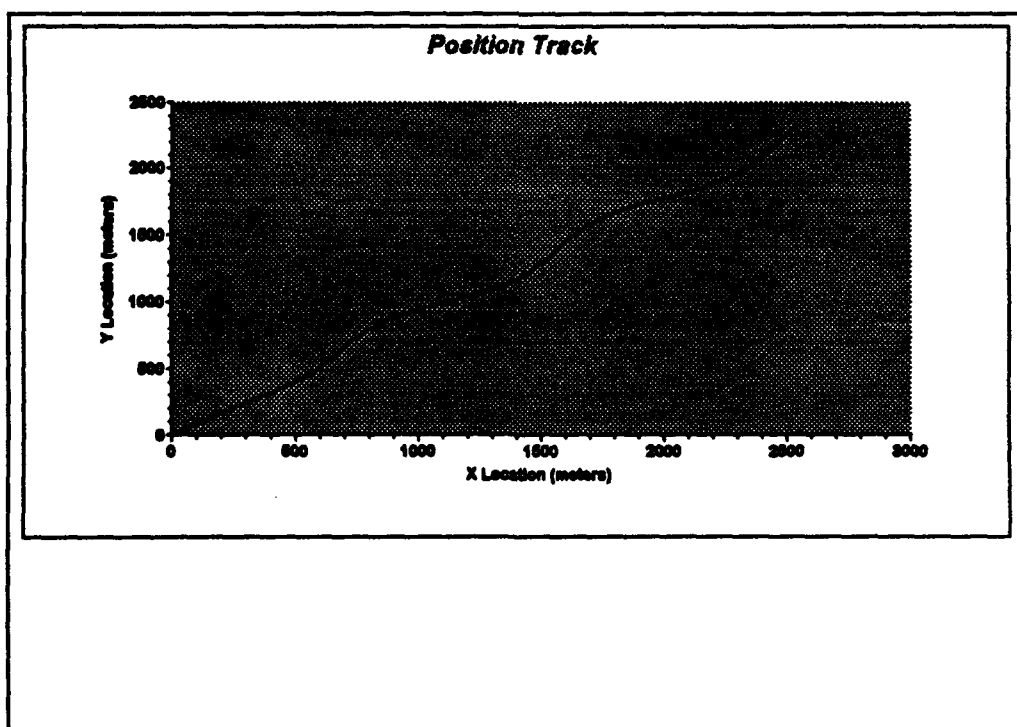


Figure A44. Run 82 Position Plot

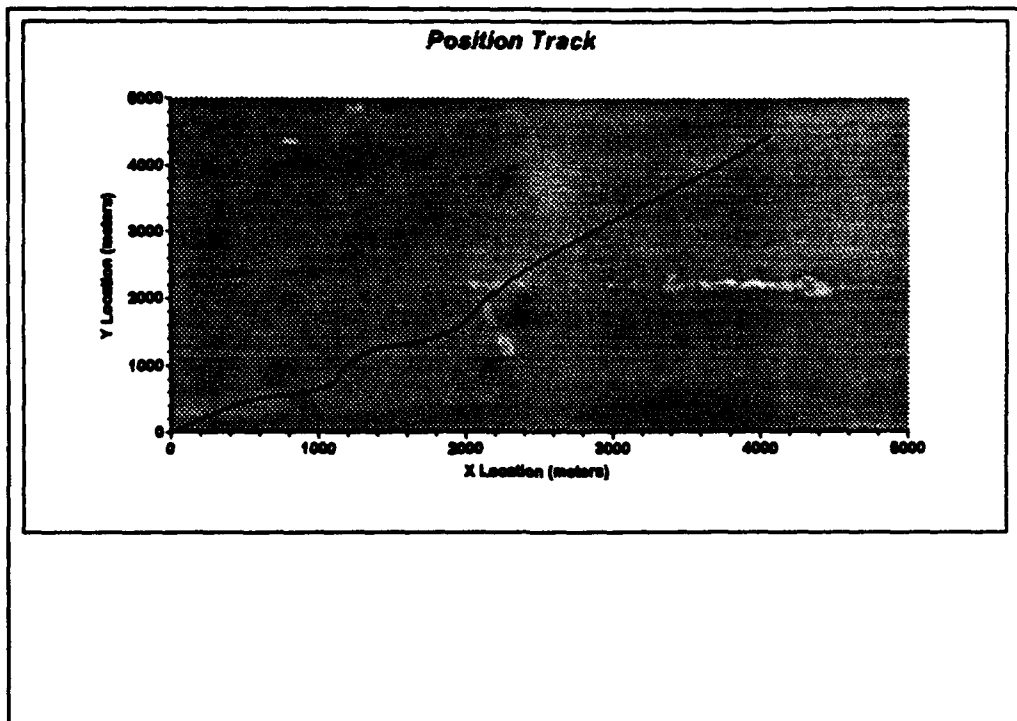


Figure A45. Run 83 Position Plot

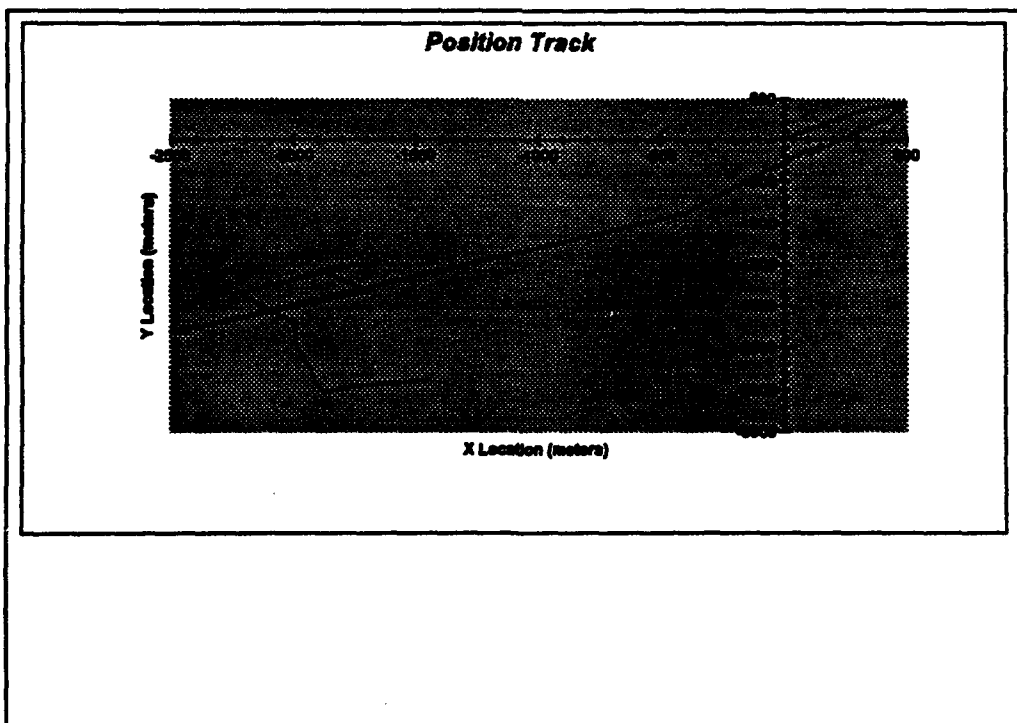


Figure A46. Run 84 Position Plot

Appendix B - Data Minimum Analysis

Table B1. Minimum Analysis

RUN DATE-TIME-GROUP = 040930Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 29
 COMMENTS: Speed Calibration Tests 4 May 0930 hrs
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 09:41:08
 RUN FINISHED AT TIME: 09:46:08

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	2.234E+02	8.697E-01	2.255E+02	2.221E+02	
2 SHIPS COURSE	DEG	2.233E+02	8.588E-01	2.254E+02	2.221E+02	
3 RUDDERANGLE	DEG	5.380E+00	2.565E+00	8.393E+00	-2.684E+00	
4 WIND SPEED	KTS	2.296E+01	9.274E-01	2.493E+01	2.042E+01	
5 WIND DIR	DEG	3.349E+02	3.343E+00	3.443E+02	3.255E+02	
6 PITCH	DEG	-2.734E-02	4.607E-03	-2.374E-02	-3.322E-02	
7 ROLL ANG	DEG	-5.729E-02	9.190E-03	-4.654E-02	-6.513E-02	
8 YAW	DEG	-2.950E+00	4.173E+00	1.757E+00	-9.025E+00	
9 vert acc	g's	-8.338E-03	2.105E-02	8.029E-02	-8.616E-02	
10 tran acc	g's	6.030E-03	1.816E-02	5.190E-02	-4.416E-02	
11 long tran	g's	-5.633E-03	1.365E-02	4.738E-02	-6.286E-02	

RUN DATE-TIME-GROUP = 040947Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 30
 COMMENTS: Speed Calibration Tests 4 May 0930 hrs
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 09:51:29
 RUN FINISHED AT TIME: 09:56:30

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	2.241E+02	6.570E-01	2.259E+02	2.225E+02	
2 SHIPS COURSE	DEG	2.240E+02	6.436E-01	2.258E+02	2.225E+02	
3 RUDDERANGLE	DEG	3.568E+00	3.353E+00	7.229E+00	-4.969E+00	
4 WIND SPEED	KTS	2.606E+01	1.174E+00	2.867E+01	2.322E+01	
5 WIND DIR	DEG	3.395E+02	2.760E+00	3.473E+02	3.323E+02	
6 PITCH	DEG	-2.933E-02	4.670E-03	-2.374E-02	-3.322E-02	
7 ROLL ANG	DEG	-6.001E-02	8.312E-03	-4.654E-02	-6.513E-02	
8 YAW	DEG	2.501E-01	6.680E-01	2.193E+00	-1.355E+00	
9 vert acc	g's	-8.177E-03	2.642E-02	6.271E-02	-8.147E-02	
10 tran acc	g's	8.510E-03	2.053E-02	7.962E-02	-6.286E-02	
11 long tran	g's	-5.663E-03	1.838E-02	4.609E-02	-5.835E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 040959Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 31
 COMMENTS: Speed Calibration Tests 4 May 0930 hrs
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 10:02:34
 RUN FINISHED AT TIME: 10:07:34

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	2.246E+02	1.324E+00	2.290E+02	2.226E+02
2	SHIPS COURSE	DEG	2.245E+02	1.309E+00	2.288E+02	2.226E+02
3	RUDDERANGLE	DEG	1.981E+00	5.984E+00	1.209E+01	-1.629E+01
4	WIND SPEED	KTS	2.824E+01	9.423E-01	3.045E+01	2.662E+01
5	WIND DIR	DEG	3.468E+02	2.349E+00	3.524E+02	3.406E+02
6	PITCH	DEG	-2.845E-02	4.746E-03	-2.374E-02	-3.322E-02
7	ROLL ANG	DEG	-5.295E-02	8.847E-03	-4.654E-02	-6.513E-02
8	YAW	DEG	7.737E-01	1.339E+00	5.265E+00	-1.276E+00
9	vert acc	g's	-8.463E-03	2.589E-02	5.802E-02	-8.498E-02
10	tran acc	g's	8.174E-03	1.784E-02	6.221E-02	-3.578E-02
11	long tran	g's	-5.241E-03	1.703E-02	4.223E-02	-6.286E-02

RUN DATE-TIME-GROUP = 041009Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 32
 COMMENTS: Speed Calibration Tests 4 May 0930 hrs
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 10:14:10
 RUN FINISHED AT TIME: 10:19:11

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	2.245E+02	6.712E-01	2.262E+02	2.232E+02
2	SHIPS COURSE	DEG	2.244E+02	6.646E-01	2.261E+02	2.232E+02
3	RUDDERANGLE	DEG	4.735E-01	2.121E+00	4.745E+00	-3.892E+00
4	WIND SPEED	KTS	3.136E+01	8.102E-01	3.338E+01	2.960E+01
5	WIND DIR	DEG	2.464E+02	1.631E+02	3.600E+02	0.000E+00
6	PITCH	DEG	-2.604E-02	4.072E-03	-2.374E-02	-3.322E-02
7	ROLL ANG	DEG	-4.755E-02	4.220E-03	-4.654E-02	-6.513E-02
8	YAW	DEG	7.021E-01	6.863E-01	2.497E+00	-6.370E-01
9	vert acc	g's	-8.310E-03	2.475E-02	7.912E-02	-7.795E-02
10	tran acc	g's	2.681E-03	2.010E-02	5.576E-02	-5.706E-02
11	long tran	g's	-5.766E-03	1.578E-02	4.996E-02	-5.512E-02

Table B1. (Continued)

RUN DATE-TIME-GROUP = 041021Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 33
 COMMENTS: Speed Calibration Tests 4 May 0930 hrs
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 10:25:40
 RUN FINISHED AT TIME: 10:30:40

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	2.249E+02	9.022E-01	2.267E+02	2.226E+02
2	SHIPS COURSE	DEG	2.248E+02	8.923E-01	2.266E+02	2.226E+02
3	RUDDERANGLE	DEG	-4.054E-01	3.139E+00	6.591E+00	-7.892E+00
4	WIND SPEED	KTS	2.959E+01	4.152E-01	3.050E+01	2.884E+01
5	WIND DIR	DEG	6.175E+00	1.633E+00	1.090E+01	1.495E+00
6	PITCH	DEG	-2.650E-02	4.311E-03	-2.374E-02	-3.322E-02
7	ROLL ANG	DEG	-4.794E-02	4.916E-03	-4.654E-02	-6.513E-02
8	YAW	DEG	1.091E+00	9.207E-01	3.044E+00	-1.236E+00
9	vert acc	g's	-8.020E-03	3.218E-02	8.850E-02	-1.002E-01
10	tran acc	g's	-5.679E-03	2.423E-02	6.157E-02	-8.220E-02
11	long tran	g's	-5.927E-03	1.734E-02	5.383E-02	-6.673E-02

RUN DATE-TIME-GROUP = 041108Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 34
 COMMENTS: Speed Calibration Tests 4 May 0930 hrs
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 11:15:24
 RUN FINISHED AT TIME: 11:20:25

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	4.573E+01	7.131E-01	4.721E+01	4.431E+01
2	SHIPS COURSE	DEG	4.570E+01	7.046E-01	4.712E+01	4.431E+01
3	RUDDERANGLE	DEG	-2.689E+00	2.852E+00	5.075E+00	-7.980E+00
4	WIND SPEED	KTS	2.410E+01	3.982E+01	9.995E+01	0.000E+00
5	WIND DIR	DEG	1.794E+02	3.561E+01	2.572E+02	1.151E+02
6	PITCH	DEG	-2.666E-02	4.714E-03	-1.425E-02	-3.322E-02
7	ROLL ANG	DEG	-5.440E-02	9.800E-03	-2.794E-02	-6.513E-02
8	YAW	DEG	-9.025E+00	1.417E-06	-9.025E+00	-9.025E+00
9	vert acc	g's	-9.903E-03	1.225E-02	2.285E-02	-4.044E-02
10	tran acc	g's	-1.265E-02	5.245E-02	1.093E-01	-1.280E-01
11	long tran	g's	-5.221E-03	6.113E-03	9.991E-03	-2.547E-02

Table B1. (Continued)

RUN DATE-TIME-GROUP = 041123Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 35
 COMMENTS: Speed Calibration Tests 4 May 0930 hrs
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 11:27:34
 RUN FINISHED AT TIME: 11:32:34

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	4.454E+01	6.631E-01	4.580E+01	4.281E+01	
2 SHIPS COURSE	DEG	4.449E+01	6.553E-01	4.571E+01	4.281E+01	
3 RUDDERANGLE	DEG	-1.854E+00	2.119E+00	1.822E+00	-7.101E+00	
4 WIND SPEED	KTS	1.999E+00	8.541E-01	4.029E+00	1.709E-01	
5 WIND DIR	DEG	8.056E+01	3.826E+01	3.599E+02	1.758E+00	
6 PITCH	DEG	-3.284E-02	6.867E-03	-2.374E-02	-5.220E-02	
7 ROLL ANG	DEG	-6.759E-02	1.115E-02	-4.654E-02	-1.023E-01	
8 YAW	DEG	-9.025E+00	1.417E-06	-9.025E+00	-9.025E+00	
9 vert acc	g's	-1.161E-02	9.399E-03	1.231E-02	-3.341E-02	
10 tran acc	g's	-1.203E-02	7.964E-02	1.518E-01	-1.821E-01	
11 long tran	g's	-5.188E-03	5.207E-03	9.347E-03	-1.966E-02	

RUN DATE-TIME-GROUP = 041135Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 36
 COMMENTS: Speed Calibration Tests 4 May 0930 hrs
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 11:38:12
 RUN FINISHED AT TIME: 11:43:12

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	4.543E+01	9.600E-01	4.756E+01	4.360E+01	
2 SHIPS COURSE	DEG	4.539E+01	9.531E-01	4.747E+01	4.360E+01	
3 RUDDERANGLE	DEG	-1.453E+00	2.129E+00	2.503E+00	-6.684E+00	
4 WIND SPEED	KTS	8.387E+00	8.319E-01	1.035E+01	6.325E+00	
5 WIND DIR	DEG	6.409E+01	6.485E+00	7.754E+01	4.598E+01	
6 PITCH	DEG	-3.497E-02	3.761E-03	-2.374E-02	-4.271E-02	
7 ROLL ANG	DEG	-6.945E-02	7.855E-03	-6.513E-02	-8.373E-02	
8 YAW	DEG	-9.025E+00	1.417E-06	-9.025E+00	-9.025E+00	
9 vert acc	g's	-1.019E-02	7.945E-03	9.961E-03	-3.458E-02	
10 tran acc	g's	-1.395E-02	5.362E-02	1.402E-01	-1.725E-01	
11 long tran	g's	-5.252E-03	5.143E-03	6.123E-03	-1.709E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 041150Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 37
 COMMENTS: Speed Calibration Tests 4 May 0930 hrs
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 11:51:17
 RUN FINISHED AT TIME: 11:56:18

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	4.500E+01	1.047E+00	4.695E+01	4.211E+01
2	SHIPS COURSE	DEG	4.496E+01	1.038E+00	4.686E+01	4.211E+01
3	RUDDERANGLE	DEG	-1.426E+00	2.983E+00	5.163E+00	-7.079E+00
4	WIND SPEED	KTS	1.118E+01	5.479E-01	1.282E+01	9.866E+00
5	WIND DIR	DEG	5.140E+01	6.096E+00	6.347E+01	3.262E+01
6	PITCH	DEG	-3.308E-02	2.362E-03	-2.374E-02	-4.271E-02
7	ROLL ANG	DEG	-6.546E-02	4.099E-03	-4.654E-02	-8.373E-02
8	YAW	DEG	-9.805E-01	1.060E+00	1.016E+00	-3.925E+00
9	vert acc	g's	-9.797E-03	8.857E-03	1.113E-02	-3.341E-02
10	tran acc	g's	-1.589E-02	6.365E-02	1.293E-01	-1.563E-01
11	long tran	g's	-5.557E-03	4.584E-03	6.123E-03	-1.966E-02

RUN DATE-TIME-GROUP = 041158Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 38
 COMMENTS: Speed Calibration Tests 4 May 0930 hrs
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 12:02:29
 RUN FINISHED AT TIME: 12:07:30

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	4.506E+01	1.066E+00	4.721E+01	4.255E+01
2	SHIPS COURSE	DEG	4.502E+01	1.056E+00	4.712E+01	4.255E+01
3	RUDDERANGLE	DEG	-2.015E+00	2.957E+00	3.053E+00	-7.475E+00
4	WIND SPEED	KTS	1.250E+01	5.649E-01	1.397E+01	1.133E+01
5	WIND DIR	DEG	4.628E+01	3.159E+00	5.319E+01	3.771E+01
6	PITCH	DEG	-3.259E-02	2.367E-03	-2.374E-02	-3.322E-02
7	ROLL ANG	DEG	-6.472E-02	2.742E-03	-4.654E-02	-6.513E-02
8	YAW	DEG	-8.931E-01	1.082E+00	1.289E+00	-3.489E+00
9	vert acc	g's	-8.766E-03	6.327E-03	1.113E-02	-3.224E-02
10	tran acc	g's	-1.490E-02	3.273E-02	5.641E-02	-9.122E-02
11	long tran	g's	-5.361E-03	4.341E-03	8.702E-03	-1.966E-02

Table B1. (Continued)

RUN DATE-TIME-GROUP = 051404Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 39
 COMMENTS: Turnning Tests 05 MAY 1991
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 14:24:11
 RUN FINISHED AT TIME: 14:33:44

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	2.107E+02	1.118E+02	3.600E+02	8.790E-02	
2 SHIPS COURSE	DEG	2.108E+02	1.116E+02	3.600E+02	8.791E-02	
3 RUDDERANGLE	DEG	8.583E+00	4.900E+00	1.209E+01	-3.035E+00	
4 WIND SPEED	KTS	1.025E+01	2.860E+00	1.394E+01	6.178E+00	
5 WIND DIR	DEG	2.711E+02	1.383E+02	3.598E+02	0.000E+00	
6 PITCH	DEG	-1.842E+00	2.866E-01	-9.725E-01	-2.690E+00	
7 ROLL ANG	DEG	-9.265E-01	4.771E-01	4.646E-02	-2.260E+00	
8 YAW	DEG	1.938E+00	7.506E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-9.040E-03	1.673E-02	4.630E-02	-5.802E-02	
10 tran acc	g's	-8.629E-03	1.206E-02	4.223E-02	-3.707E-02	
11 long tran	g's	-4.665E-03	1.029E-02	2.740E-02	-3.707E-02	

RUN DATE-TIME-GROUP = 052141Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 40
 COMMENTS: Turnning Tests 05 MAY 1991
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 21:42:50
 RUN FINISHED AT TIME: 22:02:51

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	2.030E+02	1.052E+02	3.600E+02	-9.052E-06	
2 SHIPS COURSE	DEG	2.032E+02	1.050E+02	3.600E+02	8.791E-02	
3 RUDDERANGLE	DEG	1.106E+01	2.860E+00	1.191E+01	-1.870E+00	
4 WIND SPEED	KTS	9.849E+00	1.995E+00	1.282E+01	5.470E+00	
5 WIND DIR	DEG	2.412E+02	1.553E+02	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.869E+00	2.620E-01	-1.029E+00	-2.699E+00	
7 ROLL ANG	DEG	-8.817E-01	3.851E-01	2.882E-01	-2.241E+00	
8 YAW	DEG	1.103E-02	8.541E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-9.270E-03	1.526E-02	4.864E-02	-6.271E-02	
10 tran acc	g's	-1.141E-02	1.213E-02	3.836E-02	-5.835E-02	
11 long tran	g's	-4.286E-03	8.907E-03	2.675E-02	-3.643E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 052216Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 41
 COMMENTS: Turnning Tests 05 MAY 1991
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 22:43:37
 RUN FINISHED AT TIME: 23:03:38

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.507E+02	9.657E+01	3.600E+02	-9.052E-06	
2 SHIPS COURSE	DEG	1.507E+02	9.652E+01	3.599E+02	0.000E+00	
3 RUDDERANGLE	DEG	1.036E+01	3.656E+00	1.316E+01	-4.530E+00	
4 WIND SPEED	KTS	1.143E+01	3.829E+00	1.717E+01	3.028E+00	
5 WIND DIR	DEG	1.388E+02	1.521E+02	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.878E+00	2.706E-01	-9.630E-01	-2.718E+00	
7 ROLL ANG	DEG	-7.445E-01	4.476E-01	4.184E-01	-2.688E+00	
8 YAW	DEG	6.352E+00	5.451E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-8.874E-03	1.278E-02	4.044E-02	-5.920E-02	
10 tran acc	g's	-1.327E-02	1.094E-02	3.127E-02	-5.190E-02	
11 long tran	g's	-4.277E-03	8.284E-03	2.482E-02	-3.449E-02	

RUN DATE-TIME-GROUP = 052343Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 42
 COMMENTS: Turnning Tests 05 MAY 1991
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 23:52:37
 RUN FINISHED AT TIME: 00:12:37

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.621E+02	1.051E+02	3.600E+02	-9.052E-06	
2 SHIPS COURSE	DEG	1.622E+02	1.050E+02	3.600E+02	1.758E-01	
3 RUDDERANGLE	DEG	9.651E+00	4.235E+00	1.488E+01	-1.187E+01	
4 WIND SPEED	KTS	1.703E+01	5.461E+00	2.532E+01	7.155E+00	
5 WIND DIR	DEG	1.816E+02	1.591E+02	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.959E+00	2.723E-01	-1.210E+00	-2.870E+00	
7 ROLL ANG	DEG	4.833E-01	8.368E-01	2.464E+00	-3.413E+00	
8 YAW	DEG	6.109E+00	5.888E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-9.376E-03	1.554E-02	4.630E-02	-6.740E-02	
10 tran acc	g's	-3.397E-02	1.992E-02	5.576E-02	-8.478E-02	
11 long tran	g's	-2.826E-03	9.159E-03	2.998E-02	-3.578E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 060017Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 43
 COMMENTS: Turnning Tests 05 MAY 1991
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 00:37:20
 RUN FINISHED AT TIME: 00:48:16

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.906E+02	9.392E+01	3.600E+02	1.758E-01	
2 SHIPS COURSE	DEG	1.905E+02	9.385E+01	3.598E+02	0.000E+00	
3 RUDDERANGLE	DEG	9.272E+00	4.223E+00	1.369E+01	-6.793E+00	
4 WIND SPEED	KTS	1.854E+01	4.717E+00	2.527E+01	1.048E+01	
5 WIND DIR	DEG	2.349E+02	1.558E+02	3.600E+02	8.791E-02	
6 PITCH	DEG	-1.957E+00	2.841E-01	-9.155E-01	-3.117E+00	
7 ROLL ANG	DEG	6.023E-01	9.452E-01	3.059E+00	-1.813E+00	
8 YAW	DEG	-1.755E+00	8.066E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-9.981E-03	2.056E-02	6.974E-02	-9.202E-02	
10 tran acc	g's	-3.594E-02	2.095E-02	2.675E-02	-9.058E-02	
11 long tran	g's	-3.350E-03	1.113E-02	4.545E-02	-5.190E-02	

RUN DATE-TIME-GROUP = 060454Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 44
 COMMENTS: turning tests con't
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 04:55:09
 RUN FINISHED AT TIME: 05:15:10

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.785E+02	1.023E+02	3.599E+02	-9.052E-06	
2 SHIPS COURSE	DEG	1.785E+02	1.023E+02	3.599E+02	0.000E+00	
3 RUDDERANGLE	DEG	-8.320E+00	2.260E+00	2.789E+00	-1.046E+01	
4 WIND SPEED	KTS	1.768E+01	6.992E+00	2.691E+01	5.055E+00	
5 WIND DIR	DEG	1.857E+02	1.571E+02	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.991E+00	2.440E-01	-1.267E+00	-2.794E+00	
7 ROLL ANG	DEG	-1.419E+00	6.301E-01	8.276E-01	-4.157E+00	
8 YAW	DEG	-3.117E+00	7.925E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-9.735E-03	1.471E-02	3.926E-02	-5.920E-02	
10 tran acc	g's	6.211E-04	1.559E-02	5.834E-02	-5.770E-02	
11 long tran	g's	-4.124E-03	9.304E-03	2.675E-02	-3.578E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 060518Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 45
 COMMENTS: turning tests con't
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 05:36:06
 RUN FINISHED AT TIME: 05:56:06

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.769E+02	1.079E+02	3.600E+02	-9.052E-06	
2 SHIPS COURSE	DEG	1.769E+02	1.078E+02	3.599E+02	0.000E+00	
3 RUDDERANGLE	DEG	-7.748E+00	1.651E+00	1.163E+00	-1.018E+01	
4 WIND SPEED	KTS	1.630E+01	4.737E+00	2.322E+01	6.984E+00	
5 WIND DIR	DEG	1.883E+02	1.606E+02	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.977E+00	2.504E-01	-1.181E+00	-3.126E+00	
7 ROLL ANG	DEG	-1.453E+00	7.174E-01	1.200E+00	-2.929E+00	
8 YAW	DEG	5.544E+00	6.472E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-9.065E-03	1.348E-02	4.161E-02	-6.271E-02	
10 tran acc	g's	8.425E-04	1.678E-02	4.932E-02	-5.899E-02	
11 long tran	g's	-4.158E-03	8.316E-03	3.320E-02	-3.578E-02	

RUN DATE-TIME-GROUP = 060558Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 46
 COMMENTS: turning tests con't
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 06:22:38
 RUN FINISHED AT TIME: 06:42:38

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.833E+02	1.000E+02	3.600E+02	-9.052E-06	
2 SHIPS COURSE	DEG	1.833E+02	9.997E+01	3.600E+02	0.000E+00	
3 RUDDERANGLE	DEG	-7.672E+00	2.689E+00	3.998E+00	-1.165E+01	
4 WIND SPEED	KTS	2.055E+01	6.469E+00	2.960E+01	9.499E+00	
5 WIND DIR	DEG	2.064E+02	1.594E+02	3.600E+02	0.000E+00	
6 PITCH	DEG	-2.019E+00	2.436E-01	-1.039E+00	-2.775E+00	
7 ROLL ANG	DEG	-1.872E+00	8.631E-01	9.578E-01	-4.696E+00	
8 YAW	DEG	-2.507E+00	7.991E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-9.695E-03	1.631E-02	6.622E-02	-8.616E-02	
10 tran acc	g's	8.024E-03	1.995E-02	8.220E-02	-8.155E-02	
11 long tran	g's	-3.920E-03	1.013E-02	3.256E-02	-4.352E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 060652Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 47
 COMMENTS: turning tests con't
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 07:00:16
 RUN FINISHED AT TIME: 07:20:17

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.631E+02	1.063E+02	3.599E+02	-9.052E-06	
2 SHIPS COURSE	DEG	1.632E+02	1.063E+02	3.600E+02	0.000E+00	
3 RUDDERANGLE	DEG	-7.872E+00	2.280E+00	3.624E+00	-1.020E+01	
4 WIND SPEED	KTS	1.833E+01	5.016E+00	2.618E+01	1.033E+01	
5 WIND DIR	DEG	1.657E+02	1.630E+02	3.600E+02	0.000E+00	
6 PITCH	DEG	-2.039E+00	2.799E-01	-9.819E-01	-2.984E+00	
7 ROLL ANG	DEG	-1.891E+00	8.992E-01	2.539E+00	-4.287E+00	
8 YAW	DEG	-3.386E+00	8.229E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-9.839E-03	1.808E-02	5.450E-02	-7.443E-02	
10 tran acc	g's	8.158E-03	2.124E-02	7.059E-02	-1.028E-01	
11 long tran	g's	-3.824E-03	1.094E-02	3.384E-02	-4.868E-02	

RUN DATE-TIME-GROUP = 060729Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 48
 COMMENTS: turning tests con't
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 07:31:14
 RUN FINISHED AT TIME: 07:51:14

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.581E+02	1.034E+02	3.600E+02	-9.052E-06	
2 SHIPS COURSE	DEG	1.582E+02	1.033E+02	3.598E+02	0.000E+00	
3 RUDDERANGLE	DEG	8.763E+00	4.361E+00	1.259E+01	-3.629E+00	
4 WIND SPEED	KTS	1.773E+01	4.385E+00	2.398E+01	9.890E+00	
5 WIND DIR	DEG	1.662E+02	1.631E+02	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.897E+00	2.786E-01	-9.630E-01	-3.022E+00	
7 ROLL ANG	DEG	1.798E+00	1.087E+00	4.287E+00	-2.260E+00	
8 YAW	DEG	6.191E+00	5.866E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-1.036E-02	1.569E-02	4.395E-02	-6.271E-02	
10 tran acc	g's	-5.687E-02	2.346E-02	3.578E-02	-1.344E-01	
11 long tran	g's	-3.235E-03	1.014E-02	3.771E-02	-3.772E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 060756Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 49
 COMMENTS: turning tests con't
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 08:02:04
 RUN FINISHED AT TIME: 08:22:05

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.909E+02	9.626E+01	3.599E+02	-9.052E-06	
2 SHIPS COURSE	DEG	1.909E+02	9.616E+01	3.600E+02	1.758E-01	
3 RUDDERANGLE	DEG	9.112E+00	4.466E+00	1.250E+01	-2.903E+00	
4 WIND SPEED	KTS	2.046E+01	6.223E+00	2.955E+01	6.838E+00	
5 WIND DIR	DEG	2.213E+02	1.527E+02	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.900E+00	2.860E-01	-6.784E-01	-2.785E+00	
7 ROLL ANG	DEG	1.612E+00	1.008E+00	3.989E+00	-1.553E+00	
8 YAW	DEG	-1.139E+00	8.434E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-1.090E-02	1.969E-02	5.099E-02	-7.795E-02	
10 tran acc	g's	-5.477E-02	2.228E-02	1.450E-02	-1.222E-01	
11 long tran	g's	-3.270E-03	1.261E-02	4.094E-02	-5.190E-02	

RUN DATE-TIME-GROUP = 062255Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 50
 COMMENTS: turning tests con't
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 23:01:59
 RUN FINISHED AT TIME: 23:21:59

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.793E+02	1.054E+02	3.600E+02	-9.052E-06	
2 SHIPS COURSE	DEG	1.794E+02	1.053E+02	3.600E+02	8.791E-02	
3 RUDDERANGLE	DEG	2.755E+01	7.222E+00	3.022E+01	-4.398E+00	
4 WIND SPEED	KTS	9.313E+00	3.293E+00	1.346E+01	1.832E+00	
5 WIND DIR	DEG	1.919E+02	1.497E+02	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.855E+00	2.991E-01	-5.645E-01	-3.012E+00	
7 ROLL ANG	DEG	-5.761E-01	4.302E-01	6.788E-01	-2.297E+00	
8 YAW	DEG	-4.101E+00	7.545E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-1.024E-02	1.450E-02	4.395E-02	-7.326E-02	
10 tran acc	g's	-1.564E-02	1.367E-02	3.062E-02	-6.286E-02	
11 long tran	g's	-4.762E-03	9.670E-03	2.740E-02	-3.900E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 062332Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 51
 COMMENTS: turning tests con't
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 23:37:00
 RUN FINISHED AT TIME: 23:57:00

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.846E+02	1.032E+02	3.599E+02	-9.052E-06	
2 SHIPS COURSE	DEG	1.845E+02	1.031E+02	3.598E+02	0.000E+00	
3 RUDDERANGLE	DEG	-2.879E+01	6.893E+00	2.591E+00	-3.060E+01	
4 WIND SPEED	KTS	8.530E+00	2.926E+00	1.238E+01	1.978E+00	
5 WIND DIR	DEG	1.728E+02	1.565E+02	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.914E+00	3.046E-01	-8.871E-01	-2.832E+00	
7 ROLL ANG	DEG	-1.617E+00	4.235E-01	-4.654E-02	-2.948E+00	
8 YAW	DEG	-4.436E+00	7.392E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-1.021E-02	1.506E-02	4.044E-02	-6.740E-02	
10 tran acc	g's	1.839E-03	1.187E-02	4.996E-02	-4.094E-02	
11 long tran	g's	-4.686E-03	1.007E-02	3.256E-02	-4.287E-02	

RUN DATE-TIME-GROUP = 070006Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 52
 COMMENTS: turning tests con't
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 00:17:01
 RUN FINISHED AT TIME: 00:37:01

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.834E+02	1.022E+02	3.600E+02	-9.052E-06	
2 SHIPS COURSE	DEG	1.835E+02	1.021E+02	3.599E+02	0.000E+00	
3 RUDDERANGLE	DEG	2.792E+01	6.901E+00	3.057E+01	-4.618E+00	
4 WIND SPEED	KTS	8.180E+00	2.927E+00	1.504E+01	3.761E+00	
5 WIND DIR	DEG	1.970E+02	1.607E+02	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.817E+00	3.102E-01	-7.448E-01	-2.946E+00	
7 ROLL ANG	DEG	-4.526E-01	4.254E-01	8.462E-01	-2.148E+00	
8 YAW	DEG	5.082E+00	6.982E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-9.498E-03	1.609E-02	4.864E-02	-6.623E-02	
10 tran acc	g's	-1.762E-02	1.201E-02	2.353E-02	-5.512E-02	
11 long tran	g's	-4.684E-03	1.135E-02	3.578E-02	-5.319E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 070038Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 53
 COMMENTS: turning tests con't
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 00:43:58
 RUN FINISHED AT TIME: 01:03:13

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	1.893E+02	1.053E+02	3.599E+02	-9.052E-06
2	SHIPS COURSE	DEG	1.895E+02	1.052E+02	3.600E+02	8.791E-02
3	RUDDERANGLE	DEG	-2.312E+01	1.479E+01	2.923E+01	-3.290E+01
4	WIND SPEED	KTS	9.133E+00	3.030E+00	1.519E+01	3.590E+00
5	WIND DIR	DEG	1.660E+02	1.575E+02	3.600E+02	0.000E+00
6	PITCH	DEG	-1.584E+00	7.639E-01	2.784E+00	-3.268E+00
7	ROLL ANG	DEG	-1.242E+00	7.429E-01	5.682E+00	-3.617E+00
8	YAW	DEG	4.179E+00	7.446E+00	9.025E+00	-9.025E+00
9	vert acc	g's	-9.416E-03	1.798E-02	7.677E-02	-9.436E-02
10	tran acc	g's	-9.620E-04	1.407E-02	6.092E-02	-4.932E-02
11	long tran	g's	-4.494E-03	1.083E-02	3.900E-02	-4.674E-02

RUN DATE-TIME-GROUP = 071827Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 54
 COMMENTS: Aux propulsion unit maneuvers 7 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 18:55:04
 RUN FINISHED AT TIME: 19:00:24

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	2.167E+02	7.942E+00	2.270E+02	1.993E+02
2	SHIPS COURSE	DEG	2.167E+02	7.917E+00	2.268E+02	1.993E+02
3	RUDDERANGLE	DEG	-1.099E+00	6.629E-02	-1.013E+00	-1.321E+00
4	WIND SPEED	KTS	1.372E+01	2.482E+00	1.675E+01	8.352E+00
5	WIND DIR	DEG	2.208E+02	1.231E+01	2.429E+02	1.861E+02
6	PITCH	DEG	-1.734E+00	2.840E-01	-8.681E-01	-2.405E+00
7	ROLL ANG	DEG	-1.209E+00	4.446E-01	2.696E-01	-2.371E+00
8	YAW	DEG	-5.920E+00	3.107E+00	2.423E-02	-9.025E+00
9	vert acc	g's	-1.034E-02	2.398E-02	4.864E-02	-7.678E-02
10	tran acc	g's	-6.409E-03	2.386E-02	6.737E-02	-7.511E-02
11	long tran	g's	-6.431E-03	9.534E-03	1.644E-02	-2.869E-02

Table B1. (Continued)

RUN DATE-TIME-GROUP = 0719012 MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 55
 COMMENTS: Aux propulsion unit maneuvers 7 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 19:08:41
 RUN FINISHED AT TIME: 19:13:59

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	2.305E+02	1.110E+00	2.325E+02	2.285E+02	
2 SHIPS COURSE	DEG	2.304E+02	1.100E+00	2.324E+02	2.284E+02	
3 RUDDERANGLE	DEG	-5.993E-01	2.110E+00	2.745E+00	-6.398E+00	
4 WIND SPEED	KTS	8.637E+00	2.269E+00	1.316E+01	4.860E+00	
5 WIND DIR	DEG	1.907E+02	9.345E+00	2.128E+02	1.679E+02	
6 PITCH	DEG	-1.751E+00	3.999E-01	-6.119E-01	-3.136E+00	
7 ROLL ANG	DEG	-1.022E+00	3.847E-01	2.786E-02	-1.888E+00	
8 YAW	DEG	1.204E+00	1.123E+00	3.330E+00	-9.014E-01	
9 vert acc	g's	-1.015E-02	2.499E-02	5.099E-02	-7.092E-02	
10 tran acc	g's	-9.800E-03	2.259E-02	4.223E-02	-7.446E-02	
11 long tran	g's	-6.210E-03	1.127E-02	2.933E-02	-3.707E-02	

RUN DATE-TIME-GROUP = 0719162 MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 56
 COMMENTS: Aux propulsion unit maneuvers 7 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 19:29:56
 RUN FINISHED AT TIME: 19:35:12

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	5.212E+01	1.365E+00	5.503E+01	4.958E+01	
2 SHIPS COURSE	DEG	5.215E+01	1.372E+00	5.503E+01	4.958E+01	
3 RUDDERANGLE	DEG	-4.804E+00	5.238E+00	7.558E+00	-1.394E+01	
4 WIND SPEED	KTS	2.557E+01	9.770E-01	2.703E+01	2.293E+01	
5 WIND DIR	DEG	3.370E+02	7.938E+01	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.724E+00	3.498E-01	-6.119E-01	-2.955E+00	
7 ROLL ANG	DEG	-1.045E+00	4.836E-01	5.300E-01	-2.092E+00	
8 YAW	DEG	1.350E+00	1.368E+00	4.313E+00	-1.254E+00	
9 vert acc	g's	-1.013E-02	2.411E-02	5.216E-02	-7.443E-02	
10 tran acc	g's	-1.308E-02	2.274E-02	4.416E-02	-7.898E-02	
11 long tran	g's	-5.966E-03	1.214E-02	2.933E-02	-4.352E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 071937Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 57
 COMMENTS: Aux propulsion unit maneuvers 7 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 19:37:52
 RUN FINISHED AT TIME: 19:43:16

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	5.988E+01	2.636E+00	6.479E+01	5.371E+01
2	SHIPS COURSE	DEG	5.991E+01	2.626E+00	6.479E+01	5.371E+01
3	RUDDERANGLE	DEG	-2.454E+00	8.083E-01	-5.516E-01	-5.914E+00
4	WIND SPEED	KTS	2.559E+01	7.301E-01	2.694E+01	2.344E+01
5	WIND DIR	DEG	3.482E+02	2.686E+00	3.567E+02	3.397E+02
6	PITCH	DEG	-1.713E+00	4.269E-01	-4.032E-01	-2.737E+00
7	ROLL ANG	DEG	-1.155E+00	5.512E-01	1.395E-01	-2.669E+00
8	YAW	DEG	4.377E+00	2.254E+00	9.025E+00	-1.206E+00
9	vert acc	g's	-1.041E-02	2.828E-02	4.981E-02	-7.326E-02
10	tran acc	g's	-1.187E-02	2.041E-02	4.480E-02	-7.253E-02
11	long tran	g's	-6.463E-03	1.474E-02	2.998E-02	-4.932E-02

RUN DATE-TIME-GROUP = 071944Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 58
 COMMENTS: Aux propulsion unit maneuvers 7 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 19:59:29
 RUN FINISHED AT TIME: 20:19:29

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	5.457E+01	1.004E+01	7.007E+01	4.402E+01
2	SHIPS COURSE	DEG	5.458E+01	1.003E+01	6.998E+01	3.411E+01
3	RUDDERANGLE	DEG	-5.601E+00	1.010E+01	1.600E+01	-2.497E+01
4	WIND SPEED	KTS	2.549E+01	1.561E+00	2.874E+01	2.039E+01
5	WIND DIR	DEG	3.006E+02	1.182E+02	3.600E+02	0.000E+00
6	PITCH	DEG	-1.751E+00	4.443E-01	-3.178E-01	-3.354E+00
7	ROLL ANG	DEG	-1.162E+00	5.486E-01	4.556E-01	-3.004E+00
8	YAW	DEG	3.122E+00	5.968E+00	9.025E+00	-9.025E+00
9	vert acc	g's	-1.021E-02	2.561E-02	7.912E-02	-9.084E-02
10	tran acc	g's	-1.203E-02	2.351E-02	6.479E-02	-9.122E-02
11	long tran	g's	-6.014E-03	1.459E-02	4.029E-02	-5.319E-02

Table B1. (Continued)

RUN DATE-TIME-GROUP = 072022Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 59
 COMMENTS: Aux propulsion unit maneuvers 7 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 20:23:36
 RUN FINISHED AT TIME: 20:43:36

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	5.932E+01	7.446E+00	7.024E+01	4.695E+01
2	SHIPS COURSE	DEG	5.934E+01	7.435E+00	7.015E+01	4.695E+01
3	RUDDERANGLE	DEG	-3.841E-01	1.135E+00	1.426E+00	-1.543E+01
4	WIND SPEED	KTS	2.660E+01	1.322E+00	2.872E+01	2.271E+01
5	WIND DIR	DEG	3.387E+02	6.421E+00	3.537E+02	3.238E+02
6	PITCH	DEG	-1.741E+00	5.052E-01	-1.471E-01	-3.420E+00
7	ROLL ANG	DEG	-1.303E+00	5.445E-01	5.114E-01	-2.669E+00
8	YAW	DEG	4.728E+00	5.049E+00	9.025E+00	-5.349E+00
9	vert acc	g's	-1.008E-02	2.640E-02	7.091E-02	-9.319E-02
10	tran acc	g's	-8.959E-03	2.291E-02	6.866E-02	-9.703E-02
11	long tran	g's	-6.334E-03	1.629E-02	4.287E-02	-6.157E-02

RUN DATE-TIME-GROUP = 072045Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 60
 COMMENTS: Aux propulsion unit maneuvers 7 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 20:45:55
 RUN FINISHED AT TIME: 20:47:31

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	6.244E+01	1.585E+00	6.541E+01	5.996E+01
2	SHIPS COURSE	DEG	6.246E+01	1.561E+00	6.532E+01	6.004E+01
3	RUDDERANGLE	DEG	-6.217E-01	1.372E+00	-1.780E-01	-6.727E+00
4	WIND SPEED	KTS	2.792E+01	5.355E-01	2.894E+01	2.630E+01
5	WIND DIR	DEG	3.359E+02	2.444E+00	3.421E+02	3.300E+02
6	PITCH	DEG	-1.716E+00	4.796E-01	-4.981E-01	-2.756E+00
7	ROLL ANG	DEG	-1.259E+00	4.237E-01	-3.069E-01	-2.223E+00
8	YAW	DEG	8.848E+00	3.229E-01	9.025E+00	7.672E+00
9	vert acc	g's	-1.015E-02	2.239E-02	4.278E-02	-5.920E-02
10	tran acc	g's	-7.352E-03	1.941E-02	3.384E-02	-6.350E-02
11	long tran	g's	-6.500E-03	1.462E-02	2.482E-02	-3.965E-02

Table B1. (Continued)

RUN DATE-TIME-GROUP = 072048Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 61
 COMMENTS: Aux propulsion unit maneuvers 7 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 20:51:34
 RUN FINISHED AT TIME: 20:57:49

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	5.907E+01	6.920E+00	6.664E+01	4.721E+01	
2 SHIPS COURSE	DEG	5.908E+01	6.933E+00	6.664E+01	4.721E+01	
3 RUDDERANGLE	DEG	-7.975E-01	6.258E+00	1.468E+01	-6.749E+00	
4 WIND SPEED	KTS	2.749E+01	1.492E+00	3.023E+01	2.315E+01	
5 WIND DIR	DEG	3.414E+02	1.653E+01	3.596E+02	1.758E-01	
6 PITCH	DEG	-1.694E+00	4.744E-01	-4.886E-01	-2.898E+00	
7 ROLL ANG	DEG	-1.008E+00	5.018E-01	3.440E-01	-2.446E+00	
8 YAW	DEG	6.604E+00	3.733E+00	9.025E+00	-1.113E+00	
9 vert acc	g's	-9.659E-03	2.270E-02	4.981E-02	-7.209E-02	
10 tran acc	g's	-9.030E-03	2.184E-02	4.094E-02	-8.478E-02	
11 long tran	g's	-6.313E-03	1.477E-02	2.998E-02	-4.416E-02	

RUN DATE-TIME-GROUP = 072059Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 62
 COMMENTS: Aux propulsion unit maneuvers 7 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 21:00:20
 RUN FINISHED AT TIME: 21:17:44

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	7.973E+01	1.373E+01	9.160E+01	5.011E+01	
2 SHIPS COURSE	DEG	7.977E+01	1.374E+01	9.160E+01	5.011E+01	
3 RUDDERANGLE	DEG	-1.673E+00	1.692E+00	2.811E+00	-1.853E+01	
4 WIND SPEED	KTS	2.982E+01	1.189E+00	3.223E+01	2.503E+01	
5 WIND DIR	DEG	3.227E+02	1.358E+01	3.583E+02	3.058E+02	
6 PITCH	DEG	-1.707E+00	5.149E-01	-1.566E-01	-3.268E+00	
7 ROLL ANG	DEG	-1.272E+00	5.390E-01	1.209E-01	-3.041E+00	
8 YAW	DEG	8.315E+00	1.865E+00	9.025E+00	1.809E+00	
9 vert acc	g's	-9.658E-03	2.048E-02	6.388E-02	-7.443E-02	
10 tran acc	g's	-2.004E-03	1.727E-02	5.061E-02	-7.188E-02	
11 long tran	g's	-6.294E-03	1.570E-02	3.384E-02	-5.319E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 072118Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 63
 COMMENTS: Aux propulsion unit maneuvers 7 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 21:26:34
 RUN FINISHED AT TIME: 21:37:17

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	2.024E+02	1.276E+02	3.600E+02	8.790E-02	
2 SHIPS COURSE	DEG	2.023E+02	1.276E+02	3.599E+02	0.000E+00	
3 RUDDERANGLE	DEG	-2.723E+01	7.165E+00	2.615E-01	-2.965E+01	
4 WIND SPEED	KTS	2.129E+01	5.274E+00	3.040E+01	9.451E+00	
5 WIND DIR	DEG	1.279E+02	1.088E+02	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.765E+00	4.227E-01	-4.222E-01	-3.202E+00	
7 ROLL ANG	DEG	-7.270E-01	5.645E-01	1.107E+00	-2.074E+00	
8 YAW	DEG	4.620E+00	6.330E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-9.693E-03	2.178E-02	6.740E-02	-8.147E-02	
10 tran acc	g's	-1.317E-02	1.774E-02	4.738E-02	-8.413E-02	
11 long tran	g's	-5.715E-03	1.180E-02	3.642E-02	-4.287E-02	

RUN DATE-TIME-GROUP = 072138Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 64
 COMMENTS: Aux propulsion unit maneuvers 7 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 21:41:24
 RUN FINISHED AT TIME: 21:52:08

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.340E+02	5.894E+01	2.329E+02	4.035E+01	
2 SHIPS COURSE	DEG	1.341E+02	5.892E+01	2.327E+02	4.035E+01	
3 RUDDERANGLE	DEG	-2.680E+01	9.450E+00	2.253E+01	-2.989E+01	
4 WIND SPEED	KTS	2.087E+01	6.095E+00	2.947E+01	6.886E+00	
5 WIND DIR	DEG	2.617E+02	8.413E+01	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.783E+00	4.789E-01	-3.653E-01	-3.297E+00	
7 ROLL ANG	DEG	-1.642E+00	5.074E-01	-1.953E-01	-2.781E+00	
8 YAW	DEG	4.832E+00	4.261E+00	9.025E+00	-3.925E+00	
9 vert acc	g's	-9.911E-03	2.290E-02	6.154E-02	-8.498E-02	
10 tran acc	g's	3.813E-03	1.765E-02	5.383E-02	-5.512E-02	
11 long tran	g's	-5.809E-03	1.374E-02	3.900E-02	-4.932E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 072153Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 65
 COMMENTS: Aux propulsion unit maneuvers 7 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 21:55:22
 RUN FINISHED AT TIME: 22:07:34

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.386E+02	6.136E+01	2.529E+02	5.319E+01	
2 SHIPS COURSE	DEG	1.386E+02	6.134E+01	2.527E+02	5.327E+01	
3 RUDDERANGLE	DEG	2.468E+01	1.402E+01	3.070E+01	-1.963E+01	
4 WIND SPEED	KTS	2.074E+01	7.532E+00	3.011E+01	4.396E-01	
5 WIND DIR	DEG	2.804E+02	6.087E+01	3.598E+02	1.758E-01	
6 PITCH	DEG	-1.732E+00	4.751E-01	-4.763E-03	-3.117E+00	
7 ROLL ANG	DEG	-1.385E+00	6.053E-01	9.950E-01	-2.706E+00	
8 YAW	DEG	7.492E+00	3.317E+00	9.025E+00	-1.735E+00	
9 vert acc	g's	-9.624E-03	2.110E-02	8.146E-02	-1.026E-01	
10 tran acc	g's	-2.010E-03	2.101E-02	7.317E-02	-8.736E-02	
11 long tran	g's	-5.784E-03	1.415E-02	4.158E-02	-5.448E-02	

RUN DATE-TIME-GROUP = 072208Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 66
 COMMENTS: Aux propulsion unit maneuvers 7 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 22:13:09
 RUN FINISHED AT TIME: 22:23:07

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.943E+02	1.273E+02	3.600E+02	-9.052E-06	
2 SHIPS COURSE	DEG	1.944E+02	1.272E+02	3.599E+02	0.000E+00	
3 RUDDERANGLE	DEG	2.597E+01	8.969E+00	3.015E+01	-7.233E+00	
4 WIND SPEED	KTS	1.800E+01	4.608E+00	2.679E+01	7.814E+00	
5 WIND DIR	DEG	1.066E+02	8.340E+01	3.597E+02	5.275E-01	
6 PITCH	DEG	-1.745E+00	4.197E-01	-5.740E-01	-2.917E+00	
7 ROLL ANG	DEG	-4.833E-01	6.160E-01	9.950E-01	-2.092E+00	
8 YAW	DEG	3.108E+00	8.228E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-9.987E-03	1.957E-02	7.795E-02	-9.788E-02	
10 tran acc	g's	-1.726E-02	1.994E-02	6.221E-02	-8.671E-02	
11 long tran	g's	-5.550E-03	1.172E-02	2.804E-02	-4.287E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 072356Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 67
 COMMENTS: Turning Maneuvers 07 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 00:03:25
 RUN FINISHED AT TIME: 00:12:52

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.328E+02	6.389E+01	2.402E+02	4.985E+01	
2 SHIPS COURSE	DEG	1.327E+02	6.388E+01	2.401E+02	4.985E+01	
3 RUDDERANGLE	DEG	2.306E+01	1.530E+01	3.149E+01	-3.271E+01	
4 WIND SPEED	KTS	1.929E+01	6.541E+00	2.698E+01	5.153E+00	
5 WIND DIR	DEG	2.807E+02	6.939E+01	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.771E+00	4.518E-01	-2.609E-01	-3.079E+00	
7 ROLL ANG	DEG	-1.566E+00	5.644E-01	4.742E-01	-2.818E+00	
8 YAW	DEG	6.454E+00	4.947E+00	9.025E+00	-5.085E+00	
9 vert acc	g's	-9.962E-03	2.135E-02	5.685E-02	-8.616E-02	
10 tran acc	g's	6.787E-04	1.828E-02	5.319E-02	-5.641E-02	
11 long tran	g's	-5.772E-03	1.282E-02	3.320E-02	-4.545E-02	

RUN DATE-TIME-GROUP = 080014Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 68
 COMMENTS: Turning Maneuvers 07 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 00:15:22
 RUN FINISHED AT TIME: 00:27:06

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.886E+02	1.311E+02	3.599E+02	-9.052E-06	
2 SHIPS COURSE	DEG	1.887E+02	1.310E+02	3.600E+02	8.791E-02	
3 RUDDERANGLE	DEG	2.670E+01	1.107E+01	3.189E+01	-2.598E+01	
4 WIND SPEED	KTS	1.653E+01	3.915E+00	2.317E+01	7.448E+00	
5 WIND DIR	DEG	1.038E+02	8.571E+01	3.600E+02	8.791E-02	
6 PITCH	DEG	-1.760E+00	4.828E-01	-4.032E-01	-3.060E+00	
7 ROLL ANG	DEG	-9.498E-01	5.594E-01	3.068E-01	-2.874E+00	
8 YAW	DEG	1.187E+00	8.430E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-1.010E-02	2.354E-02	7.443E-02	-1.084E-01	
10 tran acc	g's	-1.014E-02	1.701E-02	5.383E-02	-6.737E-02	
11 long tran	g's	-5.809E-03	1.267E-02	3.449E-02	-4.739E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 080028Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 69
 COMMENTS: Turning Maneuvers 07 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 00:33:41
 RUN FINISHED AT TIME: 00:43:17

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.950E+02	1.206E+02	3.599E+02	8.790E-02	
2 SHIPS COURSE	DEG	1.949E+02	1.205E+02	3.598E+02	0.000E+00	
3 RUDDERANGLE	DEG	-2.243E+01	1.731E+01	3.077E+01	-3.317E+01	
4 WIND SPEED	KTS	1.805E+01	4.577E+00	2.591E+01	8.864E+00	
5 WIND DIR	DEG	1.210E+02	9.414E+01	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.823E+00	4.677E-01	-5.835E-01	-3.202E+00	
7 ROLL ANG	DEG	-1.289E+00	5.214E-01	2.696E-01	-2.576E+00	
8 YAW	DEG	4.492E+00	6.852E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-9.808E-03	1.994E-02	6.036E-02	-7.561E-02	
10 tran acc	g's	-3.528E-03	1.820E-02	4.674E-02	-5.383E-02	
11 long tran	g's	-5.727E-03	1.237E-02	2.804E-02	-4.158E-02	

RUN DATE-TIME-GROUP = 080044Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 70
 COMMENTS: Turning Maneuvers 07 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 00:49:11
 RUN FINISHED AT TIME: 00:59:28

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.387E+02	6.238E+01	2.307E+02	3.675E+01	
2 SHIPS COURSE	DEG	1.388E+02	6.235E+01	2.305E+02	3.675E+01	
3 RUDDERANGLE	DEG	-2.404E+01	1.483E+01	3.125E+01	-3.082E+01	
4 WIND SPEED	KTS	1.858E+01	6.132E+00	2.674E+01	6.349E+00	
5 WIND DIR	DEG	2.489E+02	9.756E+01	3.598E+02	0.000E+00	
6 PITCH	DEG	-1.825E+00	4.571E-01	-5.930E-01	-3.221E+00	
7 ROLL ANG	DEG	-2.054E+00	6.285E-01	-6.231E-01	-4.157E+00	
8 YAW	DEG	7.603E+00	4.416E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-9.643E-03	1.961E-02	5.568E-02	-7.209E-02	
10 tran acc	g's	1.037E-02	1.994E-02	8.155E-02	-4.674E-02	
11 long tran	g's	-5.684E-03	1.152E-02	3.256E-02	-4.223E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 081834Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 71
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 18:46:54
 RUN FINISHED AT TIME: 19:01:49

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	2.301E+02	1.156E+00	2.329E+02	2.272E+02	
2 SHIPS COURSE	DEG	2.300E+02	1.139E+00	2.327E+02	2.272E+02	
3 RUDDERANGLE	DEG	-3.203E-01	2.791E+00	7.426E+00	-9.453E+00	
4 WIND SPEED	KTS	7.601E+00	3.144E+00	1.519E+01	2.222E+00	
5 WIND DIR	DEG	2.726E+02	1.997E+01	3.077E+02	2.286E+02	
6 PITCH	DEG	-1.739E+00	3.214E-01	-4.696E-01	-2.737E+00	
7 ROLL ANG	DEG	-4.118E-01	1.252E+00	3.394E+00	-4.975E+00	
8 YAW	DEG	9.025E+00	6.903E-09	9.025E+00	9.025E+00	
9 vert acc	g's	-9.660E-03	1.475E-02	2.989E-02	-5.216E-02	
10 tran acc	g's	-1.486E-02	2.962E-02	9.445E-02	-1.093E-01	
11 long tran	g's	-5.778E-03	7.562E-03	2.160E-02	-3.449E-02	

RUN DATE-TIME-GROUP = 081903Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 72
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 19:06:24
 RUN FINISHED AT TIME: 19:22:53

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	2.579E+02	2.166E+01	2.913E+02	2.284E+02	
2 SHIPS COURSE	DEG	2.578E+02	2.161E+01	2.910E+02	2.283E+02	
3 RUDDERANGLE	DEG	8.034E+00	2.076E+01	3.057E+01	-2.684E+01	
4 WIND SPEED	KTS	1.500E+01	5.975E+00	2.518E+01	3.297E+00	
5 WIND DIR	DEG	2.009E+02	4.412E+01	2.993E+02	1.482E+02	
6 PITCH	DEG	-1.693E+00	3.996E-01	-5.835E-01	-3.249E+00	
7 ROLL ANG	DEG	-4.819E-01	8.881E-01	2.725E+00	-3.506E+00	
8 YAW	DEG	9.025E+00	6.920E-09	9.025E+00	9.025E+00	
9 vert acc	g's	-9.665E-03	1.620E-02	4.044E-02	-6.271E-02	
10 tran acc	g's	-1.902E-02	2.167E-02	5.383E-02	-1.170E-01	
11 long tran	g's	-7.367E-03	1.160E-02	4.352E-02	-4.610E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 081928Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 73
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 19:40:57
 RUN FINISHED AT TIME: 19:55:26

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	5.163E+01	8.685E-01	5.433E+01	4.923E+01	
2 SHIPS COURSE	DEG	5.165E+01	8.687E-01	5.433E+01	4.923E+01	
3 RUDDERANGLE	DEG	-1.781E+00	3.162E+00	5.185E+00	-8.112E+00	
4 WIND SPEED	KTS	3.606E+01	3.508E+00	4.046E+01	2.777E+01	
5 WIND DIR	DEG	7.775E+00	2.158E+00	1.626E+01	1.582E+00	
6 PITCH	DEG	-1.716E+00	4.411E-01	-3.463E-01	-3.031E+00	
7 ROLL ANG	DEG	2.752E-01	6.524E-01	2.427E+00	-1.981E+00	
8 YAW	DEG	1.415E+00	8.731E-01	4.203E+00	-1.060E+00	
9 vert acc	g's	-1.089E-02	3.250E-02	8.615E-02	-1.108E-01	
10 tran acc	g's	-3.070E-02	2.069E-02	3.449E-02	-1.028E-01	
11 long tran	g's	-6.080E-03	2.152E-02	6.930E-02	-7.446E-02	

RUN DATE-TIME-GROUP = 081957Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 74
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 20:00:02
 RUN FINISHED AT TIME: 20:07:43

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	5.316E+01	1.107E+01	6.804E+01	3.349E+01	
2 SHIPS COURSE	DEG	5.318E+01	1.108E+01	6.804E+01	3.358E+01	
3 RUDDERANGLE	DEG	-1.296E+00	9.172E+00	1.132E+01	-1.257E+01	
4 WIND SPEED	KTS	3.666E+01	2.115E+00	4.220E+01	3.236E+01	
5 WIND DIR	DEG	8.030E+01	1.417E+02	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.751E+00	4.117E-01	-6.784E-01	-2.908E+00	
7 ROLL ANG	DEG	3.795E-01	1.375E+00	3.338E+00	-2.781E+00	
8 YAW	DEG	4.974E-01	7.245E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-1.071E-02	3.200E-02	7.795E-02	-1.178E-01	
10 tran acc	g's	-2.947E-02	2.974E-02	4.932E-02	-1.035E-01	
11 long tran	g's	-6.053E-03	2.013E-02	5.512E-02	-6.415E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 082009Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 75
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 20:12:58
 RUN FINISHED AT TIME: 20:21:05

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	4.976E+01	1.110E+01	6.866E+01	3.279E+01	
2 SHIPS COURSE	DEG	4.977E+01	1.110E+01	6.857E+01	3.279E+01	
3 RUDDERANGLE	DEG	-2.900E-01	9.219E+00	1.090E+01	-1.310E+01	
4 WIND SPEED	KTS	3.761E+01	2.483E+00	4.137E+01	3.160E+01	
5 WIND DIR	DEG	4.495E+01	1.067E+02	3.600E+02	0.000E+00	
6 PITCH	DEG	-1.778E+00	4.351E-01	-4.222E-01	-3.164E+00	
7 ROLL ANG	DEG	2.332E-01	1.486E+00	3.301E+00	-3.487E+00	
8 YAW	DEG	-1.842E+00	7.063E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-1.108E-02	3.679E-02	9.084E-02	-1.366E-01	
10 tran acc	g's	-2.954E-02	3.071E-02	5.254E-02	-1.015E-01	
11 long tran	g's	-5.886E-03	2.109E-02	6.092E-02	-7.317E-02	

RUN DATE-TIME-GROUP = 082022Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 76
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 20:27:57
 RUN FINISHED AT TIME: 20:36:56

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	2.316E+02	1.148E+01	2.488E+02	2.115E+02	
2 SHIPS COURSE	DEG	2.315E+02	1.146E+01	2.486E+02	2.116E+02	
3 RUDDERANGLE	DEG	-3.059E-01	9.104E+00	1.213E+01	-1.304E+01	
4 WIND SPEED	KTS	5.570E+00	3.296E+00	1.521E+01	1.441E+00	
5 WIND DIR	DEG	2.661E+02	2.346E+01	3.348E+02	1.886E+02	
6 PITCH	DEG	-1.750E+00	3.266E-01	-7.637E-01	-2.642E+00	
7 ROLL ANG	DEG	-5.509E-01	2.056E+00	4.101E+00	-5.459E+00	
8 YAW	DEG	9.025E+00	2.964E-09	9.025E+00	9.025E+00	
9 vert acc	g's	-9.943E-03	1.388E-02	2.872E-02	-4.865E-02	
10 tran acc	g's	-1.548E-02	4.205E-02	9.831E-02	-1.131E-01	
11 long tran	g's	-6.068E-03	8.043E-03	1.773E-02	-3.062E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 082038Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 77
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 20:38:58
 RUN FINISHED AT TIME: 20:47:04

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	2.282E+02	1.156E+01	2.502E+02	2.114E+02	
2 SHIPS COURSE	DEG	2.282E+02	1.153E+01	2.500E+02	2.114E+02	
3 RUDDERANGLE	DEG	-2.601E-01	9.177E+00	1.072E+01	-1.167E+01	
4 WIND SPEED	KTS	8.418E+00	3.490E+00	1.695E+01	2.466E+00	
5 WIND DIR	DEG	2.669E+02	2.213E+01	3.062E+02	2.044E+02	
6 PITCH	DEG	-1.761E+00	3.550E-01	-9.060E-01	-2.709E+00	
7 ROLL ANG	DEG	-6.810E-01	2.244E+00	4.213E+00	-6.128E+00	
8 YAW	DEG	-1.563E+00	7.439E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-1.103E-02	1.572E-02	3.340E-02	-6.154E-02	
10 tran acc	g's	-1.352E-02	4.747E-02	1.112E-01	-1.099E-01	
11 long tran	g's	-5.920E-03	7.533E-03	1.450E-02	-3.256E-02	

RUN DATE-TIME-GROUP = 082155Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 78
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 22:05:55
 RUN FINISHED AT TIME: 22:13:18

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	2.331E+02	7.282E+00	2.450E+02	2.228E+02	
2 SHIPS COURSE	DEG	2.330E+02	7.285E+00	2.449E+02	2.228E+02	
3 RUDDERANGLE	DEG	1.080E+00	9.336E+00	1.226E+01	-1.207E+01	
4 WIND SPEED	KTS	1.354E+01	1.862E+00	1.729E+01	8.620E+00	
5 WIND DIR	DEG	2.349E+02	1.075E+01	2.576E+02	2.005E+02	
6 PITCH	DEG	-1.715E+00	3.736E-01	-6.025E-01	-3.088E+00	
7 ROLL ANG	DEG	-8.261E-01	2.48E-01	1.237E+00	-2.650E+00	
8 YAW	DEG	2.835E+00	4.55E+00	9.025E+00	-6.094E+00	
9 vert acc	g's	-9.949E-02	7.12E-02	3.926E-02	-5.685E-02	
10 tran acc	g's	-9.959E-03	2.242E-02	4.223E-02	-7.188E-02	
11 long tran	g's	-6.376E-03	9.642E-03	2.869E-02	-3.127E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 082215Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 79
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 22:18:56
 RUN FINISHED AT TIME: 22:31:03

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	2.300E+02	1.092E+01	2.461E+02	2.120E+02	
2 SHIPS COURSE	DEG	2.300E+02	1.091E+01	2.460E+02	2.120E+02	
3 RUDDERANGLE	DEG	8.065E-01	9.801E+00	1.114E+01	-1.167E+01	
4 WIND SPEED	KTS	2.072E+01	2.299E+01	9.985E+01	0.000E+00	
5 WIND DIR	DEG	2.245E+02	2.466E+01	2.678E+02	1.305E+02	
6 PITCH	DEG	-1.742E+00	3.285E-01	-8.586E-01	-2.690E+00	
7 ROLL ANG	DEG	-7.805E-01	8.388E-01	1.423E+00	-3.004E+00	
8 YAW	DEG	4.013E-01	7.369E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-1.019E-02	1.443E-02	3.809E-02	-5.451E-02	
10 tran acc	g's	-1.083E-02	2.113E-02	4.609E-02	-7.962E-02	
11 long tran	g's	-6.096E-03	8.606E-03	1.837E-02	-3.191E-02	

RUN DATE-TIME-GROUP = 082232Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 80
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 22:32:57
 RUN FINISHED AT TIME: 22:46:34

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	2.275E+02	1.073E+01	2.472E+02	2.127E+02	
2 SHIPS COURSE	DEG	2.274E+02	1.071E+01	2.470E+02	2.127E+02	
3 RUDDERANGLE	DEG	1.839E+00	9.289E+00	1.059E+01	-1.093E+01	
4 WIND SPEED	KTS	2.015E+01	2.267E+01	1.000E+02	9.768E-02	
5 WIND DIR	DEG	2.318E+02	1.947E+01	2.732E+02	1.582E+02	
6 PITCH	DEG	-1.740E+00	4.339E-01	-4.127E-01	-2.898E+00	
7 ROLL ANG	DEG	-8.931E-01	8.915E-01	1.497E+00	-3.245E+00	
8 YAW	DEG	-1.603E+00	7.288E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-1.023E-02	1.566E-02	4.161E-02	-6.389E-02	
10 tran acc	g's	-9.605E-03	2.390E-02	6.930E-02	-7.833E-02	
11 long tran	g's	-6.057E-03	1.014E-02	2.611E-02	-3.707E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 082248Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 81
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 23:04:55
 RUN FINISHED AT TIME: 23:15:43

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	5.284E+01	1.049E+01	6.725E+01	3.464E+01	
2 SHIPS COURSE	DEG	5.285E+01	1.050E+01	6.716E+01	3.473E+01	
3 RUDDERANGLE	DEG	-1.467E+00	9.391E+00	1.167E+01	-1.132E+01	
4 WIND SPEED	KTS	3.035E+01	2.145E+00	3.465E+01	2.552E+01	
5 WIND DIR	DEG	1.376E+01	1.546E+01	3.595E+02	8.791E-02	
6 PITCH	DEG	-1.723E+00	5.469E-01	-2.230E-01	-3.249E+00	
7 ROLL ANG	DEG	-2.294E-01	5.790E-01	1.125E+00	-2.260E+00	
8 YAW	DEG	-9.025E+00	1.696E-06	-9.025E+00	-9.025E+00	
9 vert acc	g's	-1.136E-02	3.202E-02	9.670E-02	-1.272E-01	
10 tran acc	g's	-2.522E-02	1.989E-02	3.256E-02	-8.542E-02	
11 long tran	g's	-5.836E-03	2.301E-02	5.899E-02	-7.704E-02	

RUN DATE-TIME-GROUP = 082317Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 82
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 23:20:53
 RUN FINISHED AT TIME: 23:32:28

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	4.907E+01	1.054E+01	6.629E+01	3.279E+01	
2 SHIPS COURSE	DEG	4.908E+01	1.056E+01	6.629E+01	3.279E+01	
3 RUDDERANGLE	DEG	-1.351E+00	9.510E+00	1.107E+01	-1.398E+01	
4 WIND SPEED	KTS	2.995E+01	1.500E+00	3.321E+01	2.598E+01	
5 WIND DIR	DEG	1.688E+01	1.502E+01	3.600E+02	3.516E-01	
6 PITCH	DEG	-1.729E+00	5.582E-01	4.724E-03	-3.401E+00	
7 ROLL ANG	DEG	-4.684E-02	6.302E-01	1.906E+00	-1.832E+00	
8 YAW	DEG	-9.025E+00	1.711E-06	-9.025E+00	-9.025E+00	
9 vert acc	g's	-1.130E-02	3.717E-02	9.905E-02	-1.201E-01	
10 tran acc	g's	-2.659E-02	1.908E-02	3.127E-02	-9.187E-02	
11 long tran	g's	-5.887E-03	2.285E-02	5.899E-02	-7.511E-02	

Table B1. (Continued)

RUN DATE-TIME-GROUP = 082334Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 83
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 23:38:57
 RUN FINISHED AT TIME: 23:52:07

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	5.326E+01	1.708E+01	7.868E+01	2.136E+01
2	SHIPS COURSE	DEG	5.326E+01	1.710E+01	7.868E+01	2.136E+01
3	RUDDERANGLE	DEG	3.127E-01	1.809E+01	2.077E+01	-2.301E+01
4	WIND SPEED	KTS	2.885E+01	2.407E+00	3.389E+01	2.288E+01
5	WIND DIR	DEG	6.380E+01	1.181E+02	3.600E+02	0.000E+00
6	PITCH	DEG	-1.732E+00	6.006E-01	4.267E-02	-3.487E+00
7	ROLL ANG	DEG	-2.315E-01	6.487E-01	1.423E+00	-2.018E+00
8	YAW	DEG	-9.025E+00	1.736E-06	-9.025E+00	-9.025E+00
9	vert acc	g's	-1.133E-02	3.273E-02	9.670E-02	-1.201E-01
10	tran acc	g's	-2.313E-02	1.866E-02	3.771E-02	-8.478E-02
11	long tran	g's	-5.638E-03	2.387E-02	6.028E-02	-8.026E-02

RUN DATE-TIME-GROUP = 082353Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 84
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 23:54:05
 RUN FINISHED AT TIME: 00:13:51

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	8.697E+01	6.508E+01	2.302E+02	2.180E+01
2	SHIPS COURSE	DEG	8.695E+01	6.507E+01	2.302E+02	2.171E+01
3	RUDDERANGLE	DEG	6.101E+00	1.810E+01	2.389E+01	-2.306E+01
4	WIND SPEED	KTS	2.687E+01	7.288E+00	9.988E+01	7.326E-02
5	WIND DIR	DEG	1.275E+02	1.392E+02	3.600E+02	0.000E+00
6	PITCH	DEG	-1.729E+00	4.747E-01	1.375E-01	-3.221E+00
7	ROLL ANG	DEG	-3.586E-01	7.062E-01	1.553E+00	-2.371E+00
8	YAW	DEG	-8.426E+00	2.008E+00	2.358E-01	-9.025E+00
9	vert acc	g's	-1.107E-02	2.877E-02	7.560E-02	-1.026E-01
10	tran acc	g's	-1.890E-02	2.103E-02	4.158E-02	-8.800E-02
11	long tran	g's	-5.307E-03	1.913E-02	6.286E-02	-7.962E-02

Table B1. (Continued)

RUN DATE-TIME-GROUP = 090015Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 85
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 00:15:24
 RUN FINISHED AT TIME: 00:29:36

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	2.291E+02	1.898E+01	2.596E+02	2.019E+02
2	SHIPS COURSE	DEG	2.291E+02	1.892E+01	2.594E+02	2.019E+02
3	RUDDERANGLE	DEG	1.331E+00	1.875E+01	2.156E+01	-2.165E+01
4	WIND SPEED	KTS	1.476E+01	1.048E+01	1.000E+02	7.326E-02
5	WIND DIR	DEG	2.304E+02	2.269E+01	2.718E+02	1.483E+02
6	PITCH	DEG	-1.786E+00	4.098E-01	-4.791E-01	-3.060E+00
7	ROLL ANG	DEG	-1.087E+00	1.158E+00	2.222E+00	-4.306E+00
8	YAW	DEG	-4.120E-01	8.088E+00	9.025E+00	-9.025E+00
9	vert acc	g's	-1.037E-02	1.983E-02	5.099E-02	-7.092E-02
10	tran acc	g's	-5.151E-03	2.778E-02	6.479E-02	-8.542E-02
11	long tran	g's	-5.534E-03	1.046E-02	3.256E-02	-4.158E-02

RUN DATE-TIME-GROUP = 090034Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 86
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 00:35:47
 RUN FINISHED AT TIME: 00:47:38

MINIMUM ANALYSIS						
CHAN.	TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN
1	course400htz	deg	2.269E+02	1.800E+01	2.593E+02	2.018E+02
2	SHIPS COURSE	DEG	2.268E+02	1.794E+01	2.591E+02	2.018E+02
3	RUDDERANGLE	DEG	1.079E+00	1.888E+01	2.279E+01	-2.202E+01
4	WIND SPEED	KTS	1.230E+01	4.594E+00	2.203E+01	1.709E+00
5	WIND DIR	DEG	2.324E+02	2.462E+01	2.804E+02	1.640E+02
6	PITCH	DEG	-1.749E+00	3.834E-01	-6.404E-01	-2.879E+00
7	ROLL ANG	DEG	-1.189E+00	1.097E+00	1.367E+00	-3.710E+00
8	YAW	DEG	-1.530E+00	7.771E+00	9.025E+00	-9.025E+00
9	vert acc	g's	-1.031E-02	1.700E-02	5.568E-02	-8.616E-02
10	tran acc	g's	-5.039E-03	2.650E-02	7.962E-02	-7.575E-02
11	long tran	g's	-5.632E-03	9.929E-03	2.417E-02	-3.836E-02

Table B1. (Continued)

RUN DATE-TIME-GROUP = 090050Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 87
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 00:50:55
 RUN FINISHED AT TIME: 00:58:20

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	2.019E+02	1.227E+02	3.599E+02	-9.052E-06	
2 SHIPS COURSE	DEG	2.023E+02	1.225E+02	3.600E+02	0.000E+00	
3 RUDDERANGLE	DEG	1.652E+01	6.377E+00	2.107E+01	-1.299E+01	
4 WIND SPEED	KTS	1.757E+01	6.424E+00	3.001E+01	8.791E-01	
5 WIND DIR	DEG	1.192E+02	8.178E+01	2.493E+02	7.736E+00	
6 PITCH	DEG	-1.707E+00	4.567E-01	4.724E-03	-3.221E+00	
7 ROLL ANG	DEG	2.564E-01	1.038E+00	2.985E+00	-2.985E+00	
8 YAW	DEG	1.559E+00	7.979E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-1.069E-02	2.144E-02	6.271E-02	-7.795E-02	
10 tran acc	g's	-3.153E-02	2.711E-02	4.738E-02	-1.022E-01	
11 long tran	g's	-5.403E-03	1.628E-02	4.738E-02	-7.188E-02	

RUN DATE-TIME-GROUP = 090101Z MAY91
 TRIAL TITLE: OBSERVATION ISLAND (T-AGM 23)
 TRIAL NAME: AGM23
 COMPUTER IDENTIFICATION: A
 TRIAL SUBDIRECTORY SEQ NO: 8
 DATA COLLECT PATH: C:\DATA\AGM23A8
 UIC CODE: AGM23
 RUN: 88
 COMMENTS: ACC/Dec Stops and Zig Zags 8 May 91
 SAMPLE RATE : 3.003003
 RUN COMMENCED AT TIME: 01:02:05
 RUN FINISHED AT TIME: 01:12:22

MINIMUM ANALYSIS						
CHAN. TITLE	UNITS	MEAN	STD. DEV.	MAX	MIN	
1 course400htz	deg	1.768E+02	8.307E+01	2.905E+02	5.064E+01	
2 SHIPS COURSE	DEG	1.767E+02	8.300E+01	2.903E+02	5.064E+01	
3 RUDDERANGLE	DEG	1.059E+01	1.470E+01	2.681E+01	-3.429E+01	
4 WIND SPEED	KTS	2.174E+01	8.197E+00	3.482E+01	3.443E+00	
5 WIND DIR	DEG	2.031E+02	1.080E+02	3.599E+02	8.791E-02	
6 PITCH	DEG	-1.715E+00	4.284E-01	-1.471E-01	-3.060E+00	
7 ROLL ANG	DEG	-2.231E-01	7.510E-01	1.758E+00	-1.944E+00	
8 YAW	DEG	-2.580E+00	8.480E+00	9.025E+00	-9.025E+00	
9 vert acc	g's	-1.075E-02	2.628E-02	8.263E-02	-1.131E-01	
10 tran acc	g's	-2.326E-02	2.124E-02	2.611E-02	-8.349E-02	
11 long tran	g's	-5.300E-03	1.549E-02	5.190E-02	-7.059E-02	