NATIONAL TRANSPORTATION SAFETY BOARD
Office of Research and Engineering
Washington D.C.

June 17, 1999

Witness Group Recorded Radar Study
DCA-96-MA-070

A. ACCIDENT

Location : East Moriches, NY
Date : July 17, 1996
Time : 2045 Eastern Daylight Time (EDT)
Aircraft : Boeing 747-131, registration: N93119
Operator : Trans World Airlines, Flight 800

B. GROUP

N/A

C. SUMMARY

The witness group received many documents pertaining to witnesses that were aboard aircraft at the time of the accident. The purpose of this study was to determine the locations of the airborne witnesses, relative to the accident airplane. Additional information about the accident airplane and the associated radar data can be found in the Airplane Performance Study. Using information from that report, the Air Traffic Control Group Chairman's Factual Report, and the witness documents received from the Federal Bureau of Investigation, the locations of most of the airborne witnesses were determined. Attachment A-1 is a plot of the accident airplane's track, along with the airborne witness locations.

D. DETAILS OF INVESTIGATION

Documents received from the Federal Bureau of Investigation indicated that there were nearly 40 witnesses to the accident that were aboard other airplanes when Flight 800 crashed. Transcripts from the Air Traffic Control Group Factual Report also show that several pilots had seen portions of the accident sequence. For many of these witnesses, it was possible to locate the position of

their aircraft using radar data from the New York Terminal Radar Approach Control Facility (TRACON).

The radar data file used for this study contains about 35 minutes of recorded data, beginning at 00:02:41 Coordinated Universal Time (UTC), and has nearly 300,000 lines in it. Each line in the file represents a secondary radar return, and lists the time, range and azimuth from the radar antenna, reported altitude, transponder beacon code, and radar antenna number.

Finding data for the airplanes of interest in this file was a difficult task. Normally, the beacon code in each line of data is used to identify which airplane is associated with that return. The beacon code is a unique four-digit number that is assigned to airplanes flying in a radar-controlled environment. The code is changeable by the pilot, and is entered into a device on the airplane called a transponder. A pilot may be instructed by Air Traffic Control to change the code periodically throughout the flight. If the code (or codes) assigned to a particular airplane is known then the radar data file can simply be sorted by that code, to find the information pertinent to that particular airplane.

Most airplanes that are not being controlled by Air Traffic will all have the same code (1200) entered into the transponder. All Visual Flight Rules (VFR) airplanes that are not in direct contact with a radar controlling facility use this code. This means that many different airplanes can have the exact same beacon code, and cannot be found in the radar file by simply searching by the code itself. Instead, the airplane must be located through trial and error by plotting the radar data in the known vicinity of the airplane, and manually determining which returns are most likely from the specific airplane in question. This is done using reports of the airplane's location, altitude, point of departure and landing, specific time, and any other known circumstances. This method can also be used when the assigned beacon code for a particular airplane isn't known. ***This method cannot guarantee that the selected radar data represents the particular airplane of interest.*** However, it can be used in many cases to determine the airplane's location with a reasonable amount of certainty. For example, if an airplane is reported to have flown over a specific landmark at a particular time, altitude and heading, there may be only a single recorded radar track that matches those particular conditions. In this case, the airplane is likely to be the one selected from the radar file.

Both of the methods above were used to determine which data were associated with the airplanes plotted in Attachment A-1. The beacon code was known for some of the airplanes, and not for others. Many of the witness documents contained little or no information about the registration, type, or flight number for each airplane. This made it impossible to determine the assigned beacon code for some airplanes. In these cases, the radar data was selected based on information about the airplane's position or path of travel found in the witness documents, or in the Air Traffic Control Group Factual Report. Attachment B

contains a list of all the airplanes plotted, their associated beacon codes, and the method used to determine the beacon code.

Additionally, two of the airplanes (BTA3678 and GRA507) were located using National Track Analysis Program (NTAP) data from the Boston Air Route Traffic Control Center. The NTAP data provided the tracks and identities of these two airplanes, but not the beacon codes[1]. Because the NYTRACON data had a higher sample rate (providing positions more often than the NTAP data), it was preferable to try and extract the positions of these airplanes from it in addition to the NTAP data.

By plotting the known NTAP data for these two airplanes, and overlaying data from the NYTRACON file for the same geographical area, the data for these airplanes could be identified by comparing overlapping tracks from both data sources. The beacon codes were subsequently identified for these two airplanes, and their positions are represented from the NYTRACON radar data in Attachment A-1.

After the data sets were selected for each airplane and put in a separate file, each file was converted from its native range-azimuth format to X-Y coordinates. They X-Y coordinates align with true east and true north, respectively. While most of the data on the plot came from the ISLIP antenna, additional data came from the White Plains and JFK antennas. For some airplanes, these antennas provided better data than the ISLIP radar. All of the data were normalized so that the origin (0,0), is the ISLIP radar antenna location (**N40 47 38.2 W73 06 0.5**). Attachment A-3 contains a table showing more information about the different antenna locations.

The Plot in Attachment A-1 contains all of the selected radar data, up to time 00:32:00 UTC. This is the nearest whole minute after the last ISLIP transponder return was recorded from TWA 800, which occurred at 00:32:11.52 UTC. The tracks are annotated with the call sign / identifier for the airplane, as well as time and altitude of the last radar position plotted. The symbols along the tracks represent every 5th radar data point, which means the amount of time between each symbol is about 23-24 seconds.

[1] FAA Radar data tracking is based on airplane beacon code, and is recorded in NTAP data. However, in this case an FAA printed plot of the NTAP data was used for this correlation, and beacon codes are not provided on that plot.

E. Attachments

Attachment A

A-1 Plot of all selected Radar data. Origin (0,0) is the ISLIP ASR Radar antenna. Each square on the grid represents is 10 nautical miles on each side. Times and altitudes annotated are the last radar return prior to 00:32:00 UTC.

A-2 Table of Latitude/Longitude and X, Y positions for the geographical references used in this study.

A-3 Table of locations for the Radar antenna locations.

Attachment B

B-1 – B-3 Table listing airplanes plotted, and witnesses aboard those airplanes. Contains airplane ID, description, beacon code, and source of beacon code (method used to determine the code).

Attachment C

Pages 1-62 contain the data used to create the plot A-1. Each section contains the time (HH:MM:SS) X,Y location (nautical miles true east, and true north from the ISLIP Radar Antenna, and transponder reported altitude. All data are from the ISLIP radar antenna unless denoted in parenthesis, e.g. Jolly14 (HPN) is the data for Jolly 14, from the White Plains (HPN) antenna.

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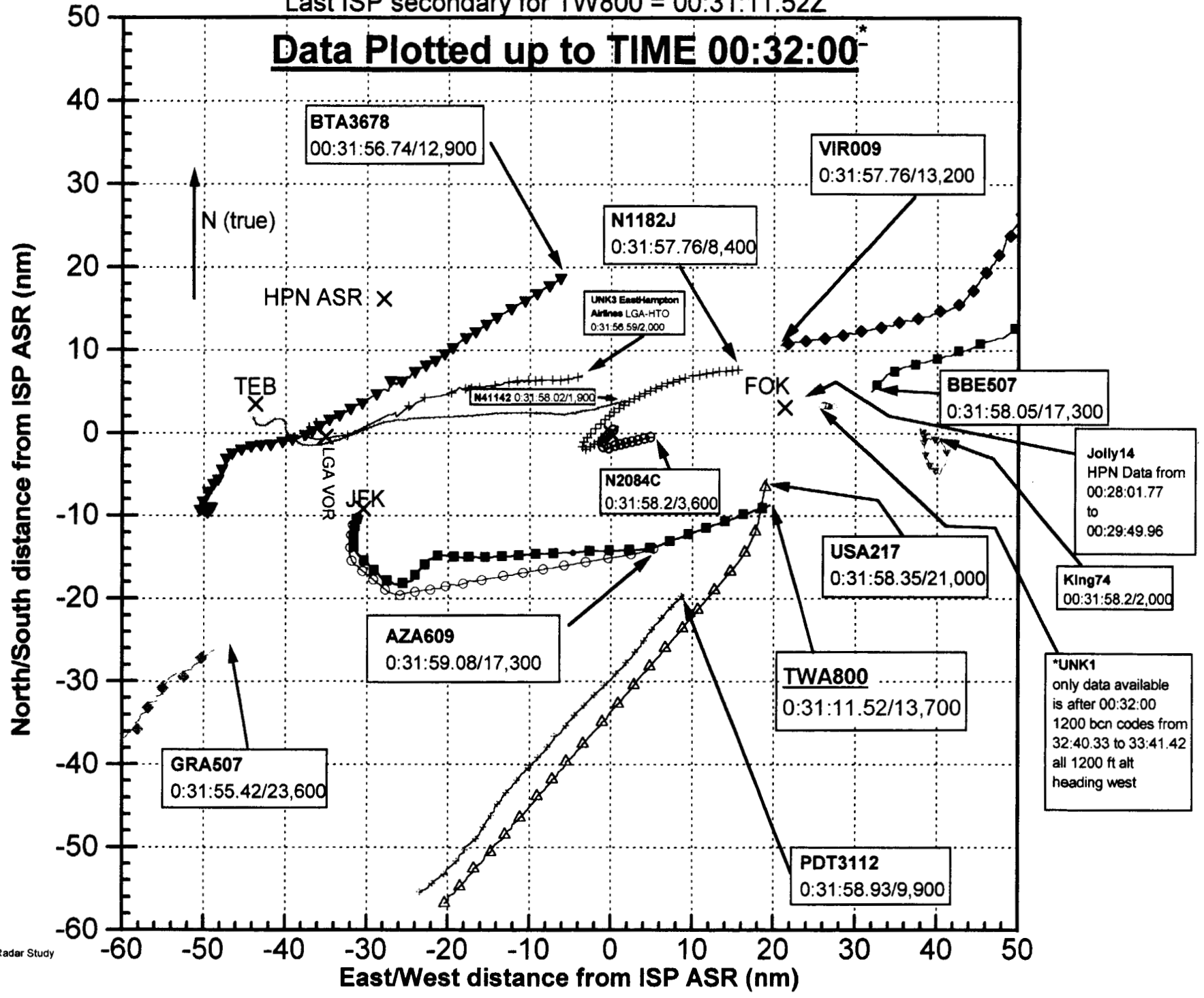
Airborne Witness Locations NYTRACON Secondary ASR DATA

Last ISP secondary for TW800 = 00:31:11.52Z



Geographical Reference Locations

	Latitude:			Lonitude:			Cartesian (nm):	
	Deg	Min	Sec	Deg	Min	Sec	X	Y
FOK	40	50	37.157	72	37	54.447	21.3374	3.0428
JFK ASR	40	38	22.4	73	45	59.2	-30.4551	-9.1396
Block Islan	41	10	5.4	71	34	40.5	68.9853	23.0843
HPN ASR	41	3	40.35	73	42	50.87	-27.8755	16.136
ISP ASR	40	47	38.2	73	6	0.5	0	0
TEB	40	51	0.365	74	3	39.01	-43.67	3.5059
LGA VOR	40	47	1.4	73	52	7	-35.0446	-0.45

Radar Sites

40	38	22.4	73	45	59.2	JFK ASR radar site, lat/lon coordinates	0
-30.455	-9.14					x/y coordinates relative to ISP ASR	
W 13.0						FAA-provided magnetic variation	
40	41	25.1	74	9	46	EWR ASR radar site, lat/lon coordinates	1
-48.53	-5.906					x/y coordinates relative to ISP ASR	
W 13.0						FAA-provided magnetic variation	
40	47	38.2	73	6	0.5	ISP ASR radar site, lat/lon coordinates	2
0	0					x/y coordinates relative to ISP ASR	
W 13.0						FAA-provided magnetic variation	
41	3	40.35	73	42	50.87	HPN ASR radar site, lat/lon coordinates	3
-27.875	16.136					x/y coordinates relative to ISP ASR	
W 12.0						FAA-provided magnetic variation	
41	29	26.14	74	6	20.52	SWF ASR radar site, lat/lon coordinates	4
-45.339	42.059					x/y coordinates relative to ISP ASR	
W 12.0						FAA-provided magnetic variation	
40	8	3.4	74	59	11.91	Trevose PA radar site, lat/lon coordinates	
-86.911	-38.592					x/y coordinates relative to ISP ASR	
40	52	42.66	72	41	15.95	Riverhead NY radar site, lat/lon coordinates	
18.775	5.12					x/y coordinates relative to ISP ASR	
42	2	2.4	70	3	11.1	North Truro MA radar site, lat/lon coordinates	
136.148	76.879					x/y coordinates relative to ISP ASR	
41	17	42	73	4	59	Sikorsky secondary radar site, lat/lon coordinates	
0.771	30.054					x/y coordinates relative to ISP ASR	
W 14.0						Sikorsky-provided magnetic variation	

SENSOR ID

NY TRACON

DCA-96-MA-070
TWA800 WITNESS GROUP RADAR STUDY
ATTACHMENT A PAGE 3 OF 3

By Airplane:

a/c ID	a/c description	beacon code	source of bcn code		masterxy worksheet name	
AZA609	Alitalia Flt609	1547	ATC exhibit 3H-U		AZA609	
BBE507	Eastwind Airlines flt507	1346	ATC exhibit 3H-U		BBE507	
BTA3678	Continental Express flt3678	2740	Boston Center NTAP / NYTRACON data overlay		BTA3678	
GRA507	Great American Airways flt507	4004	Boston Center NTAP / NYTRACON data overlay		GRA507, GRA507_HPN	
Jolly14	HH60	110	description of Time/location/departure/destination in 302		Jolly14	
KING74	NYANG C-130	1200	description of Time/location/departure/destination in 302		KING74	
N1182J	AC-12	0111/1200	ATC transcript indicated position		N1182J	
N2084C	Beech Travel Air	113	ATC exhibit 3H-U		N2084C	
N41142	Private A/C	312	ATC transcript indicated position at 00:15, only track from TEB towards East Hampton at this time. See exhibit 3-D-L page L1-2 ATC Factual		N41142	
PDT3112	Piedmont Airlines flt3112	2460	ATC exhibit 3H-U		PDT3112	
TWA800	**TWA800**	**2633**	ATC Factual Report			
USA217	UsAir flt217	2237	ATC exhibit 3H-U		US217	
VIR009	Virgin Atlantic flt009	6720	ATC exhibit 3H-U		VIR009	
UNK1	Private A/C, Block Island->FOK	1200	description of Time/location/departure/destination in 302		UNK1	
UNK3	East Hampton Airlines flt (unknown)	240	description of Time/location/departure/destination in 302		EastHamton	

Witnesses that Haven't Been Plotted:

N434	(ATC transcript) on GND at FOK		**None (ATC transcipt indicates a witness)**			
N704EU	(ATC transcript) on GND at FOK		**None (ATC transcipt indicates a witness)**			
N9288K	(ATC transcript)		**None (ATC transcipt indicates a witness)**			
UAL2	(ATC transcript) 6-7 Minutes after		**None (ATC transcipt indicates a witness)**			
UNK2	**private A/C between Northport Llico Stacks**		**Unable to locate on radar**			
UNK4	**Private A/C Flying 2000 above Jones Beach**		**Unable to locate on radar**			

Other Airplanes:

RCH0245	*(from map)*	5652	ATC exhibit 3H-U	These Airplanes were initially identified as potential Witnesses.		
ASH6523	*(from map)*	7311	ATC exhibit 3H-U	No Information from FBI documents or ATC transcripts provide any information about them.		
DAL9295	*(from map)*	6677	ATC exhibit 3H-U			
N5081C	*(from map)*	1360	ATC exhibit 3H-U			
WAT450	P3	XPNDR INOP		Crew did not see accident, only aftermath		

By Witness number					
Witness #	a/c ID	a/c description	beacon code	masterxy worksheet	
32	USA217	UsAir flt217	2237	US217	
37	BTA3678	Continental Express flt3678	2740	BTA3678	
110	GRA507	Great American Airways flt507	4004	GRA507, GRA507_HPN	
137	VIR009	Virgin Atlantic flt009	6720	VIR009	
138	BBE507	Eastwind Airlines flt507	1346	BBE507	
139	VIR009	Virgin Atlantic flt009	6720	VIR009	
140	VIR009	Virgin Atlantic flt009	6720	VIR009	
187	UNK1	Private A/C	1200	UNK1	
329	AZA609	Alitalia Flt609	1547	AZA609	
340	USA217	UsAir flt217	2237	US217	
341	USA217	UsAir flt217	2237	US217	
346	USA217	UsAir flt217	2237	US217	
357	USA217	UsAir flt217	2237	US217	
441	PDT3112	Piedmont Airlines flt3112	2460	PDT3112	
475	PDT3112	Piedmont Airlines flt3112	2460	PDT3112	
546	BBE507	Eastwind Airlines flt507	1346	BBE507	
551	USA217	UsAir flt217	2237	US217	
584	USA217	UsAir flt217	2237	US217	
585	USA217	UsAir flt217	2237	US217	
657	Jolly14	HH60	110	Jolly14, Jolly14 (HPN)	
658	Jolly14	HH60	110	Jolly14, Jolly14 (HPN)	
669	N2084C	Beech Travel Air	113	N2084C	
670	N2084C	Beech Travel Air	113	N2084C	
683	KING74	NYANG C-130	1200	KING74	
684	KING74	NYANG C-130	1200	KING74	
685	KING74	NYANG C-130	1200	KING74	
686	KING74	NYANG C-130	1200	KING74	
687	KING74	NYANG C-130	1200	KING74	
688	KING74	NYANG C-130	1200	KING74	
692	Jolly14	HH60	110	Jolly14, Jolly14 (HPN)	
701	GRA507	Great American Airways flt507	4004	GRA507, GRA507_HPN	
702	N1182J	AC-12	0111/1200	N1182J	
703	N1182J	AC-12	0111/1200	N1182J	
705	UNK1	Private A/C	1200	UNK1	

By Witness number					
Witness #	**a/c ID**	**a/c description**	**beacon code**	**masterxy worksheet**	
717	UNK3	East Hampton Airlines flt (unk)	240	EastHamton	
718	UNK3	East Hampton Airlines flt (unk)	240	EastHamton	
None (ATC transcipt indicates a witness)	N41142	Private A/C	312	N41142 (JFK)	
Witnesses Not Plotted:					
234	**UNK4**	**Private A/C Flying 2000 above Jones Beach**	**Unable to locate on radar**		
352	**UNK2**	**private A/C between Northport Lilco Stacks**	**Unable to locate on radar**		
712	**UNK2**	**private A/C between Northport Lilco Stacks**	**Unable to locate on radar**		
351 (possibly - Unable to confirm)	**UNK2 (possibly - Unable to confirm)**	**private A/C between Northport Lilco Stacks**	**Unable to locate on radar**		
None (ATC transcipt indicates a witness)	N9288K	(ATC transcript)			
None (ATC transcipt indicates a witness)	UAL2	(ATC transcript) 6-7 Minutes after			
None (ATC transcipt indicates a witness)	N704EU	(ATC transcript) on GND at FOK			
None (ATC transcipt indicates a witness)	N434	(ATC transcript) on GND at FOK			

hour	minute	second	Xeast	Ynorth	alt
0	19	56.78	-31.2459	-10.3706	5
0	20	1.48	-31.3962	-10.3142	6
0	20	6.16	-31.4671	-10.4977	7
0	20	10.88	-31.5885	-10.4305	8
0	20	15.58	-31.4448	-11.1378	8
0	20	20.25	-31.4675	-11.3093	9
0	20	24.95	-31.4531	-11.577	9
0	20	29.65	-31.6086	-11.4691	10
0	20	34.34	-31.5457	-11.9971	10
0	20	39.04	-31.588	-12.2358	10
0	20	43.76	-31.5946	-12.5176	11
0	20	48.46	-31.6331	-12.7582	12
0	20	53.15	-31.5488	-13.2905	13
0	20	57.84	-31.6762	-13.2298	13
0	21	2.57	-31.6543	-13.5639	14
0	21	7.26	-31.6199	-13.722	14
0	21	11.95	-31.4845	-14.0667	15
0	21	16.51	-31.2592	-14.4869	15
0	21	21.21	-31.062	-14.6864	15
0	21	25.9	-30.8504	-14.8766	16
0	21	35.28	-30.3428	-15.4439	18
0	21	40	-30.1028	-15.672	20
0	21	44.7	-29.9087	-15.8052	21
0	21	49.39	-29.6793	-16.035	22
0	21	54.08	-29.3095	-16.4801	23
0	21	58.78	-29.1518	-16.568	24
0	22	3.5	-28.8916	-16.8337	25
0	22	8.19	-28.6933	-16.9544	26
0	22	17.58	-27.9201	-17.7954	29
0	22	22.28	-27.802	-17.7201	31
0	22	26.99	-27.5077	-17.8304	32
0	22	31.69	-27.2688	-17.8545	33
0	22	36.38	-26.7714	-18.1216	34
0	22	41.07	-26.275	-18.3196	35
0	22	45.76	-25.9075	-18.3002	36
0	22	50.47	-25.5856	-18.1318	38

hour	minute	second	Xeast	Ynorth	alt
0	22	55.17	-25.2375	-18.0019	40
0	22	59.72	-24.863	-17.9081	42
0	23	4.44	-24.4499	-17.8391	44
0	23	9.14	-24.2397	-17.5158	46
0	23	13.98	-24.0546	-17.1581	48
0	23	18.67	-23.8006	-16.9218	51
0	23	23.37	-23.6101	-16.6231	53
0	23	28.06	-23.3789	-16.3538	55
0	23	32.76	-23.1349	-16.1302	56
0	23	37.45	-22.8649	-15.8898	58
0	23	42.14	-22.605	-15.6065	58
0	23	46.85	-22.3902	-15.2565	58
0	23	51.54	-22.0111	-15.1466	58
0	23	56.25	-21.5969	-15.0579	58
0	24	0.94	-21.2769	-14.8348	59
0	24	5.63	-20.9273	-14.7343	61
0	24	10.21	-20.4305	-14.8105	63
0	24	14.88	-20.0323	-14.853	66
0	24	19.61	-19.6241	-14.9269	69
0	24	24.3	-19.2536	-14.974	73
0	24	29	-18.9191	-14.9952	76
0	24	33.68	-18.5607	-14.9917	78
0	24	38.37	-18.159	-15.0391	80
0	24	43.09	-17.8174	-15.0346	81
0	24	47.78	-17.4407	-14.9941	82
0	24	52.47	-16.9867	-15.0625	83
0	24	57.16	-16.7077	-14.9532	84
0	25	1.86	-16.2468	-15.0421	86
0	25	6.55	-15.8456	-15.0359	87
0	25	11.28	-15.4585	-14.9873	88
0	25	15.97	-15.0398	-14.9896	89
0	25	20.66	-14.5786	-15.0288	90
0	25	25.35	-14.2576	-14.9255	91
0	25	29.9	-13.8024	-14.9456	92
0	25	34.62	-13.3963	-14.9138	94
0	25	39.31	-12.9585	-14.9255	95

hour	minute	second	Xeast	Ynorth	alt
0	25	44	-12.5596	-14.8761	97
0	25	48.69	-12.1292	-14.8682	98
0	25	53.39	-11.7836	-14.7654	100
0	25	58.08	-11.325	-14.7863	101
0	26	2.78	-10.8843	-14.766	102
0	26	7.48	-10.4933	-14.7025	103
0	26	12.2	-10.1019	-14.6716	104
0	26	16.89	-9.6608	-14.6481	105
0	26	21.59	-9.2249	-14.6128	106
0	26	26.15	-8.8331	-14.58	108
0	26	30.84	-8.3563	-14.5893	110
0	26	35.53	-7.9586	-14.5609	113
0	26	40.23	-7.5137	-14.5314	115
0	26	44.93	-7.0731	-14.5432	117
0	26	49.62	-6.6964	-14.4971	119
0	26	54.31	-6.2641	-14.4845	120
0	26	59.01	-5.8587	-14.4516	121
0	27	3.58	-5.3917	-14.4317	121
0	27	8.28	-4.6299	-14.5302	121
0	27	12.97	-4.5021	-14.3577	122
0	27	17.66	-3.9995	-14.3594	122
0	27	22.38	-3.5897	-14.323	122
0	27	27.08	-3.1405	-14.2838	123
0	27	31.77	-2.6371	-14.2745	123
0	27	36.31	-2.2712	-14.242	124
0	27	41.03	-1.714	-14.2412	124
0	27	45.72	-1.2912	-14.2074	124
0	27	50.41	-0.7213	-14.2007	125
0	27	55.11	-0.2414	-14.1859	125
0	27	59.81	0.2808	-14.1692	126
0	28	4.36	0.7585	-14.1517	127
0	28	9.05	1.2805	-14.1301	127
0	28	13.75	1.7602	-14.1096	127
0	28	18.44	2.2428	-14.0886	128
0	28	23.13	2.8612	-14.0557	128
0	28	27.68	3.309	-14.0373	128

hour	minute	second	Xeast	Ynorth	alt
0	28	32.38	3.8697	-13.9907	129
0	28	37.1	4.3461	-13.9476	129
0	28	41.79	4.787	-13.8522	129
0	28	46.49	5.2955	-13.7334	130
0	28	51.18	5.7472	-13.5843	130
0	28	55.75	6.3248	-13.3771	131
0	29	0.44	6.7939	-13.198	130
0	29	5.13	7.1856	-13.0597	130
0	29	9.82	7.6347	-12.8756	129
0	29	14.54	8.0454	-12.7521	130
0	29	19.23	8.5137	-12.5775	130
0	29	23.77	9.0154	-12.3963	129
0	29	28.46	9.4493	-12.2273	128
0	29	33.16	9.8911	-12.0557	128
0	29	37.85	10.4058	-11.8442	128
0	29	42.57	10.7739	-11.7449	128
0	29	47.26	11.2064	-11.5944	128
0	29	51.96	11.6788	-11.4339	128
0	29	56.51	12.1335	-11.2743	129
0	30	1.2	12.5756	-11.0884	130
0	30	5.89	13.0469	-10.9468	130
0	30	10.6	13.4904	-10.8001	129
0	30	15.29	13.9469	-10.6481	129
0	30	19.98	14.3741	-10.4937	129
0	30	24.67	14.8555	-10.3298	130
0	30	29.4	15.2768	-10.2107	130
0	30	34.09	15.7585	-10.0157	131
0	30	38.63	16.239	-9.804	132
0	30	43.32	16.6719	-9.6853	133
0	30	48.01	17.1207	-9.5292	133
0	30	52.74	17.6541	-9.2658	133
0	30	57.44	18.0588	-9.1974	134
0	31	2.13	18.5484	-9.0558	135
0	31	6.83	19.0091	-8.8871	136
0	31	11.52	19.5121	-8.6881	137

US217

hour	minute	second	Xeast	Ynorth	alt
0	23	4	-20.3974	-56.7092	370
0	23	8.7	-19.8726	-56.3314	370
0	23	13.39	-19.8768	-55.7995	370
0	23	18.08	-19.1944	-55.4932	370
0	23	22.77	-18.9363	-55.0205	370
0	23	27.47	-18.523	-54.6333	370
0	23	32.16	-18.1127	-54.2439	370
0	23	36.86	-17.7064	-53.8518	370
0	23	41.56	-17.4633	-53.3885	370
0	23	46.26	-16.9785	-53.003	370
0	23	50.96	-16.826	-52.5269	370
0	23	55.66	-16.3533	-52.1521	370
0	24	0.36	-15.8869	-51.7733	369
0	24	5.06	-15.5825	-51.3435	369
0	24	9.74	-15.4373	-50.865	368
0	24	14.44	-14.7462	-50.5334	367
0	24	19.16	-14.5293	-50.0758	367
0	24	23.86	-14.2375	-49.6396	366
0	24	28.55	-13.7217	-49.2658	365
0	24	33.24	-13.2173	-48.9013	364
0	24	37.93	-13.0125	-48.4386	364
0	24	42.65	-12.7354	-47.9951	363
0	24	47.34	-12.1696	-47.6258	362
0	24	52.03	-12.0458	-47.1413	361
0	24	56.72	-11.5719	-46.7779	360
0	25	1.41	-11.1672	-46.362	360
0	25	6.12	-10.7715	-45.9576	359
0	25	10.84	-10.3822	-45.5508	358
0	25	20.23	-9.6875	-44.7126	356
0	25	24.92	-9.3098	-44.2819	356
0	25	29.6	-9.0756	-43.8364	355
0	25	34.32	-8.6479	-43.4447	354
0	25	39.02	-8.157	-43.047	353
0	25	43.71	-7.8742	-42.6228	352
0	25	48.4	-7.4596	-42.1896	352
0	25	53.1	-7.2504	-41.7501	351

US217

hour	minute	second	Xeast	Ynorth	alt
0	25	57.65	-6.6599	-41.3582	350
0	26	2.34	-6.458	-40.8993	350
0	26	7.06	-5.9475	-40.4875	349
0	26	11.73	-5.6341	-40.0587	348
0	26	16.45	-5.5079	-39.6028	347
0	26	21.16	-4.9006	-39.1948	347
0	26	25.85	-4.486	-38.7723	346
0	26	30.54	-4.1984	-38.3489	345
0	26	35.24	-3.6808	-37.9158	344
0	26	39.94	-3.4054	-37.4706	342
0	26	44.63	-3.0237	-37.0488	341
0	26	49.33	-2.7064	-36.6191	339
0	26	58.72	-1.8709	-35.7481	335
0	27	3.44	-1.3598	-35.3178	334
0	27	8.13	-1.1282	-34.8567	332
0	27	12.82	-0.533	-34.4339	330
0	27	17.51	-0.3171	-33.9675	327
0	27	22.23	0.0469	-33.531	325
0	27	26.93	0.4523	-33.0909	323
0	27	31.62	0.8469	-32.645	320
0	27	36.17	1.3302	-32.2065	317
0	27	40.86	1.6057	-31.7725	315
0	27	45.58	2.0171	-31.3261	312
0	27	50.27	2.4633	-30.8709	309
0	27	54.96	2.8037	-30.4181	306
0	27	59.66	3.0423	-29.9871	303
0	28	4.36	3.5001	-29.5273	300
0	28	9.05	3.8561	-29.0895	297
0	28	13.75	4.376	-28.6204	295
0	28	18.44	4.7497	-28.1653	292
0	28	23.13	5.1132	-27.7204	288
0	28	27.83	5.5061	-27.2625	286
0	28	32.53	5.974	-26.8115	283
0	28	37.1	6.257	-26.3616	280
0	28	41.79	6.6512	-25.8934	277
0	28	46.49	7.0785	-25.4396	273

US217

hour	minute	second	Xeast	Ynorth	alt
0	28	51.18	7.4093	-24.9876	270
0	28	55.87	7.8814	-24.4974	267
0	29	0.59	8.3035	-24.0277	264
0	29	5.27	8.7092	-23.5502	261
0	29	9.96	9.0336	-23.1102	258
0	29	14.68	9.4193	-22.6505	256
0	29	19.38	9.9387	-22.1538	254
0	29	23.92	10.3649	-21.6642	252
0	29	28.61	10.6241	-21.2759	250
0	29	33.3	11.0017	-20.8188	249
0	29	38.03	11.4412	-20.348	247
0	29	42.72	11.8333	-19.8867	246
0	29	47.41	12.2474	-19.4124	244
0	29	52.1	12.6627	-18.9568	243
0	29	56.79	13.0061	-18.5326	241
0	30	1.34	13.4104	-18.0868	240
0	30	6.03	13.7807	-17.6073	238
0	30	10.75	14.1393	-17.1797	237
0	30	15.44	14.5721	-16.6896	235
0	30	20.13	14.9993	-16.2006	233
0	30	24.82	15.3491	-15.7832	232
0	30	29.54	15.6867	-15.3578	230
0	30	34.09	16.0475	-14.8658	229
0	30	38.78	16.3931	-14.3657	227
0	30	43.47	16.681	-13.9089	226
0	30	48.16	16.9723	-13.375	224
0	30	52.89	17.2279	-12.8627	222
0	30	57.58	17.4304	-12.3999	221
0	31	2.28	17.6747	-11.8527	219
0	31	6.97	17.8113	-11.3588	218
0	31	11.52	18.0438	-10.7434	217
0	31	16.22	18.1679	-10.1849	216
0	31	20.91	18.2744	-9.6631	215
0	31	25.61	18.3939	-9.1208	215
0	31	30.3	18.4855	-8.6423	214
0	31	35.02	18.5887	-8.0729	213

US217

hour	minute	second	Xeast	Ynorth	alt
0	31	39.71	18.6942	-7.5787	213
0	31	44.26	18.7974	-7.0557	212
0	31	48.96	18.9213	-6.4796	211
0	31	53.65	19.0338	-5.9363	210
0	31	58.35	19.1368	-5.4253	210

VIR009

hour	minute	second	Xeast	Ynorth	alt
0	25	46.64	51.978	29.4353	241
0	25	56.06	51.3999	28.4868	241
0	26	0.72	51.1193	28.0242	241
0	26	5.45	50.9762	27.2382	241
0	26	10.15	50.5907	26.9325	241
0	26	14.84	50.2988	26.4815	241
0	26	19.53	50.03	25.9487	240
0	26	24.24	49.796	25.345	240
0	26	28.93	49.455	24.9805	240
0	26	33.62	49.1366	24.5361	240
0	26	38.32	48.9531	23.8845	240
0	26	43.02	48.4951	23.7534	240
0	26	47.71	48.3388	23.0357	240
0	26	52.41	48.1034	22.473	240
0	26	57.1	47.9482	21.6878	240
0	27	1.82	47.517	21.5807	239
0	27	6.66	47.2204	21.0971	239
0	27	11.36	46.9478	20.6312	238
0	27	16.05	46.5819	20.2999	237
0	27	20.74	46.3336	19.7697	236
0	27	25.46	45.9618	19.4453	236
0	27	30.15	45.6621	18.9887	234
0	27	34.85	45.3014	18.6757	233
0	27	39.54	45.0231	18.1586	231
0	27	44.23	44.6993	17.789	229
0	27	48.95	44.4121	17.2817	227
0	27	53.64	44.0049	17.1232	225
0	27	58.34	43.7371	16.5566	223
0	28	3.03	43.3733	16.1916	221
0	28	7.73	43.0798	15.6313	219
0	28	12.43	42.5912	15.6022	218
0	28	17.12	42.2224	15.2469	216
0	28	21.81	41.729	15.1411	214
0	28	26.53	41.296	14.9123	212
0	28	31.21	40.8558	14.7534	210
0	28	35.92	40.332	14.7746	208

VIR009

hour	minute	second	Xeast	Ynorth	alt
0	28	40.62	39.9444	14.4243	206
0	28	45.31	39.4149	14.5074	204
0	28	50	39.0264	14.1605	202
0	28	54.7	38.5056	14.1727	200
0	29	4.1	37.6049	13.9068	196
0	29	8.79	37.1376	13.8638	194
0	29	13.48	36.7252	13.5814	192
0	29	18.2	36.1823	13.6967	190
0	29	22.89	35.7079	13.5799	188
0	29	27.58	35.2696	13.4132	186
0	29	32.28	34.8117	13.3003	185
0	29	36.97	34.4288	13.0329	183
0	29	41.69	33.9104	13.0755	181
0	29	46.38	33.4181	13.0037	179
0	29	51.07	33.0156	12.7887	177
0	29	55.77	32.5403	12.7197	176
0	30	0.46	32.065	12.647	174
0	30	5.15	31.6095	12.5234	172
0	30	9.87	31.1354	12.4464	170
0	30	14.56	30.644	12.414	169
0	30	19.25	30.238	12.2495	167
0	30	23.94	29.8219	12.0277	165
0	30	28.66	29.2728	12.1731	163
0	30	33.36	28.8545	11.9992	161
0	30	38.05	28.418	11.8689	159
0	30	42.74	27.9597	11.8291	157
0	30	47.43	27.5067	11.7366	155
0	30	52.15	27.0544	11.642	153
0	30	56.85	26.6177	11.5511	152
0	31	1.54	26.1495	11.4914	150
0	31	6.24	25.6787	11.4727	149
0	31	10.93	25.2477	11.3267	147
0	31	15.49	24.7763	11.3445	145
0	31	20.18	24.3474	11.1929	144
0	31	24.87	23.8787	11.2004	143
0	31	29.57	23.4287	11.1649	141

VIR009

hour	minute	second	Xeast	Ynorth	alt
0	31	34.26	22.9969	11.0894	140
0	31	38.98	22.5189	11.0729	138
0	31	43.67	22.1212	10.9613	137
0	31	48.37	21.7233	10.8474	135
0	31	53.07	21.2852	10.7105	134
0	31	57.76	20.8137	10.6738	132

hour	minute	second	Xeast	Ynorth	alt
0	27	58.34	58.0104	16.3334	240
0	28	3.03	57.4789	16.0885	240
0	28	7.73	56.9213	15.9324	240
0	28	12.43	56.4522	15.521	240
0	28	17.12	55.8558	15.4493	240
0	28	21.81	55.384	15.0445	240
0	28	26.53	54.7879	14.9729	240
0	28	31.21	54.3346	14.4919	240
0	28	35.92	53.7475	14.5113	240
0	28	40.62	53.291	14.0384	240
0	28	45.31	52.7388	13.8063	240
0	28	50	52.2151	13.5835	240
0	28	54.7	51.6918	13.3627	240
0	29	4.1	50.627	12.9217	240
0	29	8.79	50.097	12.7864	240
0	29	13.48	49.5369	12.6434	240
0	29	27.58	48.0355	11.5563	240
0	29	32.28	47.4537	11.5707	240
0	29	36.97	46.9243	11.3652	240
0	29	46.38	45.8007	11.0931	240
0	29	51.07	45.288	10.8218	240
0	29	55.77	44.7729	10.5542	240
0	30	0.46	44.2418	10.3573	240
0	30	5.15	43.7093	10.1619	239
0	30	10.02	43.1617	9.9647	237
0	30	14.56	42.6135	9.9071	236
0	30	19.4	42.096	9.6506	234
0	30	24.09	41.5763	9.3971	232
0	30	28.81	40.9994	9.3992	0
0	30	33.5	40.4789	9.1491	227
0	30	38.19	39.9748	8.9706	224
0	30	42.89	39.4118	8.9079	222
0	30	47.58	38.8783	8.7873	219
0	30	52.3	38.3736	8.6113	217
0	30	57	37.8137	8.6077	214
0	31	1.69	37.3345	8.3186	211

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Numerical Data for Plot A-1
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BBE507

hour	minute	second	Xeast	Ynorth	alt
0	31	6.39	36.8037	8.259	208
0	31	11.08	36.2823	8.0842	205
0	31	15.79	35.7362	8.0195	201
0	31	20.48	35.254	7.7415	198
0	31	25.17	34.7702	7.4674	194
0	31	29.87	34.25	7.3557	191
0	31	34.58	33.7833	7.147	188
0	31	39.27	33.3633	6.6316	184
0	31	43.97	32.9367	6.2848	181
0	31	48.67	32.5565	5.8503	178
0	31	53.36	32.1865	5.4278	176
0	31	58.05	31.8184	5.0652	173

AZA609

hour	minute	second	Xeast	Ynorth	alt
0	23	42.3	-31.1297	-10.1737	5
0	23	46.99	-31.2139	-10.4666	7
0	23	51.69	-31.4409	-10.3288	9
0	23	56.4	-31.4579	-10.8178	11
0	24	1.09	-31.5721	-10.965	13
0	24	5.79	-31.7176	-11.0702	16
0	24	10.5	-31.7145	-11.4525	18
0	24	15.17	-31.7609	-11.6903	20
0	24	19.89	-31.7798	-11.8638	21
0	24	24.59	-31.8149	-12.2114	22
0	24	29.29	-31.8988	-12.2999	22
0	24	33.97	-31.9199	-12.5898	23
0	24	38.66	-31.8924	-13.034	24
0	24	43.38	-31.9625	-13.2342	25
0	24	48.07	-31.9621	-13.6377	26
0	24	52.76	-32.0496	-13.7916	27
0	24	57.46	-32.0855	-14.1	28
0	25	2.01	-32.089	-14.5145	29
0	25	6.84	-32.1824	-14.4972	30
0	25	11.42	-31.9893	-15.0647	31
0	25	16.11	-31.8638	-15.3653	32
0	25	20.81	-31.7027	-15.5888	33
0	25	25.5	-31.4252	-15.9341	35
0	25	30.19	-31.265	-15.9731	36
0	25	34.91	-30.8926	-16.3852	38
0	25	39.6	-30.5636	-16.6342	40
0	25	44.29	-30.3119	-16.7995	42
0	25	48.99	-29.9556	-17.1469	45
0	25	53.68	-29.8594	-17.031	47
0	25	58.38	-29.4603	-17.4687	49
0	26	3.07	-29.1914	-17.6742	52
0	26	7.8	-28.7974	-18.0451	54
0	26	12.49	-28.5525	-18.1985	57
0	26	17.19	-28.3489	-18.3139	59
0	26	21.89	-27.974	-18.6861	61
0	26	26.58	-27.7097	-18.8812	64

AZA609

hour	minute	second	Xeast	Ynorth	alt
0	26	31.28	-27.4029	-19.106	66
0	26	35.97	-27.0563	-19.2992	68
0	26	40.53	-26.7605	-19.3373	70
0	26	45.22	-26.3971	-19.3844	72
0	26	49.91	-25.9028	-19.5775	75
0	26	54.61	-25.6284	-19.3701	77
0	26	59.3	-25.2781	-19.289	79
0	27	4.02	-24.8459	-19.2621	81
0	27	8.72	-24.486	-19.1644	84
0	27	13.41	-24.0817	-19.1473	86
0	27	18.1	-23.7541	-19.0063	88
0	27	22.79	-23.377	-19.0008	91
0	27	27.52	-23.0069	-18.9352	93
0	27	32.21	-22.6382	-18.8662	95
0	27	36.9	-22.1725	-18.8851	97
0	27	41.59	-21.8653	-18.7397	99
0	27	46.31	-21.4329	-18.7137	101
0	27	51.01	-21.0092	-18.745	102
0	27	55.69	-20.7981	-18.4422	104
0	28	0.39	-20.3154	-18.4649	104
0	28	5.09	-19.8639	-18.4478	105
0	28	9.78	-19.6009	-18.2035	106
0	28	14.48	-18.9478	-18.3702	999
0	28	19.17	-18.5777	-18.2341	107
0	28	23.86	-18.144	-18.1391	108
0	28	28.57	-17.7245	-18.0493	109
0	28	33.26	-17.4618	-17.7818	109
0	28	37.98	-16.8191	-17.8794	110
0	28	42.53	-16.4646	-17.7194	110
0	28	47.22	-15.8857	-17.7399	110
0	28	51.91	-15.4571	-17.6386	110
0	28	56.6	-15.0427	-17.5426	110
0	29	6	-14.12	-17.4176	110
0	29	10.7	-13.6027	-17.3707	111
0	29	15.42	-13.2328	-17.2223	112
0	29	20.11	-12.7353	-17.1669	114

AZA609

hour	minute	second	Xeast	Ynorth	alt
0	29	24.8	-12.2791	-17.0939	115
0	29	29.49	-11.8193	-16.9976	116
0	29	34.18	-11.3651	-16.8915	118
0	29	38.88	-10.8224	-16.8558	119
0	29	43.45	-10.2868	-16.8044	121
0	29	48.14	-9.8783	-16.649	122
0	29	52.84	-9.3904	-16.5713	124
0	29	57.53	-8.8841	-16.4935	125
0	30	2.22	-8.3353	-16.4284	127
0	30	6.91	-7.9202	-16.2851	128
0	30	11.63	-7.3206	-16.2392	130
0	30	16.32	-6.8349	-16.1437	132
0	30	21.01	-6.3336	-16.0452	133
0	30	25.56	-5.7729	-15.9728	135
0	30	30.27	-5.2466	-15.8745	137
0	30	34.97	-4.6902	-15.8027	139
0	30	39.66	-4.1918	-15.7	140
0	30	44.35	-3.6311	-15.599	142
0	30	49.04	-3.1377	-15.5139	144
0	30	53.76	-2.6052	-15.4225	146
0	30	58.32	-1.9663	-15.3435	148
0	31	3.01	-1.4547	-15.2277	150
0	31	7.71	-0.9111	-15.1757	152
0	31	12.4	-0.3713	-15.0424	154
0	31	17.1	0.1814	-14.9519	156
0	31	21.65	0.8435	-14.8821	158
0	31	26.34	1.2943	-14.7875	160
0	31	31.04	1.8769	-14.6775	162
0	31	35.75	2.4606	-14.591	164
0	31	40.45	3.0184	-14.4859	166
0	31	44.99	3.5715	-14.3595	167
0	31	49.69	4.0757	-14.2246	169
0	31	54.39	4.6709	-14.0731	171
0	31	59.08	5.2392	-13.9047	173

PDT3112

hour	minute	second	Xeast	Ynorth	alt
0	21	1.98	-23.4293	-55.3386	125
0	21	6.68	-23.138	-55.1217	124
0	21	11.37	-22.6809	-54.974	123
0	21	16.07	-22.3935	-54.7537	123
0	21	20.77	-22.281	-54.4788	122
0	21	25.46	-21.907	-54.2767	122
0	21	30.16	-21.7023	-54.0056	121
0	21	34.84	-21.4264	-53.7961	120
0	21	39.56	-21.0642	-53.6038	120
0	21	44.26	-20.8678	-53.3446	119
0	21	48.95	-20.4287	-53.1802	119
0	21	53.64	-20.1596	-52.9651	118
0	21	58.34	-20.1238	-52.6277	117
0	22	3.05	-19.8458	-52.3826	117
0	22	7.6	-19.4839	-52.1512	116
0	22	16.99	-18.9327	-51.6387	115
0	22	21.69	-18.6675	-51.4033	114
0	22	26.38	-18.6285	-51.0514	114
0	22	31.1	-18.4381	-50.7717	113
0	22	35.79	-18.0934	-50.5473	113
0	22	40.49	-17.9003	-50.251	112
0	22	45.2	-17.8616	-49.8995	111
0	22	49.88	-17.5179	-49.6566	111
0	22	54.58	-17.1865	-49.4421	110
0	22	59.28	-16.9173	-49.1542	110
0	23	4	-16.5914	-48.9359	110
0	23	8.7	-16.4062	-48.6354	110
0	23	13.39	-16.1579	-48.3896	110
0	23	18.08	-16.049	-48.0633	110
0	23	22.77	-15.8815	-47.806	110
0	23	27.47	-15.7051	-47.519	110
0	23	32.16	-15.5297	-47.2314	110
0	23	36.86	-15.3598	-46.9577	110
0	23	41.56	-15.1911	-46.6846	110
0	23	46.26	-14.943	-46.4033	110
0	23	50.96	-14.7057	-46.1517	110

PDT3112

hour	minute	second	Xeast	Ynorth	alt
0	23	55.66	-14.6811	-45.831	110
0	24	0.36	-14.3059	-45.6226	110
0	24	5.06	-14.277	-45.2868	110
0	24	9.74	-14.1832	-44.9893	110
0	24	14.44	-13.8786	-44.7409	110
0	24	19.16	-13.6501	-44.4838	110
0	24	23.86	-13.4227	-44.227	110
0	24	28.55	-13.3318	-43.9275	110
0	24	33.24	-13.1071	-43.6694	110
0	24	37.93	-12.8796	-43.395	110
0	24	42.65	-12.7243	-43.1145	110
0	24	52.03	-12.1602	-42.6441	110
0	24	56.72	-12.0094	-42.3616	110
0	25	1.41	-11.7387	-42.1458	110
0	25	6.12	-11.5271	-41.8806	110
0	25	10.84	-11.3162	-41.6138	110
0	25	20.23	-10.9712	-41.0916	110
0	25	24.92	-10.6444	-40.8706	110
0	25	29.6	-10.445	-40.6165	110
0	25	34.32	-10.1268	-40.4063	110
0	25	39.02	-9.8741	-40.1795	110
0	25	43.71	-9.7384	-39.8915	110
0	25	48.4	-9.4889	-39.6617	110
0	25	53.1	-9.182	-39.4454	110
0	25	57.79	-8.991	-39.1693	110
0	26	2.48	-8.6888	-38.9486	110
0	26	7.18	-8.5648	-38.6719	110
0	26	11.88	-8.2686	-38.4489	110
0	26	16.6	-8.0303	-38.196	110
0	26	21.3	-7.8496	-37.915	110
0	26	26	-7.6198	-37.6752	110
0	26	30.69	-7.3855	-37.4028	110
0	26	35.39	-7.2139	-37.1338	110
0	26	40.09	-6.9875	-36.8748	110
0	26	44.78	-6.9914	-36.588	110
0	26	49.48	-6.4898	-36.3787	110

hour	minute	second	Xeast	Ynorth	alt
0	26	54.17	-6.1609	-36.1345	110
0	26	58.87	-6.0009	-35.8604	110
0	27	3.44	-5.8427	-35.5865	110
0	27	8.13	-5.5263	-35.3517	110
0	27	12.82	-5.4291	-35.0824	110
0	27	17.51	-5.2233	-34.8133	110
0	27	22.23	-4.9722	-34.5824	110
0	27	26.93	-4.6665	-34.3252	110
0	27	31.62	-4.4743	-34.0826	110
0	27	36.31	-4.3338	-33.8174	110
0	27	41.03	-4.0404	-33.5707	110
0	27	45.72	-3.8045	-33.3306	110
0	27	50.41	-3.4695	-33.0997	110
0	27	55.11	-3.2926	-32.8665	110
0	27	59.81	-3.0628	-32.5904	110
0	28	4.5	-2.7915	-32.3638	110
0	28	9.2	-2.5715	-32.1162	110
0	28	13.89	-2.3563	-31.882	110
0	28	18.58	-2.0443	-31.622	110
0	28	23.28	-1.9318	-31.3786	110
0	28	27.97	-1.5822	-31.1478	110
0	28	32.67	-1.3802	-30.9072	110
0	28	37.39	-1.0398	-30.6854	110
0	28	42.08	-0.8449	-30.4413	110
0	28	46.78	-0.5605	-30.2138	110
0	28	51.47	-0.3258	-29.9672	110
0	28	56.16	-0.0497	-29.734	110
0	29	5.56	0.3552	-29.2788	110
0	29	10.25	0.6197	-29.0244	110
0	29	14.98	0.7464	-28.7713	110
0	29	19.52	1.0904	-28.5262	110
0	29	24.21	1.3856	-28.2791	110
0	29	28.91	1.5872	-28.0021	110
0	29	33.6	1.8293	-27.7528	110
0	29	38.29	1.9396	-27.4947	110
0	29	43.01	2.2587	-27.2506	110

PDT3112

hour	minute	second	Xeast	Ynorth	alt
0	29	47.71	2.5282	-26.9758	110
0	29	52.4	2.7096	-26.7069	110
0	29	57.09	2.9292	-26.4473	110
0	30	1.78	3.1832	-26.1661	110
0	30	6.47	3.3933	-25.9037	110
0	30	11.19	3.6754	-25.6126	110
0	30	15.88	3.7201	-25.3697	110
0	30	20.57	3.9918	-25.0753	110
0	30	25.26	4.1069	-24.8185	110
0	30	29.99	4.4078	-24.5291	110
0	30	34.68	4.441	-24.2853	110
0	30	39.37	4.8409	-23.969	110
0	30	44.06	5.0191	-23.7249	109
0	30	48.75	5.223	-23.4412	109
0	30	53.47	5.3176	-23.1953	108
0	30	58.02	5.726	-22.8721	107
0	31	2.72	5.9504	-22.5884	107
0	31	7.42	6.169	-22.3036	106
0	31	12.11	6.3519	-22.041	106
0	31	16.81	6.6297	-21.7458	105
0	31	21.5	6.7781	-21.5208	104
0	31	26.2	7.0482	-21.2359	104
0	31	30.89	7.3487	-20.9516	103
0	31	35.58	7.5781	-20.6867	103
0	31	40.3	7.7759	-20.4463	102
0	31	44.99	8.0985	-20.1688	101
0	31	49.69	8.3954	-19.9288	101
0	31	54.39	8.5769	-19.6813	100
0	31	58.93	8.8622	-19.4337	99

GRA507

hour	minute	second	Xeast	Ynorth	alt
0	31	17.84	-52.5086	-29.4185	230
0	31	22.53	-52.2566	-28.6478	231
0	31	27.22	-51.5905	-28.5926	231
0	31	31.92	-51.2302	-27.984	232
0	31	36.63	-50.6817	-27.6844	233
0	31	41.32	-50.3146	-27.0839	234
0	31	46.02	-49.7362	-26.8712	235
0	31	50.72	-49.2819	-26.4304	235
0	31	55.42	-48.7452	-26.1426	236

GRA507_HPN

hour	minute	second	Xeast	Ynorth	alt
0	29	46.58	-60.6166	-37.6514	203
0	29	51.28	-60.3161	-37.1577	204
0	29	55.98	-59.7719	-36.8115	206
0	30	0.67	-59.4017	-36.3771	208
0	30	5.36	-59.1042	-35.8816	209
0	30	10.05	-58.1713	-35.7622	210
0	30	14.77	-58.3523	-34.9843	211
0	30	19.46	-57.8925	-34.5666	213
0	30	24.15	-57.7521	-33.9777	214
0	30	28.84	-57.0661	-33.6931	215
0	30	33.53	-56.8416	-33.1361	217
0	30	38.25	-56.6984	-32.5496	218
0	30	42.94	-55.8025	-32.3847	219
0	30	47.63	-55.7352	-31.7559	221
0	30	52.33	-54.9913	-31.4814	222
0	30	57.02	-55.0583	-30.7579	224
0	31	1.72	-54.6891	-30.2852	225
0	31	6.42	-54.4	-29.7847	226
0	31	11.11	-53.9712	-29.3646	228
0	31	15.82	-53.3373	-29.0601	229

hour	minute	second	Xeast	Ynorth	alt
0	15	57.31	-49.0425	-8.8128	15
0	16	1.99	-49.0955	-9.1341	16
0	16	6.69	-49.16	-9.3806	17
0	16	11.38	-49.238	-9.5523	18
0	16	16.08	-49.4783	-9.1267	19
0	16	20.78	-49.5745	-9.4597	19
0	16	25.48	-49.684	-9.8757	19
0	16	30.18	-50.0267	-8.9897	19
0	16	34.87	-50.0523	-9.869	19
0	16	39.57	-50.2783	-9.3541	20
0	16	48.98	-50.4586	-9.1473	22
0	16	53.68	-50.4695	-8.9102	22
0	16	58.38	-50.4696	-8.3517	23
0	17	3.07	-50.3747	-8.2575	24
0	17	7.77	-50.1954	-8.3856	25
0	17	12.47	-50.0942	-8.1325	26
0	17	17.16	-49.977	-7.8773	27
0	17	21.88	-49.8544	-7.5444	28
0	17	26.58	-49.7001	-7.5211	29
0	17	31.27	-49.5449	-7.4976	29
0	17	35.97	-49.4839	-6.9459	30
0	17	40.67	-49.3187	-6.9999	31
0	17	45.36	-49.1046	-7.2776	32
0	17	50.05	-49.0347	-6.6534	33
0	17	54.77	-48.9296	-6.2569	34
0	17	59.47	-48.8189	-6.0143	35
0	18	4.16	-48.6856	-6.0738	36
0	18	8.86	-48.5907	-5.6842	37
0	18	13.55	-48.4921	-5.4463	38
0	18	18.25	-48.3495	-5.7313	39
0	18	22.97	-48.2512	-5.4943	40
0	18	27.66	-48.1903	-5.0388	41
0	18	32.36	-48.0819	-5.0275	42
0	18	37.05	-47.9877	-4.8687	43
0	18	41.74	-47.878	-4.709	44
0	18	46.44	-47.8107	-4.2587	45

hour	minute	second	Xeast	Ynorth	alt
0	18	51.13	-47.6831	-4.0998	46
0	18	55.85	-47.5457	-4.2351	47
0	19	0.55	-47.475	-3.569	47
0	19	5.24	-47.3354	-3.5585	48
0	19	9.94	-47.2508	-2.9696	49
0	19	14.64	-47.126	-2.9618	49
0	19	19.33	-46.9876	-2.6634	50
0	19	24.04	-46.8745	-2.4404	50
0	19	28.73	-46.706	-2.6474	50
0	19	33.43	-46.5186	-2.351	51
0	19	38.12	-46.3485	-1.9857	52
0	19	42.83	-46.1234	-2.118	54
0	19	47.52	-45.9078	-2.0374	56
0	19	52.23	-45.6856	-1.7464	57
0	19	56.93	-45.4303	-1.8764	58
0	20	1.63	-45.2036	-1.6593	60
0	20	6.33	-44.9697	-1.6507	61
0	20	11.03	-44.725	-1.9161	62
0	20	15.73	-44.4958	-1.7694	63
0	20	20.41	-44.256	-1.4884	64
0	20	25.1	-43.9989	-1.682	65
0	20	29.79	-43.7699	-1.5393	66
0	20	34.49	-43.5201	-1.5306	67
0	20	39.18	-43.2885	-1.4558	68
0	20	44.05	-43.0429	-1.3152	69
0	20	48.6	-42.775	-1.3728	70
0	20	53.44	-42.5451	-1.2346	71
0	20	58.14	-42.3019	-0.9682	73
0	21	2.71	-42.0563	-1.3498	74
0	21	7.56	-41.8395	-1.2785	541
0	21	12.1	-41.6036	-1.3352	76
0	21	16.95	-41.3576	-1.2001	77
0	21	21.65	-41.1422	-1.0674	78
0	21	26.34	-40.898	-0.8104	78
0	21	35.73	-40.4114	-0.925	80
0	21	40.42	-40.16	-0.9802	81

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Numerical Data for Plot A-1
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hour	minute	second	Xeast	Ynorth	alt
0	21	45.14	-39.9261	-0.9745	82
0	21	49.83	-39.6776	-0.9082	83
0	21	54.53	-39.4314	-0.7208	84
0	21	59.22	-39.1825	-0.656	85
0	22	8.63	-38.6965	-0.7073	87
0	22	18.02	-38.2162	-0.4637	89
0	22	22.74	-37.9984	-0.345	90
0	22	27.43	-37.7799	-0.285	90
0	22	32.13	-37.563	-0.0526	91
0	22	36.82	-37.375	-0.0523	92
0	22	41.52	-37.1539	-0.3938	93
0	22	41.52	-37.1507	1.2589	0
0	22	46.21	-36.9376	0.1746	93
0	22	50.91	-36.7174	0.3427	94
0	22	55.61	-36.5116	0.5651	95
0	23	0.31	-36.2472	0.4497	17
0	23	0.31	-36.269	1.7864	96
0	23	5.03	-36.067	0.8901	97
0	23	9.72	-35.8302	0.9944	97
0	23	14.42	-35.6007	1.3159	98
0	23	19.11	-35.3838	1.2534	99
0	23	23.81	-35.1518	1.1912	99
0	23	28.5	-34.91	1.3977	100
0	23	33.2	-34.6583	1.7604	99
0	23	37.89	-34.4323	1.5905	100
0	23	42.58	-34.1636	1.9458	100
0	23	47.29	-33.9348	1.8282	100
0	23	51.98	-33.6553	2.0719	100
0	23	56.68	-33.3925	2.2617	100
0	24	1.38	-33.136	2.3466	100
0	24	6.08	-32.8556	2.7323	100
0	24	10.8	-32.6146	2.6114	100
0	24	15.47	-32.3093	2.8863	108
0	24	20.19	-32.0262	3.0594	100
0	24	24.88	-31.7471	3.1804	100
0	24	29.58	-31.4477	3.4917	100

hour	minute	second	Xeast	Ynorth	alt
0	24	34.26	-31.1727	3.4127	100
0	24	38.96	-30.8861	3.7173	100
0	24	43.68	-30.6173	3.7326	100
0	24	48.37	-30.3418	3.7937	100
0	24	53.06	-30.0332	3.989	100
0	25	2.45	-29.4139	4.4594	23
0	25	7.14	-29.1232	4.5985	99
0	25	12.01	-28.8183	4.8224	99
0	25	16.7	-28.5254	4.7734	99
0	25	21.4	-28.163	5.2923	99
0	25	26.09	-27.9012	5.3314	100
0	25	35.5	-27.3729	5.1003	84
0	25	35.5	-27.1142	6.3989	100
0	25	40.19	-26.9109	5.96	99
0	25	44.88	-26.6051	6.107	99
0	25	49.58	-26.4137	5.8924	99
0	25	54.27	-26.0325	6.3551	99
0	25	58.97	-25.7547	6.3711	28
0	26	3.66	-25.3978	6.6975	99
0	26	8.39	-25.0833	6.9038	99
0	26	13.05	-24.8735	6.7229	100
0	26	17.77	-24.4049	7.4477	100
0	26	22.47	-24.1344	7.5271	101
0	26	27.17	-23.9263	7.4622	103
0	26	31.86	-23.601	7.76	105
0	26	36.56	-23.3211	7.9068	106
0	26	41.26	-23.0433	8.0894	108
0	26	45.95	-22.7516	8.302	110
0	26	50.65	-22.5518	8.347	112
0	26	55.49	-22.246	8.6236	24
0	27	0.18	-22.1256	8.4604	155
0	27	4.9	-21.7784	8.829	116
0	27	9.6	-21.5795	8.9032	118
0	27	14.29	-21.3105	9.0997	119
0	27	18.98	-21.0967	9.2388	120
0	27	23.67	-20.9397	9.2852	121

hour	minute	second	Xeast	Ynorth	alt
0	27	28.39	-20.5941	9.6666	122
0	27	33.09	-20.4664	9.6446	123
0	27	37.78	-20.2189	9.8714	124
0	27	42.47	-20.0306	9.9707	124
0	27	47.19	-19.78	10.189	125
0	27	51.88	-19.6181	10.2966	126
0	27	56.58	-19.4423	10.3955	126
0	28	1.28	-19.1222	10.7198	127
0	28	5.96	-18.9743	10.7906	128
0	28	15.36	-18.5033	11.1323	129
0	28	20.05	-18.3235	11.2167	129
0	28	29.6	-17.8241	11.5993	129
0	28	34.29	-17.589	11.756	130
0	28	39.01	-17.3718	11.8826	129
0	28	43.7	-17.1039	12.0493	129
0	28	48.39	-16.9661	12.1088	130
0	28	53.09	-16.6711	12.3277	130
0	28	57.78	-16.3807	12.5062	130
0	29	2.48	-16.0943	12.7232	130
0	29	7.18	-15.8442	12.8848	129
0	29	11.87	-15.605	13.0523	129
0	29	16.59	-15.352	13.2052	129
0	29	21.29	-15.0893	13.3874	130
0	29	25.97	-14.8454	13.5419	130
0	29	30.81	-14.5675	13.7036	129
0	29	35.5	-14.2782	13.8931	129
0	29	40.19	-14.0405	14.0443	129
0	29	49.6	-13.4741	14.3755	129
0	29	54.3	-13.1882	14.5547	129
0	29	59	-12.9218	14.708	129
0	30	3.68	-12.6185	14.9075	129
0	30	8.37	-12.2797	15.1079	129
0	30	17.78	-11.7771	15.3847	130
0	30	22.47	-11.44	15.5787	130
0	30	27.31	-11.0852	15.7953	130
0	30	32.03	-10.8486	15.9212	130

hour	minute	second	Xeast	Ynorth	alt
0	30	36.73	-10.5943	16.0724	130
0	30	41.42	-10.288	16.2513	130
0	30	46.11	-10.0297	16.3944	130
0	30	50.8	-9.7261	16.5763	130
0	30	55.53	-9.4269	16.7654	130
0	31	0.23	-9.1166	16.9362	130
0	31	4.92	-8.7916	17.1431	130
0	31	9.62	-8.4954	17.3442	130
0	31	14.32	-8.2079	17.4986	129
0	31	19.16	-7.7949	17.7378	129
0	31	23.85	-7.5951	17.8754	129
0	31	28.54	-7.2601	18.0808	129
0	31	33.23	-7.1164	18.2055	129
0	31	37.95	-6.7505	18.4275	129
0	31	42.65	-6.6019	18.5481	129
0	31	47.34	-6.26	18.7643	129
0	31	52.04	-5.8205	18.9869	129
0	31	56.74	-5.5506	19.1498	129

N2084C

hour	minute	second	Xeast	Ynorth	alt
0	25	3.91	0.2206	0.3784	0
0	25	8.63	0.2218	0.3777	0
0	25	13.33	0.22	0.3787	0
0	25	22.72	0.2235	0.3767	0
0	25	32.12	0.2218	0.3777	0
0	25	41.5	0.2239	0.3938	0
0	25	46.2	0.2251	0.3931	0
0	25	50.9	0.2233	0.3941	0
0	25	55.59	0.2189	0.3794	0
0	26	0.29	0.2221	0.3948	0
0	26	5	0.2191	0.3965	0
0	26	9.68	0.2218	0.4133	0
0	26	14.4	0.2128	0.4179	0
0	26	23.8	0.2006	0.4239	0
0	26	28.49	0.1855	0.3968	1
0	26	28.49	0.1912	0.4107	0
0	26	37.88	0.1734	0.3847	1
0	26	42.58	0.1404	0.3477	1
0	26	47.13	0.0902	0.283	1
0	27	18.4	-0.3125	-0.0995	5
0	27	23.08	-0.3889	-0.1638	6
0	27	27.66	-0.4762	-0.235	6
0	27	32.36	-0.5494	-0.2979	7
0	27	37.05	-0.6319	-0.3734	7
0	27	41.73	-0.7138	-0.4503	8
0	27	46.46	-0.8041	-0.5407	8
0	27	51.01	-0.8625	-0.6213	9
0	27	55.69	-0.9317	-0.711	10
0	28	0.39	-0.9953	-0.8064	10
0	28	5.09	-1.0732	-0.9084	10
0	28	9.78	-1.1234	-1.0179	11
0	28	14.48	-1.1615	-1.1365	11
0	28	19.02	-1.1803	-1.2703	12
0	28	23.72	-1.1503	-1.4013	12
0	28	28.42	-1.1056	-1.5341	13
0	28	32.97	-1.0169	-1.6498	13

N2084C

hour	minute	second	Xeast	Ynorth	alt
0	28	37.69	-0.9177	-1.742	14
0	28	42.38	-0.7871	-1.8048	14
0	28	46.93	-0.6447	-1.8276	15
0	28	51.62	-0.503	-1.8384	15
0	28	56.31	-0.3596	-1.7923	16
0	29	5.56	-0.0908	-1.6856	17
0	29	10.25	0.0375	-1.6406	17
0	29	14.83	0.1698	-1.6	18
0	29	19.52	0.3076	-1.5477	18
0	29	24.07	0.4463	-1.5136	19
0	29	28.76	0.5992	-1.4598	20
0	29	33.3	0.7028	-1.4129	21
0	29	38.03	0.8438	-1.3888	21
0	29	42.57	0.9678	-1.3437	22
0	29	47.26	1.1025	-1.3189	22
0	29	51.96	1.2417	-1.2768	23
0	29	56.51	1.3949	-1.253	23
0	30	1.2	1.5409	-1.2258	24
0	30	5.89	1.6895	-1.2098	24
0	30	10.6	1.8357	-1.1906	25
0	30	15.14	1.9844	-1.1569	25
0	30	19.83	2.1252	-1.128	26
0	30	24.53	2.2761	-1.107	26
0	30	29.25	2.4126	-1.0743	27
0	30	33.94	2.565	-1.0353	27
0	30	38.49	2.6993	-0.9897	28
0	30	43.18	2.8485	-0.9414	28
0	30	47.87	3.0028	-0.9214	29
0	30	52.59	3.162	-0.8755	29
0	30	57.29	3.3013	-0.8382	30
0	31	1.98	3.4391	-0.8005	30
0	31	6.68	3.6056	-0.7754	31
0	31	11.37	3.743	-0.7272	31
0	31	16.08	3.8916	-0.6942	32
0	31	20.63	4.0419	-0.6509	32
0	31	25.31	4.203	-0.6306	33

N2084C

hour	minute	second	Xeast	Ynorth	alt
0	31	30.01	4.364	-0.6069	34
0	31	34.72	4.5127	-0.5572	34
0	31	39.42	4.6594	-0.5174	35
0	31	44.11	4.8168	-0.5124	35
0	31	48.81	4.9925	-0.4847	35
0	31	53.51	5.166	-0.4775	35
0	31	58.2	5.3399	-0.4523	36

Jolly14 (HPN)

hour	minute	second	Xeast	Ynorth	alt
0	9	14.56	23.7638	4.9165	24
0	9	23.95	23.9372	5.1286	25
0	9	28.63	24.0291	5.1091	25
0	9	33.35	24.1067	5.176	25
0	9	38.05	24.1998	5.2399	25
0	9	42.74	24.2945	5.3863	25
0	9	47.43	24.4363	5.7752	25
0	9	56.82	24.5298	5.9239	25
0	10	1.52	24.5146	6.0929	25
0	10	6.08	24.5744	6.4984	25
0	10	10.92	24.4533	6.1879	25
0	10	15.47	24.4977	6.5125	25
0	10	20.17	24.4672	6.5181	25
0	10	24.87	24.4789	6.8471	25
0	10	29.57	24.4451	7.0188	25
0	10	34.25	24.4005	6.9438	25
0	10	38.94	24.4254	7.2703	25
0	10	43.64	24.3791	7.2782	25
0	10	48.37	24.3022	7.2912	25
0	10	53.06	24.2985	7.4566	25
0	10	57.73	24.3191	7.7815	25
0	11	7.13	24.24	7.8762	25
0	11	11.85	24.274	8.1989	25
0	11	16.52	24.3058	8.5209	25
0	11	21.23	24.2867	8.6054	25
0	11	25.93	24.2517	8.6922	25
0	11	30.62	24.2482	8.7744	25
0	11	35.3	24.2278	8.8589	25
0	11	40	24.2406	9.1823	25
0	11	44.72	24.2414	9.4265	26
0	11	49.41	24.2414	9.4265	26
0	11	54.11	24.2516	9.5065	25
0	11	58.8	24.338	9.8212	25
0	12	3.5	24.4313	9.8099	25
0	12	8.19	24.5279	9.9606	25
0	12	12.91	24.6203	9.9497	25

Jolly14 (HPN)

hour	minute	second	Xeast	Ynorth	alt
0	12	17.6	24.7756	10.341	25
0	12	22.3	24.8749	10.2481	25
0	12	26.99	25.0021	10.3983	25
0	12	31.68	25.1033	10.4696	25
0	12	36.37	25.195	10.2948	25
0	12	41.07	25.3223	10.6105	25
0	12	45.77	25.4402	10.681	25
0	12	50.49	25.5812	10.9982	25
0	12	55.18	25.6985	11.0699	25
0	12	59.87	25.8148	11.1421	25
0	13	4.56	25.9383	11.2964	25
0	13	9.25	26.0625	11.4522	25
0	13	13.94	26.1489	11.1938	25
0	13	18.64	26.3142	11.8494	25
0	13	23.35	26.4104	11.6739	25
0	13	28.05	26.539	11.9147	25
0	13	32.75	26.6551	11.9899	25
0	13	37.44	26.7883	12.3174	25
0	13	42.13	26.897	12.3098	25
0	13	46.82	27.0292	12.6385	25
0	13	51.51	27.1325	12.8015	25
0	13	56.23	27.2423	12.7948	25
0	14	0.92	27.3562	12.8731	25
0	14	5.61	27.5068	12.7788	25
0	14	10.31	27.6785	13.0253	25
0	14	15.01	27.8595	13.1868	25
0	14	24.42	28.2086	12.9956	25
0	14	29.11	28.3653	12.7268	25
0	14	33.81	28.5102	12.5441	25
0	14	38.5	28.6404	12.623	25
0	14	43.2	28.7382	12.4433	24
0	14	47.88	28.7735	12.2662	24
0	14	52.6	28.8066	12.5252	23
0	14	57.29	28.7953	12.3521	23
0	15	1.99	28.7421	11.8313	23
0	15	6.69	28.7205	11.7455	22

Jolly14 (HPN)

Jolly14 (HPN)

hour	minute	second	Xeast	Ynorth	alt
0	15	11.37	28.6908	11.5739	22
0	15	16.07	28.6383	11.316	22
0	15	20.76	28.6073	11.1438	22
0	15	30.15	28.5529	10.8875	22
0	15	34.87	28.5206	10.7157	21
0	15	39.57	28.4642	10.459	21
0	15	44.27	28.4672	10.8081	21
0	15	58.35	28.177	9.9666	28
0	16	3.05	28.1181	10.1471	20
0	16	7.75	27.9771	9.728	20
0	16	12.44	27.8837	9.7387	20
0	16	17.14	27.7556	9.3212	20
0	16	21.84	27.6881	9.6747	20
0	16	26.54	27.5645	9.431	21
0	16	35.93	27.3465	9.1991	21
0	16	40.62	27.2584	9.1241	21
0	16	45.34	27.1434	8.9669	21
0	16	50.04	27.0438	8.8083	21
0	16	54.74	26.9403	8.7364	21
0	16	59.44	26.8779	8.7448	21
0	17	4.13	26.7619	8.5905	20
0	17	8.83	26.6613	8.4336	20
0	17	13.53	26.5601	8.2772	21
0	17	18.22	26.4829	8.2884	19
0	17	22.91	26.3384	8.0541	19
0	17	27.61	26.2761	8.0634	19
0	17	32.3	26.1307	7.8314	19
0	17	36.99	26.0557	7.7582	19
0	17	41.7	25.9499	7.6899	20
0	17	46.41	25.816	7.5418	20
0	17	51.1	25.6833	7.3108	20
0	17	55.79	25.6063	7.3234	20
0	18	0.49	25.5158	7.2541	20
0	18	5.18	25.4113	7.1032	19
0	18	9.89	25.3344	7.1162	18
0	18	14.58	25.1997	6.8873	0

Jolly14 (HPN)

Jolly14 (HPN)

hour	minute	second	Xeast	Ynorth	alt
0	18	19.3	25.11	6.7351	17
0	18	28.69	24.8665	6.4447	15
0	18	33.38	24.8055	6.4559	15
0	18	38.23	24.6979	6.3086	14
0	19	1.72	24.0774	5.2655	0
0	19	6.42	24.0827	5.6793	11
0	19	11.12	24.0224	5.8572	11
0	19	15.81	23.8975	5.551	10
0	19	20.52	23.7241	5.2567	10
0	19	25.19	23.6467	5.1903	9
0	19	29.91	23.5512	5.0454	9
0	19	34.61	23.4772	5.1439	8
0	19	39.3	23.3498	4.9241	7
0	19	43.97	23.2364	4.7028	1510
0	19	58.08	22.9394	4.5231	4
0	20	2.78	22.8455	4.4626	5
0	20	7.48	22.7335	4.3245	0
0	20	12.18	22.621	4.1871	0
0	20	35.67	22.6295	3.1169	1510
0	21	17.96	23.9962	3.1029	14
0	21	22.65	24.1926	3.3084	15
0	21	27.35	24.4268	3.6759	16
0	21	36.73	24.5669	3.1307	18
0	21	41.45	24.7238	3.1775	19
0	21	46.14	24.9395	3.468	20
0	21	50.83	25.0756	3.4354	20
0	21	55.53	25.2322	3.484	19
0	22	0.22	25.4417	3.6925	20
0	22	9.61	25.7418	3.5356	20
0	22	14.32	25.9703	3.8304	20
0	22	19.02	26.0024	3.2131	20
0	22	23.72	26.2866	3.6706	20
0	22	28.41	26.4155	3.4652	20
0	22	42.51	27.0066	3.5936	18
0	22	47.21	27.2316	3.8091	18
0	22	51.89	27.4244	4.0322	18

Jolly14 (HPN)

Jolly14 (HPN)

hour	minute	second	Xeast	Ynorth	alt
0	22	56.61	27.5248	3.8328	18
0	23	1.31	27.7213	4.1461	19
0	23	6	27.8619	4.2053	19
0	23	10.7	27.9657	4.0934	19
0	23	15.39	28.1091	4.2423	19
0	23	20.08	28.2496	4.3025	19
0	23	24.78	28.4592	4.6183	19
0	23	29.47	28.6342	4.8536	19
0	23	38.87	28.9783	5.1476	19
0	23	43.58	29.1838	5.5608	20
0	23	48.26	29.273	5.2716	20
0	23	52.81	29.4934	5.6856	20
0	23	57.66	29.551	5.3101	20
0	24	2.2	29.7236	5.6436	20
0	24	6.92	29.7846	5.6325	20
0	24	11.62	29.8161	5.6268	20
0	24	16.32	29.848	5.8945	27
0	24	21.01	29.9084	6.5234	19
0	24	25.7	29.8472	6.5336	19
0	24	30.39	29.8009	6.5413	19
0	24	35.11	29.7534	6.6401	19
0	24	39.8	29.7357	6.8237	19
0	24	44.49	29.6729	6.9245	19
0	24	49.19	29.6683	7.197	20
0	24	53.88	29.6476	7.4714	20
0	25	3.27	29.6293	8.1044	19
0	25	7.96	29.542	7.9367	19
0	25	12.66	29.5447	8.296	19
0	25	17.38	29.4982	8.3024	19
0	25	22.07	29.4604	8.4858	19
0	25	26.76	29.437	8.6681	19
0	25	31.45	29.3745	8.6762	1503
0	25	36.15	29.3468	8.9478	20
0	25	40.87	29.1935	8.6106	19
0	25	45.56	29.0877	8.8915	19
0	25	59.64	28.5507	8.519	20

Jolly14 (HPN)

Jolly14 (HPN)

hour	minute	second	Xeast	Ynorth	alt
0	26	46.6	27.0325	8.7239	19
0	26	51.29	26.8824	8.6595	19
0	26	56.02	26.7471	8.5925	19
0	27	0.71	26.5908	8.2728	19
0	27	5.4	26.4708	8.2049	19
0	27	10.09	26.3656	8.1352	19
0	27	14.78	26.2385	7.8149	19
0	27	19.51	26.1708	7.9951	20
0	27	28.89	25.9062	7.6121	20
0	27	33.58	25.7986	7.6292	20
0	27	38.27	25.6221	7.3208	19
0	27	43	25.4743	7.0082	18
0	27	47.69	25.3974	7.0214	17
0	27	52.38	25.3065	6.9528	17
0	27	57.08	25.2302	6.882	16
0	28	1.77	25.1391	6.8139	16
0	28	6.47	25.0637	6.7433	15
0	28	6.47	24.958	6.5955	15
0	28	15.86	24.8508	6.4476	15
0	28	20.71	24.7591	6.3808	14
0	28	25.4	24.6674	6.3143	14
0	28	30.1	24.6362	6.4036	14
0	28	34.79	24.5142	6.1763	14
0	28	53.59	24.1752	5.7438	10
0	28	58.3	24.0823	5.5963	10
0	29	2.98	23.9717	5.3707	10
0	29	7.68	23.9598	5.6212	10
0	29	12.37	23.816	5.2373	10
0	29	17.06	23.8694	5.8875	24
0	29	21.78	23.677	5.1839	9
0	29	26.47	23.5654	4.9596	9
0	29	31.16	23.5209	5.0519	8
0	29	35.86	23.4432	4.9862	8
0	29	40.55	23.3645	4.9208	7
0	29	45.27	23.3211	5.0127	7
0	29	49.96	23.1905	4.713	6

Jolly14

hour	minute	second	Xeast	Ynorth	alt
0	9	10.92	23.7376	5.3269	23
0	9	15.61	23.8263	5.5008	24
0	9	20.15	23.9077	5.6357	25
0	9	24.85	24.0207	5.7013	25
0	9	29.56	24.118	5.7631	25
0	9	34.25	24.1971	5.9	25
0	9	38.95	24.3094	5.9669	25
0	9	43.64	24.3883	6.1056	25
0	9	48.34	24.4752	6.2069	25
0	9	53.03	24.5276	6.3808	25
0	9	57.72	24.5679	6.4719	25
0	10	2.42	24.5586	6.6306	25
0	10	7.13	24.5369	6.8273	25
0	10	11.82	24.5197	6.9439	25
0	10	16.52	24.4964	7.141	25
0	10	21.22	24.5041	7.225	25
0	10	25.92	24.4747	7.3796	25
0	10	30.63	24.47	7.5014	25
0	10	35.33	24.4261	7.6931	25
0	10	40.03	24.4176	7.773	25
0	10	44.72	24.4111	7.8949	25
0	10	49.42	24.3774	8.0494	25
0	10	54.11	24.3594	8.2514	25
0	10	58.81	24.3482	8.331	25
0	11	3.51	24.3138	8.5279	25
0	11	8.21	24.2768	8.7249	25
0	11	12.9	24.3077	8.7777	25
0	11	17.6	24.2974	8.9431	25
0	11	22.32	24.2572	9.1399	25
0	11	27.01	24.2587	9.2684	25
0	11	31.71	24.274	9.3598	25
0	11	36.39	24.2306	9.5999	25
0	11	41.08	24.2585	9.6542	25
0	11	50.5	24.2538	9.9987	26
0	11	55.19	24.2777	10.2274	25
0	11	59.88	24.317	10.3756	25

Jolly14

hour	minute	second	Xeast	Ynorth	alt
0	12	9.31	24.5268	10.599	25
0	12	14	24.6717	10.6167	25
0	12	18.69	24.7664	10.7929	25
0	12	23.38	24.876	10.9317	25
0	12	28.07	24.9851	11.0709	25
0	12	32.79	25.1277	11.1341	25
0	12	37.49	25.2368	11.2752	25
0	12	42.04	25.3413	11.4623	25
0	12	46.73	25.4657	11.5657	25
0	12	51.42	25.5931	11.6236	25
0	12	56.11	25.6676	11.7998	25
0	13	0.83	25.8419	11.8325	25
0	13	5.52	25.9152	12.0102	25
0	13	10.22	26.0196	12.1558	25
0	13	14.91	26.1796	12.1817	25
0	13	19.6	26.2833	12.3283	0
0	13	24.32	26.42	12.4419	25
0	13	29.01	26.509	12.5835	25
0	13	33.71	26.6256	12.7386	25
0	13	38.4	26.7808	12.8128	25
0	13	43.09	26.8674	12.9558	25
0	13	47.79	26.9944	13.0171	25
0	13	52.51	27.0946	13.1681	25
0	13	57.2	27.1941	13.3199	25
0	14	1.89	27.3486	13.3956	25
0	14	6.58	27.4617	13.5552	25
0	14	11.3	27.651	13.5964	25
0	14	15.97	27.812	13.6226	25
0	14	20.69	28.0292	13.5692	25
0	14	25.39	28.2178	13.5003	25
0	14	30.08	28.3718	13.4677	25
0	14	34.78	28.4836	13.4137	25
0	14	39.47	28.643	13.221	24
0	14	44.19	28.7179	13.096	24
0	14	48.87	28.7152	12.9884	24
0	14	53.71	28.834	12.5655	23

Jolly14

hour	minute	second	Xeast	Ynorth	alt
0	14	58.4	28.7092	12.6162	23
0	15	3.1	28.7146	12.4087	23
0	15	7.82	28.6671	12.2838	22
0	15	12.51	28.6551	12.0714	22
0	15	17.2	28.5647	12.085	22
0	15	21.9	28.588	11.7855	22
0	15	26.59	28.5516	11.6686	22
0	15	31.29	28.5706	11.3702	21
0	15	35.99	28.5304	11.3035	1504
0	15	40.71	28.4944	11.1382	21
0	15	45.4	28.4239	11.0603	21
0	15	50.1	28.3074	11.015	21
0	16	13.58	27.8581	10.351	1503
0	16	18.28	27.7418	10.2593	20
0	16	23.01	27.6261	10.1683	20
0	16	27.68	27.5552	9.9983	21
0	16	32.38	27.4073	9.9923	21
0	16	37.07	27.2901	9.9021	21
0	16	41.79	27.2183	9.6878	21
0	16	46.48	27.1442	9.5675	21
0	16	51.18	27.0268	9.4795	21
0	16	55.88	26.952	9.314	21
0	17	0.58	26.8053	9.3556	21
0	17	5.28	26.7146	9.1866	20
0	17	9.97	26.6382	9.0233	20
0	17	14.67	26.5336	8.9425	20
0	17	19.39	26.4288	8.862	19
0	17	24.09	26.3238	8.7818	19
0	17	28.77	26.2299	8.6169	19
0	17	33.47	26.1373	8.4976	19
0	17	38.16	26.0429	8.3344	19
0	17	42.86	25.9339	8.2118	20
0	17	47.58	25.8148	8.1741	20
0	17	52.27	25.706	8.0533	20
0	17	56.97	25.6112	7.9373	20
0	18	1.66	25.5007	7.8173	20

Jolly14

Jolly14

hour	minute	second	Xeast	Ynorth	alt
0	18	6.36	25.4168	7.6636	19
0	18	11.06	25.3203	7.5502	18
0	18	15.75	25.2195	7.3938	17
0	18	20.44	25.122	7.2815	17
0	18	25.17	25.002	7.2467	16
0	18	29.86	24.9303	7.1016	15
0	18	34.56	24.848	6.8728	3
0	18	43.94	24.6071	6.8061	13
0	18	48.64	24.497	6.7352	12
0	18	53.35	24.3926	6.5858	12
0	19	2.74	24.2043	6.257	11
0	20	18.05	22.5633	4.3773	5
0	20	27.44	22.5849	4.0942	5
0	20	32.14	22.6739	3.8595	6
0	20	36.84	22.7626	3.8026	7
0	20	41.56	22.8884	3.7157	7
0	20	46.25	23.0649	3.5991	8
0	20	50.95	23.1715	3.7252	9
0	20	55.64	23.3583	3.6449	10
0	21	0.36	23.4853	3.7386	10
0	21	5.06	23.6461	3.727	11
0	21	9.76	23.832	3.6439	12
0	21	14.46	23.9816	3.7044	13
0	21	19.15	24.1199	3.7258	14
0	21	23.85	24.2751	3.7498	15
0	21	28.54	24.3838	3.9585	16
0	21	33.23	24.57	3.6799	17
0	21	37.95	24.7128	3.7785	18
0	21	42.64	24.8463	3.838	20
0	21	47.34	24.9964	3.7826	20
0	21	52.03	25.1458	3.8447	20
0	21	56.73	25.3	3.8683	20
0	22	1.44	25.476	3.8552	20
0	22	6.13	25.6217	4.0384	20
0	22	10.83	25.8064	4.0675	20
0	22	15.53	25.973	4.012	20

Jolly14

hour	minute	second	Xeast	Ynorth	alt
0	22	24.94	26.3656	4.0312	20
0	22	29.64	26.5379	4.141	20
0	22	34.32	26.7394	4.1725	19
0	22	39.02	26.9242	4.2013	19
0	22	43.74	27.1406	4.2351	18
0	22	48.42	27.3253	4.2639	18
0	22	53.11	27.4684	4.4593	18
0	23	2.53	27.7782	4.5967	19
0	23	7.23	27.919	4.7964	19
0	23	11.92	28.0653	4.8659	19
0	23	16.62	28.2119	5.0253	19
0	23	26	28.5586	5.1318	1502
0	23	30.7	28.7199	5.2064	19
0	23	35.4	28.8407	5.4115	19
0	23	40.09	28.9905	5.6242	19
0	23	44.81	29.1593	5.6569	20
0	23	49.49	29.3107	5.7793	20
0	23	54.19	29.4705	5.8578	20
0	23	58.89	29.6448	5.9398	20
0	24	3.59	29.7552	6.1047	20
0	24	8.3	29.8492	6.2669	20
0	24	12.97	29.866	6.4142	20
0	24	17.7	29.8967	6.565	20
0	24	22.39	29.8611	6.7975	19
0	24	26.94	29.8128	7.076	19
0	24	31.63	29.791	7.1671	19
0	24	36.31	29.7496	7.3993	19
0	24	41.04	29.7423	7.4945	19
0	24	45.73	29.7113	7.6806	20
0	24	50.42	29.6481	7.8589	20
0	24	55.11	29.6024	8.09	20
0	24	59.8	29.5919	8.1849	20
0	25	4.5	29.5412	8.366	19
0	25	9.22	29.5059	8.6013	19
0	25	13.91	29.4946	8.6964	19
0	25	18.61	29.4425	8.9268	19

Jolly14

hour	minute	second	Xeast	Ynorth	alt
0	25	23.3	29.4431	8.9764	19
0	25	27.99	29.4038	9.2118	19
0	25	32.7	29.3907	9.3561	20
0	25	37.4	29.3178	9.4819	20
0	25	42.09	29.1845	9.6864	19
0	25	46.79	29.0804	9.7014	19
0	25	51.48	28.9321	9.7508	20
0	25	56.18	28.7392	9.8335	20
0	26	0.87	28.5765	9.7778	20
0	26	10.27	28.2664	9.7202	20
0	26	14.99	28.1037	9.6643	20
0	26	19.68	27.9562	9.6136	20
0	26	24.38	27.8082	9.5149	20
0	26	29.08	27.6455	9.4593	20
0	26	33.77	27.4531	9.4406	19
0	26	38.47	27.3056	9.3898	19
0	26	43.17	27.1146	9.3702	19
0	26	47.86	26.9945	9.2365	19
0	26	52.55	26.8318	9.1808	19
0	26	57.25	26.7118	9.0025	19
0	27	1.97	26.5781	8.9575	19
0	27	6.66	26.4711	8.7858	19
0	27	11.36	26.3751	8.5749	19
0	27	16.05	26.2288	8.5719	19
0	27	30.15	25.8748	8.1931	20
0	27	34.85	25.7499	8.0671	20
0	27	39.54	25.6498	7.863	19
0	27	44.23	25.528	7.7828	18
0	27	48.95	25.4321	7.6683	17
0	27	53.64	25.3241	7.5933	17
0	27	58.34	25.2302	7.5234	16
0	28	3.03	25.1559	7.3333	16
0	28	7.73	25.0359	7.2983	15
0	28	12.43	24.9424	7.2295	15
0	28	17.12	24.8959	7.0505	15
0	28	21.81	24.7815	6.9364	14

Jolly14

hour	minute	second	Xeast	Ynorth	alt
0	28	26.53	24.7081	6.7933	14
0	28	31.21	24.5876	6.7601	14
0	28	35.92	24.5133	6.6183	13
0	28	40.62	24.4625	6.4441	13
0	28	50	24.2759	6.3551	11
0	28	54.7	24.1753	6.3684	10
0	29	18.2	23.7847	5.8769	9
0	29	22.89	23.7113	5.7815	9

N41142 (JFK)

hour	minute	second	Xeast	Ynorth	alt
0	15	23.42	-43.9572	1.944	6
0	15	28.03	-43.906	1.833	7
0	15	37.27	-43.7586	1.4436	7
0	15	41.88	-43.7167	1.245	8
0	15	46.52	-43.5443	1.1099	8
0	15	51.13	-43.3502	1.0542	8
0	15	55.74	-43.1717	0.9767	9
0	16	0.36	-42.9946	0.8988	9
0	16	4.98	-42.777	0.9436	9
0	16	9.61	-42.6217	0.9104	9
0	16	14.23	-42.3798	1.0537	9
0	16	18.83	-42.2221	1.1399	10
0	16	23.47	-42.033	1.2599	10
0	16	28.08	-41.8648	1.397	10
0	16	32.84	-41.6896	1.4936	10
0	16	37.45	-41.503	1.6431	10
0	16	42.08	-41.3253	1.7332	10
0	16	46.69	-41.1205	1.7599	10
0	16	51.32	-40.9498	1.7515	10
0	16	55.93	-40.7085	1.7658	11
0	17	0.55	-40.5136	1.6907	11
0	17	5.18	-40.2995	1.5916	11
0	17	9.79	-40.1724	1.4531	11
0	17	14.4	-40.126	1.2413	12
0	17	19.03	-40.0136	1.0891	12
0	17	23.67	-40.0151	0.8731	12
0	17	28.27	-40.0799	0.6361	13
0	17	32.88	-40.0294	0.4665	13
0	17	37.51	-39.9913	0.2824	13
0	17	42.13	-39.8867	0.122	13
0	17	46.75	-39.7944	-0.0525	13
0	17	51.36	-39.6382	-0.2045	13
0	17	55.99	-39.5169	-0.3496	14
0	18	0.6	-39.3332	-0.4747	14
0	18	5.21	-39.1772	-0.627	14
0	18	9.85	-38.8739	-0.5888	14

N41142 (JFK)

hour	minute	second	Xeast	Ynorth	alt
0	18	14.45	-38.8607	-0.8856	14
0	18	19.06	-38.6552	-0.9878	14
0	18	23.69	-38.4411	-1.1271	14
0	18	28.3	-38.2817	-1.1902	14
0	18	32.94	-38.0928	-1.3103	14
0	18	37.54	-37.8785	-1.3648	14
0	18	42.17	-37.6881	-1.3995	14
0	18	46.78	-37.4304	-1.4181	14
0	18	51.42	-37.2084	-1.4293	14
0	18	56.02	-37.0084	-1.4219	14
0	19	0.63	-36.7664	-1.4233	14
0	19	5.26	-36.5341	-1.3974	14
0	19	9.88	-36.3152	-1.3865	14
0	19	14.49	-36.0979	-1.381	14
0	19	19.27	-35.8529	-1.398	14
0	19	23.88	-35.6504	-1.3363	14
0	19	28.49	-35.4193	-1.2983	14
0	19	33.1	-35.1655	-1.2513	14
0	19	37.73	-34.9516	-1.1998	14
0	19	42.35	-34.7408	-1.1192	14
0	19	46.96	-34.5144	-1.0728	14
0	19	51.58	-34.2394	-0.9743	14
0	19	56.33	-34.076	-0.9344	14
0	20	0.95	-33.8734	-0.848	14
0	20	5.59	-33.6322	-0.7858	14
0	20	10.2	-33.4003	-0.7012	14
0	20	14.81	-33.1924	-0.6315	14
0	20	19.43	-32.9651	-0.5294	14
0	20	24.04	-32.7531	-0.4704	14
0	20	28.67	-32.5334	-0.3833	14
0	20	33.43	-32.3242	-0.3046	14
0	20	38.04	-32.1127	-0.2299	14
0	20	42.67	-31.9311	-0.1352	14
0	20	47.28	-31.6861	-0.0671	15
0	20	51.91	-31.4699	0.023	14
0	20	56.52	-31.2501	0.1069	14

N41142 (JFK)

N41142 (JFK)

hour	minute	second	Xeast	Ynorth	alt
0	21	1.15	-31.0411	0.1856	14
0	21	5.76	-30.8155	0.2911	14
0	21	10.51	-30.5995	0.3589	14
0	21	15.16	-30.3802	0.4537	14
0	21	19.76	-30.1862	0.5443	14
0	21	24.37	-29.9454	0.5967	14
0	21	29	-29.7574	0.7103	14
0	21	33.61	-29.507	0.7838	14
0	21	38.24	-29.2984	0.8563	14
0	21	42.87	-29.0825	0.9551	14
0	21	47.48	-28.8465	1.0468	14
0	21	52.23	-28.6218	1.1358	14
0	21	56.87	-28.3991	1.1884	14
0	22	1.47	-28.1826	1.2709	14
0	22	6.1	-27.939	1.3762	14
0	22	10.71	-27.682	1.3755	14
0	22	15.34	-27.4794	1.4177	14
0	22	19.95	-27.2421	1.4462	14
0	22	24.58	-27.0256	1.5094	14
0	22	29.19	-26.7733	1.5572	14
0	22	33.82	-26.5342	1.605	14
0	22	38.57	-26.3366	1.6304	14
0	22	43.18	-26.0924	1.6688	14
0	22	47.82	-25.8573	1.6731	14
0	22	57.04	-25.1477	1.6047	0
0	23	1.68	-25.0781	1.7455	14
0	23	6.28	-24.9291	1.7928	0
0	23	10.89	-24.6703	1.7997	14
0	23	15.52	-24.4599	1.8285	14
0	23	20.13	-24.2059	1.8483	14
0	23	24.77	-23.9827	1.8451	14
0	23	29.37	-23.7162	1.8306	14
0	23	34.13	-23.4819	1.8683	14
0	23	38.76	-23.2961	1.8977	14
0	23	43.37	-23.0749	1.9017	14
0	23	47.99	-22.7327	1.8575	14

N41142 (JFK)

N41142 (JFK)

hour	minute	second	Xeast	Ynorth	alt
0	23	52.6	-22.5758	1.8997	14
0	23	57.24	-22.3149	1.9031	14
0	24	1.84	-22.0859	1.9268	14
0	24	6.48	-21.8381	1.9333	14
0	24	11.08	-21.605	1.9495	14
0	24	15.7	-21.3537	1.9468	14
0	24	20.33	-21.135	1.968	14
0	24	24.94	-20.8768	1.9953	14
0	24	29.57	-20.6718	2.0239	14
0	24	34.2	-20.4142	2.0037	14
0	24	38.8	-20.1506	2.0178	14
0	24	43.55	-19.9244	2.02	14
0	24	48.19	-19.6583	2.0243	14
0	24	52.79	-19.4287	2.0195	14
0	24	57.42	-19.2109	2.0665	14
0	25	2.03	-18.9739	2.0941	14
0	25	6.66	-18.7413	2.0781	14
0	25	11.27	-18.485	2.0794	14
0	25	15.88	-18.2958	2.1523	14
0	25	20.51	-18.0253	2.0879	14
0	25	25.12	-17.7817	2.0976	14
0	25	29.74	-17.5898	2.1628	14
0	25	34.35	-17.3267	2.1466	14
0	25	38.98	-17.063	2.1252	14
0	25	43.59	-16.8496	2.163	14
0	25	48.22	-16.6119	2.2175	14
0	25	52.83	-16.3616	2.2076	14
0	25	57.46	-16.1382	2.2791	14
0	26	2.07	-15.8866	2.2622	14
0	26	6.71	-15.668	2.2875	14
0	26	11.32	-15.4074	2.3058	14
0	26	15.95	-15.187	2.326	14
0	26	20.56	-14.9412	2.3627	14
0	26	25.17	-14.7199	2.3776	14
0	26	29.78	-14.4544	2.3847	14
0	26	34.41	-14.2848	2.4692	14

N41142 (JFK)

hour	minute	second	Xeast	Ynorth	alt
0	26	39.17	-13.9819	2.4208	14
0	26	43.78	-13.7566	2.4264	15
0	26	48.41	-13.5237	2.4727	15
0	26	53.04	-13.2972	2.4741	14
0	26	57.65	-13.0262	2.4634	14
0	27	2.26	-12.8349	2.5132	14
0	27	6.89	-12.5623	2.497	14
0	27	11.5	-12.3069	2.5051	14
0	27	16.13	-12.0779	2.4937	14
0	27	20.76	-11.8652	2.5088	14
0	27	25.37	-11.6087	2.5093	14
0	27	29.97	-11.3505	2.5073	14
0	27	34.6	-11.1184	2.4869	14
0	27	39.24	-10.9402	2.5533	14
0	27	43.84	-10.6801	2.5446	14
0	27	48.47	-10.4375	2.5639	14
0	27	53.08	-10.1862	2.5033	14
0	27	57.69	-9.9245	2.4865	14
0	28	2.32	-9.6803	2.4992	14
0	28	6.93	-9.4455	2.4617	14
0	28	11.57	-9.263	2.5201	14
0	28	16.17	-8.9647	2.428	14
0	28	20.78	-8.7361	2.4651	14
0	28	25.41	-8.5344	2.4864	14
0	28	30.03	-8.2704	2.4529	15
0	28	34.66	-8.0502	2.4369	15
0	28	39.26	-7.8306	2.4186	16
0	28	43.9	-7.6455	2.4695	16
0	28	48.51	-7.3788	2.4273	17
0	28	53.14	-7.1231	2.3327	17
0	28	57.74	-6.919	2.3434	17
0	29	2.36	-6.7155	2.3525	18
0	29	6.97	-6.5286	2.3977	18
0	29	11.6	-6.2894	2.3311	18
0	29	16.21	-6.0666	2.2994	19
0	29	20.84	-5.8163	2.2786	19

N41142 (JFK)

hour	minute	second	Xeast	Ynorth	alt
0	29	25.44	-5.6281	2.3196	19
0	29	30.07	-5.4116	2.3729	19
0	29	34.68	-5.2417	2.451	19
0	29	39.31	-4.9893	2.4257	19
0	29	43.94	-4.8079	2.5557	20
0	29	48.69	-4.502	2.4074	20
0	29	53.3	-4.3198	2.5366	19
0	29	57.94	-4.138	2.6664	19
0	30	2.54	-3.8658	2.5934	19
0	30	7.17	-3.6551	2.735	19
0	30	11.77	-3.4376	2.7823	19
0	30	16.4	-3.1822	2.7452	19
0	30	21.04	-2.9347	2.8028	19
0	30	25.64	-2.7153	2.8474	19
0	30	30.27	-2.4773	2.8484	19
0	30	39.5	-1.9807	2.9584	19
0	30	44.11	-1.78	3.0437	19
0	30	48.74	-1.5971	3.1731	19
0	30	53.35	-1.3484	3.2271	19
0	30	57.99	-1.1277	3.2677	19
0	31	2.59	-0.8783	3.3197	19
0	31	7.2	-0.6572	3.3589	19
0	31	11.84	-0.4074	3.4095	19
0	31	16.46	-0.1869	3.447	19
0	31	21.06	0.0245	3.5899	19
0	31	25.69	0.2944	3.5918	19
0	31	30.3	0.5164	3.628	19
0	31	34.93	0.7277	3.7712	19
0	31	39.56	1.0091	3.6625	19
0	31	44.17	1.1811	3.9021	19
0	31	48.78	1.4634	3.7903	19
0	31	53.41	1.6951	3.8841	19
0	31	58.02	1.9268	3.978	19

EastHampton

hour	minute	second	Xeast	Ynorth	alt
0	12	54.2	-37.7644	-0.3429	14
0	13	31.8	-36.6189	-0.6694	15
0	13	41.19	-36.3059	-0.7194	14
0	14	18.76	-35.0721	-0.6411	15
0	14	56.36	-33.9361	-0.3597	15
0	15	48.05	-32.4051	-0.2445	15
0	18	51.28	-27.3277	2.2726	15
0	19	5.39	-27.0192	2.2051	14
0	19	24.19	-26.5511	2.5364	15
0	19	33.57	-26.4059	2.0327	15
0	20	25.24	-24.917	3.3484	15
0	20	34.64	-24.7434	2.978	15
0	20	58.14	-24.0327	3.6813	15
0	21	26.49	-23.2217	3.996	15
0	21	26.49	-23.061	4.1871	15
0	21	35.87	-22.9267	4.3083	15
0	22	41.66	-21.0428	4.5591	15
0	22	51.06	-20.7487	4.6621	15
0	23	5.17	-20.3459	4.6702	15
0	23	19.26	-19.8473	5.0066	15
0	23	28.64	-19.6124	4.9153	16
0	23	38.04	-19.2618	5.2062	17
0	23	42.73	-19.1648	5.0853	18
0	23	56.84	-18.6472	5.5968	19
0	24	15.62	-18.2104	5.2533	20
0	24	25.03	-17.8909	5.3998	19
0	24	29.73	-17.7547	5.4182	19
0	24	34.42	-17.6998	5.165	19
0	24	34.42	-17.5209	5.7907	19
0	24	43.82	-17.3464	5.4686	20
0	24	48.51	-17.2104	5.4839	20
0	24	57.89	-16.9046	5.6158	20
0	25	2.59	-16.7276	5.6997	20
0	25	7.29	-16.6265	5.6086	20
0	25	16.7	-16.366	5.5487	20
0	25	21.4	-16.2221	5.5831	20

EastHampton

hour	minute	second	Xeast	Ynorth	alt
0	25	49.58	-15.2778	5.7613	20
0	25	54.42	-15.123	5.7295	20
0	26	3.8	-14.8543	5.7323	20
0	26	8.51	-14.7228	5.6816	20
0	26	22.62	-14.2684	5.81	20
0	26	27.32	-14.0534	6.0009	20
0	26	36.7	-13.8595	5.8177	20
0	26	50.8	-13.375	5.9554	20
0	26	55.49	-13.1635	6.1541	20
0	27	14.29	-12.5944	6.2209	20
0	27	23.67	-12.2989	6.2877	20
0	27	28.39	-12.1876	6.2308	20
0	27	33.09	-12.0858	6.1553	20
0	27	42.47	-11.7594	6.2412	20
0	27	47.19	-11.5528	6.3606	20
0	27	56.58	-11.3813	6.1528	20
0	28	1.28	-11.0593	6.4703	20
0	28	15.36	-10.7645	6.2314	20
0	28	20.05	-10.5797	6.2992	20
0	28	29.6	-10.2103	6.4238	20
0	28	34.29	-10.085	6.3882	20
0	28	39.01	-9.9368	6.3584	20
0	28	43.7	-9.7768	6.405	20
0	28	53.09	-9.4802	6.3995	20
0	28	57.78	-9.3243	6.378	20
0	29	2.48	-9.1562	6.4293	20
0	29	7.18	-8.9653	6.4818	20
0	29	11.87	-8.8067	6.5123	20
0	29	16.59	-8.7039	6.4158	20
0	29	21.29	-8.5793	6.426	20
0	29	25.97	-8.3808	6.4804	20
0	29	35.36	-8.1066	6.4492	20
0	29	49.46	-7.6188	6.4525	20
0	29	54.16	-7.4941	6.4061	20
0	29	58.85	-7.2515	6.4936	20
0	30	3.54	-7.2096	6.3767	20

EastHampton

hour	minute	second	Xeast	Ynorth	alt
0	30	8.23	-7.0501	6.3914	20
0	30	22.47	-6.5358	6.4577	20
0	30	27.19	-6.3887	6.4494	20
0	30	31.89	-6.2635	6.4406	20
0	30	36.58	-6.0606	6.5258	20
0	30	41.27	-5.9567	6.4734	20
0	30	45.96	-5.7841	6.5028	20
0	30	55.38	-5.4816	6.5368	20
0	31	0.08	-5.2912	6.5922	20
0	31	4.77	-5.1008	6.6424	20
0	31	19.01	-4.7241	6.6878	20
0	31	23.7	-4.4923	6.7701	20
0	31	33.08	-4.2121	6.8378	20
0	31	37.8	-4.1037	6.8486	20
0	31	42.5	-3.9509	6.9022	20
0	31	51.89	-3.69	6.957	20
0	31	56.59	-3.5073	7.0508	20

King74

hour	minute	second	Xeast	Ynorth	alt
0	27	49.24	38.3268	-0.299	25
0	27	53.94	38.6212	-0.5386	25
0	27	58.63	38.8872	-0.5423	24
0	28	3.33	39.1813	-0.727	24
0	28	8.02	39.4652	-0.5503	24
0	28	12.72	39.7442	-0.6763	23
0	28	17.41	40.0138	-1.1722	22
0	28	22.11	40.2889	-0.8087	22
0	28	36.22	40.8757	-1.5738	21
0	28	45.61	41.0858	-2.4035	25
0	28	50.3	41.1708	-2.2816	21
0	29	13.8	41.1028	-3.4818	20
0	29	37.26	40.6034	-4.1307	19
0	29	41.99	40.3105	-4.9145	19
0	29	51.36	39.9074	-4.741	19
0	29	56.06	39.718	-4.4719	19
0	30	0.76	39.5513	-4.2687	19
0	30	5.44	39.4138	-4.3763	20
0	30	10.17	39.3093	-3.8771	20
0	30	14.85	39.1748	-3.8031	20
0	30	19.54	39.0445	-3.851	20
0	30	24.24	38.943	-3.5996	20
0	30	28.93	38.8399	-3.17	20
0	30	33.65	38.735	-3.1015	20
0	30	38.34	38.6286	-2.855	20
0	30	43.03	38.5367	-2.6102	20
0	30	47.72	38.4545	-2.4267	20
0	30	57.14	38.3915	-1.891	20
0	31	1.84	38.3466	-1.4764	20
0	31	11.23	38.3308	-1.005	20
0	31	15.94	38.3292	-1.0639	20
0	31	20.63	38.3487	-0.8876	20
0	31	25.31	38.3524	-0.7116	21
0	31	30.01	38.3243	-0.5344	21
0	31	39.42	38.2499	-0.064	20
0	31	44.11	38.1406	0.1705	20

King74

hour	minute	second	Xeast	Ynorth	alt
0	31	53.51	37.8206	0.7493	20
0	31	58.2	37.6375	0.5144	20

UNK1

hour	minute	second	Xeast	Ynorth	alt
0	32	40.33	27.3961	3.1621	12
0	33	3.85	26.8123	3.1782	12
0	33	8.53	26.6992	3.2064	12
0	33	13.24	26.5701	3.2323	12
0	33	17.92	26.4609	3.219	12
0	33	22.62	26.3536	3.3288	12
0	33	27.31	26.2495	3.2747	12
0	33	32.03	26.1154	3.3395	12
0	33	36.73	26.0221	3.3275	12
0	33	41.42	25.924	3.2341	12

N1182J

hour	minute	second	Xeast	Ynorth	alt		
0	17	30.68	-0.2207	-0.2639	0		
0	17	35.82	-0.3213	-0.1228	1		
0	17	40.37	-0.381	-0.1815	1		
0	17	45.06	-0.4664	-0.2538	1		
0	17	49.75	-0.5543	-0.3218	2		
0	17	54.47	-0.6428	-0.3865	2		
0	17	59.17	-0.7179	-0.4438	3		
0	18	3.86	-0.8219	-0.5133	3		
0	18	8.56	-0.9025	-0.5617	4		
0	18	13.25	-1.0223	-0.6341	4		
0	18	17.95	-1.1169	-0.6904	4		
0	18	22.67	-1.213	-0.7421	5		
0	18	27.37	-1.3209	-0.8053	6		
0	18	32.06	-1.4289	-0.8682	6		
0	18	36.76	-1.5207	-0.9271	7		
0	18	41.45	-1.6289	-0.9897	7		
0	18	46.15	-1.7229	-1.0468	8		
0	18	50.84	-1.8161	-1.1034	8		
0	18	55.56	-1.9265	-1.1624	9		
0	19	0.25	-2.0217	-1.2156	9		
0	19	4.95	-2.1159	-1.2723	10		
0	19	9.65	-2.2114	-1.3251	10		
0	19	14.35	-2.3144	-1.3964	11		
0	19	19.04	-2.4063	-1.4569	11		
0	19	23.74	-2.5086	-1.5294	12		
0	19	28.44	-2.5992	-1.5901	12		
0	19	33.13	-2.7169	-1.6679	13		
0	19	37.83	-2.8124	-1.7206	13		
0	19	42.53	-2.9081	-1.773	14		
0	19	47.23	-3.0149	-1.8381	14		
0	19	51.93	-3.1117	-1.8905	15		
0	19	56.63	-3.2285	-1.9077	16		
0	20	1.33	-3.3478	-1.8891	16		
0	20	6.03	-3.4346	-1.8285	17		
0	20	10.73	-3.5115	-1.7468	17		
0	20	15.41	-3.5378	-1.6199	17		

N1182J

hour	minute	second	Xeast	Ynorth	alt		
0	20	20.25	-3.554	-1.5036	18		
0	20	24.95	-3.5257	-1.3657	18		
0	20	29.65	-3.5056	-1.2417	19		
0	20	34.34	-3.4474	-1.1208	20		
0	20	39.04	-3.3853	-1.0038	20		
0	20	43.76	-3.3205	-0.891	20		
0	20	48.46	-3.2333	-0.7884	21		
0	20	53.3	-3.1462	-0.6808	22		
0	20	57.99	-3.0705	-0.581	22		
0	21	2.71	-2.977	-0.4833	23		
0	21	7.42	-2.882	-0.373	23		
0	21	12.1	-2.784	-0.2695	24		
0	21	16.81	-2.6971	-0.1778	24		
0	21	21.65	-2.6079	-0.0757	25		
0	21	26.34	-2.5159	0.0196	25		
0	21	35.73	-2.3025	0.22	26		
0	21	40.42	-2.2122	0.3111	27		
0	21	45.28	-2.1158	0.4144	27		
0	21	49.98	-2.0157	0.5052	28		
0	21	54.67	-1.938	0.6077	28		
0	21	59.51	-1.8059	0.7032	28		
0	22	4.23	-1.7081	0.8113	28		
0	22	8.92	-1.5792	0.9207	28		
0	22	13.77	-1.4659	1.0394	28		
0	22	18.46	-1.3555	1.1552	28		
0	22	23.3	-1.2273	1.2698	28		
0	22	27.99	-1.117	1.3872	29		
0	22	32.86	-1.005	1.4897	31		
0	22	37.55	-0.8886	1.5803	31		
0	22	42.24	-0.7869	1.6843	32		
0	22	47.09	-0.6695	1.7685	32		
0	22	51.8	-0.5466	1.875	32		
0	22	56.64	-0.4417	1.9824	33		
0	23	1.36	-0.3267	2.0522	33		
0	23	6.05	-0.2126	2.1616	33		
0	23	10.75	-0.0935	2.2641	34		

N1182J

hour	minute	second	Xeast	Ynorth	alt		
0	23	15.59	0.0183	2.3439	34		
0	23	20.28	0.1433	2.4488	35		
0	23	24.98	0.2461	2.5351	36		
0	23	29.67	0.3678	2.6153	36		
0	23	34.52	0.4774	2.7245	36		
0	23	39.21	0.6045	2.8107	37		
0	23	43.93	0.713	2.8821	37		
0	23	48.61	0.835	2.9626	38		
0	23	53.31	0.9539	3.042	38		
0	23	58	1.073	3.1175	39		
0	24	2.7	1.1934	3.2242	39		
0	24	7.56	1.3175	3.2932	39		
0	24	12.24	1.4368	3.3792	40		
0	24	16.96	1.5697	3.4398	40		
0	24	21.65	1.6867	3.523	41		
0	24	26.35	1.8074	3.6031	41		
0	24	31.04	1.9371	3.677	42		
0	24	35.73	2.0474	3.7596	42		
0	24	40.45	2.184	3.8266	43		
0	24	45.14	2.3001	3.9038	43		
0	24	49.83	2.4248	3.9748	44		
0	24	54.67	2.5483	4.0642	44		
0	24	59.36	2.6633	4.1202	44		
0	25	4.06	2.7981	4.2003	45		
0	25	8.78	2.9175	4.2512	45		
0	25	13.47	3.0665	4.3387	46		
0	25	18.17	3.1929	4.4019	46		
0	25	22.86	3.3213	4.4627	46		
0	25	27.55	3.4538	4.5382	47		
0	25	32.27	3.5721	4.605	47		
0	25	36.96	3.7089	4.6768	47		
0	25	41.65	3.8276	4.7214	48		
0	25	46.35	3.9607	4.7947	48		
0	25	51.04	4.1097	4.8525	49		
0	25	55.74	4.2358	4.9092	49		
0	26	0.44	4.3815	4.9692	50		

N1182J

hour	minute	second	Xeast	Ynorth	alt	
0	26	5.15	4.5236	5.0516	50	
0	26	9.83	4.644	5.091	51	
0	26	14.54	4.7781	5.1579	51	
0	26	19.24	4.9061	5.2314	52	
0	26	24.09	5.0404	5.2765	52	
0	26	28.79	5.1707	5.3468	52	
0	26	33.48	5.3208	5.4183	53	
0	26	38.17	5.4589	5.4574	53	
0	26	42.87	5.575	5.5393	54	
0	26	47.57	5.7352	5.5774	54	
0	26	52.26	5.8709	5.6399	55	
0	26	56.98	6.0158	5.6908	55	
0	27	1.67	6.1535	5.7501	55	
0	27	6.37	6.2924	5.8079	56	
0	27	11.06	6.4403	5.8536	56	
0	27	15.76	6.5629	5.9283	57	1200 starts here
0	27	20.47	6.7156	5.9918	58	
0	27	25.17	6.8459	6.0332	58	
0	27	29.86	6.9985	6.0728	59	
0	27	34.55	7.1325	6.1319	60	
0	27	39.24	7.2463	6.1912	61	
0	27	43.96	7.3702	6.2385	61	
0	27	48.66	7.5577	6.2591	61	
0	27	53.35	7.6947	6.313	61	
0	27	58.04	7.8233	6.3785	61	
0	28	2.74	7.9936	6.416	62	
0	28	7.43	8.1551	6.4637	62	
0	28	12.13	8.3056	6.5005	63	
0	28	16.82	8.4569	6.5356	63	
0	28	21.52	8.598	6.5818	63	
0	28	26.24	8.7526	6.6363	64	
0	28	30.91	8.8983	6.7039	64	
0	28	35.63	9.0515	6.7328	65	
0	28	40.33	9.2297	6.7558	65	
0	28	45.02	9.3843	6.7812	65	
0	28	49.71	9.5424	6.8286	66	

N1182J

hour	minute	second	Xeast	Ynorth	alt		
0	28	54.58	9.6888	6.8661	66		
0	29	3.95	9.9978	6.9707	67		
0	29	8.64	10.1797	6.982	67		
0	29	13.36	10.3382	6.9979	68		
0	29	18.05	10.5008	7.0376	68		
0	29	22.75	10.6522	7.0918	68		
0	29	27.44	10.8258	7.1121	69		
0	29	32.13	11.0002	7.1303	69		
0	29	36.82	11.1406	7.1728	70		
0	29	41.54	11.305	7.2054	70		
0	29	46.23	11.493	7.2018	71		
0	29	50.92	11.6364	7.2667	71		
0	29	55.62	11.8271	7.2855	72		
0	30	0.32	11.9801	7.3038	73		
0	30	5.01	12.1231	7.34	73		
0	30	9.72	12.2905	7.3645	74		
0	30	14.41	12.4456	7.3797	74		
0	30	19.1	12.6633	7.3782	74		
0	30	23.8	12.7584	7.4336	75		
0	30	28.51	12.9276	7.4527	76		
0	30	33.21	13.0728	7.483	77		
0	30	37.9	13.2314	7.5199	77		
0	30	42.59	13.4109	7.4865	77		
0	30	47.28	13.5827	7.5005	77		
0	30	52	13.7168	7.5471	78		
0	30	56.7	13.8892	7.5591	78		
0	31	1.4	14.0456	7.5328	79		
0	31	6.09	14.1922	7.5554	80		
0	31	10.79	14.3515	7.5558	80		
0	31	15.49	14.4895	7.6285	80		
0	31	20.18	14.6512	7.6562	81		
0	31	24.87	14.7973	7.646	81		
0	31	29.57	14.9838	7.6264	82		
0	31	34.26	15.0969	7.7129	82		
0	31	38.98	15.2673	7.653	82		
0	31	43.67	15.4304	7.6755	83		

N1182J

hour	minute	second	Xeast	Ynorth	alt		
0	31	48.37	15.5542	7.7073	83		
0	31	53.07	15.716	7.6979	83		
0	31	57.76	15.8799	7.7177	84		