

AESOP Flight

Flight #8 I990711

<u>Sensor or system</u>	<u>Number or Name</u>
INE	1
Accelerometer	1
Temperature Probe	2
Dew Point Probe	2
Altitude (for vertical wind)	Pressure Altitude
Static Pressure	Rosemount Fuselage
Dynamic Pressure	Rosemount Fuselage
Time Source	Micro 99
Constants File	CO3992.CON

Notes:

There was one time gap 1828:51-1829:10.

The radar altimeter (RA159) had a spike at takeoff and was replaced by RA232 from 1701:01-1713:30. A spike also occurred on landing and RA159 was set to zero from 0057:38-0106:00.

Dewpoint (DW2) had a few spikes (overshoots) that were removed and patched (1802:15-1802:45, 1907:15-1907:45, and 2131:01-2132:30). Dewpoint (DW2) exceeded ambient temperature (AT2) for a short period due to precipitation.

	<u>Takeoff</u>	<u>Landing</u>
Aircraft static pressure	1000.6	996.7
Corrected tower pressure	1020.3	1018.3

The aircraft INE positions were renavigated with respect to GPS.

SPECIAL NOTE!!! Locations 80, 81 and 82 of record five on the standard tape contain vertical ground, vertical air and vertical speeds, respectively, computed using Dave Jorgensen's vertical wind algorithm.
It is recommended that these values be used for vertical wind analysis.

Flight Meteorologist: Stan Czyzyk, (813) 828-3310 ext. 3086

U.S. DEPT. COMM./NOAA/OAO - DATA SECTION WORK FORM NO.1 OAOWF1 FILE

FLT ID: 990711I	FM: KBNA	TO: KBNA
FLT NO: 99-039	BLK IN: 01042	ATA: 00582
ETD: 1700Z	DLK OUT: 1700Z	RTD: 1717
ETE: 000Z	BLK TIME: 8:04 8.1	FLT TIME: 7:47 7.8
SPONSOR ORG: NOAA-AL	PROGRAM: NESOP	PURPOSE: GIBSON/CLIFTY

OAO PERSONNEL

AC TAGCANT, B	SYS ENG LYNCH, T ✓
CP OMARRO, T ✓	DATA SYS HORN BROOK, C ✓
NAV ROTHBUN, D ✓	RADAR
FE BOST, G	BT/ODW
RADIO ROGERS, M ✓	CLD PHYS
FD CZYZYK, S ✓	DOPPLER

PARTICIPATING SCIENTIST/VISITORS/OAO

LAST, FIRST NAME	ACTIVITY ON A/C	AFFILIATION
HUBLER, G ✓		
RVENSON, T ✓		
HUEY, G ✓		
KUSTER, B ✓ / JOHNSON, T ✓		
HOLLOWAY, J ✓		
LEE, Y ✓		
FLOCKE, F ✓		
MEAGHER, J ✓		

PROPOSED/ACTUAL MISSION/REMARKS (RECCO, FIXES, STORM, PENET, NHOP #)

U.S. DEPT. COMM./NOAA/OAO - DATA SECTION WORK FORM NO.2 OAOWF2 F

FLT ID: 990711

TIME OFF: 1711Z

TIME ON: 0058Z

	A/C T/O	WX STN	A/C LAND	WX STN
PRESSURE	1000.6	30.13	996.7	30.07

NO DATA DISPOSITION/DATE/QUALITY

1/SEC FLT LVL TAPES	2	
FAST FLT LVL TAPES		
RADAR TAPES	1	
DOPPLER TAPES		
ODW CASSETTES		
HARD COPIES	1	
AXDT		
AXCP		
ODW		

PHOTOGRAPHY

	FWD	LS	RS	VERT
ON				
OFF				
RATE				

REMARKS

9907 ~~PI~~ I

TIME	LAT	lon	TK	HD	TX	TD	WD	WS	PA	GD	PJ	SD	REMARKS
1716-													PBL 5700 FT PA
172730	37 09	86 32	341	338	0.3	-23.8	268	20.9	4236	4286	597.7	996.8	LEVEL 14K PA
173030	37 20	86 36			-0.5	-31.0							LEVEL 14.5K PA
173300	37 30	86 40	344	341	-1.2	-32.2	266	14.9	4401	4485	585.1	996.4	CLR 800 + ADV
174710	38 17	87 16											PT 8
175510	38 42	87 40											PT 1
175610	38 44	87 45											DESCEND
	38 22	87 20	143	141	19.3	7.5	164	12.6	528	466	951.0	1003.7	5500 TID PBL
180530	↓	↓									↓	↓	LEVEL 2 PA
180645	38 17	87 28											PT 8
181516	38 40	87 40	321	324									PT 1
1818													PT 2
182435	35 16	87 35											PT 3
182713	38 10	87 45											PT 4
183435	38 29	88 07											PT 8
183708	38 26	88 18											PT 6
184412	38 02	88 03											PT 7 + DESCEND
184540	38 08	88 03	314	318	22.8	4.9	411	10.3	217	154	987.8	1005.7	LEVEL 500 ASL
185100	38 21	88 19											PT 6 + CLIMB
185326	38 22	88 14	164	162	14.2	6.3	64	10.4	1038	1017	894.6	1005.4	LEVEL 3600 PA
185845	38 05	88 13											PT 7 + CLIMB
190204	38 18	88 08	314	316	9.5	-3.0	100	10.2	1917	1915	803.2	1006.2	LEVEL 6500
190700	38 24	88 24											PT 6 + DESCEND
190930	38 21	88 34											PT 9 LEVEL 2K PA
191810	38 56	88 14											PT 8
193004	38 11	88 47											PT 11
193313	38 08	88 01											PT 10
195155	38 00	89 16											PT 13
195500	38 59	89 30											PT 14
200828	37 29	89 38											PT 15
													TURN
201640	37 52	89 58											TURN
202033	37 59	89 45											TURN
204550	37 57	89 59											TURN
205500	38 22	88 22											CLIMB
205715	38 22	87 55	83	84	7.1	-19.2	114	6.5	2830				TURN PT 6 ~
210135	38 27	87 55	83	84	7.1	-19.2	114	6.6	2825	2837	716.9	1000.6	CLOUDBASE 6K PA
210910	38 55	85 48											LEVEL 9.5
213428	39 05	85 26	62	63	20.3	8.3	63	12.5	557	861	948.2	987.5	DESCEND
214430	38 38	85											PT 1 LEVEL
214750	38 33	85 10											PT 8
215710	38 57	85 38	322	326	20.5	8.7							PT 3
215840	38 56	85 45											PT 2
220805	38 26	85 26	147	144	21.4	5.9	50	10.2	552	374	948.7	992.8	PT 5
221046	38 20	85 35											PT 4
222038	38												PT 7
2225													PT 6
22292													CIRCLE
2304													CLIMB
231101	37 08	86 50	242	244	21.6	13.0	44	15.0	552	477	948.8	1000.7	PT 0 LEVEL 2 PA

990711I

TIME	LAT	LO	TIC	HD	TP	TD	WD	WS	PD	GA	PS	SP	REMARKS
2318	3715	8916											TURN+CLIMB
232310	3706	8703											TURN+CLIMB
2325	3709	8707	312	319	16.7	12.5	51	12.8	1017	966	896.9	1001.1	LEVEL 3500
232950	3722	8719											TURN+DESCEND
233235	3716	8729											TURN 2500
234030													TURN
2344	3646	8726	236	236	19.9	14.1	50	17.0	709	598	930.8	996.8	TURN
234525	3648	8731											CLIMB
235820	3725	8807											TURN
235935													DESCEND
000220	3718	8821											TURN
002800	3638	8817											TURN
003735	3623	8740											PLUME CLIMB
004840	3603	8700			17.3	16.7	48	17.1					IN RAIN

Point	lat_Gibson	lng_Gibson	lat_deg_gibson	lat_min_gibson	lng_deg_gibson	lng_min_gibson
0	38.29	-87.28	38	18	-87	17
1	38.74	-87.68	38	44	-87	41
2	38.62	-87.89	38	37	-87	53
3	38.18	-87.49	38	11	-87	30
4	38.06	-87.7	38	3.7	-87	42
5	38.5	-88.1	38	30	-88	5.9
6	38.42	-88.34	38	25	-88	21
7	37.94	-87.92	37	57	-87	55
8	37.75	-88.06	37	45	-88	3.7
9	38.35	-88.59	38	21	-88	35
10	38.27	-88.83	38	16	-88	50
11	37.6	-88.24	37	36	-88	14
12	37.45	-88.42	37	27	-88	25
13	38.19	-89.08	38	11	-89	4.7
14	38.07	-89.29	38	4.2	-89	17
15	37.33	-88.63	37	20	-88	38
16	37.22	-88.84	37	13	-88	51
17	37.95	-89.5	37	57	-89	30

3600PA

Point	lat_Paradise	Ing_Paradise	lat_deg_paradise	lat_min_paradise	Ing_deg_paradise	Ing_min_paradise
0	37.48	-87.09	37	29	-87	5.2
1	37.11	-86.76	37	6.4	-86	46
2	37.01	-86.93	37	0.81	-86	56
3	37.42	-87.29	37	25	-87	17
4	37.36	-87.49	37	22	-87	29
5	36.88	-87.06	36	53	-87	3.8
6	36.72	-87.17	36	43	-87	9.9
7	37.31	-87.68	37	18	-87	41
8	37.25	-87.88	37	15	-87	53
9	36.59	-87.3	36	35	-87	18
10	36.46	-87.43	36	27	-87	26
11	37.19	-88.08	37	12	-88	5
12	37.1	-88.25	37	6.1	-88	15
13	36.36	-87.6	36	22	-87	36
14	36.27	-87.77	36	16	-87	46
15	37.01	-88.42	37	0.53	-88	25

06/09
 2332 010
 10000
 1 1/2 2 1/2 3
 2000

Point	lat_clifty	lng_clifty	lat_deg_clifty	lat_min_clifty	lng_deg_clifty	lng_min_clifty
0	38.68	-84.97	38	41	-84	58
1	39.13	-85.36	39	7.6	-85	22
2	39.01	-85.58	39	0.61	-85	35
3	38.57	-85.18	38	34	-85	11
4	38.45	-85.39	38	27	-85	24
5	38.89	-85.79	38	54	-85	47
6	38.81	-86.04	38	49	-86	2.2
7	38.33	-85.61	38	20	-85	36
8	38.14	-85.75	38	8.7	-85	45
9	38.74	-86.28	38	44	-86	17
10	38.66	-86.53	38	39	-86	32
11	37.99	-85.93	37	59	-85	56
12	37.84	-86.11	37	50	-86	6.7
13	38.58	-86.77	38	35	-86	46
14	38.46	-86.99	38	28	-86	59
15	37.72	-86.33	37	43	-86	20
16	37.61	-86.54	37	36	-86	32
17	38.34	-87.2	38	21	-87	12
18	38.75					

Point	lat_John	lng_John	lat_deg_john	lat_min_john	lng_deg_john	lng_min_john
0	36	-87.64	35	60	-87	38
1	36.35	-88.07	36	21	-88	4.1
2	36.25	-88.19	36	15	-88	11
3	35.9	-87.75	35	54	-87	45
4	35.81	-87.87	35	48	-87	52
5	36.16	-88.31	36	9.4	-88	18
6	36.09	-88.46	36	5.6	-88	28
7	35.68	-87.95	35	41	-87	57
8	35.52	-87.99	35	31	-87	59
9	36.03	-88.62	36	1.8	-88	37
10	35.97	-88.78	35	58	-88	47
11	35.39	-88.07	35	24	-88	4.1
12	35.27	-88.15	35	16	-88	8.9
13	35.9	-88.94	35	54	-88	56
14	35.81	-89.05	35	48	-89	3.2
15	35.17	-88.27	35	10	-88	16
16	35.07	-88.38	35	4.5	-88	23
17	35.71	-89.17	35	43	-89	10

Point	x_john	y_john	x_Louisville	y_Louisville	x_Gibson	y_Gibson	x_paradise	y_paradise
0	-25	-20	-30	-30	-30	-30	25	-6
1	30	-20	30	30	30	30	-25	-6
2	30	-5	30	30	30	30	-25	12
3	-25	-5	-30	-30	-30	-30	30	12
4	-25	10	-30	-30	-30	15	35	30
5	30	10	30	30	30	15	-30	30
6	35	25	35	37.5	35	37.5	-40	48
7	-30	25	-30	37.5	-30	37.5	40	48
8	-40	40	-40	60	-60	60	45	66
9	40	40	40	60	40	60	-45	66
10	45	55	45	82.5	45	82.5	-50	84
11	-45	55	-45	82.5	-60	82.5	50	84
12	-50	70	-50	105	-60	105	50	102
13	50	70	50	105	50	105	-50	102
14	50	85	50	127.5	50	127.5	-50	120
15	-50	85	-50	127.5	-60	127.5	50	120
16	-50	100	-50	150	-60	150		
17	50	100	50	150	50	150		

700km 120km 115km 180km 640km 126km

2hr 10min 2hrs 16min 2hrs 25min 2hrs
 profile 30min profile 30min profile 30min profile 30min

2hrs 40min 2hrs 46min 3hrs 2hrs 30min

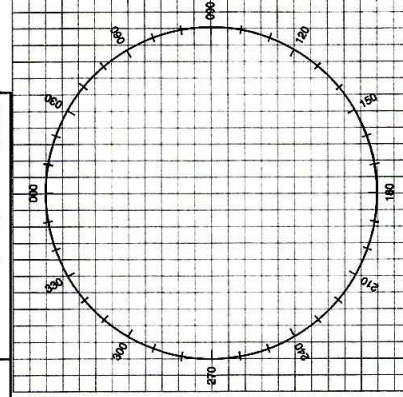
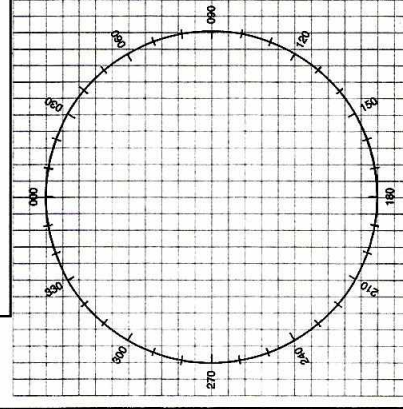
SCHEDULED / ACTUAL TAKEOFF Z	DATE OF TAKEOFF
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CLEARANCES

[illegible]

MISSION LOG

PAGE OF



POSITION REPORT

1. POSITION
2. TIME
3. ALTITUDE
4. NEXT POSITION
5. ETA
6. NEXT POSITION

EMERGENCY MESSAGE

TRANSMIT THE FOLLOWING MESSAGE TO ANY AGENCY ON THE AIR-GROUND FREQUENCY IN USE. IF UNABLE TO ESTABLISH COMMS, ATTEMPT CONTACT ON ANY OF THE FOLLOWING EMERGENCY FREQUENCIES:

UHF/VOICE	VHF/VOICE	MF/VOICE	HF/CW	MF/CW
243.0	121.5	2182 KHZ	8364 KHZ	500 KHZ

**MAYDAY, MAYDAY, MAYDAY
THIS IS NOAA** , NOAA

- POSITION _____ N/S _____
E/W AT _____ Z _____

- HEADING _____ TRUE/MAG _____
- AT _____ KTS TRUE/INDICATED _____

- FLIGHT LEVEL OR ALTITUDE -

• WE ARE A P-3 AIRCRAFT WITH _____ SOULS ON BOARD _____

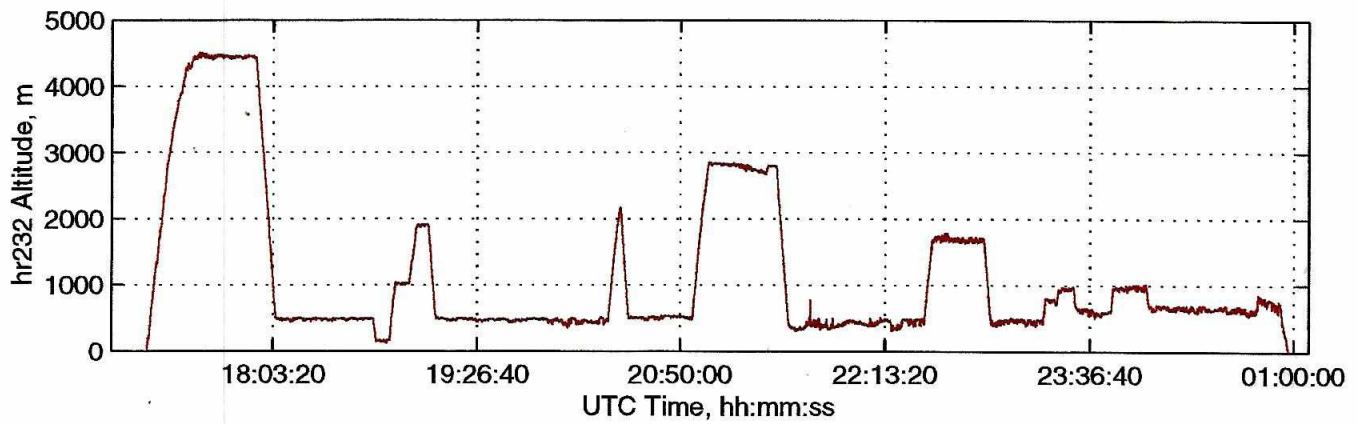
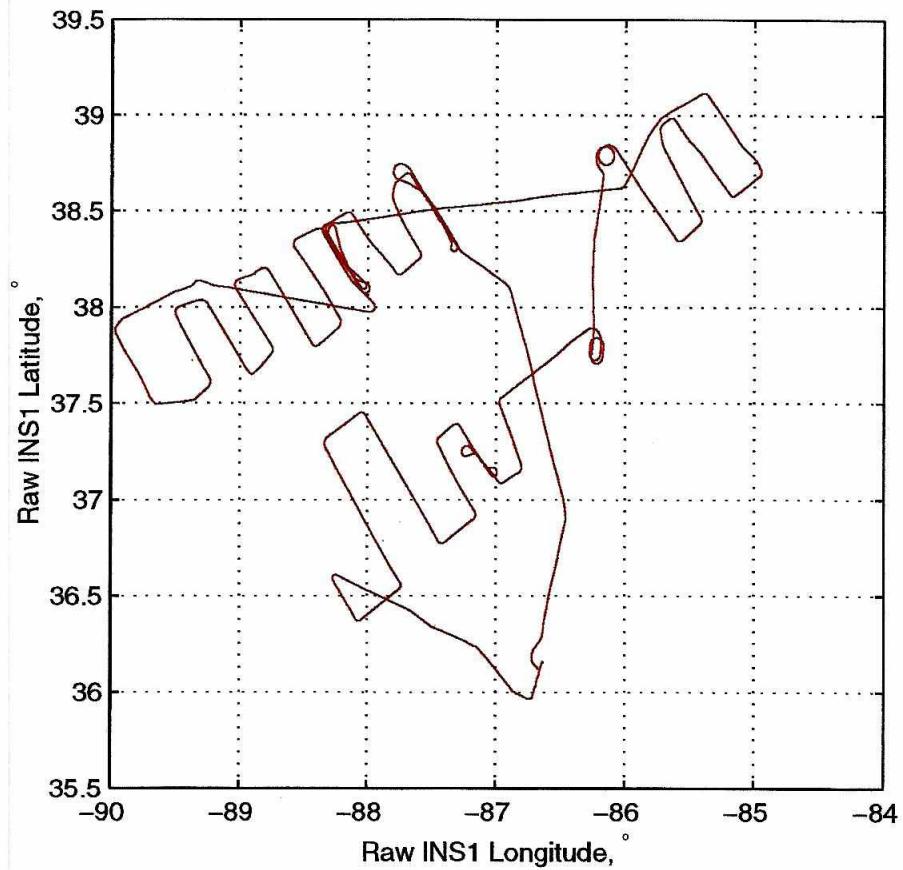
- NATURE OF EMERGENCY ASSISTANCE DESIRED

- ASSESS / ANCE DESIGN
- PILOT INTENTIONS

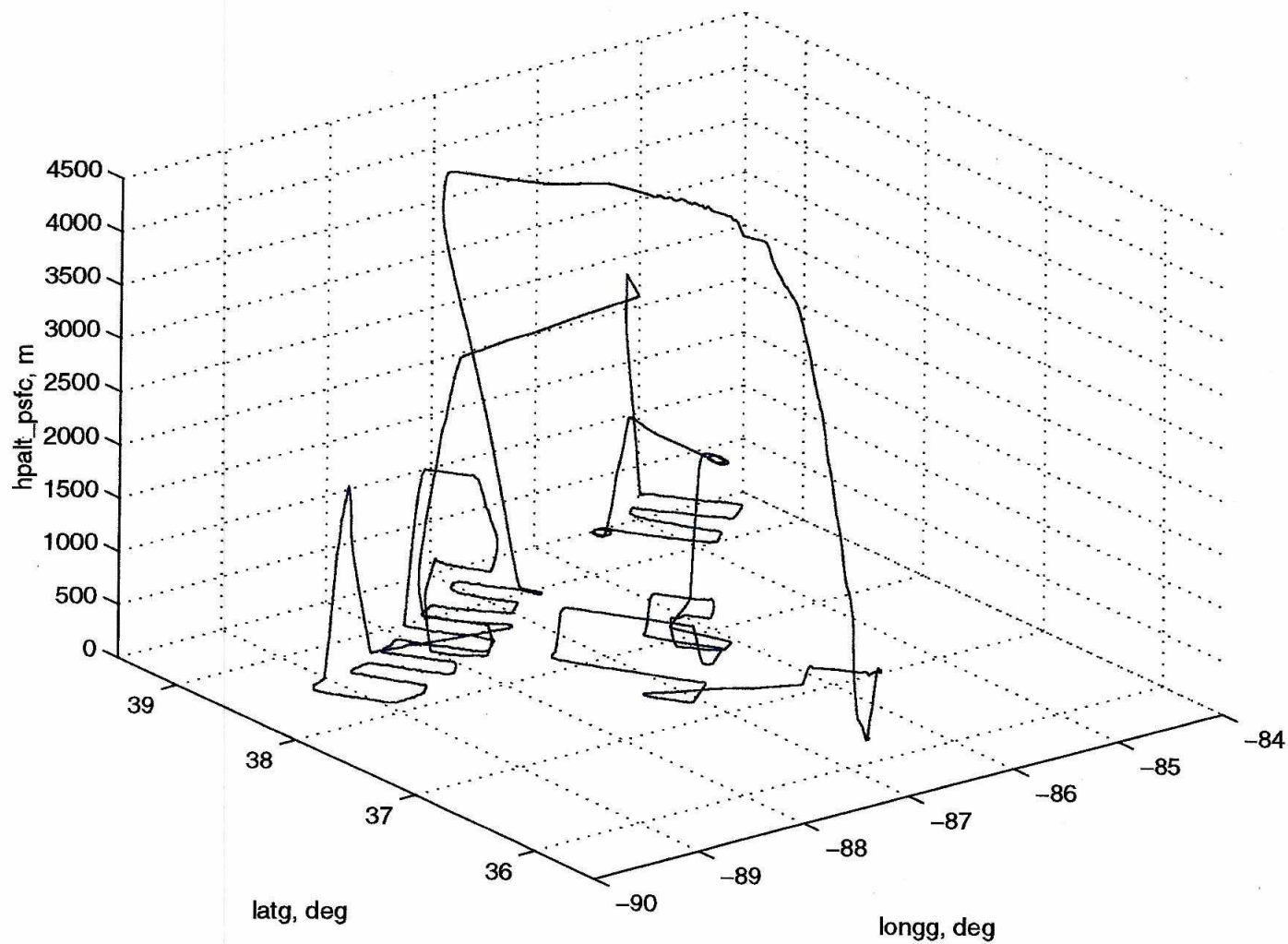
- WE HAVE _____ ENDURANCE REMAINING _____

[illegible]

N43RF -- OZONE99 -- 11 July 1999 UTC



OZONE99 990711ls_P 16:56:31-01:06:10 UTC: 3-D FLIGHT TRACK 1/8



Flight plan : 11 July 1999

Power Plant Study in Illinois, Indiana or Kentucky

Gibson, IN, Paradise, KY, Clifty, IN

Select Power Plants according to 7 July am forecast

Gibson, IN (38 22N, 87 46W)	48 ktons NOx / y
Petersburg, IN (38 32N, 87 15W)	20 ktons NOx / y
Paradise, KY (37 16N, 86 59W)	154 ktons NOx / y
Clifty, IN (38 44N, 85 25W)	59 ktons NOx / y

default climb rate 1500 ft/min

Access to plane : 7:00 am CDT

Preflight : 8:00 am CDT

Pt 0: Nashville (36 08N, 86 41W)

Doors closed:

Takeoff: 11 CDT

Head to Pt. 1 (38 18N, 87 17W) (245 km, 40 min)

On way to Pt. 1 climb to 15 kft, Calibration at 15 kft,

After calibration descend in route to arrive at Pt. 1 at 1500 ft AGL

11:40-14:10 Gibson

Gibson Power Plant (38 22N, 87 46W) (plume pattern 2 hrs 30min)

Start Gibson Pattern upwind of Gibson,

Winds are forecast to be from the NE at ~ 6 m/s (12 knts)

Intercept the power plant plume at 2 upwind and 6-7 downwind distances (~22 km, 14 mi apart).

==> At 2nd downwind transect (~38 km downwind): Measure vertical distribution of plume within the PBL by flying across the plume at 3 heights within the PBL and one 100m-200m above the top of the PBL

If the legs are shorter than in the default plume pattern, repeat some of the transects.

14:10-14:40 Transit to Paradise (30 min)

14:40-17:10 Paradise Study

(Paradise Power Plant (37 16N, 86 59W)

Head to Pt 2 (37 29N, 87 5.2W) Close to Pt. 2 use traffic cone pattern to determine PBL height

Winds are forecast to be from the NE at ~ 5 m/s (10 knts)

Fly transect upwind of Paradise (~< 10 km distance) to identify plume position.

Intercept the power plant plume at 7 additional distances (18 km apart)

==> At 2nd downwind transect (~30 km downwind): Measure vertical distribution of plume within the PBL by flying across the plume at 3 heights within the PBL and one 100m-200m above the top of the PBL

At the end of the Paradise Study climb 10 kft for Calibration, constant altitude for 15 min, after calibration climb to 20 kft in route to Nashville

1 HR AFTER
STACK
TRAFFIC CONE
CLOCK SLOW

IF QUICK
REPEAT
LEGS

5.5 min 15
6.5 ^ 37 min + 12 min = 49 min
5-10 min 1 HR
(ANS)

Head to Nashville Pt. 6 (36 08N, 86 41W) Arrive in Nashville at ~ 18:00

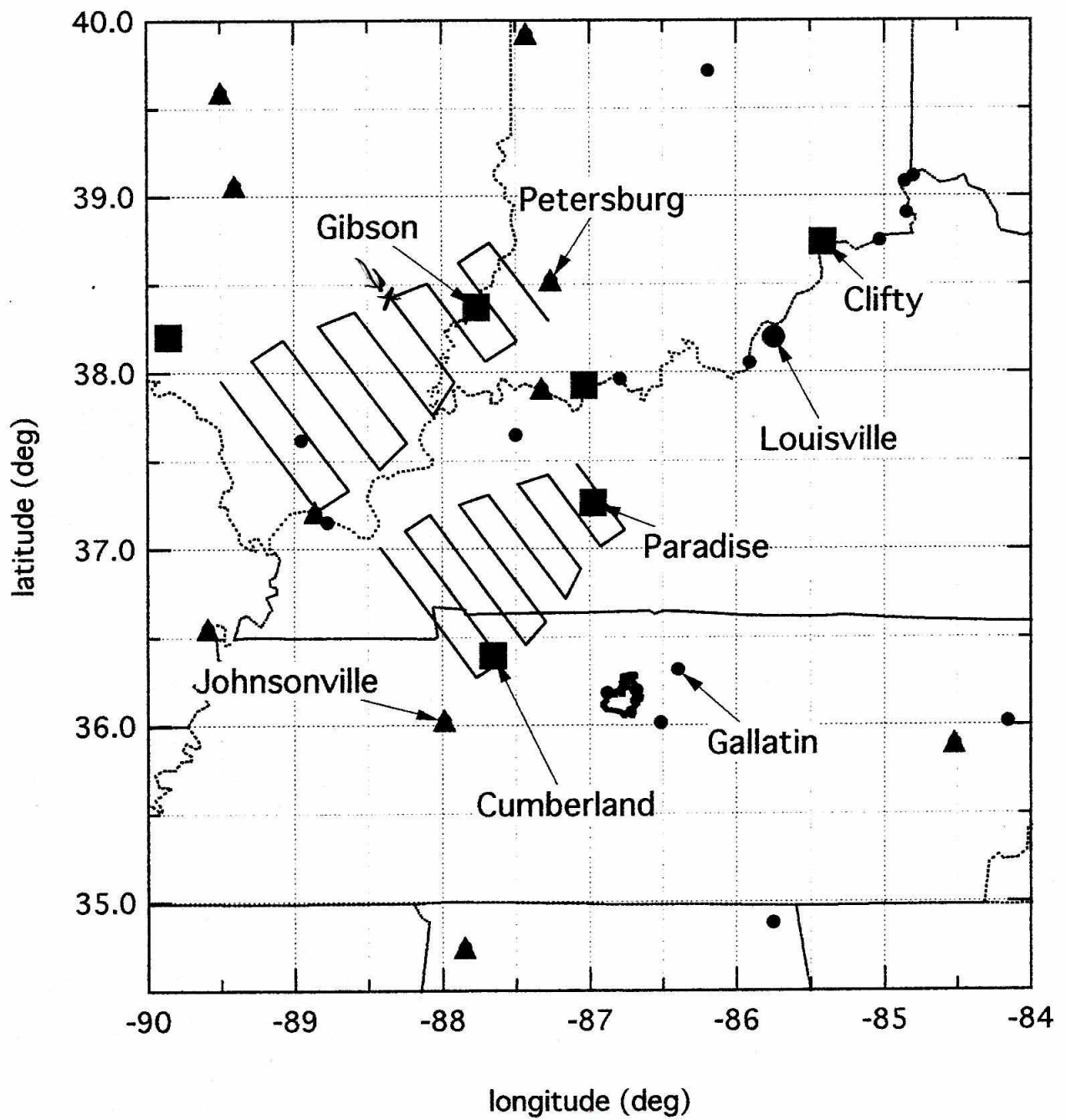
Flight Time is estimated as ~7hrs

Alternate Power Plants are:

Clifty, IN (38 44N, 85 25W)	59 ktons NOx / y
and Johnsonville (36 02N, 88 00W)	20 ktons NOx / y,
Cumberland (36 23N, 87 39W)	175 ktons NOx / y

Decision will be made before the flight according to the forecast of the frontal position.

Flight plan : 11 July 1999
Gibson and Paradise Power Plant Study



37 56 N 89 47 W

37 20 N 89 14 W