

AESOP Flight

Flight #10 1990713

<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:

The radar altimeter (RA159) had a spike at takeoff and was replaced by RA232 from 1652:01-1738:20. A spike was occurred at 2253:12-2255:57 and was replaced by RA232. A spike also occurred on landing and RA159 was set to zero from 2356:49-2403:00.

Dewpoint (DW2) exceeded ambient temperature (AT2) several times due to precipitation. DW2 appears to be less responsive in such dry conditions 1721:00-1732:30. A spike in DW2 due to balancing was removed and patched 1726:00-1729:30. A second spike was removed and patched due to an overshoot after a climb (1731:30-1732:30).

	<u>Takeoff</u>	<u>Landing</u>
Aircraft static pressure	997.0	994.7
Corrected tower pressure	1019.3	1016.9

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/DAO - DATA SECTION WORK FORM NO.1 DAOWF1 FILE

FLT ID: 990713I	FM: KBNA	TO: KBNA
FLT NO: 99-041	BLK IN: 0001Z	ATA: 2357Z
ETD: 1700Z	DLK OUT: 1654Z	RTD: 1703Z
ETE: 2330Z	BLK TIME: 7.07 7.1	FLT TIME: 6.54 6.9
SPONSOR ORG: NOAA-AL	PROGRAM: AESOP	PURPOSE: WEST / NASHVILLE

DAO PERSONNEL

AC TAGGART, B	SYS ENG LYNCH, T ✓
CP OMARA, T	DATA SYS HORN BROOK, C ✓
NAV RATHBUN, D ✓	RADAR
FE WADE, S ✓	DT/ODW
RADIO ROGERS, M ✓	CLD PHYS
FD CZYZYK, S ✓	DOPPLER

PARTICIPATING SCIENTIST/VISITORS/DAO

LAST, FIRST NAME	ACTIVITY ON A/C	AFFILIATION
HUBLER, G ✓	P.I	NOAA-AL
RYERSON, T / HVEY, G ✓	SCIENTIST	"
HOLLOWAY, J / JOHNSON, T ✓	"	"
PARRISH, D / FEHSENFELD	"	"
KUSTER, B ✓	"	"
FLOCKE, F ✓	"	NOAA
LEE, Y ✓	"	BROOKHAVEN
SPOTIS, P ✓	MEDIA	CHRISTIAN SCIENCE MONITOR

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

RA-159 OUT

172830Z BALANCE DWZ

1813 DW1

190230 DW1

190940 0002 DW1



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

FLT ID: 990713E

TIME OFF: 1703Z

TIME ON: 2357Z

	A/C T/O	WX STN	A/C LAND	WX STN
PRESSURE	997.0	30.10	994.7	30.03

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	
AXBT		
AXCP		
ODW		

PHOTOGRAPHY

	FWD	LS	RS	VERT
ON				
OFF				
RATE				

REMARKS

TIME	LOT	LOW	TR	ND	TD	TD	WD	WS	BA	GA	PS	SP	REMARKS
171105	3628	8707	304	304	4.5	-2.5	132	3.6	2971	2928	70.5	992.3	LEVEL 10K PA
1717													IN (N) CLOUD TOP
1720													CLIMB 12K PA
172300	3628	8800	268	269	3.8	-26.9	282	7.7	3612	3664	649.5	1001.2	LEVEL 12K PA
172845													DESCEND
173335	3630	8808	93	93	11.6	9.5	116	4.8	1773	1763	817.6	1005.9	LEVEL 6K PA
174015	3629	8738											DESCEND
174250	3629	8727	88	89	21.0	16.6	55	2.7	700	630	931.6	996.9	3200 cloud base LEVEL 2500
174335	3629	8723											PT 1
175442	3629	8800											PT 2
175740	3626	8757											PT 3
180315	3618	8733											PT 4 + DESCEND
180450	3617	8737	281	284	24.9	17.5	14	6.1	314	214	976.1	997.1	LEVEL 1200 PA
180957	3618	8759											PT 3 + CLIMB
181215	3618	8752	84	84	17.6	14.6	356	10.1	1029	977	895.6	995.4	LEVEL 3500
181735	3618	8729											PT 4
181955	3626	8734	259	260	12.6	9.1	91	2.1	1780	1700	817.1	997.4	LEVEL 6000
182535	3619	8808											PT 3
182800	3618	8750	86	86	6.7	9.0	172	6.0	2998	2921	702.0	992.6	LEVEL 10000
183255	3618	8730											LT-M40 TURN
183735	3612	8742											TURN + DESCEND
184250	3612	8805											LEVEL 2500
1845	3606	8805											PT 6
184740													PT 7
185230	3605	8732											DESCEND 2200
190525	3556	8818											PT 8
191040	3556	8800											PT 9 + DESCEND
191150	3556	8755											CLIMB
191437	3556	8743											DESCEND
191650	3558	8749	250	251	18.3	13.7	60	6.7	1046	945	894.0	1003.8	TURN + CLIMB PA
192227	3556	8814											LEVEL 3500
192445	3554	8809	75	77	12.5	9.6	153	3.3	1785	1754	916.6	1002.7	TURN + CLIMB
192930	3557	8748											LEVEL 6000
193520	3556	8810	272	272	5.0	-5.6	89	6.1	3026	3011	698.0	1000.1	TURN + CLIMB PA
193810	3556	8824											LEVEL 10K
194430	3548	8817											TURN + DESCEND PA
194645	3548	8807											LEVEL 3000
195053	3548	8749											LEVEL 2500
195330	3548	8789											TURN PT 12
200220	3540	8826											PT 13
200414	3534	8826											TURN PT 14
201355	3533	8744											PT 15
201625	3525	8744											PT 16
202650	3524	8826											PT 17
202856	3518	8828											PT 18 + DESCEND
204124	3516	8835											PT 19 500 AGL
2043	3514	8739	287	287	22.1	15.7	713	5.0	710	487	930.9	982.3	PT 20 + CLIMB LEVEL 2500
205355	3516	8825											PT 19 + CLIMB
205555	3514	8826	73	72	18.4	14.9	750	3.2	1024	990	896.1	1004.4	LEVEL 3500
210520	3516	8737											PT 20 + CLIMB

[illegible]

Czyzyk

Flight plan : 13 July 1999

Johnsonville and Cumberland Plume Study
and Nashville Urban Survey

Winds are forecast to be in general from the N, but light and variable during midday

Johnsonville (36 02N, 88 00W) 20 ktons NO_x / y,
Cumberland (36 23N, 87 39W) 175 ktons NO_x / y

default climb rate 1500 ft/min

Preflight : --:00 am CDT

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

Doors closed:

Takeoff: 12 CDT

~3500 PA
2500 PA
500 AGL
8000 PA
10000 PA

TEARNOPS

Head to Pt. 1 (36 29N, 87 23W) (73 km, 11 min)

On way to Pt. 1 climb to 10 kft, Include holding pattern for Calibration at 10 kft (20 min)

Descend to 6 kft for second Calibration (5 min)

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

12:40-16:40 Cumberland and Johnsonville

Pt. 1 - Pt. 24

(plume pattern 3 hrs 05min, time for vertical stacks 60 min)

Intercept the power plant plume at 12 upwind and downwind distances

Collect WAS hydrocarbon samples in the Cumberland and Johnsonville plume plus occasional outside samples

Short Vertical Stack 10 km downwind of Cumberland (20 min)

After crossing the Cumberland plume at 1500 ft AGL, reverse direction and cross the plume repeatedly at 2-3 additional altitudes within the PBL and 1-2 altitudes above the PBL. **(total of 4 additional heights)**

The length of the legs will be determined by the width of the plume.

Continue with plume pattern at 1500 ft AGL.

==> **Short Vertical Stack 10 km downwind of Johnsonville (20 min)**

After crossing the Johnsonville plume at 1500 ft AGL, reverse direction and cross the plume repeatedly at 2-3 additional altitudes within the PBL and 1-2 altitudes above the PBL. **(total of 4 additional heights)**

The length of the legs will be determined by the width of the plume.

Continue with plume pattern at 1500 ft AGL.

==> **Short Vertical Stack 55 km downwind of Johnsonville**

After crossing the Johnsonville plume at 1500 ft AGL, reverse direction and cross the plume repeatedly at 2-3 additional altitudes within the PBL and 1-2 altitudes above

the PBL. (total of 4 additional heights)

The length of the legs will be determined by the width of the plume.

Continue with plume pattern at 1500 ft AGL.

After end the plume pattern: Head to Pt. 25

2000 PA

(~110 km, 20 min)

On way to Pt. 25 climb to 10 kft, Calibration in route at constant altitude (15 min)

17:00-18:20 Nashville Urban Pattern (default Wind from 300 deg) Pt. 25-Pt.38 (~84 min)

Rotation of urban pattern will be adjusted 7/13 am according to latest forecast.

Low Level Passes Upwind, Over and Downwind from Nashville (~7 km increments)

Flight Altitude: 1500 ft AGL

==> Collect .. **in-situ HC samples** inside and outside of the urban plume.

Head to Nashville Pt. 0 (36 08N, 86 41W)

On return to BNA include low level pass over Cornelia Fort

Arrive in Nashville at ~ 18:30

Flight Time is estimated as ~> 6hrs 30 min

HEL0

1500 MSL

UNTIL 2PM CDT

FREQ 123.45

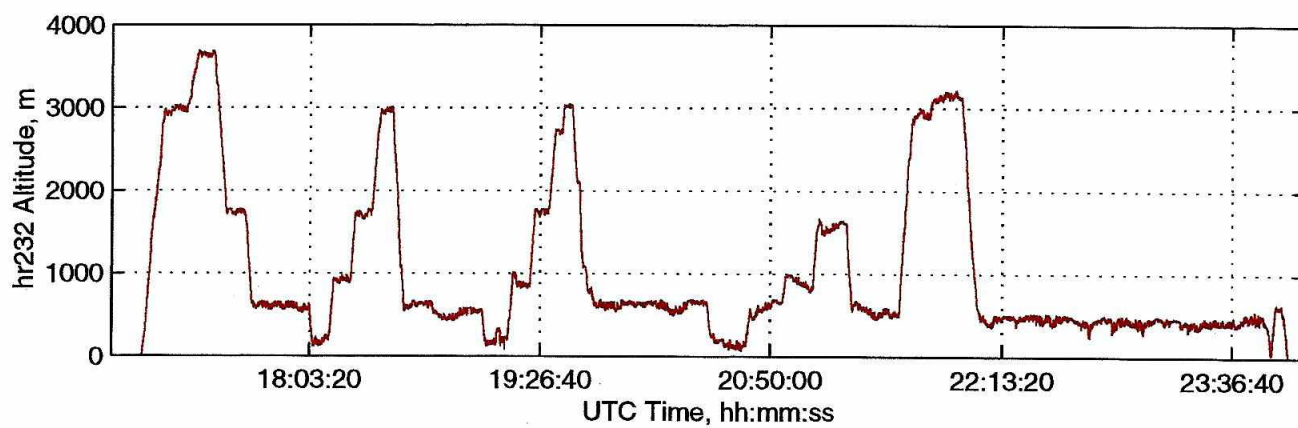
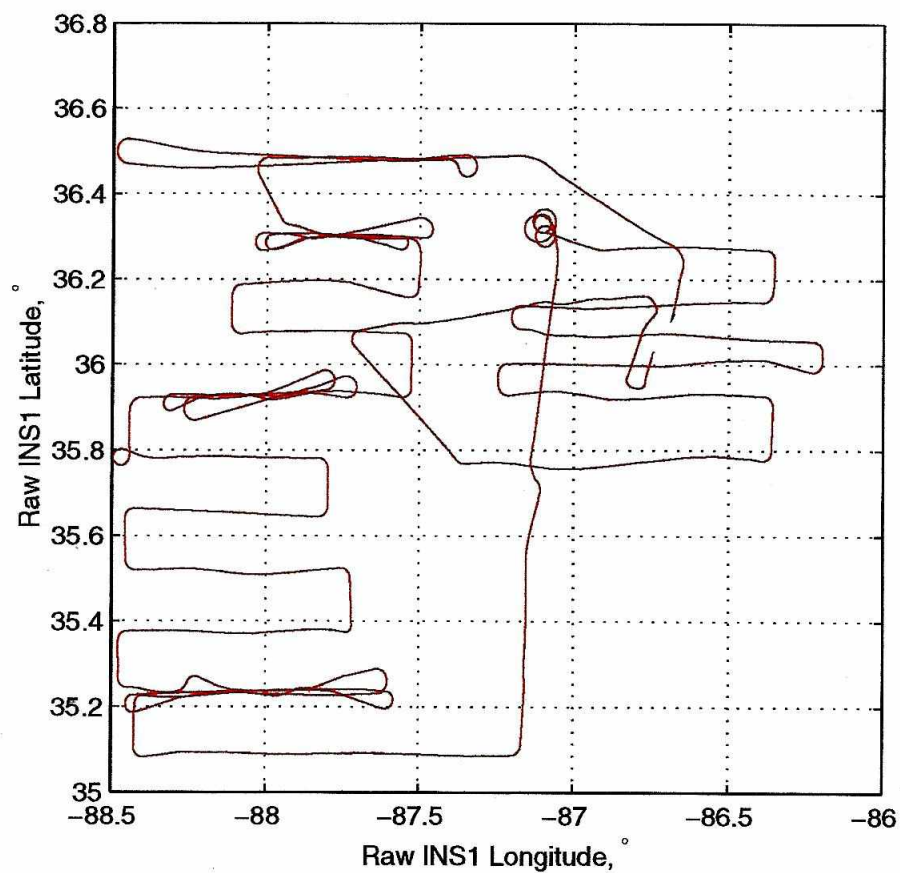
5-7 CDT

1500-3000 MSL

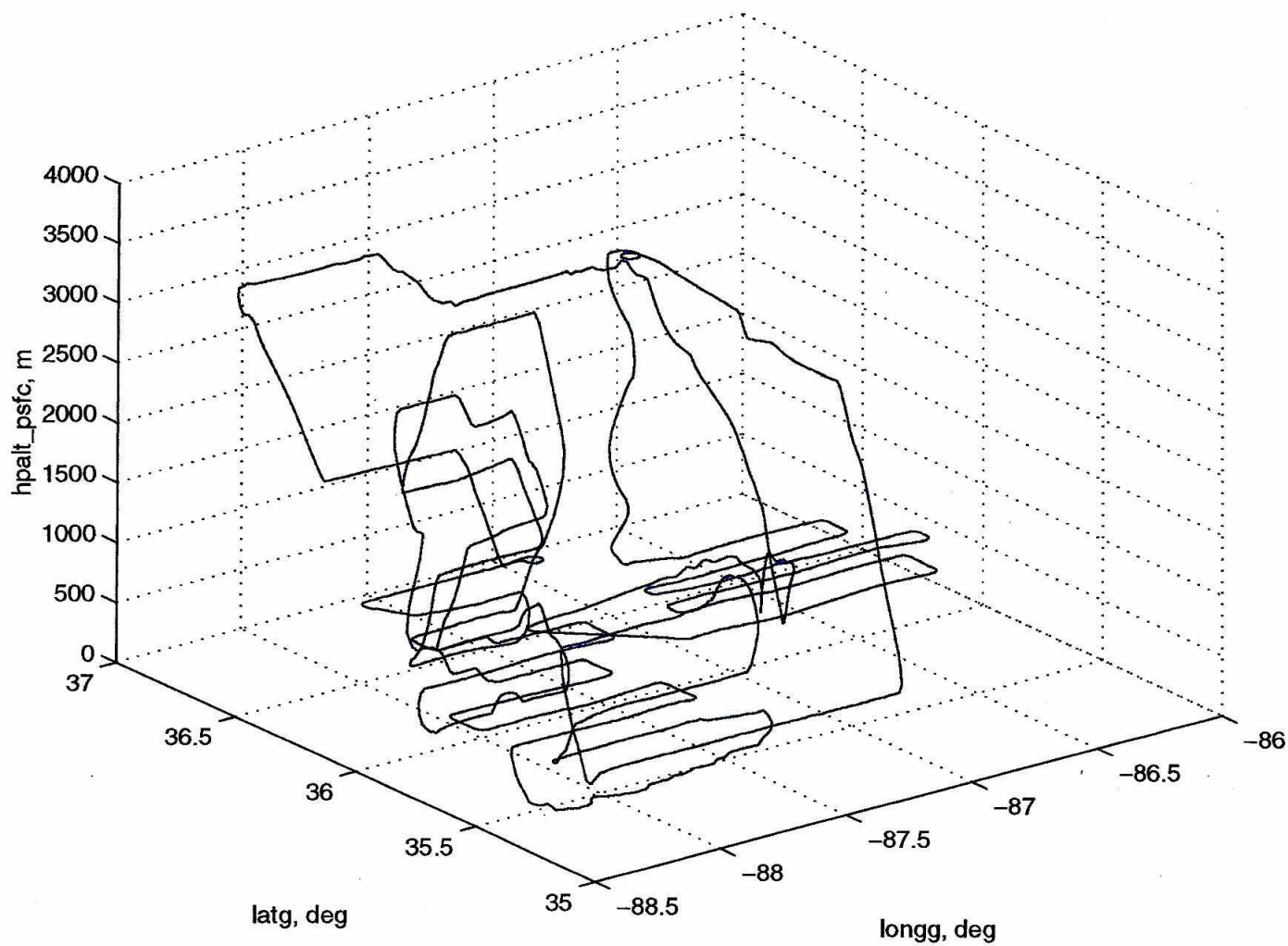
Point	lat_071399	lng_071399	lat_deg_0713	lat_min_0	lng_deg_071	lng_min_0
0	36.13	-86.68	36	7.8	-86	41
1	36.48	-87.38	36	29	-87	23
2	36.48	-87.88	36	29	-87	53
3	36.3	-87.99	36	18	-87	59
4	36.3	-87.49	36	18	-87	29
5	36.19	-87.43	36	12	-87	26
6	36.19	-88.1	36	12	-88	6.1
7	36.08	-88.21	36	4.5	-88	13
8	36.08	-87.43	36	4.5	-87	26
9	35.94	-87.38	35	56	-87	23
10	35.94	-88.21	35	56	-88	13
11	35.8	-88.27	35	48	-88	16
12	35.8	-87.32	35	48	-87	19
13	35.67	-87.27	35	40	-87	16
14	35.67	-88.32	35	40	-88	19
15	35.53	-88.38	35	32	-88	23
16	35.53	-87.21	35	32	-87	13
17	35.4	-87.21	35	24	-87	13
18	35.4	-88.44	35	24	-88	26
19	35.26	-88.44	35	16	-88	26
20	35.26	-87.15	35	16	-87	9.3
21	35.13	-87.15	35	7.7	-87	9.3
22	35.13	-88.44	35	7.7	-88	26
23	34.99	-88.44	34	60	-88	26
24	34.99	-87.1	34	60	-87	5.9
25	36.06	-87.23	36	3.6	-87	14
26	36.63	-86.53	36	38	-86	32
27	36.43	-86.51	36	26	-86	31
28	36.05	-86.99	36	3	-86	59
29	36	-86.93	36	0.17	-86	56
30	36.38	-86.46	36	23	-86	27
31	36.34	-86.4	36	20	-86	24
32	35.96	-86.87	35	57	-86	52
33	35.91	-86.81	35	55	-86	49
34	36.29	-86.34	36	17	-86	20
35	36.24	-86.28	36	15	-86	17
36	35.86	-86.75	35	52	-86	45
37	35.71	-86.8	35	42	-86	48
38	36.28	-86.09	36	17	-86	5.4
39	36.13	-86.68	36	7.8	-86	41

[illegible]

N43RF — OZONE99 — 13 July 1999 UTC



OZONE99 990713ls_P 16:51:41-00:03:40 UTC: 3-D FLIGHT TRACK 1/8



Flight plan : 13 July 1999
Cumberland and Johnsonville Power Plant, Nashville Urban Study

