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

FLT ID: 970204H	FM: EINN	TO: EINN
FLT NO: 97-021	BLK IN: ~~0550~~ 1520	ATA: 1515
ETD: 0600	BLK OUT: 0550	ATD: ~~0604~~ 0601
ETE: 1530	BLK TIME: 9,5	FLT TIME:
SPONSOR ORG: NOAA	PROGRAM: FASTEX	PURPOSE: IOP 10

OAO PERSONNEL

AC KENNEDY, P ✓	SYS ENG LYNCH, T ✓
CP KENUL, P ✓	DATA SYS MCMILLAN, S ✓
NAV KOZAR, S ✓	RADAR BARR, J ✓
FE ~~BTS~~ TORREY, R/WADE, S ✓	BT/ODW CARPENTER, D ✓
RADIO ROGERS, M ✓	CLD PHYS
FD WHITE, S ✓	DOPPLER

PARTICIPATING SCIENTIST/VISITORS/OAO

LAST, FIRST NAME	ACTIVITY ON A/C	AFFILIATION
JORGENSEN, D ✓ $5	SCIENTIST	NSSL
SHEPHERD, T ✓		NSSL
LEMAITRE, Y ✓		CNRS
OURY, S ✓		↓
JAUBERT, G ✓		

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

57 20-10W METMAN 60
46 N (04-52)

KLWC 09442 ✓

1003.9

50.5
18.5

1009.0

4802 → 5135
+530 +550
1610 (1357) 1730
1710
1655

51101
1805

48N
1520

5100
1318

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

FLT ID: 970204H TIME OFF: 0604 TIME ON: 1515

	A/C T/O	WX STN	A/C LAND	WX STN
PRESSURE	1003.5	1003.9	1009.8	1009.0

	NO	DATA DISPOSITION/DATE/QUALITY
1/SEC FLT LVL TAPES	1	
FAST FLT LVL TAPES	1	
RADAR TAPES	1	
DOPPLER TAPES	1	
ODW CASSETTES		
HARD COPIES	1	
AXBT		
AXCP		
ODW		

PHOTOGRAPHY

	FWD	LS	RS	VERT	
ON					
OFF					
RATE					

REMARKS

Form 413-50
- 63

970204H

Time	LA	LO	TA	TD	WD	WS	
05 45							ENG 58.1 K
0551							TAXI
0607	LA	CO	TA	TD	260	16	TOFF
0610	5225.6	935.4	-4.8	-21.9	264	45.9	LEVEL
0625							Balance TWT
0700	524.6	133.6	-1.1	-6.2	299	22.1	start radar leg to pt 2
0754:30	4846.0	1040.6	4.9	-0.8	267	34.9	pearl right end radar leg
0759	4844.3	1643.2	4.8	-1.3	267	36.0	Gross leg
0820	4830.4	1224.1	4.4	-1.3	270	34.5	start radar leg to pt 4
0916	527.0	1207.5	-1.9	-7.9	292	16.0	end radar leg
0936	5147.9	1431.3	-2.0	-6.6	318	13.4	start radar leg to pt 6
			4.0	-3.5	250	33.7	change to new ~~pt 7~~ 48.0N 16.2W
~~11:30~~	~~4846.8~~	~~1625.0~~	~~3.9~~	~~2.6~~	~~270~~	~~25.0~~	~~start radar leg to pt 5 35N 165W~~
							start radar leg to new pt 51 35N 165W
1112:30	4846.8	1625.0	3.9	-2.6	270	25.0	pearl right
1142	5031.2	1644.1	0.0	-4.3	249	15.9	end radar leg
1152	5026.5	1726.3	0.4	-4.7	229	17.5	start radar leg
1234	481.4	1518.8	5.3	-3.2	262	25.8	end radar leg
							encircle CW eyetive region
1340	490.9	1338.3	3.9	-2.6	251	26.1	climb 6K ft/h 360°
1347	4911.1	1321.9	0.5	-2.1	249	33.1	climb 7K ft/h "
1357	4952.2	1320	-1.4	-5.4	281	35.5	descend to 5K
1415	51.04	13.28			274	14.0	BOLO
1430 51	5058.5	1321.0	-11.7	-16.8	260	75.2	sonde away
1515					300	6	LND
							BLK

```
TITLE (MAX 21 CHARACTERS) -- EX  HURRICANE PAINE
FASTEX IOP10 FRONT WAVE
YYMMDDL  FLT I.D.
970204H
HHMMSS START TIME    -99999 DEFAULT TO START OF DATA FOR PRINTOUT ONLY
060011
HHMMSS END TIME      999999 DEFAULT TO END OF DATA FOR PRINTOUT ONLY
151700
HHMMSS TAKE OFF TIME
060100
* NUMBER OF TAPES (I2) ...FOR STANDARD TAPE OUTPUT ONLY
06
* -------LOGICAL UNIT OF INPUT DATA (I1)  5, 8 OR 9 FOR TAPE DRIVE
8
* -------LOGICAL UNIT OF OUTPUT TAPE DRIVE (I1) [FOR STANDARD TAPE ONLY]
8
* -------LOGICAL UNIT OF PRINTER (I1)
6
* -------DATE OF PROGRAM (MMDDY)
06094
* -------STATIC PRESSURE PROBE (I1)
* 1 = PSW (WINGTIP)
* 2 = PSF (CO-PILOT/FUSELAGE)
* 3 = FUTURE USE
2
* -------DYNAMIC PRESSURE PROBE (I1)
* 0 = PQW(WINGTIP)
* 1 = PQF1 (FUSELAGE 1281)
* 2 = PQF2 (FUSELAGE 1221)
* 3 =FUTURE US
1
* ---------INE SELECTION  (I1)
* 1 = INE 1
* 2 = INE 2
2
* ---------ACCELEROMETER (I1) - USUALLY THE SAME AS YOUR INE SELECTION
2
* --------- TOTAL TEMPERATURE PROBE (I1) [1 OR 2]
1
* --------- DEWPOINT TEMPERATURE PROBE (I1) [1 OR 2]
2
* ---------ALTIMETER OPTION (I1) - FOR VERTICAL WIND COMPUTATION
* 0 = PRESSURE ALTITUDE (OVER LAND)
* 1 = RADAR ALTITUDE APN-159 (OVER WATER)
* 2 = RADAR ALTITUDE APN-232 (OVER WATER)
1
* ---------PRINTOUT RATE  SECONDS (I2)
30
* ---------WINDSPEED/DIRECTION RUNNING AVERAGE TIME, SECONDS (I2)
10                                  ! FOR STANDARD TAPE OUTPUT ONLY
* ---------TIME OPTION (I1)
* 1 = MICRO 29
* 2 = TIME BASED GENERATOR #1
* 3 = TIME BASED GENEATOR #2
1
* ---------NAME OF CONSTANTS FILE EX CO3863.CON
CO2971.CON
*****************************************************************
CI>
```

DATE : 4 FEB 97

TO : Chief, AOC Flight Operations

FROM : Pilot/Flight Director, Aircraft N42RF ON _____ BLOCKTIME
OFF _____ 9.5

SUBJECT: Hazardous Duty

PURPOSE OF FLIGHT: FASTEX

Hazardous Duty Pay is required for flight made on 4 FEB 97
(DATE)

Request based on HAZARDOUS FLIGHT IN REGION ASSOCIATED WITH CYCLOGENESIS AT LOW ALTITUDES

Personnel on board authorized Hazard Pay:

TORREY, R	
WADE, S	
ROGERS, M	
LYNCH, T	
McMICCAN, S	
BARR, J	
CARPENTER, D	

~~PILOT~~/FLIGHT DIRECTOR: LCDR S. P. WHITE

APPROVED: _____ DISAPPROVED: _____

CHIEF, AOC FLIGHT OPERATIONS: _____

FASTEX FLIGHT #6

FLIGHT #06 H970204

TYPE OF DATA	SENSOR OR OPTION
INE	2
Accelerometer	2
Temperature probe	1
Altitude change option (for vertical winds)	RA159
Static pressure	Rosemount fuselage
Dynamic pressure	Rosemount fuselage
Time source	Micro 99
Constants file	CO2971.CON

Notes:

There were thirteen time/data gaps 0607:41 0608:00 0647:40 0647:41 0647:50 0751:21 0751:30 0821:01 0821:10 1111:21 1111:30 1138:41 1138:50.

Radar Altitude (APN-159) patched from 0601:11 - 0601:21
1452:01 - 1457:00
1514:01 - 1517:00.

Accelerometer #2 (AV#2) patched from 1456:21 - 1457:00.

Downward spikes in radar altimeter data are a result of overflying land.

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.

	Takeoff	Landing
Aircraft static pressure	1003.5 mb	1009.8 mb
Corrected tower pressure	1003.9 mb	1009.0 mb

Flight Meteorologist: Sean White, (813) 828-3310 ext. 3072

CI>

c:\fastex\970204h.wpd
FASTEX AIRCRAFT CHIEF SCIENTIST EVENT LOG

Flight Number: 970204H1 Page 1 of
Date: February 4, 1997 Aircraft ID: 42RF Scientist: Jorgensen

Event Log

Time (UTC)	Approx. Location (Lat, Lon)	Event & Comments
5:46:07	Shannon	Engine Start
5:51:36	Shannon	Blockout Dropsonde antenna fixed. Will try a test sonde on the ferry back. This is flight #6, IOP 10
6:00:39	52.709 -8.909	Takeoff METMAN: pt 1: 51 54N 13 42W 0702 Z 48 30 11 24W
6:30:53		308D and METMAN estimate their pt. 1 at about 0700. We're slowing down a bit to get there near 0652. Will need to spiral down to 5k ft when we get there
6:32:17	52.324 -11.534	No echo showing on LF to the SW
6:53:50	52.080 -13.163	at pt 1 descent spiral to 5k ft for 1st run
6:59:34	52.096 -13.077	start leg 1
7:01:54		308D started run at 0700
7:13:15	51.257 -12.493	LF shows precip cells 150 nm ahead near our turn point
7:30:02	50.248 -11.721	LF shows precip band now near our turn point oriented ENE-WSW
7:34:17	49.993 -11.538	small convective type storm about 10 nm ahead on nose radar. Lvl 2 dBZ
7:36:24	49.867 -11.447	Small storm now showing on TA. Tops only a km or two above us
7:41:13		since expected wave development is expected north of the band, we'll stick with the pattern as drawn up
7:44:00	49.413 -11.122	sfc pressure has been rising slightly as we go south, so the legs are set up well with respect to the pressure trough
7:44:53	49.361 -11.085	upper cloud deck is more evident on TA as we go south
7:47:58	49.173 -10.954	now in stratiform rain region, which was seen on LFearlier. Weak bright band, very good velocity structure
7:53:06		METMAN60 advises pt 2 at 0757
7:54:39	48.776 -10.680	at end of leg at pt 2, perl #1 to the right in light stratiform precip
7:55:00		0818UTC for 308D to pt 3
7:59:20	48.736 -10.738	perl #1 completed, now tracking 264 toward pt 3
8:10:37	48.612 -11.655	beginning to break out of precip region
8:17:41		METMAN reports Ops Center 51 30N 17 30W at 12Z PV anomoly

8:19:20	48.493	-12.371	at pt 3 turn to trk 355 to pt 3 - start of leg 2 - ETA for pt 4 0915 Z
8:22:23			0912 ETA for 308D to pt 4
8:33:13	49.375	-12.483	see a blob of precip on LF near 48.5N 16.5W
8:48:15			0916 ETA for METMAN to pt 4. Their sondes are apparently working well with an improvised launch procedure.
8:57:04	50.875	-12.661	16.5W 50W expected precip and cloud head max at 10Z from Ops Center relayed via satcom from METMAN. That position is about 3 degrees of longitude west of our anticipated precip max location at 10Z.
9:15:44			308D at pt 4
9:16:39	52.118	-12.840	at pt 4, turn to trk to pt 5
9:18:34			0934 ETA for 308D to pt 5 - our ETA also 0934
9:21:17	52.060	-13.265	winds here are 312/17 - down near the middle of the last leg the winds were 256 - convergence zone? Sfc P 1012 mb here.
9:26:42	51.978	-13.778	no precip evident on the LF
9:34:34	51.852	-14.525	at pt 5 turn to trk 147 to pt 6 on leg 3. 308D also turned at same time
9:38:16	51.643	-14.373	blob of precip near 50N 16.5W which is close to the region where the Ops Center reported the models forcasted a "cloud head" region of the developing wave
10:14			Changing pattern to jump 50 nm on the other side of the Electra for new pt 7. Setting up a coordinated run to the north through the middle of the cloud head band. Now tracking SW to new pt 7 at
10:27:39	49.120	-14.031	Comma head shape to the precip zone 100 nm to our NW
10:31:43			Will go north with Electra 50 nm to our east at 1101 Z
10:46:43	48.471	-15.285	Going through zone of small convective cells
10:48:30	48.366	-15.484	Looks like a very narrow (5 nm wide) squall line on the east flank of the cloud head band oriented NE-SW. At 50 nm range on the LF it has specks of 40-45 dBZ
10:59:41	48.017	-16.142	at new pt 7, trk 355 to new pt 8 start of leg 4
11:01:10	48.068	-16.204	now tracking northbound
11:13:12	48.811	-16.453	perl to the right near the end of the squall line
11:15:41			end of perl resume northbound track
11:17:38			308D and P-3 nearly braceted the line
11:35:50			estimate time for mid-run time of 1243 for next leg (pts 9-10). Estimated end of that leg 1320 Z
11:42:34	50.489	-16.727	prematurely cutting this leg short to cut over to new leg 9-10. Trk west to 17 30 lthen back SW to new point 10
11:50:23	50.511	-17.435	end of the westbound track-turning SE to new point 10-start of leg 5
12:00:41			308D completed pattern and is on its way back to SNN

12:02:22	49.843	-16.884	winds are picking up as we track to the SE
12:14:11	49.164	-16.280	going though a field of shallow convective cells that show a highly sheared appearance on the TA.from SE to NW
12:18:01	49.164	-16.280	A different appearance to the character of the LF sea return across the squall line. We're now passing through the SW end of it and the sea reture blooms to the south, but virtually non-existant to the north.
12:26:41	49.164	-16.280	Broke though the line. Wind speeds have dramatically increased to 45 knots from 15 knots
12:34:25	48.016	-15.307	at pt 10 end of leg 5 and end of the systematic survey. Will now track 045 to intercept the line.
12:36:30			no precip on TA since we cut though the line
12:40:19	48.296	-14.884	going through a few shallow cells on the south side of the line
12:52:34	49.110	-14.652	through line turn to trk 045 behind the line
12:56:00	49.273	-14.398	lots of stratiform precip this side of line - turbulence and some embedded convective cells
12:58:37			cloud head band has become detached from the squall line
13:00:24	49.477	-14.079	wave type structuires at the tops of the TA echoes
13:10:10	49.842	-13.246	the convective part of the line has weakened considerably-not much indication of the comma head any more.
13:12:00	49.922	-13.114	turn to trk 145 to get on the front side of the line
13:21:28	49.513	-12.396	ahead of the line now-end of leg turn to trk 225
13:23:18			line now looks very ragged-just blobs of 35 dBZ cells
13:30:08	49.153	-12.852	turn to trk 255 to follow the line to the west
13:40:19	49.009	-13.647	end of sw bound leg, outside turn and climb to 6 kft for run north
13:44:08	49.013	-13.531	start northbound run at 6k ft
13:47:40	49.249	-13.531	climb up to 7k ft to get past 0 degrees temp
13:58:02	49.941	-13.519	end of leg descend back to 5k ft and track to the buoy-will do a spiral ascent at the buoy and then release the sonde for a test
14:03:40	50.269	-13.449	no precip echo on the TA-large region of stratiform precip to the rear-now tracking 007 to the buoy
14:15:44	51.032	-13.297	at buoy-performing spiral ascent to 23k ft
14:26:09	50.986	-13.415	at 232k ft
14:30:55	50.975	-13.383	sonde away over the buoy
14:39:28			perfect sonde drop
14:46:47			about a 75 knot tailwind on the way home
15:14:41	52.705	-8.918	land
15:20:10			Block In

MSA Coordinator Summary Report

970204H IOP10 on Expected Frontal Wave Development
Aircraft Involved: P-3, Electra, UK C-130

Summary Description of Mission:

The planned primary mission was the systematic survey ("Lawnmower" pattern) on an active portion of frontal wave cyclone expected to develop in the southern part of the MSA. The P-3 and Electra departed Shannon on schedule about 0600 and 0540 UTC, respectively. The two Doppler aircraft rendezvoused with the C-130 begin the highly coordinated runs at the initial point at 0700 UTC. The first two legs of the systematic survey were basically completed in clear air, with only a narrow region near the southern turn points in, or near, a weak convective/stratiform band. During the first half of the third leg, a zone of precipitation was noted on the P-3s LF radar near 50N 16.5W which was also a region that the Ops Center (via an e-mail received by the C-130 satellite communications equipment) indicated was the expected region of "cloud head development" as an upper level PV max was predicted by the UKMO LAM model there. Based on the LF radar and model forecast, the flight tracks of the P-3 and C-130 were modified (the Electra flight plan could not be modified due to endurance limitations) to shift westward. To maintain the integrity of the "systematic survey" the P-3 track was shifted from 100 km to the east of the Electra, to 100 km to the west. The C-130 track was shifted to be down the middle of the two Doppler aircraft tracks. The new tracks nicely intercepted an advancing ENE-SSW squall line with the P-3 and Electra tracks bracketing the line, and the C-130 through the middle. Following the completion of its leg, the Electra departed the region at 1200 UTC and returned to Shannon. The P-3 and C-130 completed another leg through the western edge of the line, then the C-130 also departed. The P-3 continued to perform "Doppler boxes" around the line for another 1.5 hours. Following the completion of the Doppler patterns at 1400 UTC, (by which time the line had weakened and become a blob of stratiform rain with embedded convection) the P-3 tracked to the buoy at 51.02N, 13.33W, performed a spiral ascent to 23,000 ft, and drop a sonde to test the system. The sonde performed perfectly and the P-3 returned to Shannon at 1520 UTC.

Communications & Coordination:

1. No troubles.

P-3 Equipment Problems Encountered:

1. The P-3 Doppler radar displays seemed to occasionally show unrealistic radial velocity patterns.

Coordination Problems

1. No problems of note.

Recommendations & Evaluation:

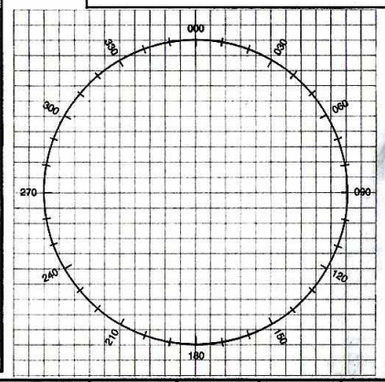
1. Very good mission from an execution point of view. Coordination of legs was easily accomplished by speeding up and/or slowing down to syncronize each leg.
2. The last 2 legs of the P-3 and C-130, and the last leg of the Electra were within the most interesting precipitation region. The system resembed a "comma" with extensive stratiform precip behind (to the north and west) of the moving squall line.

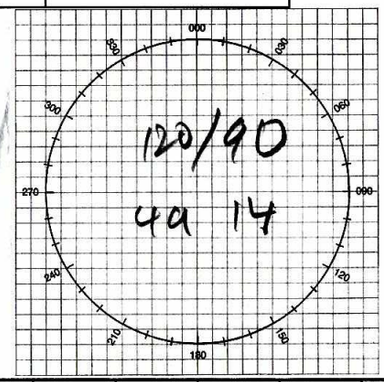
--Dave Jorgensen & Yvon Lemaitre

1 OF 1 — 192 — 5154 1342 0702 4830 1124W

MISSION LOG — PAGE ___ OF ___

CLEARANCES			
FREQ	ALT	HDG	OTHER





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 _____, 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
- PILOT INTENTIONS
- WE HAVE _____ ENDURANCE REMAINING

TIME	FIX TYPE	POSITION	INS 1 POSITION	K ERR	INS 2 POSITION	K ERR	MH	VAR +E==>	TH	DR +R==>	TRK	GS	WD	WS	ALT	TAS	NEXT PT	DIST	TIME	ETA	REMARKS
0545	VIS	5241.6N 00855.5W	✓		✓																ENG/CHOCKS
0550		TAXI																			TAXI
0600		TOFF																			TOFF
0612	GPS	5233.6N 0949.6W	5233.5N 0949.7W	+1 −1	5233.5N 0949.7W	+1 −1			260	3L	257	196	266	45	8K	240					LEVL OFF
0728	GPS	5022.6N 1148.9W	5021.6N 1149.2W	+1.0 −.3	5022.3N 1148.7W	+.2 +.2			163	9L	154	240	207	31	5K	224					FM1
0828	GPS	4901.7N 1226.7W	4859.6N 1227.0W	+.1 −.3	4901.0N 1226.4W	+.7 +.3			346	9R	355	229	265	39	5K	232					FM1
0911	SW to INS		TO		INS	2		as	PRIMARY												
0928	GPS	5157.4N 1354.2W	5155.2N 1355.6W	+2.2 −1.4	5156.8N 1354.5W	+.6 −.3			256	2L	254	220	201	12	5K	229					FM1 POSN
1128	GPS	4905.7N 1404.9W	4903.3N 1406.5W	+2.4 −1.6	4905.6N 1404.7W	+.1 +.2			236	3L	233	197	246	35	5K	232					FM1 POSN
1128	GPS	4934.9N 1634.4W	4930.9N 1637.0W	+4.0 −2.6	4934.1N 1634.1W	+.8 +.3			348	7R	355	209	271	34	5K	228					FM1 POSN
1308	GPS	4945.6N 1328.7W	4941.8N 1333.5W	+3.8 −4.8	4945.2N 1328.3W	+.4 +.4			056	4R	060	240	284	22	5K	226					FM1 POSN
1400	GPS	5002.2N 1330.0W	4957.9N 1335.6W	+4.3 −5.6	5006.7N 1330.1W	+.5 −.1			082	5R	007	221	296	27	5K	233					FM1 POSN
1415	GPS	5100.4N 1318.4W	5055.7N 1324.8W	+4.7 −6.4	5059.7N 1318.2W	+.7 −.2					007		284	16	5K						MNVR BUOY 62081
1431	GPS	5058.5N 1322.0W	5054.5N 1329.2W	+4.0 −7.2	5057.8N 1321.8W	+.7 −.2			094	4L	090	373	280	74	23K	300					SONOBUOY
1515		LAND																			LAND
1520	VIS	5241.6N 0855.5W	5238.2N 0903.6W	+3.4 −7.9	5242.0N 0855.6W	−.4 −.1															CHOCKS