

19870922II-FDIR

Error summary I870922 Hurricane Emily

--Navigation : Renavigation was done using 5 radar fixes, 1 VOR fix, and the terminal error. Two other VOR fixes were not used since they disagreed with the radar fixes by 5nm or more. The one VOR fix used was taken on the ferry to San Juan, when the plane flew directly over a VOR.

TIME	CORRECTION (nm)		TYPE FIX
	LAT	LON	
202311	0.0	0.0	Radar
203059	-2.1	-0.9	"
220746	-3.0	-1.8	"
222750	-3.6	-2.4	"
225918	-3.6	-2.4	"
230333	-4.0	-1.1	VOR fix
233100	-6.1	-1.0	Terminal error

Note from the above table that the drift in INE#2 started quite suddenly, drifting 2nm in latitude and 1 nm in longitude in just 8 minutes.

--Air to Air TACAN: 12 readings of the distance separating the 2 aircraft were taken on N43RF between 15:51 and 21:00Z. 4 of these distances were compared to distances obtained by using corrected and uncorrected INE positions from the 2 aircraft. Distances calculated with corrected INE's agree within 3nm to the TACAN distances.

TIME	TACAN	Distance apart:	
		CORRECTED INE'S	UNCORRECTED INE'S
165530	19nm	21.6nm	21.6nm
190000	72nm	70.1nm	70.1nm
203730	11nm	12.3nm	12.7nm
210000	11nm	10.7nm	7.8nm

--Radar altitude : No RA problems seen! This is unusual, so be alert for spikes during ascents and descents. I may have missed some.

--Vertical winds : The attack pressure sensor failed at 21:19:46Z during eye penetration #8. During the final 2 hours of the flight, AP was modeled as drifting linearly from -5mb to 0mb (about what one would expect given fuel consumption rate and no weather.) This approximation will cause the vertical winds to be in error by up to 3.5 m/s in eyewall passages, ascents, and descents. In non-turbulent straight-and level flight, this error will be 0 - 2 m/s.

The AP failure will also cause wind speed to be in error by .2 m/s and wind direction by 1 degree during eyewall penetrations.

--Dew point : The dew point frequently exceeded the temperature during cloud penetrations. Use the dew point information with caution.

--Liquid water : Looks bad. No corrections made.

	<u>Take off</u>	<u>Landing</u>
Corrected station pressure	1016.0mb	1014.0mb
Aircraft static pressure	1015.2mb	1013.8mb

NOAA3 0512A EMILLY

16:30
69 30'

U.S. DEPT. COMM./NOAA/ORD - DATA SECTION WORK FORM NO.1 DROWF1 FILE

FLT ID: 870922I FM: SJN TO: SJN
 FLT NO: 87-71 BLK IN: 23:33 ATR: 23:23
 ETD: 15 Z BLK OUT: 14:48 RTD: 14:56
 ETE: 9:00 BLK TIME: 8:45 FLT TIME: 8:27
 SPONSOR ORG: HRD PROGRAM: HURF '87 PURPOSE: EMILY RSRCN

ORD PERSONNEL

AC GUNNOE ✓ SYS ENG SCHRIKER -
 CP MEYERS ✓ DATA SYS JARVI
 NAV SECRETAN ✓ RADAR LINO ✓
 FE RICCI/KIRKPATRICK ✓ BT/ODW GONZALES ✓
 RADIO MC CONNAHEA ✓ CLD PHYS
 FD MASTERS DOPPLER

PARTICIPATING SCIENTIST/VISITORS/ORD

LAST, FIRST NAME	ACTIVITY ON A/C	AFFILIATION
MARKS ✓	HRD	
DODGE ✓		
GAMACHE ✓		
KAPLAN ✓		
DORST ✓		

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

16 12' 125 S SANTO 1001
 68 20' 5-7 470

16:33:30 FIX 5
 16 54°
 69 06°

17 21
 70 14

TR 1 205-210°
 TR 2 330° 15:47
 TR 3 210°-225
 TR 4 080° 16:08

16° 24.5' FIX 1
 068° 35.5'

14:58:46 FIX 6
 17° 11' N
 69° 23' W

16 35 17 Z FIX #3
 68 46 100 KT SE GIDE 105 KT

16:20 : 16 25' FIX 2
 68 43'

42 spiral descent 17 12 N 19:14 35 mi from center

09 Penetrations

U.S. DEPT. COMM./NOAA/ORD - DATA SECTION WORK FORM NO.2 ORDF2 FILE

FLT ID: 4709221 TIME OFF: 23:23 TIME ON: 14:56

	A/C T/O	WX STN	A/C LAND	WX STN
PRESSURE	TWR 1016 R 1015.3 G 1016	0VC	TWR 1014 R 1015 G 1014	Bfen

NO DATA DISPOSITION/DATE/QUALITY

1/SEC FLT LVL TAPES	1	
FAST FLT LVL TAPES		
RADAR TAPES	10	
DOPPLER TAPES	24	
ODW CASSETTES		
HARD COPIES	2	
CLOUD PHYSICS	36	
AXBT	0	
AXCP	0	
ODW	0	

PHOTOGRAPHY

	FWD	LS	RS	VERT
ON				
OFF				
RATE				

REMARKS

82
79
1305

PROPOSED T.O.	1500 ±
ACTUAL T.O.	1456

SYS	BEGIN ALIGN TIME	NCS CONN	Ω AID	TIME OUT OF COARSE	ALIGN STS 0-5	(1) TIME INTO NAV.	(2) TIME OUT NAV.	ΔT (2)(1)	TERMINAL ERRORS		
				ELAPSE ALIGN POST TIME					LAT	LONG	G S
INS 1		✓			0	1441	2330	8+49	-8.6	+3.9	4
INS 2 IMU		✓			0	1441	2330	8+49	-6.1	+1.0	4

OTHER REMARKS:

$$\begin{array}{r} 2290 \\ 1441 \\ \hline 849 \end{array}$$

A/C COMMANDER		NAVIGATOR		A/C NO.		MISSION NO.		TIME AIRBORNE		LOCATION		DATE		PILOT NAME	
GUPNOE		SECRETAN		N43RF		870922 143408		1456		SAN JUAN U		22-SEP 1987		LOT EMILY	
TIME OF ENTRY	POSITION	TYPE INE USED	INE #1 POSITION	LAT LON COR'S	INE #2 POSITION	LAT LON COR'S	ALT GS	TH TK	REMARKS						
1456	18-26.9 065-59.3	4 2	18-26.9 065-59.2	0.0 +0.1	18-26.9 065-59.3	0.0 0.0			TAKE OFF						
1546		9 2	16-24.6 068-35.4		16-24.7 068-35.1										
1620		9 2	16-28.2 068-42.9		16-27.9 068-43.1										
1700		9 2	16-35.6 068-48.0		16-35.1 068-48.1										
1744		9 2	16-44.6 068-58.9		16-43.5 068-59.2				INE'S 109						
1758	17-38 069-27	2 2	17-36.4 069-30.4	+1.6 -3.4	17-35.2 069-30.9	+2.8 -3.9			345/51						
1802	17-37 069-28	2 2	17-36.6 069-31.3	+0.4 -3.3	17-35.4 069-31.9	+1.6 -3.9			346/51						
1833		9 2	16-54.5 069-07.6		16-52.8 069-08.0										
1959		9 2	17-11.8 069-22.0		17-09.3 069-22.8				INE'S 229						
2034		9 2	17-19.7 069-29.0		17-16.8 069-30.2										
2107		9 2	17-24.8 069-34.3		17-22.5 069-36.0										
2208	18-04 069-14	2 2	18-05.9 069-14.1	-1.9 -0.1	18-03.1 069-16.5	+0.9 -1.5			315/34						
ATC CLEARANCE: 330° 79000 E11000 (wind) 120.9 3665															
ENROUTE CLEARANCES: ↑ 9000															
TYPE OF FIX: (1) DR (2) RADIO (3) CELESTIAL (4) VISUAL (5) LORAN (6) RADAR (7) DOPPLER - INERTIAL (8) OMEGA (9) INERTIAL (10) OMEGA - INERTIAL															

Page 3

EMILY #1

870922 I

TIME	LAT	LONG	TK	WD	WS	PA	TA	TD	RD	RS	SP	PS	A-A TACH
1503	18 32	66 19	252	126	26	2239	13	7	26	13	1017	760	
1551													13
16:55:00	16 19	66 42	341	224	62	2954	3062	9	15	9	998	702	19
17:22:15	17 7	66 17	346	144	55	2905	9.7	7.8	21	8.7	1010	710	73
18:30:10													13
19:00:00													72
19:17:35	16 46	70 04	9	17	28	2906	11	6	15	10	1007.5	709	30
19:21:35	-19:23												15
19:25:10	CP												7
19:30:50													30
19:48:25	17 16	70 1	92	20	27	2908	10	10	22	9	1008	710	26
20:34	17 18	69 28											
20:27:30													11
210000													11
2107	17 25	69 34											
2217	17 36	69 43											

STEADY

FIX #7

FIX #8

FIX #9