

19870922H1-FDIR

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

FLT ID: 870922H	FM: SAN JUAN	TO: SAN JUAN
FLT NO: 48-87	BLK IN: 0001Z	ATA: 2351
ETD: 1500Z	BLK OUT: 1454Z	RTD: 1501Z
ETE:	BLK TIME: 9:07	FLT TIME: 8:50
SPONSOR ORG: HRD	PROGRAM: HURRICANE	PURPOSE: WATER BUDGET

DAO PERSONNEL

AC TURNER	SYS ENG GOLDSTEIN
CP LAYDON / EILERS	DATA SYS LEYVA
NAV HENDERSON	RADAR THOMPSON, J
FE MOORE	BT/ODW
RADIO NUNN	CLD PHYS
FD DAMIANO / PARRISH	DOPPLER

PARTICIPATING SCIENTIST/VISITORS/DAO

LAST, FIRST NAME	ACTIVITY ON A/C	AFFILIATION
WILLOUGHBY	CLOUD PHYSICS	HRD
WILLIS	CLOUD PHYSICS	HRD
BLACK, B	CLOUD PHYSICS	HRD
GRIFFIN, J	CLOUD PHYSICS	HRD
BURPEE	PI	HRD
REYNARD	MEDIA	LA FIAARO
McFADDEN		DAO

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

Paul DP at 150330Z

1541-1542Z

1st incite 045 TRK out

19 Penetrations in H. Emily - A world record.
 Flew eyewall water budget. → Flew pies at 17K →
 then descent spiral 50nm/299 fm center →
 then ~~more~~ more pies all quadrants @ 19K.

19 pents!!

New Record...

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

FLT ID: 870922H TIME OFF: 1501Z TIME ON: 2351Z

	A/C T/O	WX STN	A/C LAND	WX STN
PRESSURE	TS 1016.3 SP 1011.4	30.02 / 1016.3	TS 1014.5 PS 1015	1014.5

NO DATA DISPOSITION/DATE/QUALITY

1/SEC FLT LVL TAPES	1	
FAST FLT LVL TAPES		
RADAR TAPES	16	
DOPPLER TAPES		
ODW CASSETTES	4	
HARD COPIES		
C.R.	77	
AXBT		
RXCP		
ODW	6	One bad R, bad T, P last drop

PHOTOGRAPHY

	FWD	LS	RS	VERT	
ON					
OFF					
RATE	1/5	1/5	1/5		

REMARKS

A number of radar data system failures - reloaded program.

A/C COMMANDER		NAVIGATOR		A/C NO.		MISSION NO.		TIME AIRBORNE		LOCATION		DATE		PROJ. NAME	
Turner		HENDERSON		N42RF		870922H		1501 Z		SJU		22 SEP 87		"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						
1451	18-26.3 66-00.7	4 2	18-26.3 66-00.7	Ø Ø	18-26.3 66-00.7	Ø Ø	X X	X X	BLOCKS						
1554		9 2	16-22.8 68-39.9		16-23.5 68-38.9		16.0		Δ						
1625		9 2	16-27.5 68-46.0		16-27.4 68-45.3				Δ						
1641		2 2	17-13.6 68-28.4		17-12.9 68-27.6		16.0 326	265 270	310°/84 ?						
1657		9 2	16-33.7 68-49.7		16-33.4 68-48.0		16.0		Δ						
1709		9 2	16-37.5 68-59.0		16-38.2 68-51.9				Δ						
1723		2 2	16-36.0 69-28.4		16-37.9 69-26.3		16.0 306		350°/107 ?						
1746		9 2	16-40.6 69-00.6		16-41.0 68-59.1		16.0		Δ #7						
1814		9 2	16-50.2 69-06.1		16-49.1 69-04.3		16.0		Δ #8						
1824		2 2	16-59.6 68-48.6		16-58.9 68-46.2		16.0		325°/107 ?						
1831		9 2	16-50.7 69-07.9		16-50.6 69-05.2		16.0		Δ #9						
1842	16-44.0 68-30.0	2 2	16-40.6 68-38.3	+3.4 -8.3	16-41.5 68-35.2	+2.5 -5.2	16.0 333		326°/120 ?						
ATC CLEARANCE: L/280 VTR → BRQ 718.0 L/10 WX															
719.0 → BRQ Rep FTR 710.0 → SJU 29.95															
ENROUTE CLEARANCES: ↓ 5.0 ↓ 2.0															
c/Land															
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															

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
1902		9/2	16-55.7 69-16.3		16-56.6 69-13.4		16.0		Δ #10
1943		2/2	17-22.8 70-01.5		17-22.2 69-58.4		17.5		012°/65 CDO?
1956		9/2	17-08.1 69-25.7		17-08.3 69-22.3		18.0		Δ #11
2021		9/2	17-10.1 69-31.5		17-11.0 69-22.6		18.0		Δ #12
2025	17-29.0 69-20.0	2/2	17-26.0 69-27.8	+3.0 -7.8	17-26.9 69-23.9	+2.1 -3.9	18.0		341°/58 CDO
2035		9/2	17-18.5 69-33.6		17-18.7 69-29.8		18.0		Δ #13
2104		9/2	17-20.4 69-38.3		17-20.3 69-34.4		18.0		Δ #14 15
2120		9/2	17-19.0 69-39.8		17-19.7 69-35.5		18.0		Δ #15
2125	17-29.0 69-17.0	2/2	17-21.9 69-22.7		17-22.7 69-18.4		18.0		338°/64 CDO?
2154		9/2	17-23.6 69-45.4		17-24.3 69-40.3		19.0		Δ #16 2W
2202	17-22.0 69-18.0	2/2	17-16.9 69-30.6	+5.1 -12.6	17-17.2 69-25.4	+4.8 -7.4	19.0		343°/67 CDO?
2210	17-22.0	9/2	17-27.3 69-49.0		17-27.4 69-43.7		19.0		Δ #17
2228		2/2	18-06.1 69-33.7		18-05.9 69-28.7		19.0		327°/21 CDO
2239		9/2	17-31.9 69-53.1		17-32.1 69-48.0		19.0		Δ #18
2300		9/2	17-33.0 69-55.6		17-34.3 69-50.1		19.0		Δ #19
2312	17-55.0 68-49.0	2/2	17-49.9 68-55.5	+5.1 -6.5	17-51.1 68-49.8	+3.9 -0.8	19.0 30.8	072° 064	071°/105 BRQ
0001	18-26.3 66-00.7	4/2	18-25.2 66-05.5	+1.1 -4.8	18-25.0 66-00.1	+1.3 +0.6	X	X	Blox / RE #1 / 6 S #2 / 1

42

TIME	LAT	LONG	TRK	HD	WD	WS	PA	GA	TA	TD	SP	PS	RD	PQ
1506	1832	6614	267	263	126	30	1857	2003	15.6	11.7	1019.2	802.8	26.3	75.8
1516	1829	6656	273	271	112	33	3794	4058	4.1	2.2	1017.4	629.6	22.9	61.4
1528	1806	6744	237	229	123	41	4859	5151	-2.	-2.4	1012.9	550.6	5.6	72.4
1538	1726	6814	206	190	119	57	4848	5725	-9	12	1009.3	550.9		68.0
1549	1640	6831	199	185	121	77	4857	5059	-1.4	.7	1000.2	554.9		74.6

1554 16°23' 68°39' 965 MB Penet 1

16068 DROPPED 1626 6842 (97)

16°25' 68°41' 966 MB Penet 2

16252 16°27' 68°45' 963 MB Penet 3

971-979

969 complete

165657 16°33' 68°48' 957 Penet 4

17092 16°38' 68°54' 960 Penet 5

1719 16 53 69 30 210 47 32 4870 5116 -1.3 -0.8 550 100%

1732	16 41 68 53	961	Sound	Penet 6
1746	16 40 69 02	958	967.6	Penet 7
1812	16 50 69 05	959		Penet 8
1831	16 51 69 06	960		Penet 9
1902	16 56 69 15	958		Penet 10

1913 17 12 69 46

1930 17 08 69 52

1944 17 23 69 53

1956 17 08 69 25

2018 17 19 69 45

2022 17 10 69 31

2037 17 17 69 31

2107 17 20 69 40

2120 17 22 69 32

2154 17 26 69 42

2210 17 30 69 40

Bottom of spiral descent

957

5507 5726 -3.3 -2.4

957

958

958

958

958

959

Penet 11 Drog ↑ to top of rainband

503 14 bound

Penet 12

Penet 13

Penet 14

Penet 15

Penet 16

Penet 17

22.75

U.S. DEPT. COMM./NOAA/ORD - DATA SECTION WORK FORM NO.2 OROWF2 FILE

FLT ID: 870922H TIME OFF: 1501Z TIME ON: 2351Z

	A/C T/O	WX STN	A/C LAND	WX STN
PRESSURE	TS 1016.3 CP 1011.4	30.02 / 1016.3	TS 1014.5 PS 1015	1014.5

NO DATA DISPOSITION/DATE/QUALITY

1/SEC FLT LVL TAPES

1

FAST FLT LVL TAPES

RADAR TAPES

16

DOPPLER TAPES

ODW CASSETTES

4

HARD COPIES

C.P.

77

RXBT

RXCP

ODW

6

One bad R, bad T, P last drop

PHOTOGRAPHY

	FWD	LS	RS	VERT
ON				
OFF				
RATE	1/5	1/5	1/5	

REMARKS

A number of radar data system failures - reloaded program.

42

TIME	LAT	LONG	TRK	HD	WD	WS	PA	GA	TA	TD	SP	PS	RD	PQ
1506	1832	6614	267	263	126	30	1857	2003	15.6	11.7	1018.2	802.8	26.3	75.8
1516	1829	6656	273	271	112	33	3794	4258	4.1	2.2	1017.4	629.6	22.9	61.4
1527	1806	6744	237	229	123	41	4859	5151	-2.	-2.4	1012.9	550.6	5.6	72.4
1538	1726	6814	206	190	119	57	4848	5725	-9	.2	1009.3	550.9		68.0
1549	1640	6831	199	185	121	77	4857	5059	-1.4	.7	1000.2	549.9		74.6

1554 16°23' 68°39' 965 MB Penet 1

16068 DROPPED 1626 6842 (919)

16°25' 68°41' 966 MB Penet 2

16252 16°27' 68°45' 963 MB Penet 3

971-979

969 complete

165657 16°33' 68°48' 957 Penet 4

17092 16°38' 68°54' 960 Penet 5

1719 16 53 59 30 210 47 32 4870 5116 -1.3 -0.8 550 1000

1732	Fix	16 41 68 53	961	Sonde	Penet	6
1746	16 41 69 01	958	967.6	Penet	7	
1812	16 50 69 05	959		Penet	8	
1831	16 51 69 06	960		Penet	9	
1902	16 56 69 15	958		Penet	10	

1913 17 12 69 46

1930 17 08 69 52

1944 17 23 69 53

1956 17 03 69 25

2018 17 19 69 45

2022 17 15 69 31

2037 17 17 69 31

2104 17 20 69 40

2120 17 22 69 32

2154 17 30 69 42

2210 17 30 69 40

Bottom of spiral descent

1956	17 03 69 25	957	Penet 11	Drop	↑ to top of rainband					
2018	17 19 69 45	5507	726	-2.2	-0.4	770	53	17	Penet	12
2022	17 15 69 31	108	130	957					Penet	13
2037	17 17 69 31								Penet	14
2104	17 20 69 40	958							Penet	15
2120	17 22 69 32	958							Penet	16
2154	17 30 69 42	958							Penet	17
2210	17 30 69 40	959							Penet	17

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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
1902		9/2	16-55.7 69-16.3		16-56.6 69-13.4		16.0		Δ #10
1943		2/2	17-22.8 70-01.5		17-22.2 69-58.4		17.5		012°/65 CDO?
1956		9/2	17-08.1 69-25.7		17-08.3 69-22.3		18.0		Δ #11
2021		9/2	17-10.1 69-31.5		17-11.0 69-27.6		18.0		Δ #12
2025	17-29.0 69-20.0	2/2	17-26.0 69-27.8	+3.0 -7.8	17-26.9 69-23.9	+2.1 -3.9	18.0		341°/58 CDO
2035		9/2	17-18.5 69-33.6		17-18.7 69-29.8		18.0		Δ #13
2104		9/2	17-20.4 69-38.3		17-20.3 69-34.4		18.0		Δ #14 15
2120		9/2	17-19.0 69-39.8		17-19.7 69-35.5		18.0		Δ #15
2125	17-29.0 69-17.0	2/2	17-21.9 69-22.7		17-22.7 69-18.4		18.0		338°/64 CDO
2154		9/2	17-23.6 69-45.4		17-24.3 69-40.3		19.0		Δ #16 2W
2202	17-22.0 69-18.0	2/2	17-16.9 69-30.6	+5.1 -12.6	17-17.2 69-25.4	+4.8 -7.4	19.0		343°/67 CDO?
2210		9/2	17-27.3 69-49.0		17-27.4 69-43.7		19.0		Δ #17
2228		2/2	18-06.1 69-33.7		18-05.9 69-28.7		19.0		327°/21 CDO
2239		9/2	17-31.9 69-53.1		17-32.1 69-48.8		19.0		Δ #18
2300		9/2	17-33.0 69-55.6		17-34.3 69-50.1		19.0		Δ #19
2312	17-55.0 68-49.0	2/2	17-49.9 68-55.5	+5.1 -6.5	17-51.1 68-49.8	+3.9 -0.8	19.0 20.8	072 064	071°/105 BRQ
0001	18-26.3 66-00.7	4/2	18-25.2 66-05.5	+1.1 -4.8	18-25.8 66-00.1	+1.3 +0.6	X	X	Blox / RES #1 / 6 #2 / 1

A/C COMMANDER		NAVIGATOR		A/C NO.		MISSION NO.		TIME AIRBORNE		LOCATION		DATE		PROJ. NAME	
Turner		Henderson		N42RF		870922H		1501 Z		SIU		22 SEP 87		"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						
1451	18-26.3 66-00.7	4 2	18-26.3 66-00.7	φ φ	18-26.3 66-00.7	φ φ	X	X	BLOCKS						
1554		9 2	16-22.8 68-39.9		16-23.5 68-38.9		16.0		Δ						
1625		9 2	16-27.5 68-46.0		16-27.4 68-45.3				Δ						
1641		2 2	17-13.6 68-28.4		17-12.9 68-27.6		16.0 326	265 280	310°/84 ?						
1657		9 2	16-33.7 68-49.7		16-33.4 68-48.0		16.0		Δ						
1709		9 2	16-37.5 68-59.0		16-38.2 68-51.9				Δ						
1723		2 2	16-36.0 69-28.4		16-37.9 69-26.3		16.0 306		350°/107 ?						
1746		9 2	16-40.6 69-00.6		16-41.0 68-59.1		16.0		Δ #7						
1814		9 2	16-50.2 69-06.1		16-49.1 69-04.3		16.0		Δ #8						
1824		2 2	16-50.6 68-48.6		16-58.9 68-46.2		16.0		325°/107 ?						
1831		9 2	16-50.7 69-07.9		16-50.6 69-05.2		16.0		Δ #9						
1842	16-44.0 68-30.0	2 2	16-40.6 68-38.3	+3.4 -8.3	16-41.5 68-35.2	+2.5 -5.2	16.0 333		326°/120 ?						
ATC CLEARANCE: L/280 VTR → BRQ 718.0 L/10 WX															
719.0 D → BRQ Rep FIR 710.0 D → SIU 29.95															
ENROUTE CLEARANCES: 75.0 72.0															
C/LAND															
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															

PROPOSED T.O.	1500	7
ACTUAL T.O.	1501	7

SYS	BEGIN ALIGN TIME	NCS CONN	Ω AID	TIME OUT OF COARSE	ALIGN STS 0-5	(1) TIME INTO NAV. 24-1	(2) TIME OUT NAV.	ΔT (2)(1)	TERMINAL ERRORS		
				ELAPSE ALIGN POST TIME					LAT	LONG	GS
INS 1		No	No		φ	1451	0001	9+10	+1.1	-4.8	6
INS 2 IMU		No	No		φ	✓	✓	9+10	+1.3	+0.6	1

OTHER REMARKS:

U.S. DEPT. COMM./NOAA/ORD - DATA SECTION WORK FORM NO.1 OROWF1 FILE

FLT ID: 870922H	FM: SAN JUAN	TO: SAN JUAN
FLT NO: 48-87	BLK IN: 0001Z	ATA: 2351
ETD: 1500Z	BLK OUT: 1454Z	RTD: 1501Z
ETE:	BLK TIME: 9:07	FLT TIME: 8:50
SPONSOR ORG: HRD	PROGRAM: HURRICANE	PURPOSE: WATER BUDGET

ORD PERSONNEL

AC	TURNER	SYS ENG	GOLDSTEIN
CP	LAYDON / EILERS	DATA SYS	LEYVA
NAV	HENDERSON	RADAR	THOMPSON, J
FE	MOORE	BT/ODW	
RADIO	NUNN	CLD PHYS	
FD	DAMIANO / PARRISH	DOPPLER	

PARTICIPATING SCIENTIST/VISITORS/ORD

LAST, FIRST NAME	ACTIVITY ON R/C	AFFILIATION
WILLOUGHBY	CLOUD PHYSICS	HRD
WILLIS	CLOUD PHYSICS	HRD
BLACK, B	CLOUD PHYSICS	HRD
GRIFFIN, J	CLOUD PHYSICS	HRD
BURPEE	PI	HRD
REYNARD	MEDIA	LA FLEURO
McFADEN		ORD

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

Prel DP at 150330Z

hold in 1541-1542Z

1st incuts 045 TRK out

19 Penetrations in H. Emily - A world record.
 Flew eye wall water budget. → Flew pies at 17K →
 then descent spiral 50nm/290 fm center →
 then ~~more~~ more pies all quadrants @ 19K.

19 Pents!!

New Record...

HURRICANES 87 DATA SUMMARY

870922H H. Emily Eyewall water Budget (HRD)

TYPE OF DATA	SENSOR OR OPTION
INE	2 (with Radar fixes)
Accelerometer	2
Temperature probe	1
Altitude change option (for vertical winds)	RA
Static pressure	Rosemount (fuselage)
Dynamic pressure	Rosemount (fuselage)
Time source	Micro 29
Constants file	CO2872.CON

Notes:

Numerous syncro radar altimeter spikes have been removed from the data and patched with either a digital radar altimeter or pressure altitude correction. The spikes normally occur while changing altitude, in roughly 3300 foot intervals.

INE#2 was corrected with a series of radar fixes provided by Frank Marks. No renav was necessary before 191258Z. The corrections to INE#2 were:

200847Z	+1.2 (min-lat)	-0.6 (min-lon)
202915Z	+1.8	0.0
205254Z	+1.2	-1.2
215506Z	+1.8	-1.5
221131Z	+1.8	-1.5
223419Z	+1.8	-1.2
230717Z	+1.8	-1.2

We also used the terminal position error to correct the rest of the flight.

The slip pressure became very spikey from 2206Z to 2220Z. The spikes have been removed about the mean.

The J/W liquid water probe failed (wire broke) at 210520Z and was out for the rest of the flight.

	Take Off	Landing
Aircraft Static Pressure	1016.5 mb	1015.0 mb
Corrected Tower Pressure	1016.3 mb	1014.5 mb

Jack Parrish