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

FLT ID: 990823N	FM: KMCF	TO: TISX
FLT NO: 99-42	BLK IN: 0224	ATA: 0222
ETD: 1730Z	BLK OUT: 1728	ATD: 1736
ETE: 9	BLK TIME: 8:56 (8.9)	FLT TIME: 8:46 (8.7)
SPONSOR ORG: NHC	PROGRAM: SURVEILLANCE	PURPOSE: TD DVL OF P.A.

OAO PERSONNEL

AC Maxson ✓	SYS ENG Goldstein
CP McCann ✓	DATA SYS Smith —
~~NAV~~ Yates	RADAR
FE	DT/ODW Pradas-Bergnes
RADIO	~~CLD PHYS~~ White ✓
FD Parrish ✓	~~DOPPLER~~ Kitson

PARTICIPATING SCIENTIST/VISITORS/OAO

LAST, FIRST NAME	ACTIVITY ON A/C	AFFILIATION
Goldenberg, S. ✓		
Kaplan, J. ✓		

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

1605 25.3/21.6
2301 10.3
2221 215/7
3100

Hit big updraft near Maxson. Looks like ~17 m/s ↑, 6 m/s ↓.
Big ∇ ↑ in cell - Low 30 dBz.
- Another T ↑ SE of cell near Drop Point 24. W.D.

59

990823N TD? FLIGHT

Time	LAT	LON	TK	WD	WS	GA	PA	TA	TD	PS	
1728	27 [illegible]	82 [illegible]									
1737	24 48	82 54	186	207	8		-9.5	26	19.8		BLOCK Out
173915	27 45	82 26	77	200	2.6	1955	1900	15	13	787	
1801	27 13	79 45	109	175	7.7	10158	9759	-36	-29		
183739	26 00	75 00	93	57	2.4	13101	12549	-62	-58	176	Drop 1 Lake tonight
183934	26 00	74 44	89	20	1.3	13100	12548	-61	-60	176	Drop 1A No winds
185550	26 00	72 30	89	304	4	13097	12542	-60	-60	176	Drop 2 ✓
191355	26 00	70 00	89	199	24	13104	12540	-59	-61	176	Drop 3 ✓
193125	26 00	67 30	89	227	20	13107	12537	-59A	-61.5	176	Drop 4 ✓
194852	25 52	65 00	89	245	19	13116	12534	-59.8	-62	176	Drop 5 No
195030	25 43	64 59	180	250	15	13113	12528	-59	-62	176	Drop 5A Back Up
200820	23 38	65 07	280	235	22						Drop 6 ✓
202343	23 30	67 45	270	194	14	13132	12535	-61.4	-55.3	176	Drop 7 ✓
205026	23 30	70 30	270	185	16	13114	12534	-60.8	-59.6	176	Drop 8 ✓
211114	23 30	73 15	270	178	7.9	13117	12529	-60.7	-60.9	176	Drop 9 ✓
213339	23 14	76 00	180	211	3.6	13706	13112	-66.5	-64.1	160	Drop 10 ✓
214831	21 30	75 51	~	133	6.2	13701	13119	-63.4	-65.8		Drop 11 ✓
220104	21 30	74 15	89	135	7	13712	13114	-64.7	-64.7	160.3	Drop 12 ✓
221456	21 24	72 30	~	153	16	13704	13109	-64	-64	160	Drop 13 ✓
222321	20 28	72 34	~	146	18	13707	13110	-64	-64	160	Drop 14 ✓
223725	19 30	74 02	270	207	8.6	13719	13109	-65	-63	160.4	Drop 15 ✓
225459	19 30	76 15	271	226	3.4	13706	13108	-63.6	-64.8	160.3	Drop 16 ✓
231325	19 22	78 30	90	LAUREN	DETECT						Drop 17 No launch detect
231415	19 14	78 31	186	26	3	14286	13676	-69.3	-66.0	145	Drop 17A ✓
232909	17 30	78 20	~	68	7.6	14289	13675	-68.9	-67.5	145	Drop 18 ✓
234919	17 30	76 00	89	75	9	14303	13673	-68.3	-67.9	145	Drop 19 ✓
001112	17 30	73 15	88.8	117	18	14318	13680	-70	-68	145.5	Drop 20 ✓
003744	17 30	70 38	89	91	14	14323	13680	-70	-67	145	Drop 21 ✓
004732	17 30	68 59	91	49	5.6	14313	13685	-69.7	-67.7	145.4	↑ ↑ ↑
005617	17 40	68 00	~								Drop 22 NO Pressure
005739	17 51	67 59	360	24	7	14316	13683	-69.6	-68.5	145.5	Drop 22A ✓
011548	19 40	68 35	~	15	19	14312	13680	-68.3	-67.1	145.6	Drop 23 ✓
012753	20 30	67 25	58	306	14	14302	13672	-65.8	-55		Drop 24 ✓ Big warning just before drop
014813	20 45	64 59	178	148	7.9	14305	13679	-66.9	-61.7		Drop 25

NOAA/AOC/SED N49RF Flight Performance log

N49RF Project: Hurricane 99 Project No. 430 Flight No. 6 Flight ID: 990823N

SED Crew: Goldstein, Smith, Pradas Mission:

Pre-Flight: 1700 Z Take-Off: 1736 Z Landing: 0220 Z

	SYSTEM			Pre-Flight Check	In-Flight	Post-Flight	
NAV	IRS #1			✓			
	IRS #2			✓			
	IRS #3			✓			
	GPS Honeywell #1			✓			
	GPS Honeywell #2			✓			
	GPS Collins			✓		Off? ☑	
	Nose Radar -Collins			✓		Off? ☑	
		Time	Temp °C	TGOD		Time	Temp °C
TEMP	Temp #1	1711	25.7				
	Temp #2	↓	25.4	↓		↓	
	Temp #3		25.6				
	Temp #4		25.9				
	DP Left		18.0		Cal. Time:		
	DP Right	↓	17.5	↓	Cal. Time:	↓	
PRESS	Attack Angle (ADCAOA)			✓			
	Slip Angle (BPx/DxPx)			✓			
	Differential (PQ1/PQ2)			✓			
	Absolute (PS1/PS2)			1014.8 / 1015.4			
	Check Radome Press. Lines ☑			Date:			
SYSTEMS	DOWN PRT-5 ⇨ Open? ☑			—		Closed? ☑ —	
	MADS (WINDS/DISCWIN)			✓		# DATs: 1	
	MADS Printer ⇨ Paper? ☑			✓		Printer Power off? ☐	
	MADS Cal. Date: —			QC time: 1714		QC time: 0224	
	WINDS ⇨NET BCAST ☑			✓			
	HAPS System / Time set? ☑			HRD		# Msg.: 24 # Fail: 9	
	AVAPS System / Time set? ☑			JAS			
	AVAPS Printer ⇨ Paper? ☑			✓ JAS			
	Exterior Walk Around ☑			✓ JCPB			
	Inspect DropSonde Chute Bolts			✓ JAS			
MISC	Satcom (Flight Phone) ☑			✓		Off CB? ☑ —	
	Call COMSAT? ☑ (*292#)			✓			
	FCU/UPS/CB			CB's Checked? ☑		UPS off? ☑	
	AVAPS Sondes			# On Board: 150	# Dropped: 29	# Good: 25	
	AXBT			# On Board: —	# Dropped: —	# Good: —	
	APN-232			✓			
	Modem Power On? ☑			✓			

1	DAT Tape #1	On: 1710	Type: V60	Off: 0226
2	DAT Tape #2	On:	Type:	Off:

Comments: DBD2 Test @ 0151

05/25/99 JCPB

Please Note Any Discrepancies

Item No.	Zulu Time	Problem Description & Observations	Initials
1	0100	T+2 Probe read about 20° C less than the rest	
2	0951	DBP2 read 50.1 mbar, incorrect reading	

N49RF Hurricane 99 / AVAPS DropSonde Log

N49RF Project: HURRICANE 99 Flight ID: 990823N

Mission: PRE-DENNIS INVEST Flight #: _____ System Status: OK

Drop #	Sonde Serial Number	Chn. #	Time (Zulu)	Press. offset	Winds time	Operator Initials	Comments / Drop Status/ Failure Reason	GOOD ☑
1	983 620 568	5/1	1837	0.3	120	JCPB	LATE WINDS	✓
2	984 325 387	6	1839	0.6	∅	JCPB	NO WINDS (OE)	B
3	984 325 208	7/3	1856	0.0	28	JCPB		✓
4	985 035 228	8/4	1914	0.0	48	JCPB		✓
5	983 620 576	5/1	1931	0.0	37	JCPB		✓
6	985 035 224	6/2	1948	0.0	—	JCPB	NO WINDS	B
7	984 715 369	7/3	1950	0.0	42	JCPB		✓
8	984 715 170	8/4	2008	0.4	35	JCPB		✓
9	985 035 013	5/1	2029	0.5	25	JCPB		✓
10	984 715 366	6/2	2050	0.5	50	JCPB		✓
11	984 715 019	7/3	2111	0.0	34	JCPB		✓
12	983 620 690	8/4	2133	0.5	23	JCPB		✓
13	984 325 198	5/1	2148	0.4	24	JCPB		✓
14	984 715 016	6/2	2201	0.5	15	JCPB		✓
15	984 715 171	7/3	2214	0.4	27	JCPB		✓
16	984 715 172	8/4	2223	0.4	28	JCPB		✓
17	983 410 143	5/1	2237	0.8	23	JCPB		✓
18	983 840 549	6/2	2255	0.9	23	JCPB	INTERFERENCE	✓
19	983 840 548	3	2313	1.0	—	JAS	NO LAUNCH DETECT	B
20	983 620 726	7	2314	.5	26	JCPB		✓
21	984 715 372	4	2329	0.4	18	JAS		✓
22	983 310 087	1	2349	0.7	19	ASG		✓
23	985 035 052	2	0011	.7	27	ASG		✓
24	984 325 299	3	0033	.3	34	ASG		✓
25	990 148 021	4	0056	.7	30	ASG	NO PRES	B
26	985 035 226	5	0057	.4	18	JAS		✓
27	983 620 600	1	0115	.5	14	ASG		✓
28	983 310 005	2	0127	.7	23	ASG		✓
29	985 035 276	3	0149	.4	16	ASG		✓
30								
31								
32								
33								

* GPS Warmup Message missing

To: M@H@C[John.Kaplan@noaa.gov]
From: Jack R. Parrish@AOC1@NOAA
Cc:
Subject: Warm G-IV Temps
Attachment:
Date: 10/5/99 3:56 PM

Hi, John,

I had a long discussion this morning with Richard McNamara, our Cal Lab instrument expert, about the G-IV temperatures measured in pre-Dennis. He feels that the extreme examples (increases of about +30C) are likely instrument problems, rather than meteorological events. Some of the more modest rises, 5-10C, stand a better chance of being real.

In both cases, the sensors that indicated the extreme rises were unsealed fast-response Rosemount probes, which are much more likely to measure rapidly changing conditions, but are also more susceptible to wet-bulbing and excessive probe heating in the event of wetting of the probe. When I told him I doubted much water was around at -60C, he mentioned sublimation could cause the same problem.

If he's right, it's worrysome that the instrument(s) feeding temperature into the Flight Management System seem to also indicate these largest temperature departures as well. He is presently investigating exactly what probe(s) feed into the flight system, and what parameters are input into Indicated Air Speed. I will contact representatives at Gulfstream, Honeywell (FMS designer), and Rosemount to seek comparable results in test flight or instrument test conditions. If this is an instrument problem (and it is still 'if'), we need to brief the pilots on what it is and when to expect it. I'll keep you informed.

The one thing you all might do while I'm chasing it this way is to find out where good comparison IR imagery is archived, and get the best high-resolution images there are for the place and time we encountered the wierd weather (big updraft - 1814Z on 23 August, near Nassau, and the larger scale blowoff from the Dennis convection, about 0125Z on 24 August, north of the Mona Passage between Hispaniola and Puerto Rico).

It will take me awhile to hunt down the engineers I need from our contractors. Thanks for your patience, this is important (even if it turns out to not be meteorologically exciting), as it may allow us to work more within the outflow regions.

Talk with you soon,

Jack

To: M@H@C[<John.Kaplan@noaa.gov>]
From: Jack R. Parrish@AOC1@NOAA
Cc:
Subject: Re: Temperature anomalies in Pre-Dennis
Attachment: BEYOND.RTF
Date: 9/29/99 8:15 AM

Hi, John,

I really appreciate the time y'all have put into discussing these temps we measured in pre-Dennis. I completely agree with your task list, to which I will add some feedback from the pilots/technicians who understand the FMS (Flight Management System) that is the processor between sensors reserved for flight critical functions and the flight controls. These instrument readings are not recorded except in the short term (black box), and are unfortunately overwritten on the next flight, so at best their findings must be anecdotal.

Richard McNamara in our Cal Lab will hopefully help shed some light on what to believe/not believe in comparisons of temp sensors (I will provide him plots and data if he wants). We typically process our jet data in Net/CDF format on a DAT...are you able to work with it?

It will take me a week or two to gather the necessary AOC people's input from the four winds, and to crunch the data.

Thanks again, John, and it was a pleasure to fly high with you guys this season.

Jack

From: "John Kaplan" <John.Kaplan@noaa.gov>, on 9/27/99 2:34 PM:

Jack:

Last week Rob Rogers and I had a meeting to discuss the large temperature increases that were detected by some of the G-IV sensors during our 990823 G-IV flight around the disturbance which later became Hurricane Dennis. After our discussion ended, Rob and I came up with a list of tasks that we feel need to be completed before we can ultimately decide if a study on this topic is both worthwhile and possible. Since you will obviously be an integral part of this study, we compiled a list of tasks which we hoped that you can help us complete.

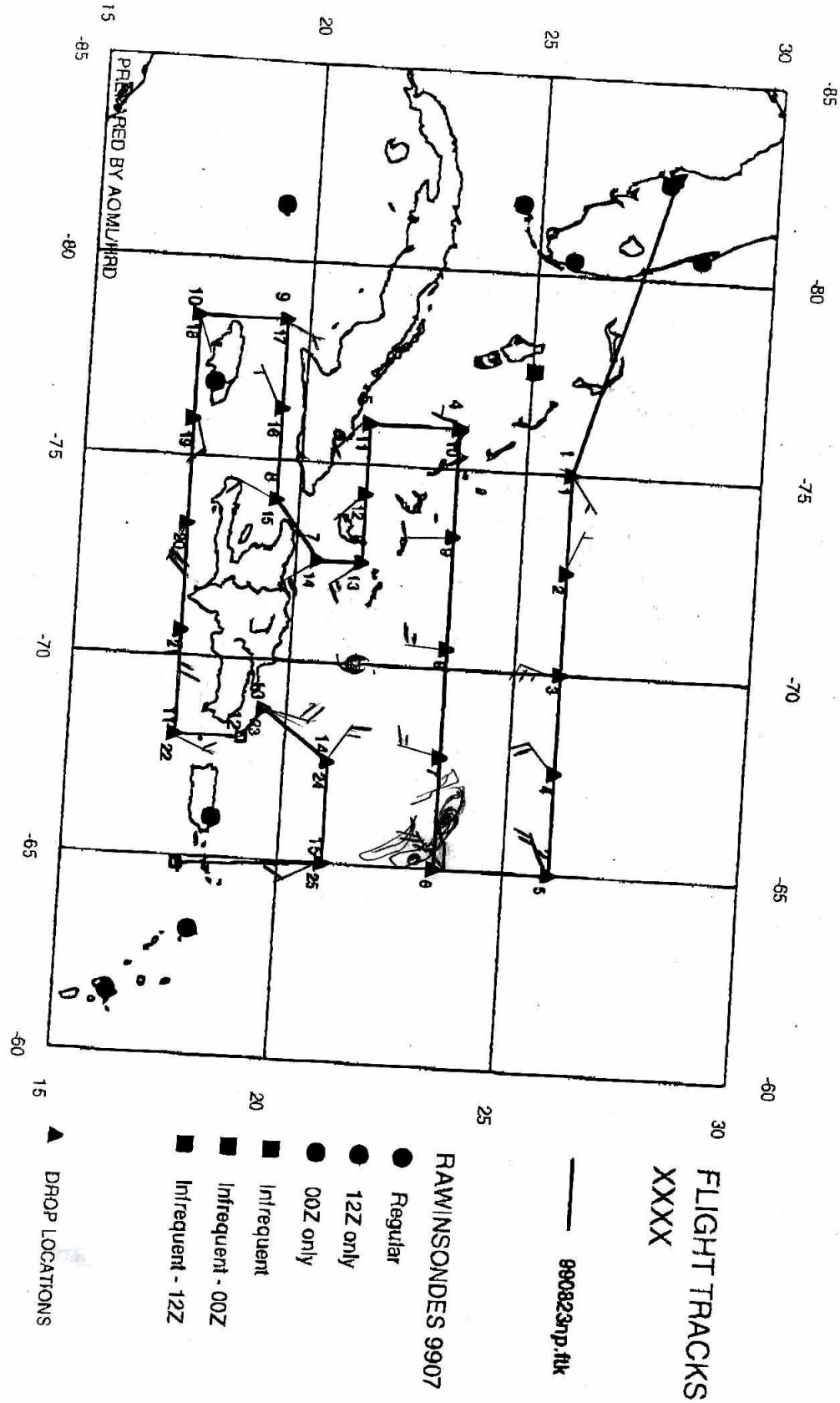
1. Could you speak to the engineers that understand how the G-IV temperature sensors work and ask them if they have an explanation for why the sensors apparently detected vastly different temperatures during these two events. Moreover, do they think that the large temperatures rises recorded by some of the sensors are real?

If the answers that you receive from the engineers suggest that the large temperature increases measured on board the G-IV were probably real and were not due to instrument problems of some kind or another could you:

2) provide the flight level data for the time periods that coincide with the 2 warm events that were detected by some of the G-IV sensors. I am not sure what type of flight-level data is archived for the G-IV, but I would think that the parameters that we be the most useful would be lat, lon, pressure, temperature, dewpoint, wind direction, and wind speed.

Since Sim, Mike, and Stan have all expressed some interest in working on this topic as well, the make-up of the group from HRD that will ultimately collaborate with you on this research is yet to be determined. However, I think that the tasks outlined above are a good starting point for whatever group is formed.

John


PREPARED BY AOML/HRD
15
20
25
30
-85
-80
-75
-70
-65
-60
FLIGHT TRACKS
XXXX
990823np.ftk
RAW/NSONDES 9907
Regular
12Z only
00Z only
Infrequent
Infrequent - 00Z
Infrequent - 12Z
DROP LOCATIONS

HURRICANE SYNOPTIC SURVEILLANCE MISSION PLAN: XXXX

Prepared by the Hurricane Research Division at 12:01:56 PM on 08/22/99.
File: 990823np.ftk

Aircraft: N49RF Altitude: FL410-450 Proposed takeoff: 23/1730Z

TRACK DISTANCE TABLE

#	LAT (d m)	LON (d/m)	RAD/AZM (nm/dg)	LEG (nm)	TOTAL (nm)	TIME (h:mm)
0	MACDILL					
1	26 00	75 00		0.	0.	0:00
2	26 00	65 00		418.	418.	1:07
3	23 30	65 00		540.	958.	2:20
4	23 30	76 00		150.	1108.	2:40
5	21 30	76 00		606.	1715.	4:03
6	21 30	72 30		120.	1835.	4:19
7	20 30	72 30		196.	2031.	4:46
8	19 30	74 00		60.	2091.	4:54
9	19 30	78 30		104.	2195.	5:08
10	17 30	78 30		255.	2449.	5:43
11	17 30	68 00		120.	2570.	5:59
12	19 00	68 00		602.	3172.	7:21
13	19 30	68 45		90.	3262.	7:33
14	21 00	67 30		52.	3314.	7:40
15	21 00	65 00		114.	3428.	7:55
16	ST CROIX			140.	3569.	8:14
				199.	3767.	8:51

HURRICANE SYNOPTIC SURVEILLANCE MISSION PLAN: XXXX

Prepared by the Hurricane Research Division at 12:01:56 PM on 08/22/99.
File: 990823np.ftk

Aircraft: N49RF Altitude: FL410-450 Proposed takeoff: 23/1730Z

DROP LOCATIONS

#	LAT (d m)	LON (d m)	RAD/AZM (nm/dg)	TIME (h:mm)	
1	26 00	75 00		1:07	1843
2	26 00	72 30		1:25	
3	26 00	70 00		1:43	
4	26 00	67 30		2:02	
5	26 00	65 00		2:20	
6	23 30	65 00		2:40	
7	23 30	67 45		3:01	1730
8	23 30	70 30		3:22	
9	23 30	73 15		3:42	2112
10	23 30	76 00		4:03	2133
11	21 30	76 00		4:19	2149
12	21 30	74 15		4:32	
13	21 30	72 30		4:46	
14	20 30	72 30		4:54	
15	19 30	74 00		5:08	
16	19 30	76 15		5:25	
17	19 30	78 30		5:43	
18	17 30	78 30		5:59	2329
19	17 30	75 53		6:19	
20	17 30	73 15		6:40	
21	17 30	70 38		7:00	
22	17 30	68 00		7:21	
23	19 30	68 45		7:40	
24	21 00	67 30		7:55	
25	21 00	65 00		8:14	0144