

U.S. Dept. of Commerce / NMAO / NOAA / Aircraft Operations Center			
Flt ID: 050722N	From: KMCF	To: KMCF	
Flt. No: 05-113	Blk In: 0001 z	Time On: 2353 z	
ETD: 18 z	Blk Out: 1750 z	Time Off: 1833 z	
ETE: 5 + 30	Blk Time: 6 + 11 (6.2) Hrs	Flt Time: 5 20 + (5.3) Hrs	
Sponsoring Org: ONC/NOCP	Program: CDO Mapping #2	Purpose: T.S. Franklin	

Aircraft Commander: <i>Finke</i>	Data System: <i>Carpenter</i>
Co-Pilot: <i>Finn</i> / <i>Hagan</i>	AVAPS: <i>Tony</i>
Navigator: /	System Eng:
Flight Eng: /	AA <i>Kozak</i>
Flight Director: <i>Berrish</i> /	AA <i>Trey</i>
Avionics:	Crew Chief:

[illegible]

(See reverse for additional remarks)

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Flight ID:		Time Off: Z		Time On: Z	
A/C - Takeoff		Wx Station - Takeoff		A/C - Land	
Wx Station - Land		A/C - Land		Wx Station - Land	
Pressure		mb		mb	
mb		mb		mb	
ATIS		Time		Observation	
Takeoff		Z			
Land		Z			
		Number		Data Disposition / Date / Quality	
Flight Level Tapes					
Radar Tapes					
Cloud Physics Tapes / CDs					
Video Tapes					
Dropsondes		Good: Bad:			
AXBT					
AXCP					
AXCTD					

Remarks:

Tropical Storm Franklin CDO-Mapping mission report – 7/22/2005

Jack Parrish, Flight Director

The NOAA G-IV crew, with Dr. John Gamache serving as HRD investigator and observer, chose to fly a Central Dense Overcast (CDO) mission on TS Franklin after being cancelled from NHC Surveillance tasking that morning, as the storm approached the NE Bahamas on July 22, 2005. It was the second CDO mission flown in the 2005 hurricane season, following a CDO-mapping mission on TS Emily on July 13, 2005. Emails between Dr. Frank Marks (HRD director), and Naomi Surgi (NCEP WRF data coordinator) from the day before indicated that they wanted us to consider making some dropwindsonde measurements during the future CDO missions, so we planned accordingly for up to 13 drops.

During planning, information from the National Hurricane Center (NHC) and reconnaissance aircraft indicated that Franklin was a moderate tropical storm, with surface pressure reported as 1007 millibars, changing little with time, and maximum surface winds estimated as about 55 knots. The surface wind maxima were generally reported from 20-40 miles from the surface center. Cloud-top temperatures near the storm's center were in the mid-minus 70's (C), with no convective cores reaching the -80's. For reference, typical G-IV altitude temperature is -65C to -69C. Before take-off it appeared that the coldest cloud tops and possibly greatest region of convection would be east of the center, but our plan was to obtain satellite images frequently during the mission to track the highest cloud tops.

During flight briefing, there was discussion from the union representative about the mission, and the result was that one of the G-IV crew members chose not to accompany the mission. We flew with the two remaining SED technicians. The crew was aircraft commander CAPT Mark Finke, pilot CDR Michele Finn, pilot LCDR Jeff Hagan, flight director Jack Parrish, electronics technicians Dale Carpenter and Ray Tong, HRD Scientist John Gamache, and observers CAPT Steve Kozak and CDR Bruce Topey.

Shortly after block out, we experienced a DAT-drive failure, and replacing the unit caused a one-half hour delay. Once repaired take-off and climb to altitude was normal. The TS Franklin flight pattern was promulgated by Dr. Gamache in two parts, the first being a square-wave north to south survey pattern (drawn for tropical cloud clusters with hard-to-find centers), followed by a single Figure-4 pattern centered on the reported storm center. Going into the square-wave pattern, we anticipated that the pattern had been drawn a little too far to the west to perfectly cover the entire CDO, and this was the case in execution, although we probably covered about 80%, and were in the clear over the CDO on the east side. About half the time in the survey pattern we were in cloud, with cloud tops between just above the aircraft to perhaps 5,000 feet above us. Occasional light chop was experienced, more often in cloud than in the clear. While we were able to pick out convective rain bands with the nose radar well below the aircraft, no cells with reflectivity greater than 21 dBz (minimum detectable signal on the display) were encountered at flight level on July 22nd. By comparing the recent satellite images from the on-board Internet with the planned flight track, it became obvious that on the

third leg of the square-wave pattern we would be very near the storm's surface center about 2/3 of the way down the track. We were vigilant to both possible "eyewall-type" thunderstorms and to a visual surface center on this leg, but it was all about the same across the storm's top, in the clouds with poor visibility and no radar targets. However, the smooth ride made for more confidence in planning the flight's second part, the figure-4 pattern.

By the time we were on the last west to east leg of the square-wave pattern, communication with the NHC gave us a new storm center estimate, about which to base the figure-4 pattern. Additionally, Dr. Gamache wanted dropsondes launched at 60 miles from the center, 15 miles in the center, 15 out from the center, and 60 miles out. These center, turn and drop points were coordinated between the flight director and flight crew (using the FMS to generate the drop points), and we made the five drops as planned on a straight leg from SE to NW of the storm's center. Again at the center, little was seen visually, although some curvature imaged on the radar while sweeping well below the aircraft gave us the strongest clues available locally as to the location of the storm center. After flying west to end well north of the center, the flight's last leg was NE to SW, again across the storm center, with 4 drops, two on each side of the center. Data from the dropsondes indicated that, while we had moved the initial pattern a little east of where initially planned, it needed to be moved even farther east to truly capture the surface center. Between poor indication using flight level winds, poor radar organization, and not-accurate-enough center positioning from satellite imagery and position estimates given to us from up-to-date calls to the NHC, this further confirms our expectation that making exact surface center measurements from 45,000 feet is exceedingly difficult, especially in weak, disorganized tropical systems.

Other than some data transmission glitches from a couple of the dropsondes from AVAPS up to the HAPS station, all systems worked optimally on this mission, and what we saw visually backed up well what we saw on the nose radar. In this particular case, we made no course diversions from those planned due to weather hazards ahead of the aircraft.

N49RF AVAPS DropSonde Log

N49RF Project: HURR 05

Flight ID 0507 21/2 n

Mission: T.S. FRANKLIN
000

Flight #: 1

Launcher S/N: 002

Status: Sys 1 ☒

Sys 2 ☒

Drop #	Sonde Serial Number	Chn. #	Time (Zulu)	Press. offset	Winds time	Operator Initials	Comments / Drop Status / Failure Reason	GOOD <input checked="" type="checkbox"/>
1	042 115 110	1	1907	0	22	RT	050721N	✓
2	034 113 081	1	1932	-1.4	24		050722N	✓
3	034 113 022	1	2128	-1.4	42			✓
4	034 135 029	2	2146	-1.4	22			✓
5	042 115 120	1	2202	-1.3	24			✓
6	034 135 057	2	2209	-1.0	46			✓
7	073 615 070	3	2210	0	42			✓
8	034 323 174	4	2213	-2.2	25			✓
9	034 135 036	4	2219	-1.0	18			✓
10	034 323 175	1	2246	-4.7	22			✓
11	034 323 182	2	2252	-1.2	23			✓
12	034 325 139	3	2250	-1.9	—		REAL LATE WINDS	✓
13	034 325 136	4	2301	-1.8	30			✓
14								
15								
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① TTUA $26^{\circ}48'N$ $75^{\circ}25'W$

② 60 miles from CTR1 $27^{\circ}16'N$ $75^{\circ}55.3'W$

③ 15 miles from CTR1 ^{$27^{\circ}49'N$} ~~$28^{\circ}N$~~ ^{$76^{\circ}30'W$} ~~$76^{\circ}42'W$~~

④ CTR1 $28^{\circ}N$ $76^{\circ}42'W$

⑤ 15 miles ↓ $28^{\circ}10.8'N$ $76^{\circ}53.9'W$

⑥ 60 miles $28^{\circ}48.6'N$ $77^{\circ}36'W$

60
15
6
15
60

360/

222
28.0N
76.7

Center 1
28 00N
76 42W

(11A) 26 48
75 25W

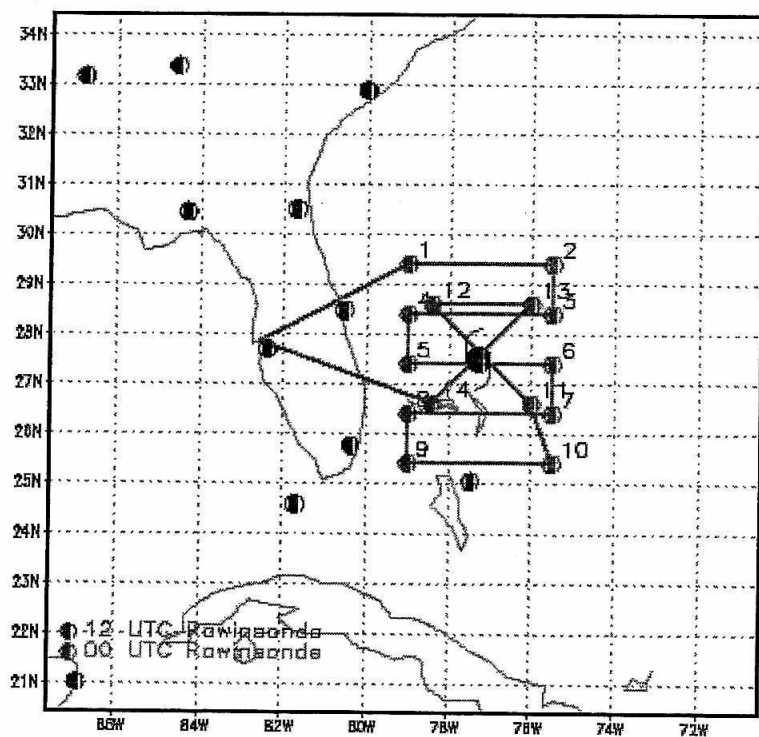
(12A) 29 10N
78 00W

(13) 29 17N
75 20W

(14) 26 54N
78 00W

Center 2
28 10N
76 42W

60
15



1577

GRADE COLLECTOR

2005-07-22-08:44

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HURRICANE CDO-MAPPING MISSION PLAN: FRANKLIN

Prepared by the Hurricane Research Division File: current1.ftk

Aircraft: N49RF Altitude: FL410-450 Proposed takeoff: 22/1800Z

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TRACK DISTANCE TABLE

#	LAT (d m)	LON (d/m)	RAD/AZM (nm/dg)	LEG (nm)	TOTAL (nm)	TIME (h:mm)
0	MACDILL			0.	0.	0:00
1	29 24	79 00		208.	208.	0:38
2	29 24	75 30		183.	391.	1:03
3	28 24	75 30		60.	451.	1:11
4	28 24	79 00		185.	636.	1:36
5	27 24	79 00		60.	696.	1:45
6	27 24	75 30		187.	883.	2:10
7	26 24	75 30		60.	943.	2:18
8	26 24	79 00		188.	1132.	2:44
9	25 24	79 00		60.	1192.	2:52
10	25 24	75 30		190.	1382.	3:18
11	26 36	76 00		77.	1459.	3:28
12	28 36	78 24		175.	1634.	3:52
13	28 36	76 00		127.	1761.	4:09
14	26 36	78 24		175.	1936.	4:33
15	MACDILL			233.	2169.	5:14