

**Mission Summary**  
**Hurricane Dennis**  
**Winds Near Landfall**  
**990830H Aircraft: N42RF**

**Scientific Crew:**

Chief Scientists: Sam Houston, Peter Dodge  
Cloud Physics: Sim Aberson  
  
Radar: Frank Marks, Peter Dodge  
Workstation: Paul Leighton  
Dropwindsonde: Mike Black , Chris Landsea  
AXBT: Sim Aberson

**Aircraft Crew:**

Pilots: CAPT Dave Tennesen, CDR Phil Kenul  
Flight Engineer: Greg Bast, Mark Rogers  
Navigator: LT Carl Newman  
Flight Director: Stan Czyzyk  
Engineers: John Hill, Sean McMillan, Chris Hornbrook

*Mission Briefing:*

Initial planning for a Winds Near Landfall mission into Dennis began prior to its closest approach to the coast, because there was a chance that the hurricane might make landfall south of the Carolinas. It later became evident that Dennis would approach the southeast North Carolina coastline (the fourth hurricane to do so since 1996). As is typical for advanced planning of nearly all landfall missions, the estimate of the time and location of Dennis' closest approach to the coast was very difficult. Dennis began to speed up and turn away from the coast early on 30 August 1999. HRD decided to fly the experiment that morning because ground-based teams from Texas Tech, Clemson University, and the University of Oklahoma had deployed 10 m meteorological towers and mesonets to study the wind field of the storm (Table 1). Flight tracks were designed to provide flight-level winds for HRD's real-time surface wind analysis system (Fig. 1). The primary data for this analysis would have been provided from the flight-level winds in the initial figure 4, which was to be flown at 8000'. In addition, GPS dropwindsondes were to provide near surface data in the core (especially the eyewall to the right of Dennis' forward motion). GPS drops were also planned along and near the coast in the vicinity of the tower sites and NDBC buoys and C-MAN's. High-resolution time-series of surface data were from the CLKN7 site by NDBC and ASOS sites in eastern North Carolina by the ASOS program office and the National Climatic Data Center.

*Mission Synopsis:*

The take off time for N42RF from MacDill AFB was 1750 UTC and the ferry to the IP was slightly more than 1.5 hours. Unfortunately, shortly after take off the crew noted problems with the hydraulic system aboard the aircraft. Despite their best efforts at repairing the problem in flight, the decision was made to abort the mission just as the plane began to fly toward turning point 2 (Fig. 1). The plane returned safely to MacDill and landed around 2131 UTC.

*Evaluation:*

The HRD Winds at Landfall mission into Dennis was aborted. However, data from U.S. Air Force reconnaissance aircraft, GPS-dropwindsondes, the Moorehead City WSR-88D, numerous NDBC sites, ASOS sites, and special university tower and mesonet deployments will be

available for evaluation of Dennis' winds during its initial approach to North Carolina (Dennis later made landfall along the North Carolina coast near Cape Lookout on 5 September after slowly meandering at sea for several days).

*Acknowledgments:*

Many thanks to Hugh Willoughby, Peter Black, and Frank Marks for help with mission planning. Peter Dodge and Mike Black assisted with modifications to the flight track that Peter Dodge and I developed the night before the mission was to take place. Special thanks to the crew of N42RF for their diligent efforts to repair the problem in flight. Also, thanks to Stan Czyzyk for working with me in my first time in the role of Lead Project Scientist. It was a good "dry run", and I hope to be ready for the real thing soon. While I was in Miami and Tampa working on this mission, Mark Powell, Shirley Murillo, Eric Uhlhorn, and Mark Croxford were running the HRD surface wind analysis system. I very much appreciate them taking over for me while I was planning and (almost) executing the experiment.

*Problems:*

A full crew was already in place for the mission, so improvement in communication about crew deployments was discussed after the mission. No known problems with data gathered by fixed or special observing platforms in North Carolina were reported at the time of this writing (including the WSR-88D).

Table 1: Locations of University tower deployments

Tower location	Latitude (N) (deg min)	Longitude (W) (deg min)	University
Kure Beach.	34 00	77 54	Clemson
Wrightsville Beach.	34 13	77 48	Clemson
Topsail Beach.	34 23	77 38	Clemson
Beaufort Airport	34 44	76 39	Texas Tech
Atlantic Beach.	34 53	76 21	Texas Tech

Figure 1: Proposed flight-track based on the best estimate of Dennis' position at the expected time of N42RF's initial arrival into the hurricane's core.

Center Lat: 35.00 Lon: -75.00

# Hurricane Dennis NOAA 42 Flight Pattern

