



FRD Activities Report September 2004



Research Programs

Extreme Turbulence (ET) Sphere

Two successful deployments of the ET spheres were carried out in September. On 2-6 September, three spheres were deployed along the East Coast of Florida for Hurricane Frances. Two of these were the new “big-hole” design developed at FRD, and the other was a design developed at ATDD that uses an air pump to back-flush water from the pressure ports. The second deployment took place on 14-17 September for Hurricane Ivan. One big-hole and one back-flushed sphere were deployed just west of Pensacola, Florida (Figure. 1). The eye of Ivan passed very close to these spheres.

Although the data analysis is just beginning, the ET spheres appear to have performed well in both hurricanes. The big-hole spheres in particular appear to continue operating properly even in heavy rain (Fig. 2). Overall, about 2.6 GB of data were collected by the big-hole spheres in Frances, and about 1.9 GB were collected in Ivan. The back-flushed sphere also appears to have worked well in Ivan, although the wind data from this design contain many rain spikes that must be removed in postprocessing. In the preliminary scans of the data, the peak observed wind speed was about 50 m/s (112 mph) from the big-hole sphere deployed in Hurricane Ivan. (Richard Eckman, 208-526-2740, and Tom Strong, FRD; Ron Dobosy and Phil Hall, ATDD)



Figure 1. Tom Strong (left) and Rick Eckman setting a ground anchor for an ET sphere deployed for Hurricane Ivan.

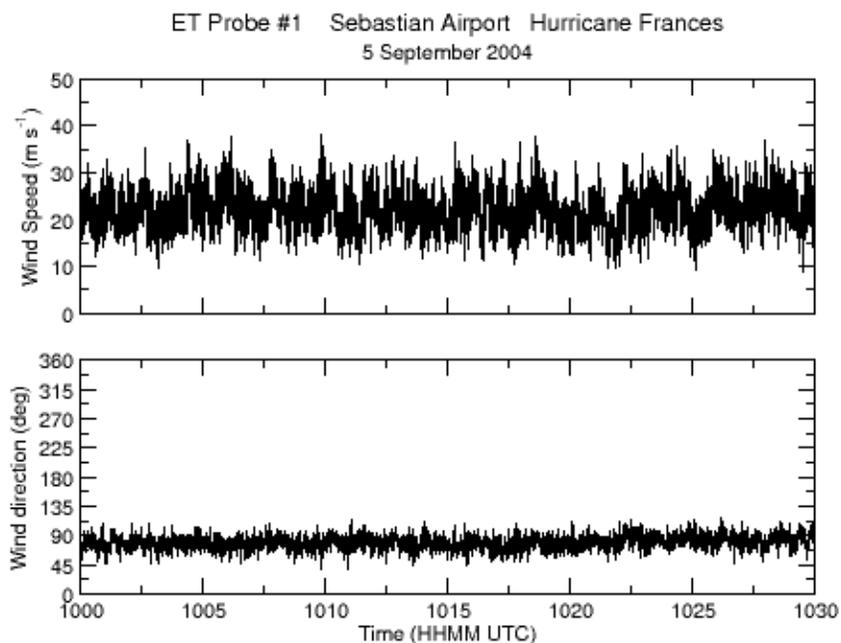


Figure 2. Wind speed and direction from an ET sphere deployed in Sebastian, FL for Hurricane Frances. The data cover a half-hour period, with the maximum observed gust being about 38 m/s (85 mph). The data show no evidence of rain spikes.

New York City Study

Work has begun in preparation for the New York City Study to begin in March 2005. A budget was submitted to the sponsor for 3 field deployments of 3 weeks each. A standard operating procedure (SOP) is being prepared to aid in the training of analysts and serve as a reference guide for the analysis of sulfur hexafluoride (SF_6) by gas chromatography. The instruments are being optimized to shave off any excess analysis time. Purge times, injection lengths, etc. are being tested for the greatest efficiency of analysis. The goal is to analyze and verify the data for all 100 cartridges per test within at least one 10-12 hour day.

Much of this month entailed the ordering and receipt of new upgraded instrumentation for the tracer analysis facility. A new gas divider for making calibration standards in-house was purchased as new columns, gas scrubbers, and other consumables. A new scaler was also purchased to perform wipe tests on the Ni-63 detectors. A new printer/copier/fax/scanner was purchased and set up so that there will no longer be a need to rent a copier when in the field. The old computer monitor was replaced with a flat screen monitor to aid in viewing flexibility as well as being a significant weight and space reduction. A new computer desk was added to make data viewing more flexible. The desk can be used when the analyst is sitting or standing. A wireless link was installed that allows the sampling and analysis history records to be queried

from a remote computer so review of sampling records does not interrupt sample analysis. A number of spare parts have also been received including analog to digital converters, temperature controllers, valves, pressure sensors and others. Upgrades are also being done to the analysis software to fix known bugs and incorporate needed features that should make the analysis process more efficient. (Debbie Lacroix, 208 526-9997, and Roger Carter)

Smart Balloon

With the inclusion of the new ozone sensor from the University of New Hampshire inside the transponder enclosure, it was necessary to modify the design by moving the temperature sensor and replacing the aspirator. A new lightweight, low-power aspirator and radiation shield have been developed to provide very accurate temperature and relative humidity measurements. A new very low power digital temperature and relative humidity sensor will be used to help maintain the necessary small size and keep the weight to just a few grams. Testing of the new aspirator against a Met One aspirator indicates the accuracy to be within 0.2 C. (Randy Johnson, 208 526-2129)

Pentagon Shield

The final SF₆ tracer dissemination data were sent to the sponsor, which completes FRD's obligation. The data have been removed from FRD computers and stored in a secure area, according to the sponsor's requirements. (Kirk Clawson, 208 526-2742 and staff)

Cooperative Research with INEEL

DMCC Assist Visit

The DOE Meteorological Coordinating Council (DMCC) conducted an assist visit on September 8 and 9, reviewing FRD's contribution to DOE-ID's meteorological program. Walt Shalk from DOE-NTS and Carl Mazolla from Shaw Environmental represented the DMCC. They met with FRD staff, the DOE COR, the INEEL Emergency Preparedness manager, and representatives of the State of Idaho INEEL Oversight Program, among others. They inspected mesonet towers, instrumentation, and data handling processes. The initial findings of the visit included three noteworthy practices, which indicates a stellar performance by FRD. The summarized noteworthy practices are: 1) The meteorological program is run very efficiently and all INEEL customers expressed strong satisfaction with FRD, 2) FRD operates a top-notch mesonet data quality assurance plan, and 3) the data recovery for the mesonet exceeds 99%, far above the 95% required by DOE orders. (Kirk Clawson, 208 526-2742 and staff)

Emergency Operations Center (EOC)

Three separate EOC requalification sessions were held this month on the 8th, 15th, and 29th. Six FRD staff participated and were requalified as emergency response operations staff. Thus, three-fourths of the staff have attended the seminar. The remainder will attend the final session next week. The training covered a number of topics including event classification, notifications, log

keeping, usage of communications equipment, and recovery operations. A brief tabletop exercise was held as part of the training.

On September 30, an EOC assessment specialist meeting was attended by Jason Rich. Together the team participated in a table-top drill to foster cooperation among the various subject matter experts in the EOC, including the subject matter of meteorology as provided by FRD. The table-top scenario was centered around a simulated jetliner crash into one of the buildings at INTEC on the INEEL.

INEEL Support

Work is proceeding on the mesonet telemetry upgrade. New radios are being installed along with new Campbell Scientific CR23 data loggers, replacing the older wide-band radios and CR10 data loggers. This upgrade also requires new data acquisition software. The system upgrade should be completed by the end of the year deadline. (Brad Reese, 208 526-5707)

Other Activities

Travel

Rick Eckman and Tom Strong to Melbourne, Florida, September 1-7, to deploy ET spheres into Hurricane Frances.

Rick Eckman and Tom Strong to Tallahassee, Florida, September 13-18, to deploy ET spheres into Hurricane Ivan.

Training

Debbie Lacroix attended a Comprehensive Capillary Gas Chromatography seminar in Salt Lake City, Utah, September 15-17.