



## FRD Activities Report August 2004



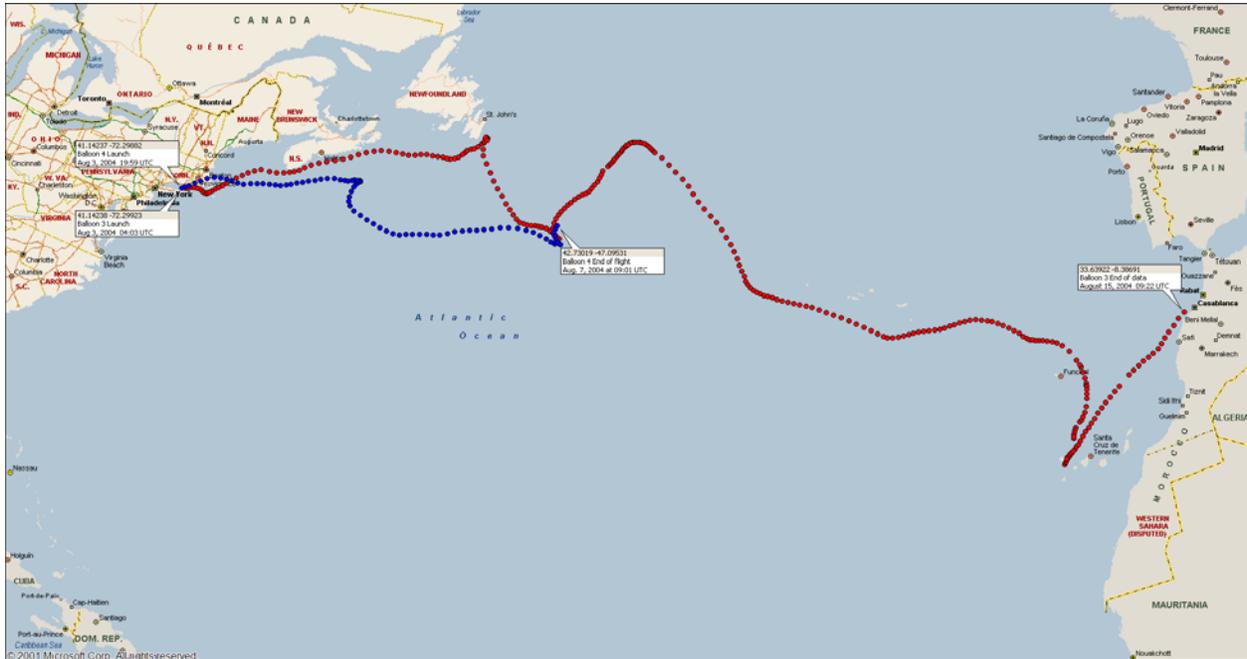
### Research Program

#### *Smart Balloon Sets Distance Record During NEAQS - ITCT*

During the month of July, two Smart Balloons equipped with ozone analyzers (Figure 1) were launched in Lagrangian experiments as a part of the New England Air Quality Study - Intercontinental Transport and Chemical Transformation (NEAQS-ITCT). (See FRD Activities Report of July.) An additional two Smart Balloons were launched in early August. The two balloons each carried a miniaturized atmospheric ozone detector built by the University of New Hampshire (UNH) in addition to the FRD suite of air temperature, relative humidity, pressure, etc. One of these two balloons set what is believed to be both a time aloft and a distance world record for neutrally buoyant scientifically instrumented balloons. Balloon 3 ended its atmospheric research mission after a 12-day journey across the Atlantic Ocean and traveled a total distance of over 5,000 miles (Figure 2). The transatlantic flight marks the first time a low-level balloon has drifted in air masses from one continent to another while continuously measuring ozone and meteorological conditions.



**Figure 1.** Randy Johnson, right, and Steven Businger (Univ. of Hawaii), launch a Smart Balloon from Long Island, NY.



**Figure 2.** Path of Balloon 3 (red) and Balloon 4 (blue).

Balloon 4 traveled a similar path to that of Balloon 3 but its flight was terminated after 85 hours. A leak in the ballast portion of the balloon caused the balloon to use almost all onboard battery power in a vain attempt to maintain altitude. Therefore, the decision was made to ditch the balloon in the ocean while sufficient power remained to do so.

Quoting Dr. Robert Talbot, Chief Scientist of the NOAA funded Atmospheric Investigation, Regional Modeling, Analysis and Prediction (AIRMAP) Cooperative Institute, “Balloon flights were more successful than we ever imagined several months ago during the initial planning stages. It’s not only a question of understanding the intricacy of the chemistry, but the transport as well. These balloon measurements will not only improve our understanding of ozone distribution over the ocean, but will improve our ability to model and forecast it.”

The balloon flights indicate that ozone concentrations over the North Atlantic may be much higher than have previously been thought. It will take additional flights over the Atlantic during the next few years to determine the persistence of the high ozone levels. (Randy Johnson, 208-526-2129, and Shane Beard)

### *ET Sphere*

Hurricane Charley provided the first opportunity to deploy the ET spheres this season when it made landfall in Florida on 13 August. The ET sphere deployments are being coordinated with a hurricane interception team lead by Dr. John Schroeder from Texas Tech University. Unfortunately, the track and intensity forecasts for this storm were relatively inaccurate, and

nearly all land deployment teams were unable to get equipment into position in time. Based on the guidance through 11 August, the TTU team had decided not to deploy for Charley. One day before landfall, TTU attempted a last-minute effort to deploy one tower, but by that time it was too late for us to get the ET spheres into position. Even if the spheres had been in Florida, it is likely they would have been deployed too far north based on the 48-72 hour position forecast. In fact, this is exactly what happened with the single tower deployed by TTU. Just hours before landfall, the official forecast had the storm coming ashore near Tampa, which was more than 100 km to the north of the actual landfall.

A second opportunity for deploying the ET spheres arose late in August, when Hurricane Frances was forecast to make landfall on the East Coast of Florida. Ron Dobosy from ATDD planned to depart Oak Ridge with the equipment van on 1 September, whereas Rick Eckman and Tom Strong from FRD made flight reservations to arrive in Melbourne, FL on the evening of the 1<sup>st</sup>. The plan was to deploy 3 ET spheres along the East Coast of Florida at locations where TTU also was deploying meteorological towers. The deployment was successful and will be reported in next month's report. (Richard.Eckman, 208-526-2740, and Tom Strong, FRD; Ron Dobosy and Dave Senn, ATDD)

### ***Pentagon Shield***

The Pentagon Shield project is rapidly approaching completion. Data processing for the continuous analyzers has been completed. Final output files containing QC flags have been created and carefully reviewed for errors. Notebooks and QC sheets were reviewed and compared with the output files to ensure that the files were made correctly and all problems were flagged correctly. We are now in the process of generating a list of locations for the stationary analyzers and calculating pass numbers for the mobile analyzer. The data will be released as soon as these are completed. (Roger Carter, 208-526-2745)

A description of the PIGS locations for each IOP was generated and reviewed for accuracy. The readme file attachment to include quality assurance/quality control (QA/QC) procedures is being written. Once the readme file is finished, the PIGS data will be ready for distribution. (Debbie Lacroix, 208-526-9997)

## **Cooperative Research with INEL**

### ***Emergency Operations Center (EOC)***

Jason Rich will replace Jeff French on Team A as lead meteorologist. Jeff transferred to ATDD in Oak Ridge, TN, last month. Jason attended an EOC training session on August 2.

FRD personnel participated in a drill at the EOC on August 4. The scenario involved a fire in the North Box Line processing area of the Radioactive Waste Management Complex (RWMC) treatment facility. The fire could not be extinguished with the CO<sub>2</sub> fire suppression system and

the INEEL fire department was called to the scene. Neil Hukari and Roger Carter provided meteorological support and ran models.

### ***INEEL Support***

On 17 August a group from INEEL attended an orientation class on INEELViz and the MDIFF dispersion model. The class included an overview of the INEELViz interface and a brief introduction to basic concepts associated with dispersion modeling. (Brad Reese and Richard Eckman, 208-526-2740)

Many of the sensors at the eddy-correlation flux tower near Grid III were replaced in August. These included the sensors associated with the estimation of soil heat flux, the net radiometer, and the pyranometer. Over time, these sensors had deteriorated to the point that they were providing unreliable results. Testing is under way to determine if the new sensors are working properly. (Richard.Eckman 208-526-2740, Kirk Clawson, and Tom Strong.)

## **Other Activities**

### ***RRT Dispersion Modeling System***

In early August, Ed Dumas from ATDD visited FRD to install a copy of the RRT dispersion modeling system. This ARL system combines the HYSPLIT dispersion model with a display interface based on the ArcView GIS. The system currently uses 12 km Eta model output to drive HYSPLIT, but it would be fairly simple to reconfigure it to use output from the MM5 model run at FRD. (Richard.Eckman, 208-526-2740)

### ***CAMS Reimbursable Module Training***

Paula Fee attended the CAMS Reimbursable Agreement Training August 18-20, 2004 at the Mountain Administrative Support Center (MASC) in Boulder, Colorado. The CAMS Reimbursable Agreement module will allow users to record, monitor, and control activities related to reimbursable agreements, customer orders, and related billing activities.

While in Boulder, Paula took the opportunity to meet with personnel at MASC on August 17-19. She met with personnel in the Human Resources, Procurement, Finance, Real Estate, Security, and Environmental Compliance Divisions to discuss some issues and to introduce herself to some of the new employees. (Paula Fee, 208-526-2329)

### ***Publications***

Clawson, K. L., R. G. Carter, D. J. Lacroix, N. F. Hukari, and K. J. Alwine. 2004. Joint Urban 2003 vertical SF<sub>6</sub> real-time analyzer and time-integrated sampler data characteristics. Fifth Conference on Urban Environment, August 23-26, 2004, Vancouver, British Columbia. American Meteorological Society.

Kniewel, J. C., B. B. Balsley, P. Benda, J. F. Bowers, K. L. Clawson, J. H. Copeland, R. G. Frehlich, M. L. Jensen, S. D. Mayor, R. D. Sharman, S. M. Spuler, D. P. Storwold, S. P. Swerdlin, T. T. Warner, and J. C. Weil. 2004. An overview of the Pentagon Shield 2004 field campaign. Fifth Conference on Urban Environment, August 23-26, 2004, Vancouver, British Columbia. American Meteorological Society.

K. J. Alwine, K. L. Clawson, J. J. Leach, D. Burrows, R. Wayson, J. Flaherty, and E. Allwine. 2004. Urban dispersion processes investigated during the Joint Urban 2003 Study in Oklahoma City. Fifth Conference on Urban Environment, August 23-26, 2004, Vancouver, British Columbia. American Meteorological Society.

### *Visitors*

Ed Dumas, NOAA/ARL/ATDD, Oak Ridge, TN, 3-5 August, to install a copy of the RRT dispersion system.

### *Travel*

Shane Beard to Long Island, NY, June 30-August 7, to launch Smart Balloons in support of NEAQS.

Randy Johnson to Long Island, NY, June 30-August 12, to launch Smart Balloons in support of NEAQS.

Kirk Clawson to Las Vegas, NV, August 2 - 3, to attend ARL and Cooperative Institute for Atmospheric Sciences and Terrestrial Applications (CIASTA) meetings.

Paula Fee to Boulder, CO, August 16 - 20, to attend the CAMS Reimbursable Module Training.

Kirk Clawson to Vancouver, BC, August 22 - 26, to present a paper at the AMS Fifth Conference on the Urban Environment.