Related Links

UNH Institute for the Study of Earth, Oceans, and Space

NOAA

Improved Weather Forecasting: For UNH Scientists, the Answer is Blowin' in the Wind

Contact David Sims
Communication and Information Coordinator
Institute for the Study of Earth, Oceans, and Space
603-862-5369

July 10, 2003

DURHAM, N.H. -- "If you don't like the weather, wait a minute." So goes the saying about fickle, unpredictable Mother Nature. Although weather forecasting has improved greatly thanks to satellites and computer models, the ability to provide accurate, long-term forecasts is hampered by one critical factor: the wind.

Scientists at the University of New Hampshire moved one step closer toward getting the critical wind data when U.S. Senator Judd Gregg (R-NH) announced this month that he had secured $3.2 million in funds from the National Oceanic and Atmospheric Administration (NOAA) for the start-up of a project "BalloonWinds."

Using a helium-filled balloon the size of a football field, BalloonWinds will float a laser up to the edge of the atmosphere, fire it towards Earth, and measure global wind speeds for the balloon mission's eight to 12-hour flight.

BalloonWinds represents the latest, and most critical, stage in a $14 million, multi-year, multiagency project that has been funded by NOAA through Gregg's efforts. It is the last major test before the decision to put the laser technology on Earth-orbiting satellites is made.

In a 1998 report to Congress, NOAA stated that the "most important gap" in making improved one- to five-day forecasts is the absence of wind profile data.

Weather forecasting is based on a very simple concept: if you know where a weather system is now, and you know the speed and direction of the wind, you can tell where that weather system will be at some later time. The more data available, the less the weather models will "drift" and the more accurate the forecast will be.

"The wind is what brings you the weather," says Berrien Moore III of

UNH's Institute for the Study of Earth, Oceans, and Space (EOS). Moore is the chief scientist for the project.

To date, the UNH-led the team has built two ground-based instruments that fire a laser up into the atmosphere. Facilities in Bartlett, N.H., and at the Mauna Loa Observatory in Hawaii have provided proof-of-concept data since 2000 and 2002, respectively.

"In the last three years UNH has produced a system that is providing highly accurate wind readings and using that data to better predict the path of dangerous storms," Gregg said.

For example, using these technologies, it may be possible to accurately narrow the predicted path of a hurricane so that only 100 miles of coastline is evacuated instead of 300 miles.

But before such accurate predictions can be made, the balloon must fly. The targeted launch date is September 2005. With a payload of approximately one ton packed into an Air Force research balloon gondola, it will take the 300 x 200-foot balloon three hours to reach its destined height of 100,000 feet -- a "near-space" encounter.

A balloon of that size contains six million cubic feet of helium. Most of the payload weight will be from a rack of 15 batteries needed to power the instruments and the liquid nitrogen gas used for "thermal management."

The balloon will rise from the sands of New Mexico at 100 degrees up to the upper edges of the atmosphere at -60 degrees.

Moore concludes, "After New Mexico, the next step is space."

Back to UNH News Bureau