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

UNH Chosen by NASA to Evaluate Earth Observing Satellite

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DURHAM, N.H. -- University of New Hampshire scientists are among those chosen to help validate key instrument and spacecraft technologies aboard the National Aeronautics and Space Administration's Earth Observing satellite, the latest launch of NASA's New Millennium Program.

NASA launched the satellite, named EO-1, on Nov. 21 from the Vandenberg Air Force Base in California. Its mission is to take high-resolution images of Earth's forests, urban centers and oceans.

NASA's New Millennium Program is unique in that it tests advanced technologies in space flight, instead of in a laboratory on Earth.

"EO-1 will change the way we do land imaging by demonstrating new lower-cost technologies that will provide images of greater clarity, accuracy and detail than previously available," says Mary Martin, research assistant professor in the Complex Systems Research Center of UNH's Institute for the Study of Earth, Oceans, and Space.

Martin, along with Marie-Louise Smith, a research ecologist with the Northeastern Research Station of the U.S. Forest Service, were chosen by NASA to evaluate EO-1's Hyperspectral Imager (Hyperion) and its ability to provide accurate image data on forest composition and growth. The focal point of their research is the White Mountain National Forest.

The EO-1 Mission will fly three advanced land-imaging instruments: Hyperion, the Advanced Land Imager and the Atmospheric Corrector. If successful, these instruments will enable future missions to more accurately classify and map land utilization globally.

Earth observing satellites like EO-1 use electronic sensors to measure reflected light, or radiances. A satellite usually has several sensors sensitive to different wavelengths, or bands, of light, allowing the satellite to detect different colors.

Images obtained by remote sensing satellites enable scientists to better analyze such things as crop and forest health, as well as track natural disasters like floods and fires and their impact on the environment.

"Our work has focused on the use of remote sensing data to determine forest health and productivity, as well as to classify different species," says Martin. "This work has utilized data from NASA's Airborne Visible/Infrared Imaging spectrometer (AVIRIS), which is flown on a high altitude airplane."

NASA's most prolific Earth observing satellite, Landsat 7, can map large areas of land but in images of only seven color bands. Hyperion can image a 7.5 kilometer by 100 kilometer land area per image and provide detailed mapping across 220 spectral color bands.

EO-1 will follow Landsat 7's orbit and collect identical images for later comparison on the ground. Comparison of these "paired images" will be one means to evaluate EO-1's land-imaging instruments.

"We'll be comparing the Hyperion data with data we have from Landsat 7 and AVIRIS, as well as extensive field data collections," says Martin. "Reflected light measured by remote sensing satellites tells us about foliar chemistry, but field measurements must also be taken to validate the data and determine its relationship to such things as species diversity and forest growth."

Smith adds that the goal is to be able to have accurate satellite data that will help scientists better track changes in forests which may be caused by natural growth, pollution, or climate change.

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