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**UC Merced senses need for accurate snow depth**

Down-to-earth NASA provides wireless pods to aid water managers

By ROSALIO AHUMADAMERCED SUN-STAR  
Last Updated: May 12, 2005, 05:39:51 AM PDT

MERCED — Using NASA technology, university researchers are working on a system to get more accurate measurements of Sierra Nevada snowfall — in order to help Central Valley communities make better decisions about water use.

To collect the data, University of California at Merced scientists are using networks of wireless sensor pods the size of grapefruits, but as technologically sophisticated as an iPod.

For water authorities, the data could tell with accuracy if the region is in for a relatively dry season, in which case conservation would be in order, or if people will be able to do as they like when watering lawns and washing cars.

The National Aeronautics and Space Administration is developing these sensor webs for planetary exploration. But NASA's Jet Propulsion Laboratory in Pasadena loaned 10 sensor pods to UC Merced in January, said Roger Bales, a professor in the School of Engineering.

"Decision makers need accurate measurements to plan for water deliveries," he said. "If you depend on water from the mountains, you want to know how much you're getting."

For example, when news organizations report 2 feet of new snow, the measurements can be 20 percent to 30 percent off the mark, Bales said.

"The measuring tools they use now are based on technology from several decades ago," he said.

Existing tools accurately measure the amount of snow at any given point in time, Bales said, but sensor webs can make continuous measurements over an entire area to get more precise measurements for hydrologic and climate studies.

A sensor web comprises wireless pods designed to adapt to changing environmental conditions. For example, Bales and postdoctoral researcher Bob Rice are using a sensor web to record a set of snow properties in the Merced River basin in Yosemite National Park.

Rice said the sensors provide a versatile way to make measurements at different locations in rugged terrain.

Before going wireless, he said, researchers had been restricted in where they could place sensors.

The UC Merced sensor pods arrived well into the 2004-05 winter, so their deployment came late in the season. Bales said he hopes to have 100 wireless pods in the Sierra Nevada in the next two years.



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The Jet Propulsion Laboratory contacted Bales and Rice in an effort to find new earthbound applications for the NASA technology.

Rice said he and Bales will provide information to the laboratory to help develop the next generation of sensor webs.

Bales said earthbound work will help NASA learn if the sensors can withstand long-term deployment in extreme temperatures, like the surface of Mars.

"(The Jet Propulsion Laboratory) is interested in the technology," Bales said. "We're interested in the science."

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