

Fort Hays radar monitors solar flares

With the biggest solar flares in six years making news and causing concern around the globe, a facility at Fort Hays State University is paying dividends.

That is the SuperDARN radar arrays on Fort Hays State grounds southwest of Hays. "Essentially," said Dr. John Heinrichs, chair of the university's department of geosciences, "it's a Doppler weather radar that looks at the highest levels of the atmosphere."

In an interview Thursday, Heinrichs was monitoring data in real time from the effects of the solar winds on the ionosphere.

"In fact," he said, "I'm looking right now at the SuperDARN plots and we can see where the effects are strongest." Thursday morning, that was north of Alaska, where there was a strong "anti-cyclonic rotation" (clockwise) in the ionosphere over Alaska and a strong counterclockwise rotation over Iceland.

"Our location was chosen because we are right in the middle of the United States," monitoring the upper atmosphere from Alaska to Iceland.

"It turns out that the places showing the most activity today are right in the beam field of the Fort Hays State radar," he said.

The Fort Hays State antennas were constructed in 2009 and 2010 on a site at the northeast corner of the intersection of Golf Course Road and 210th Ave. Each of the two low-power, high-frequency radars has a total of two dozen 56-foot poles that support wire antennas over 42-foot gaps. The Fort Hays radar facility is funded as part of a National Science Foundation program called MSI, or Mid-Sized Infrastructure.

The Fort Hays installation was part of a \$6 million Science Foundation grant to build pairs of new radars at sites in Kansas, Oregon, Alaska and the Azores. The overall project is a collaboration involving Virginia Tech, Blacksburg, Va., as the lead institution; Dartmouth College, Hanover, N.H.; the University of Alaska, Fairbanks; and the Johns Hopkins University Applied Physics Laboratory, Laurel, Md. Fort Hays' involvement is through the departments of geosciences and physics.

"These solar flares are like a big pulse of electrons and protons that are shot at the earth," said Heinrichs. "They actually cause the ionosphere to move — they cause weather in the ionosphere, like we have down here."

Looking at the data Friday morning, Heinrichs said, he was seeing in real time indications that the ionosphere was, in places, moving as fast as 2,000 meters, or roughly half a mile, per second.

"I haven't seen movement this fast since we've been receiving data," he said. "Ordinarily, velocities would be half that or a little less."

He said that the impact on the earth of these most recent flares has turned out to be a little less than was expected. "It's a little bit weaker than people thought it would be," he said.

At a "K rating" of 5, this is not the strongest possible storm, said Heinrichs. In storms with an intensity of 9, he said, "We would be able to see auroras here in Kansas. But with 5, the best viewing might be only as far south as Minnesota or Michigan."

"Fort Hays State is definitely contributing to a major international effort to monitor the effects of these storms," he said. "And the fact is we can get real time data now. We can actually watch as it happens. So we're having a direct effect in the study of these storms and their effects on earth."

Earth's magnetic fields protect the planet's surface from getting direct impact, but they do cause damage to electronics, to satellites, to communications and air travel.

"There are cases on record that such storms caused such a load on telegraph lines that telegraph keys would melt and cause fires," he said.

Another benefit to Fort Hays is for academics. The university has a student intern to maintain the site, and the Department of Geosciences and the Department of Physics has access to real-time data and pictures to use in class.

"When we teach a class that's about the atmosphere, we can use this data," he said.

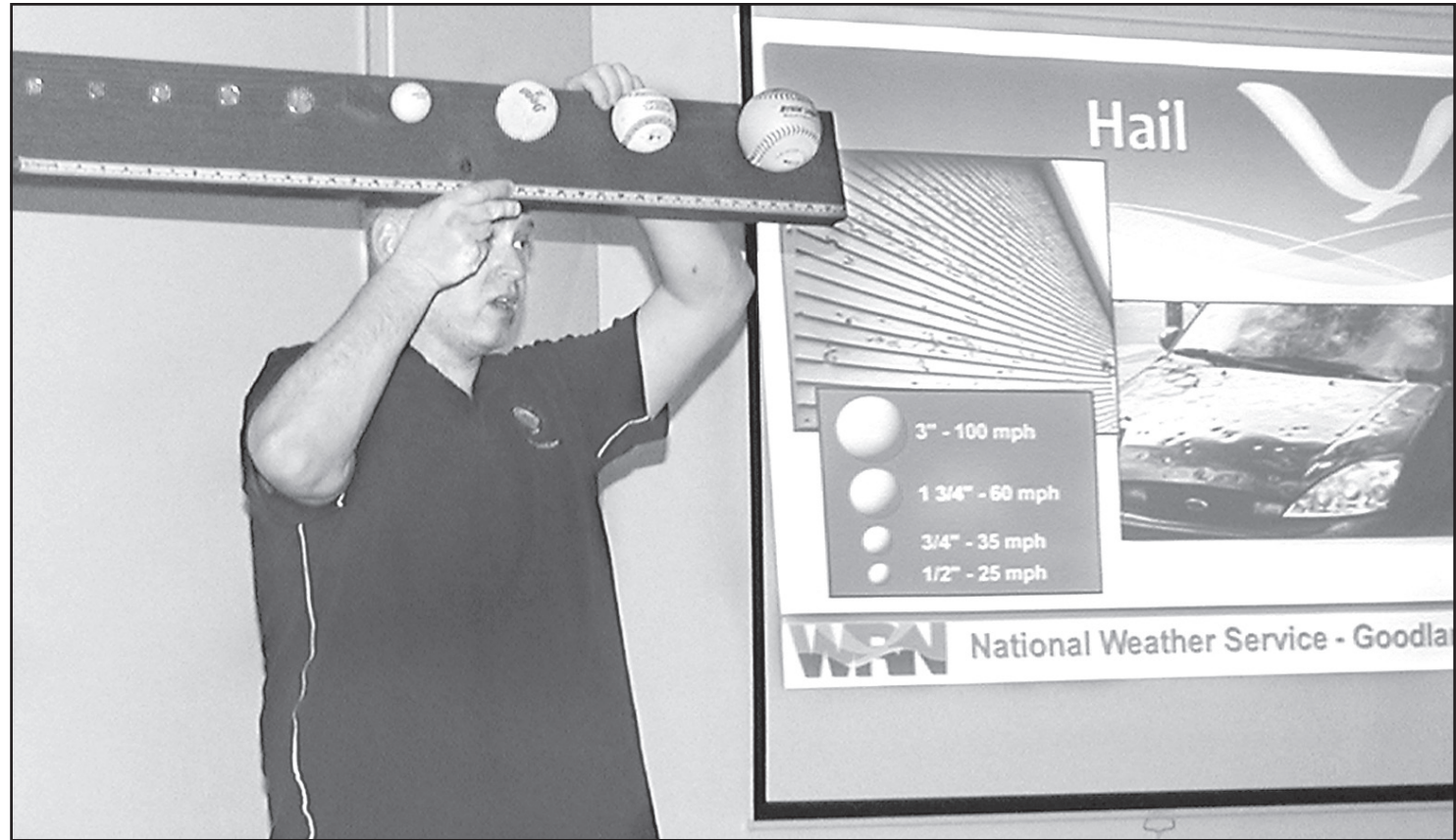
The student intern, Randy Ouellette, a Fort Kent, Maine, senior majoring in geography, said his main job is maintaining the site. "I basically upkeep the integrity of it," he said. "I make sure all the transmitters are up and running and working properly."

"It is a near perfect location for those antennas," he said, "but you have to battle the wind all the time."

He said it is a great opportunity to learn more about electronics in general and the physics of the upper atmosphere. "It's a great opportunity for any intern to get involved with a worldwide project like this," he said.

As for his career choices, that is a tough question, he said. "There are so many aspects to it. I would like to do something in environmental sciences, something that doesn't involve too many office hours, something that involves being out there in the field."

Measuring the bad news



Hail, from dime to softball size, traveling at up to 100 mph, can ruin your whole day. Chris Foltz, a meteorologist with the National Weather Service office in Goodland, displayed some size comparisons at a storm spotter training session in Colby

last week. He talked about thunderstorm development, how hail and tornados form and how to identify and report storms to the service.

EVAN BARNUM / Colby Free Press

Disaster kit helps prepare for weather emergency

It's important to know how to prepare for severe weather, according to the Kansas Department of Health and Environment. Make sure you have what you need in an emergency disaster kit and know the meaning of warnings and watches.

Severe weather can strike anywhere this tornado season.

"When severe weather strikes you often have only a few minutes to respond and seek shelter. It is essential for you and your family to be prepared in an emergency," said Robert Moser, state health officer. "We recommend that everyone become familiar with the type of weather they may encounter ... prepare an emergency disaster kit and practice their emergency plan frequently."

Many people do not understand the difference between a watch and a warning.

When conditions are favorable for severe weather to develop, a severe thunderstorm or tornado watch is issued.

Information from weather radar, spotters and other sources is used to issue severe thunderstorm and tornado warnings when severe weather is imminent. Warnings are passed to local radio and television stations and broadcast over weather radios. Warnings are also relayed to emergency management and public safety officials who then activate local warning systems to alert communities.

The department recommends assembling an emergency disaster kit in advance.

If you need to take shelter, be sure every family member puts on hard-soled footwear and take your emergency disaster kit with you. It should contain:

- Non-perishable food items and water.
- Manual can opener if your kit contains canned food.
- Blankets or sleeping bags.
- Change of clothing for each family member.

- First-aid kit.
- Prescription medications.
- Sun block.
- Flashlight and batteries.
- Weather radio.
- Set of car and house keys.
- Whistle to signal for help.
- Highway map that marks the counties to follow the storm.
- Identification and a credit card or cash.
- Any specific items you may need for children such as diapers or formula.

Additional supplies may be

needed for family members with disabilities or medical conditions. Don't forget pets will also need supplies, including food, water, collars and leashes. Smaller animals may need a crate or a cage. Another good preparation is to designate an out-of-state friend or family member as your family contact in case weather strikes while your family members are apart.

Additional information about severe weather and being prepared is available at www.ready.gov.

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