



UNIVERSITY OF OKLAHOMA

120 David L. Boren Blvd

Norman, OK 73072

Phone: (405) 325-1819

Fax: (405) 325-1108

[www.weathersphere.org](http://www.weathersphere.org)

## Courtesy of The Norman Transcript—5/5/09

### Local scientists take part in national tornado experiment

By: Julianna Parker Jones

In less than two weeks, researchers from around the country will launch a comprehensive field study of tornadoes that could change the way storms are understood and increase the lead-up time for severe weather warnings.

The base operations center will be at the National Weather Center in Norman, but researchers from Norman also will be out in the field chasing storms across the 900 miles of the central Great Plains.

"The reason we do this is to understand so we can get better applications," said Don Burgess, a research scientist with the Cooperative Institute for Mesoscale Meteorological Studies. One of those applications could be increasing the lead time in issuing life-saving tornado warnings, he said.

The project, Verification of Rotation in Tornadoes EXperiment2 (VORTEX2 or V2), will explore the origins, structure and evolution of tornadoes May 10 through June 13 and continue with another six weeks of research next spring. The project is the largest and most ambitious attempt to study tornadoes in history and will involve more than 50 scientists and 40 research vehicles, including 10 mobile radars.

Burgess will be in charge of one of the radars, the X-band dual-polarization mobile radar owned by the University of Oklahoma and the National Severe Storms Laboratory.

"This one to me is exciting, and we haven't used it before, seen this kind of data on this scale before," he said.

Burgess also participated in the original VORTEX study in 1994 and 1995, after which V2 is modeled. That study was the first to look at the evolution of tornadoes, and the information produced by VORTEX was the basis for many advances in meteorology, Burgess said.

The original project was similar in nature -- a collaborative field study taking place over several weeks in two springs -- but its scale was much different, said Chris Schwarz, a meteorology graduate student who will work with Burgess in the field for V2.

"This project is a lot bigger," Schwarz said. "There are a lot more instruments."

The first VORTEX project used only one mobile radar -- the first ever created. In addition to using more equipment to measure the atmosphere, the team will be using more advanced technology.

"The technology is caught up to where basically we think we can get a better look" at tornadoes, Schwarz said.

V2 has been in the works since 2004, said Burgess, who is on the eight-person steering committee for the project. Its budget of \$10.5 million is funded by the National Science Foundation, the National Oceanic and Atmospheric Administration and universities. The budget of the first VORTEX was about one fourth to one third of V2's budget.

All types of equipment will be used in V2 to get as much information as possible about the atmosphere around these storms: mesonets, radars, soundings, stick-nets and tornado probes.

Researchers in the field will follow supercell thunderstorms -- violent storms that sometimes but not always produce tornadoes -- to learn more about how tornadoes develop. They'll collect detailed information in the field that can't be ascertained from the radars planted around the country.

"Field radars looking longer distances away can't see many details," Burgess said. "With radar, range is everything."

Those details are important because scientists know the general structure of tornadoes, but don't yet know how the different layers work.

"You might have certain winds affecting the first floor of the house and different winds affecting the second floor of the house," Burgess said.

One of the goals of V2 is to map and understand the low-level in tornadoes, he said. The project also is meant to help scientists better understand why some supercells produce tornadoes and others don't.

Scientists will do numerical modeling from the data collected in the experiment as well. The data will be available to anyone for research purposes, and will be applied to operations in many ways in the coming years.

Preliminary results from V2 are scheduled for presentation at Penn State University this fall. At that time, organizers will begin planning details of the second phase of V2, scheduled for May 1-June 15, 2010.

The data will hopefully help in the long-term goal of dramatically increasing the lead-time in tornado warnings, Burgess said.

Because scientists don't understand tornadoes well enough to accurately predict when they will appear, meteorologists don't issue warnings until they detect a tornado in the area, he said. In the future, they might be able to warn as soon as a tornado is forecast. That's a long-term research goal, however, he said.

Before the data can be used to create application, however, it must be collected. VORTEX2 will be a massive collaborative effort, and keeping everyone on the same page in this process will be a feat in itself.

The large number of people involved in the project will require a lot of coordination. The field coordination vehicle will take all the data being produced in the field and lets the field coordinator communicate with each vehicle.

"The biggest concern is you have this big armada, ... and we have all these limitations," Schwarz said.

While the pieces of equipment involved are mobile, they have to remain still to do their job. So scouting vehicles will stay ahead of the equipment, looking for open locations to plant the equipment so they can read the storm when it arrives. Locations must be accessible via roads, free of low-hanging power lines and far from trees or tall buildings that can disrupt readings, Schwarz said.

As a result, storm chasing isn't always the exciting thing many think of it as, he said.

"Storm chasing is a lot different than what 'Twister' shows you," he said. "You're not always on the move."

Instead, it's often a waiting game, he said. Scientists read the data that is being collected by radars on the ground and try to predict where the storm will go. Then they set up their equipment near where they think it will be and wait for it.

"The idea is to be five or 10 miles from the edge of the storm," Burgess said. Sometimes when you are patient and wait, Schwarz said, you still miss the storm because it didn't do what you thought it would. But that's the nature of meteorology, he said.

"It's the weather, it's gonna do what it's gonna do," he said.

It's also the nature of storm chasing to often be in harm's way, Burgess said. But the emphasis will be on safety, he said.

"There are hazards involved, you can't completely get rid of them when you're chasing storms," he said.

The risks are worth it for Schwarz.

"Seeing Mother Nature at its finest is one of the coolest things," he said. And the potential benefits of VORTEX2 are extraordinary: "to try and figure out how tornadoes develop, how they evolve, trying to help out with forecasting," he said.