New Radar Detects Tornadoes Faster

By ASHLEY PHILLIPS and NED POTTER
July 25, 2008 —

abcnews.go.com

Researchers Hope New Technology Can Increase Warning Times, Save Lives

As a record-breaking and increasingly deadly tornado season wreaked havoc across middle America this summer, researchers have been testing a new, high-tech radar system that could help forecasters better pinpoint when, where and how a twister — or any other storm for that matter — will strike.

The United States has the most powerful radar network in the world -- a national system called NEXRAD. But even so, the average tornado warning comes only 12 minutes before the storm strikes -- and three quarters of the warnings are false alarms.

"We don't want to have people who are waiting 10, 15, 20 minutes, and then nothing happens," said Kevin A. Kloesel, associate dean of the College of Atmospheric and Geographic Sciences at the University of Oklahoma.

To that end, university researchers, in conjunction with the National Oceanic and Atmospheric Administration, which runs the National Weather Service, have been quietly testing a new high-tech system of radars that can see what current NOAA radars can't: storm activity that is close to the ground.

"The National Weather Service operates a radar network and those radars are located hundreds of miles apart. They cover huge areas, are large and do surveillance scanning over the area they cover," Kloesel said. "The problem with large scanning radar is that the farther you look out — when you send a beam straight out, the Earth is actually curving away from it as you get farther and farther away. When you get 90 to 100 miles out, that beam is sensing the storm at 8,000 to 10,000 feet."

According to Kloesel, who has worked on the project since it began six years ago, earth curvature creates an "umbrella" close to the ground that radars can't see; this new system, called Collaborative Adaptive Sensing of the Atmosphere (CASA), is designed to look under that umbrella, where severe weather, like tornadoes, and hail actually form.

In order to achieve that, CASA is built around a system of radars that are low to the ground, on cell phone towers, for example, and scan smaller areas.

"We see what's going on down low much better than you can with the existing technology," Kloesel said.

Unlike existing weather radars, however, the CASA radars also communicate with one another, so if a tornado is tearing through an Iowa town for example, the radars can communicate with each other and follow it as it travels its path instead of continuing to examine random areas that aren't experiencing any storm activity.

"The current system of radars [doesn't] interact with one another. It just sits and spins," Kloesel said. "[With CASA], you can have multiple radars sensing the same storm. They work in many instances like air traffic controllers."

Kloesel doesn't view CASA as competition for current radar technology, but rather a great way for NOAA to get an even clearer picture from both the ground and the air of what's happening in a storm.

"Storms are three-dimensional, so even though a storm might be producing a tornado, the current technology is going to [only] give us a good look at what's going on in the upper part of that atmosphere," he said.

CASA could be especially helpful in areas that are prone to severe weather, like Houston, a city that often floods — the radars can accurately report rainfall — or other rain-related activity, in any part of tornado alley.

Another area where CASA could help? With warnings. Currently, the National Weather Service only delivers warnings when a tornado is detected. When a tornado warning is issued, for example, residents have an average of 12 minutes before the tornado hits. Some storm victims had even less than that. Like residents in Iowa and neighboring Kansas on June 11, when a series of tornados swept through. Four people were killed at a Boy Scout outing in Iowa, where some survivors said they had only three or four minutes notice.

Currently, before issuing a warning, the weather service often issues a less imminent tornado watch, that usually covers a wide area that experts say too many residents ignore.

"Sometimes people have to take a little more care," said Penn State meteorologist Jay Searles. "If people aren't able to look and take a little personally responsibility, it is a little hard to do. Educating yourself can really aid or help prevent disasters from happening as far as loss of life."

With CASA on the other hand, forecasters could do a "warning on forecast" model. Because the radars are watching what's happening with weather so close to the ground, forecasters would be able to issue warning with pinpoint accuracy up to two hours ahead of time where and when a tornado is likely to strike, according to Kloesel.

"We hope to be able to lower the false-alarm rate from the current 75 percent, maybe down to 10 or 20 percent," said Kelvin Deoegemeier, a professor of meteorology at the University of Oklahoma.

The study is facing a funding review from the National Science Foundation later this year and questions of infrastructure and cost are likely to be asked, said Kloesel, who declined to give cost estimates, saying they were out of date and not ready to be published. But whatever the cost, he says that as far as the researchers are concerned, the system is ready to be used.

"When you visit other states -- Texas, Wyoming -- they're clamoring for radars like this," said Jerry Brotzge, operations director for the CASA project at the University of Oklahoma. "They're willing to pay out of their own city money to buy a radar like this."