

Tracking Tool Monitors Colorado Lightning Strikes

Brian Heaton | August 22, 2012



As [wildfires ravaged](#) parts of Colorado earlier this summer, a Web-based tracking tool was helping responders quickly and more accurately find the blazes caused by lightning strikes.

Called the Lightning Decision Support System, the Boulder Office of Emergency Management (BOEM) started using the technology a couple days prior to the Flagstaff Fire that started on June 26 and eventually burned 300 acres. As lightning pummeled the county, emergency workers were able to pinpoint the location of strikes in real time and more confidently send responders to the scene.

Mike Chard, BOEM's director, said his deputy director, Sgt. Dan Barber, was manning the software the night of the Flagstaff Fire. Chard recalled that it was so dry and windy in the area, before Barber was able to get the lightning location data down to 911 dispatch personnel, the office had already received calls about it.

That first lightning hit was just the beginning of a series of strikes that the tracking software — developed by Weather Decision Technologies (WDT) — helped locate that evening in Boulder County.

“That night we had another four or five lightning strike fires, so we were going crazy around here, and the lightning strike software seemed to pick all those up and help us out directing people to these strikes,” Chard said.

Monitoring the weather has become commonplace for emergency officials in Boulder County. The BOEM established a severe weather protocol a couple of years ago in response to a wildfire in Fourmile Canyon that destroyed 169 homes. Once lightning or other harsh weather begins, Chard's team goes into a monitoring phase where it pushes out information and warnings to first responders and engages weather spotters. Chard said the lightning strikes tracking tool was a natural extension of that protocol.

"One of the philosophies that we are using here is instead of waiting for disaster to hit, we are trying to fill another void, which is to be more predictive in our efforts to pass [along] information, increase awareness and decrease reaction time," Chard said. "It seems to be working well."

How It Works

The Lightning Decision Support System operates off a Google Map interface that can be accessed via a computer or mobile device. The program imports cloud-to-cloud and cloud-to-ground lightning data from Earth Networks' Total Lightning Network, which features more than 550 lightning sensors measuring atmospheric conditions. The sensors are scattered around the world. The information is compiled using a mathematical formula to show the location of each lightning incident.

In an email to *Government Technology*, David VandenHeuvel, senior vice president of enterprise solutions for WDT, explained that data from the sensors is processed by the company in real time and displayed via standard Internet connections. The information is collocated with the National Weather Center.

"This allows us direct connections to many high-volume data sets from the National Weather Service," VandenHeuvel wrote. "WDT also uses satellite dishes and other types of connections to receive data in the fastest methods possible."

When an emergency worker accesses the system online, he or she see markers that indicate where lightning has hit, including the latitude and longitude coordinates of the strikes. Chard said the program plots the lightning strikes within 300 meters of their actual locations.

In the foothills and at higher elevations, the results tend to be a little less accurate. But prior to the system being installed, emergency personnel relied on reports from the community, so the technology has been helpful to speed up response time to lightning fires.

"Most of the time you are driving up and down rural roads because someone saw a strike over in a ridgeline and it's very difficult to gauge [where the lightning impact occurred]," Chard said. "So this at least gives people an idea of generally where they should go."

Weather Alerts

The lightning program also provides [alerts](#) when weather conditions start to deteriorate.

For example, when a lightning strike occurs within a 20-mile ring around the county, the program sends out an advisory that lightning is approaching the area. If another strike occurs within 10 miles of the county, another warning is automatically generated. If no lightning is detected in Boulder County during a 30-minute period, an “all clear” message is sent out.

The technology isn't perfect, however. Chard recalled that at times, you could hear the crack of lightning outside the county's emergency office, and see a marker pop up on the screen 20 seconds later. Other times a lightning strike has taken minutes to register.

One of the system's other useful parts is a prediction feature. If the option is enabled, the detection system tracks and predicts the path of a lightning storm. Chard said his team has experimented with the prediction component and found it to be fairly reliable.

Boulder County officials can use the system to estimate storm advancement and the probability of lightning hitting specific locations, which will help preparedness efforts for various community events. The Boulder Office of Emergency Management plans to use the predictive technology when a race route for the U.S. Pro Cycling Challenge travels through the area on Saturday, Aug. 25.

“We will be able to give [the data] to incident commanders and event planners,” Chard said. “There is actual radar technology that goes with it — it just doesn't show lightning, it also shows the storm and its intensity through radar imagery and gives you storm attributes. It gives you a vector direction of the storm ... and a timeline of when that is going to hit a location.”

Looking Ahead

The software subscription costs BOEM approximately \$6,900 per year, according to Chard. The system is monitoring a 50 by 50-mile area that completely covers Boulder County and a good chunk of neighboring counties so staff members can see potential severe weather events moving into the area.

Investing almost \$7,000 each year might be a bit steep for some local governments, but Chard said it's a fairly small investment considering the loss of life and property damage that wildfires can cause. VandenHeuvel said prices start at \$2,400 per year and up, depending on the amount of lightning coverage needed and specialty layers added to the system.

WDT has a variety of advancements on the horizon for the lightning detection system.

VandenHeuvel said the sensor network is being continually upgraded as new sensor locations are added. The company also continues to create new weather layers for its

program and recently added a live chat feature so users can go back and forth with WDT meteorologists.

Chard felt that one of the system's most useful features is its archived data. Users can go back and look at any date and time to get lightning strike information. However, the search can take some time because the data exists in one-hour increments. Chard would like to see that improved in a future iteration of the program.

The lightning display screen shuts down after an hour. Once restarted, it boots up with fresh data, not the previously displayed information. This could pose problems for a user trying to find a strike that someone out in the field is investigating.

"Lightning strikes may take a couple of hours to even manifest, [so] you have to go back through layers in order to find ... the strike that someone may be going to," Chard said. The process is a bit difficult. "It would be nice to see the ability to tweak the viewing time frame of the data."

<http://www.govtech.com/public-safety/Tracking-Tool-Monitors-Colorado-Lightning-Strikes.html>