Winning with weather at WAAY-TV

Life-saving one of a kind TV weather radar network

by Karen Boush

6-minute read

On April 27, 2011, 72 people died when the deadliest twister in Alabama's history tore through northern parts of the state. The Hackleburg–Phil Campbell tornado was rated an EF-5, the most destructive category of tornadoes, with winds greater than 200 miles per hour. It obliterated houses, decimated trees and carried vehicles hundreds of feet, sometimes in seconds.

Kate McKenna is the chief meteorologist at WAAY-TV in Huntsville, Alabama, a thriving, technology-focused city in the heart of the Tennessee Valley. She recently posted an article (external link) explaining why

some people were caught off guard by the Hackleburg–Phil Campbell tornado.

"On a day like April 27, large, long-track, violent tornadoes aren't missed by radars. They're seen from miles away, with well-defined rotation and debris signatures," McKenna writes.

At the time, however, almost every broadcast station in North Alabama relied solely on the National Weather Service (NWS) radar, which generally scans the region every 4 – 6 minutes. The Hackleburg–Phil Campbell tornado and other twisters on April 27 traveled up to 70 miles per hour, and the NWS

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The WAAY-TV private radar network gathers weather data up to

4 - 6

times faster

WAAY-TV meteorologists have accurate, high-resolution radar across

13,500

square miles

radar has blind spots that create gaps in coverage mostly due to terrain. The WAAY 31 StormTracker Early Warning Radar Network changes that. With radars covering all of North Alabama from the Shoals to Huntsville and Decatur, to Guntersville, they have eliminated any gaps in radar coverage, providing live-real time data as severe weather approaches.

Although the Hackleburg–Phil Campbell tornado was singularly devasting, North Alabama residents are accustomed to tornado warnings. The region is prone to strong- to violent-category tornadoes, particularly from March to May. The state also experiences other types of severe weather year round.

"We are known for our tornadoes, but we get it all, from hurricanes and tropical storm remnants to blizzards and ice storms," McKenna says. "We even get little earthquakes in northeast Alabama, possibly caused by the karst topography there."

To help protect residents, WAAY-TV needed real-time radar insights. It also needed more extensive coverage than the NWS could offer. The NWS uses two long-range radar systems to gather data for North Alabama, a 13,500-square-mile region with large plateaus, rolling hills and some lowlands. One is located in Hytop, Alabama, northeast of Huntsville in Jackson County, and the other is to the southwest in Columbus, Mississippi, close to the state line.

Each weather radar scans a large, circular area, but because of the radar locations these circular areas of coverage do not completely cover regions, creating "safety gaps" in highly populated areas such as Florence and Muscle Shoals in northwest Alabama. In addition, because beam height increases with distance, a condition accentuated by the earth's curvature, the NWS radar beams couldn't detect atmospheric activity nearer to the ground on their outer edges.

Street-by-street weather data

To address these limitations, the station built the WAAY 31 Storm Tracker Early Warning Radar Network, one of the largest privately owned radar networks in the US. Combining the station's proprietary radar data with NWS data, WAAY-TV eliminates gaps in coverage and gains accurate, up-to-date weather information across North Alabama and into Mississippi, Tennessee and Georgia.

The network comprises three Doppler radars from IBM Business Partner Enterprise Electronics Corporation (EEC), a leading global manufacturer of precision weather radars. The

network radar data also integrates seamlessly with Max Storm and other Max Ecosystem solutions from The Weather Company®, an IBM Business.

Rain or shine, WAAY-TV meteorologists can now provide viewers with unique weather insights, including exclusive alerts well in advance of approaching storms. By delivering forecasts on-air and also pushing them out to mobile and web devices, they can not only potentially save lives but also attract new viewers, including people who tend to rely on third-party weather apps.

WAAY-TV meteorologists and EEC engineers designed the WAAY 31 Storm Tracker Early Warning Radar Network based on months of studying historical tornado tracks and mapping radar beams. After their research, they

concluded that if the station installed a single, centrally located radar, coverage would be obstructed in some areas by the terrain. In the end, they decided to use three strategically located compact radars with overlapping coverage.

The station worked with EEC to hoist a short-range EEC Ranger X-Band unit atop a bank roof in Decatur. They also installed two longer-range EEC Maverick X-Band units on water towers—something never done before— in Muscle Shoals to the west and another in Guntersville to the east.

"From the business side of it, their service has been outstanding and incredibly responsive to our needs," says Mike Wright, General Manager at WAAY-TV, of EEC's involvement in the project.

The radar units complete 360-degree scans every 60 seconds, delivering timely insights that meteorologists need to accurately gauge developing weather situations. Meteorologists can also run sector scans in seconds for closeup views of specific areas.

Furthermore, EEC's advanced, dual-polarity technology delivers 16-meter-resolution images, approximately 10 times that of NWS images. With more detailed, overlapping coverage, meteorologists can view lower-level circulations, such as smaller-scale tornadoes, microbursts and straight-line winds.

EEC and specialists from The Weather Company helped integrate the radar network within the Max Storm solution, which enables meteorologists to

create unique high-resolution radar visualizations that are of higher resolution than those created with NWS radar data alone. In addition, meteorologists can zoom in on areas of possible heavy flash floods, rainfall and hail. Most important, meteorologists can focus in on velocity information indicating rotating storms, thereby defining specific tornado locations and movement down to the street level. They can also diagram projected storm trajectories in detail.

Furthermore, meteorologists can rapidly distribute weather radar and imagery across platforms using the Max Engage with Watson® solution. With the Max Connect solution, they can easily control all these functions on- or off-air using an Apple iPad device.

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Kate McKenna, Chief Meteorologist, WAAY-TV

Up to 4 – 6 times faster weather insights

With the WAAY 31 Storm Tracker Early Warning Radar Network, the station gathers resolute weather insights every minute versus waiting up to 4 – 6 minutes for less precise NWS radar data, depending on the NWS scan mode in use. This time savings can literally make a life-or-death difference for residents.

For Wright, nothing is more important than informing viewers of potentially life-threatening weather faster and with greater accuracy than anyone else.

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one of our station's highest callings," he says.

The performance of WAAY-TV radar as compared with NWS radar became apparent in mid-February 2021, when a nearly nationwide storm caused freezing rain, sleet and snow across Central and North Alabama.

"The proof is in the data. Our Decatur radar was scanning at such a low level, we were able to see localized, lake-effect snow. It was so localized that the national radar in Hytop and Columbus missed it," explains McKenna.

"Also, we had flurries coming into the Shoals," she adds, "and we were able to see those little bands of light snow, which are notoriously difficult to pick up. Nothing was visible on the national radars."

By investing in its own local radar network, the station is well positioned to grow its audience and boost ratings, especially by expanding its digital presence.

"I want to be sure that when people invest their time in WAAY, we give them severe weather information they're looking for as quickly as we can and that it's up-to-date—providing an earlier warning than other radars available in the market—and accurate," comments Wright.

The station's mobile and web views and audience interactions have increased since the network became fully operational in 2020. Using both mobile and web devices, WAAY-TV viewers can access all three live radar screens at any time. They can also receive timely, personalized weather insights

and talk one-on-one with WAAY-TV meteorologists on social media.

With a leading-edge radar network, the station has also strengthened its brand and culture. Employees and residents alike are taking ownership in the network, spurring deeper connections that encourage viewers to keep tuning in to WAAY-TV. For instance, the leaders of Tuscumbia, Alabama, will present the station with a Key to the City award in gratitude for placing one of the radar units in nearby Muscle Shoals, an area previously unserved by radar coverage.

"I've always believed you win with weather," says Wright.

About WAAY-TV

WAAY-TV, (external link) virtual channel 31, is an ABC-affiliated television station in Huntsville, Alabama, also home to NASA's George C. Marshall Space Flight Center. Owned by Allen Media Broadcasting, WAAY-TV is a leading provider of local news, weather information, sports and community events. It has served the North Alabama and Southern Tennessee region since 1959 and employees 74 people.

Solution components

- Weather Company Max Connect
- Weather Company Max Engage with Watson®
- Weather Company Max Storm

About Enterprise Electronics Corporation (EEC)

A global leader in weather radar and satellite systems, IBM Business Partner EEC (external link) has manufactured and installed approximately 1,100 remote sensing systems in more than 100 countries. Founded in 1971 in Enterprise, Alabama, the company is an industry leader in introducing new technologies that enhance performance. Its focus on technological innovation continues to help drive its success.

About The Weather Company

The Weather Company, an IBM Business, delivers more than 25 billion personalized and actionable forecasts globally each day to millions of consumers and thousands of marketers and businesses. It accomplishes this through The Weather Company's API, its business solutions division, and digital products from The Weather Channel (external link) and Weather Underground (external link). Its products include the world's most downloaded weather app, a network of 250,000 personal weather stations, a top-20 US website, one of the world's largest Internet of Things (IoT) data platforms, and industry-leading business solutions.