AccuWeather
ENTERPRISE SOLUTIONS™

We Know The Business of Weather™

Looking Back at Recent Extreme Flash Flooding and AccuWeather's Proven Expertise in Flooding Warnings

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Two iron rails dangling pitifully over a swollen creek. The bridge supporting them had been swept downstream. Those rails represented a disaster waiting to happen: A train attempting to cross the creek would have plunged into the water, imperiling the lives of the crew, causing a multi-million dollar property loss and, perhaps, causing the adjacent waterways to become seriously polluted.

Or, on June 23, 2016, as flash floods flowed out of the mountains of West Virgina, and killed 24, AccuWeather's flash flood warnings were issued more than 5 hours before those of the National Weather Service. Our client, CSX Railroad, had sufficient time to reroute trains so as to keep their people and equipment out of harm's way.

"Mike, thank you to your team for the outstanding work!"

-Tony Foisy,
CSX Technology
Project Manager

"The Kansas Turnpike Authority views AccuWeather Enterprise Solutions as a true partner in helping KTA prepare for and respond to weather events. It's nice to know we have someone to count on in the face of Kansas' extreme and ever-changing weather."

-Steve Hewitt, Kansas
Turnpike Authority CEO

Or, take the Canada to Mexico Interstate 35 on September 9, 2016. In the middle of the night, just north of the Kansas-Oklahoma border, water began to cover the road due to torrential rains that exceeded 9 inches in four hours. Again, it was not a surprise. Kansas Turnpike officials were already standing by, having been given a flash flood warning two hours before. The road was closed and traffic re-routed in an orderly fashion before anyone could be harmed.

These events, and many others, are not happy coincidences. They are the result of the application of state-of-the-art weather science by AccuWeather Enterprise Solutions, Inc. and its clientele. In both cases, timely and precise flood warnings were received in time to stop the train and reroute vehicular traffic before loss of life could occur.

As our nation paves ever more areas (causing more rapid runoff) and puts more infrastructure in areas at elevated risk (flood plains), flood forecasts, and flash flood warnings in particular, increase in importance.

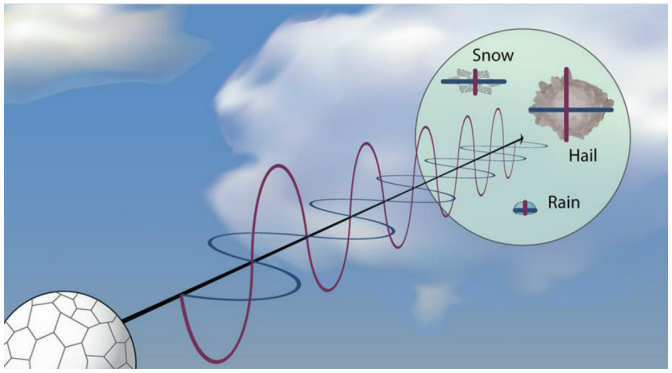
In this paper, we discuss the rapid progress in the field of flash flood forecasting that has occurred in the last 18 months and how that progress may apply to your enterprise and to society as a whole.

1 Dual Polarization Radar

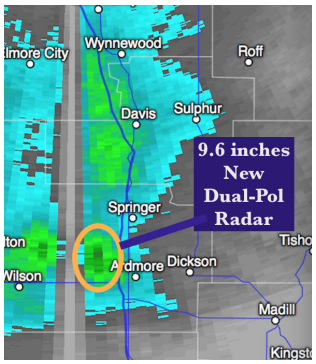
The first of these new scientific advances is dual polarization radar. Without going too deeply into detail, the type of precipitation (snow, rain, hail) had to be inferred by the meteorologist when using conventional radar. With dual polarization, the radar can distinguish between precipitation types and measure them. For example, it provides us with highly accurate measurements of rainfall that are updated every five minutes or, in some cases, even more frequently.

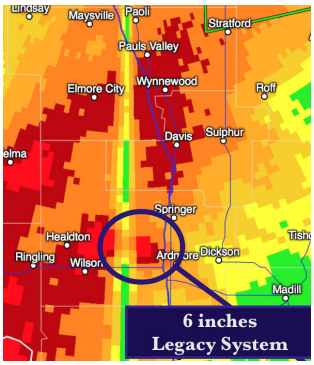
The radar also provides estimates of the size of hailstones and can provide us with measurements of snowfall.

This continuously updated flow of rainfall information, combined with antecedent conditions (e.g., are recent rains causing streams in the threatened area to already run high?) allows AccuWeather meteorologists to provide fast and extremely accurate judgments as to when flash flood warnings should be issued as well as estimates as to the seriousness of the flooding.



Dual polarization can discern the type of precipitation. Image courtesy: NOAA.



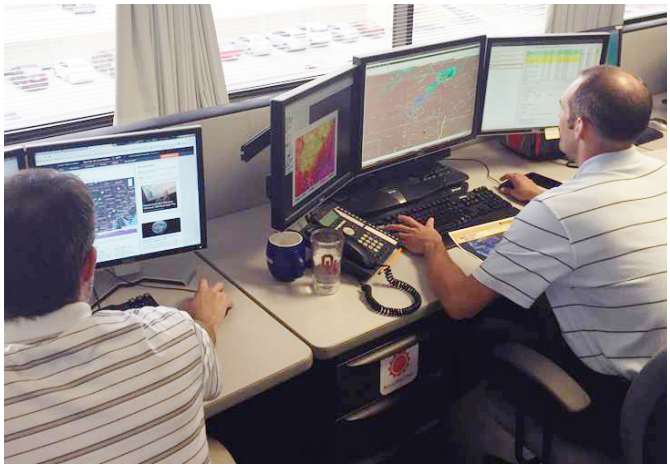


With dual polarization, excessive rainfall can be detected faster so more timely warnings can be issued.

2 SmartWarn®

We are often asked, "How can your meteorologists create better storm warnings for your clients from a single location compared to the National Weather Service (NWS) having 132 offices across the country?" To be fair, we rely on the meteorological infrastructure and raw data created by the NWS. If they receive a spotter report in, say, Charlotte, we get instant notification. But, the main difference is in the tools the respective meteorologists use. AccuWeather Enterprise Solutions' (AES) meteorologists use a unique tool called SmartWarn.

SmartWarn was already the leading meteorological workstation before dual polarization radar became available. As dual polarization became available in May, 2015, the decision was made to further upgrade its hydrological capabilities. Higher resolution terrain, dual polarization, client elevations, river basins, and other rainfall forecast processing capabilities were all added.



AccuWeather Enterprise Solutions meteorologists monitor storms using our exclusive SmartWarn® system.

3 Meteorologist Training

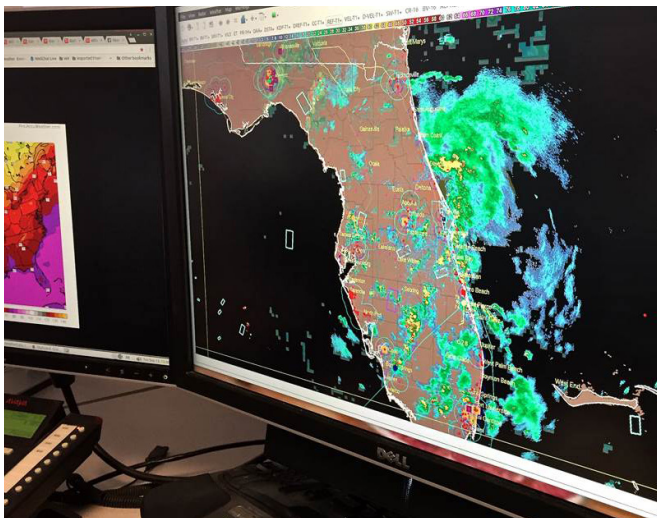
AccuWeather Enterprise Solutions' meteorologists are the best of the best. Before a newly-hired meteorologist is allowed to issue storm warnings to our client, he or she must pass a training program and testing to insure competency.

In addition to the standard hydrological training given to meteorologists in college, we took the extra step of bringing in Dr. David Ford, the leading applied hydrologist in the United States, to give our meteorologists state-of-the-art training in flash flood recognition and warnings.

4 NextStorm

We are prepared for launch and operation of the new GOES-R weather satellite. We expect it to be fully operational in the first quarter of 2017. AccuWeather has already invested in new downlinks to ingest this never before available data that will be available as often as every one minute – more frequently than most government radars! The GOES-R data will flow into SmartWarn, further enhancing our ability to recognize and warn of floods.

NextStorm is a weather satellite computer analysis system that will empower our meteorologists to even more effectively warn of flash floods including the parts of North and Central America that are not well-covered by radar or other instrumentation. It will also allow the warnings of all types of storms to be even more timely than they are now.



Here is a photo of NextStorm. The polygon in northern Florida shows an area where thunderstorms (with dangerous lightning) are expected to form in the next 20 minutes. Rader has yet to show a storm in the area.

At a time when government resources dedicated to flash flood warnings are stretched thin, AccuWeather Enterprise Solutions is dedicated to providing the finest warnings of floods the science will allow.

If you are not already a client, please call us today today at 814.235.8600 or email us at sales@accuweather.com to learn more about AccuWeather Enterprise Solutions. After all, the next storm may already be on the way!

Mike Smith is a board-certified consulting meteorologist and a Fellow of the American Meteorological Society. He is founder of WeatherData, Inc. which became part of AccuWeather in 2006 and where he now serves as Senior Vice President and Chief Innovation Executive of AccuWeather Enterprise Solutions. Mike is the author of two books, *When the Sirens Were Silent* and *Warnings: The True Story of How Science Tamed the Weather*. Mike is a frequent speaker and author on both popular and technical weather-related topics. He has appeared on The Discovery Channel, The History Channel, Fox News, and all of the major networks.