Dual Polarization Radar Upgrade Q&A
September 26, 2011

Q: What is dual polarization technology and how is it better than current radar?
A: Dual polarization technology is a major upgrade to the existing radars, which only transmit and receive information in the horizontal direction. Dual polarization technology, in addition to the horizontal, transmits and receives energy in the vertical plane, providing a two-dimensional picture of what type of precipitation is actually out there. Current radars give forecasters a rough idea of how intense precipitation is, which way it is moving and how fast, but provide very little information on precipitation type.

Dual polarization technology adds new information about the size and shape of an object. With this, forecasters can clearly identify rain, hail, snow or ice pellets like never before. This gives forecasters more confidence to accurately assess weather events because they have more information to forecast the type of precipitation and a better idea of how much to expect.

Q: How does dual polarization technology improve flood forecasts?
A: One of the main advantages of upgrading to dual polarization technology is improved precipitation estimation. Forecasters who examine the new data are able to pinpoint areas of heavy rainfall much better than with existing radar technology, and radar-estimated rainfall amounts will be more accurate. Armed with this new information, forecasters are able to detect flash floods much better than before and improve accuracy and lead time for flash flood warnings.

Q: How does dual polarization technology improve winter weather forecasts?
A: During winter weather events, current radar technology makes it very difficult to tell the difference between the various types of winter precipitation. Dual polarization radar provides the ability to tell the difference between rain and snow, which gives forecasters a much better idea of what to expect on the ground. For instance, current radar technology allows forecasters the ability to detect the presence and movement of winter precipitation, but it is very difficult to infer whether it is rain, snow, or a mixture of both. Dual polarization radar data provide certainty that at the height of the radar beam the precipitation is rain, snow, or a mixture of rain and snow, which a forecaster can then infer the eventual precipitation type at the ground based on environmental conditions from the radar beam to the ground.

Q: Does dual polarization technology improve what forecasters see?
A: Yes. Normally when we look at the radar we're looking for weather. Dual polarization radar can actually tell the difference between the weather and areas that might contain birds, bats, and insects, targets that are difficult to identify and remove automatically with existing radar technology. Dual polarization radar data can correctly identify more than 99 percent of non-weather targets, enabling the automated removal of these non-weather targets and a much cleaner radar display, making it much easier to focus on the weather.

Q: Will dual polarization technology improve tornado warnings?
A: Dual-polarization radar technology can detect and identify the presence of tornado debris, giving the forecaster a high degree of confidence that a damaging tornado is on the ground. This also helps a forecaster pinpoint and track the location of a tornado. This is especially helpful at nighttime or with tornadoes that are rain-wrapped, essentially whenever reliable spotter reports are unavailable.

Q: Will the radar upgrade help forecast tornadoes in advance?
A: While dual polarization radar provides specific information about the location of a tornado, at this point it does not provide added information about where a tornado will form ahead of time.

Q: Will dual polarization technology improve hail forecasts?
A: Dual polarization radars allow forecasters the ability to pinpoint where in the storm hail is falling. It also provides the ability to detect giant hail, roughly larger than golf balls. Over the next several years, hail size estimation will be vastly improved as new algorithms are developed and refined using data from all across the country.

Q: Will the radar look different?
A: Radar data displays you're used to seeing on TV or on the internet won't change. What you will get are new radar products based on the dual polarization technology that will provide new information about what's really out there. For more information about the new radar products available from the NWS, please visit http://www.wdtb.noaa.gov/courses/dualpol/outreach

Q: When will my radar be upgraded?
A: The NWS will upgrade all 160 radars across the U.S. and at 5 overseas locations from now through March 2013. A current schedule is available from this website: http://www.roc.noaa.gov/WSR88D/PublicDocs/DualPol/DeploymentSchedule.pdf

Q: How long will the upgrade take?
A: At any individual radar site, expect the radar to be down 10-14 days. Forecasters will use information from adjacent radar sites during this time.

Q: How much does each upgrade cost?
A: The approximate cost for upgrading each radar is $225,000 for parts and labor.

Q: How much is the program cost?
A: The approximate cost for the entire program is $50M.

Q: I am a radar user and would like more information about the dual polarization radar upgrade.
A: Because this is such a significant upgrade the National Weather Service has created an outreach course designed to help radar users understand this new radar information available to them. The course is available online: http://www.wdtb.noaa.gov/courses/dualpol/Outreach/

Q: Is there information explaining dual polarization technology that is brief and simple to understand?
A: Yes, a short video produced by NOAA is available on YouTube that explains the basic benefits of dual polarization for the general public. Anyone can link to the video, which includes subtitles: http://www.youtube.com/watch?v=tX6LH_l3P3Y

Q: Has dual polarized radar been tested?
A: Yes. The NOAA National Severe Storms Laboratory conducted the Joint Polarization Experiment (JPOLE) in 2002-2003 to demonstrate the operational capabilities of polarimetric radar. During the experiment, data were delivered in "real-time" to the National Weather Service and other users and NSSL scientists aided in the data interpretation. JPOLE proved that significant improvements in rainfall estimation, precipitation classification, data quality and weather hazard detection were possible using dual polarization radar. In August 2010, 20 NWS forecasters visited Norman, Okla., for an operational assessment of dual polarization radar products. They examined four very different case studies and completed surveys before the assessment and afterwards, focusing on how radar products were incorporated into the forecast and warning process. After incorporating dual polarization products, forecaster responses to the survey indicated a significant benefit over existing radar technology for winter weather, flash flood and hail operations. They also saw great benefit in the ability to detect airborne tornado debris.