



USDA-ARS Mobile Radar

USDA Agricultural Research Service
U.S. DEPARTMENT OF AGRICULTURE

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Introduction

- The USDA-ARS Mobile Radar is an EWR E700DP X-Band Dual Polarization Doppler Weather Radar system.
- The product allows for users to be able to gather information in remote locations where there is not adequate radar coverage.
- The purpose of the unit is to gather characteristics of rain to better predict when and where soil erosion will occur to earth covered dams and levees.



Figure 1: Reflector Antenna



Figure 2: Radar on Tripod



Figure 3: Radar on Telescoping Mast

Outputs

Products:

- Reflectivity
- Radial velocity
- Spectrum width
- Signal quality index
- Differential reflectivity
- Correlation coefficient
- Differential phase
- Specific differential phase

System Overview

Mobile unit ideal for remote locations:

- Deploy with as little as four people in less than an hour
- Mount to structures, tripod or mast
- GPS
- 120VAC 60HZ power

X-band radar specifications:

- 9.345 GHz \pm 25 MHz
- Hybrid dual pulse
- 100+ km range
- -5° to 90° elevations
- 0° to 360° azimuth

Capabilities:

- Sector blanking
- Dual PRF Velocity De-aliasing

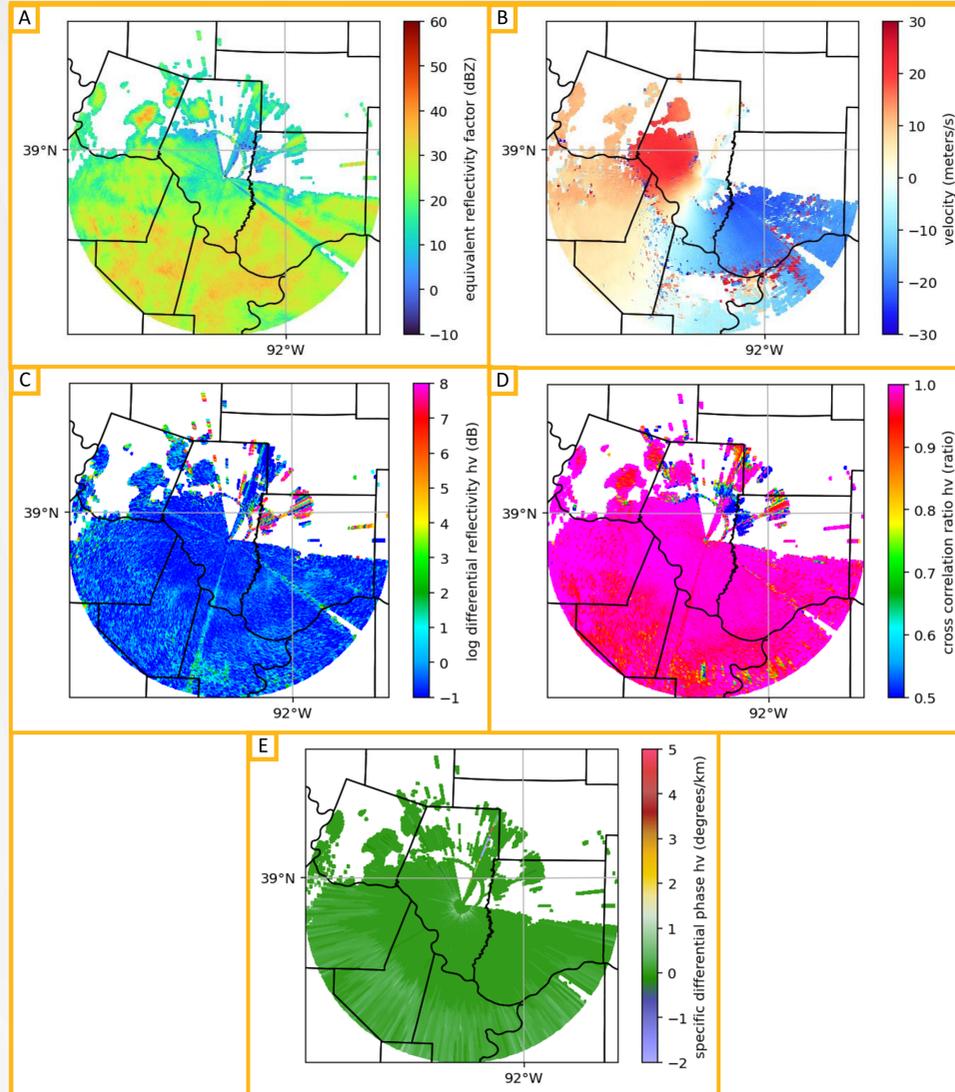


Figure 4: 17:03 UTC 26 October 2025 - MU South Farm, Columbia, MO. The USDA-ARS Mobile Radar is currently deployed in central Missouri gathering information on hydrometeors where NOAA NEXRAD does not have detailed coverage of the lower atmosphere. (A): Reflectivity, (B): Radial Velocity, (C): Differential Reflectivity, (D): Cross Correlation (E): Specific Differential Phase *

Next Steps

- Estimating the kinetic energy of rain utilizing reflectivity and differential reflectivity to derive the drop-size distribution while incorporating radial velocity
- Improving hydrological stream flow forecasting and monitoring for small catchments – sediment transport, flood forecasting
- USDA soil erosion for dams and levees

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Citations

* Helmus, J.J. & Collis, S.M., (2016). The Python ARM Radar Toolkit (Py-ART), a Library for Working with Weather Radar Data in the Python Programming Language. *Journal of Open Research Software*. 4(1), p.e25. DOI: <http://doi.org/10.5334/jors.119>