

Deployment of the X-band dual polarization phased array radar in the Dallas-Forth Worth Urban Demonstration Network.

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The Microwave Remote Sensing Laboratory (MIRSL) at the University of Massachusetts has developed an X-band dual polarization Phase Tilt Weather Radar (PTWR). Phased-array systems have received substantial attention in the weather community due to several potential benefits such as smart scanning and high temporal resolution. A major challenge to their operational use is their direction-dependent beam and polarization characteristics. There are known sensitivity losses and also measurement biases in the polarimetric radar products when the beam is directed away from the principle planes of the array aperture.

During Spring 2014, the PTWR was deployed for a period of 8 weeks atop a building on the U. Texas campus in Arlington, TX. The deployment site was located within the the Dallas-Forth Worth Urban Demonstration Network operated by Center for Collaborative Adaptive Sensing of the Atmosphere (CASA). The proximity of a CASA X-band radar offered the opportunity for comparison of a solid-state phased array observations and magnetron-based mechanically scanned systems. Both systems were nearly collocated, which allowed for a quantitative comparison of products from the two radar systems. Through particular case studies, we illustrate the added value of high temporal resolution for severe weather observations. The severity of biases and the effectiveness of correction schemes for polarization products is also illustrated. Finally, the quality of polarimetric radar products compared with CASA X-band radar and NEXRAD S-band radar is evaluated.