# High-Temporal Resolution Observations of Weak-Echo Reflectivity Bands in the 16 May 2017 Wheeler, Texas, Tornado

*Casey Griffin[1,2], David Bodine[1,2], Javier Lujan[1,2], Robert Palmer[1,2]

1. University of Oklahoma, 2. Advanced Radar Research Center

The documentation of horizontal and vertical vorticity in the near-tornado environment is necessary to better understand tornadogenesis and tornado maintenance. Recent research has focused on identifying the source of low-level vorticity available to be tilted and stretched by low-level updrafts. This study investigates multiple weak-echo reflectivity bands (WRBs), which are hypothesized to be associated with horizontal vortices, observed near the 16 May 2017 EF-2 Wheeler, Texas. Data are provided with 7-second temporal resolution over 110° azimuth x 20° elevation sector volumes by the Atmospheric Imaging Radar (AIR). The AIR is a mobile, X-band, imaging radar that uses digital beamforming to collect simultaneous RHI scans and steers mechanically in azimuth, which is particularly useful for the study of tornadoes because horizontal advection and rapid tornado evolution are negligible when interrogating vertical structure.

While previous studies showed that WRBs were approximately collocated with visual observations of horizontal vortices, the volumetric radar data necessary to interrogate the relationship between the WRBs and horizontal vorticity were not available. This study presents simultaneously collected RHIs that confirm the presence of a strong horizontal vortex adjacent to a WRB. These RHIs also show that the WRBs are much deeper and vertically continuous than previously hypothesized. In addition to providing novel documentation of the vertical structure of WRBs, RHIs and PPIs showing the genesis and evolution of multiple WRBs that formed in rapid succession are presented and context into future work determining the significance of WRBs for tornado maintenance is provided.

Keywords: Phased Array Radar, Tornado