Advanced Radar Techniques Team
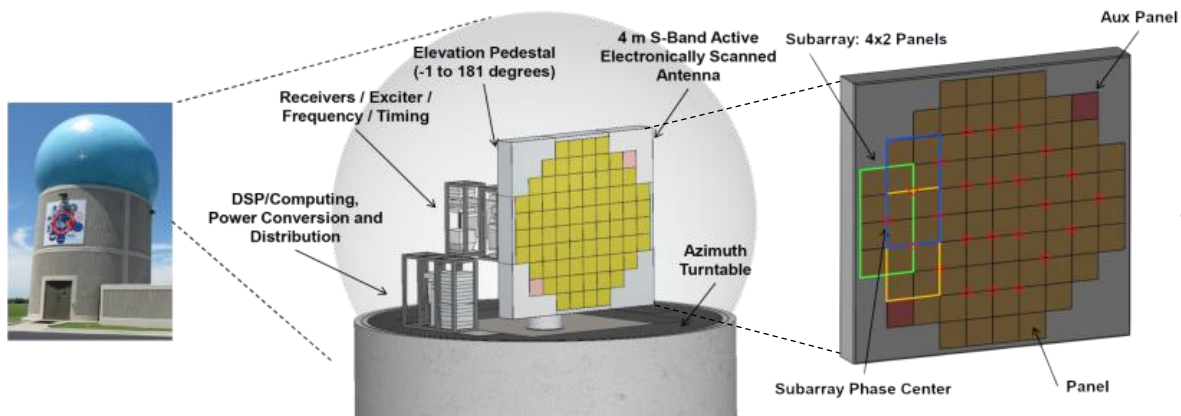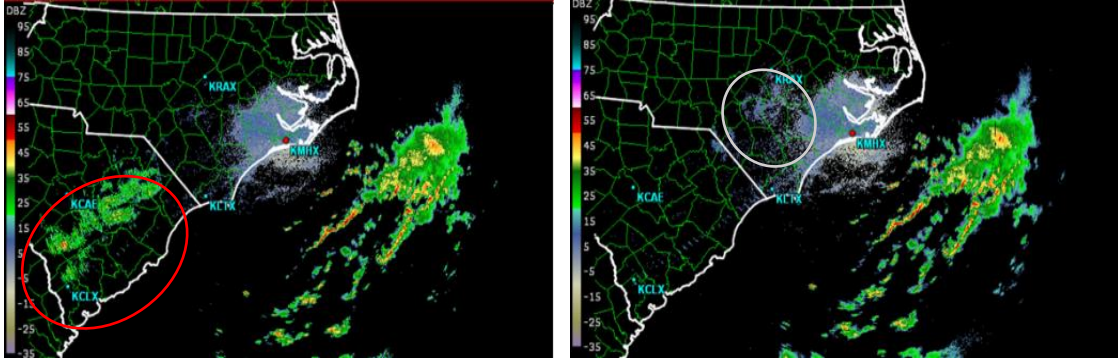Theme: Weather Radar Research and Development

The Advanced Radar Techniques (ART) team conducts research and development of innovative signal-processing and remote sensing techniques to improve the quality, coverage, accuracy, precision, and timeliness of meteorological products from weather radars. The ART team is co-located with the National Severe Storms Laboratory (NSSL) Radar Research and Development Division (RRDD) and combines expertise in electrical and software engineering.

The ART team's mission includes exploration, implementation, and demonstration of unique capabilities offered by phased-array radar for weather observations; and transfer of weather radar technology to existing systems in government, public, and private organizations. Research and development activities in the ART team rely on or are aimed at improving several state-of-the-art weather radars. One of them is the KOUN radar, a Weather Surveillance Radar-1988 Doppler (WSR-88D) research radar operated by NSSL. Another radar is the National Weather Radar Testbed Advanced Technology Demonstrator (NWRT ATD). The ATD is the first full-scale, S-band, dual-polarization phased array radar built from the ground up and designed specifically for use as a weather radar.

The ATD is a proof-of-concept system to demonstrate improved capabilities and refine the cost-driving requirements of a multifunction phased array radar (MPAR). It is an S-band, mid-scale, dual-polarized, multifunction, active, electronically scanned PAR at the National Weather Radar Testbed (NWRT) in Norman, OK.

Radar reflectivity images from the KMHX radar in Newport/Morehead, NC. The current operational processing (left panel) is compared to the proposed processing (right panel). The proposed processing using novel techniques developed by the ART team is more effective at removing ground clutter contamination (red oval) and preserving weak weather echoes (yellow oval).

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