

Gadanki Active Phased Array MST Radar: Multi-channel capabilities and initial results

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The most powerful active phased array MST radar (AAMSTR) having 360° beam agility, modularity, multi-channel capability and built-in scalability has been realised at NARL, Gadanki, India (13.45°N, 79.18°E). Several latest technologies has been implanted in the radar development, such as placing state-of-the-art high power solid state Transmit-Receive modules (TRM) near antenna elements to minimize cable losses, complex distributed control signal system to each TRM through optical fiber, flexible antenna array configuration to support upto a maximum of 64 channels with direct digital receiver system for Spaced Antenna (SA) and Interferometry/ Imaging applications. The system has been validated for its scientific usage in a variety of experimental modes, like Doppler beam swinging (DBS) and Velocity-Azimuth-Display (VAD) modes in the troposphere. The initial results are found to be very encouraging. The multi-receiver capability has been tested with different array apertures and base lengths for interferometry and spaced antenna experiments. The improved detectability and high resolution capabilities with built-in flexibilities caters the present and future scientific requirements of the atmospheric research community. In this paper, we present the system configuration with multi-channel facility, validation of products, new capabilities and the first results obtained using the Active Phased Array MST Radar.