

## **8.7 X-BAND PHASED-ARRAY POLARIMETRIC RADAR TESTBED: STATUS AND INITIAL RESULTS**

S. J. FRASIER<sup>1</sup>, W. HEBERLING<sup>1</sup>, C. WOLSIEFFER<sup>1</sup>, M. ADAM<sup>1</sup>

<sup>1</sup> Microwave Remote Sensing Laboratory, University of Massachusetts, Amherst, USA  
frasier@umass.edu

An X-band, dual-polarized, phased-array radar developed by Raytheon has been adapted for weather observation by the Microwave Remote Sensing Laboratory (MIRSL) at UMass. The radar, called the Low Power Radar (LPR), operates at 9.6 GHz with a peak transmitting power of approximately 100W. The phased array consists of 2560 elements (arranged in a 64 x 40 grid), each with individual amplitude, phase, and polarization control on both transmit and receive. Each element transmits nominally 40 mW and employs a custom monolithic microwave integrated circuit chip for element control. The radar has been configured to accommodate various pulsing modes, such as single and dual-prf, and dual-prt, in various polarization transmit/receive modes such as single (HH or VV), alternating (HH,VV), fully polarimetric (HH,HV,VV,VH). Pulse compression is implemented to achieve adequate sensitivity at long ranges. We present an overview of the radar system, observations from initial deployments from a mobile platform, and outline future research plans.

The highly programmable phased-array architecture permits not only rapid scanning of extended volumes, but also element-based control of polarization. One research objective with the radar is to investigate in detail the polarimetric properties with scan angle to better understand potential biases in polarimetric products. To this end, side-by-side operations with a reference radar employing a conventional parabolic dish are planned. The flexible programmable aperture offers the possibility to mitigate these biases through polarization synthesis.

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