

8.12 ON THE USE OF HORN ANTENNA TO CALIBRATE THE MPAR ADVANCED TECHNOLOGY DEMONSTRATOR

IGOR R. IVIĆ^{1, 2}

¹ Cooperative Institute for Mesoscale Meteorological Studies, University of Oklahoma

² NOAA/OAR National Severe Storms Laboratory, Norman, Oklahoma, USA

igor.rade.ivic@gmail.com

The goal of a Spectrum Efficient National Surveillance Radar (SENSR) initiative in the U.S. is to explore solutions for vacating the 1.3-1.35 GHz radio frequency band (currently occupied by the FAA/DoD/DHS systems) so that it can be auctioned to the private sector. One option is the Multifunction Phased Array Radar (MPAR) which seeks to combine the aircraft detection and tracking as well as weather surveillance into a single polarimetric PAR system. While the functionality of PAR technology for point targets is well-established, accurate polarimetric measurements of distributed targets using this technology have not yet been demonstrated. Currently, the cylindrical and planar architectures are being assessed for MPAR. The latter provides greater flexibility to perform point target and weather functions but (at least in theory) presents a greater challenge to achieve sufficient accuracy for polarimetric weather measurements. To evaluate the performance of a planar polarimetric PAR for weather surveillance, MPAR Advanced Technology Demonstrator (ATD) is being constructed by the MIT Lincoln Laboratory and will be installed in Norman, OK. To perform calibration functions, a tower with the horn antenna will be installed near the ATD site. It will be used to measure the peaks of the ATD antenna patterns on transmit and receive. To account for the system induced errors, these measurements will be used to correct the power measurements from the horizontal and vertical channels, as well as the cross-correlation estimates. But, the limited accuracy of beam peak measurements will affect the correction quality. Herein, an assessment of the beam peak measurement errors as well as their effects on the accuracy of polarimetric variable estimates is presented.