

## **Ultra Wide Band Lower Atmospheric Propagation (LATPROP) System**

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The EM propagation in coupled air-sea inhomogeneous region varies due to ducts, trapping layers and other surface based effects. Coupled Air-Sea Processes and EM Ducting Research (CASPER) is a multi-university research initiative (MURI) project that aim to a further prediction and exploration of EM propagation in coastal marine atmospheric boundary layers (MABL). The East Coast Intensive Operations Period (IOP) is a large field experiment that will be conducted of coast of Duck, NC, during October-November of 2015.

Our system is composed of an ultra-wideband transmitter and a receiver system from 2-40 GHz. This system will be able to sweep the frequency domain and record the variation of propagation loss with frequency under ducting conditions. An Agilent PSG signal generator be placed on the Field Research Facility (FRF) pier in Duck, NC, and emit EIRP between 30-37 dBm, depending on the frequency. The system is composed of 2-18 and 18-40 GHz horn antennas and ultra wide band amplifier.

The receiving system is deployed on a stationary research vessel (R/V Atlantic Explorer). Two UWB antennas (2-18 GHz, 25-40 GHz) will be installed at an extension metal bar on the starboard side of the vessel to avoid bow mast blockage. The antennas will be connected to an Agilent EXA signal analyzer through a low-noise amplifier (LNA) and ultra low loss cable. The whole system is controlled by software on a remote computer or the EXA OS. Both PSG and EXA are connected to internet through LAN cables and the communication between PSG and EXA has been synchronized. Data on each sweep frequency are recorded.

The LATPROP system will measure the lower atmospheric propagation loss in the coastal areas from 2-40 GHz frequencies. The measured signal will be used to invert for the evaporation duct refractivity profile and compare to the profile inferred from concurrent meteorological and oceanographic measurements and COAMPS predictions. Processed data collected during the CASPER East IOP in October-November of 2015 will be presented.