# Lower Atmospheric Propagation Measurement System (LATPROP) Radar CASPER West Research Campaign Post Processing Update

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The Coupled Air-Sea Processes and EM Ducting Research (CASPER) is a multi-disciplinary university research initiative designed to characterize the marine atmospheric boundary layer (MABL) as an EM propagation environment. The CASPER West research campaign was conducted offshore of Pt. Mugu in Southern California. CASPER West was conducted from late September through October of 2017 because of the presence of variable ducting conditions including evaporation, surface, surface based, and elevated ducts as a result of the marine atmospheric boundary layer inversion.

The Lower Atmospheric Propagation Measurement System (LATPROP) Radar implements the Refractivity from Clutter (RFC) technique to estimate the atmospheric refractivity profile from sea clutter measurements. Thus, the LATPROP radar was designed for optimum clutter sensitivity. For this purpose, a commercial Koden MDS-63R marine radar architecture was converted to a software-defined, RFC-capable, high power, high gain system. The RFC algorithm works by obtaining the environment in which the simulated clutter pattern matches the measured radar data. The environment is simulated by a parabolic wave equation (PWE) algorithm.

In order to maximize the clutter to noise ratio (CNR) for the highest fidelity RFC results, additional signal processing techniques were incorporated in the post processing of the data collected during the CASPER West campaign. In this presentation the post processing techniques will be discussed including spur removal, radio frequency interference (RFI) removal, mean noise level subtraction, range oversampling, non-coherent integration, coherent-on-receive processing, and pulse-pair processing.