

A Comparison of Observed Radar Performance with Meteorological Conditions in the North Sea

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In September 2014 a North Sea field experiment was conducted in collaboration between the United States and the Netherlands. The campaign featured a wide range of sensors and systems to determine target positions, and to measure and predict meteorological conditions. The collected data will serve to validate and improve accuracy of phased array radar performance modeling using various assessments of meteorological conditions.

During the experiment, a land based X-band radar has persistently been used to track a fast craft and a tug boat. Both vessels were equipped with corner reflectors which enabled repeated measurements of the propagation factor. The conditions of the maritime atmospheric boundary layer gave rise to extended detection ranges throughout the experiment. For the fast craft alone, the collected data covers 26 runs between transmitter and extended radar horizon for a time span of 4 days.

A discussion will be given on the spatial and temporal development of the observed propagation factor. The transmission path across the North Sea will also be modeled with the Advanced Refractive Effects Prediction System (AREPS) and the included radar threshold model (RTM). Using an inversion technique, both the observed and modeled propagation factors will be analyzed to obtain the corresponding evaporation duct heights. The variability of the propagation factor and the evaporation duct will then be compared with a thorough assessment of the weather situation that is presented in a companion paper in this session (K. Horgan, et al).