

Analysis Of US Navy EM and NWP Models using Wallops 2000 Experimentation Data

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During 2000, the Naval Surface Warfare Center (NSWC) performed an experiment off the coast of Wallops Island, VA that was used to validate the Tropospheric Electromagnetic Parabolic Equation Routine (TEMPER) model. The experiment consisted of collecting signal strength from a transmitter on a ship to a stationary receiver located on Wallops Island at various elevations and ranges. This analysis covered S-band, C-band, and X-band frequencies wherein meteorological data from a helicopter and rocketsonde were collected along with propagation factor F^2 . In order to further understand Naval EM propagation modeling capabilities, a new analysis was performed by reusing the measured weather data and propagation data from the original experiment. This analysis used Coupled Ocean Atmosphere Mesoscale Prediction System (COAMPS) to provide modeled data as an alternative to the measured meteorological data. In addition to a newer version of TEMPER, other commonly used US Navy EM propagation models were also used. The analysis was performed over the variables of the three frequencies, measured/modeled weather, and the US Navy EM propagation models with regards to the differences in F^2 between modeled and measured values. This analysis helps characterize the impacts of using Numerical Weather Prediction (NWP) as an alternative to measured weather in EM propagation modeling.