EMSPPA: Electromagnetic Spectrum Performance Products Ashore
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The Electromagnetic Spectrum Performance Products Ashore (EMSPPA) project was developed by U.S. Naval Research Laboratory to provide a reachback electro-magnetic (EM) performance products system called Electromagnetic Propagation and Performance Assessment Suite (EMPPAS) for U.S. Navy applications. This product is modular, driven by a high-fidelity environmental model, and leverages legacy and emerging EM or Radio Frequency (RF) capabilities in a unified electromagnetic spectrum (EMS) system and integrates them with the Interactive Scenario Builder (or Builder) tool. Builder, with integration of EMPPAS, will replace the current tactical decision aid tool for RF-Advanced Refractive Effects Prediction System (AREPS). Builder is an interactive simulation tool for three-dimensional RF propagation in the atmosphere. It calculates one-way and two-way propagation RF loss taking into account the complex antenna and radar cross section (RCS) pattern data as well as incorporating the influence of meteorology and terrain. Builder can provide visualization of RF capabilities for different platforms such land-based radars, ships or aircrafts and can be used for detailed analysis and geo-spatial and temporal situational awareness. However, the RF propagation calculations are computationally intensive and would require long runtimes to execute on a desktop or laptop computer. To overcome this latency, EMSPPA products are generated by running the Coupled Ocean/Atmosphere Mesoscale Prediction System (COAMPS) model and the Builder tool on the FNMOC High Performance Computing (HPC) systems for different scenarios with products being provided to the user via the GeoServer. The scenario file required for configuring and running the COAMPS model and Builder simulation is generated by the user and transferred to FNMOC. The burden of computing power at the requesting entity is shifted from local workstations to the FNMOC HPC systems. This allows the requested EMPPAS products to be available for users from the FNMOC GeoServer in either GeoTiff (graphical) or XML (metadata) formats in a reliable and timely manner.

This paper describes the EMSPPA project and its implementation on FNMOC HPC systems and provides preliminary results based on generic input scenarios.