

**EM Propagation Modeling and System Performance  
Assessment by SPAWARSYSCEN San Diego**

Wayne L. Patterson & Amalia E. Barrios  
Space and Naval Warfare Systems Center, San Diego  
Atmospheric Propagation Branch, 2858

wayne.patterson@navy.mil  
Com: (619) 553-1424  
Fax: (619) 553-1417

amalia.barrios@navy.mil  
Com: (619) 553-1429  
Fax (619) 553- 1417

*Since 1945, the Atmospheric Propagation Branch of Space and Naval Warfare System Center, San Diego and its predecessor organizations have provided a full spectrum research and development program, rapidly responding to critical fleet EM propagation requirements and deploying systems to address these requirements.*

*From an urgent military operational requirement for propagation modeling within a terrain effects dominated environment, we developed the Advanced Propagation Model (APM), a hybrid ray-optic and parabolic equation (PE) model that uses the complimentary strengths of both methods to construct a fast, but yet very accurate composite model. Using its full hybrid mode, APM has proven to be much faster than PE models alone, with overall accuracy at least as good as the pure PE models. With its airborne sub-model, APM can solve problems for very high elevation angles, where PE methods would not normally be used.*

