

Preliminary Electromagnetic Measurement Results from Trident Warrior'13 Using Sources of Opportunity

C. Yardim⁽¹⁾, T. Rogers⁽²⁾, S. Lynch⁽²⁾, N. Fuhrer⁽²⁾, and P. Gerstoff⁽¹⁾
(1) Marine Physical Lab., University of California, San Diego, CA
(2) SSC PACIFIC, San Diego, CA

Trident Warrior 2013 was conducted off the coast of Norfolk, VA from July 12-18, 2013. Passive RF measurements were made between 80-700 Hz using a vertically polarized monopole and a horizontally polarized bicone antennas that are mounted on the R/V Knorr. The RF measurements are composed of three phases:

1. Estimation of unknown source parameters from ship measurements next to the shore as a function of relative azimuth. These include the source power, antenna pattern, and losses.
2. Antenna patterns of receiving antennas attached to the ship are measured by spinning the ship around its axis and averaging the results of multiple turns.
3. One-way RF signal for multiple sources of opportunity are continuously recorded as the ship moves off shore and returns. After the parameters in (1) and (2) are calculated, it is possible to statistically estimate the propagation effects of the ducting environment. The sources of opportunity are composed of numerous FM, TV, Automatic Terminal Information Service (ATIS), VHF omnidirectional radio range (VOR), and Tactical Air Navigation System (TACAN).

In addition, a large number of direct atmospheric measurements were made using kites, balloons, drifting bouys, and Scan Eagle UAV. The RF data can be used to validate atmospheric predictions and local measurements. It can also be used to estimate statistically the propagation loss on a point in space along the coast where source of opportunity SNR is large. Finally, it is possible to invert for the environment and assimilate the data into atmospheric models using an entirely passive system.