

Precision HF Geolocation

1. Introduction

This task will perform research and development to enable precision T/FDOA geolocation of High Frequency (HF) emitters through the development of a ground and sky wave measurement discriminator and the development of geolocation techniques that make use of this discriminator. Developments under this task can be used to enhance existing and emerging T/FDOA geolocation systems with an HF geolocation capability.

2. Background

Conventional Direction Finding techniques used to prosecute HF signals of interests are accuracy limited and are very dependent on the range to target. Conversely, T/FDOA geolocation techniques provide precision geolocation that is much less dependent on emitter range but for the HF problem are often complicated by ionospheric reflections that allow non-line-of-site propagation, resulting in erroneous geolocations. Knowledge of line-of-site to an HF emitter would allow for T/FDOA geolocation. This however requires methodologies to discriminate between HF ground and sky waves and is the motivation for this effort.

3. Task Description

The specific tasks to be performed as part of the Precision HF Geolocation TST Project are listed below.

3.1 HF Ground and Sky Wave Measurement Discriminator Algorithm Development. This task will focus on the development and testing of discriminator algorithms. These algorithms will be based on the following techniques: 1) T/FOA Measurement Consistency; 2) Multi-Peak CAF Plane Processing; and 3) Algorithms for detection of FOA and phase signatures that are characteristic of ionospheric reflections, and also blind channel estimation signal processing techniques for detection of sky-wave propagation.

3.2 Initial HF Discriminator Demonstration. Laboratory and ground tests will be conducted to support development, testing and analysis of the algorithms developed under 3.1. Additionally, a ground test will be conducted to demonstrate an initial HF geolocation capability. Results will be analyzed and documented as part of the final technical report.

Algorithm developmental and operation algorithm testing will occur at the Ticom Geomatics headquarters in Austin, TX. System demonstrations will be conducted for SPAWARSYSCEN in the Austin, TX and San Diego, CA areas.

4. Contract:

Unclassified US NAVY contract # 06-D-7149.

5. Point. of Contact

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