

# **Terms of Reference**

## **Global Positioning System (GPS)**

### **Vulnerability and Alternatives**

#### **General Objective**

Examine the vulnerabilities of the Global Positioning System (GPS) on Navy and Marine Corps platforms and weapon systems, identify deficiencies, and recommend solutions to the problems. Because GPS is a global utility, Navy and Marine Corps issues and proposed solutions must be examined in the context of what is occurring in the other services, and in the US and foreign civil communities. Identified solutions and recommendations will be made with these concerns in mind.

#### **Background**

GPS is capable of providing highly accurate position, velocity, and timing information to military users anywhere in the world. GPS provides a substantial military advantage and is being integrated into virtually every facet of military operations. Vulnerabilities of GPS have been identified in numerous studies. Specific solutions or recommended alternatives for Naval platforms/weapons systems must be identified.

#### **Specific Tasking**

1. Review and consolidate the findings of the GPS vulnerability studies which have been performed during the past ten years.
2. Review GPS vulnerabilities and the Department of the Navy's (DON) mitigation plans for platforms, weapons, communications, and intelligence systems as related to the projected threat, to GPS Modernization, and to the Navigation Warfare (NavWar) Program and related Advanced Concept Technology Demonstrations (ACTDs). Specifically include the effects of both intentional and unintentional jamming on these systems.
3. Recommend near- and long-term DON-specific research, development, test, acquisition and training activities to improve GPS-related military readiness and precision navigation capabilities in an Electronic Warfare (EW) environment.
4. Identify and recommend alternative strategies for DON platforms, communications, intelligence, and weapons systems where the mitigation of the threat to GPS becomes ineffective or prohibitively costly.

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