

High Frequency Surface Wave Radar Temporary Radiate License Request

1. Program of Research Description of Experiment and Theory of Operation:

USCG District 7 Miami, has requested that Raytheon conduct a High Frequency Surface Wave Radar System (HFSWR) Demonstration in a “Operational Environment” in the Key West area. They have been loaned for a minimum of 120-days, the Canadian DND 1018-Transportable HF-SWR System. The scheduled dates are April 13, 2003 through September 31, 2003

High Frequency Surface Wave Radar (HF-SWR) is a new type of radar that has been developed for the over-the-horizon detection and tracking of maritime vessels and low-flying aircraft. The High Frequency (HF) refers to the frequency band from 3 MHz to 30 MHz, of which 12 to 18 MHz is normally used for the SWR 1018 operation. Surface Wave refers to the phenomena of vertically polarized radio waves following the conducting surface of the ocean. This permits the surveillance of surface and low-flying vehicles well beyond the visual horizon.

A Raytheon Pathfinder Marine Radar is to be added to the demonstration to accommodate the Coast Guard who are interested in this radar to fill-in the short range gap (10-15 miles) of the HFSWR. Characteristics of the Pathfinder II are the following bandwidths – 22.5 MHz, 5 MHz med/long pulse, with pulsewidths of 0.06, 0.25, 0.5 and 1.0 usec. PRF's are 3000, 2000, 1000, and 750 Hz. Polarization of the antenna is vertical, with 24 RPM rotation rate.

2. Objectives Thought to Accomplish:

The demonstrations will take place at the Sugarloaf Key, Florida. Showcased will be a **live demonstration of Detection and Display of both surface and airborne targets** applicable to Counter-Narcotics Initiatives, Homeland Defense, Force Protection, and Maritime Domain Awareness and other National surveillance missions. These targets of opportunity include fishing vessels, go-fast boats, small aircraft and helicopters.

Small fast boats, known as “Go-fast” boats, have become a major concern to many communities within the Government. These boats can be used for running illegal drugs, carrying illegal immigrants, and transporting terrorist weapons of destruction. Detection and tracking of these vessels at a tactically significant range from a shoreline is of utmost importance in order to thwart hostile intentions or illegal activities.

CUSTOMER KEY NEEDS:

USCG : Requires an immediate surveillance capability to be able to detect “Go-Fast” boats in their Operational Area of responsibility, with the focus of this demo being just off of Cuba.

CDTDPO: Validation of enhancements that Raytheon has inserted into the current HFSWR 1018 System, since the last demo which was conducted during the summer of 2002.

MDA: Providing a sensor that can detect Go-Fast Boats as potential platforms for a Cruise Missile Launch.

3. How the Program of Experiment will continue the Science of Experimentation of Radio Art:

Traditional HF-SWR systems have not had much success with detection of low radar cross section (RCS) targets due to the limitation imposed by the clutter and noise environment in which it must operate. To support the detection and tracking of small targets Raytheon has developed clutter and interference suppression techniques that will allow the system to operate reliably and consistently in electrically hostile environments. The transportable HF-SWR system being made available can be readily deployed to make the necessary measurements and demonstrate the operational feasibility of detecting and tracking go-fast boats and vectoring assets for interdiction purposes.

4. Antenna Description:

The antenna is a log periodic antenna.