

Title: MARINE UNEXPLODED ORDNANCE (UXO) SURVEY SYSTEM

Principal Author: Chet Bassani, SAIC, Advanced Sensors and Analysis Division

SAIC, Advanced Sensors and Analysis Division has developed a marine towed array (MTA) system suitable for underwater unexploded ordnance (UXO) surveying. It is designed for shallow water (<30 ft) applications. The 5 m wide air foil-shaped sensor platform has two rear outboard control surfaces to control depth and attitude. It houses 8 cesium vapor magnetometers with 0.6 m horizontal spacing and a time domain EM system with a single large transmitter coil and 4 smaller receiver coils. The sensor platform is towed behind a 30-foot pontoon boat. The pontoon boat was selected for its inherent stability and shallow draft. The boat also houses the data acquisition system and auxiliary electronics required for controlling and monitoring the sensor platform. The electronic sub-systems are contained in two waterproof 19" standard instrument racks. XY positioning of the platform is achieved by measuring the azimuth of the tow cable with respect to the GPS heading of the pontoon boat. The sensor platform has two operating modes: altitude mode for maintaining a constant altitude above the bottom; and depth mode for maintaining a constant depth below the water surface. The survey velocity is between 2 and 5 knots.

The system's first UXO field demonstration took place in the Currituck Sound of North Carolina, adjacent to the former Duck Naval Target Range. Approximately 350 acres were surveyed using the magnetometer and EMI sensors. An overall target location accuracy of ± 25 cm was achieved. A total of 100 targets from the 500 target dig list were re-acquired and dug by UXO-qualified divers. Approximately 50% of the recovered targets were UXO items associated with the former range.

The system's second UXO field demonstration took place in Ostrich Bay, on Puget Sound adjacent to the former Puget Sound Naval Ammunition Depot. Approximately 75% of the Bay was surveyed (324 acres). Of the 100 targets specified for intrusive investigation only a small fraction was intact ordnance.

A third UXO field demonstration was completed in Lake Erie adjacent to the former Erie Army Depot. Widely-spaced transect surveys evaluated the UXO distribution down range from the proof-testing firing points. The active range is significantly more than 50,000 acres. 250 targets were intrusively investigated. The vast majority were intact projectiles. This presentation will concentrate on the results from the most recent demonstration.

A fourth UXO field demonstration has been completed on Vieques and Culebra Islands, PR during the summer of 2007. All electrical/electronic equipment was shipped to San Juan and a vessel of opportunity was utilized for both Vieques and Culebra surveys.

