

ULTRATEMA-4 MARINE DYNAMIC CLASSIFICATION SYSTEM FIELD TRIALS

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Many former and active Department of Defense ranges and installations have Munitions and Explosives of Concern (MEC) in the underwater environment posing a potential, current, or future hazard. The Army Corps of Engineers has evaluated formerly used defense sites and found that there are more than 10 million acres potentially containing MEC in underwater environments, at approximately 400 sites. Remediation of these sites in a cost-effective manner requires as few deployments and as few false positive targets as possible. This necessitates a highly reliable, single-pass dynamic classification system. Design objectives are to detect and classify medium-size ordnance (e.g. 60-mm mortars and larger) with a single-pass towed platform at minimal standoff distances in water depths between 5 and 150 feet.

There have been a number of technologies developed and tested for underwater MEC wide-area detection, including some 15 projects under the SERDP and ESTCP programs. The objective of the project “UltraTEM Marine towed system for detection and characterization of buried ordnance” is to design and demonstrate a vessel-towed single-pass marine dynamic classification system for wide-area assessment and full coverage surveys. This will be achieved by modifying and integrating Gap Explosive Ordnance Detection’s and Black Tusk Geophysics’ existing UltraTEM® package and associated software into Tetra Tech’s towed electromagnetic array (TEMA) platform, and then demonstrate its capabilities over a series of blind targets at controlled site. If approved, this would be the first marine system approved for advanced geophysical classification in the United States.

Previous versions of this sensor technology have been optimized for European dredging sites, where interest is focused on larger and deeper targets. For DoD munitions response sites, the coil configuration and deployment platform both need to be optimized for smaller, shallower (<1m burial depth) targets of interest (TOI). Dynamic classification of smaller TOI, as well as consistent differentiation between TOI and clutter, requires data with high signal-to-noise ratio (SNR) and multiple transmitter excitation directions.

Initial tests were conducted in spring 2021 in both fresh and salt water in the Seattle area to refine the weight and balance distribution and demonstrate the reliable flight characteristics required for precision surveying. This presentation details the results of the October 2021 shakedown test of the system at Sequim Bay over a variety of targets including ISOs, MEC simulants and clutter in a blind test area. The UltraTEMA-4 successfully passed these initial field tests and modifications based on the lessons learned from this effort are being implemented. The final ESTCP demonstration is planned for 2022 at Sequim Bay.