

**Strategic Environmental Research and Development Program
(SERDP)**

FY 2017 STATEMENT OF NEED

Munitions Response (MR) Program Area

**DETECTION, CLASSIFICATION, AND REMEDIATION OF MILITARY
MUNITIONS UNDERWATER**

1. Objective of Proposed Work

The objective of this Statement of Need (SON) is to develop technologies to detect, classify, and remediate military munitions found at underwater sites. Capabilities are needed for a wide variety of aquatic environments such as ponds, lakes, rivers, estuaries, and coastal and open ocean areas. Munitions of interest range from small projectiles and mortars to large bombs, although proposals need not address the entire range of potential munitions with a single solution. Water depths up to 35 meters are of primary interest and there is a specific need for systems that can operate in depths less than 5 meters.

Proposals addressing any aspect of munitions response for underwater sites will be considered, with particular interest in the following topics:

Characteristics of Munitions Underwater and Their Environment: There is a need to improve our current and historical understanding of environmental conditions of underwater sites that impact the performance of sensors and systems used to detect and classify buried and proud munitions. Proposals using existing sensor systems and/or modeling approaches that affect technology performance or site management decisions will be considered. Topics of interest include, but are not limited to:

- Assessing the environment in which the munitions are found. Characteristics such as sediment type, seafloor morphology, hydrodynamic conditions, and water column turbidity or visibility may impact the detection and characterization of munitions underwater. Both real-time and historical models and databases are needed.
- Assessing the relative abundance of intact munitions, munitions-related debris (including fragments, scrap, and remains of targets), and other sources of clutter at multiple sites. Munitions-related debris and other sources of clutter represent potentially significant sources of false alarms making detection and remediation of underwater munitions difficult and costly.

Wide Area and Detailed Surveys: Technologies are needed to allow rapid assessment of large areas to identify concentrations of munitions and areas free of munitions. Technologies addressing this aspect of the problem must provide high areal coverage rates but may be successful with only modest probabilities of detection and classification. In areas found to be

contaminated, data will be required to define the nature and extent of munitions contamination. Individual items must be detected with high probability and sufficient location accuracy that they may be unambiguously identified for retrieval.

The Strategic Environmental Research and Development Program (SERDP) co-sponsored a Workshop on Acoustic Detection and Classification of Unexploded Ordnance in the Underwater Environment in 2013 that identified a number of high priority research topics in this area. The workshop report can be obtained from the SERDP website (<http://serdp-estcp.org/content/download/27995/277023/version/2/file/SERDP+Acoustics+Workshop+Report+2013+Final+DistroA.pdf>). We strongly encourage proposers to review the information in this report for additional detail.

Proposals addressing sensor development, platform integration, analysis methodologies, or large-scale collection of field data at real munitions sites will be considered.

Cost-Effective Recovery and Disposal: Technologies are needed to cost-effectively and safely recover munitions in the underwater environment. Current practices employing divers for manual retrieval of targets are dangerous and prohibitively expensive. Proposals should focus on recovery in the shallow water environment, where munitions are likely to be encountered by the public (up to depths routinely accessed by recreational divers), and should address explosive safety issues. Cost-effective, safe, and environmentally acceptable remediation techniques are also needed for underwater items that cannot be moved due to explosive safety concerns and where blow-in-place operations underwater can significantly impact marine life.

Proposals submitted under this SON should consider operation in a variety of conditions with regard to salinity, water depth, water turbidity, bottom characteristics, depth of burial, and clutter scenarios in a variety of marine, brackish, and fresh water environments. Proposals addressing contamination of soils and water by munitions constituents are not within the scope of this SON.

2. Expected Benefits of Proposed Work

Results from this work will provide expanded capability to cost-effectively characterize, remediate, and manage munitions response sites in the underwater environment and to deploy advanced technologies for a wide diversity of site conditions.

3. Background

As a result of past military training and weapons testing activities, munitions are present at sites designated for base realignment and closure (BRAC) and at Formerly Used Defense Sites (FUDS). Modern geophysical surveying techniques can effectively be used to characterize sites potentially contaminated with munitions on dry land. However, many sites contain munitions underwater, where the environment both restricts access to and may significantly impact the performance of established and emerging characterization technologies.

Historical Perspective: Many active and former military installations have ranges and training areas that include adjacent water environments such as ponds, lakes, rivers, estuaries, and coastal ocean areas. In other sites, training and testing areas were deliberately situated in water environments. Disposal and accidents also have generated significant munitions contamination in

the coastal and inland waters in the United States. Munitions may migrate in the fluid underwater environment and it is not uncommon for munitions to wash on shore during storm events. Dredging projects frequently encounter munitions.

The U.S. Army Corps of Engineers (USACE) and the U.S. Navy have identified more than 400 underwater sites that are potentially contaminated with munitions. The majority of areas are in shallow water (0-120 feet) where the munitions pose a threat to human health and the environment. Some of these sites date back to the 18th century and others were used as recently as this decade. Property potentially containing munitions in underwater environments exceeds 10 million acres. Deeper water areas are known to contain munitions from disposal activities that took place through the early 1970s.

Complementary SERDP/ESTCP-Funded Projects: Currently, SERDP and ESTCP are supporting a number of efforts addressing the problem of munitions response underwater. These efforts are primarily focused on developing an understanding of the performance of acoustic and geophysical sensors for this mission. A few projects are addressing the issue of underwater munitions characteristics and their environment. A brief description of these completed and ongoing projects can be found at the SERDP and ESTCP website (www.serdp-estcp.org/Program-Areas/Munitions-Response).

4. Cost and Duration of Proposed Work

The cost and time to meet the requirements of this SON are at the discretion of the proposer. Two options are available:

Standard Proposals: These proposals describe a complete research effort. The proposer should incorporate the appropriate time, schedule, and cost requirements to accomplish the scope of work proposed. SERDP projects normally run from two to five years in length and vary considerably in cost consistent with the scope of the effort. It is expected that most proposals will fall into this category.

Limited Scope Proposals: Proposers with innovative approaches to the SON that entail high technical risk or have minimal supporting data may submit a Limited Scope Proposal for funding up to \$200,000 and approximately one year in duration. Such proposals may be eligible for follow-on funding if they result in a successful initial project. The objective of these proposals should be to acquire the data necessary to demonstrate proof-of-concept or reduction of risk that will lead to development of a future Standard Proposal. Proposers should submit Limited Scope Proposals in accordance with the SERDP Core Solicitation instructions and deadlines.

5. Point of Contact

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For Core proposal submission due dates, instructions, and additional solicitation information, visit the SERDP website at www.serdp-estcp.org/Funding-Opportunities/SERDP-Solicitations.