

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

FY 2012 STATEMENT OF NEED

Munitions Response (MR) Program Area

**IMPROVEMENTS IN THE DETECTION AND REMEDIATION
OF MILITARY MUNITIONS UNDERWATER**

1. Objective of Proposed Work

The objective of this Statement of Need (SON) is to significantly improve the ability of the Department of Defense (DoD) to detect, characterize, 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 ranging from 20-mm projectiles to 2000-lb bombs must be detected and discriminated from other non-hazardous items, although proposals need not address the entire range of potential munitions with a single solution. Technologies applicable in waters up to 120 feet deep are of primary interest.

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

Platform improvements for detailed surveys

Detailed surveys of contaminated areas are conducted to support remediation of individual munitions items. Individual items must be detected with high probability and sufficient location accuracy that they may be unambiguously identified and retrieved. Geophysical sensors (magnetometers and electromagnetic-induction sensors) are good candidates for this type of survey but, to be effective, they must be deployed in close proximity to the bottom. Underwater vehicles (either towed or autonomous) that can maintain bottom separation of one to two meters, or better, and sub-meter location precision will be required to achieve the potential of underwater geophysical surveys.

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 preferable 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.

Underwater phenomenology

There is a need improve our understanding of the phenomenology of underwater munitions and the underwater site conditions that impact their detection by magnetic, electromagnetic induction, optical and acoustic sensors. Proposals using existing sensor systems and/or modeling approaches to explore munitions characteristics and site conditions that could affect technology performance or site management decisions will be considered. Topics of interest include, but are not limited to:

- Assessing and predicting the location of munitions relative to the sea floor: whether they are found proud of the sea bottom, partially buried, or completely buried in the sediment as a function of historical use and site conditions. Information on munitions locations is needed to assess the utility of various underwater sensor and survey approaches.
- 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.

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.

In 2007, the Strategic Environmental Research and Development Program (SERDP) co-sponsored a Technical Exchange Meeting on Technology Needs for the Characterization, Management, and Remediation of Military Munitions in Underwater Environments that identified high priority research topics in this area. A more detailed description of these issues can be found in the report from the Technical Exchange Meeting (<http://serdp-estcp.org/content/download/8054/99435/version/1/file/SERDP-ESTCP-UW-Workshop.pdf>).

2. Expected Benefits of Proposed Work

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

3. Background

Statement of Problem: 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 have also 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 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 wide array of efforts addressing the munitions response problem. These efforts are primarily directed at the development of geophysical instruments and the collection and analysis of geophysical data, and include a few projects aimed at the underwater munitions response problem. A brief description of these completed and ongoing projects can be found at the SERDP and ESTCP web site (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 \$150,000 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 web site: www.serdp-estcp.org/Funding-Opportunities/SERDP-Solicitations.