

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

**FY 2013 SEED STATEMENT OF NEED**

**Munitions Response (MR) Program Area**

**IMPROVEMENTS IN THE DETECTION, CLASSIFICATION, AND  
REMEDICATION OF MILITARY MUNITIONS UNDERWATER**

The SEED Solicitation is a means for researchers to test a proof of concept during an effort of approximately one year.

**1. Objective of Proposed Work**

The objective of this SEED 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 small 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:

**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 to support site management decisions or the initial steps of a response program. These technologies must provide high areal coverage rates but may be successful with only modest probabilities of detection. In contaminated areas, data are needed 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 or continued monitoring.

**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 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.

### **Characteristics of Munitions Underwater and Their Environment**

There is a need improve our understanding of the distribution and condition of underwater munitions and the underwater site conditions and clutter environments 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 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.
- 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, 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>).

Proposals need not address all aspects of this SEED SON. 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 and remediate 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 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 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 web site ([www.serdp-estcp.org/Program-Areas/Munitions-Response](http://www.serdp-estcp.org/Program-Areas/Munitions-Response)).

## **4. Cost and Duration of Proposed Work**

To meet the objectives of this SEED SON, proposals should not exceed \$150,000 in total cost and approximately one year in duration. Work performed under the SEED SON should investigate innovative approaches that entail high technical risk and/or have minimal supporting data. At the conclusion of the project, sufficient data and analysis should be available to provide risk reduction and/or a proof-of-concept. SEED projects are eligible for follow-on funding if they result in a successful initial project.

## **5. Point of Contact**

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For SEED proposal submission due dates, instructions, and additional solicitation information, visit the SERDP web site at [www.serdp-estcp.org/Funding-Opportunities/SERDP-Solicitations](http://www.serdp-estcp.org/Funding-Opportunities/SERDP-Solicitations).