

# PROGRAM ANNOUNCEMENT FOR FY 2013 ENVIRONMENTAL SECURITY TECHNOLOGY CERTIFICATION PROGRAM (ESTCP) ENVIRONMENTAL TOPICS

## BAA Pre-Proposal Submittal Instructions

(Reference: Broad Agency Announcement (BAA) January 12, 2012, U.S. Army Corps of Engineers, Humphreys Engineer Center Support Activity)

### 1. INTRODUCTION

The Environmental Security Technology Certification Program (ESTCP) is the Department of Defense's (DoD) demonstration and validation (Dem/Val) program for environmental technology. Throughout this document, "technology" refers broadly to integrated systems based on any combination of hardware (equipment) and software (processing), materials engineering processes, and resource management devices, methods, tools, or models based on scientific principles. Technologies appropriate for demonstration and validation will be sufficiently mature that all required laboratory or other proof-of-principle work has been completed. Commercial technologies already in use are not considered appropriate for demonstration and validation.

ESTCP is seeking proposals for innovative environmental technology demonstrations as candidates for funding beginning in Fiscal Year (FY) 2013 in the following topics:

- 1) Management of Contaminated Groundwater;
- 2) Characterization, Control, and Treatment of Testing and Training Range Contamination;
- 3) Military Munitions Detection, Classification, and Remediation;
- 4) Watershed Management Models/Tools for DoD Installation Applications; and
- 5) Demonstration/Validation of Alternatives to Cadmium Plating in Manufacturing and Maintenance of Weapons Systems.

Descriptions of these topic areas are in Appendix A. Complete solicitation details are on the ESTCP web site at <http://www.serdp-estcp.org/Funding-Opportunities/ESTCP-Solicitations/Environmental-Technologies-Solicitation>.

**This Broad Agency Announcement (BAA) is for Private Sector organizations.** DoD organizations (Services and Defense Agencies) wishing to submit proposals to ESTCP should refer to the DoD Call for Proposals. Other Federal agencies (non-DoD) should refer to the Non-DoD Federal Call for Proposals. Instructions for the Non-DoD Federal and DoD Calls for Proposals may be found on the ESTCP web site [www.serdp-estcp.org/Funding-Opportunities/ESTCP-Solicitations/Environmental-Technologies-Solicitation](http://www.serdp-estcp.org/Funding-Opportunities/ESTCP-Solicitations/Environmental-Technologies-Solicitation).

#### 1.1 BACKGROUND

The purpose of ESTCP is to demonstrate and validate the most promising innovative environmental technologies that target DoD's most urgent environmental needs and are projected

to pay back the investment through cost savings, improved efficiencies, or improved outcomes. ESTCP responds to high priority DoD environmental technology requirements and the need to improve defense readiness by reducing the drain on the Department's operation and maintenance dollars caused by real world commitments such as environmental restoration, waste and facility management, and range sustainability. The goal is to enable promising technologies to receive regulatory and end user acceptance and be fielded and commercialized more rapidly. To achieve this goal, ESTCP projects create a partnership between technology developers, responsible DoD organizations, and the regulatory community. This program announcement is seeking proposals from the technology development community.

ESTCP demonstrations are conducted under operational conditions at DoD facilities or locations for which DoD holds environmental responsibility. Candidate technologies are expected to have successfully completed laboratory testing and, when applicable, initial small-scale field testing. The demonstrations are intended to generate supporting cost and performance data for acceptance or validation of the technology. ESTCP demonstration projects are also required to support the future implementation of the tested technology through the development of appropriate guidance, design, and/or protocol documents. ESTCP will not support full-scale demonstrations that are primarily intended to solve an individual installation's problem. Full-scale cleanup is not performed under ESTCP. ESTCP gives priority to those projects that address multi-Service or DoD environmental requirements.

ESTCP projects must:

1. Execute the technology demonstration to validate the technology's performance and expected operational costs:
  - Each project develops a demonstration plan to govern the technical execution and management of the demonstration. Guidance describing the requirements of the ESTCP Demonstration Plan can be found at [www.serdp-estcp.org/Investigator-Resources/ESTCP-Resources/Demonstration-Plans](http://www.serdp-estcp.org/Investigator-Resources/ESTCP-Resources/Demonstration-Plans). The demonstration plan is reviewed and must be approved by the ESTCP Office prior to beginning any fieldwork.
  - Each project is expected to generate sufficient pertinent and high quality data to scientifically prove the validity of all claims made for the technology.
  - Cost and performance data will be collected during the demonstration(s) to allow realistic estimates to be derived for full-scale implementation of the technology at the demonstration site and other DoD sites.
2. Transfer the technology:
  - Identify and work with the intended DoD user community to achieve their acceptance and feedback on the usefulness of the technology.
  - Publish appropriate guidance, design, and/or protocol documents to assist the future implementation of the technology.
  - Publish a final report based on the ESTCP Final Report guidance at [www.serdp-estcp.org/Investigator-Resources/ESTCP-Resources/Technical-Reports](http://www.serdp-estcp.org/Investigator-Resources/ESTCP-Resources/Technical-Reports).
  - Provide a draft cost and performance report for publication by ESTCP based on the ESTCP Cost and Performance Report guidance at [www.serdp-estcp.org/Investigator-Resources/ESTCP-Resources/Technical-Reports](http://www.serdp-estcp.org/Investigator-Resources/ESTCP-Resources/Technical-Reports).

- Publish the results of the demonstration in the scientific peer reviewed literature and present results at technical conferences, as appropriate.
3. Provide data and support to achieve regulatory and end-user acceptance:
- Technologies needing regulatory approval for use will be required to engage the regulatory community at the outset of project execution. Feedback from regulators must be solicited and incorporated into the project's demonstration plan.
  - No single approach for working with the regulatory community is prescribed by the program. Interaction with individual state regulatory organizations, interstate groups, and the U.S. Environmental Protection Agency (EPA) is encouraged. The approach taken should be appropriate for the technology being demonstrated and the regulatory issues associated with implementing the technology.

Offerors selected for demonstration will be teamed with a DoD partner, who will be responsible for assisting in selecting the demonstration site, validating the technology's cost and performance, interfacing with the regulatory and user community, and supporting the transfer of the technology across DoD.

## **1.2 GENERAL INFORMATION FOR PRIVATE SECTOR PROPOSERS**

Awardees under this BAA will be selected through a multi-stage review process, including a brief pre-proposal, a full proposal, and an oral presentation. Based upon the pre-proposal evaluation by ESTCP, each of the pre-proposal submitters will be notified as to whether ESTCP requests or does not request the submission of a full proposal. Those submitters who are invited to submit full proposals, but who do not have a DoD partner or a DoD demonstration site, will be assigned a liaison to assist in the identification of an appropriate demonstration site. Each full proposal submitter will be asked to make an oral presentation to the ESTCP Technical Committee. The costs associated with this initial, pre-award presentation shall not be included in the proposal cost estimate. This cost is borne by the proposer.

Based on evaluation of the written proposal and oral presentation, each full proposal submitter will be notified as to whether the Government wishes to enter into negotiation for the award of a contract. Offerors are advised that only the Contracting Officer is legally authorized to commit the Government. ESTCP reserves the right to select for award any, all, or none of the proposals received. ESTCP also reserves the right to select a portion of the work proposed in any single proposal for award. There is no commitment by ESTCP to make any contract awards, nor to be responsible for any money expended by the offeror before contract award is made for a demonstration. Due to the volume of pre-proposals anticipated to be received, ESTCP will not provide debriefs on those that are not requested to submit a full proposal.

The solicitation will be managed by the ESTCP Office along with the U.S. Army Corps of Engineers, Humphreys Engineer Center Support Activity (HECSA) at Fort Belvoir, Virginia. For contracting information, please contact Ms. Susan Hill at HECSA, by telephone at 703-428-6420 or by e-mail at [Susan.M.Hill@usace.army.mil](mailto:Susan.M.Hill@usace.army.mil). General procedural questions may be referred to Ms. Jina Banks-Saunders in the ESTCP Office at 703-696-2127. For technical questions regarding this announcement, contact the individual listed within the topic area description.

### 1.3 EVALUATION SCHEDULE

**Table 1. ESTCP Project Selection Schedule**

<b>DATE</b>	<b>ACTIVITY</b>
January 12, 2012	BAA / Call for Pre-Proposals Released
<b>March 15, 2012; 2 p.m. Eastern Time</b>	<b>Pre-Proposals Due to ESTCP Office</b>
June 2012	Request Full Proposals
<b>August 2012</b>	<b>Full Proposals Due to ESTCP Office</b>
September 2012	Briefings Before ESTCP Technical Committee
October 2012	Project Selection
March 2013	Award of Contracts / Project Initiation

## 2. PRE-PROPOSAL INSTRUCTIONS

To be eligible for consideration, readers wishing to respond to this announcement must submit a pre-proposal. Any pre-proposal submitted shall be in response to only one of the ESTCP topic areas set forth in Appendix A of this document. The pre-proposal must concisely describe the technology, including its level of development or maturity, and its cost/benefit. Specific DoD site(s) may be suggested in the pre-proposal but are not required.

### 2.1 COVER PAGE

Each pre-proposal must include an ESTCP cover page prepared via the Web Proposal Tracking System (WebPTS) module within the SERDP and ESTCP Management System (SEMS) web site.

1. Go to <https://sems.serdp-estcp.org>, and follow the instructions to create a user name and password. If you already have an account, log in and click on the WebPTS tab at the top of the screen if you are not already on that page. As you make entries in the cover page, you may save data that have been entered or submit a completed cover page. A cover page **must** be completed and submitted before an electronic proposal can be uploaded via WebPTS.
2. After you submit your cover page, additional on-screen instructions will be displayed. A **signed** web-generated cover page must be included as the first page of the pre-proposal. The pre-proposal can be signed by the Principal Investigator or other individual. ***Pre-proposals lacking a Cover Page or with an unsigned Cover Page will be considered unresponsive.*** A cover letter beyond this Cover Page is neither required nor desired. The Cover Page is not included in the page limitation.

If you require assistance with WebPTS, contact Amy Kelly at [akelly@hgl.com](mailto:akelly@hgl.com) or by telephone at 910-579-8052, or the ESTCP Office at 703-696-2127.

### 2.2 PRE-PROPOSAL LENGTH AND STYLE

Pre-proposals should be no longer than five (5) pages and type face not less than 11 point. All margins (top, bottom, left, and right) should not be less than 1 inch. A one-page curriculum vitae is required for each of the principal performers. One attachment of up to three pages of supporting data may also be submitted. The cover page, curricula vitae, and supporting data, including references, are not included in the 5 page limit.

### 2.3 PRE-PROPOSAL CONTENT

The pre-proposal must contain the following information:

1. Short Descriptive Title
2. ESTCP Topic Area: Each proposal must list what topic area it addresses:
  - 1) Management of Contaminated Groundwater;
  - 2) Characterization, Control, and Treatment of Testing and Training Range Contamination;

- 3) Military Munitions Detection, Classification, and Remediation;
  - 4) Watershed Management Models/Tools for DoD Installation Applications; or
  - 5) Demonstration/Validation of Alternatives to Cadmium Plating in Manufacturing and Maintenance of Weapons Systems.
3. Lead Organization: Project lead, organization, address, telephone number, fax number, and e-mail address.
  4. Problem Statement: Clearly state the environmental problem the technology demonstration is addressing and its relevance and importance to DoD. Identify the current approach (if one exists) for this problem and discuss its shortcomings.
  5. Technology Description: The technology description should include the following information:
    - a) *Technical Objectives*. Briefly state the objective of the proposed effort.
    - b) *Technology Description*. Describe the technology in sufficient detail to provide an accurate and factual understanding of its theory, functionality, and operation. If appropriate, provide an overall schematic of the technology. Discuss how the technology is innovative.
    - c) *Technology Maturity*. Provide evidence the technology is mature enough for demonstration (include references and funding history). Discuss any development or design work that is required prior to demonstration.
    - d) *Technical Approach*. Provide a broad overview of the experimental design of the demonstration proposed for evaluating the technology. Discuss the major elements of the demonstration and identify the key aspects of the overall approach as they relate to the evaluation of the technology. Include a brief description of a proposed site(s), if known, or the desired site characteristics. Discuss the scale of the proposed tests and any treatability studies that will be required prior to demonstration. Identify specific technical or performance objectives to be validated. Identify methods for measuring and assessing the performance and expected operational costs of the technology. Describe criteria for success of the demonstration and the technology. Describe the technical approach in terms of tasks to be accomplished.
    - e) *Technical Risks*. Identify potential issues of concern and technical risks in taking the technology from the research phase to the proposed scale of the demonstration. Identify any assumptions that have been made that, if not realized, could impact the successful implementation of the project. Discuss how risks will be managed. If the demonstration is not at full scale, discuss any scale-up issues that will remain at the conclusion of a successful demonstration.
    - f) *Related Efforts*. Provide information on any relationship to other similar projects. Identify funding sources for these efforts.
  6. Expected DoD Benefit: Describe the expected benefit in terms of environmental impact and/or reduced cost. Assess the environmental benefit per site or implementation and the expected aggregate benefit for DoD. Provide realistic projections of the number of DoD sites or facilities where the technology could be deployed. Discuss how the information obtained from the demonstration will enable adoption of the technology throughout DoD. Estimate the expected return on investment and the time for payback. Discuss the life-cycle cost advantages over current approaches.

7. Schedule of Milestones: Provide a project schedule with expected milestones and deliverables for the duration of the project in the form of a Gantt chart. Ensure that all required deliverables are included in the Gantt chart. Required deliverables are found in the reporting guidelines at [www.serdp-estcp.org/Investigator-Resources/ESTCP-Resources](http://www.serdp-estcp.org/Investigator-Resources/ESTCP-Resources).
8. Technology Transition: Describe the method by which the technology will be transitioned to end user(s) or commercialized. Specify how technology transfer methods will differ to reach appropriate audiences (i.e., regulators, consultants, etc). Describe any proposed guidance documents that will assist in future implementation (i.e., guidance, design, and/or protocol documents). Explicitly identify potential first DoD users and follow-on implementation. If there are known institutional or regulatory barriers that effect the transition, they should be described in this section along with recommendations for addressing these barriers.
9. Performers: List the name and organization of the lead person(s) for each organization involved in the proposed demonstration and their expected contributions. Provide a one-page curriculum vitae for each of the performers (not included in the five page pre-proposal count).
10. Funding: State the level of requested funding per year for the duration of the project, including any development, design, or treatability work. Identify costs for any major equipment to be purchased by ESTCP. Although identification of a specific demonstration site is not required for pre-proposals, include an estimate for the cost for a representative field demonstration of the technology. Ensure adequate funds are requested to meet all reporting and travel requirements. ESTCP reporting requirements are available at [www.serdp-estcp.org/Investigator-Resources/ESTCP-Resources](http://www.serdp-estcp.org/Investigator-Resources/ESTCP-Resources). List other sources of expected funding to support the demonstration and leveraged resources. Provide a Point of Contact and telephone number for each leveraged resource listed.

### 3. SUBMITTAL INSTRUCTIONS

Your pre-proposal will be considered officially submitted upon successful on-line submission of a PDF of your complete proposal package via WebPTS. No hard copies are required. **Pre-proposals must be submitted prior to 2:00 p.m. Eastern Time on March 15, 2012.**

Once your proposal has been finalized, create a single PDF that contains all required sections. Make sure to insert the signed and scanned cover page as the first page of the PDF. You are now ready to upload your proposal to the web site.

- Log in at <https://sems.serdp-estcp.org> and go to the WebPTS Tab.
- Follow the on-screen instructions. You must SUBMIT your cover page before the proposal upload function will be activated. Instructions for creating your Cover Page can be found in Section 2.1.

**NOTE:** A system-generated cover page will append to your uploaded proposal as the first page. Once your proposal has been uploaded you will receive an on-line confirmation message in WebPTS and an email will be sent to the submitter.

You may continue to modify your cover page and upload revisions to your proposal until the due date. Should you need to re-upload a proposal or revise your cover page, go to **“My Cover Pages,”** select **“Edit”** next to your proposal title, and click on **“Submit”** to arrive at the proposal upload screen. Make sure any changes to the cover page are made first. Prior versions of your proposal will be over-written and **only the last version uploaded** will remain in the system. It is recommended that you upload your proposal as early as possible prior to the deadline, to ensure a successful and timely submission.

For WebPTS or proposal upload questions, contact Amy Kelly at [akelly@hgl.com](mailto:akelly@hgl.com) or by telephone at 910-579-8052, or the ESTCP Office at 703-696-2127.

#### **4. FULL PROPOSAL**

After evaluation of the pre-proposals, ESTCP will contact all submitters and either request or not request each to submit a full proposal. At that time, detailed instructions will be provided for the full proposal format. If necessary, ESTCP will coordinate and schedule a partnering meeting with an appropriate DoD partner to provide input for the full proposal including, but not limited to, selection of a DoD demonstration site. Full proposals may not be submitted outside the pre-proposal process. Any full proposal that has not been reviewed in the pre-proposal phase will not be evaluated nor considered for award under this BAA.

## **5. EVALUATION FACTORS FOR PRE-PROPOSALS AND FULL PROPOSALS**

The following evaluation factors will be the sole basis for reviewing pre-proposals and full proposals submitted in response to this BAA. Relevance and technology maturity are pass/fail criteria evaluated at the pre-proposal stage only; proposals not passing these gates will not be further evaluated. Among the evaluation factors for both pre-proposals and full proposals, Technical Merit is most important, followed by Cost/Benefit, Transition Potential, and Cost. Small Business Participation will be a factor for the full proposal only and will be weighted less than Cost.

### **ESTCP RELEVANCE (PRE-PROPOSAL ONLY)**

An assessment will be made whether the submission responds to the DoD environmental requirement as described in the topic area (see Appendix A).

### **TECHNICAL MATURITY (PRE- PROPOSAL ONLY)**

An assessment will be made of the appropriateness of the proposed technology for demonstration and validation. Proposed technologies should have completed required proof-of-concept work and have evidence of the technology's capabilities. Technologies should be mature enough that within one year of project initiation any required laboratory treatability work will be completed and a field ready application can be deployed for testing. Standard commercially available instruments or approaches currently deployed at DoD sites will be considered too mature. ESTCP will not consider project submissions that fall in the categories of basic research (scientific foundation) or exploratory development (bench-scale applied research).

### **TECHNICAL MERIT**

An assessment of the technical merit of the proposal will be made. Factors to be considered include: (a) the methodology is scientifically sound; (b) the technology is innovative and is the current state-of-the-art; (c) the technical risks are well characterized; and (d) the technical team is qualified to execute the proposed project.

### **COST/BENEFIT OF TECHNOLOGY**

An assessment as to the cost/benefit of the proposed technology, if it were deployed, will be made. Factors to be considered include: (a) the projected cost savings and/or risk reduction are significant; (b) the projected benefits are reasonable and consistent with the proposed technology; and (c) the payoffs from the proposed technology are commensurate with the projected costs and risks.

### **TRANSITION POTENTIAL**

An assessment as to the potential for a successful transfer of the technology to the DoD user will be made. Factors to be considered include: (a) there is a well defined DoD user for the technology; (b) there are clearly identified activities that will support and enhance the transfer of the technology; and (c) the technology can be implemented within DoD.

### COST OF PROPOSAL

An assessment as to the reasonableness of the proposed cost will be made. Costs should be appropriate and traceable to the level of effort required to execute the project.

### SMALL BUSINESS PARTICIPATION (FULL PROPOSALS ONLY)

The government goal is that small business participation represents 5 percent of the total contract value. The government encourages offerors to propose a goal of 5 percent or greater small business participation. The overall goal accomplishment shall be met through collective small business participation from any type of small business or sub-category small business. Large and small businesses will be evaluated on the basis of: (a) The extent to which small business firms are specifically identified in proposals; (b) The complexity and variety of the work small firms are to perform; and (c) The extent of participation of small business firms in terms of the value of the total acquisition and the extent of which the proposals meet or exceed the small business 5 percent participation goal for this acquisition. Along with applicable qualifications, capabilities, demonstrated achievements, and proposed commitment to the project by the small business, these items will be examined and assessed when full proposals are evaluated.

## APPENDIX A Topic Areas

### Topic 1: Management of Contaminated Groundwater

#### Objective

Demonstration projects are sought for tools, methodologies, or technologies that can reduce the cost of managing the Department of Defense's (DoD) long term liability associated with contaminated groundwater. Groundwater contaminants of concern include chlorinated solvents, energetic compounds, metals, emerging contaminants of interest to DoD, or mixtures of these contaminants. The primary focus of this topic area is innovative technologies and approaches for managing sites and the associated risks where contamination will persist for a significant period of time after an initial remedy is selected. Cost-effective management tools or technologies to specifically address dense, non-aqueous phase liquid (DNAPL) source zones that cause persistent groundwater plumes are of interest. Proposed technologies also may address the risk characterization or remediation of vapors that emanate from contaminated groundwater. Optimization, assessment, and/or long-term monitoring tools related to remediation of contaminated groundwater will be considered.

In June 2011, the Strategic Environmental Research and Development Program (SERDP) and ESTCP co-sponsored a Workshop on *Investment Strategies to Optimize Research and Demonstration Impacts in Support of DoD Restoration Goals*. This workshop identified high priority research topics involving improved assessment and optimization of remediation technologies for treatment of chlorinated solvent-contaminated groundwater. A more detailed description of these issues can be found in the report from the workshop ([www.serdp-estcp.org/content/download/12020/145838/version/2/file/Investment+Strategies+Workshop+Report+October+2011.pdf](http://www.serdp-estcp.org/content/download/12020/145838/version/2/file/Investment+Strategies+Workshop+Report+October+2011.pdf)). Proposers are strongly encouraged to review the workshop report for additional detail.

#### Background

The DoD's Installation Restoration Program has set goals to achieve Response Complete (RC) at 95% of Installation Restoration Program (IRP) sites at active installations, and IRP sites at Formerly Used Defense Sites (FUDS) by the end of FY 2021. The Cost to Complete (CTC) at these sites was calculated at \$12.8 billion in FY 2010. Of these sites, groundwater contaminated with chlorinated solvents is often the most intractable problem. Substantial progress has been made in the past 20 years in the development of technologies for remediation of contaminated groundwater; however, challenges remain. Remedial costs are particularly high at sites, where (1) contamination is extensive, but concentrations are low, (2) DNAPL is present in the subsurface, (3) site hydrogeology is complex (e.g., fractured bedrock), or (4) site conditions require extensive long-term monitoring.

A recent area of interest is green and sustainable remediation related to Executive Order 13514. Specifically, DoD goals are focused on increased energy efficiency; measurement and reduction of greenhouse gas emissions from direct and indirect activities; conservation and protection of water resources through efficiency, reuse, and stormwater management; elimination of waste, increased recycling, and pollution prevention; and fostering markets for sustainable technologies and environmentally preferable materials, products, and services. When applicable, proposers

should consider how such issues may be addressed within the context of in situ remediation of contaminated groundwater.

Proposed technologies should have completed all required laboratory work, although site-specific treatability work prior to the field demonstration is acceptable. Technologies and methods are sought that have well-defined demonstration/validation questions to address. ESTCP demonstrations should address technical and/or regulatory issues that inhibit the widespread use of the proposed approach across DoD. ESTCP supports demonstrations at a scale sufficient to determine the operational performance of the remediation technology and to estimate its expected full-scale costs. Full-scale cleanup of specific sites is not performed under ESTCP. Specific DoD demonstration site(s) may be suggested in the pre-proposal, but are not required.

ESTCP has supported the demonstration of a number of technologies designed for protection and remediation of contaminated groundwater. Proposers should be familiar with the ESTCP portfolio of technologies and tools in order to avoid duplication of previous efforts. ESTCP groundwater project descriptions are available on the ESTCP web site (<http://serdp-estcp.org/Program-Areas/Environmental-Restoration/Contaminated-Groundwater>).

**POINT OF CONTACT:**

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## **Topic 2: Characterization, Control, and Treatment of Testing and Training Range Contamination**

### Objective

Treatment and control technologies are sought that specifically address the remediation or containment of range-related contaminants and residue such as metals, energetics (RDX, HMX, TNT, DNT, picric acid), propellants such as perchlorate, or mixtures containing these contaminants in soils. Remedial and control technologies that allow for continued range operation during technology implementation, are deployable over large areas, or can serve to sustain areas subject to continued use are of interest. Of particular interest is understanding the long-term protectiveness of natural or engineered reductions in bioavailability of contaminants of concern.

### Background

Sustaining test and training ranges is essential to meet DoD's responsibility to ensure adequately trained personnel and properly tested equipment. It is essential to restore and sustain the environment on these ranges in such a way as to allow continued long-term use of these ranges for military testing and training. Test and training ranges present unique challenges for characterization, control and treatment technologies. They may encompass thousands of acres, have limited historical records, and are subject to continued use, which may result in introducing additional contamination.

Management tools and technologies are sought to cost effectively and more accurately delineate munitions constituent source zones and contaminant loading on test and training ranges. Technologies that account for the difficulties of sampling on operational ranges are of particular interest. In addition, management tools or technologies are sought that address soil and groundwater contamination emanating from these source zones, in terms of effective monitoring, sentinel systems, and/or improved exposure assessments.

Proposed technologies should have completed all required laboratory work, although site-specific treatability work prior to the field demonstration is acceptable. Specific DoD site(s) may be suggested in the pre-proposal but are not required. ESTCP supports demonstration at a scale sufficient to determine the operational performance of the characterization, control or treatment technology and to estimate its expected full-scale costs.

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### Topic 3: Military Munitions Detection, Classification, and Remediation

#### Objective

Demonstration projects are sought for technologies that address the needs listed below:

*Classification Technologies:* Technologies are needed that can discriminate munitions as small as 20-mm and 37-mm projectiles from other non-hazardous items in the subsurface. A single technology need not be applicable to all possible munitions types, nor all possible site conditions. Technologies are requested for ultimate inclusion in a series of live-site Classification Demonstrations being conducted by ESTCP in three categories:

- Integrated systems (hand held, man-portable, or vehicle towed) that can survey tracts of land, detect potential munitions and classify anomalies as arising from munitions or harmless clutter;
- Systems that are cued by other survey technologies which can cost effectively, non-invasively interrogate the suspected item and discriminate munitions from clutter; and
- Signal processing technologies that can exploit the current state-of-the-art electromagnetic induction survey data to improve classification capabilities.

*Live Site Demonstrations:* ESTCP has initiated a series of demonstrations at live munitions sites to facilitate the adoption of advanced sensors and analyses in the production environment. Reports describing the results of previous demonstrations in this series are available at [www.serdp-estcp.org/Featured-Initiatives/Munitions-Response-Initiatives/Classification-Applied-to-Munitions-Response](http://www.serdp-estcp.org/Featured-Initiatives/Munitions-Response-Initiatives/Classification-Applied-to-Munitions-Response). Implementation of these classification technologies will require demonstrations at a number of sites spanning a wide range of munitions and site conditions.

As part of this series, demonstrations in one or a combination of the following areas by either individual performers or teams of performers are sought. Demonstrations that involve the use of these technologies as they would be used on production sites or with production teams are of particular interest.

- Data collection with advanced EMI sensors
- Innovative data collection methodologies
- Advanced technologies for data analysis and anomaly classification
- Use of these advanced techniques in the production environment

Proposals that focus only on data analysis and signal processing technologies can expect data sets from one, or more, of the following advanced sensors to be available:

- MetalMapper (ESTCP Project MR-200603)
- TEMTADS (ESTCP Project MR-200601)
- Man-Portable Vector sensor (ESTCP Project MR-201005)
- Handheld BUD (SERDP Project MR-1667)
- Man-portable TEMTADS (ESTCP Project MR-200909)

Details of each of these sensors can be found at [www.serdp-estcp.org/Program-Areas/Munitions-Response/Land/Sensors](http://www.serdp-estcp.org/Program-Areas/Munitions-Response/Land/Sensors).

Demonstrations in the live site program will be conducted at sites amenable to the use of towed arrays and other large platforms as well as sites on which smaller cart and man-portable sensors will be appropriate. Some sites will be open, with good sky view, while others will have vegetation and other obstructions that restrict access to GPS signals.

Proposers with technologies that may be applicable to only a subset of demonstration sites and conditions should specify in the pre-proposal the conditions under which their technology will operate most effectively. Proposals ultimately selected for funding will be matched with a demonstration site(s) based on these restrictions; therefore, it is imperative that proposers provide a clear description of applicable operating conditions.

To be considered for inclusion in the live site program, technologies should be mature enough that within three months of project initiation any required shakedown testing will be completed and a field-ready system can be deployed for testing. This will generally require testing that has been verified by a neutral third party, either at the Standardized UXO Test Sites or other sites that have supported such testing. Minor variations in practice using standard commercially available instruments or approaches currently deployed at DoD sites will be considered too mature.

*Underwater Munitions:* Technologies are needed that can reliably detect and classify munitions that are proud or buried, either individually or in clusters, in the underwater environment. Technologies that will facilitate management of underwater munitions sites are also of interest. Munitions of interest range from small projectiles to large bombs at depths to 120 feet.

## Background

As a result of past military training and weapons-testing activities, military munitions, including unexploded ordnance, are present at sites designated for base realignment and closure (BRAC) and at Formerly Used Defense Sites (FUDS). Current estimates indicate that millions of acres of land and water potentially contain munitions contamination. Ongoing military operations deposit additional munitions on active installations, necessitating periodic maintenance. Construction and reconfiguration of ranges can involve substantial costs for unexploded ordnance (UXO) removal and safety support. Using current technologies, the cost of identifying and disposing of munitions in the United States is estimated to be in the tens of billions of dollars.

Proposed technologies should have completed required proof-of-concept work showing evidence of the technology's capabilities. Initial demonstrations may be at a controlled test site, in which case subsequent testing at live munitions response sites will depend on the performance demonstrated during the controlled tests. Demonstrations directly on live sites, with appropriate supporting performance information, will also be considered. These live site demonstrations may be integrated with ongoing munitions response projects or may be part of the series of large-scale ESTCP demonstrations that are currently being executed.

Technologies applicable to the detection and remediation of explosives in soil or groundwater are not responsive to this topic area.

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## **Topic 4: Watershed Management Models/Tools for DoD Installation Applications**

### Objective

Demonstration projects are sought that can advance the management of land and water resources within a watershed context on Department of Defense (DoD) installations. The focus is on models and decision support tools associated with watershed hydrology, erosion, and impacts to receiving water bodies and their aquatic receptors. Numerous models and tools are available at various stages of development, regional specificity, and sensitivity to various watershed land use and management activities. To take advantage of the current state of model/tool development and management practices using such models/tools, ESTCP is seeking proposals that demonstrate innovative but technically mature technologies, along with associated methodological approaches, that are relevant to a military land use and management context. Application of such models/tools should facilitate the ability of DoD installations to sustain their training and testing missions while meeting compliance and stewardship responsibilities.

As a result, ESTCP is interested in demonstrating models/tools that:

- are broadly applicable across multiple DoD installations on at least a regional basis and can address a variety of military land use and associated management applications;
- incorporate mechanistic understanding, while taking advantage of empirical observations and numerical approaches, to address management questions within a scientifically robust conceptual framework in which key uncertainties are quantified;
- enable efficient tailoring of the amount, frequency, type, quality, and availability of input data needed (for calibration, validation, and long-term use), model/tool complexity (appropriate spatial and temporal scales), and cost of implementation to the nature of the land and water resource management decisions to be made;
- are already accepted, or can receive acceptance through the demonstration project, by the regulatory community for such practices as setting, monitoring, and meeting total maximum daily load standards or managing wetlands; and
- result in software, if developed or modified as part of the project, that is in the public domain, well documented, and reasonably enables future modifications and linkages to other appropriate models/tools.

Desired outcomes of successful demonstrations include validated capabilities to:

- transfer the model/tool to multiple installations in a cost-efficient manner (i.e., costs and user difficulties associated with initial implementation at a new installation are commensurate with the value gained by implementation) and target implementation by the most appropriate end-user community;
- conduct “systems-level” and scenario analyses that can address assessment, monitoring, and adaptive management (compliance, mission sustainability, and stewardship) needs and actions of interest to DoD resource managers across natural, semi-natural, heavily disturbed, and urbanized landscapes, both within and across an installation’s administrative boundary, as appropriate;
- operate in both hindcasting and forecasting modes, the latter of which can be used under

assumptions of climate non-stationarity; and

- communicate model outputs and uncertainties to end users and decision makers in a manner that is easily interpretable and directly relates to management actions and their effects.

Not included as part of this topic are those models/tools that explicitly address coastal processes associated with sea level change and storm surge.

### Background

To accomplish its testing and training missions the DoD uses and in many cases directly manages approximately 30 million acres of land. Often such uses result in direct and indirect physical impacts to soil, vegetation, and water resources. Often these impacts are layered on top of legacy (e.g., prior agriculture) impacts to these land and water resources. Impacts that result in soil erosion and run-off (whether from rain or snowmelt) with subsequent changes in water flows and loading of sediment, nutrients, and pollutants to receiving water bodies can result in compliance, sustainability, and stewardship problems. Watersheds represent an important organizing principle for sustainable natural resource management on DoD lands. Advanced watershed analysis and management models/tools that can be applied and integrated at multiple scales are needed to sustainably manage installations at a systems level.

Proposed technologies and methodologies should have completed all appropriate proof-of-principle work as applicable. ***In particular, any individual or coupled model proposed for demonstration already must have been successfully calibrated and validated at a minimum of one location at relevant spatial and temporal scales.*** ESTCP supports demonstration at a scale sufficient to determine the operational performance of the technology or methodology and to estimate its expected full-scale implementation costs. Site-specific field work (e.g., if some initial local model calibration is required) may be allowed prior to the actual demonstration if it can be completed during the first year of the project. Specific DoD site(s) may be suggested in the pre-proposal but are not required to be identified until submittal of the full proposal.

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## **Topic 5: Demonstration/Validation of Alternatives to Cadmium Plating in Manufacturing and Maintenance of Weapons Systems**

### Objective

Projects are sought to demonstrate and validate alternative materials and processes to cadmium plating that is currently used on a variety of weapons systems. Proposals should address one of the following three areas:

- Electrical and optical connectors and backshells
- Fasteners (threaded and unthreaded)
- Components (for example, items such as wheels and landing gear)

The materials and processes to be demonstrated/validated should already be developed to at least a Technology Readiness Level (TRL) of 4, and the proposed project should bring it to TRL 7 or higher. The primary concern is coatings that provide corrosion protection rather than only galvanic compatibility. Proposals should provide information on previous laboratory testing and field testing, if available, showing performance of the alternative material, as well as information on existing use, if any. Additional materials testing can be proposed (and will be required in the absence of publicly-available, high-quality performance data). In addition, projects must develop a Joint Test Protocol and Demonstration Plan involving stakeholder input and approval from OEM and/or DoD organizations.

Projects must demonstrate producibility, which is defined as the ability to be used in production for the application specified under relevant production conditions. This includes the ability to scale-up the process to accommodate high-volume production of small items (e.g. by barrel coating) or, for components, to accommodate large items such as landing gear. Field testing of coated items must be included in the proposed project.

Proposed materials and processes should take into account compatibility of the alternative material with mating or adjacent surfaces (i.e., the avoidance of large galvanic couples) in common military systems.

Current cadmium plating specifications require chromate conversion subsequent to plating. Proposed alternative materials should either require no post-coating surface treatment or should utilize a post-coating surface treatment that does not involve hexavalent chromium.

Proposed projects involving connectors or fasteners must involve an OEM, and all projects must involve at least one DoD organization as a funded co-performer that is considered a stakeholder for the intended application. Proposals should also indicate the involvement of other DoD stakeholders at least at the consultant level.

Unless the technology is already included in existing specifications, proposed projects must include support for the development of a new specification, or modification of an existing specification, to include the alternative material.

## Background

Cadmium plating, usually with chromate conversion of its surface, has been used by DoD for many years to provide corrosion protection to steel components, and galvanic compatibility and lubricity to electrical connectors and fasteners. Almost all high strength steel components (except functional surfaces) are cadmium plated for sacrificial corrosion resistance. Most threaded and many non-threaded fasteners, as well as electrical and optical connectors, are cadmium plated to provide corrosion protection or galvanic compatibility with aluminum airframes and skins.

Cadmium plating is usually chromate converted to improve corrosion protection. For electrical conductivity electrical connectors are used as-plated, while most other applications require primer and paint. Electrical connectors must provide good electrical conductivity and lubricity for mating and unmating, while threaded fasteners require lubricity for the correct torque-tension. Most landing gear and actuators are fabricated from high strength steel, requiring a coating process that avoids hydrogen embrittlement (low hydrogen embrittlement Cd, MIL-STD-8708).

Most connectors, backshells and fasteners are coated in large numbers by OEMs or their suppliers, while components are typically coated in small numbers by OEMs and recoated by DoD organizations during overhaul.

Some military specifications for electrical connectors permit the use of alternative coatings to chromated cadmium (e.g. MIL-DTL 38999L), including pure Al, ZnNi and electroless Ni-PTFE, but data on these alternatives is lacking for broad DoD use.

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