



ITRC PROJECT PROPOSAL:

Classification Technology and Next Generation Geophysical Sensors

Proposal Date: March 9, 2009

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Call for Proposals Topical Area

- Munitions constituents (MUNI)

Technologies and approaches for identifying, characterizing, removing, and/or remediating unexploded ordnance and other munitions constituents.

Problem Statement (why is this project necessary and relevant to ITRC's purpose & mission¹?)

The detection and remediation of munitions is one of DoD's most pressing environmental problems. The Military Munitions Response Program is charged with characterizing and, where necessary, remediating sites containing munitions. Unfortunately, funding for this program is limited and the list of sites is long; current yearly funding only corresponds to a few percent of the estimated cost to complete the Program. Real progress on this problem will require efficiencies to be found in the remediation process.

Field experience indicates that often in excess of 90% of objects excavated during the course of a munitions response are found to be non-hazardous items. Current technology, as it is commonly implemented, does not provide a quantitative, validated means to classify anomalies as being due to

¹ **ITRC Purpose:** To advance innovative environmental decision making
ITRC Mission: Develop information resources and help break down barriers to the acceptance and use of technically sound innovative solutions to environmental challenges through an active network of diverse professionals.

hazardous munitions or non-hazardous items. With no information to suggest the source of the anomaly (unexploded ordnance [UXO] vs. fragmentation), all anomalies must be excavated by certified UXO technicians using extensive safety measures. As a result, most of the costs to remediate a site containing munitions are currently spent on excavating targets that represent no threat. Distinguishing intact munition items (UXO, discarded military munitions [DMM], etc.) from non-hazardous metal (fragmentation, cultural debris, etc.) and geology, a process referred to as Classification, is critical to DoD efforts to cost-effectively remediate sites containing munitions. (Note: this process used to be referred to as “Discrimination”)

The Environmental Security Technology Certification Program (ESTCP), with Congressional direction, has begun a series of Classification demonstrations designed to test and validate detection and classification capabilities of currently available and emerging technologies on real sites under operational conditions. The results of the first demonstration, at former Camp Sibert, AL, were quite impressive and the second demonstration is on-going at former Camp San Luis Obispo, CA, a more challenging site. Using currently available technologies, the contractor team at Camp Sibert was able to correctly classify nearly half of the anomalies as resulting from non-hazardous items. The emerging sensors demonstrated by their developers did even better; in one part of the site there were only three false positives.

While leaving non-hazardous metal in the ground may pose a significant cost savings to DoD the regulatory community will not be comfortable leaving un-resolved anomalies in the ground. The regulatory community requires education on the basis of the technology, applicability of the emerging sensors (benefits and limitations), and actual case studies demonstrating their use.

Proposed Scope to Address Problem (what is the approach for this project?)

The UXO team proposes to develop a Technology and Regulatory Guidance document (Tech-Reg) titled “Classification Technology and Next Generation Geophysical Sensors”. The Tech-Reg will contain a description of the technology and an explanation of how geophysical sensor readings can be used to “classify” anomalies. The document will continue with a description of the various “Next Generation Sensors” and include a discussion of their benefits and limitations. The document will conclude with several “Case Studies” where the sensors/technologies have been successfully deployed. State regulators will increasingly be asked to evaluate these technologies for use at their sites and this Tech-Reg will provide a basis for this evaluation and ultimate acceptance of this technology. An Internet-Based Training will be developed concurrently.

Targeted Users (who will use products generated by this project?)

- Federal, state, and local regulators and stakeholders involved in oversight of MR projects
- DoD consultants, munitions response contractors, and technology vendors
- Tribal and Community stakeholders

Summary of Deliverables (primary project product(s))

Technology/Methodology Overview: During the first year of the project the team will conduct research on classification technology and the next generation of geophysical sensors. The team will prepare a summary of the technology and include an explanation of the physics that allow for classification of anomalies. The team will identify those sensors/technologies that have been validated and are ready for field deployment and prepare a brief explanation of each. The team will identify relevant case studies including validation studies and prepare summaries of each. The above information will be summarized in a Technology/Methodology Overview Document.

Technology and Regulatory Guidance Document: Following the completion of the Overview document the team will make a determination regarding the appropriateness of preparing a Tech-Reg. This determination will be based on whether adequate information is available to describe to regulators and consultants the proper questions and criteria required to make defensible decisions when developing and reviewing applications for technology deployment. Once the team decides that the available information is adequate the team will expand on the overview document to include a description of the capabilities of the individual sensors/technologies, discuss the benefits and limitations of each technology, identify pertinent questions that should be evaluated during

technology selection, and evaluate the criteria required to make defensible decisions. The above information will be summarized in a Tech-Reg.

Internet Based Training: Internet based training will be developed concurrently with the Tech-Reg. A POC dry run will be offered to inform the State POC's of the use and applicability of the guidance prior to concurrence review. The IBT will be offered during the implementation phase for this project.

Impact (how will this project result in more effective environmental decision making?)

The dissemination of this knowledge to state regulators, tribal organizations, and other stakeholders in the environmental community is best achieved through the ITRC network. The ESTCP reports provide the detailed information about the technologies demonstrated. The purpose of the ITRC document is to explain the technology and its application at MR sites and to dispel common misconceptions about the technology.

Project Schedule

Year 1 (January-December 2010)

- Team Formation and select PA: This step will require minimal effort as the UXO team is already in existence. However, the team will ensure adequate state participation and evaluate team skills/experience to ensure they are appropriate, and if not identify potential team members with relevant experience. *See discussion in Proposed Personnel below.*
- Conduct research into the technology /methodology, identify relevant case studies, and summarize in a Technology Overview Document.
- Evaluate if technology is advanced enough to prepare Tech-Reg.

Year 2 (January-December 2011)

- Prepare Draft Tech-Reg for internal team review.
- Develop Draft Final Tech-Reg for DoD/POC review.
- Finalize and publish Tech-Reg Guidance Document.
- Develop Internet Based Training (IBT)
- IBT Dry-Run.
- Develop Implementation Strategy.

Year 3-4 (January-December 2012 and 2013)

- Project implementation Initial and Final Phase
- Offer IBT
- Attend conferences to advocate use of the product. Presentations, poster sessions, etc.
- Prepare and submit implementation report.

Proposed Personnel

This proposal was developed based on a survey of current UXO team members. The team developed a list of six potential proposals for consideration by the team. Based on a preliminary survey of the team three proposals were selected for development based on: need within the MR industry and regulatory community, a project scope that could be addressed by the UXO team, and a determination that the technology was mature enough for evaluation and development of a Tech-Reg. The three proposals were reviewed by the team and two proposals were determined to be appropriate for ITRC Board consideration. Therefore, this proposal has been determined by the UXO team to represent an: identified need, project scope that is achievable for the team, and the technology is mature enough for technology evaluation and preparation of a Tech-Reg. Specific comments from the UXO team include:

"Potential to be most useful over the next few years and could potential result in large cost savings for many projects" – Anna Butler, USACE

"Proposal has a well-focused scope that ITRC can address" – Mark Fletcher, ARCADIS

Proposed Team Leaders:

- **Bill Harmon**, Michigan Department of Environmental Quality: Bill Harmon is the state coordinator for the Formerly Used Defense Site program. Bill has worked for the MDEQ since 1992. Bill is responsible for oversight of DoD military munitions and Superfund Site response actions in Michigan. Bill has been a member of the ITRC UXO team since 2006 and has served as team leader since 2007. Bill served six years with the U. S. Navy and retired from the Naval Reserve with the rank of Commander. Bill has a BS degree in biology with a minor in physics from Michigan Technological University.
- **Guy Warren, Alaska Department of Environmental Conservation:** Guy Warren is an Environmental Program Specialist with the Federal Facilities Environmental Restoration Program for the Alaska Department of Environmental Conservation in Anchorage, Alaska. Mr. Warren has worked for ADEC since 2006 and serves as the Federal Facility Agreement, Restoration Project Manager for the Former Adak Naval Complex and the Military Munitions Response Program Coordinator for ADEC. Mr. Warren works with other ADEC project managers to ensure the MMRP program is implemented consistently across the state. Mr. Warren has experience with all DoD services conducting MMRP work in the State of Alaska and has overseen several large MEC remediation projects on Adak. Prior to working for ADEC he served as the Environmental Director for the Native Village of Tanacross, a village in interior Alaska, and worked for over 5 years as a private consultant in Anchorage. Mr. Warren has served on the ITRC UXO team since 2007 and has served as team leader since 2008. Guy earned a Bachelor's Degree in Environmental Studies from Utah State University in Logan, UT in 1998.

Potential State Interest:

Classification is an important emerging topic in the MR industry that has the potential to greatly reduce the cost of cleanup for MR Sites. Therefore, it is critical for the state regulator to understand the technology, its benefits, and limitations.

- Currently the UXO team has membership from the following States: Alabama, Alaska, Colorado, Michigan, Nevada, New Jersey, Oklahoma, South Carolina, and Texas. The team is currently seeking to improve state participation in the UXO team for our current project. We are seeking participation from Arizona, California, Florida, New Mexico, Utah, Montana, and Wyoming. Since the UXO team is a standing team State participation is anticipated to carry over from project to project.

Other Organizations:

- Currently the UXO team has representatives from the following federal and state organizations: USGS, Washington DC Department of the Environment, US Army ERDC, USACE (Omaha District, Albuquerque District, Huntsville Ordnance and Explosives Center of Expertise), US Air Force Air Armament Center, US Army Environmental Command, West Virginia Army National Guard, USEPA (OSWER, Federal Facilities Restoration and Reuse Office), Pacific Northwest National Laboratory, US Army Center for Health Promotion and Preventative Medicine, Kansas Army National Guard, NOSSA, and ESTCP/SERDP.
- Currently the UXO team has representatives from the following IAP member organizations: DuPont, Tetra Tech-EC, Tetra Tech-Inc., Battelle, AMEC Earth and Environmental Solutions, ARCADIS, UXOPro Inc., SAIC, Weston Solutions, Kleinfelder, and WL Gore and associates.

Skill Mix of Team Members Required

- The UXO team represents a diverse group of professionals from the range of specialties involved within the munition response industry. The team will continue to solicit participation from all segments of the MR industry.

Sectors of Team Members Required

- The primary gap in team membership is within the geophysical research community (Berkley National Labs, USGS, University of Denver, Nova Research, etc.). If selected as a project for

2010 the team will identify the key individuals within these organizations and invite them to participate on the team.

The UXO team has been working since 1999 to provide information and training to state regulators on many of the complex technical aspects of munitions cleanup. The team has presented two-day training on the basics of UXO cleanup as well as internet-based training on site investigations and site remediation at UXO and DMM sites. The team has also prepared documents addressing important aspects of munitions cleanup work including historical records review, geophysical prove-outs, survey of munitions response technologies, and most recently quality considerations for munitions response work.

Related Work:

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