



# STANDARDIZED UXO DEMONSTRATION SITES

## SHALLOW WATER STANDARDIZED UXO TECHNOLOGY DEMONSTRATION SITE



U.S. Army Corps of Engineers, Huntsville Center displaying their Shallow Water Detection System.



### For more information

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For decades, soldiers and weapons developers have gone to ranges and training areas to practice with and test bombs, projectiles, grenades, and other munitions. A portion of these munitions did not function as designed, becoming what is known as unexploded ordnance (UXO). UXO has accumulated from these activities over the years at approximately 1,700 Formerly Used Defense Sites, 25 Base Realignment and Closure sites, and a number of active installations covering millions of acres.

The U.S. Army is committed to characterizing and remediating these sites to a condition consistent with their intended use. One major barrier to honoring this commitment is the lack of adequate technology that can reliably detect UXO and discriminate between the UXO and non-hazardous materials common to the ranges and test areas. Failure to distinguish between UXO and non-hazardous materials such as shrapnel, target, or munitions parts results in a high percentage of false alarms. These false alarms increase the amount of time required to remediate a site and drives up the costs associated with cleanup efforts. Advancements in UXO detection and discrimination technologies are necessary if there is to be a successful restoration and transfer of firing and test ranges to other purposes. Due to the projected cost of UXO site cleanup, even small advancements in technology will result in significant cost avoidance and increased safety for technology users and the public.

Many UXO sites requiring cleanup contain wetlands, ponds, lakes and tidal areas with a water depth of 10 feet or less. Shallow water areas are estimated to cover approximately 202,000 acres. The establishment of the Shallow Water Standardized UXO Technology Demonstration Sites further demonstrates the Army's continuing commitment to the environmental remediation of all Department of Defense ranges. This site has been designed to independently test and compare the performance of current UXO detection sensors and systems. It also provides a developmental area for private industry and academia interested in advancing the state of the art of existing or emerging shallow water detectors.

## MISSION

The site is located at Aberdeen Proving Ground, Maryland. The program's mission is to provide the UXO community with standardized technology demonstration sites for shallow water technologies, protocols, and targets for UXO technology testing and performance. The program provides an automated system for the scoring of sensor and system performance in both the response and discrimination stages, allowing for comparison of gathered data. Performance reports are posted to the program's Web site to allow access to testing and demonstration results. The program also maintains a standardized target repository of items available to use for testing and demonstration purposes.

## SITE LAYOUT

The area chosen for the shallow water test site was known as Cell #3 in a dredgespoil field. The cell bottom is primarily composed of sediment removed from the nearby Bush River. This is a freshwater site. Metal and non-metallic clutter has been cleared from the site to avoid extraneous signals. The test site contains three areas; a calibration area, a blind grid area, and an open water area.

This test site has been designed so that the calibration and blind grid areas meet the 2.4-meter (8-foot) definition of shallow water as specified in the Environmental Quality Testing Military RDT&E Project Execution Plan 1. With these areas under 2.4 meters of water, corresponding depths in the open water area range from 0.2 through 3.4 meters (0.5 through 12 feet). Another test site design feature is that the water level is adjustable between 0.3 and 3.0 meters (1 and 10 feet). The test area ranges in size between 1.5 and 2.8 hectares (3.7 and 6.9 acres) depending on water level.

The Calibration Area contains fifteen projectiles, three each 40, 60, 81, 105 and 155 mm. One of each projectile type is buried at a projectile diameter to depth ratio of 1:1, 1:5, and 1:11. In addition, two "clutter-cloud" targets scenarios have been constructed. The calibration area is designed to provide the user with a sensor library of detection responses for the emplaced targets and an understanding of their resistivity prior to entering the blind test fields. Target emplacement data sheets and GPS coordinates are provided to users of this area.

The blind grid area contains 644 detection opportunities. Each grid cell is 4 meters square. At the center of each cell is either an ordnance item, clutter, or nothing. Users receive the GPS coordinates for the boundary of this area.

The open water scenario contains a variety of navigational, detection, and discrimination challenges. This scenario comprises all the water covered ground, excluding the calibration and blind test areas.

## SITE USE

Access to the site may be gained through referencing site use in a SERDP or ESTCP proposal or through the EQT program. Prospective users may also elect to pay for the use of the sites themselves. To request the use of a site, prospective users must submit an application sixty days prior to the desired demonstration date. The application is available on the Web site [www.uxotestsites.org](http://www.uxotestsites.org). The user must also submit a demonstration plan, including field operations, equipment description, and QA/QC plans, thirty days in advance of the desired demonstration date. Final approval authority rests with the Program Manager.



The Shallow Water Standardized UXO Technology Demonstration Sites Program is a multi-agency undertaking coordinated by the U.S. Army Environmental Command (USAEC). The program is funded and supported by the U.S. Army Environmental Quality Program (EQT). The Aberdeen Test Center (ATC) and the U.S. Army Corps of Engineers' Engineer Research and Development Center (ERDC) provide programmatic support.