Standardized UXO Demonstration Sites

Operator Influence on Unexploded Ordnance Detection Performance

The countermine community has found that a major influence on the ability of detection systems used to accurately locate and discriminate land mines in the field directly relates to the system operator. Until recently, operator influence, as a potential influence on a system's overall detection capability had not been evaluated in the munitions and explosives of concern (MEC)[1] community. This project will take operators trained in identically and compare their ability to operate a system as instructed. The results of this demonstration will then be evaluated and the level of influence quantified. The knowledge gained from collected data will help to determine the level of operator influence present and identify the steps necessary to remove operator bias in order to support more accurate detection and discrimination of unexploded ordnance (UXO).

Partners in this project include Texas Engineering Extension Service (TEEX) at Texas A&M University, Concurrent Technologies Corporation (CTC), the U.S. Army Corps of Engineers (USACE) – Hunstville, and the U.S. Army Research Labs – Human Research and Evaluation Directorate (HRED). TEEX will provide novice operators, and CTC will assist with data analysis. USACE – Hunstville will be responsible for geophysical consultation, detection equipment, and test methodologies, and U.S. Army Research Labs – HRED will support audiology testing and psychological evaluation of participants.

The objective of the task is to determine what factors, if any, elicit greater human performance during UXO clearance operations at munitions response sites (MRS). The study involves careful observation of both "novice" and "expert" UXO technicians, while capturing data that can be correlated

For more information

U.S. Army Environmental Command
Public Affairs Office
1-800-USA-3845 or 1-800-872-3845
email: imcom-usaecpublicaffairsoffice@conus.army.mil
http://aec.army.mil

[1] *As defined in Department of Defense Directive 6055.9-STD, approved by the Department of Defense Explosives Safety Board, MEC is a term which distinguishes specific categories of munitions that may pose unique explosives safety risks including: UXO, as defined in 10 United States Code (U.S.C) 101(e)(5); DMM as defined in 10 U.S.C. 2710(e)(2); or munitions constituents (e.g., TNT, RDX), as defined in 10 U.S.C. 2710(e)(3) if present in high enough concentrations to pose an explosive hazard.*

between the two groups. The "novices" in this project are all recent graduates of the UXO Technician Level I certification program at TEEX. Anyone having no prior experience with UXO detection equipment could be considered a true novice; however some constraint had to be placed on the level of inexperience. Having all novices come from TEEX allows testing of demonstrators with the same training. The "experts" in this project are demonstrators who have either earned the title of Level III UXO Technician or have had military EOD formal training which consists of over one year of specialized military schooling. Experts in this project typically have a minimum of five years of EOD Field experience.

Data collected in the project to be correlated between the two groups, novices and experts, includes: Probability of detection (Pd), False Alarm Rate (FAR), detector height above grade, sweep rate, forward velocity, personal demographics, and time required to cover the test grid. A laser-based tracking system will allow for real-time recording of human movement. Additionally, stress and hearing tests will be performed on all participants to provide a more thorough understanding of human factors during these field tests.

Testing of operators utilizing EM-61 and Shonstedt magnetometer systems was completed in late 2005 at the Standardized UXO Technology Demonstration Site located at Aberdeen Proving Ground, Maryland. The collected data will be evaluated by U.S. Army Aberdeen Test Center personnel in early 2006. The goal of data analysis will be to provide a clearer understanding of distinctions separating the performance of "novice" and "expert" UXO technicians.

Technologies that can only be operated by experts and the system's manufacturer are of minimal use to the UXO community for detection and discrimination efforts. The proper training and transfer of detection and discrimination technologies is of equal importance to the actual technologic capability of system. Ultimately, this project will quantify the level of operator bias present during UXO detection activities and will lead to improvements in the baseline transition and training programs for the technologies.

UXO technician is wearing various analytical devices in order to capture his overall efficiency.