Multi-Axis, Multi-Component Classification Metal Detector

Program Manager 256-895-1540

U.S. ARMY CORPS OF ENGINEERS **BUILDING STRONG®**

Objective

Transition a new multi-axis electromagnetic sensor emerging from Defense Department research and development efforts to the U.S. Army Corps of Engineers (USACE) Military Munitions Response Program (MMRP).

Problem Statement

Current technologies do not provide robust capabilities to classify anomalies as unexploded ordnance (UXO), discarded military munitions (DMM) or other materials. New, purpose-designed sensor technologies offer superior classification performance. This activity will transition commercially available versions of this newly available technology to project use by USACE personnel, primarily in a quality assurance role. Other uses will be incorporated as USACE becomes familiar with the technology and its applications.

Technology Description

Metal detectors designed to classify UXO from clutter have been in development for many years through the Strategic Environmental Research and Development Program. One such system, a multi-axis, time domain electromagnetic induction system has gone through demonstration and validation through the Environmental Security Technology Certification Program and is now commercially available through Geometrics, Inc., a geophysical equipment manufacturer. Metal detectors designed to classify buried objects as an item of interest (such as UXO or DMM) use technologies to calculate the polarizabilities of a buried object's principle axes. This is accomplished using multiple electromagnetic transmitters and multiple receiver sensors. For efficiency and portability, these systems will use three orthogonally oriented EM transmitters and multiple three-axis receiver sensors. The receiver sensors measure decay transients from buried objects, which in turn are modeled to polarizabilities of the object's three principle axes. This information is then fed into automated classifiers or matched to polarizability libraries of known objects.

Technical Approach

USACE will acquire MetalMapper systems configured for full anomaly classification. USACE will obtain training on how to operate the units in the field and be instructed on how to process the data and extract anomaly characteristics for anomaly classification. Once system operations and data analysis are understood, these tools will be incorporated into munitions response quality assurance plans; the intent is to use these tools to test results of anomaly resolutions performed by contractors in their on-going project activities.

These advanced systems will simplify QA functions by allowing QA personnel to visit any anomaly identified during normal project activities and test whether or not a UXO or DMM item remains without having to excavate. As project teams become familiar with this technology it will be transitioned into the anomaly resolution process as an alternative to excavating anomalies during remedial response actions.

Expected DoD Benefit

This project advances the state of the art in geophysics for the military munitions response program. This project provides government personnel with specialized, hands-on training using one of the most advanced, commercially available geophysical sensor specifically designed to differentiate UXO and DMM from clutter. This project also provides USACE personnel the opportunity to learn how best to integrate this new technology into their MMRP quality assurance process and transition it to the anomaly resolution process.

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Distribution A: Approved for public release; distribution is unlimited.
June 2010