

Meeting DoD's Environmental Challenges

Multi-Sensor Towed Array Detection System (MTADS) (MR-199526)

Objectives of the Demonstration

The U.S. Department of Defense controls more than 12 million acres of weapons ranges in the United States. This ESTCP project sponsored the development and evaluation of a fully automated, vehicle-towed Multi-Sensor Towed Array Detection System (MTADS) for locating buried Unexploded Ordnance (UXO) that allows the user to see through shallow near-surface clutter and to distinguish real targets



from false positives. The system uses multiple sensor arrays, satellite navigation, and a Differential Global Position System (DGPS). Data collected in the field are downloaded to an analysis workstation and maps showing buried targets and suitable for integration into Geographical Information Systems (GIS) are automatically generated.

The MTADS can be configured with one of three sensor arrays: magnetometer, magnetic gradiometer, and electro-magnetic induction. Data from the multiple sensors can be correlated and overlaid or integrated with other photographic or geophysical data or images. Sophisticated data analysis algorithms analyze targets and identify the size, depth, and location of buried ordnance. MTADS has been through four test demonstrations to determine overall detection performance and unique characteristics: (1) Naval Research Laboratory Chesapeake Bay Division, Maryland; (2) Magnetic Test Range in Twentynine Palms, California; (3) Jefferson Proving Ground, Indiana; and (4) Pine Ridge Reservation Badlands Bombing Range in South Dakota.

Demonstration Results

The MTADS exhibited excellent performance for detection of buried bombs and shells. The detection rate was very good for all sensor modalities (up to 95% probability with location accuracy better than 30 cm), and MTADS successfully located and characterized 80-100% of the emplaced buried ordnance ranging in size from submunitions to 2000-pound bombs at depths up to 5 meters. In addition, the quality of the data collected by the MTADS permitted the development and implementation of advanced discrimination algorithms to help mitigate the false-alarm problem that plagues most detection systems.

Implementation Issues

MTADS represents a faster, more cost efficient and effective survey tool compared to conventional manual methods, particularly in scenarios where remediation is required. Estimated survey costs



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(based on MTADS equipment costing less than the original \$740k for the prototype) were in the range of \$500 to \$1,000 per acre. MTADS creates a permanent archival record for each target detected and survey control points that will enable the targets to be reliably reacquired at any time in the future.

At this point in its development, MTADS is usable in the field with certain limitations. Although a 30% reduction in false detection has been achieved, data interpretation remains subject to the expertise of the user. (Project Completed - 1999)

Related Documents

- 🔀 Cost and Performance Report
- <u>Technical Report</u>
- <u>Technical Report</u>
- 🗾 Final Report
- Jointerim Report
- <u>Interim Report</u>
- Interim Report