



# **COST EFFECTIVENESS ANALYSIS: IMPLEMENTING WIDE AREA ASSESSMENT (WAA) TECHNOLOGY ON ARMY MMRP SITES**

**Prepared for: U.S. Army Environmental  
Command**

***Leading Change for Installation Excellence***



# Agenda

- **Introduction**
- **Background**
- **Approach**
  - **Document traditional v. WAA MMRP site characterization methods**
  - **Define MMRP site conditions**
  - **Identify costs and benefits of each MMRP site characterization method**
  - **Desktop validation of cost effectiveness analysis**



## Introduction

- **Develop cost effectiveness analysis of application of WAA techniques/technologies to Army MMRP sites**
- **Compare costs and benefits associated with the application of WAA to those of more traditional MMRP characterization methods**
- **Final products**
  - **Cost Effectiveness Analysis Report**
  - **Recommendations for WAA methods on actual Army MMRP Sites**



## Background

- Only a fraction of areas on MMRP sites require response actions
- Need techniques that can quickly assess large sites and identify:
  - Previously unidentified areas of munitions activities (require investigation/cleanup)
  - Areas of no previous munitions-related activity (footprint reduction)





# Approach

## Document WAA Methods

- Document traditional characterization methods
- Document emerging WAA methods
- Describe each based on common parameters

Example Parameters ↓ Methods	Purpose/ Expected Results	Applicability	Limitations	Equipment and Materials	Labor	Detection Ability	Coverage Rates	Cost
Traditional Method								
WAA Method								



# Traditional UXO Characterization Methods

- ~ 100 percent Coverage
- Grid by Grid, Lane by Lane Characterization/Mapping
- Variety of man portable systems & Platforms applied
  - EMI (EM61)
  - Cesium-vapor Mag (G-858)
  - Flux-gate Mag (Schonstedt)



Flux-gate Mag



Cesium-vapor Mag

## Data Sources:

- Installation-level workplans
- Site characterization reports
- Technology research and development (AEC/ATSC Demonstrations)

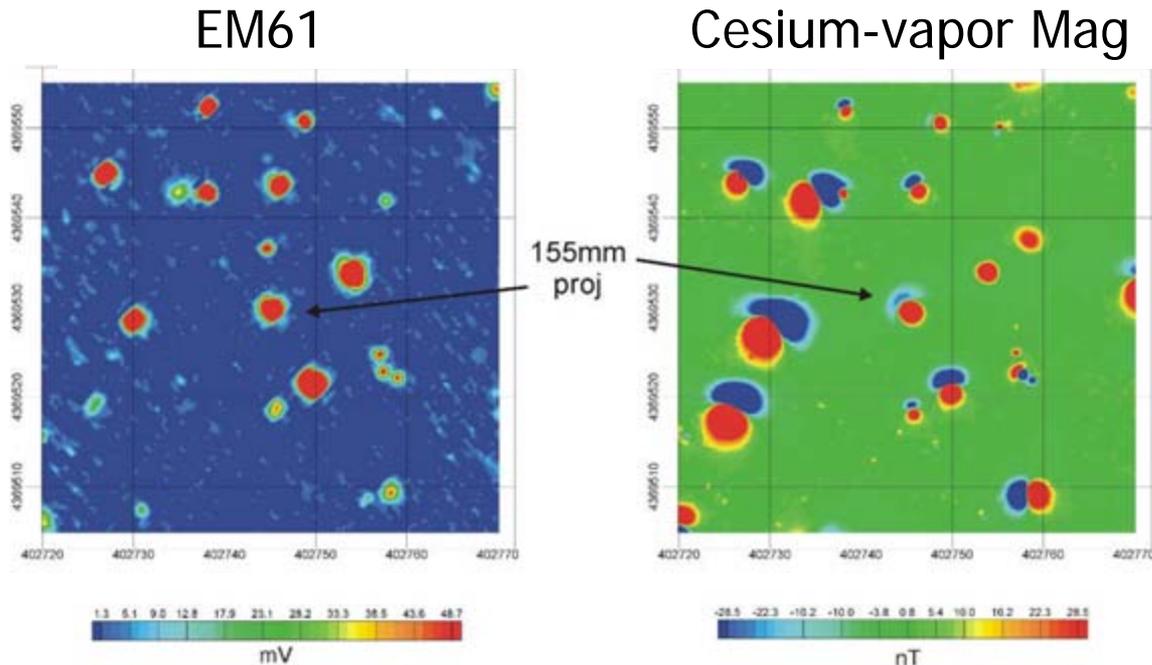


EMI



# Traditional UXO Characterization Results

## Maps of individual ordnance





# WAA UXO Characterization Methods

## Airborne

- LIDAR and orthophotography
- Helicopter-borne magnetometer
- Followed by land based QA/QC

## Land based

- Towed-magnetometer and EMI arrays
- Widely spaced sampling transects using visual sampling plan

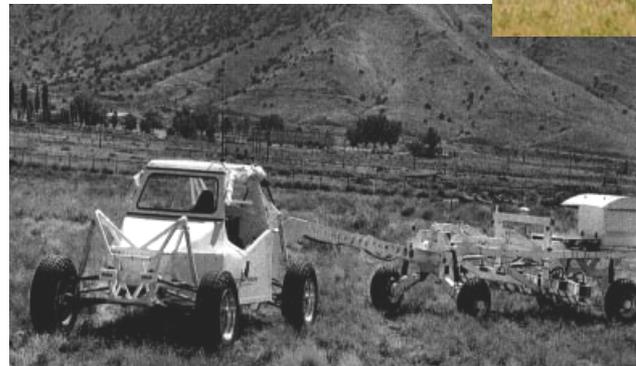
## Data Sources:

- SERDP/ESTCP projects
- Industry-based research and design
- Air Force MMRP



LIDAR and Ortho

Helicopter magnetometer

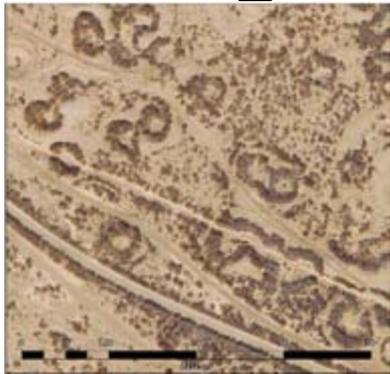


Towed mag and EMI

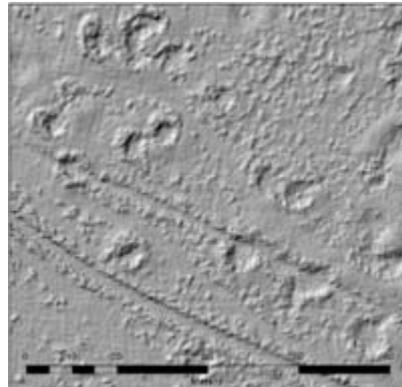


# WAA Technology Results

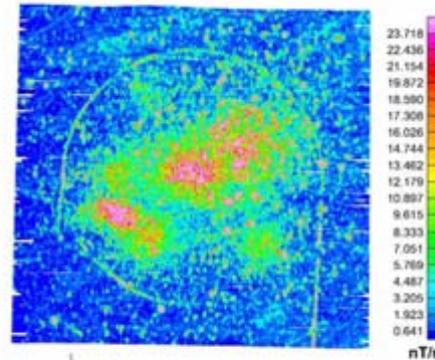
## Ordnance feature/ density maps - very large areas



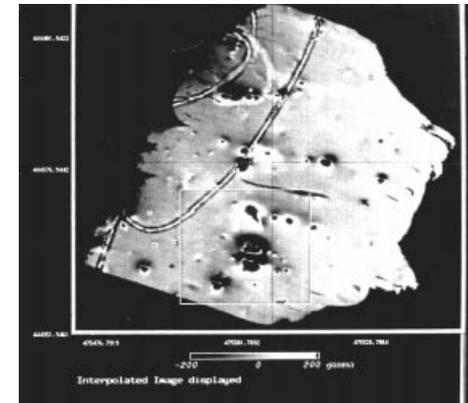
Orthophotography



LiDAR



Helicopter-borne magnetometer



Magnetometer Towed Array



# Potential Site Factors

- **Vegetation & Terrain**





# Potential Site Factors

- **Vegetation**



Ranges before (left) and after (right) a controlled burn



## Desktop Validation

- Identify 3-5 Army MMRP sites
- Align the site type with applicable methods
- Determine the most cost effective methods based on:
  - Site features
  - Desired end state/future land use





## Identify Costs and Benefits

- **Document and quantify cost and benefits of applying traditional and WAA methods**
  - Assess in context of representative MMRP site descriptions
  - Quantify costs of data collection and processing
  - Evaluate benefits
    - ID previously unidentified areas
    - footprint reduction
    - increased confidence in data
    - accelerated schedule
    - secondary benefits (improved elevation data, facility/infrastructure inventories, etc.)
- **Compare and contrast traditional and WAA methods**
- **Identify conditions when each method is most cost effective**
- **Cost Effectiveness Analysis Report**



## Final Products

- **Cost Effectiveness Analysis Report**
  - When and where can this technology be used to characterize a site?
  - What is the most cost effective way to characterize a site that has these key attributes?
  - Does the use of this technology to characterize this site meet the level of confidence required for decision makers to exclude areas from future assessment/response?
- **Site-specific recommendations for WAA**



# INSTALLATION MANAGEMENT COMMAND



***“Sustain, Support and Defend”***