Demonstration of Wide Area Assessment Technologies to Characterize Munitions Density

Closed Castner Firing Range
Fort Bliss, TX

Technical Project Planning Meeting #4
20 October 2010

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Agenda

- Review project objectives
- Intrusive Investigation Approach
- Cultural Resources Protection
- Intrusive Procedures
- Demolition Operations
- Materials Potentially Presenting an Explosive Hazard (MPPEH)
- Progress to Date and What We're Finding
- Schedule Update & Questions

Project Objectives

Characterization Challenge

- Millions of acres of closed ranges in MMRP site inventory
- Many acres do not contain UXO
- Need methods to cost effectively:
  - Focus characterization efforts on areas used for munitions related activities
  - Eliminate areas with no indication of munitions use

Full Coverage: "Mag and Flag"

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Project Purpose

- Field test the WAA methods and conclusions included in the *Wide Area Assessment Cost-Benefit Analysis: Active Army Military Munitions Response Program* (USAEC 2009)
- Collect site characterization data using a variety of WAA methods in a manner to ensure usable data for subsequent MMRP investigations (i.e., RI/FS)

Objective

Demonstrate non-traditional technology applications for detecting munitions on Army property

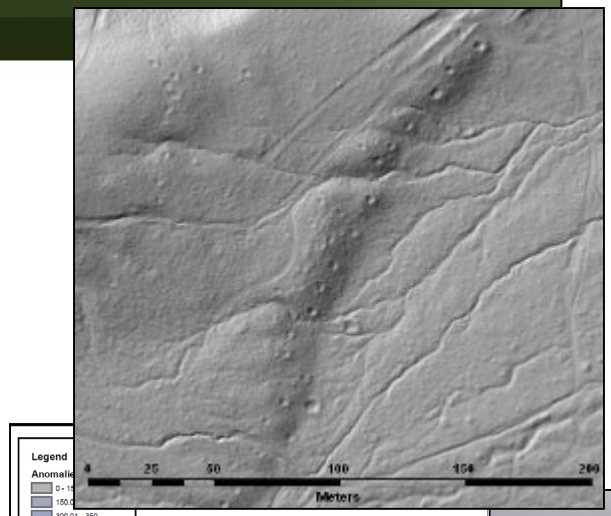
- Determine areas with evidence of past military munitions use
- Determine relative density of anomalies across these areas
- Determine areas with minimal evidence of past military munitions use

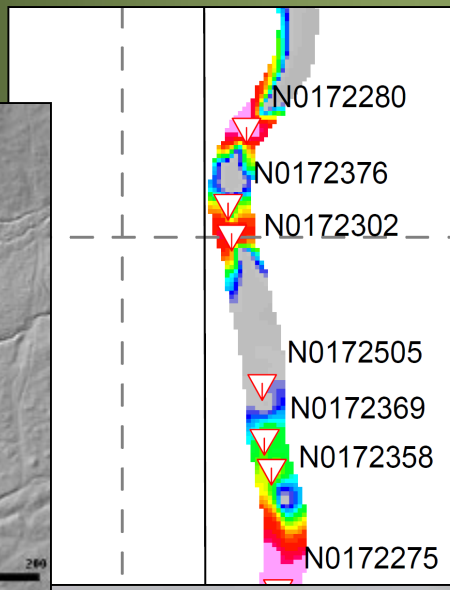
What is not included…

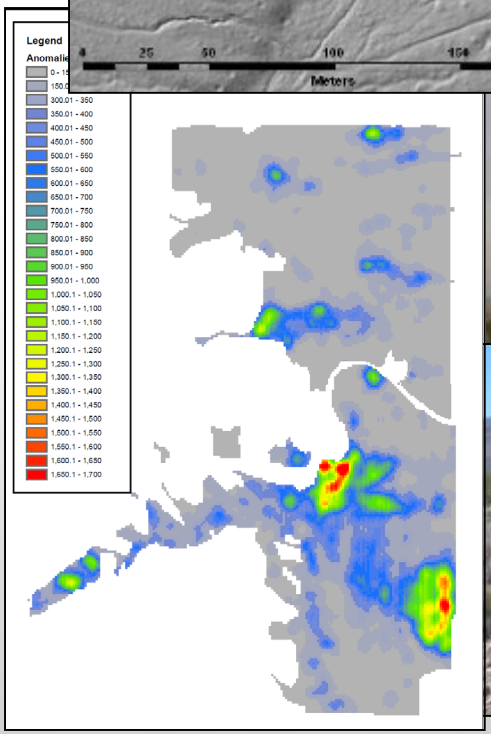
- Remedial Investigation
- Decisions about future land use
- Decisions about transferring the property
- Decisions about developing the property
- Decisions about mapping individual ordnance items
- Decisions about cleaning-up all the munitions

What is included…

- Collecting data about the distribution and density of munitions on Closed Castner Range
- Demonstrating costs and benefits of applying proven technologies in innovative ways







Project Scope

- Site Reconnaissance
- Lidar & Orthophotography
- Site Prep
  - Survey
  - Run VSP
  - Mark Transects
  - Install IVS
- Helicopter-borne Magnetometry
- Ground-based Geophysics (towed array & man-portable EMI)
- Analog Data Collection
- Intrusive Investigation
- Project Reports
  - WAA Field Demonstration Report for Castner Range
  - Revised WAA Cost-Benefit Analysis: Active Army MMRP
  - WAA Cost Estimating Equations

Complete. Results discussed at TPP #2.

Complete. Results discussed at TPP #3.

Ongoing.

Yet to do.

Intrusive Investigation Approach

Intrusive Investigation: Purpose

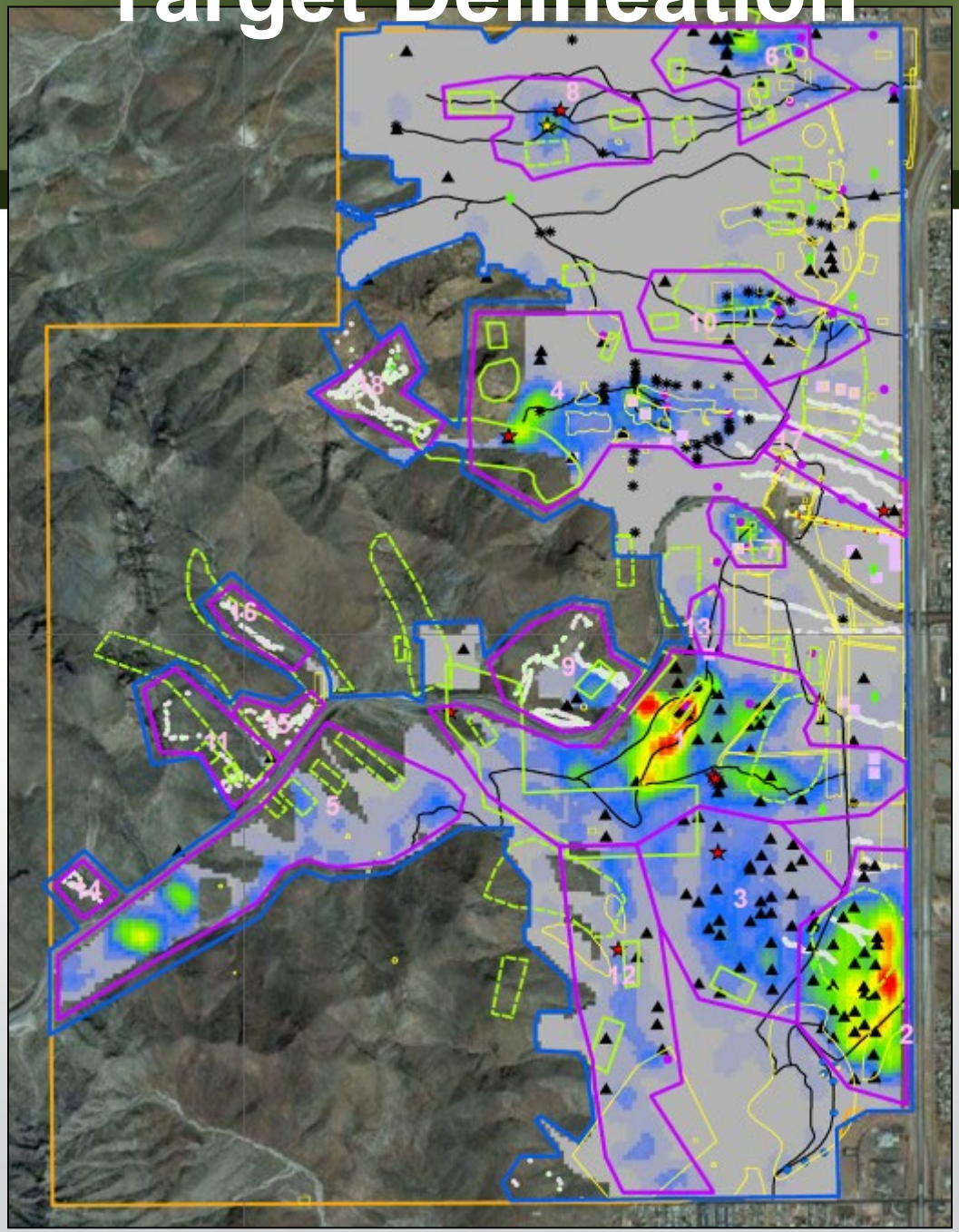
- Verify target and non-target areas:
  - Target areas:
    - Determine the proportion of the anomalies that are attributable to munitions
    - Perform statistically valid sampling through intrusive investigation of detected anomalies to characterize the source of each anomaly and confirm areas as target areas
  - Non-target areas:
    - Test hypotheses that MEC densities are less than or equal to 0.5 MEC items per acre
    - Perform statistically valid sampling (at 90% confidence level) through intrusive investigation of detected anomalies to "resolve" and confirm the source of each anomaly
- Characterize each excavated object (size, depth, orientation, nomenclature…)

Delineating Target Areas

(FYI – You're not supposed to be able to read this.)

Data Layer	Wt	Target Areas																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
DGM 300/Acre	10											NA	10	10	NA	NA	NA		NA
DGM 800/Acre	15			15				15	15	15	15	NA			NA	NA	NA		NA
DGM 1200/Acre	20	20	20		20	20	20					NA			NA	NA	NA		NA
EHSI Inv MEC	7				7		7		7	7	7	7							
EHSI Inv MD	3	3		3	3		3		3	3	3	3	3						
Surface MEC	7	7		7	7				7	7			7			7		7	
Surface MD	3	3	3	3	3		3		3	3	3	3	3		3	3	3		3
Analog MEC Recon	3	NA	3	3	3	NA	NA	NA	NA	3	NA	3	NA	NA	3	3	3	3	3
Lidar or Ortho	2	2	2		2	2	2	2	2	2	2		2	2				2	
Hist Range Fans	2	2	2	2	2	2	2	2	2	2		2	2	2	2	2	2	2	2
Heli-MagAOI	2		2	2	2			2			2			2					
Stakeholder Concerns	3											3			3	3	3		3
Total Score		37	32	35	49	24	37	21	39	42	32	21	27	16	11	18	11	14	11
Mean Anomaly Density / Acre		590	837	410	352	382	284	482	223	396	234	59	247	316	48	108	265	80	433

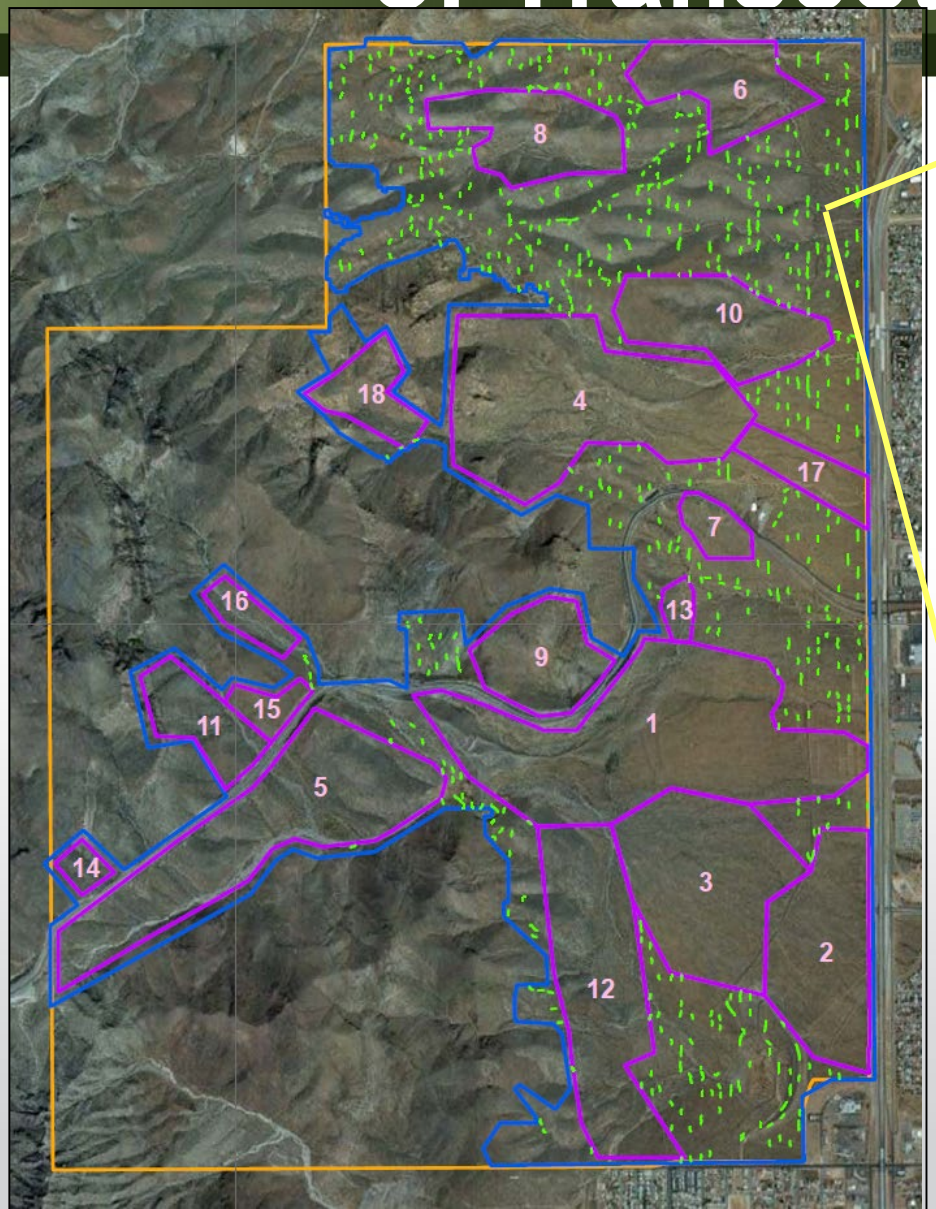
Target Delineation

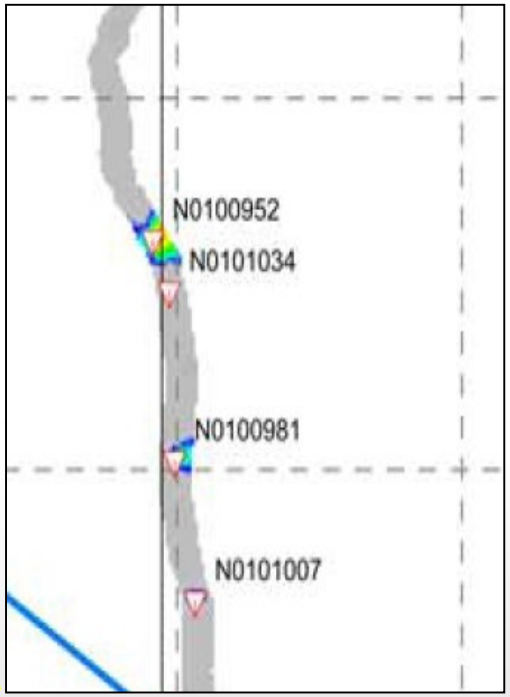


Sample Size Calculations

- Assume homogeneity within each target area and in all of non-target area
- Sample of anomalies in target areas
  - Estimated population of anomalies (based on DGM anomalies/acre)
  - Proportions of munitions/non-munitions items (comparing background densities to target area densities)
  - Upper/lower error limit (.05)
- Sample of anomalies in non-target areas
  - Based on *UXO Estimator* software
  - Identify enough linear feet of transect to meet 90% confidence level
  - Identify anomalies within transects

Random 100-ft Sections of Transect





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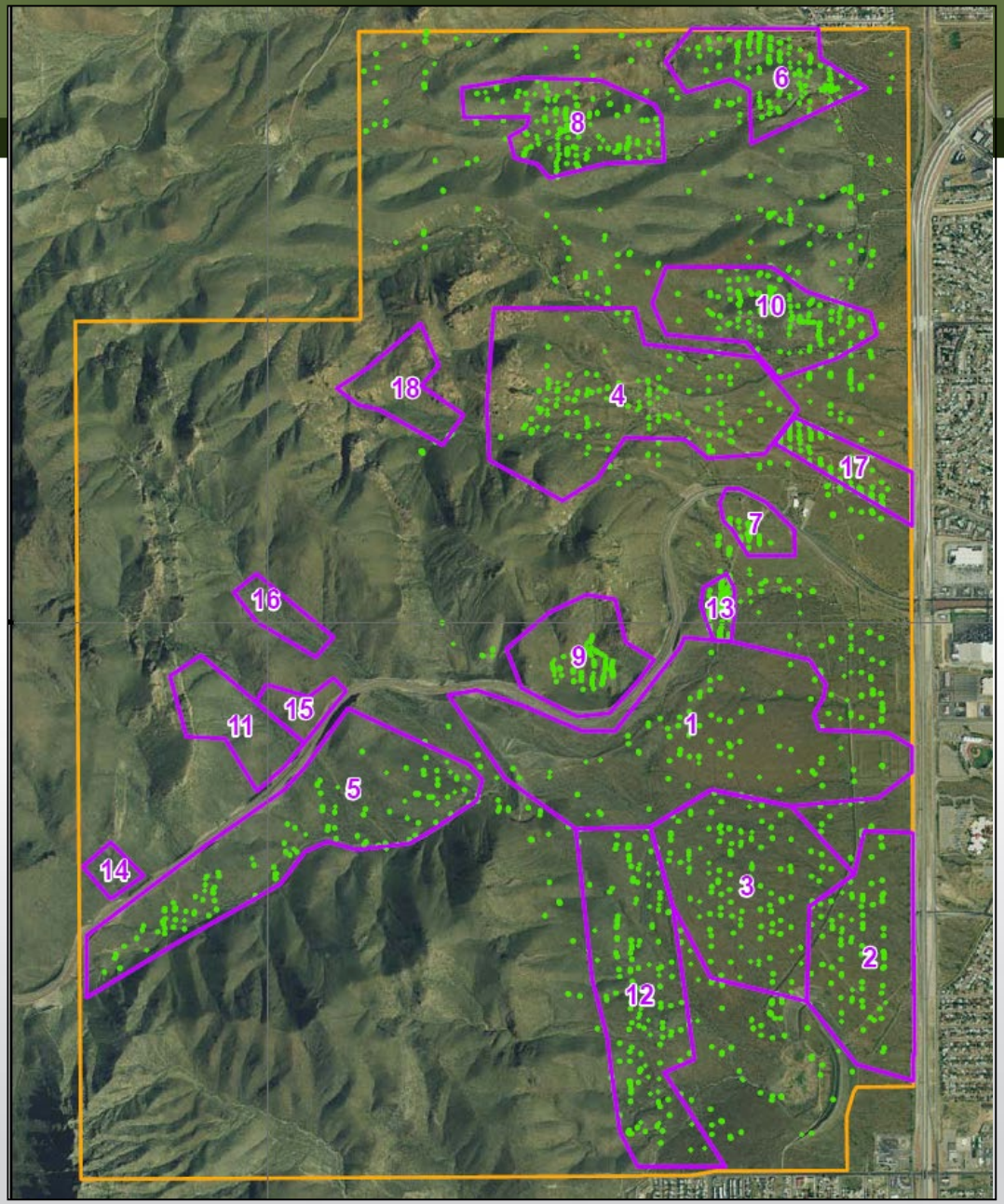
Selected Anomalies

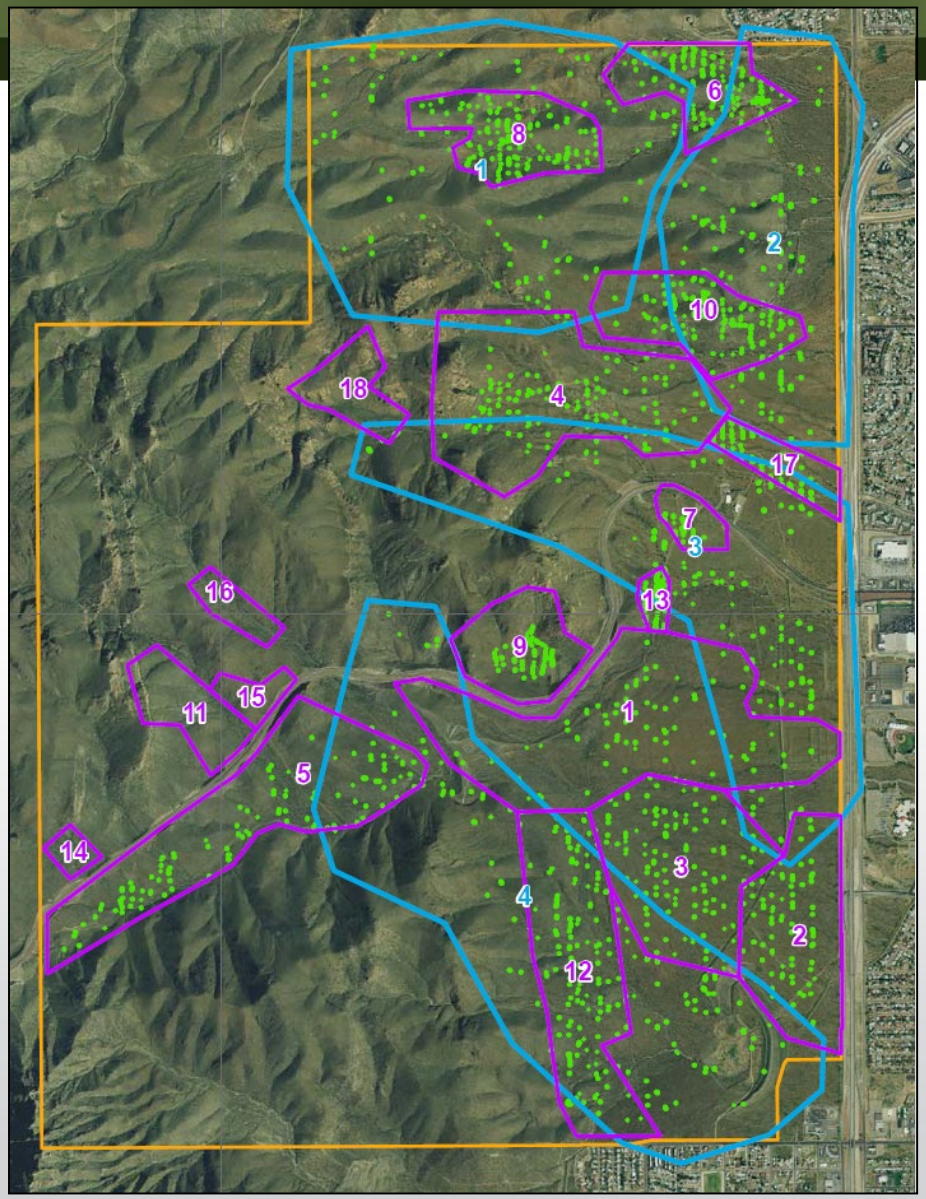


Number of Digs – Target Areas

Area	Calculated Sample Size	Anomalies Being Sampled
TA 1	80	80
TA 2	80	80
TA 3	125	125
TA 4	125	129
TA 5	125	125
TA 5	125	125
TA 6	155	156
TA 7	125	61
TA 8	155	155
TA 9	125	125
TA 10	155	156
TA 11	175	175*
TA 12	155	155
TA 13	155	93
TA 14	175	175*
TA 15	175	175*
TA 16	155	155*
TA 17	175	141
TA 18	125	125*

* Estimated. Dependant on actual numbers of anomalies in surveyed area

Non-Target Area "Lots"



Number of Digs Non-Target Areas

Area	Calculated Sample Size	Anomalies Being Sampled
NTA Lot 1	95	108
NTA Lot 2	95	138
NTA Lot 3	95	153
NTA Lot 4	95	120

Lots established for Quality Control (QC) sampling. If a dig fails acceptance testing, the lot fails and requires some degree of rework.

Cultural Resources Protection

Cultural Resources Protection

- Conducted Cultural Resource Awareness Training
  - El Paso Archeology Museum
  - Fort Bliss Cultural Resources Staff
- Surveyed areas - URS UXO Tech and Fort Bliss archaeologist
- Deleted/replaced anomalies located in areas “eligible” for protection
- Established stop-work and notification procedures for inadvertent discoveries

All proposed anomaly locations have been surveyed and “cleared” for intrusive investigation

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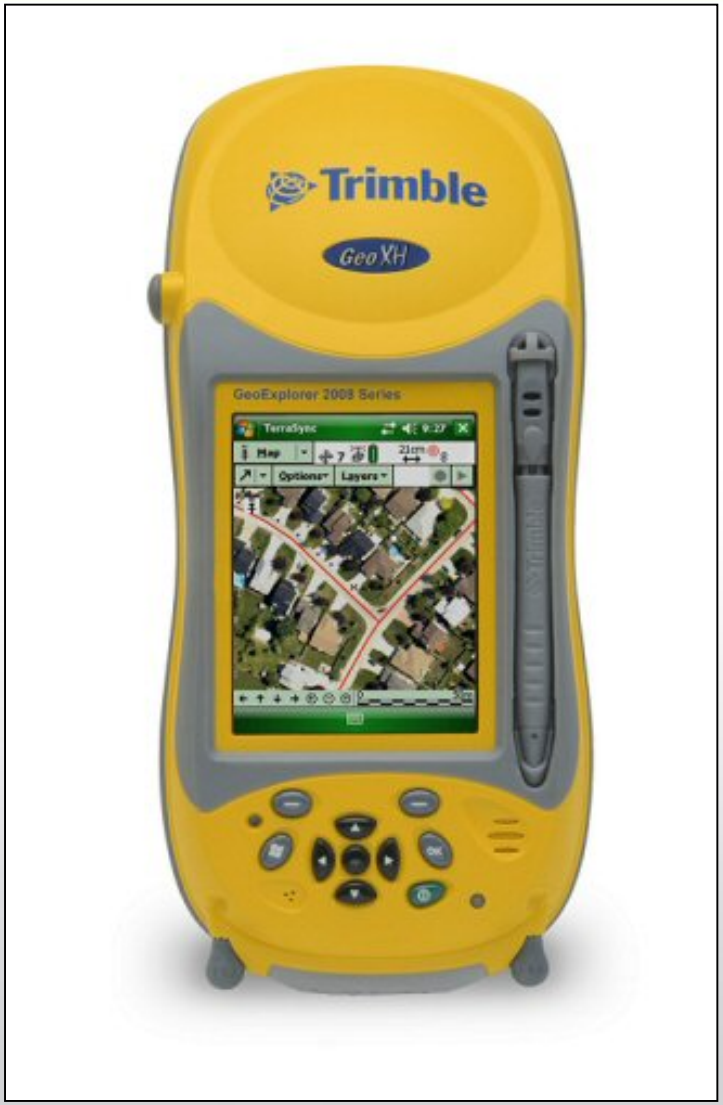
Intrusive Procedures

Intrusive Procedures: Overview

- Navigate to anomaly location using handheld GPS unit (Trimble GeoXH)
- Pinpoint anomaly using handheld EMI (MineLab)
- Use hand-tools to excavate all anomalies in sampling area
- Classify items
  - MEC
  - Munitions debris
  - Range related debris
  - Cultural debris
- Record data about each item

Instrument Set: Trimble GeoXH

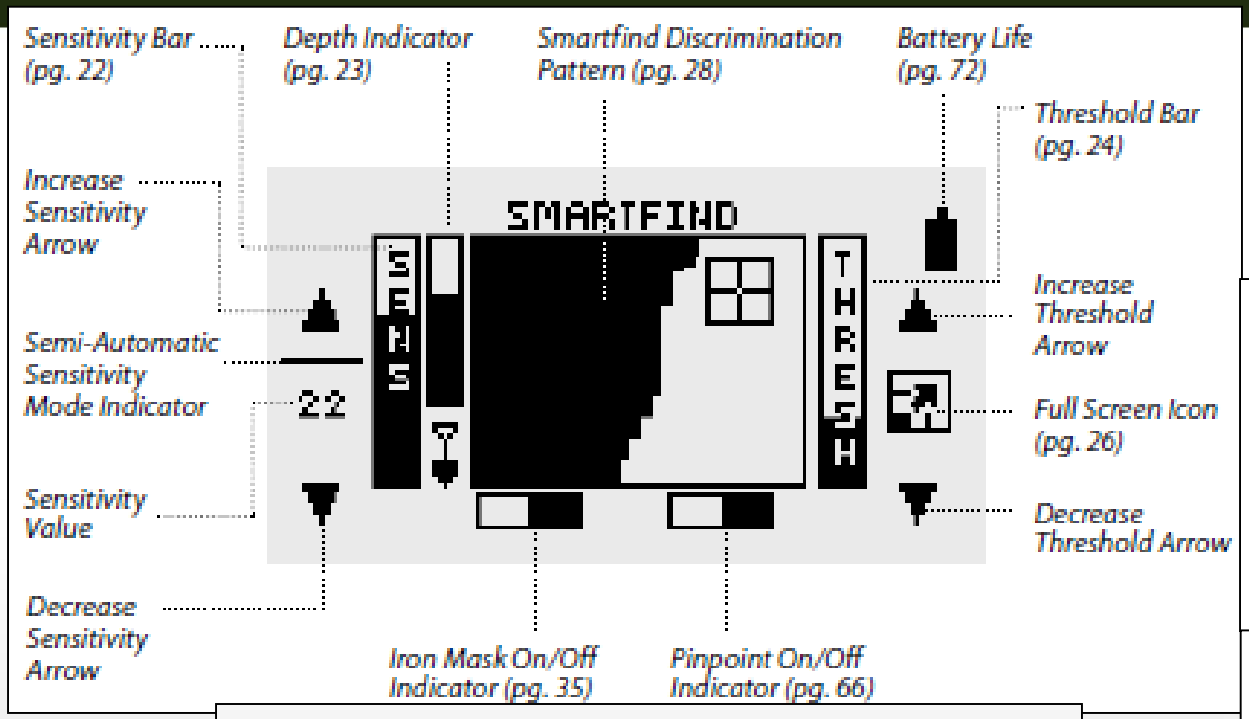
- Handheld GPS and PDA
- No base-station to set up
- Simpler and cheaper than RTK (?)
- ~ 1ft accuracy (sufficient for wide area assessment?)
- Daily QC check on surveyed control point

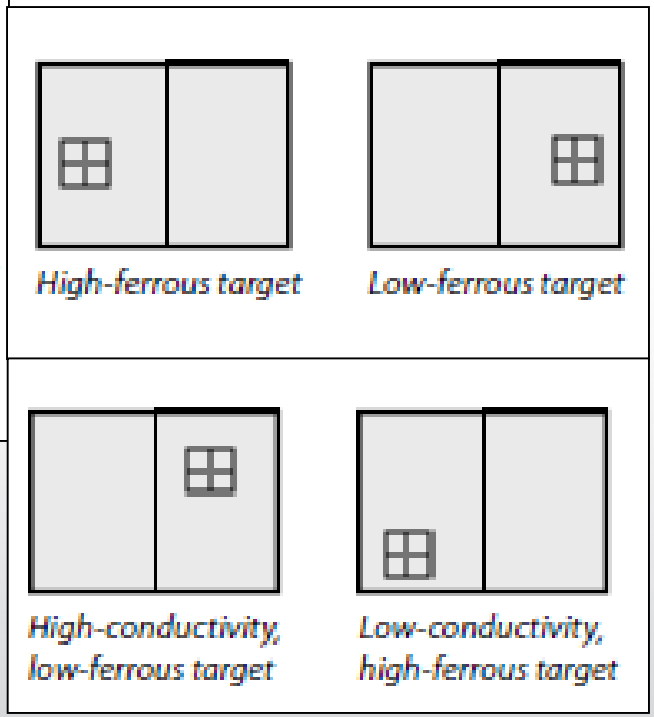


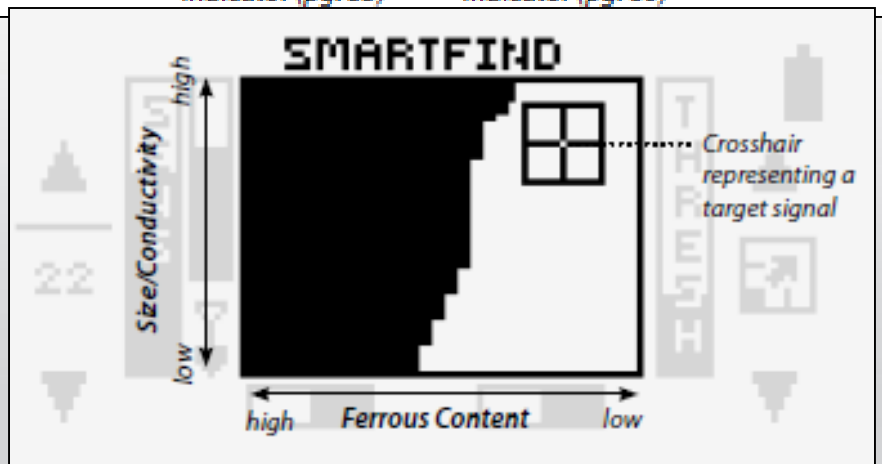
Instrument Set:
MineLab Explorer II Hand-held Sensor

- Electromagnetic Induction (EMI) Sensor:
  - Creates electrical field that induces a magnetic field in metallic objects
  - Detects of all metals- ferrous and non-ferrous- for MEC operations
  - Changes in the field create an audible alarm.
- Function Checks
  - Continuing to use the Instrument Verification Strip (IVS) established for the DGM data collection
  - Created parallel IVS with non-ferrous objects
- Settings checks at start and mid-day (additional as needed)

MineLab Settings and Readings





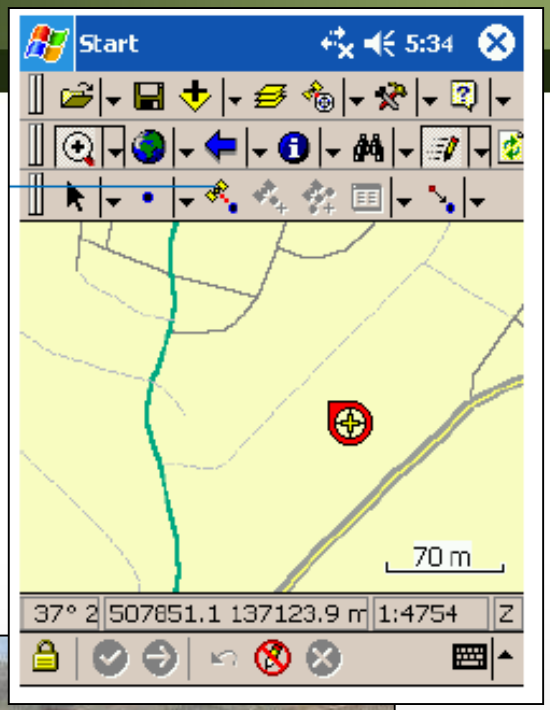


Intrusive Procedures

- Step 1: Reacquire original point
- Step 2: Detect/investigate anomalies
- Step 3: Data capture
- Step 4: Stop digging decision

Step 1: Reacquire Point

- Navigate to POINT using GeoXH and reference data layer
  - Use the cross hairs and spend some time refining location
- Capture EXACT location of reacquired POINT
  - Allow GeoXH to settle ~2 minutes before capturing POINT
- Pin flag (ORANGE) the EXACT location and record “PointID” on flag



Step 2: Detect/Investigate Anomalies

- Use MineLab2 to detect metallic anomaly within 1.5m radius of pin flag
- Intrusively investigate anomaly
- Capture EXACT location of excavated object
- Use MineLab2 to confirm no remaining metallic signature
- If additional metallic signature, continue intrusive investigation

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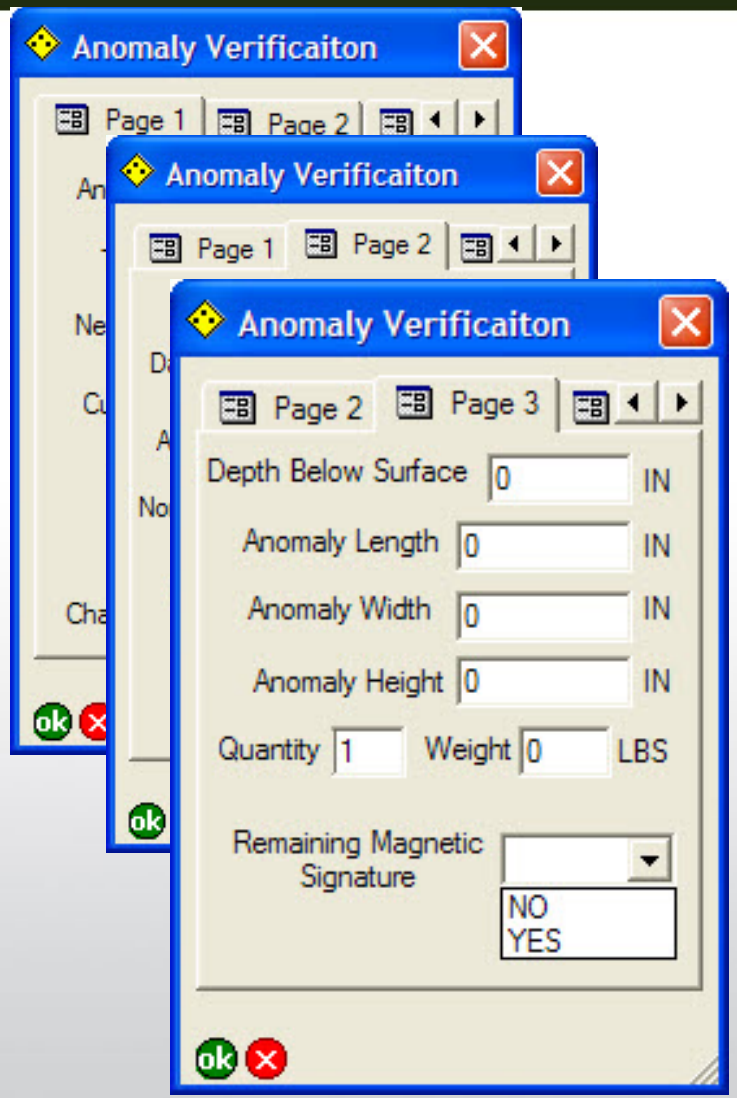
Step 3: Data Capture

- On page 1 of QuickForm, label as Anomaly “A”
- Enter data on page 2 and 3
  - Distance and direction from orange pin flag
  - Anomaly type (CD, MD, RRD…)
  - Nomenclature (60mm mortar, barbed wire…)
  - Depth and orientation
  - Dimensions and weight
- Digital photograph



Step 4: Stop Digging Decision

- "Stop digging" decision criteria:
  1. Excavation of metallic objects within 1.5 meter radius of reference POINT that is consistent with reported mV response value;

AND

  2. No additional MineLab2 responses at the excavation site;

OR

  3. Excavation of 3 metallic objects of consistent type (e.g. 3 pieces of like munitions fragments, construction material, fencing, etc.) (Note: In non-target areas, these must be non-munitions related objects. Prevent excavation/removal of "trash pits.")
- To stop digging, the team must satisfy criteria #1 and one of the criteria #2.

Requires judgment about the excavated object and the mV response value. Requires geophysicist QC of ALL dig results.

QC of Intrusive Operations

UXOQCS

- Observes daily position and function checks for all teams/instruments
- Observes reacquisition, detection, investigation, and data entry
- Performs acceptance testing on a sample of digs (12 digs/target area or lot)
  - Reacquire point using RTK GPS
  - Measure response at point using EM61 (90% reduction of original response or below 4mV)

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QC of Intrusive Operations

- Project Geophysicist
  - Reviews all dig data for positional accuracy and consistency of metallic object with original mV response
- QC Geophysicist
  - Reviews a sample of dig data (12 digs/target area or lot) for positional accuracy and consistency of metallic object with original mV response

Demolition Operations

Commercial Explosives

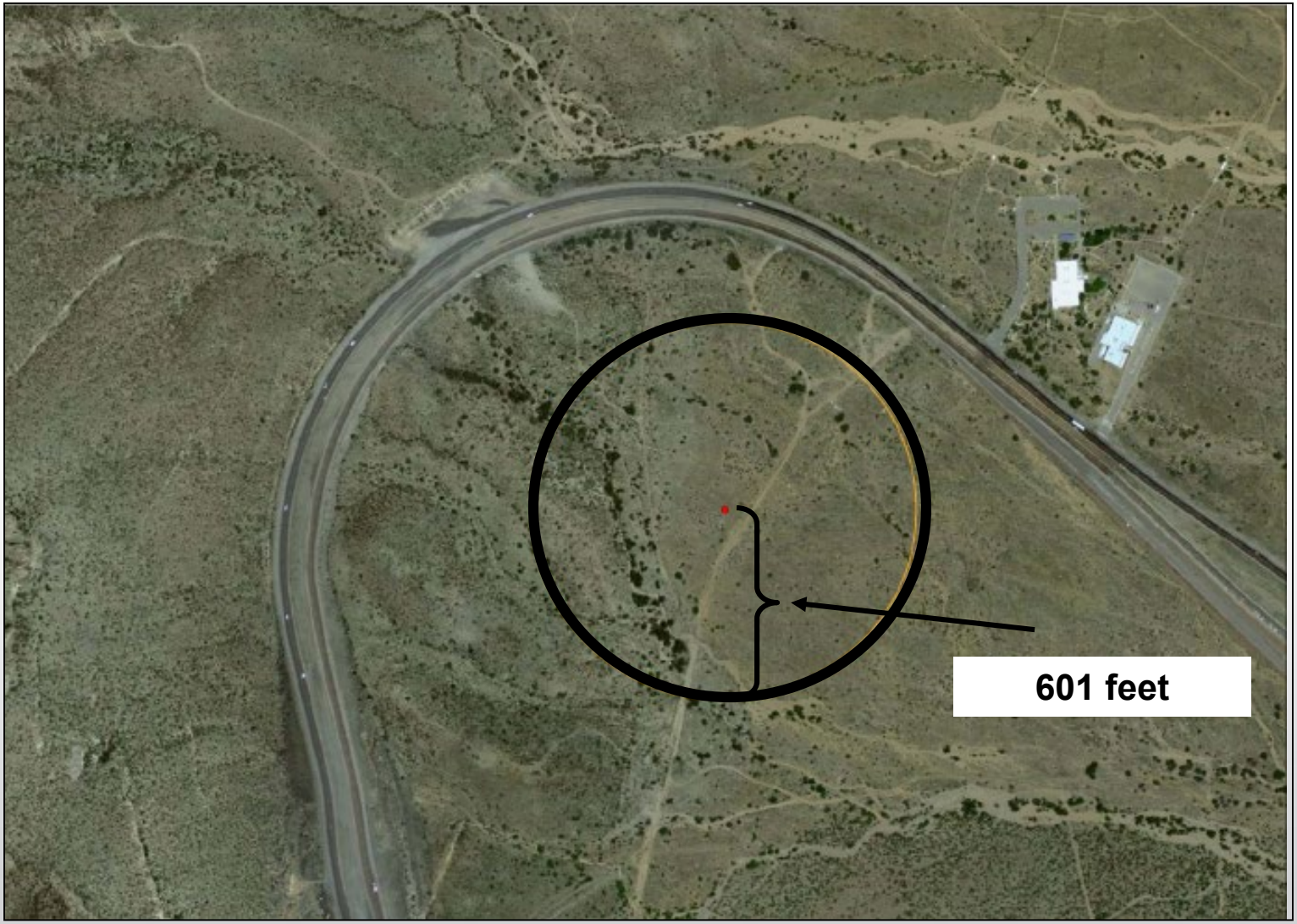
- Jet perforators.
  Total NEW = 4.4 lbs
- 50-grains/foot detonation cord.
  Total NEW = 10 lbs
- Electric blasting caps. (To ensure proper compatibility and separation, stored in integral cap box mounted on side of magazine.)

Explosives Storage

Type 2 (BATF) magazine

- Sited (601 ft Q-D arc)
- Grounded (0.098 Ohms)
- Fenced (8 ft, 3 strand barbed wire, grounded)

Quantity Distance Safety Arc Around Explosives Storage



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Overview: Demo Operations

- MEC will be detonated in place. Exceptions:
  - Movement necessary for the efficiency of operations or the protection of people, property, or critical assets
  - Risk associated with movement is acceptable
  - SUXOS and UXOSO must agree the item is acceptable to move, with OESS concurrence if on site
- If occupied buildings or roadways are within the MFD-H, implement one of the following:
  - Implement engineering controls to reduce the MSD in accordance with HNC-ED-CS-S-98-7, August 1998, Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions
  - If acceptable to move, relocate beyond the MFD-H from occupied buildings or roadways
  - Coordinate with Fort Bliss/local authorities to evacuate any occupied buildings or block public roadways during MEC disposal operations
- Perforate MEC using commercial jet perforator charges, initiated with blasting caps and remote firing device (RFD) in accordance with Explosive Site Plan (ESP) and Demo SOP

Notification of Demo Ops

- The SUXOS will notify the Fort Bliss Incident Operations Center (FBIOC) at 915-569-6951 or 915-569-6952.
- The FBIOC will make the following notifications PRIOR to any MEC disposal operation being conducted.
  - Ft. Bliss Range Control - (915) 569-9240
  - TX-DOT - (915) 790-4233
  - NM-DOT - (575) 882-4300
  - US Border Patrol Operations Center - (915) 5854145
  - El Paso City PD (915) 832-4400
  - El Paso City FD - (915) 771-1000
  - DHS (El Paso)- (915) 564-7276
  - US Border Patrol Museum - (915) 759-6060
  - El Paso Archeology Museum - (915) 755-4332
  - Fort Bliss Safety Office
  - Fort Bliss Directorate Plans, Training, Mobilization and Security
  - Fort Bliss Installation Security
  - Fort Bliss Public Affairs Officer

Demo SOP

- Plan the op
  - Positively identify the MEC
  - Emergency procedures
  - Daylight hours only
  - SUXOS defines demolition team roles
- Control access and limit personnel
  - Visual confirm no unauthorized personnel
  - Secure access routes

Demo SOP (cont'd)

Control and limit explosive materials

- SUXOS and UXOSO access magazine and issue explosives
- Inspect vehicles (ATF-approved day boxes)
- Maintain all safe quantity and distance requirements

Demo SOP (cont'd)

Strict firing device prep sequence

- Test all equipment (e.g., RFD, blasting caps, galvanometer, circuits…)
- Control RFD unit and activation keys
- Surrender activation keys after test and only re-issue them when assured area is clear
- Attach initiators

Demo SOP: Firing Procedures

- Ensure no unauthorized personnel
- Account for all site personnel
- Verbal warning
- Initiate the charge
- Wait 5 minutes
- Check the shot
- SUXOS gives the “All clear”

Demolition Operations

Munitions Debris (MD)

MD:
Why is it managed so strictly?

- Munitions Debris is generally included within the larger category of:

  Material **P**otentially **P**resenting an **E**xplosive **H**azard, OR **MPPEH**

- DoD has policies in place that specifically provide for the management and disposition of MPPEH

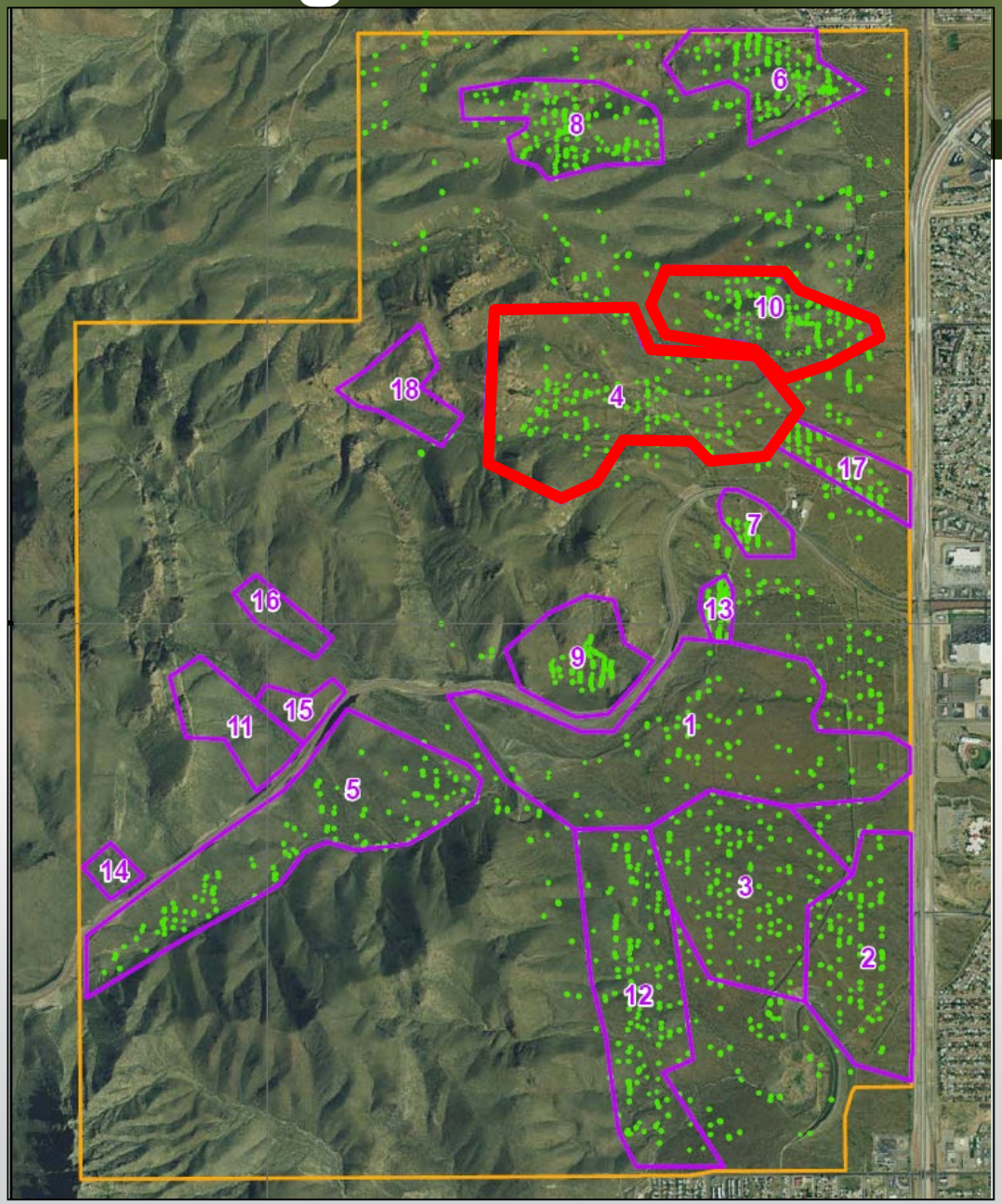
Examples of MD

MD: Explosive Safety Management Requirements

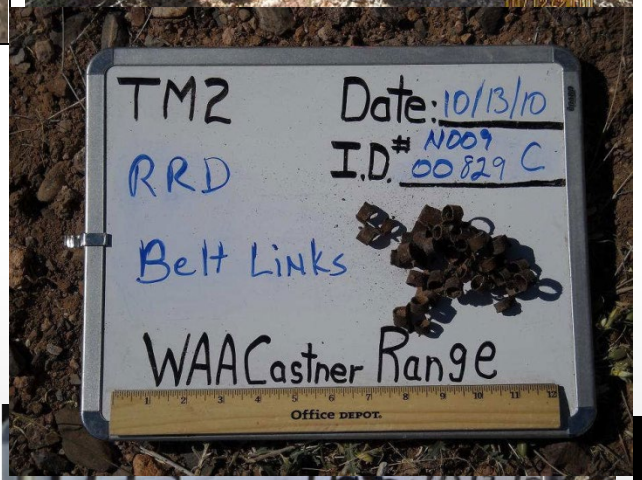
- Document as “safe” (free from explosive hazard) or “hazardous” via – 2x 100% visual inspections
- Segregate, mark, and secure
- Vent all internal cavities
- Deform or mutilate to eliminate munition characteristics (performed off-site by specialty subcontractor)
- Maintain chain of custody – goal attain closed circuit process through “final disposition” (metal ingot)
- Qualifications (training and experience) for handlers

Progress to Date and What We're Finding

Progress to Date



What We've Found to Date



Summary Data

- Anomalies investigated: 216
- Objects excavated: 504
- MEC: 0
- About 50% munitions debris and 50% non-munitions scrap
- Approximate weight
  - MD: 48 lbs
  - Non-MD scrap: 115 lbs

Project Schedule

Project Schedule

- September 2010 – January 2011: Anomaly reacquisition and intrusive investigation
- February – May 2011: WAA Report writing

Questions?