

Survey Objectives

- Detect and delineate possible underground storage tanks associated with former barracks at eight client-designated areas
- Delineate suspected septic systems at one of the eight client-designated areas

Survey Design

- Reconnaissance-level digital electromagnetic (EM) ground survey to detect any buried metallic material
- Follow-up ground penetrating radar (GPR) survey to further characterize anomalies from the EM survey

Field Work Flow

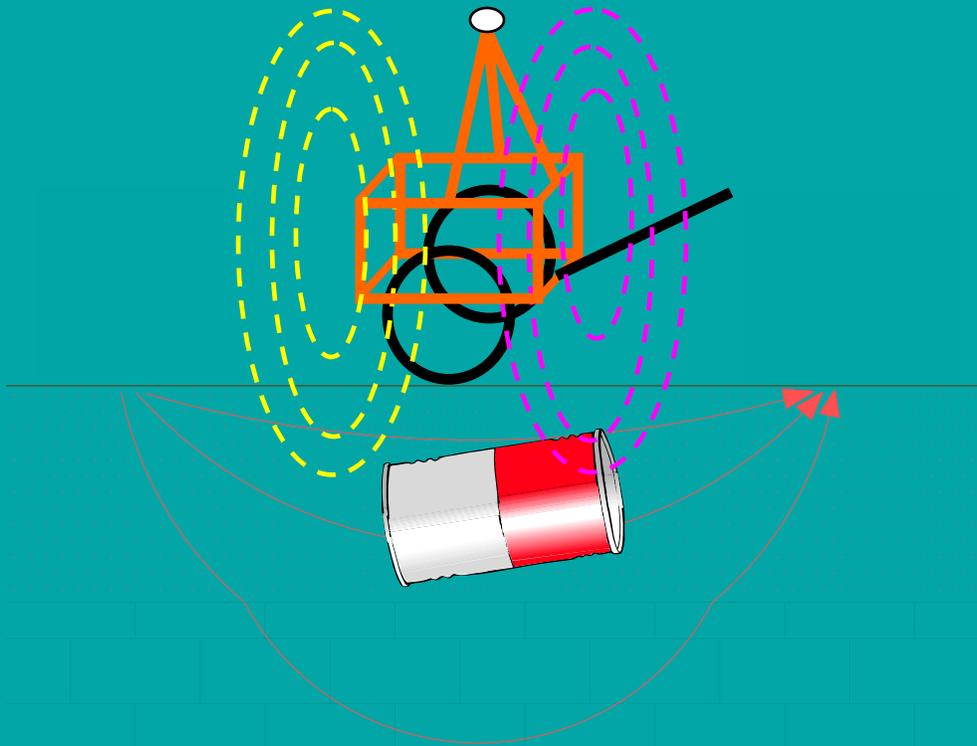
- Scan survey areas with EM instruments
 - Geonics EM-61MK2 for areas with abundant surface metal
 - Geonics EM-31 for areas free of surface metal

- Process EM data and pick targets
 - Compare EM data with aerial photos to eliminate obvious surficial sources of metal (i.e. Catch Basins, Manhole Covers)
 - Create target pick-list, then upload list and EM maps to GPS instruments

- Re-acquire targets and scan with GPR
 - Navigate to target locations
 - Determine source of EM anomaly: Metal Surface Feature, Metal Subsurface Feature
 - If surface feature, make note and continue on
 - If subsurface feature, delineate target extents with TW-6
 - Scan target with GPR in attempt to better characterize shape of target

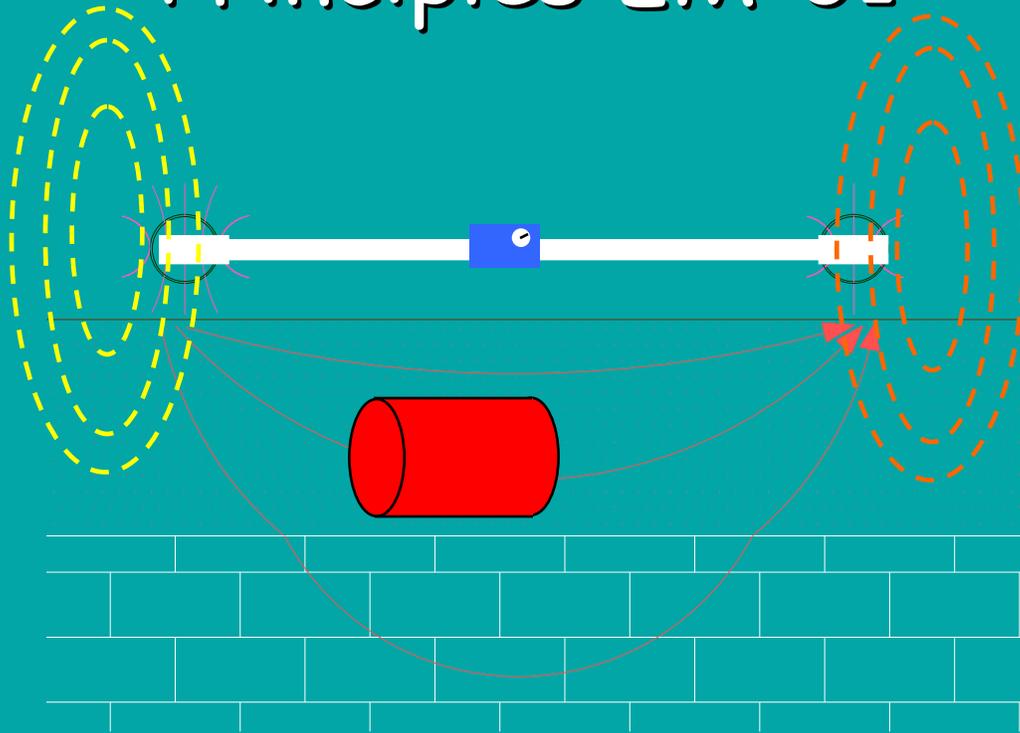
EM Instrumentation

Metal Detection Principles EM-61MK2



- Energy - Subsurface electrical currents driven by applied EM field
- Sensitive to presence of highly electrically conductive materials (metals)

Metal Detection Principles EM-31



- Energy - Subsurface electrical currents driven by applied EM field
- Sensitive to variations in electrical conductivity due to changes in electrical properties of adjacent soils and amount of metal in soil or surroundings

Geonics, Ltd. EM-61MK2 Instrument

Primary digital subsurface metal mapping instrument in areas cluttered with surface metal



GPS Receiver

MD Coils

Geonics, Ltd. EM-31 Instrument

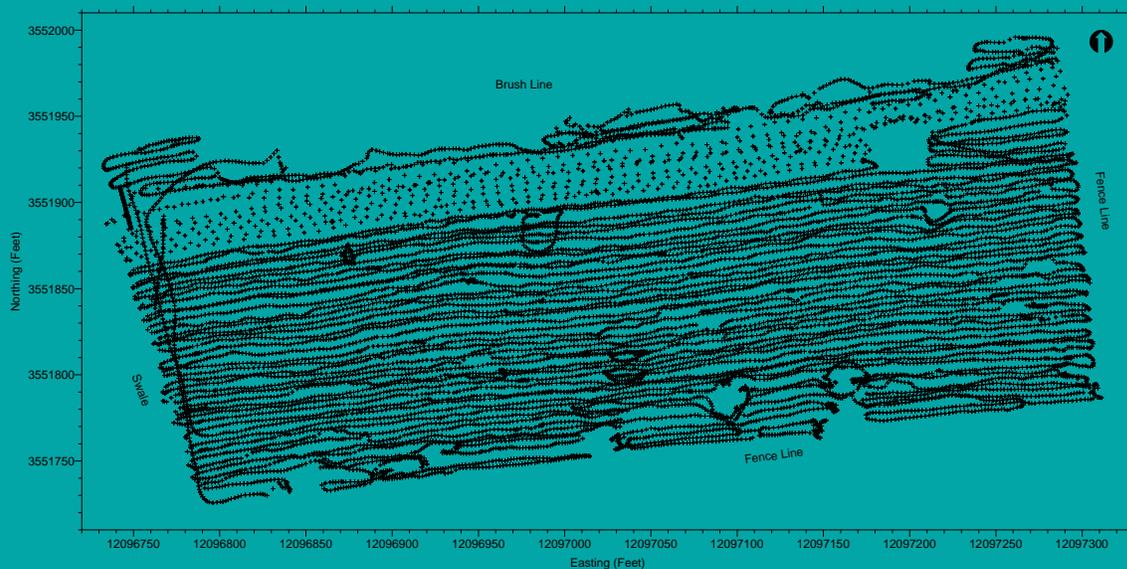
Primary digital metal mapping instrument
in areas free of surface metal



Instrument
designed to
determine bulk
soil conductivity
and estimate
subsurface metal
content

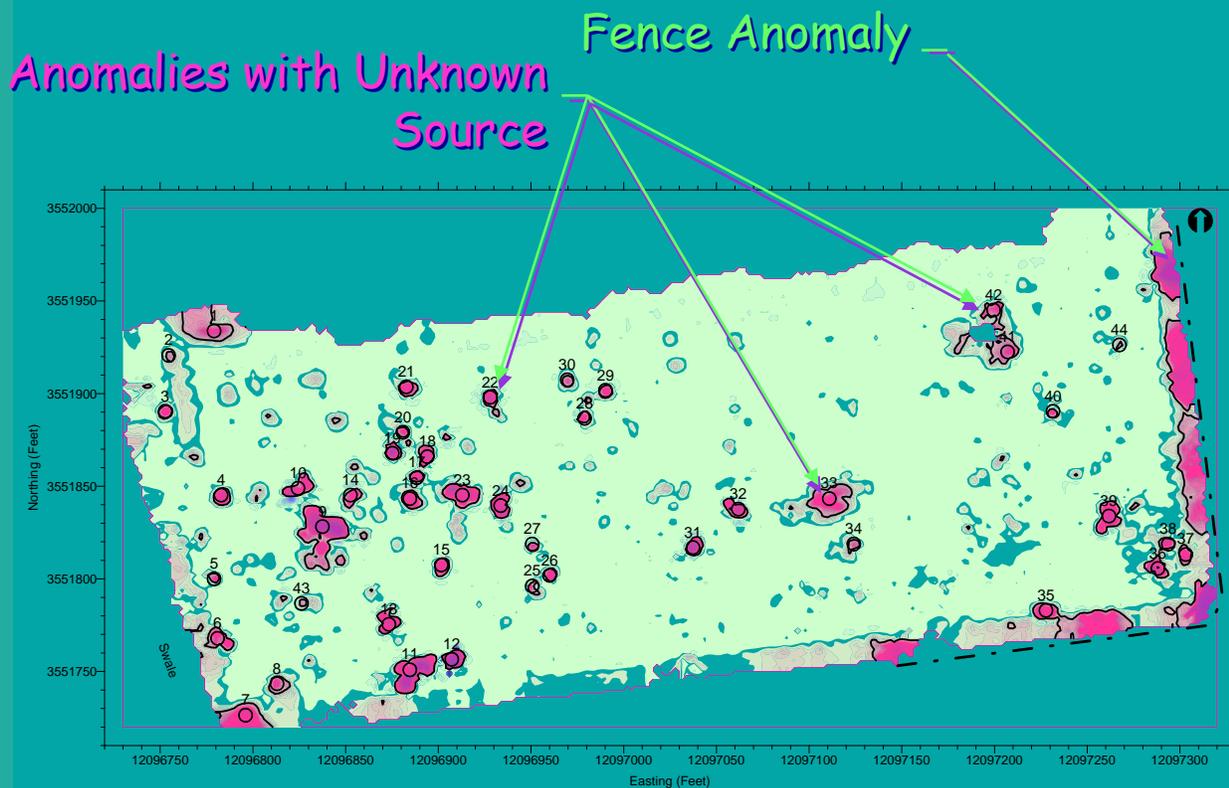


Sample MD Survey Data Coverage



- Data collected approximately every 8 inches from east to west along lines separated by 4-5 feet
- Location control provided by sub-meter accuracy GPS system connected to EM instrumentation

Sample MD Survey Data



Geonics, Ltd. EM-61 differential coil response: effective survey depth ~12'

Target Reacquisition EM Instrument

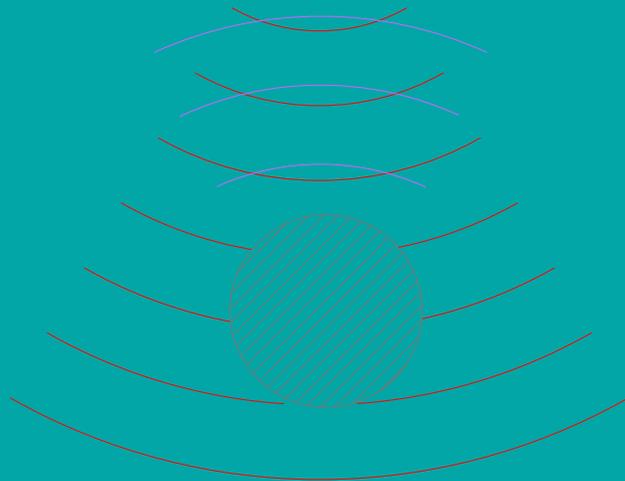
Audible alarm when metal reaches approximate center of array



Approximate size and shape can be determined in field

Fisher TW-6 instrument

Ground Penetrating Radar Principles



- Energy - electromagnetic pulses
- Sensitive to variations in electrical conductivity

Ground Penetrating Radar Field Equipment



Transducer

Controller/Monitor

GSSI SIR-2

Example GPR Profile

