

# UX-Analyze

## Geosoft software extension for Oasis montaj

For unexploded ordnance (UXO) projects using advanced electromagnetic (EM) geophysical data UX-Analyze provides a comprehensive software solution for data processing, modelling and target classification. In addition to documenting quality by means of standard plots and reports, UX-Analyze allows you to select target signatures of interest, model the data and classify the results from static (cued) or dynamic surveys. These capabilities are incorporated into a complete workflow with easy to use tools for automated, day to day processing while also allowing manual access to individual functions when required.

Classification is the process of analyzing data to decide whether the source of an anomaly is a hazardous target of interest (TOI), and in some cases, even deciding which specific type of munition may be present. During unexploded ordnance or munition clean-up projects, most of the items excavated are not hazardous, but are harmless scrap metal (also called 'clutter'). If geophysical targets can be determined to be non-hazardous without digging, they can be left unexcavated, or can be excavated in a less costly way (i.e. not requiring the same safety precautions). This has the potential to save millions of dollars on some projects, allowing funds to tackle more of the many outstanding clean-up projects.

UX-Analyze supports advanced EM sensor data from the Naval Research Laboratory (NRL) TEM 2x2, the Geometrics MetalMapper and the new MetalMapper 2x2 instruments. It also includes support for informed source selection (also called dipole filtering), for sophisticated target selection from dynamic data.

Geosoft and AcornSI have developed and validated UX-Analyze for several years with support from the Department of Defense (DoD) Environmental Security Technology Certification Program (ESTCP). UX-Analyze is approved for the requirements of the Department of Defense (DoD) Advanced Geophysical Classification Accreditation Program (DAGCAP).

### Use UX-Analyze to:

#### Import

- Dynamic Data
- Static (cued) Data

#### Prepare

- Data QA & QC
- Data Corrections
- Background Level
- Pick targets – including informed source selection

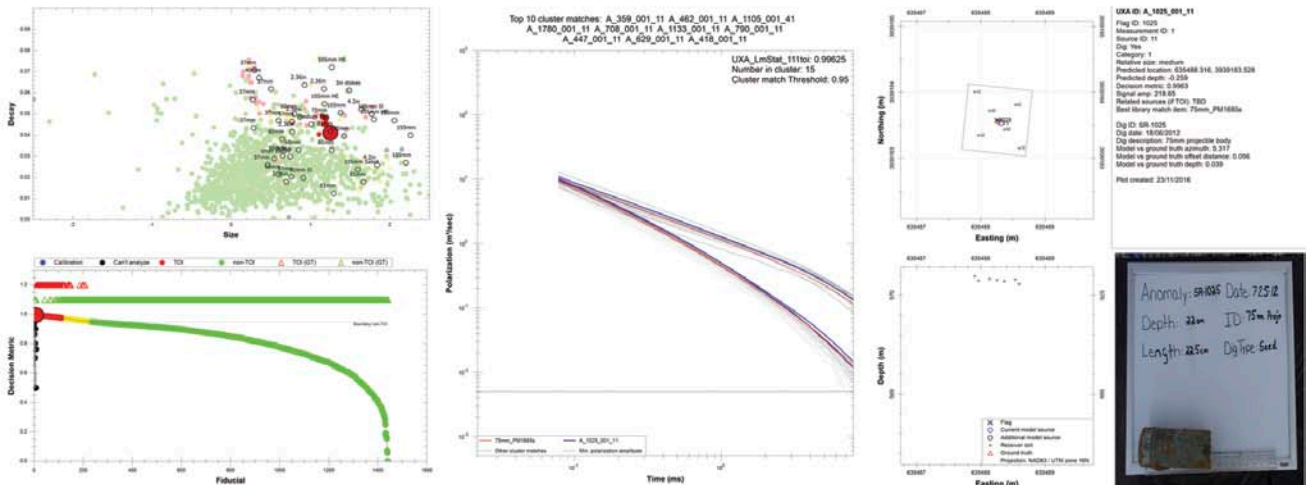
#### Analyze

- Single and Multi-Object Inversions
- Create Site Specific UXO Signature Library
- Match item responses to library
- Identification of non-library items through cluster analysis

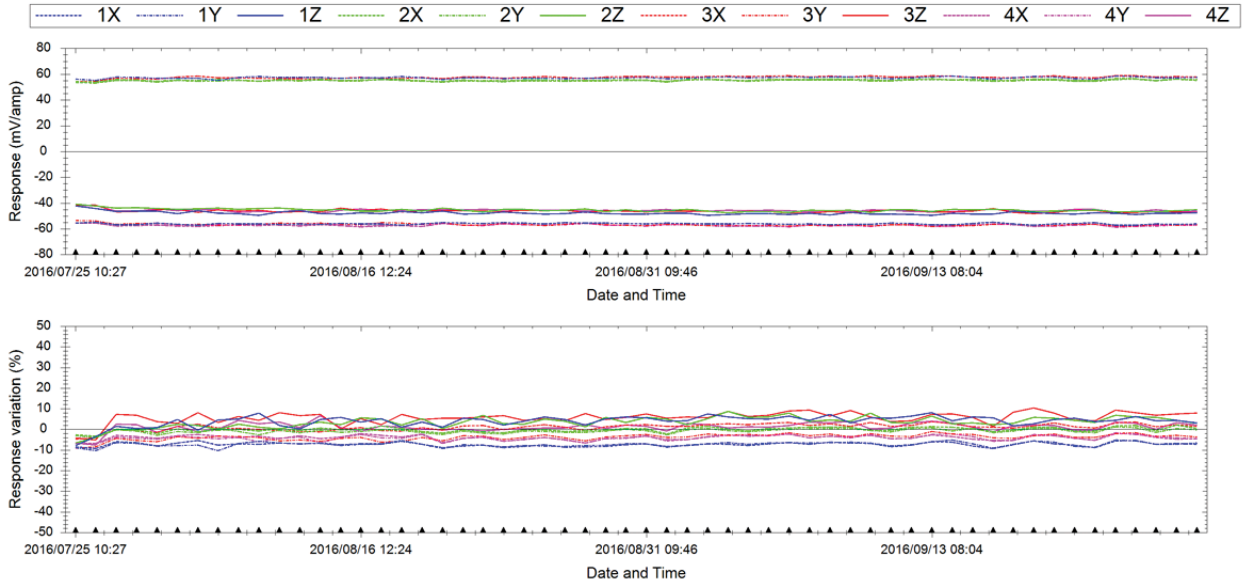
#### Classify

- Classification
- Ranking – static (cued) survey list, dig list
- Document

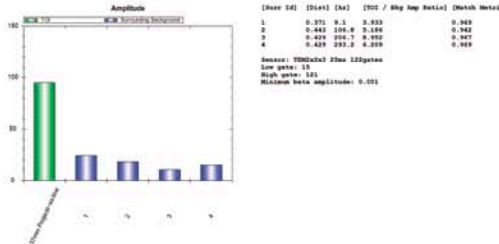
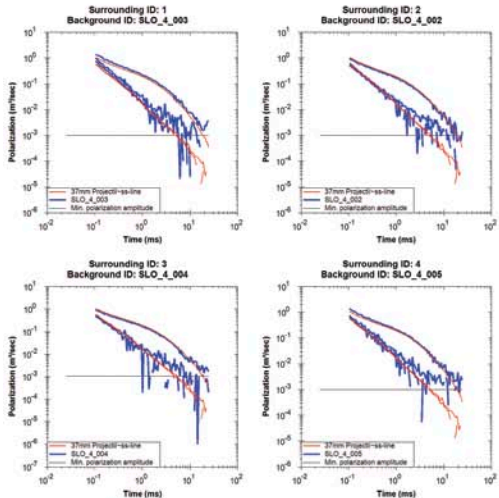
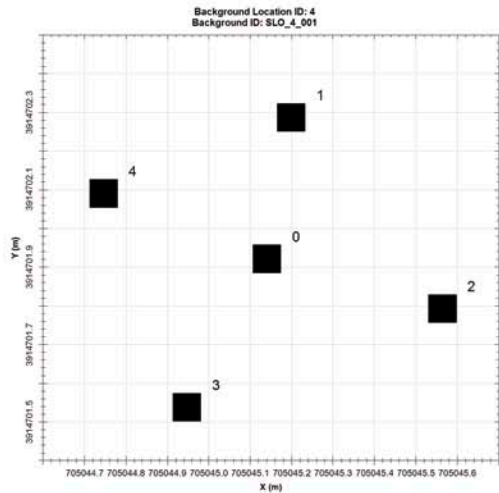
### Post Excavation Plot



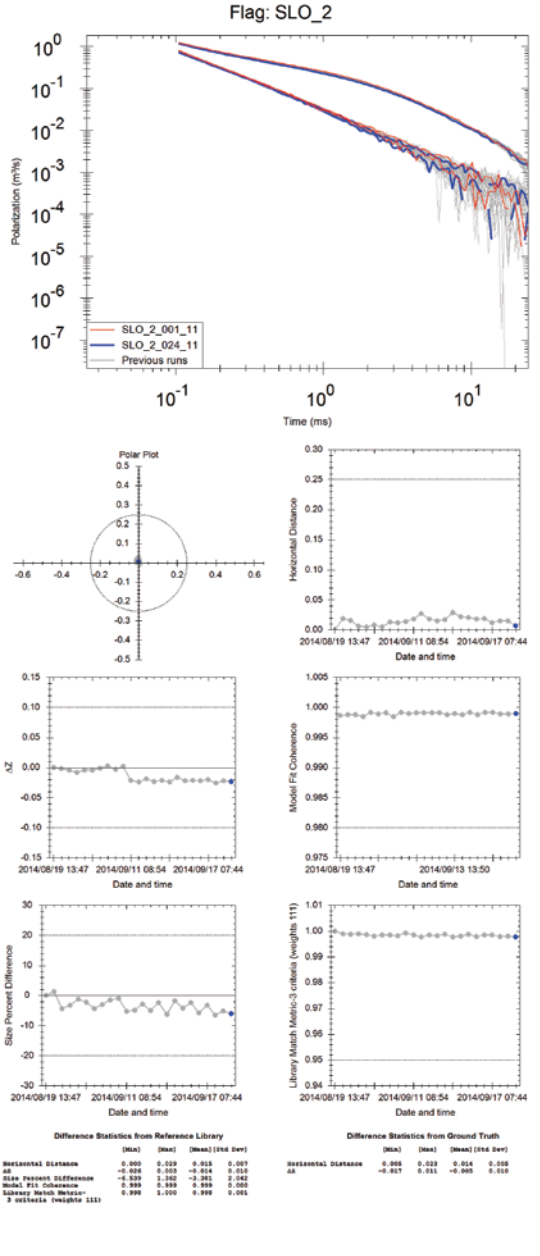
### Sensor Function Test Plot



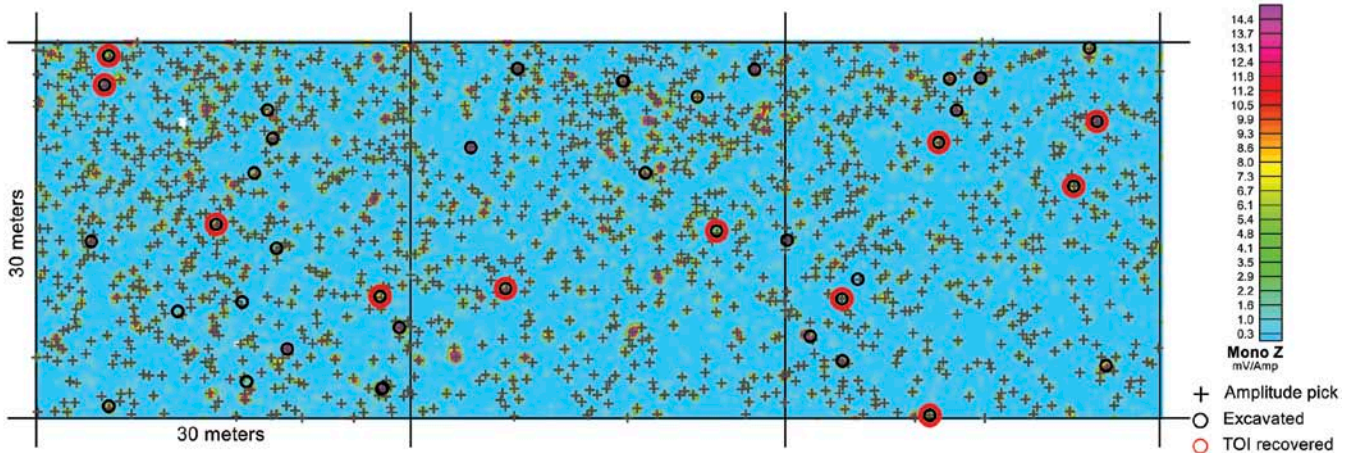
### Background Validation Plot



### Instrument Verification Strip (IVS) Quality Check Plot



## Informed Source Selection (ISS) Detection Map



### UX-Analyze Features

#### Prepare Data for Analysis

- Import dynamic or static field data in HDF5 or CSV format.
- Quality checks and reporting.
- Apply data corrections.
- Background removal.

#### Find Targets

- Automated target picking
- "Informed source selection" (dipole filter) using automated inversions of dynamic survey data.
- Inspect and refine existing targets.

#### Analyze

- Single and multi-object model inversions (solvers) to yield polarizabilities for anomalies. Updated inversion algorithms.

#### Construct Signature Library

- Includes existing US Army Corps of Engineers (USACE) signature libraries.
- Tailor and refine libraries for site specifics.
- Look for unknown clusters of signals to find unexpected targets of interest (TOI) on a site.

#### Classify and Rank

- Find likely UXO based on polarizabilities.
- Find target signatures matching Signature Library.
- Classify and rank targets – e.g. munition vs. clutter.
- Identify targets for excavation or follow-up static survey.
- Document and report.



UX-Analyze includes modelling tools developed in partnership with Acorn Science & Innovation.

UX-Analyze is available as an extension of Oasis montaj. As a prerequisite, UX-Analyze requires a current version of Oasis montaj and the UXO Land extension.

While helping to streamline complex tasks, the tools within UX-Analyze require an understanding of geophysical methods and in particular electromagnetics, for effective use and interpretation of results.