GEOSOFT
Oasis montaj

UXO Land

Geosoft software extension for Oasis montaj

International Unexploded Ordnance (UXO) contractors and cleanup organizations use Geosoft software to rapidly and reliably convert high volumes of geoscientific data into accurate mapping and target detection.

The UXO Land extension for Oasis montaj provides a complete suite of tools for working with land-based UXO survey data. UXO Land provides unique capabilities for finding and analyzing UXO targets, based on electromagnetic and magnetic (total field and gradiometer) data. Process, analyze and perform quality assurance (QA) and quality control (QC) tests on high volumes of data. . It is used to quickly locate the ground position of potential UXO targets in large volumes of data and narrow these selections to a final target list.

Geophysical correction tools identify and remove noise in the data from sources such as background geology or instrument-inherent sources. Apparent depth, size and weight calculations help to further characterize UXO targets for informed decisions.

The Industry Standard for UXO Geophysics

UXO Land and its predecessors have been refined with over 20 years of development at Geosoft. It is the industry standard for UXO geophysics contractors and consultants. Using UXO Land, geoscientists can organize and handle large volumes of data with ease and speed.

UXO Land supports appropriate EM systems with a focus on the Geonics EM61 transient electromagnetic (EM) EM61-Mk2 system with various coil configurations. Generally, all types of field magnetometers, arrays and gradiometers are supported.

Look also for UXO Land's sister product, UXO Marine, providing specialized workflows and tools for underwater UXO detection with magnetic and gradiometer data.

Use UXO Land to:

- Locate and analyze UXO targets
- Run a comprehensive suite of QA/QC procedures, tests and reports
- Apply lag, heading, sensor offset, and base station corrections to help remove unwanted signals from data
- Apply spatial filters to smooth and enhance profile and gridded data
- Create an analytic signal grid from magnetic data to position positive peaks over the center or edges of potential UXO targets
- Automatically pick targets from both electromagnetic (EM) and magnetic data
- Interactively add, remove or edit targets from profiles and grids
- Measure the target size
- Calculate the apparent depth to source from EM and magnetic data
- Create an audit log to track all data processing
- Create customized maps and reports

Integrated with advanced US Department of Defense (DoD) Technology

UXO Land combines the features previously available in Geosoft's UX-Detect package and the US Army Corps of Engineers' UX-Process package. This integrated toolset provides a single familiar workflow that takes you through all the steps from survey planning to QA/QC, target identification and analysis using EM61 and magnetic data. It also complements the UX-Analyze toolset for classification of UXO targets with advanced EM sensors.

UX-Process and UX-Analyze were built for the US Department of Defense (DoD) by Geosoft (in partnership with AcornSI for UX-Analyze), with funding from the DoD's Environmental Security Technology Certification Program (ESTCP).

Survey Planning

UXO Land facilitates the effective planning of surveys with tools to map out survey path, map out the shortest route between targets after analysis, progress reporting by survey grid, and other features.

Data QA and QC

UXO Land includes a set of quality assurance (QA) and quality control (QC) tools that improve the utilization of field data by identifying and correcting instrument and acquisition errors. The main capabilities were originally developed by Geosoft over many years as part of the UX-Process package for the US Army Corps of Engineers, and were intended to standardize the QC/QA process for effective project management. This suite of tools addresses repetitive data quality issues associated with resurveying and the resulting loss of productivity in UXO investigations.
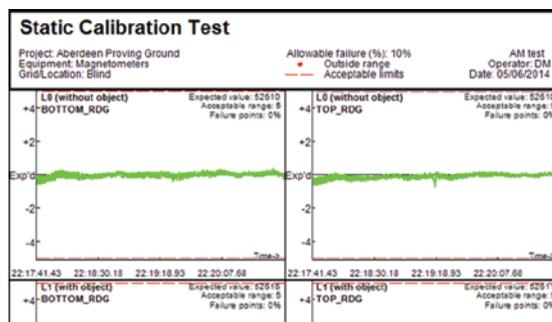

Use a comprehensive set of QA and QC tools to identify and correct instrument and acquisition errors.

- Address repetitive data quality issues to prevent resurveying and improve productivity in UXO investigations.

- Effectively meet government data quality standards with tools to standardize the QA/QC process when collecting, processing and analyzing data for US Army Corps of Engineers (USACE) projects. Test results are automatically recorded in USACE Access database format.

Data Processing and Preparation

Rapidly process your data and apply numerous filters and enhancements with ease.
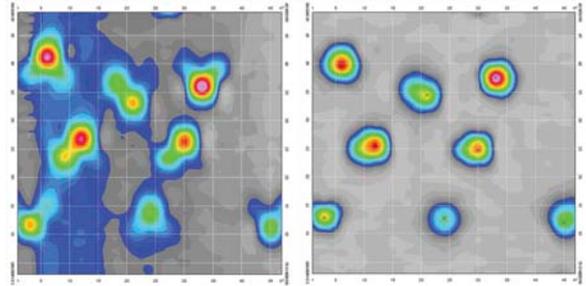
Filtering to Clean and Enhance your Data

UXO Land provides a complete range of 1D and 2D filters for processing your data.

A wide variety of spatial 1D filters are commonly used to smooth data and reduce noise. The specialized 1D Non-Linear Filter is ideal for removing very short wavelength, but high amplitude features from data. It is very useful as a spike-rejection filter, but can also be effective for removing short wavelength geological features, such as signal from surficial features.

Filters may also be used to remove background signals that are not of interest. Many other filters can be applied to enhance features or targets of particular interest.

Lag, Heading, Sensor Offset, and Base Station Corrections

Correction routines to remove unwanted signal from data include:

- Lag correction shifts data to adjust for timing differences between positioning and geophysical data.

- Heading correction for a systematic shift (in the data) that is a function of the direction of travel for a survey line.

- Magnetic base station (diurnal) corrections to magnetic data.

Sensor offset corrections allow you to accurately position each sensor in an array relative to the location of your positioning data.

Automated and Interactive Target Selection
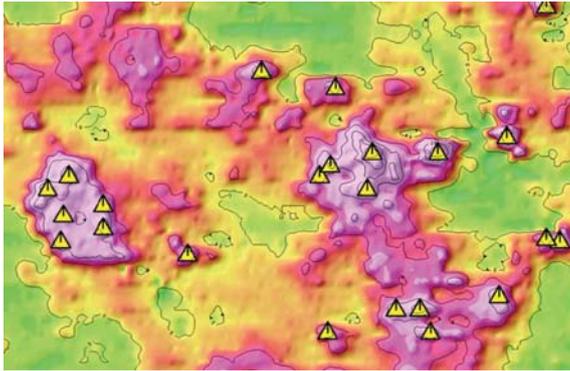
Pick and analyze UXO targets, based on magnetic (total field and gradiometer) and electromagnetic data. Targets may be picked from either profile data or grids.

EM61 targets are typically picked based on peak vain the data above a user-specified threshold.

Magnetic anomalies in the data are usually selected by using UXO Land's automated peak picking algorithms after calculating the analytic signal from the measured or calculated magnetic gradients. Calculation of the analytic signal is a special feature that repositions magnetic anomalies centered over the target of interest – regardless of remanent magnetization or direction of the local magnetic field. It is therefore very useful for accurately picking target locations. Targets may also be picked directly based on dipole anomalies in total field magnetic data.

After automated picking, additional targets can be refined interactively in profile or gridded data. Targets may also be interactively deleted, grouped or moved by the analyst.

Target Analysis

Target visualization and analysis tools enable qualification of target picks. Depth and size calculations help to characterize UXO targets and provide more accurate locations.
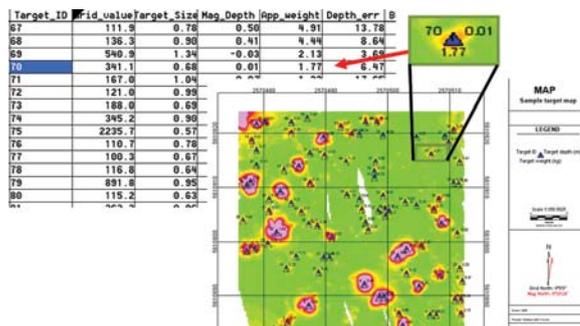

To characterize potential UXO targets, you can invert your magnetic and EM61 data to calculate data models and parameters regarding the nature or source of the geophysical anomaly. These parameters include a refine target location, and depth along with other details such as magnetic moment and orientation.

In addition, for EM61 data you can also determine source depth from a ratio of responses from the top and bottom EM61 coils. With magnetic data, you can also calculate apparent depth, size and weight using the 2D Euler Deconvolution function. The apparent depth to the magnetic source of selected magnetic targets is derived from Euler's homogeneity equation.

Reporting

A full set of mapping capabilities is included in the Oasis montaj base software. Reports, maps and visualization in profile, 2D and 3D are all included. Access a variety of tools to make your survey progress reporting more effective.
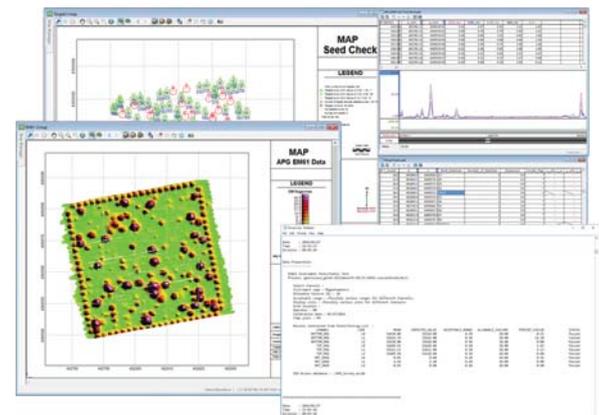
- Map making tools enable the creation of UXO target maps for visualization and display of the target locations and reporting.

- Create an audit log to track all data processing as a historical archive record.

Key Functionality

- Supports electromagnetic (EM) data and magnetic data of all types
- Automated and interactive target picking and editing
- Target analysis and refined locations plus apparent depth, size and weight calculations
- Full suite of data QA/QC and data corrections

*The UXO Land and UXO Marine extensions require Geosoft Oasis montaj.

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