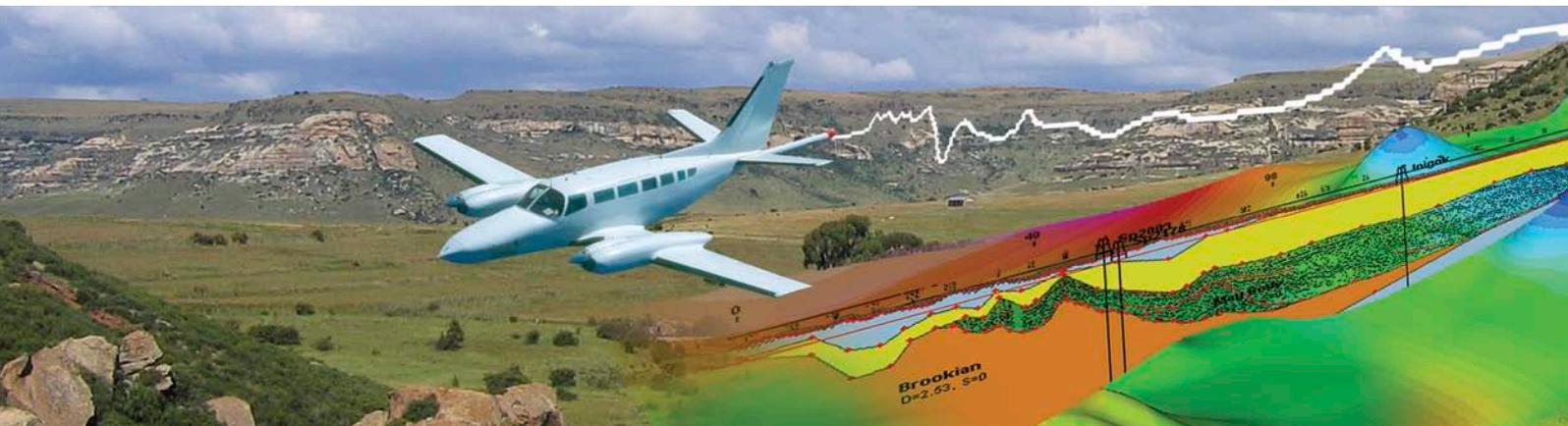




Mapping, Modelling, Interpretation
Gravity and Magnetics

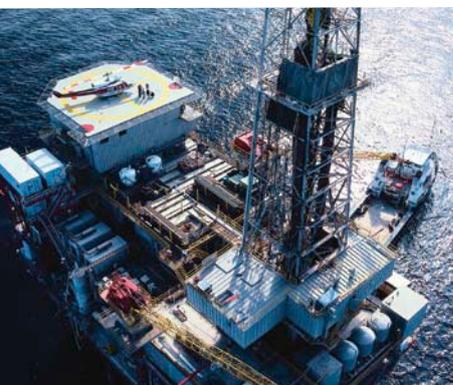


Energy Exploration Solutions



"Geosoft is still by far the best software for generating gravity and magnetic interpretations, and products that can be easily integrated into the seismic world. I can process data, work on maps, and build the model in the same platform. I can generate something and send it knowing that in a few minutes, they can have it at their work station and on their screen."

Mark Longacre, MBL



Tools to focus all your exploration efforts

In today's competitive energy marketplace, energy companies face growing worldwide demand for hydrocarbons and increasingly challenging exploration targets.

Geosoft meets the needs of successful energy companies with Oasis montaj™ and GM-SYS™ – a range of gravity and magnetic mapping, modelling and interpretation solutions.

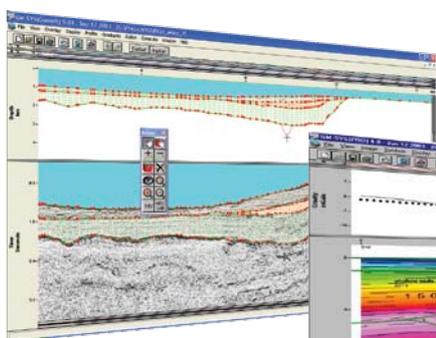
These global industry standard mapping, interpretation and modelling solutions help oil and gas companies improve their potential for successful discoveries, reduce risks and keep costs down.

With the gridding, filtering, modelling, depth-to-basement, and other capabilities of Oasis montaj and GM-SYS, you can optimize your analysis and visualization of gravity

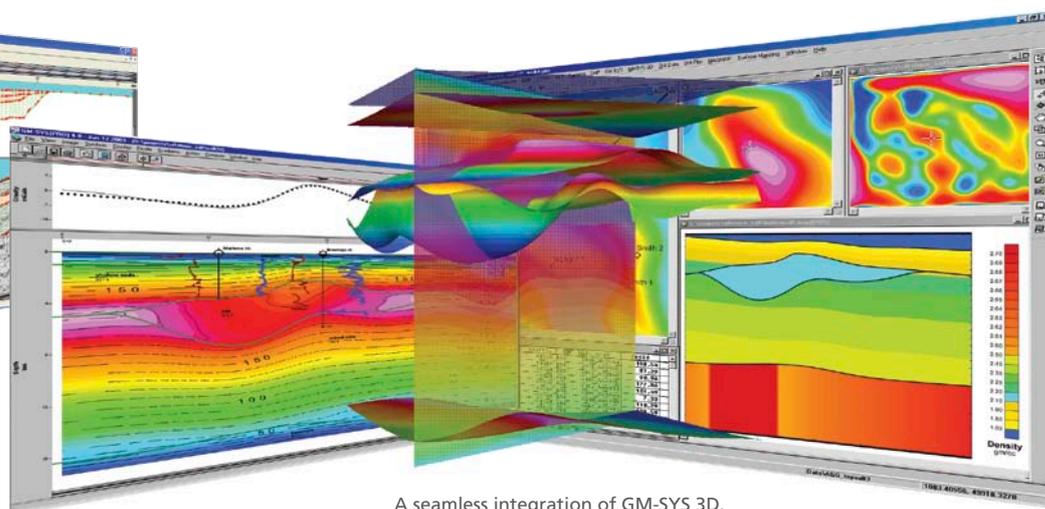
and magnetic data and integrate this information with interpretations derived from geologic, seismic and other data.

As a result, you maximize the accuracy of your final interpretations and minimize the number of potential targets that require expensive exploration methods such as seismic reflection or drilling.

A powerful solution that meets the need for energy companies to look at as much data as possible, as efficiently as possible, in as many ways as possible.

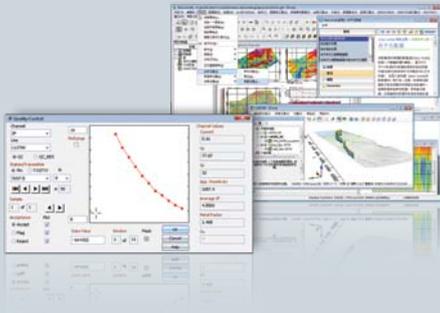


Load time sections, build models in time and convert to depth for gravity and magnetic calculations.



A seamless integration of GM-SYS 3D, Oasis montaj and GM-SYS Profile.

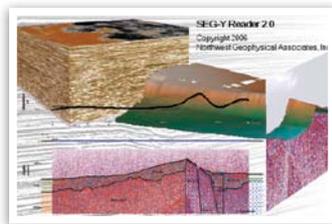
Oasis montaj: A powerful core technology



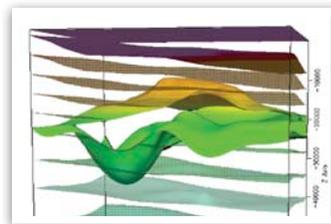
At Geosoft, we specialize in developing the technology required to drive integration, visualization and understanding of multidisciplinary datasets within the geosciences. We have always understood the need for, and unique challenge of, building knowledge and creating better interpretations from large volumes and diverse types of earth data.

Geosoft developed its powerful mapping and processing software to meet the rigorous demands of earth science investigations and exploration. It's the ideal core technology for the robust data-intensive solutions needed by the oil and gas industry.

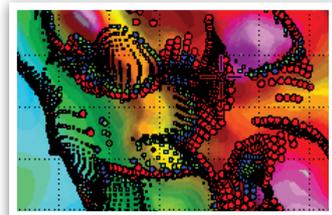
Oasis montaj provides you with an optimal environment for integrating, viewing and comparing large-volume geophysical, geochemical and geological data. It accelerates the data analysis required to support effective daily problem solving and decision-making in large oil and gas initiatives.



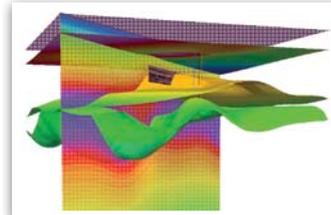
Convert SEG-Y data into bitmaps or 3D grids.



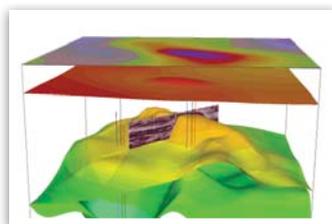
Create GM-SYS 3D blocks with internal density variance, based on depth.



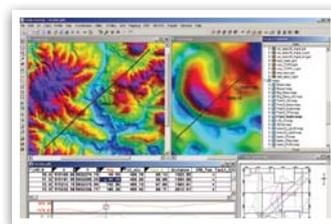
Display Euler solutions.



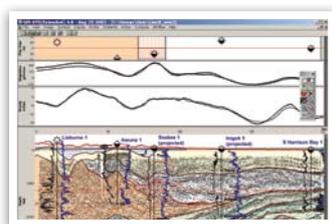
Insert profiles into GM-SYS 3D models.



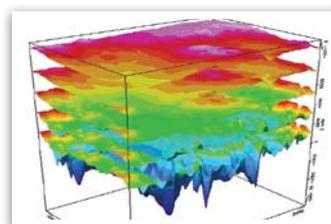
Display seismic sections with inversion results.



Use GM-SYS with Oasis montaj to create a fast, well-constrained and presentable interpretation.



Sophisticated 2D profile modelling.



Complete 3D interpretation.

Rich, 3D environment

Geosoft provides a wide range of 3D functionality, and has also taken its 3D functionality to the ArcGIS platform. Geosoft enables you to visualize all your data, including geology, geophysics and geochemistry, in a single 3D environment.

A scalable, high-performance database

Key to the Geosoft data experience is the performance of the Geosoft database (GDB). A Geosoft database can store and handle over a billion points of data per channel per line, making it easy to process, integrate and visualize data at each stage of your project lifecycle.

Dynamic linking of multiple data views

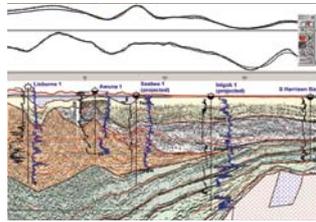
Dynamic linking provides the ability to highlight a single data point and see the position of that point on other maps, on the GDB profile viewer, on scatter plots, ternary plots and on 3D views. This feature enables geoscientists with a quick and efficient way to interrogate and interactively edit their data, and to evaluate potential prospect selections more quickly.

On-the-fly projections

Geosoft's advanced projection engine provides on-the-fly projection, and can handle over 2000 datums and projections. Our dynamic linking feature works with multiple maps and databases in different projections.

GM-SYS Profile Modelling

Superior gravity and magnetics and modelling solutions



GM-SYS Profile Modelling is a user friendly and feature-rich interactive gravity and magnetic modelling program that enables you to rapidly create a geologic model and test its accuracy by comparing the model's gravity and magnetic response to observed measurements.

Rapid model creation

- Create models with the "starting model wizard".
- Clone models from existing ones.
- Import models from numerous formats.
- Automatically create models from digitized geologic images.

Flexible and robust model structure

- Model volume is divided into blocks or layers separated by surfaces so gaps and overlaps are not possible and models are exceptionally stable.
- Profile strike of blocks may be non orthogonal.

- Blocks may be independently truncated in the Y direction, asymmetrically if desired, enabling close approximation of 3D geologic structures.

Interactive model editing

- You can move nodes/blocks independently or in groups with a drag of the mouse.
- Response curves are constantly recalculated as changes are made, enabling you to watch the model's response change in real-time as you alter the model.
- Interactively vary block properties and watch the model response change in real time.
- Display and edit in both plan view (at any depth) and cross-section views simultaneously.
- Sophisticated joint inversion on up to 100 constrainable parameters.

Comprehensive model response

- Calculate and simultaneously display both gravity and magnetic responses for the same model.
- Magnetic calculations include both induced and remanent components.
- Calculate the six gradient components of the gravity field and the vertical and horizontal gradient of the total magnetic field.

- Create a 3D gravity and/or magnetic response grid from your 2½ D model to examine "off profile" anomalies.
- Display responses of individual blocks.

Time to Depth

- Add a "time" window below the standard depth window.
- Load seismic time sections, build models in time using all of the GM-SYS tools, assign velocities, and convert the time model to a depth model.
- Changes made in either the time or depth windows are immediately reflected in the other window.

Integration with other software

- Completely integrated with GM-SYS 3D, Oasis montaj and the montaj extensions.
- Place SEG-Y bitmaps and other images in the background of your model.
- Import seismic and other horizons.
- Import wells, well markers and configurable LAS well files.
- Plot depth picks or other markers as symbols on the cross section.
- Export surfaces or entire models to many other programs.

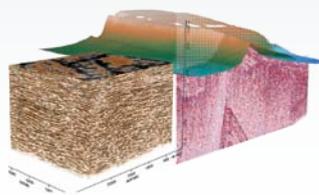
How the SEG-Y Reader saves you time and money

The SEG-Y Reader, included in the Geophysics extension and Advanced level of GM-SYS Profile, converts 2D SEG-Y data into bitmaps, Oasis montaj grids or databases and 3D SEG-Y data into 3D Grids or databases.

You can insert the bitmaps and 2D or 3D Grids into GM-SYS Profile Modelling, GM-SYS 3D Modelling, and Oasis montaj.

The SEG-Y Reader includes previewers to assist with

selecting the correct header encodings, byte orders and data formats. To decrease output file size, you can decimate traces and window



Convert 3D SEG-Y files into 3D grids

the output to a defined area based on shotpoint locations.

You can view and override nonstandard fields. In addition, the SEG-Y Reader can accept trace locations from either trace headers or a separate navigation file. When creating a seismic bitmap or grid, the 2D SEG-Y data may be automatically projected on to a vertical plane (e.g. GM-SYS cross section).



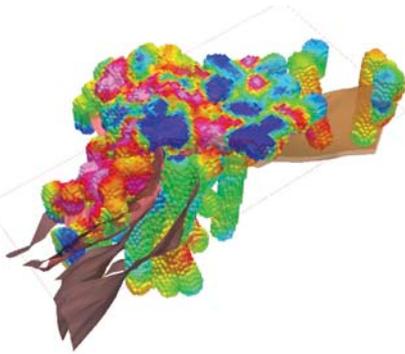
"It's very prudent to do 3D modelling for prospect modelling of salt bodies when you're considering a very expensive well in deep water. We've been using 3D seismic volumes, and approximations of a 3D velocity volume, in our interpretations for some time. With modelling software such as GM-SYS 3D, we can now convert that to depth and ensure that it makes sense with the observed gravity and magnetic data."

Dr. Michal Ruder, Wintermoon Geotechnologies



GM-SYS 3D Modelling

3D gravity and magnetic modelling software



GM-SYS 3D is an interactive layer-based gravity and magnetic modelling program that enables you to design 3D models that accurately depict the variation and irregularity of subsurface structures and calculate your models' gravity and magnetic responses. The user-friendly interface provides easy model creation, visualization, manipulation and constraint. Build a "Time" model using seismically-derived time horizons and velocities, then convert this directly to a "Depth" model.

Joint Inversion

- Better understand your subsurface geology with Full Tensor Gravity Gradient Joint Inversion.
- Jointly use any combination of the gravity gradient tensor components plus magnetic and normal gravity to constrain the inversion.
- Specify weighting factors for each of the eight possible data constraints.
- RMS mis-fit is displayed at each step so that users can monitor the progress of the inversion and stop it at any time.

Easily create realistic model structure

- Easily edit layers to any shape of your choosing.
- Layer properties may be constant, vary laterally or vary with depth.

- No limit to the number of layers or size of models.
- Invert simultaneously on multiple weighted variables and set inversion constraints.

Thoroughly examine models

- View model from any vantage point within or outside the model.
- Rotate the model vertically and/or horizontally, around any point within the model.
- Adjust the opaqueness of layers to view embedded structures.
- Extract profiles of geometry, density or susceptibility with their station measurements and response curves.
- Place extracted profiles into their proper location in your model.
- Keep complete model and layer information in view and accessible at all times with the Model Explorer.

Sophisticated model response

- Filter responses to match the filters applied to your observed data.
- Remove the gravity response of known geology to highlight the response of unknown structures (gravity stripping).
- Calculate your response grids at any altitude (or depth for borehole data) you desire.
- Upward continue measurements/responses to a flat or variable surface.
- Easily calculate gravity gradient data in the six standard tensor components.

- Calculate the response of a 3D grid that contains gravity or magnetic properties.

VALEM Inversion Service

- High performance cloud-based gravity inversion service.
- Resolve the base of salt from gravity data bound by the constraints of seismic modelling.
- Seamlessly integrated as a natural part of the GM-SYS 3D modelling workflow.

Integration with other software

- Completely integrated with GM-SYS Profile, Oasis montaj and the montaj extensions.
- Import horizons as grids.
- Build and edit time models within GM-SYS 3D from seismically derived time horizons and velocities and convert them to gravity and magnetic depth models.
- Convert and export GM-SYS 3D models as 3D grids with geometry, density and susceptibility information.
- Import 3D grids and calculate the gravity response.
- Import and correctly place images (seismic bitmap, cross-sectional balancing profiles, geologic sections, etc.) that can be registered in Oasis montaj and many other programs.

Superior connectivity and data-sharing

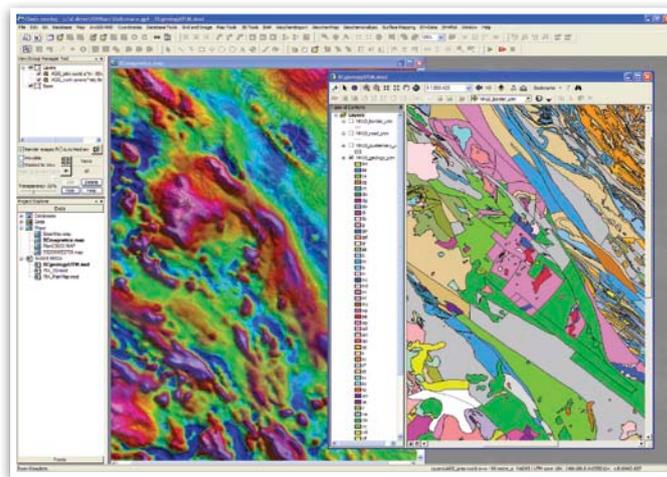
Geosoft is a leader in format compatibility. We support over 50 data, grids, maps and image formats.

Geosoft's extensive plug-ins and data conversion options ensure superior connectivity between your Oasis montaj core technology and your specialized oil and gas applications, GIS or other software. Plug-ins are also available for ER Mapper and MapInfo.

In addition, Oasis montaj core technology enables you to seamlessly access both original spatial data and processed information (grids, images and vector plots). Or import, export and use a wide variety of formats.

We are committed to providing you with a simple and natural data experience that empowers your exploration of the earth.

Geosoft and Esri ArcEngine



With version 7.3, Geosoft has embedded Esri ArcEngine into Oasis montaj, enabling geoscientists to use Esri tools to natively display Arc .mxd and .lyr files, without leaving the Geosoft environment. ArcGIS and Geosoft users can share their files seamlessly and spend more time collaborating.

To make it easier for geoscientists to access more data, Geosoft has also built-in data access technology to expand the range of internal and external data servers available, including DAP, ArcIMS, WMS and Tile servers.

Spatial data import formats

- ASCII data files, CSV
- ASEG GDF files
- Database table files (single or all tables)
- Excel spreadsheets
- Flat archive data files
- USGS data files

Processed data import formats

- ArcGIS shapefile (SHP) and Multiple XML Documents (MXD)
- AutoCAD DXF (DXF)
- GoCad (.Vo)
- Grid and image formats
- MapInfo TAB files

- Maxwell Plate files
- SEG-Y data
- UBC (MOD, MSH, DEN, SUS)
- LAS files (LAS)

Common grid formats

- DEM formats (GLOBE, ETOPO5, USGS)
- ER Mapper grid (ERS)
- Esri binary raster (FLT) and arc data files (ADF)
- Landmark ZMAP (DAT)
- Grid eXchange Format (GXF)
- Surfer grid file (GRD)
- Landsat MSS
- USGS (.ddf, .dem, and .oddf)

Common image formats

- EOSAT MSS (Old 4 Band BIL)
- ER Mapper algorithm (ALG)
- GeoTIFF image (TIF)
- GIF (GIF)
- IMG image (IMG)
- JPEG file interchange format (JPG)
- Landsat MSS (4 band BSQ), Landsat TM
- PCIDSK format (GIX)
- Portable Network Graphics Format (PNG)
- Tagged Image File Format (TIFF)
- Windows Bitmap (BMP)



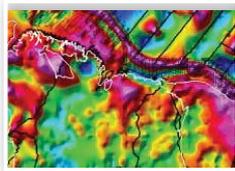
"Exploration companies want to know where sedimentary basins are and the thickness of the sedimentary package. With Geosoft's software, you can process magnetic and gravity data follow up with seismic data and then verify seismic findings."

Estella Atekwana, Oklahoma State University



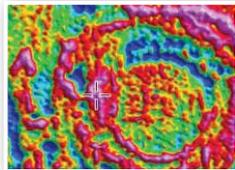
montaj extensions

A diverse range of gravity and magnetic interpretation solutions.



Geophysics

The Geophysics extension provides a range of filters and statistical tools for working with large volume geophysical data. A variety of geostatistical tools provide the ability for summary and advanced statistics.



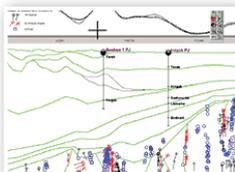
MAGMAP Filtering

MAGMAP Filtering utilizes a 2D-FFT filter library to allow the application of common Fourier domain filters to gridded data in Oasis montaj. Rapidly process and enhance gridded datasets by applying a wide range of geophysical and mathematical filters.



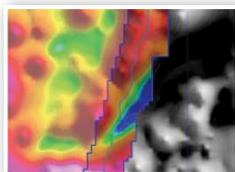
Grav/Mag Interpretation

The Gravity and Magnetic Interpretation extension automatically locates and determines depth for gridded magnetic and gravity data with Euler 3D Deconvolution processing routines. It includes the Keating Magnetic Correlation Coefficients tool for kimberlite exploration.



Depth to Basement

The Depth to Basement extension provides an automated method for determining the position, dip and intensity of magnetic source bodies for a magnetic profile. The depths are determined using Werner Deconvolution, Analytic Signal and Extended Euler Deconvolution.



Gridknit

GridKnit provides two advanced methods for rapidly and accurately merging virtually any pair of geophysical grids. It includes a blending method for merging grids and a suturing method for defining a join path.



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