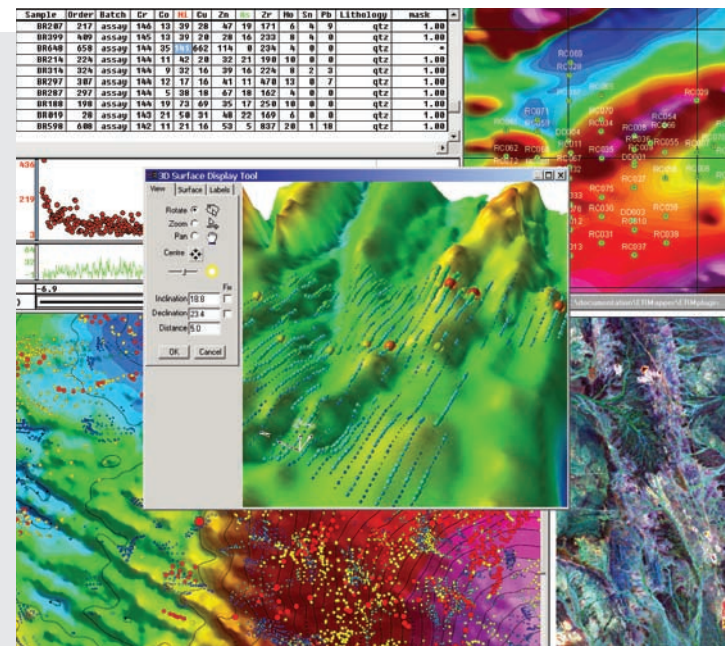


# Rapid data assessment and dynamic visualization reduces risk and increases prospecting capabilities in exploration



The ability to effectively display, rapidly assess and dynamically experiment with multiple datasets has helped to reduce risk and increase prospecting capabilities in exploration. Increasingly, what's required in exploration is software that can handle large volumes of data and multiple data sources and data types, such as geophysical data, geochemical data, drillhole data, satellite imagery, GIS data and any kind of mapping data, within one single environment or transparently linked environments. Utilizing today's visualization tools, geoscientists are able to reduce risk and increase understanding by looking at as much different data as they can, in as many different ways as they can, within compressed project time frames. Despite the fact



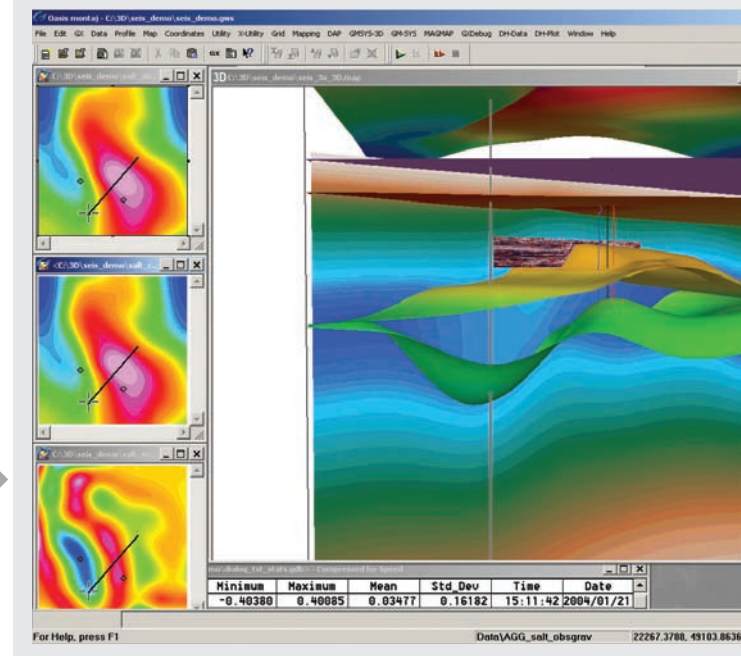
## Integrated montaj mapping environment

Powerful exploration mapping systems such as Oasis montaj enable the integration and visualization of many types of data at once. From raw survey data to 3D surface models, you can process, interpret and analyze geology, geophysics, drillhole, GIS and remote sensing data in a single environment.

that exploration companies are leaner, with fewer people and shorter project time frames, Dr. Michal Ruder, principal of US-based Wintermoon Geotechnologies Inc has seen exponential improvements in productivity and data quality as a result of new software for mapping and visualization. Whereas it used to take weeks to process and interpret geoscience datasets, today it's not uncommon for geoscientists to address the salient issues of

## GMSYS-3D modeling software

This 3D visualization of gravity and magnetic models was created using NGA's GMSYS 3D modeling software. The three flat maps along the left side of the workspace show Observed Gravity, Calculated Gravity, and the Difference. The black line marks the location of the seismic section shown in the 3D visualization on the right. The "+" symbol in the flat maps tracks the location of the 3D cursor in the 3D visualization (the long vertical line at the end of the seismic section). The other vertical plane in the 3D visualization is the sub-surface gravity response.



interpretations in the course of one or two days. "I can remember doing batch maps, in paper copies, back in the 1980's," says Dr. Ruder. "Since then, the ability to image geoscientific datasets on a computer screen in real-time, and continual improvements in visualization software, has had an amazing impact on what we can do, as geoscientists, and how quickly we can do it." Interpretation results are also more accurate because geoscientists have the tools to view the quality of the data in every single phase, from initial data processing and quality control through to visualization, integration and the final interpretations

## Dynamic and integrated visualization

Equipped with her laptop and mapping software, which includes ArcGIS and Geosoft's Oasis montaj mapping and processing software, it's not uncommon for Dr. Ruder to do interpretations on-the-fly, in collaborative meetings with major Oil and Gas customers. "I can do a lot of work in my clients' offices on my laptop," says Dr. Ruder. "My mapping software enables a lot of interactivity, and testing of their hypothesis, and I can show customers results in real time." There are efficiency and quality advantages in being able to dynamically pull customer data in, whether it's well data, satellite imagery or other types of data, and immediately looking at it as part of the interpretation. The dynamic linking of multiple views of imagery, maps, profiles, plots and data in Oasis montaj also provides an easier point of reference for visually linking common features or areas of interest. This type of rapid assessment and dynamic experimentation depends on the ability to interactively display, and enhance, different attributes in different ways, whether through contrast enhancement, shade relief, angle illumination, two dimensional or three dimensional displays. Speed in creating and recreating visualizations, or refreshment time, is also an important consideration, especially when dealing with large datasets

## Three dimensional modeling

The use of specialized three-dimensional modeling software, for prospect modeling of salt bodies, can further help to reduce risk in areas such as potential field exploration "It's very prudent to do 3D modeling for prospect modeling of salt bodies when you're considering a very expensive well in deep water," says Dr. Ruder. The GMSYS 3D application, developed by Northwest Geophysical Associates, is integrated with, and fully exploits, the three dimensional visualization capabilities of Oasis montaj. Geoscientists can use the software to plot 3D displays of the entire model in one simple step while retaining control over

each element in the 3D visualization. The 3D visualizations update automatically during inversion and structure editing. Geoscientists can also add wells, seismic sections, or other vector or raster information to their 3D model visualizations. "We've been using 3D seismic volumes, and approximations of a 3D velocity volume, in our interpretations for some time," says Dr. Ruder. "With modeling software such as GMSYS 3D, we can now convert that to depth and ensure that it makes sense with the observed gravity and magnetic data."

## Software and data integration

Today's visualization software is required to enable and support the easy integration of different types of datasets, including geoscientific data, satellite imagery and other GIS data into the mapping environment. Working in multiple software environments, is a reality for geoscience consultants like Dr. Ruder who need to meet their needs, as well as the needs of customers with a variety of software preferences. "In general, I find that the software tools I use work well together," says Dr. Ruder. "I also welcome the ability to distribute datasets and grids back and forth between my GIS and mapping software, with new programs like Geosoft's Target for ArcGIS." While geoscientists recognize that there's a lot to gain by looking at different types of data, Dr. Ruder admits that there is still a tendency, within each discipline, to use the data that they understand the best. "In general, I think people don't realize how easy it is to integrate all of their datasets, whether it's seismic and non-seismic, raster and vector," says Dr. Ruder. "GIS software and Oasis montaj provide some great tools for that."



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