

Deeper Insight For Reservoir Characterisation

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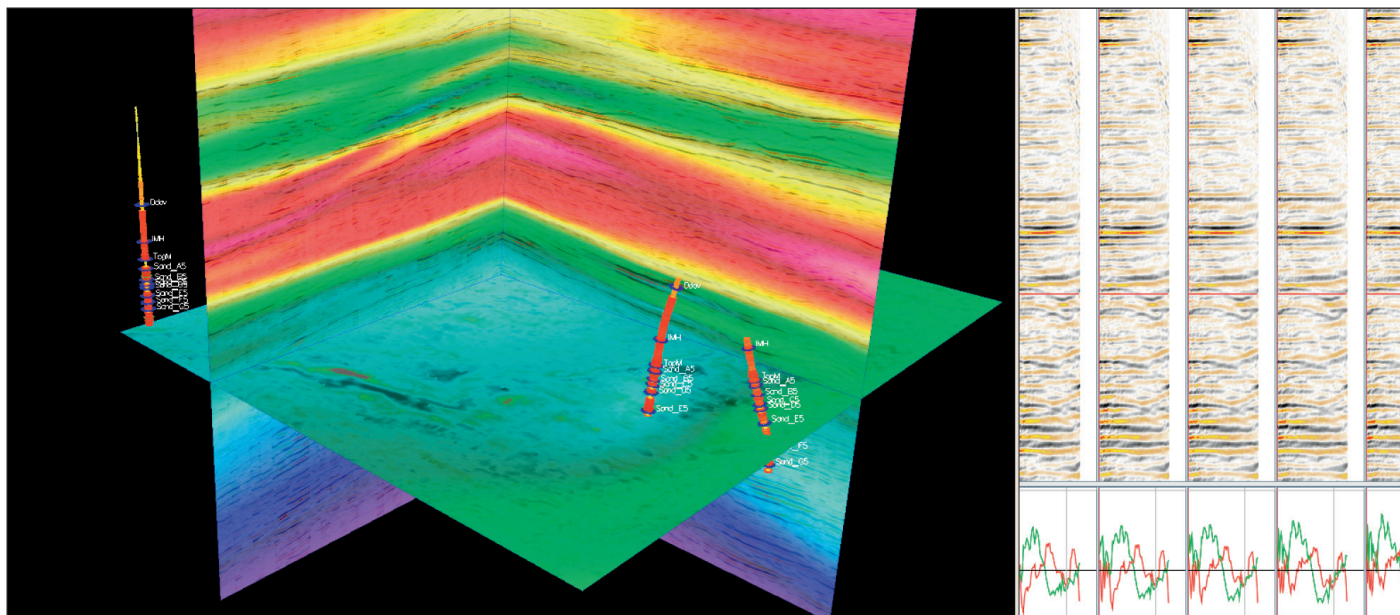


Fig. 1. The 3D viewer is at the core of Insight. Co-rendering allows the user to visually combine multiple volumes (stacks, gathers, velocities etc.) with other data types. While other windows are available, the amount of functionality available in the 3D view makes this window the focus of any interpretation process. This image shows a single near offset as the seismic image with an overlay of the velocities we will use to stack. The gathers are centred around the intersection of the lines displayed.

Finding and developing a reservoir has come a long way since neolithic man, swimming around in the La Brea tar pits, was struck by a stray spark and discovered the BBQ. Advances in our understanding of the reservoir have been increasing exponentially ever since. The most significant advance in recent time has been the

move towards a more integrated and iterative development of the model of the sub-surface. The distance between seismic acquisition and the petrol bowser is now less than at any time in the past. We see, more clearly and more quickly, the effect a small change in the data upstream has on our reservoir model and in turn our profit.

What has changed to shorten the distance between E & P? It is the process of how we go about finding and developing that has changed, the combination of how we use people, tools and information to achieve our objectives. The tools need to enable people to better convert the ever increasing amount and breadth of information into understanding. Hardware has played its part in this improvement though hundred-fold increases in computing power per dollar. Software development, however, has not always matched this and old software tools rarely take advantage of the improvements in hardware performance or people's abilities and needs to access information. The current market leader in reservoir simulation software is almost 30 years old, a truly remarkable achievement in the world of software. But while it has survived, it's still living in the '80s in terms of performance and pricing, as does its siblings.

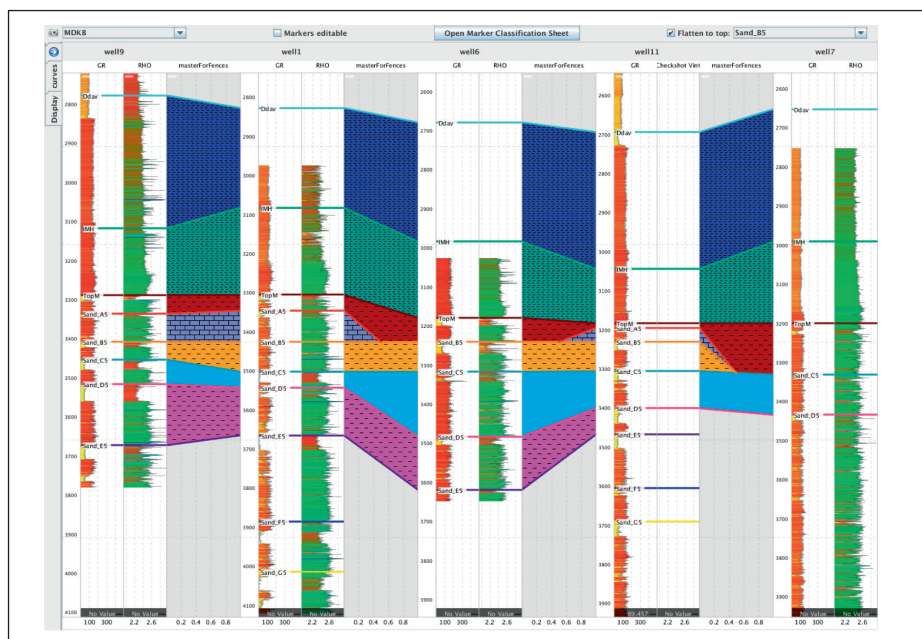


Fig. 2. A simple well correlation from Insight. Wells are fully integrated and these cross-sections, marker picking and logs will update in all Insight views as changes are made.

DownUnder GeoSolutions (Dugeo), headquartered in Perth, Western Australia, is in the enviable situation of developing in a high performance hardware and programming language world, without being weighed down by the shoulder pads and big hair. Its origins, eight years ago, as a lean provider of quantitative interpretation services has made it leverage the advances in the tools it uses to the full. With such tools it would have been silly not to make them commercially available. So they did.

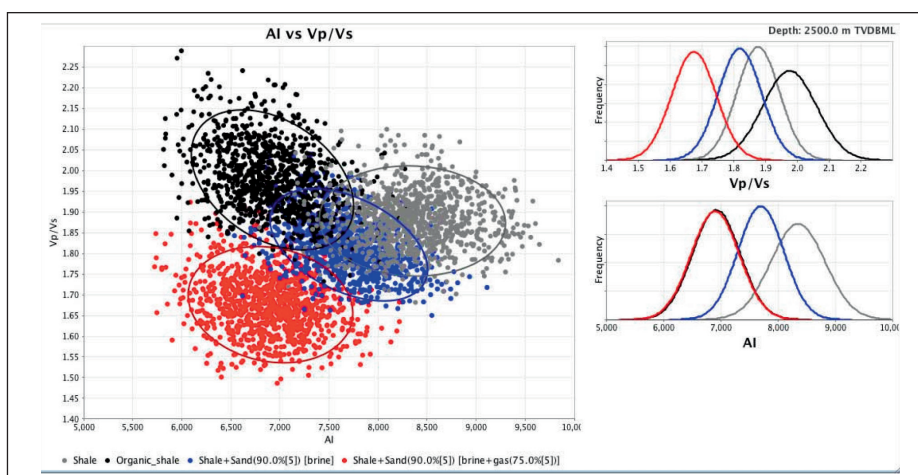


Fig. 3. Stochastic forward modelling results for four combinations of lithology and fluid. The ellipses represent the probabilities of lithology/fluid combination shown. This example comes directly from a study which correctly predicted gas in 6 consecutive exploration wells.

The DUG family of software solutions for the oil and gas sector consists of: DUG Insight – a 2D/3D/gather seismic interpretation and visualisation package, DUG Well – for well log visualisation and manipulation, Gassmann substitution and deterministic AVO modelling; as well as DUG Rock, for lithology trend interpretation. There are also a number of specialist tools developed for Dugeo's service business and available to select customers, such as depth imaging – for advanced velocity model building and depth migration, and DUG Spike for inversion.

These tools were originally developed to meet the need to deliver high quality quantitative interpretation (QI) and seismic processing services, more recently these products into commercial products which enable E & P companies to quickly evaluate their prospects while incorporating the more advanced pre-stack and QI capabilities.

Dugeo's philosophy of software product development hinges of three factors: performance, ease of use and fit for purpose. It seeks to maximise the performance advantage from modern hardware, utilising the multi-threading capabilities to enable the user to continue to interpret while the hardware is hard at work with more intensive tasks. With the ability to handle more data, more effectively, the limitations of the interpreter easily accessing pre-stack datasets no longer apply. 3D graphics advances are presented to the user as faster, higher quality images. This drive for performance translates to value for the end user through features like the propagator and multi-horizon picker, that speed up the interpretation process and let the interpreter continue working during these operations and spend more of their time on the technical issues. Tools which in the past have been

constrained to three dimension now work just as well with another dimension added to the mix. The ability to access, effectively visualise and operate on data in the offset domain is inherent in Insight.

The objective is to have products that are so easy to use that they require minimal support, both for the end user and for DUG. Not only in terms of user interface and robustness, but also in learning the products, supporting more operating systems, installation and purchasing. All this can be done via the web and by any user, without the requirement for an IT department. New users are able to learn through online video tutorials (the interweb never sleeps), and the support team, with offices in Perth

and Toronto (support never sleeps either). Inevitably, and quickly, the users are weened off and become self-supporting.

The DUG product development team is small and closer to the customers. This means that the turnaround on improvements to the tools are fast and effective, i.e. they meet the customers' needs. The latest version of the Insight software, targeted for release at the end of August, is an example of how a close relationship between the development team and the market can make a real difference in terms of enhancing the end user experience. While there are some major additions such as a new synthetics package, Well Correlation and new processes such as AVA Stack Rotation and the Multi-Horizon propagator, to name a few, there are dozens of smaller enhancements that are designed to make the interpretation process faster and easier for all users. This co-operative engagement of user and developer results in a better product because the root needs, the "why" is better understood by the development team, and this is only achievable by having a team that is highly skilled, broad experience and that a closer link with the end users.

The process of E & P has changed, it is shorter than it once was and certainly a faster. The productivity from that process has, until know, been much limited by the tools at its disposal, in particular the software. Shorter lead times for releases, better customer service and ability to adapt are essential to enable the process to further improve, and this challenge is accepted by DUG. ♦

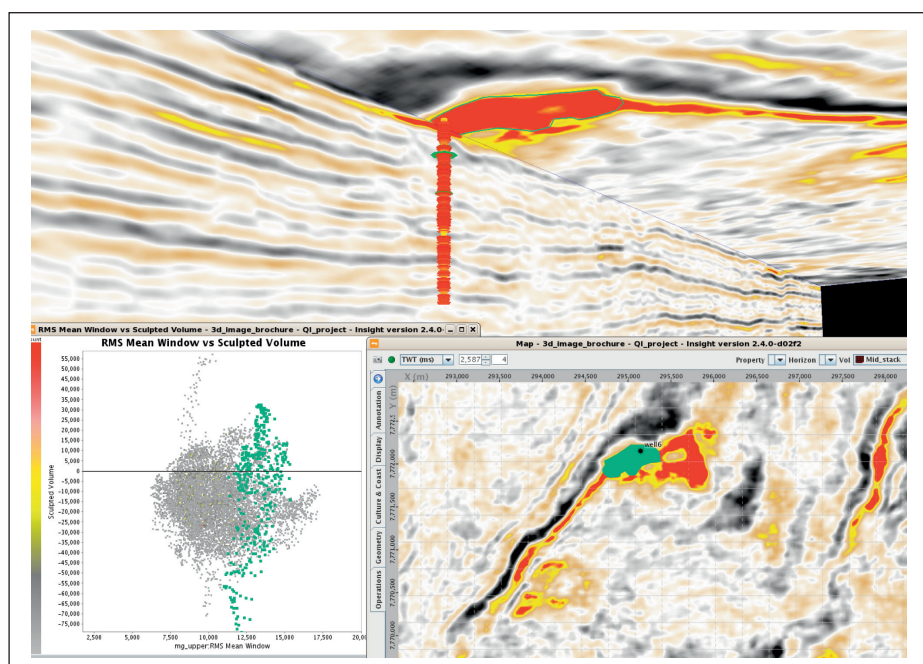


Fig. 4. Insight allows you to quickly compare attributes from your volumes, horizons and/or wells, and visualise your data in the 3D view. It is also possible to use the data selected, where appropriate, to perform volumetric calculations.