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3D PluraView – stereoscopic 3D-visualisation for the oil- and gas industry

In order to optimize the exploration and production of oil and gas fields, assess potential and increase yield, it is mandatory to understand all aspects of the geological subsurface situation. A higher level of understanding will lead to an earlier recognition of problems, reduce avoidable delays and associated substantial expenses. The optimal visualization of 3D geo-datasets is the key for geologists and geophysicists to analyze and evaluate geological and geophysical information components with the highest degree of confidence. The stereoscopic 3D PluraView dual-screen systems with integrated beam splitter mirror from Schneider Digital, offer such an optimal 3D visualization right at the workplace. With up to 4K resolution per screen and stereo-channel, the user benefits from a readily available, extremely bright and high-contrast 3D-stereo display on his/her desktop, when evaluating stratigraphic profiles, seismic 3D data, borehole information and derived 3D models. In the oil and gas industry, stereo-capable software platforms, such as Petrel from Schlumberger, Halliburton GeoProbe or MapInfo Discover are utilized. These allow the professional user to integrate, display and analyze all relevant subsurface information components quickly and comprehensively, display variants and associated simulations, improve play understanding and ultimately support more accurate hydrocarbon recovery forecasts. The visualization in 3D-stereo is an integral part of a 'best-practice toolkit', ensuring the success of the project.

Petroleum engineers and geoscientists spend a substantial amount of time combining 2D and 3D data sets from multiple sources to create interpolated 3D digital subsurface models. These datasets are used extensively over longer periods of time by the oil and gas industry in a variety of formats, with varying resolutions and in very large volumes. The stereoscopic monitors of the 3D PluraView series offer the highest stereoscopic display quality at the workplace with their proven beam splitter technology. They are the decisive interface for the visualization, for the creation and analysis of digital 3D 'twins'. All recorded surface and subsurface structures, as well as dynamic processes that are relevant for the exploration and production of oil and gas fields, can be visualized on the stereoscopic 3D monitors from Schneider Digital. True stereoscopic visualization not only makes it easier to interpret 3D data, it also dramatically improves collaboration between exploration and production team members. Several specialists can view, analyze and discuss a dataset simultaneously on a 3D PluraView. They benefit from the impressive, holographic representation of the geospatial data in a normal, not specially prepared or darkened office environment and a flexible viewing angle of almost 180 degrees.

Optimum visualization for stereoscopic 3D geo-datasets at the workplace

The 3D PluraView monitors are ideally suited to display 3D subsurface reservoir models stereoscopically in 3D, together with detailed surface datasets. With two high-resolution screens, the stereoscopic image pairs for the left and the right eye are combined by the so-called 'beam splitter', a specially coated transfective mirror, to form a very bright and high-contrast holographic stereo image. Due to the different polarization angle of the PluraView glasses, both stereo channels are separated for the left and the right eye, resulting in a perfect 3D-stereo display for the professional desktop.

The stereoscopic visualization is an essential part of professional geology software, such as Schlumberger Petrel, Halliburton GeoProbe, Baker Hughes JewelSuite, the Dassault GEOVIA Modules or MapInfo Discover. As the global market leader in the GIS sector, Esri has implemented with ArcGIS Pro a fully stereoscopic 3D GIS environment. ArcGIS Pro enables also the mapping of stratigraphic and tectonic subsurface structures with 3D voxel elements.

The visualization and especially the editing of spatial structures in 3D-stereo environment is an definitive key function. With a stereoscopic display, real spatial relationships can be understood immediately and intuitively and can be captured with great precision, compared to regular screens which can only display a flat 2D-perspective view, without any depth information.

Modern software environments for exploration and production are always three-dimensional and volumetric. Due to the high costs and risks involved, they must be as efficient as possible, reliable and optimized in terms of data processing. The ensuing field activities must meet all HSE standards and therefore the entire process chain must verifiably and fully correspond to the current state of the art and 'best practice'.

The 3D PluraView monitors by Schneider Digital represent this 'state of the art' in terms of hardware. They are by far the most practical and highest resolution 3D-stereo desktop systems currently available and are designed for fatigue-free, daily use in standard office environments as the perfect visualization solution for:

- 3D spatial data visualization - stratigraphic and tectonic surfaces
- Interpretation of 3D seismic data
- Integration of 3D surface and subsurface datasets
- Assessment and analysis of reserves
- Play development planning
- 3D modeling of property rights
- Preparation and visualization of directional drilling pathways
- Reservoir simulation, pressure drop modelling
- Industrial plant simulation / installation of production technology
- Dynamic modeling of finite elements (FEM)
- Oil & Gas 3D printing applications
- Software training for geologists, geophysicists, petroleum engineers
- Geo-scientific education

Reliably authorize exploration results through 3D models

A comprehensive and accurate understanding of the available 3D geological and geophysical data is required to comprehend the stratigraphic and tectonic structures, as well as the rock properties of oil and gas reservoirs in relation to their production potential. Among other things, seismic 3D profiles are recorded for this assessment, to identify reflective horizons, structures and faults. Together with results from other data sources, such as existing well logs, aero-magnetics and electrical resistivity tomography, all information is merged to create the most competent 3D reservoir model possible. If the evaluation is positive, this preliminary model will then be expanded by additional geo-datasets to support justifiable decisions about the future number, positioning, direction and depth of additional exploration boreholes, or the drilling of the first production wells.

The representation of the reservoirs in "real" 3D is also ideal for creating comprehensive static and especially dynamic models in 4D time-lapse series for clearly simulating pressure drop and flow changes under various

production scenarios. The best-possible combination, evaluation and interpretation of various 3D features is essential for the closest digital representation of the reservoir. This includes all major tectonic structures such as sealing or non-sealing faults and the modeling of stratigraphic layers. In particular, it includes as much information as possible about the source-, reservoir- and cap rock layers. Highly relevant are the accurate depth and structure of reflection horizons from geophysical exploration, combined with all physically present rock material from drill cuttings and core samples within the investigation area, as well as the determination of further petrophysical rock parameters by geophysical downhole probes. A "good" subsurface model shows the spatial relationships and properties of relevant features in sufficient detail and can therefore be used with acceptable accuracy to estimate the future behavior of an oil and gas reservoir under different production scenarios.

With the stereoscopic visualization technology from Schneider Digital, it is possible to perfectly visualize the correct spatial relationships of reservoir structures and their properties. This allows oil and gas engineers to evaluate potential reservoirs, estimate reserves, and predict reservoir properties and production behavior. It enables them to further optimize production setup, complete projects on time and on budget, and ultimately increase the company's competitiveness and profitability.

Especially at the transition point from exploration to production activities and associated surface installations, not only economic aspects are relevant, but strict environmental protection measures also have to be taken into account. Meeting associated requirements for official approval procedures are critical decision issues. Geospatial datasets that have been prepared on the desktop on 3D PluraView systems can be visualized just the same on large-format, stereoscopic projection systems and LED walls for larger groups of viewers, for instance for the company decision makers and public officials and thus presented in a much more easily understandable way.

The 3D PluraView monitors are the key element for geologists, geophysicists and engineers to create, visualize, analyze and understand complex 3D subsurface datasets, increasing confidence and leading to better-informed management processes throughout the project.

Benefits of 3D stereo visualization technology for oil and gas companies:

- 3D PluraView monitors are fully compatible with almost any workstation, even laptop hardware. Most professional software applications require only a standard professional graphics card for visualization.
- No need for special drivers or IT configurations, no stereo signal emitters as required by active shutter glasses. 3D PluraView monitors work with standard NVIDIA or AMD graphics drivers and are future-proof, operating with the latest Windows or Linux versions.
- Absolutely flicker-free and therefore permanent, comfortable usage thanks to very light, passive and cross-polarized stereo glasses.
- Shared stereoscopic viewing for small workgroups of two to six users, especially with the 27" and 28" 3D PluraView models.
- Fully integrated and usable in normal office daylight environments due to bright and high-contrast displays with up to 4K resolution per stereo channel.
- True spatial depth perception in 3D-stereo display mode, promoting an intuitive and faster understanding of stratigraphic and tectonic features and relationships.
- Best 3D-stereo visualization solution for geospatial professionals and engineers, supporting all stereoscopic features of leading software applications.
- Substantial decision support through 3D visualization, better validation of work results as well as error avoidance and less scope for misinterpretations.

More information online under: www.pluraview.com

More information at:

<https://www.3d-pluraview.com/en/application-field/3d-pluraview-in-geo-applications>

Video on the practical use of the 3D PluraView system in geospatial application areas:

<https://www.youtube.com/watch?v=bff3yju1oTY&t=8s>

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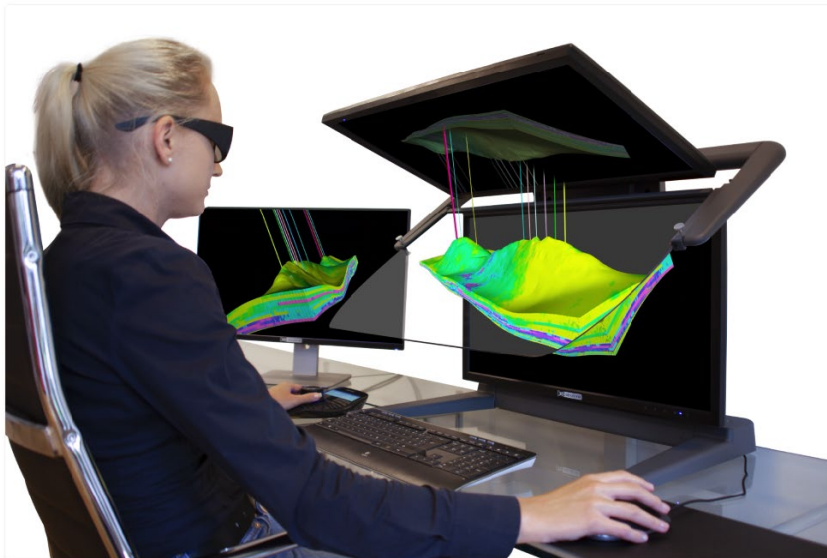
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Images:



Caption:

The optimal visualization of 3D geo-datasets in the oil and gas industry. There are utilized stereo-capable software platforms in combination with the 3D PluraView from Schneider Digital.

Schneider Digital – The company:

Schneider Digital is a global full-service solution provider for professional 3D-stereo, 4K/8K and VR/AR hardware. Based on its 25 years of industry and product experience as well as its excellent relationships with leading manufacturers, Schneider Digital offers innovative, sophisticated professional hardware products and customized complete solutions for professional use. Qualified advice and committed after-sales service are the company's own standards.

The Schneider Digital product portfolio includes the right professional hardware solution for the respective requirements in these areas: High resolution 4K/8K to multi-display walls. Schneider Digital is the manufacturer of its own powerwall solution smartVR-Wall and the passive stereo monitor 3D PluraView. Performance workstations and professional graphics cards from AMD and NVIDIA as well as innovative hardware peripherals (tracking, input devices, etc.) round off the product range. Many articles are in stock. This guarantees fast delivery and project realization.

Schneider Digital is an authorised service distributor of AMD FirePRO/Radeon Pro, PNY/NVIDIA Quadro, 3Dconnexion, Stealth int., Planar and EIZO. Schneider Digital products are used primarily in graphics-intensive computer applications such as CAD/CAM/CAE, FEM, CFD, simulation, GIS, architecture, medicine and research, film, TV, animation and digital imaging.

Further information is available at www.schneider-digital.com and www.3d-pluraview.com.

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