4D Visual Analytics and Data Integration with CoViz 4D

Dynamic Graphics’ 4D Quantitative Visualization Technology

CoViz® 4D leads the industry in providing dynamic visual analytics for reservoir surveillance and management. Understanding the changing response of a reservoir over time is critical for optimizing production and development decisions. CoViz 4D makes it possible for multi-disciplinary users to simultaneously view and interrogate datasets from throughout the asset development team—regardless of the original data source. Understanding through data fusion—powerful in 3D—increases enormously when used in 4D: The unique temporal functionality in CoViz 4D allows you to visualize how development decisions affect your reservoir.

True 4D Data Integration

CoViz 4D makes it possible for customers to simultaneously view and interrogate multiple time variant data and displays. Possible inputs include 4D seismic volumes and attributes, reservoir simulation, fluid production, well events and real-time drilling feeds, production tests, microseismic and monitoring data, time sensitive remote sensing imagery, and other time relevant data critical to the asset team. Utilities are included for data to be evaluated simultaneously in time snapshots or time sequence animations. Real-time 4D data fusion on the desktop is finally a reality.

Integration of multi-disciplinary data, including reservoir simulation, 4D seismic, seismic attribute extractions, structure model, and production data

Core photos and completion diagrams are among many types of data which are easily linked to the 3D/4D visualization environment. Data used with permission of owner.
Hydraulic fracturing is monitored using microseismic data. Event locations, error bars, and focal mechanisms are visualized in 4D in relation to the surrounding geologic model, well locations, and surface infrastructure. Treatment curves are also integrated into the display.

The large onshore dataset from Teapot Dome Wyoming visualized using CoViz 4D. Data courtesy of RMOTC and the U.S. Department of Energy.

Seismic amplitude values are sampled into both a reservoir simulation grid and well log data, enabling statistical analysis and comparison of diverse datasets.

About Dynamic Graphics, Inc.
Software Solutions Since 1969

Dynamic Graphics, Inc. provides world class solutions for spatial analysis problems in the petroleum, environmental, and earth-related sciences. Over the past four decades, we have been the premier provider of geospatial answers with our innovative, easy-to-use software and outstanding support services.

We offer three separate software packages: CoViz® 4D, WellArchitect®, and EarthVision®. Each can be a standalone product, serving a different purpose in the hydrocarbon development or environmental analysis workflow. However, when used in conjunction, they provide a collaborative multidisciplinary environment that offers dramatic synergies.

All of our software products are designed to meet clients’ practical application needs, industry standards, and our own stringent quality-control requirements. We provide a complete spectrum of regularly scheduled and customized training courses prepared by our full-time educational services staff. Once our products are in use at a client site, our experienced technical support personnel are available to offer their expertise and unparalleled levels of support.

Dynamic Graphics is committed to responding to the challenges our clients face in their day-to-day work. We know that the continued success of our company depends upon developing innovative, dependable, easy-to-use software, while offering strategic support services that help our clients solve their demanding, time-sensitive problems. The quality of our service is the key to our past success; let us show you how we can turn that into success for your company!
Spend Your Time Hunting for Opportunity—Not For Data

Multidisciplinary teams are made up of experts armed with many tools to advance their understanding within their realm of expertise. Even with the evolution of greater centralized storage and networking of data and information, no individual in an asset team has complete knowledge of the location, identity, or purpose of all of the information that is vital and available to the team. Much of these disparate data are processed within a variety of software applications provided by multiple vendors and operated by multidisciplinary users with unique expertise. CoViz 4D provides a means for teams and individuals to access information simultaneously from many sources and applications in a flexible viewing environment without the need for specific knowledge of where the information is stored, or how to run the software that generated the information. Data and information to be included become a function of team needs, not limited by user’s expertise: critical surface information can be united with subsurface drilling; geological, petrophysical and reservoir data are visualized with maps, models, and displays of related tabular, graphical, and text resources.

“Every CoViz 4D enhancement is focused on helping clients use their data to make better decisions. We firmly believe that seeing data in context is necessary to fully understand what your data are telling you. We love hearing about successful drilling decisions that could not have been made without the analysis and understanding that CoViz 4D allows.”

Integrated 2D-3D-4D Visualization

for Collaborative Team Sessions and for the Individual’s Desktop

This technology was first envisioned to empower teams in a collaborative environment for processes such as exploration planning, exploitation evaluation, and reservoir surveillance. Now Dynamic Graphics is bringing these same capabilities to the desktop so that team members can have broad data fusion capability at all times. With greater access to vital information from the desktop or in collaborative meetings, Dynamic Graphics’ customers are positioned to make better and faster decisions in order to seize opportunities and accelerate returns from efforts and investments.

Comparable seismic and cellular extractions and averages computed across a turbidite channel offshore Northwest Europe.
Quantitative Visualization and Seismic History Matches

In addition to clear strengths as a team visualization tool, CoViz 4D is also the premiere environment for integrated 4D visual analytics.

CoViz 4D includes significant features for the rapid, integrated, quantitative analysis and statistical comparison of diverse 3D and 4D data sets. In particular, this includes the generation of synthetic 4D seismic volumes from rock physics inputs, (Sim2Seis workflow), the calculation of displacement, strain and seismic time-shifts in the overburden due to thickness change in the reservoir (4D Geomechanics workflow), and the quantitative analysis of 4D seismic data within a multidisciplinary data fusion environment.

Specific functionality, available to users interactively from the viewing environment, includes:

- Rapid time-to-depth, and depth-to-time, conversions of data sets
- Creation of petroelastic models from rock physics parameters via Gassmann substitution (Sim2Pem
- Calculation of 4D synthetic seismic data from a petroelastic model (Pem2Seis)
- Rapid, first-order screening of overburden deformation and time-shifts, based on reservoir compaction (4D Geomechanics)
- Time-step arithmetic operations (rapid calculations of differences over time)
- Interactive tools for property averages and attribute extractions in seismic space and cellular space
- Back-interpolations of property values between spatially and temporally overlapping data
- Statistical analysis and cross-plotting of diverse data types with interactive links back into the 3D/4D viewing space
- Multiple output options to capture and export the results of the quantitative analysis
- Available well planning module for easy-to-use well design in a data-rich environment (CVIWD)