

**1+2** Seismic data are visualized in real-time and 3D.

**3+4** Analysts interact and collaborate to explore huge oil and gas data sets.

## THE VRGeo CONSORTIUM

### Hardware and Software Technologies for Interactive Visualization Systems in the Oil and Gas Industry

#### Fraunhofer Institute for Intelligent Analysis and Information Systems IAIS

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#### Seeing the Invisible

Exploration for oil and gas creates huge datasets. Discovering subtle structures in this data can mean the difference between success or failure of a borehole. Only the best visualization and interaction techniques are good enough. In 1998, Adolfo Henriques from Statoil, Norway, took the initiative to establish a consortium of companies with a common interest in exploring the possibilities of interactive visualization systems.

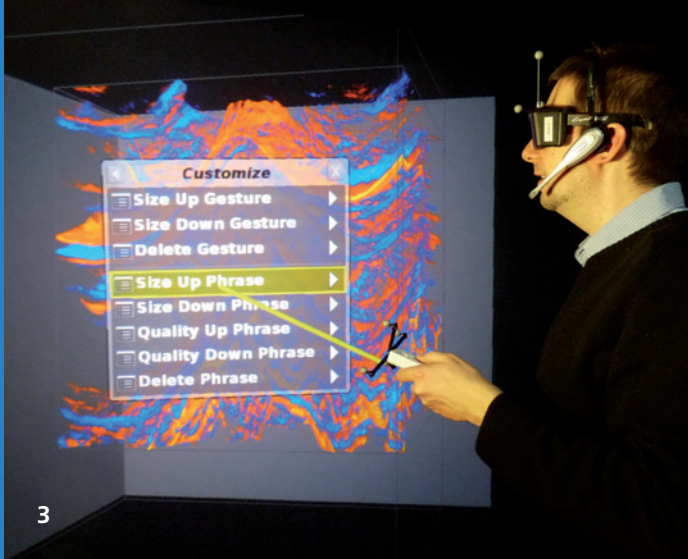
#### The VRGeo Consortium

The VRGeo Consortium is a consortium of the oil and gas industry and their technology providers. The mission is to develop new methods and technologies, which eventually find their way into the oil and gas companies by means of the technologies providers.

The VRGeo Consortium successfully exists since 1998. Many VRGeo results can be found in soft- and hardware, which is used in oil and gas companies today.

#### Consortium Members

The members of the VRGeo Consortium represent oil and gas companies, their suppliers of software applications, and their providers of related technology. Industrial companies are full members and scientific institutions are academic members of the VRGeo Consortium. Current industrial members are BP, Chevron, ExxonMobil, Petrobras, Saudi Aramco, Shell, Statoil, Barco, HP, Landmark, and NVIDIA. Current academic members are CMR, NTNU, and PUC Rio. Fraunhofer IAIS hosts the VRGeo Consortium and is conducting the technical R&D work.



## Research & Development

VRGeo's main focus is on Visual Analytics Systems for the oil and gas industry. In particular, VRGeo addresses the following topics:

- Advanced Visualization (e.g. large seismic horizon and volume rendering): real-time, interactive, remote
- Natural Interfaces (e.g. multi-touch or speech control): fit to the task, easy to use, intriguing, human, invisible
- Team Work Environments (e.g. multi-user display systems): collaborative, multi-disciplinary, task-specific, immersive
- Technology watch related to oil and gas exploitation

The VRGeo R&D agenda is defined once a year by the VRGeo Consortium members. The members of the consortium decide on the continuation of existing topics and the introduction of new topics.

## Major Achievements

- **SeisTouch:** Together with the VRGeo Consortium member Statoil, the VRGeo R&D team developed the so-called Statoil SeisTouch. It is a standalone multi-touch system running an application for inspection and annotation of 2D seismic surveys.
- **Volume Ray Casting:** The VRGeo R&D team developed an out-of-core real-time visualization system for simultaneously rendering multiple very high-resolution image data sets.

- **VRGeo Volume Rendering Benchmark Framework:** The VRGeo R&D team benchmarks latest graphics boards and drivers with respect to their slice-based volume rendering performance.

## The VRGeo Consortium Membership Value Proposition

Being a full member of the VRGeo Consortium means to...

- be part of one of the rare international working groups where experts from oil and gas – though being competitors – share experiences, ideas, challenges, and finally resources.
- share the expense of basic research in advanced visualization and interactive visualization systems.
- have an impact on the VRGeo R&D agenda according to individual needs and strategic objectives.
- have the right to review and license all VRGeo R&D results.
- give collective feedback and impact on suppliers' roadmap.
- have access to Fraunhofer's well-known research staff in terms of collaborative R&D activities and also for topic-specific consulting purposes.
- optionally nominate one or more individual collaborators per year as resident professional to work at Fraunhofer IAIS as a participant in the VRGeo R&D program.
- represent a company in the VRGeo Steering Committee with one vote.
- have the right to nominate an academic member.

## Testimonials

*"VRGeo is a perfect forum to discuss, experience and influence technology development within oil & gas science",*  
Jens Grimsgaard, Leading Researcher Geophysics Interpretation, Statoil ASA.

*"...Saudi Aramco scientists have developed a billion cell reservoir simulation visualization technology, ... , by adopting Fraunhofer Institute's Octreemizer product. Up to a few billion cell models can easily be visualized in three dimensions using the new technology. Users can rotate the image and generate two dimensional cross sections at desired locations of the three dimensional image of a reservoir property (i.e. pressure or permeability, etc.) by a mouse click. Generating images takes a few seconds only. This product allows engineers geologist to analyze the input and output of a giga-cell simulation in practical times.",*  
in: From Mega-Cell to Giga-Cell Reservoir Simulation, Dr. Ali H. Dogru: Saudi Aramco Journal of Technology, pp. 63-70, Spring 2008.

*"Identification of opportunities to improve our current technology."*

*"Ability to test future concepts which might offer technology step changes."*

*"Forum to discuss visualization topics with a diverse group of visualization experts."*

*"Interaction between research, users, software and hardware providers."*

Knut Hansch, Principal Geophysicist, Canamens Energy AS, formerly with BP.