

# MANAGING CHANGE IN PETROLEUM INDUSTRY

The petroleum industry works amid a rapidly changing environment and GIS is changing right along with it. Robert Brooks looks at the technology trends that petroleum companies are latching on to

## **WHAT IS NEW IN THE INDUSTRY IS HOW PETROLEUM**

companies are managing their business. Petroleum is a geographic industry. Their resources are regionally dispersed and the majority of their business issues involve geographic questions. Place matters. It is the difference between a billion

dollar discovery such as the Tupi field off the coast of Rio de Janeiro and a multimillion-dollar loss. What happens at a place is even more important. Geographic knowledge can be the key to preventing an economic disaster like the 2008 explosion at Varanus Island in Australia. To implement this type of thinking, petroleum companies are applying geospatial technologies such as a geographic information system (GIS).

GIS first made its appearance in the petroleum industry decades ago, but it began to gain open acceptance after the publication of the 1989 Geobyte article "Petroleum Problem Sets Challenge Geographic Information Systems." Since then GIS has grown in use and is now accepted as one of the critical technologies used in the exploration process. GIS software is commonly found on the desktops of geologists and geophysicists and is used in many facets of basin, play, and prospect analysis.

### **Trends**

The advent of the Internet sparked a slow migration away from a traditional desktop environment where thick

applications were installed, data was stored or accessed, and analysis occurred. This application environment has proven to be complicated, expensive, and difficult to standardise, control, and manage. Instead, there has been a slow but steady shift toward thin-client solutions which are focussed, easy to use and support, and lightweight. In this newer breed of solutions, data and functionality are stored on centralised, high performance servers. In addition, these products are licensed in a way that promotes extended usage, as opposed to the highly controlled desktop methods.

We have seen products, such as P2 Energy's Enterprise Upstream, appear in the petroleum community. These applications provide strong technical solutions to more people for a lower overall price. They are also extending the reach of geographically based thinking and decision making from a limited number of analysts to whole departments. It is expected that this trend will continue to proliferate to include other arenas from risk

assessment tools to pipeline integrity management solutions. In addition, we fully expect to see cloud computing extend this trend. Cloud computing will allow traditional analyses to use dynamic and scalable computing on virtualised resources provided as a service over the Internet instead of in-house servers.

The second trend is how GIS is growing out of its core areas and into new business realms. There are many additional business processes in a petroleum company where GIS could make valuable contributions. Let's take for example production and operations. GIS can be used to optimise well patterns, route crews, and optimise the schedules of specialised teams. It can enable operators to manage the integrity of a gathering pipeline to prevent leakages and ensure public and workforce safety; expose regional surface subsidence or geographic patterns related to water cut; or provide a mechanism for production teams to see operational data in a spatial context.

The final trend is the way GIS is fitting into the overall integration of an organisation, often referred to as the enterprise. Enterprise integration is a term used to describe system interconnection, electronic data interchange, product-data exchange, and distributed computing. Every petroleum organisation has

implemented key enterprise information technologies. In some cases they are Client Relationship Management Systems (CRM), Human Resource Management (HRM), Enterprise Resource Planning (ERP) or Document Management Systems (DMS). For others it is Work Order Management (WOM), Asset Management Systems (AMS) or SCADA. Regardless of the type, the technologies were selected for the ability to optimise operations. A common link between all of these systems is that the information they manage is spatial in nature; but few of these application have access to true geography.

The role of GIS in the enterprise has historically been to provide broad

access to geospatial data and to create a common infrastructure upon which to build and deploy applications. While this is a valuable role, GIS users are maintaining geographic data at great cost while greater functionality can be achieved. Cutting-edge organisations are exposing geographic information and GIS capabilities to other enterprise solutions, thereby providing a spatial context across enterprise systems and making GIS-based analysis available to several applications. GIS is poised to become an integration technology fused into every aspect of an organisation's operations. GIS is becoming an operational requirement and a way of conducting business.

The petroleum industry works amid a rapidly changing environment, and GIS

is changing right along with it. For the past 20 years petroleum operators have used GIS to think geographically. GIS eases operations, improves analysis, and exposes organisations to information about their operating environment. GIS is going to continue to empower the industry as it changes form. As GIS becomes more accessible, its use will extend to other operating teams and it will be applied in different environments. GIS will find its role as a unifying force in the petroleum industry's enterprise playing field. ■

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- In the oil and gas industry geospatial technology is central to decision making, right from tracing oil deposits to laying the supply infrastructure and for repair and maintenance.
- It enables open use and exchange of various data such as satellite imagery, aerial photos, and geologic studies. Each of these data can be layered on a map, along with other details including location, lease and ownership of existing wells and their pipeline infrastructure. The resulting analysis can help determine promising locations - or eliminate weak ones - for exploration and drilling.
- Sensors installed throughout the drilling and supply infrastructure provide live operational feed which can be used to plan scheduled maintenance and respond to exact location of problems. This increases operational safety, delays replacement cycles and ultimately reduces operational cost. The availability of high resolution satellite imagery with frequent revisit time offers a viable substitute to sensor technology.