Spanish Oil Company Uses Seismic Imaging Technology off Brazil's Coast

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Spain-based oil and gas company Repsol, which operates in over 30 countries, has begun exploration operations off the Brazilian coast and in the Gulf of Mexico using the firm's advanced seismic imaging project known as Kaleidoscope.

Kaleidoscope is powered by reverse-time migration (RTM), a sophisticated subsurface imaging tool whose potential is accepted by the oil industry, but until now has not been used because of technical hurdles.

Repsol's Kaleidoscope technology overcomes those hurdles, enabling searches for energy reserves at greater depths and with greater clarity up to 10-times faster than conventional technology.

The Kaleidoscope project was launched in November 2006, and its research data, powered by the IBM PowerXCell(TM) 8i processors, proved this technology was successful in imaging areas of complex subsurface geological structure, such as the rich hydrocarbon provinces of the deep waters of the Gulf of Mexico, offshore Brazil and West Africa.

These basins are the new frontiers in oil exploration, where significant oil reserves are known to be present below thick masses of salt but have been difficult to pinpoint using conventional seismic imaging technology. Now, Kaleidoscope's clearer, faster seismic images bring unprecedented opportunities for energy companies to accurately identify underground oil and gas reserves in these traditionally hard-to-image areas.

Kaleidoscope enables Repsol to locate oil reserves buried some 30,000 feet (10,000 feet of water and then 20,000 more feet of seabed) below the Gulf of Mexico's surface, for example.

The U.S. Department of the Interior's Minerals Management Service estimates the Gulf holds approximately 56 billion barrels of oil equivalent (oil and natural gas), which, at US$ 65/barrel, would be worth over US$ 3 trillion and would meet the entire U.S. demand for oil and gas for about 2.5 years.

"Repsol is pleased to launch Kaleidoscope's exploration operations in the Gulf of Mexico and Brazil as the project proves the success of the collaborative approach to research we have pursued for the past two years," said Francisco Ortigosa, Repsol's director of Geophysics.

"The speed and power of the IBM PowerXCell 8i processor-powered Kaleidoscope Supercomputer paired with the RTM imaging algorithm and the computational support of the Barcelona Supercomputing Center (BSC) truly positions Kaleidoscope at the cutting edge of innovative, and collaborative, exploration technology. Hard-to-image areas known to have rich fossil fuel reserves are now being opened to time- and cost-efficient exploration."

In addition to launching the project's first real-world applications, Repsol has also made the commitment and investment to build and operate its own supercomputer to provide the computational power and stability needed for Kaleidoscope's future expansion.

The Kaleidoscope Supercomputer, a 120 Tflops, scalable Linux cluster computer system powered by IBM PowerXCell(tm) 8i processors, runs the project's RTM production code on large datasets of information. The IBM PowerXCell 8i, originally developed for next-generation gaming consoles, is a critical component to the development of this new class of seismic technology.

As the first supercomputer to combine these technologies, the Kaleidoscope Supercomputer has a peak performance equivalent to 10,000 Pentium 4 processors, the mainstream desktop and laptop central processing units (CPUs).

Repsol is an integrated international oil and gas company, operating in more than 30 countries and is the leader in Spain and Argentina. It is one of the ten major private oil companies in the world and the largest private energy company in Latin America in terms of assets.

From exploration and production to marketing, Repsol is present in all stages of the business. With an oil and gas production of over 1.1 million barrels of oil equivalent per day and a refining capacity that surpasses 1.2 million barrels per day, the company operates nine refineries, and is the leader in Spain, Argentina, and Peru.

Repsol sells its oil products through a wide network of 6,800 sales outlets spread over Europe and Latin America. In chemicals, Repsol is the top-ranking producer of petrochemical products in Spain and Portugal. In the liquefied petroleum gas business (LPG), it is the third largest company in the world and one of the most efficient operators.

Repsol also distributes natural gas, directly or via its affiliates, to over 9 million customers in Spain and Latin America.