

Repsol's Kaleidoscope Seismic Imaging Named 2008 Technology Winner

Repsol YPF 1/3/2008

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Repsol YPF, a globally integrated energy company based in Spain, was recently honored as a 2008 technology "winner" by the editors of IEEE Spectrum, the trade publication of IEEE, the world's largest organization of technology and business leaders, for Repsol YPF's Kaleidoscope Project.

The Kaleidoscope Project -- a partnership of top geophysicists, computer scientists and organizations from around the world -- has developed advanced computerized techniques that usher in the next generation of seismic imaging technology used for oil and gas exploration. The new technology reveals oil and gas deposits buried deep in the earth efficiently and cost-effectively that had been invisible to traditional imaging techniques.

Credited with "solving the oil equation" in IEEE Spectrum's January 2008 issue, the Kaleidoscope Project makes possible the full realization of the next generation seismic imaging technology, including a specialized technique called Reverse Time Migration (RTM), that will accelerate and streamline oil and gas exploration compared to current industry standards. This technology will significantly reduce exploration risks within a context where a hit-or-miss drilling test can cost over \$150 million.

"We are advancing seismic imaging by moving from a science of 'approximations' due to lack of computer power to one of more precise algorithms tailored to a new generation of processors," said Francisco Ortigosa, Repsol YPF's chief geophysicist and project leader. "To achieve our scientific and business goals for the Kaleidoscope Project, we have assembled a premier dream team of professionals from industry, government and academia. We are excited and proud to raise the industry standard in seismic exploration and to be recognized for our work by the distinguished editors at IEEE and IEEE Spectrum."

Repsol plans to use the new seismic technology to locate hydrocarbons and oil reserves buried some 30,000 feet (10,000 feet of water and then 20,000 more feet of seabed) from the U.S. Gulf of Mexico's surface. The U.S. Department of the Interior's Minerals Management Service estimates that the Gulf of Mexico holds approximately 56 billion barrels of oil equivalent (oil and natural gas), which, at \$90/barrel, would be worth nearly \$5 trillion and meet the entire U.S. demand for oil and gas for about five years.

These oil reserves are very difficult to find and reach due to the extreme depths of the "ultradeep water," as it is known in the oil industry, as well as thick layers of salt that preclude the visualization of oil-bearing sands underneath using only current seismic imaging technology. Ultradeep water represents the new frontier in petroleum exploration, and the Kaleidoscope Project's technological advances in earth imaging provide an opportunity to penetrate that frontier, yielding strong competitive advantages.

The Kaleidoscope Project uses new models, algorithms and one of the world's most powerful supercomputers, called the MareNostrum, operated by the Barcelona Supercomputing Center (BSC) and equipped with IBM's processors and supercomputing architecture. In addition to utilizing this state-of-the-art research facility, Repsol has successfully collaborated with some of the world's most experienced technology partners, including 3DGeo, a Houston-based imaging company formed by Stanford University professor and seismic imaging pioneer, Biondo Biondi, and Stanford University's Stanford Exploration Project (SEP), a leading industry-funded academic consortium, whose purpose is to improve the theory and practice of constructing 3-D and 4-D images of the earth from seismic echo soundings.

For a complete description of the Kaleidoscope Project -- including its scientific and business impacts -- please read IEEE Spectrum's article, "Solving the Oil Equation," in its January issue or on its Web site at: <http://spectrum.ieee.org/jan08/5809>.

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