The next frontier

For a geoscience company like CGG, a new frontier is promising if it satisfies several criteria in terms of attractiveness. These criteria include the geology of the oil system in place, the local statutory and fiscal context, the political and economic environment and, most importantly, how interested our clients are. Also, by its very definition, a frontier zone is an area that is still relatively underexplored.

Our only real guide to the future is the past. If we look to the past, we see that exploration frontiers come in many forms. There are true geographic frontiers, areas that have been largely discounted and underexplored, perhaps due to political, commercial or environmental reasons, or simply because trends pointed in a different direction. But there are also more subtle technology-driven frontiers. In the offshore world, advances in drilling technology continuously create new frontiers as we push into deeper water and take on deeper reservoirs with a litany of associated risks related to high pressures and temperatures.

If we combine these factors, we see four priority new frontiers, which are, in no particular order:

1. The Arctic, which according to a USGS 2008 study, is estimated to contain approximately 13% of the world’s undiscovered oil reserves and almost 30% of its undiscovered natural gas reserves, most of which are offshore. The high risk and costs involved in exploiting oil and gas in these regions are nevertheless significant challenges... but are not deterring the oil and gas companies, and we are seeing growing interest and activity in the Arctic seas. The Barents Sea and the Russian Arctic (Kara Sea), two areas in which CGG has been very active, have recently seen the greatest activity. In 2013, CGG conducted a 3D BroadSeis multi-client survey in the Barents Sea to provide new broadband data to assess the region’s petroleum potential. Our Robertson Geolab group are also currently acquiring a multi-client surface geochemistry survey to detect seafloor seeps of hydrocarbons in the South East Barents Sea, which has received unprecedentedly high prefunding from major oil industry players.

2. The “Golden Triangle” between the American Gulf of Mexico, Brazil and West Africa continues to extend into ever deeper zones. CGG is conducting exclusive and multi-client seismic surveys in all three of these locations. The definition of pre-salt/subsalt reservoirs is a major challenge, requiring both innovative acquisition methods and considerable imaging expertise. CGG has acquired multiple wide-azimuth marine seismic surveys in the region over the last decade and, more recently, developed innovative solutions such as StagSeis, which mobilizes several seismic vessels, to produce but the potential prize of finding a deeper oil window. This is a front and center topic for many regional explorers.

The recent emergence of E&P companies focused on deep plays on the continental shelf of the US Gulf of Mexico indicates the potential for new plays in mature basins. In fact, there are several key areas around the world that are currently experiencing growing interest.

In East Africa, massive gas discoveries in Mozambique are creating great excitement – not just about the potential for additional gas discoveries in neighboring Tanzania, Madagascar and the Comoros Islands, but the potential prize of finding a deeper oil window. This is a front and center topic for many regional explorers.

OE spoke with experts from CGG and Ion Geophysical to ascertain where the next frontiers of future offshore oil and gas exploration will be located. These areas are certain to blossom over the next five years. Here’s how the experts answered.

CGG

Ion Geophysical
next-generation images of these complex geologies. Initially focused on the Gulf of Mexico, these strategies are now of interest to our clients for application in Brazil and West Africa.

3. Mexico, where the recent energy reforms are pushing the country to center stage as a frontier zone for the oil industry’s international players, for the first time in over 75 years. A deepwater zone in the southern part of Mexican waters in the Gulf, covering reserves estimated at 3.22 billion boe, will be gradually offered up to foreign and privately owned oil companies over the coming months. With a track record of over 25 years of active operations in Mexico, CGG has in-depth knowledge of all the basins, both in terms of their geological and geophysical characteristics and the best way to conduct seismic survey operations. This means we are ideally placed to support our clients in their efforts to increase exploration success rates and optimize hydrocarbon development and production while reducing costs and related risks.

4. East Africa has seen considerable renewed interest on the part of international oil and gas companies after major gas discoveries off Mozambique and Tanzania. The announcement by Pancontinental Oil & Gas NL of the first oil discovery offshore Kenya has also heightened this interest.

Oil and gas exploration is very fast-moving and we are of course attentive to other frontier zones, which all present specific challenges relating to their geological and geophysical complexity. As an example, the recent development of deepwater fracturing technologies could lead to the emergence of new frontier zones.

Other areas of interest in the southern hemisphere include Australia, Uruguay and Argentina. There are new basins still to be explored in the northern hemisphere, too.

The east coast of Canada, including Labrador and Newfoundland, has recently demonstrated real potential, and the US east coast seems to be finally ready to benefit from real, modern exploration techniques.

In Norway, the opening up of the northern reaches of the Barents Sea looks very promising, and recent discoveries in the Kara Sea suggest that the Arctic will eventually fulfill the tremendous claims for the area made in recent years.

From a technology perspective, the acquisition of high quality 3D data under ice in the Arctic is emerging as a critical exploration need. In fact, 3D is increasingly vital for exploration in all frontier areas. Historically, 2D seismic has been used to define deep basin architecture, with successive 2D iterations utilized to increase grid density per acquisition prior to leasing.

Outside of the most prolific mature basins of the North Sea and the Gulf of Mexico, 3D has been used sparingly for post-award drilling decisions. Today, many frontier areas offer the potential for prolific stratigraphic traps that cannot be well characterized on 2D data. Consequently, the technology curve belongs firmly to 3D seismic; the key to future offshore exploration lies in increasingly efficient and innovative methods in this area.

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Christophe Barnini has served as senior vice president, communications, for CGG since 2013. His scope of activities includes corporate and financial communications, as well as internal communications and business communications with clients. He was previously head of investor relations from 2000 and prior to that he served as vice president, finance, for the Americas, from 1998 to 2000, and held the post of group financial controller from 1996 to 1998. Before joining CGG, he was vice president at IBM Consulting Group from 1991 to 1996.