Dipping into the seabed acquisition market

If there is a seismic survey market waiting to happen, it could be on the seabed. Andrew McBarnet takes a look at the next generation of ocean-bottom node solutions.

Vidar Hovland joined marine seismic contractor Petroleum Geo-Services (PGS) in 2005 just as the company shut down its two ocean-bottom cable seismic crews because the business was not regarded as viable. Fast-forward to 2016, and we find him busy launching inApril, the oddly named Norwegian start-up seabed seismic equipment company.

He spent the intervening years in the upper echelons of PGS management having arrived from Fugro Geoteam, where he had been managing director of its seismic business. Hovland was president of PGS marine acquisition and then vice president, special projects, for the two years before he left.

In essence, he could be said to know a thing or two about how the business and technology of marine seismic operations work. Why then would he want to develop any company in the marine seismic space during the worst downturn in living memory, let alone one focused on seabed surveying, which to date has had a spotty commercial history?

"Some of us had been talking about it for a while," Hovland says. "We were convinced that there could be a future in a system that was cheaper and more efficient to operate than existing ocean-bottom seismic solutions. We knew that oil companies liked the ability of seabed imaging to provide higher resolution data for applications like reservoir appraisal and 4D seismic monitoring, but were concerned at the cost.

"We also felt there was an opportunity to open up the market and challenge conventional towed streamer acquisition in some exploration contexts such as multi/wide-azimuth surveys for imaging complex geology. These are very expensive, and in the case of wide-azimuth are multi-vessel operations. With our efficiency and if the price is right, multi-client companies

LINING UP: Norway's inApril plans to launch a pilot programme for the Venator integrated ocean-bottom node seismic data acquisition system this summer.

Images: inApril

could also be interested in doing limited exploration projects with our equipment."

inApril started in 2012, before anyone had an inkling of the coming crisis. The name was originally a temporary placement for trade registration purposes, but it has stuck. The management now feels it adds some intrigue to their activities. inApril is closing in on the commercial introduction of its Venator integrated ocean-bottom node (OBN) seismic data acquisition system. Hovland says the first 100 nodes are currently being assembled in Norway in anticipation of a pilot deployment of the system this summer. He is optimistic about the first commercial applications in 2017.

His confidence is placed in the advances Venator has to offer over the competition. It is conventional in the sense that Venator is a "nodes-on-a-rope" solution. Nodes containing seismic recording equipment are spooled from a vessel onto the seabed. Then the same vessel, or possibly a separate source vessel, shoots seismic over the target area, after which the nodes are recovered in order to extract the recorded data.

"A number of innovative features distinguish us from the existing node-on-a-rope systems. When you add them up, they make a game-changer," he says. "Most importantly, automation of the whole deployment and retrieval of the nodes is completely hands-free. We have tested this exhaustively and it is immediately safer and more efficient."

inApril has worked primarily with specialist Norwegian companies Goodtech and Westcon Power & Automation to achieve this degree of automation.

The A3000 node component of the Venator system will be one of the first in the market that can serve both shallow and deepwater environments down to 3000 metres without any modification. Competitor FairfieldNodal, for example, has the Z700 node-on-a-rope for shallower targets and the ROV-assisted Z3000 for deeper seabed work.

Venator's node is small enough for rope deployment. It has an in-built battery with a 100-day capacity. This makes it suitable for ROV deployment in deeper water environments. The configuration also allows the nodes to be stacked densely on board the vessel without the need for bulky battery chargers. inApril suggests 10,000 nodes can be deployed from one vessel.

The A3000 node will be the first to incorporate an in-built transponder to provide positioning information at all times. As a result, there is no need to slow the automated deployment and recovery process to attach or remove positioning devices. The placement of the box-shape node on the rope can be flexible to suit the geometry of the survey acquisition, i.e., not at fixed intervals like existing systems. Automation also extends to a customised data management system for optimum quality control during the survey. For example, post-processed navigation data can be generated in near real-time.

inApril is targeting a launch and recovery speed not so far achieved by any other company. It has built a back deck demonstration in Oslo and believes the fully automated system could be deployed and recovered at three to five knots. This could mean covering 10 square kilometers in a day with eight-kilometre offset. Rival systems can only manage two to three square kilometres, according to the company. Over a large survey the cost savings could be as much as 60% to 70%.

Hovland and his colleagues are not worried about the timing of Venator's development. Not always easily, the company has managed to negotiate financing throughout its history to date. He regards this as an encouraging sign.

"We intend to be an asset-light organisation. As much as possible of what we do is outsourced. This will include manufacturing and maintenance of nodes once we are in business."

inApril does not intend to get into the vessel operating business. One of the selling points of Venator is that it is not proprietary and is available for sale to any company. Hovland notes that there are plenty of ship owners and contractors with vessels on their hands that could easily be used for Venator. For some jobs a containerised version can be shipped anywhere in the world.

For smaller projects a single vessel could handle the source as well. One or two source vessels would probably be required for larger operations.

So far, he says the company's demonstrations have attracted a range of interest from oil companies, seismic contractors and multi-client specialists from around the world. This prompts him to believe that there is a pent-up market for OBN surveys if they can match the cost and efficiency expectations of the E&P industry.

In 2014, ocean seabed surveys accounted for an estimated 14% of marine seismic, according to a study by Norwegian analyst Arkwright. This compares with 6% in 2006. Last year, there was further percentage growth to an estimated 17%, attributed to increasing node-on-a-rope operations. Oil companies did cut back on their E&P budgets in 2015 — projects have been cancelled or postponed, and the ocean-bottom seismic (OBS) business has suffered as a result.

There are a number of players in the field. Some are purely

"We think the timing of our entry into the market is very promising."

Vidar Hovland, inApril

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PRODUCTION LINE: An initial 100 Venator ocean-bottom nodes are being assembled in Norway.

suppliers of OBS systems like inApril. Others operate with their own, or bought-in, nodes, or less commonly, cables.

One of the pioneers of the OBN nodes-on-a-string system, FairfieldNodal, has temporarily closed down its Z700 crews and is simply continuing work in the Gulf of Mexico with its deepwater Z3000 operation. Last year, FairfieldNodal was working off Gabon with its Z700 crew, but had a job for BP in the North Sea cancelled.

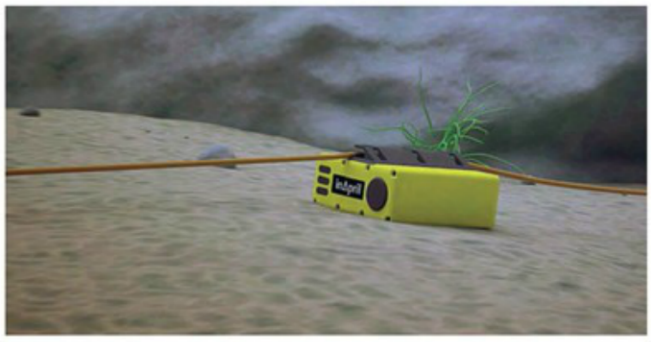
In 2014, it signed a multi-year contract with multi-client specialist TGS for full azimuth nodal (FAN) seismic surveys in the Gulf of Mexico using the Z700. One early project was Nessie FAN, a 54 block multi-client FAN survey in the South Timbalier protraction area covering a number of existing fields and exploratory acreage. The other was the Ogo FAN survey, a 136- block multi-client FAN survey in the Eugene Island protraction area.

ION Geophysical's OceanGeo has had its Calypso system on hold for 11 months since completing wide-azimuth surveys for Petrotrin in the West Indies and Eni off Congo-Brazzaville. Expected work off West Africa and Brazil has not so far materialised.

Calypso ocean bottom cable (OBC) is the upgrade of ION's original VectorSeis Ocean used by the now defunct Reservoir Exploration Technology (RXT) using buoyed cables. RXT had some successes early on with the seabed seismic market, wide open in the early 2000s when PGS (permanently) and WesternGeco withdrew from the OBC business. RXT's growth with an expanded fleet was hit by the downturn of 2008, from which it never really recovered.

Various rounds of restructuring followed, notably involving a joint venture in Brazil. ION has ended up owning a rebranded OBC company, OceanGeo, offering the Calypso OBC solution, which it designed.

Scope for OBC in the future may be limited. The E&P industry has been signalling its preference for OBN for some time. Node-based seismic is regarded as more cost effective, easier to operate and able to survey in deep water not practical for cable. In this context there is a question mark over whether the recently de-rigged WesternGeco OBC crew will ever be revived. It had been working in the Middle East up to December last year and previously the North Sea. WesternGeco had been using the Q-Seabed system adapted from the single point receiver Q-Marine towed-streamer seismic data acquisition system.



IN PLACE: The Venator system is designed for both shallow and deepwater environments

For the moment, work is scarce. In January, there was a substantial award by Saudi Aramco to the Chinese geophysical contractor BGP for a large-scale 3D transitional-zone seismic acquisition, reportedly worth $340 million, in which there is believed to be an OBN element. This is Saudi Aramco's first 3D survey project in the Red Sea region, but may be the precursor to a long-term seabed survey programme over more of the Red Sea.

Early last year, BGP carried out a pilot seismic study in the Red Sea with the Norwegian OBS company Magseis. The chairman is Anders Farestveit, who in the 1970s founded the Norwegian seismic company Geco and has been involved in many other ventures since, including Wavefield Inseis.

The founding of Magseis in 2009 suggested Farestveit was a believer in the future of OBS surveys. The distinctive feature of the Magseis Marine Autonomous Seismic System (MASS) is that its nodes are deployed on a steel

wire with what is said to be a high degree of automation. The company has been working in Malaysia after early work in the North Sea. It expects to deploy a second vessel this year.

The surprise was that the Red Sea work was not won by ARGAS, the longstanding Saudi Arabian geophysical company in which CGG has a 49% interest. If any seabed geophysical work was included, then CGG would presumably have drawn on technology from Seabed Geosolutions, the joint venture with Fugro in which it has the 40% minority share.

The market has yet to see Seabed Geosolutions deploy its next generation Manta OBN system, which has many features similar to inApril's Venator, including "no touch" deployment and a node design rated for all depths to 3000 metres.

Seabed Geosolutions is easily the largest player in the OBS market. There was a hiatus following the Fugro-CGG merger, but now it is beginning to make its presence felt in the market. It inherited the Case Abyss ROV-operated OBN system, including its dedicated vessel *Hugin Explorer*, currently working for Chevron on the Gorgon project off Western Australia. Fugro acquired the business from Seabird Exploration, which in turn had bought it from Seabed Geophysical, the Norwegian pioneer of modern commercial node surveys. The company also has the Trilobit cable-free, ROV-operated node system developed by CGG. This has not yet established itself in the market.

Seabed Geosolutions has an ocean-bottom cable offering, the SeaRay system, originally developed by CGG's Sercel manufacturing division. It has seen recent deployment in Vietnam and Mexico. In July 2015, CGG won a contract variation from Abu Dhabi National Oil Company to conduct a shallow-water seabed survey over the Ghasha-Butini field using SBG equipment. The $125 million survey was to take around 12 months.

There are other companies sensing an opportunity. Geokinetics, traditionally thought of as a land and transition zone company, has been deploying OBX nodes manufactured by Houston-based Geospace Technologies in various contracts, most recently in the Caspian. Geospace made a name for itself in the OBS world as the supplier of the buried cable seabed acquisition systems for permanent reservoir monitoring systems, most recently for Statoil's Snorre and Grane fields off Norway. This market, however, has been dormant since the Statoil awards in 2012.

Photo: Per Thrana

EXPERIENCE: Magseis chairman Anders Farestvelt.

A rapidly emerging service company in the OBS sector is NASDAQ-listed SAExploration, based in Houston. In July, the company completed its first major deepwater ocean-bottom marine seismic project in South-east Asia using an ROV deployment method at water depths reaching 1100 metres, with nodes supplied by Geospace. SAExploration has also been working in Alaska for Apache using FairfieldNodal equipment.

For Hovland, the current OBN activity, and the expected work when the market picks up, coming from areas such as Brazil, West Africa, the Gulf of Mexico and Europe, augur well for the future. "We think the timing of our entry into the market is very promising."