

# Surge in seabed surveys

The pent-up market for ocean bottom seismic is beginning to break out

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Those in the know say that the market for ocean bottom seismic (OBS) surveys never really declined, certainly not in the dramatic fashion experienced by seismic vessel owners with towed-streamer acquisition technology. It was more a case of projects being postponed.

It seems that the wait is over. A recent much quoted study by Rystad Energy estimates demand for OBS will increase by 90% from 2016 to 2017, where awarded contracts make up the majority of the increase.

The value of the market is said to be closing in on \$1 billion, and this figure will be exceeded in 2018.

More remarkable, perhaps, is that OBS projects are winning an increasing proportion of the total marine seismic survey market, with the main inroad being made in the proprietary sector.

This fits into the current industry narrative, which says marine seismic surveys are slowly creeping back onto oil companies' radar screens.

However, any spending for the foreseeable future is likely to be tightly focused on imaging projects to optimise output from producing fields, typically 4D seismic monitoring, and limited near-field exploration targeting additional reserves close to known or producing reservoirs.

The uplift in OBS comes partly from projects delayed during the worst of the downturn now getting approval, but it also reflects a changing sentiment about the cost benefits of seabed seismic.

Since the 1990s, various marine seismic operators have proved the obvious, that sensors (a combination of hydrophone and geophone) placed on the seabed using cable or node technology provide superior imaging of the subsurface to anything possible using towed-streamer acquisition.

This has remained the case even as towed-streamer operators have improved imaging through advanced source and streamer technology, notably with the wider recording frequency possible with broadband seismic techniques, and wide-azimuth survey techniques to image complex formations, such as subsalt reservoirs in the Gulf of Mexico and off Brazil.

The constant frustration for oil industry clients has been the cost and cumbersome logistics, which confined OBS to a niche position in the marketplace.

That dynamic has been undergoing a gradual shift, and a new generation of technology solutions is likely to accelerate the process.

Ocean bottom cable (OBC), the laying of retrievable cable with embedded receivers, was the method which dominated the early development of OBS.

It is now rapidly being phased out. Only Schlumberger's WesternGeco (Q-Seabed), Seabed GeoSolutions, the joint venture between CGG and Fugro (Sercel SeaRay 3000) and OceanGeo, an ION Geophysical company (VSO/Calypto) still list crews on the books, but that is not where the action is.

The current market leader is FairfieldNodal, which can claim to have done the most to put OBN surveys on the commercial map with its development of the Z700 node-on-a-rope system for operating in water depths down to 700 feet (213 metres) and its ROV-assisted Z3000 for work down to 3000 feet (914 metres).

The company is estimated to have increased its share of the OBS market from 15% in 2016 to 30% this year.

FairfieldNodal has been able to capitalise on having equipment available as demand has picked up, while some of its competitors are transiting to updated technology.

Its schedule includes a contract for BP in Trinidad, work for Aker BP on the Clair and Valhall fields off UK and Norway, respectively, a survey for Petrobras on the Libra field off Brazil and a visit to BP's Mad Dog field in the Gulf of Mexico.

The company normally carries out its surveys with its own vessels, but has agreed to supply Z700 nodes to Chinese marine seismic contractor BGP for a survey for BP's Tangguh gas field, off Indonesia.

Seabed GeoSolutions (SBGS) has a continuing shallow-water and transition zone contract with Adnoc in Abu Dhabi using Sercel adapted equipment.

Its node-based operations currently rely on its ROV-assisted Case Abyss nodes operated from the purpose-built Hugin Explorer.

The original concept dates back to the first node-based seabed seismic survey in the Caribbean in the early 2000s by the pioneering but now forgotten SeaBed Geophysical.

That company was taken over by SeaBird Geophysical. Subsequently, the technology was acquired by Fugro, which brought it into the SBGS partnership.

The company has been working on Total's Egina field off Nigeria and is expected to be heading for projects in the pipeline off Brazil.

Schlumberger's WesternGeco continues to deploy its proprietary Q-Seabed off Mexico for Pemex but is also in the OBN survey business, using its own vessel crews to deploy OBX nodes manufactured by Geospace Technologies.

It has work in prospect for Statoil off Norway on the Oseberg field and also off Malaysia. Canadian company SAExploration also employed OBX nodes for a contract now completed for Chevron off West Africa.

US company Geokinetics, a specialist in shallow-water surveys, also depends on brought-in equipment from node manufacturers when required.

The choice is limited because most OBN systems are proprietary to their operators, as is the case for FairfieldNodal and SBGS.

The latest mover in the OBN sphere has been Norwegian company Magseis, which has opted to own and operate its vessels.

Its Marine Autonomous Seismic System (MASS) is based on small sensor capsules inserted into a steel cable that can be deployed and retrieved in large quantities at high speed. There is also an ROV-assisted version.

The company recently secured a seven-month extension to its first major contract, with BGP, operating its OBS-adapted vessel Artemis Athene in the Red Sea for Saudi Aramco.

It is expected to mobilise a second crew this summer for ConocoPhillips on the Ekofisk field.

Later this year may see the launch of the Venator OBN system that has been under development by Norwegian start-up inApril ([Upstream Technology 01/2016](#)).

Following final trials in the North Sea this summer, inApril will be offering marine seismic operators a highly automated system for deployment and recovery of its A3000 nodes at speeds of up to six knots.

The company says the increased efficiencies will enable the system to compete against towed-streamer acquisition solutions for near-field projects, and hence expand the potential market for OBN surveys in the future.

Meanwhile, SBGS is already on the start line building the first units for its 4C Manta system with similar specs and aspirations.

Manta is said to feature a fully automated handling system with innovative deployment methods, providing previously unrecorded efficiencies in survey configuration up to 3000 metres.

It remains to be seen whether the introduction of the new generation systems from Magseis, SBGS and inApril can redefine the OBS market.

Assuming the growth predicted, one obvious question is how leading marine seismic contractors without OBS capability will respond to the potential intrusion on their territory.

Fifteen years ago, Petroleum Geo-Services (PGS) and WesternGeco were both operating two OBC crews.

PGS withdrew from the business altogether and WesternGeco kept it on low beam, as the market was not there.

Times have clearly changed. Who knows - it may inspire some merger and acquisition activity in the not-too-distant future.