

Solving Efficiency Fragmentation with an End-to-End OBS Technology Suite

New system spans initial survey planning and design through field execution to maximize operational performance.

CONTRIBUTED BY ION GEOPHYSICAL

Ocean-bottom seismic (OBS) acquisition techniques are an effective means of building high-quality seismic datasets, but operational inefficiencies have made scaling OBS for large exploration projects difficult.

“Seabed operations are still inefficient relative to towed streamer,” said Chris Usher, ION Geophysical CEO. “Challenges exist in source control, in receiver management, in the number of vessels required to carry out the OBS operation, and in QA/QC management. This operational fragmentation creates a high number of opportunities for delay, which can cascade through every phase of the OBS operation.”

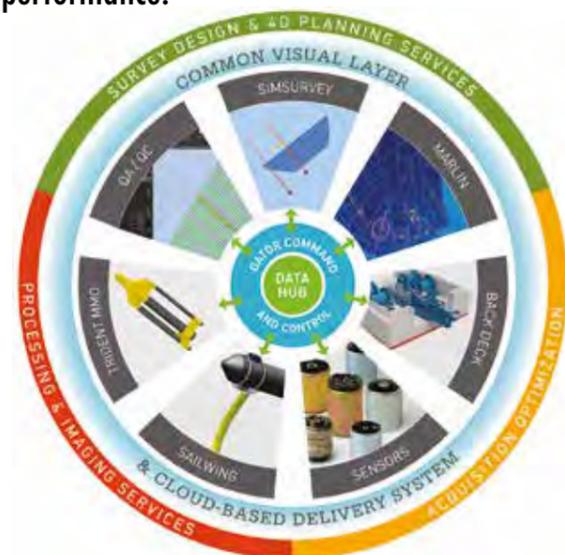
“Our goal is to bring OBS operations to a new level of performance, increasing the value of the data by enabling better geophysics and delivering it to E&P geoscientists faster,” Usher said.

ION leveraged best practices and technology envisioned during the firm’s time operating its own seabed acquisition business to develop an end-to-end OBS offering called 4Sea. The objective of the 4Sea technology is to dovetail each step

of the acquisition operation, compounding performance benefits at each phase for a more cost- and time-effective result. The key is a data-centric approach, with cutting-edge software orchestrating novel, “smart” hardware.

“4Sea is truly a transformational architecture, unifying data with proven command and control, allowing all stakeholders to share data in real time,” Usher said. “We are applying unique capabilities across the offering, from time and motion simulations through SIMOPS, back deck management and in-water systems to control the source more efficiently, all tied together with a built-for-purpose QA/QC system.”

The 4Sea system spans initial survey planning and design through field execution to maximize operational performance. MESA SimSurvey software is an operations’ digital twin that simulates multiple acquisition scenarios, constrained by the geophysical objectives and the available equipment, allowing optimal plan selection. Marlin software provides a unique digital platform that enables multiple stakeholders to share and visualize vessel route plans, foresee and avoid conflicts between vessels and fixed assets, optimize schedules safely within a rules-based environment, and



The 4Sea technology is transforming seabed seismic. (Image courtesy of ION Geophysical)

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measure and improve asset performance. In the field, Gator software drives real-time command and control across multi-vessel crews for highly flexible source configuration and deployment/retrieval scenarios, and it provides the orchestration across 4Sea’s smart hardware.

These unique hardware solutions further improve OBS operational performance. ION’s automated Back Deck system accelerates receiver deployment, enabling node-handling vessels to operate at higher speeds. Deployment and retrieval at up to five knots can markedly reduce total vessel time over the course of a project. The 4Sea Back Deck system also reduces the crew size necessary to handle nodes, minimizing HSE exposure and risk. SailWing active source steering improves source vessel operations, enabling tighter turning radii for faster line changes, less drag for fuel efficiency, and more consistent array stability for better geophysics. 4Sea’s hardware and software components are seamlessly linked to an integrated QA/QC protocol that ties vessel telemetry with acquired seismic data for higher quality survey results.

“This new acquisition architecture provides a step change for OBS operations,” Usher said. “We deliberately made 4Sea a modular system from the outset, so that contractors can use as much of the system as they want. For example, our automated Back Deck is compatible with virtually any seabed node, and our SailWing system can be deployed on any source vessel. These are both compatible with Gator software they may already have invested in, significantly improving any contractor’s performance.”

These improvements will benefit projects in congested producing fields, but also bring the benefit of OBS surveys to new market applications.

“The market is moving to a multiclient model for seabed surveys, which means lots of acreage being covered by lots of nodes,” Usher said. “By improving the rate of node deployment and data collection, 4Sea is making full-azimuth, long offset surveys in complex geologies both technically and economically feasible.” ■

BETTER FUTURE

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today we have 23 industrial scale projects that are either operating or under construction.”

Over that decade the conversation has moved on from does this technology work to how can it be implemented at scale? The challenge the industry will face for the next 10 years is how to move CCUS along the path that the renewables sector has followed, reducing the cost and developing a commercial model to drive growth in the market.

“Despite these advances, the CCUS sector has a long way to go. By and large, we don’t have a policy framework in place that can drive this forward,” Warren said. “There is some good work in the U.S. around tax credits and some excellent work in the U.K. around an investment framework for CCUS. But outside of those countries the debate is at a very early stage.”

“The other final point I would make is that there is a lack of big champions. We haven’t seen the industry wholeheartedly get behind the technology and push it as an option to be deployed at scale. We also haven’t seen the environmental movement get behind the CCUS story even though it is critical to the future of combating climate change.” ■