Peter Whiting, head of Geoscience at Viridien.　　⬚.　　　　　　　　　　　Photo: VIRIDIEN

Viridien's seismic technology 'unlocks' US Gulf subsalt

Viridien launched Laconia sparse OBN survey across 329 blocks in US Outer Continental Shelf last August

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10 June 2025

Viridien's latest imaging technology has "unlocked" subsalt exploration in the US Gulf's Garden Banks and Keathley Canyon areas, its head of geoscience has told Upstream.

Viridien last August launched the Laconia sparse ocean bottom node (OBN) survey across 329 blocks in the two areas of the US Outer Continental Shelf in a bid to improve subsalt imaging that has made previous exploration challenging.

"This part of the Gulf of America was considered a very difficult area because it is really hard to see what's happening below the salt," Peter Whiting told Upstream in an interview.

But the OBN data, combined with in-house Sercel tuned pulsed source and the company's pioneering elastic full-waveform inversion (FWI) technology have "all of a sudden unlocked what is happening below the salt," he said.

The full results of the multi-client survey will be delivered by the end of June, but Viridien said initial findings provide "a significantly improved image of the deep basin architecture, including potential subsalt reservoir targets in the Paleogene interval".

 Key improvements include imaging of the salt, the recognition of low-velocity shales, and the impact on the imaging of minibasins and salt welds, the company said.

Quality data, new technology

OBN surveys have changed the quality of seismic data acquisition in recent years. The nodes, placed on the seabed, deliver superior data, albeit at a higher cost, compared to the towed streamer data captured from the surface of the ocean.

Whiting was excited about the images from the Laconia survey, noting that quality data, combined with new technology such as FWI — which he describes as the "biggest thing" to have happened in the seismic industry in recent years — will have a real impact on exploration.

"We're seeing things now that we wouldn't have believed that we could see 10 years ago," Whiting said.

Better imaging has meant the difference between operators leaving a basin and staying, allowing companies to drill exploration wells with more confidence and even maximise production from existing reservoirs, he said.
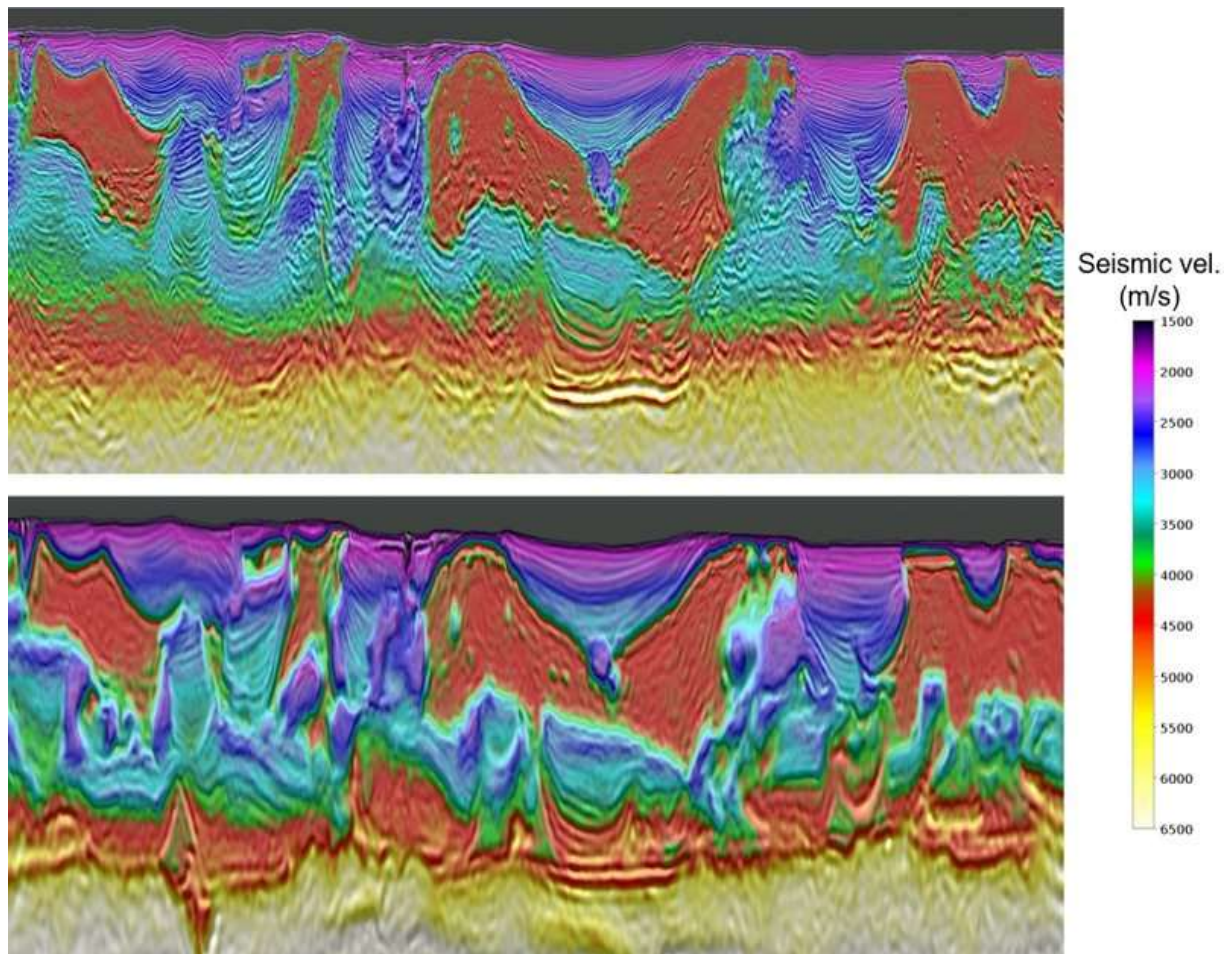
Laconia in the Garden Banks area of the US Gulf: Full azimuth streamer 15 Hz RTM image overlaid with 6 Hz streamer FWI velocity (top) and long-offset low-frequency sparse OBN "early-out" 5 Hz FWI Image overlaid with corresponding velocity (bottom).

Better cycle times and costs

The improvements in imaging have also had a significant impact on an operator's cycle times and costs, says Whiting, noting that it will allow for more precise drilling.

"If a field is bounded by salt, the operator needs to drill as close to the salt as possible. But if the image is fuzzy, they have to be safe and place the well a bit further away," Whiting explained.

"When we create an image that is more accurate, they go, 'Oh, we can now drill closer to the salt flank, and access more of the reservoir.' This can be very significant for our clients who can access more of the reserves in place and create tremendous value for their company."

Whiting says Viridien's FWI works in all settings — whether it be land, shallow water, deepwater or salt — and is one of the reasons he said that the company would win any "head-to-head" competition with other industry players.

"But the technology doesn't do the work, it's a tool and so a super important thing is to have really excellent and brilliant staff," Whiting said.

Viridien takes its research and development seriously. It presented 22 research papers at the recent EAGE conference in Toulouse, France, 14 of which were co-authored with clients.

'Hire the best people'

Asked how Viridien is responding to the new technical challenges of exploration, Whiting said: "Like we always have. For companies like ours, we have to develop new technology all of the time."

Meanwhile, its recruitment philosophy is simple: "hire the best people possible," with researchers ranging from physicists to mathematicians, engineers and geoscientists.

Recruits are expected to take a practical approach and are put to work on the production team for up to a year "to learn what the real problems are", before being moved into a research team that coexists alongside other teams to drive regular increments in technology.

"With every project that we do, it's an opportunity to improve our technology. So you need the people that are capable of understanding the problem and working with R&D to find a way to improve the technology to solve that problem," Whiting said.

The company also takes a bespoke approach to the high-performance computing (HPC) required to process seismic data, building its own in-house capability rather than buying in the service.

"If you're paying a lot for your compute and you start worrying how much the compute is costing, you'll limit the amount of testing, which limits the amount of innovation, which limits the progress on your technology. We see having optimised, cost-effective HPC as an enabler for innovation," Whiting said.

AI 'just another tool'

While other companies, including TGS, are going all in on the potential of cloud computing and AI, Whiting is more circumspect.

"We don't talk about AI a lot because it is just another tool and we use it in lots of places."

The world's largest oil and gas players are all looking at how to deploy AI most effectively, with BP and Abu Dhabi National Oil Company (Adnoc) being among the most vocal about the technology's ability to reduce cycle times and cut costs.

But Whiting does see the benefits of AI, not only for cost-saving but also in allowing companies to do more things, better.

The company offers a Data Hub service that deploys AI at scale to allow operators to better organise subsurface data, a service that BP contracted under a multi-year contract in 2022.

The service collates and organises millions of files of internal geoscience data, from special core analyses to pressure, volume and temperature reports, to allow operators to take more informed exploration decisions based on their own extensive archives.

But Whiting cautions about the limitations of large language models to take exploration decisions.

 "The tech companies have got technology for data transformation, but they don't have the expertise to know if it's going right or wrong," Whiting said.

"There is a team of experts in Data Hub that are using the AI, making sure that it's doing the right thing because AI always gets something wrong. It needs to be supervised. You can't just let it run."