

# PetroMarker

to change the CSEM market game



## NAUTILUS MARINE SERVICE GMBH

Nautilus Marine Service GmbH is a German company that has been in operation since 1985. Nautilus Marine Service has gained international reputation by its VITROVEX® deep sea glass housings along with associated services and accessories. Nautilus Marine Service provides high quality glass floatation and instrument housings in different shapes, sizes and pressure ratings up to full ocean depth. The company's headquarters is in Buxtehude (Germany), South of Hamburg.



Beginning operation during 2005 following research into the development of a vertically deployed Controlled Source Electro Magnetic (CSEM) survey system, the Norwegian PetroMarker AS is today able to offer oil and gas operators a proven technology. It embodies several advantages over traditional horizontal systems. The company's vertical CSEM technology was originally engineered between 2005 and 2007, before entering into the market commercially and generating a total accumulated turnover of \$80 million between 2007 and 2012. However, while the vertical CSEM system produced some highly favourable survey results, the technical equipment was deemed to be too much of an investment per unit and to be relatively oversized during deployment.

"We realised that it was important to get the equipment technically reengineered to become more efficient and to get our operating cost down and deliver competitive 3D services. We drastically reengineered the equipment and are now ready to re-enter the market. To give you a feel for the proportions of the reengineering the receivers now weigh 270 kg and are about five metres tall, whereas they used to weigh eight tons and stretch more than 12 metres high," explains PetroMarker CEO, Helge Holen. "We ran two large scale tests in 2016 in the North

Sea and demonstrated that the improved vertical CSEM technology was fully functional and ready for deployment."

Together with a consortium of five sponsoring major oil companies and with the valuable sponsorship from the Norwegian Government's incentive scheme in Innovation Norway, they set out to verify the technology. "By working with this consortium of oil companies we were able to develop a technology verification survey, to be executed in the Barents Sea. It was undertaken during September 2016. In our view, the trial turned out to be a fantastic operational success – the execution went ahead very well, with no safety issues. The deployment of the receivers and the recording of data worked as expected, as did the recovery of the receivers using an automatic release mechanism," Helge reveals. "The recovered data had a background 'noise' level in a clearly competitive range when compared to data obtained by competing technologies. Within this industry it is very important to have accurate data that is not cluttered with unwanted distortion. The noise level that was recorded with our equipment was down to 1.0 volts per square root hertz (V/√Hz)."

Indeed, following the company's lengthy and dedicated period of reengineering its vertical CSEM system, PetroMarker is now ready to re-enter into the market with a technology that encompasses an impressive suite of advantages. "The key benefit of the vertical CSEM method over horizontal scanning technologies is that we are able to penetrate significantly deeper below the ocean floor. We can scan at depths of up to 4.5km below the seafloor, as opposed to around 2.5km with competing technologies. A quite attractive benefit to the end user. In terms of resolution, the system offers greatly improved lateral resolution, meaning that we achieve a sharper lateral edge where hydrocarbons are present," Helge says. "The third factor, which also has a lot of potential for the future, rests on the fact that both the source and the receivers are in stationary position when pulsing. This means that we can repeat the deployment in the same positions and repeat the survey. We therefore believe we have the foundation for developing a time-lapse model of a reservoir. This potential application has generated a lot of interest from several oil companies."

The most immediate market application of the vertical CSEM system offers a valuable tool in oil field exploration and appraisal/delineation.