

Testing the depth capability of a passive optical acoustic sensor for oil reservoir monitoring

NPL has recently completed a consultancy under the Measurements for Innovators (MFI) programme with the aim of characterising a passive optical acoustic sensor for marine oil and gas applications.



The unique optical seabed seismic system, called Fosar[®] is made for commercial oilfield use by a new company called Stingray Geophysical. The Fosar system consists of a passive, fully fibre-optic array of Optical Sensor Units (OSU) connected by armoured fibre-optic cable (see image on left). The Technology was originally developed in the mid nineteen-eighties where its small size, high sensor count and extreme robustness were attractive for anti-

submarine warfare applications. The oil and gas industry is now benefiting from the development of this technology and Stingray Geophysical Ltd is developing a reliable and cost effective permanent reservoir monitoring system.



As a part of their development program, Stingray[®] wanted to carry out testing of a sensor unit at simulated ocean conditions to determine the acoustic performance of the sensor at various environmental conditions as well as monitoring the integrity of the device. This required acoustic characterisation over a frequency range from 2,000 Hz down to the lowest frequency that we were able to measure. The acoustic testing was undertaken at simulated depths down to 600 m while at approximately 8 °C using the unique test facility provide by the NPL Acoustic Pressure Vessel.

The image on the left shows the testing of the Fosar unit in the NPL Acoustic Pressure Vessel.

The consultancy opportunity has proven highly valuable to Stingray.

Richard Luff, Operations Director, of Stingray commented:

“Stingray Geophysical has been developing fibre-optic sensing technology for the permanent monitoring of undersea oil and gas reservoirs. As a part of our product development programme we approached NPL concerning a functional test of an optical sensor unit (OSU) under increasing hydrostatic pressure. This test was necessary to prove that we suffered no degradation of sensor performance with depth.

The consultancy service provided by the NPL Underwater Acoustic Laboratory allowed us to qualify our current sensor and housing design to water depths of 600 metres.”

“We at Stingray would like to express our gratitude for the services provided by the NPL Underwater Acoustics Laboratory. Following a phone call to NPL, we were able to set up our equipment and carry out the tests in less than two weeks. We are extremely pleased with the rapid response of NPL and the quality of the facilities offered. In particular, we appreciate the assistance given in the trials by yourself and Gary. We are pleased to say that the trials went faultlessly and to be able to do all this under the Measurements for Innovators programme has been an additional bonus.”

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About Stingray Geophysical

Stingray Geophysical is commercialising unique fibre-optic sensing technology for geophysical oil & gas reservoir monitoring. QinetiQ originally developed the technology for defence applications and Stingray is the exclusive licensee for oil & gas applications. Stingray Geophysical and its partners, QinetiQ, Sensoptics, Atlas Elektronik and Bergen Oilfield Services, have world-leading skills and resources in the areas of fibre-optic sensing, fibre-optic systems manufacturing, geophysics, geophysical sensor development, sub-sea installations, seismic acquisition and project management.

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