Technology Strategy Board
Driving Innovation

Innovation **results**

AN R&D CASE STUDY #048

New wireless technology manages subsea assets

This project has successfully demonstrated that a wireless link can be used to monitor, control and maintain subsea production equipment, overcoming the difficulties of sending radio waves through salt water.

The need

Advances in wireless technology have the potential to boost economic growth by revolutionising work carried out in challenging subsea environments. All but 1% of the UK's oil and gas production comes from the surrounding seabed where there is a network of 14,000 km of pipelines, over 100 oil platforms, some 180 gas platforms and a large number of subsea installations. Working conditions in a marine environment can be inhospitable and dangerous so novel wireless technology is in demand to provide remote access to manage and connect subsea equipment.

The results

The project, led by WFS Technologies, was carried out to produce a working demonstration system of how subsea production equipment can be monitored and controlled by using broadband wireless instrumentation. The project was able to extend the technology and overcome some of the typical barriers to reliable through-water communication. Radio waves do not transmit easily through salt water because the conductivity of the sea reduces the signal strength and the higher the radio frequency the greater the reduction.

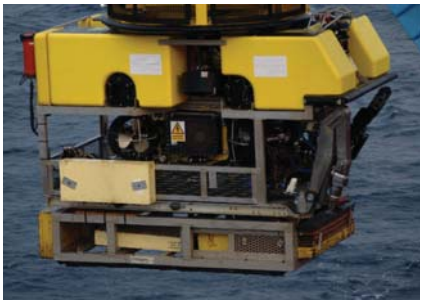
The results of the project have demonstrated that this new technology has significant potential and offers operational advantages over existing methods and technologies. For example, acoustic modems and repeater buoys are often used for communication, but they do not always operate reliably; buoys are obtrusive and acoustic modems do not work well in water that is shallow, noisy or murky. Also acoustic systems deliver only low bandwidth.

The project has led to the development of two groundbreaking commercial products: V-SLIM and SeaPAR®. Both devices use radio technology for subsea communication in different applications, and this technology represents the next generation of wireless-enabled subsea monitoring equipment.

The V-SLIM is a monitoring unit that tests the insulation resistance and electrical integrity of subsea equipment. It can be used by a diver or remotely operated vehicle (ROV) to

carry out five different techniques to identify the location of subsea electrical faults and to record the general integrity of each electrical flying lead, connector and electrical distribution unit. With the data available in real time to the diver, ROV or a vessel on the surface, V-SLIM allows instant decisions to be taken to replace or repair equipment. One of the key benefits of the unit is to reduce significantly the period between detecting electrical faults and rectifying them. Another attribute is its use for long-term monitoring and the storage of data that can help in predicting trends or identifying potential electrical failures.

SeaPAR® (Sea Power Acoustic & Radio) brings together in one unit the capability to transmit and receive wireless data and to provide a wireless power source. It also incorporates short-range high bandwidth radio frequency, mid-range low bandwidth radio frequency and long-range low bandwidth acoustic communication with navigation and location capabilities. The unit features an inductive charging function that can provide wireless power to sensors, data loggers, control systems and wireless autonomous under water vehicle (AUV) docks. The unit can recharge without intervention or charge up other devices attached to it, such as sensors, data loggers, etc. SeaPAR® has also been designed to interface with a range of subsea assets (fixed and mobile) to provide as much flexibility and versatility in its operations as possible. It can accommodate management, operational, inspection, repair and maintenance regimes for various subsea industries.



A remotely operated vehicle (ROV)

'It is very satisfying to help usher in the next generation of subsea systems by providing reliable real-time wireless communication.'

MARK VOLANTHEN, CEO, WFS TECHNOLOGIES

Market potential

The market for both these devices is global and relevant to a broad range of subsea sectors including gas and oil industries. The new technology puts these devices ahead of current competition. The wireless-enabled technology in both devices could prove to be disruptive and completely change the market. Ostensibly, the devices are targeted at oil and gas production where there are significant economic benefits, particularly as these commodities are processed at the sea bed. However, they are also relevant to alternative energy, subsea mining, oceanography and homeland security markets. There are also implications for reducing the environmental impact of subsea operations because these devices can extend the operational life of equipment.

Recognition

During this project, SeaPAR® became a winner at the prestigious Spotlight on New Technology Award at the Offshore Technology Conference in Houston – an accolade rarely awarded to non-US technology. This has showcased the system's attributes and helped to secure sales.

Project no. BE022A

Project partners
WFS Technologies (lead partner)
Fugro Subsea Technologies
Viper Subsea Ltd

Technology Strategy Board investment
£337,326

Total project investment
£674,655

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