

# HYDRO INTERNATIONAL INTERVIEWS BRENDAN HYLAND WFS TECHNOLOGIES

## â€™Subsea Internet of Thingsâ€™™ to Transform Amount of Information Available



It's fascinating to see that communication techniques are evolving. On the shore there is already a clear trend towards eliminating cables and wires. So a logical consequence would be to see this also happening underwater. One of the pioneers of underwater wireless communication has been Wireless Fibre Systems Technologies, or WFS Technologies. They have succeeded in making underwater communication wireless and are even going a step further by initiating what they themselves call the 'subsea internet of things'. *Hydro International* interviews Brendan Hyland, founder of WFS Technologies.

*What made you start WFS Technologies?*

I started WFS to deliver innovative wireless services to support the ever-increasing appetite for internet-based services. I was excited by the potential of short range wireless technologies to change business models by reducing costs and increasing flexibility.

*The first venture was underwater radio for short distances – was this developed as a kind of bridge for difficult to access places?*

I was excited by how Bluetooth and WiFi have opened up the world for land-based communications. I set out to see how this could be replicated in the underwater world. I employed a team to carry out some research on underwater radio and they developed some groundbreaking technology.

*What was the breakthrough for broadband capacity and greater distances?*

The broadband capacity and distances are dictated by the laws of physics but the critical breakthrough was developing the technology that could extend the battery life of wireless systems by at least two orders of magnitude when compared with equivalent acoustic alternatives. The batteries on conventional wireless sensor systems typically have to be replaced after six months. Today, we can deploy equipment for up to 15 years using modest battery packs – in most cases the remaining life of the field.

We have also made the packages lighter and more compact to reduce the cost and complexity of installation.

*WFS Technologies uses the slogan 'Wireless for Subsea'. In what cases can underwater data communication replace cabled devices?*

WFS has long believed that the subsea world should benefit from the same revolution in wireless communications that has transformed our world. Wireless will not replace hard-wired systems but complement them.

*What is currently the biggest challenge for underwater communication?*

The biggest challenge faced by suppliers of underwater communications solutions is the acceptance by the industry of automation, to increase profits, improve safety and extend asset life. The industry is inherently conservative and has been reticent to adopt the same level of automation subsea that is the norm in land-based process industries. The industry downturn, however, has focused the minds of operators on using automation to increase production output and drive down costs.

*How is the acceptance of wireless underwater communication?*

We have seen a sustained acceptance of wireless on the back of successful deployments. Operators have recognised the benefits, particularly the reduction in costs and the increase in flexibility.

There is a perception that wireless is used to displace cables. This is not true. Wireless can actually extend the capability of cabled systems by providing automation in applications where it is not cost effective to deploy a cabled system.

*WFS Technologies emphasises the ‘Subsea Internet of Things’, referring to monitoring applications. Do you see a potential for moving communication from – or between - AUVs as well, for example?*

‘Subsea Internet of Things’ architecture goes beyond remote harvesting of sensor data by ROVs and AUVs. Smart sensors process data locally to implement efficient control strategies. Efficient subsea architectures balance the trade-offs between timeliness and cost. For example, many asset integrity monitoring applications do not require real-time control – harvesting information every 6-12 months by AUV is quite acceptable. Other applications require an instantaneous response which can be achieved using extended wireless networks at the well-head.

*At some stage the data needs to be linked above water. Gliders and AUVs need to reach the surface to achieve this. How will this change in the future?*

Seatooth communications can transmit data through the splash zone. We can use this unique capability on offshore structures to extend wireless networks through the air-water interface, to sensors and actuators located subsea.

We can also incorporate Seatooth technology into subsea control modules to extend the reach of wireless communications, using existing cables for back-haul to the surface.

We foresee the use of AUVs to harvest data from remote sensors, uploading this information via subsea docking stations. Similarly, pigs will be used as ‘AUVs in pipes’ to harvest asset integrity information from remote sensors.

*What possibilities do you anticipate outside your traditional markets like oil & gas and defence – like science and ocean mapping?*

We see great potential deploying wide area sensor networks across littoral waters, providing real-time data communications to extend the ‘Internet of Things’ to the ‘Subsea Internet of Things’, transforming the amount of information available for research.

In cabled systems, it becomes increasingly expensive to install sensors farther away from a subsea node due to the material cost and the large vessels necessary to lay the line. This is not an issue with wireless systems. Sensors can be installed in isolated locations outside the economic range of cabled systems.

*What are industry standards? What kind of developments are being made?*

WFS is an active participant in open standards initiatives to facilitate wireless communication in the underwater world. We are a founding member of the Subsea Wireless Group (SWG) that has worked hard in designing and structuring standards to feed into the American Petroleum Institute (API) 17F which deals with subsea controls. Earlier this year, Chris Curran, the chair of the 17F committee, joined WFS as its Houston based project director.

WFS is equally supportive of work on subsea standards being driven by the US Department of Defense and sees a beneficial cross-fertilisation between the two sectors.

*How is WFS Technology working together with universities? Or is the organisation conducting its own research?*

WFS has undertaken its own fundamental research in the technology but continues to work with universities to develop applications further. We are particularly active with universities to support cost-effective deployment of environmental monitoring sensors.

*How do you see the future of light as wireless underwater communication medium?*

Light is a very exciting medium for high bandwidth, relatively short range communications. WFS is developing Seatooth Hybrid, an innovative subsea wireless communications and control system incorporating radio, acoustic and optical technologies. We see hybrid technology as the future.

*What would you like to share with Hydro International readers?*

Seatooth is a sophisticated modem technology that can be linked with a variety of sensors. In specific applications, this could enable hydrographic instruments to significantly reduce the deployment and lifetime costs.

**Brendan Hyland** studied electrical and electronic engineering at Queen’s University of Belfast. Since then he has worked in the chemicals industry, management consultancy and in the industrial instrumentation sector. After completing an MBA at the University of Durham, Brendan founded Kymata Ltd in 1998; an optoelectronics company that designs and develops planar optical devices. He raised USD160m in funding and assimilated an international shareholder base that included Kleiner Perkins, IBM, BT, JP Morgan and Royal Bank of Scotland. He established operations in Scotland, the Netherlands, the USA and Canada before selling the business to Alcatel in 2001.

Brendan founded WFS in 2003 and has steered it to become the world leader in underwater and underground radio products.