

CSIGNUM PARTNERS WITH NEWCASTLE UNIVERSITY IN TECHNOLOGY TRANSFER OF UNDERWATER DIGITAL SIGNAL PROCESSING TECHNIQUES

Research Project to Increase Wireless Radio Transmission Data Rates and Distances for CSignum HydroFi™ Modem Across the Water-Air Boundary

BATHGATE, SCOTLAND – 24 August 2022 – [CSignum](#) Ltd., the global leader in wireless underwater communications, asset digitization, and actionable insights for ocean and freshwater industries, today announced it has completed a two-month research project in underwater wireless communications with Newcastle University, renowned for its leadership in underwater acoustic communications research.

CSignum is preparing in coming months to commercially test and launch its HydroFi Modem, the first reliable point-to-point wireless radio communications system that enables the transmission of data through the water-air boundary. Led by Newcastle University Professor Jeffrey Neasham and CSignum CTO Mark Rhodes, the knowledge exchange and research project focused on increasing the HydroFi™ Modem communications data rate and transmission distances from underwater to above water receivers, as well as improving battery life for real-world deployments.

“We were able to significantly improve the amount of fixed data we could transmit in a shorter time by using a faster data rate,” said CSignum CTO Mark Rhodes. “This means our modems are powered on for a shorter period and so will use less power to communicate a given data payload. This will be of great benefit in terms of how operators choose to allocate resources to remotely deploy and service the HydroFi modems and receivers in ocean observing, environmental monitoring, aquaculture, renewable energy, and oil and gas environments.”

“In addition, we improved the Hydrofi communication waveform, coding and receiver structure to deliver greater robustness against local sources of electromagnetic interference,” said Professor Neasham of Newcastle University. “All radio systems need to be compatible with the electromagnetic environment generated by local elements of integrated systems and natural atmospheric sources. Another strength of the HydroFi Modem is that it is not affected by rough sea states, turbid conditions, or shallow water splash zones.”

CSignum intends to continue its successful collaboration with Newcastle University to enhance future versions of the HydroFi radio modem and incorporate resulting breakthroughs into the technology roadmap. On completion of the project, the collaborative team identified some clear ideas for future development in the areas of power consumption and advanced DSP techniques, which will further extend the product performance envelope.

As a result, CSignum and Newcastle University efforts will build on their respective IP portfolios. CSignum currently has 22 granted and in-force patents, with further pending patents, in such areas as bi-directional water-to-air and air-to-water wireless communications, automation, antenna design, remote command and control, adaptive bandwidth, redundancy and failover, and low power management. These technologies are designed to deliver sensor data through the water-air boundary, water column, seabed and subsea structures. As a result, operators in ocean observing, environmental monitoring, aquaculture, renewable energy, and oil and gas will be able to modernize their infrastructures with digitized, real-time data to make smart decisions.

About Professor Jeffrey Neasham, Newcastle University

Professor Jeff Neasham leads the SEALab team of the Intelligent Sensing and Communications research group at Newcastle University. His areas of expertise include digital signal processing, digital communications, biomedical instrumentation, underwater acoustics, ultrasound, analog and digital circuit design, and embedded software. In addition to CSignum HydroFi Modem research, he currently manages and is an active researcher on projects in underwater acoustics, wireless sensor networks, biomedical instrumentation and non-destructive testing projects. He also serves as Supervisor of Postgraduate Students and Undergraduate/MSc project work and lectures on undergraduate and postgraduate taught modules.

About Mark Rhodes, CSignum CTO

Mark is the original inventor of digital through water radio communications and has over 30 granted patents in this field. He has a track record of innovation, and translating technology into commercial product development, in a broad range of technology areas including cellular communications, airborne radar, industrial condition monitoring and fiber optic communications. He believes the HydroFi Modem is just the start of the innovation possible with the HydroCore platform, which provides a building block approach to rapidly developing solutions that meet the digitization needs of our customers.

About CSignum, Ltd.

CSignum is the only wireless communications provider that enables the first automatic and reliable transmission of data through and across the water-air boundary, water column, seabed and subsea structures using HydroFi technology. Our patented communication, monitoring and navigational platform and solutions help aquaculture, freshwater, ocean observing, offshore wind, and oil and gas industries automate and reliably transmit data as they digitally transform and scale remote communications systems for greater sustainability, increased performance, and preparedness for unforeseen events.

[CSignum](#) was founded in 2020 to engineer a smarter planet by optimizing ocean and freshwater health for the sustainable use by all. The company is headquartered in Bathgate, Scotland.

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