

IIRSM Risk Excellence Awards 2026 winner Partrac's V-LiDAR is transforming offshore risk management

# DESIGNING OUT

# DANGER

Innovation is often measured by what a new technology can do. But sometimes the greatest breakthroughs come from changing how work is done in the first place.

By rethinking how offshore wind measurement systems are designed, deployed and maintained, Partrac Limited, a Venterra Group company, has done exactly that with V-LiDAR – a pioneering floating LiDAR system that

has earned the company the IIRSM Risk Excellence Award 2026 for Technological Breakthrough of the Year.

Developed for the offshore wind sector, V-LiDAR is a next-generation floating Light Detection and Ranging (LiDAR) system used to measure wind speed, wind direction and atmospheric conditions at sea. Rather than relying on traditional meteorological masts fixed to the seabed, LiDAR uses laser pulses to measure wind profiles from the sea surface to the height at which turbine blades operate. The resulting data enables developers to assess potential offshore wind farm sites, optimise turbine placement and maximise energy generation.

Floating LiDAR technology has become increasingly important as offshore wind projects move further from shore into deeper waters. Mounted on a buoy, floating LiDAR systems provide a flexible, cost-effective alternative that can be deployed and relocated as projects develop. However, operating these systems has traditionally involved significant challenges. Large floating buoys weighing more than two

tonnes must be transported offshore, deployed in demanding sea conditions, serviced during lengthy measurement campaigns and eventually recovered. Many of these operations require heavy lifting, personnel transfers between vessels and floating structures, confined-space entry and maintenance activities in challenging marine environments.

For Partrac, those hazards were not simply operational issues to be managed – they represented an opportunity to rethink the technology altogether.

With more than 20 years of metocean experience and involvement in more than 35GW of offshore wind developments worldwide, the company had accumulated a detailed understanding of where the risks existed. Drawing on more than a decade

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of floating LiDAR campaigns, its engineers concluded that many of the hazards associated with conventional systems were not inevitable; they were consequences of legacy designs that had evolved from existing buoy platforms rather than being purpose-built for offshore wind measurement.

Instead of adapting what already existed, the team started again. Their guiding principle was straightforward: wherever possible, eliminate hazards through engineering rather than relying solely on procedures or controls to manage them. That philosophy is evident throughout V-LiDAR's design and reflects the hierarchy of risk control familiar to every safety professional.

One of the clearest examples is the buoy's integrated single lifting point. Conventional floating LiDAR systems often require complex multi-point lifting arrangements when being deployed or recovered at sea, increasing both operational complexity and the potential for lifting incidents. V-LiDAR simplifies the entire process through a single, purpose-designed lifting system that makes offshore handling significantly safer and more efficient.

One of the most significant safety improvements is the complete removal of the need for personnel to transfer from vessels onto the buoy during routine operations. Historically, engineers have often boarded floating buoys offshore to attach lifting equipment or undertake maintenance, exposing them to one of the higher-risk activities associated with offshore working. V-LiDAR has been designed so that this step is no longer necessary, removing the hazard altogether.

Maintenance procedures have also been transformed. V-LiDAR uses modular external capsules containing key components, allowing equipment to be accessed, serviced or replaced without anyone entering the buoy itself. The result is faster maintenance, reduced downtime and, most importantly, significantly lower exposure to hazardous working conditions.

Other innovations continue the same design philosophy. Integrated feet provide a stable platform when the buoy is positioned on a vessel deck, removing the need for temporary support structures and reducing the risk of movement during servicing. Deck layouts have been simplified to minimise trip hazards, while integrated work restraint points improve protection for personnel working around the equipment.

Real-time satellite communications enable continuous transmission of data back to shore, removing the need for engineers to retrieve information manually during offshore visits. Combined with an operational deployment period of up to 20 months before servicing is required, the technology substantially reduces the number of offshore interventions over the buoy's operational life.

Fewer maintenance campaigns mean fewer vessel movements, lower fuel consumption

20+

years of metocean experience accumulated by Partrac

35GW+ OF OFFSHORE WIND DEVELOPMENTS WORLDWIDE

10+

years of managing floating LiDAR campaigns utilised to redesign the legacy system

2026 — THE YEAR PARTRAC WON THE PRESTIGIOUS IIRSM RISK EXCELLENCE AWARD FOR TECHNOLOGICAL BREAKTHROUGH OF THE YEAR WITH V-LiDAR

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V-LiDAR is the first floating LiDAR buoy to be completely designed and built in the UK (at Osbit's Port of Blyth facility)

and reduced carbon emissions, while also minimising the exposure of offshore personnel to hazardous environments.

Beyond operational safety, V-LiDAR has been engineered to improve resilience and reliability in increasingly demanding offshore conditions.

V-LiDAR's hull has been optimised for stability, durability and towing performance, enabling faster offshore operations without compromising equipment integrity. Integrated forklift pockets simplify transport and reduce reliance on crane lifts during onshore handling, while onboard monitoring systems continuously assess the condition of the power system, allowing preventative maintenance.

Marine safety has also been built into the design. The buoy incorporates Automatic Identification System (AIS) technology to improve visibility to nearby vessels, complies with international guidance on offshore lighting and visibility, and uses site-specific mooring systems engineered to withstand extreme weather conditions.

Sam Athey, Managing Director at Partrac, said: "V-LiDAR was developed with a clear focus on reducing offshore risk while delivering high-integrity, reliable data. The IIRSM award is an important recognition of that approach and reflects the expertise, commitment and safety-first mindset of the team behind it."

The project also reflects close collaboration across Venterra Group, combining Partrac's metocean and offshore operational experience with fellow Venterra company Osbit's engineering and manufacturing expertise, alongside the Group's health, safety, sustainability, quality and environmental leadership, to develop a solution capable of addressing long-standing industry challenges. Designed and built at Osbit's Port of Blyth facility, V-LiDAR is the first floating LiDAR buoy to be designed and built in the UK.

Claire Binns, Group Director of HSSEQ at Venterra Group, said: "Innovation delivers the greatest value when it improves safety outcomes. To be recognised by IIRSM is a real honour, particularly in an area as critical as risk excellence. It speaks to the strength of collaboration across Partrac and Venterra Group, and our shared commitment to advancing safer offshore wind technologies."

As offshore wind continues to expand across the globe, technologies that can improve both operational performance and worker safety will play an increasingly important role in supporting the energy transition. V-LiDAR demonstrates that innovation is at its most powerful when it begins with a simple question: how can risk be eliminated rather than managed?

By embedding that principle into every stage of design, Partrac has produced a technology that not only delivers accurate offshore wind measurement but also establishes a new benchmark for safer offshore operations. ♥

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