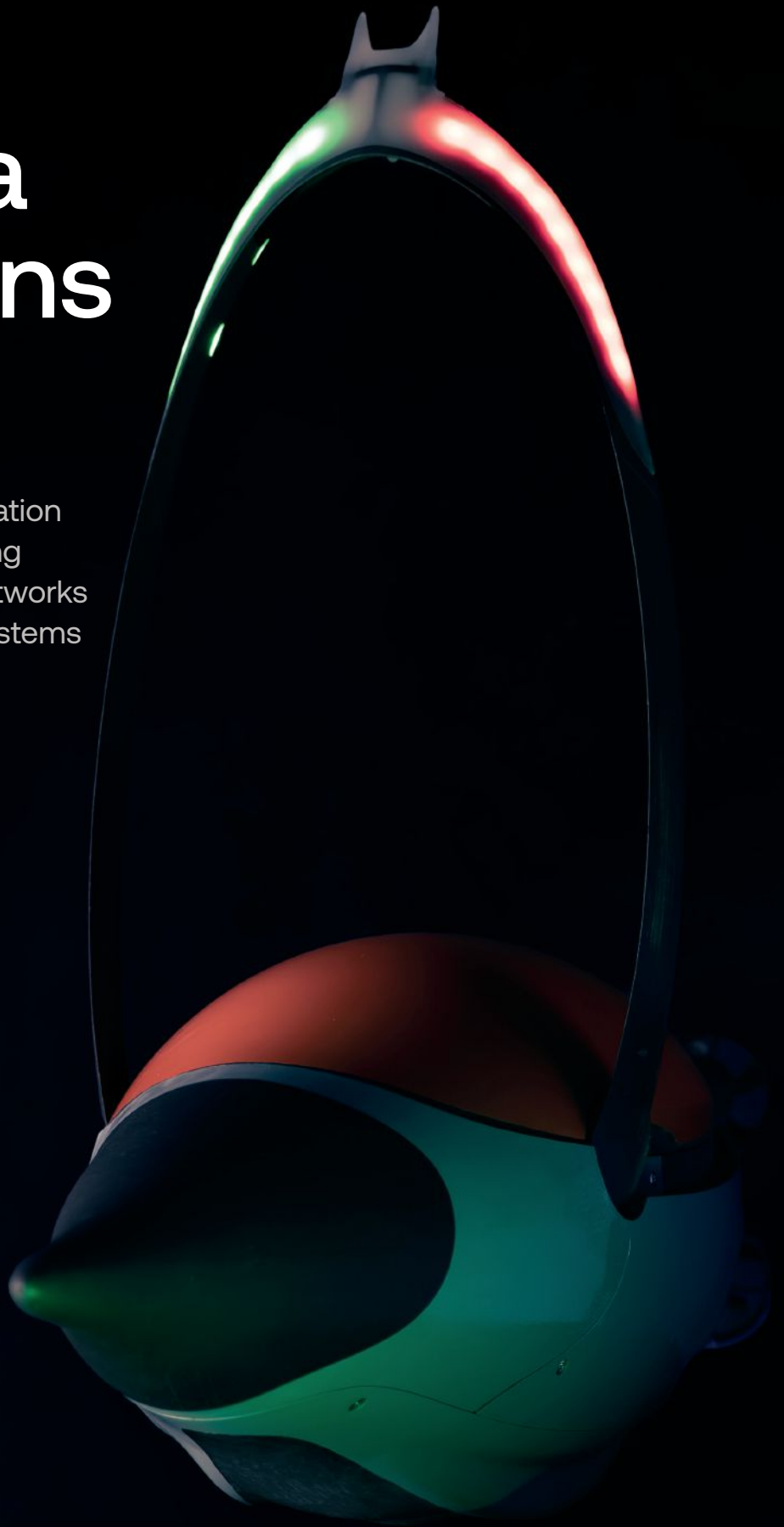
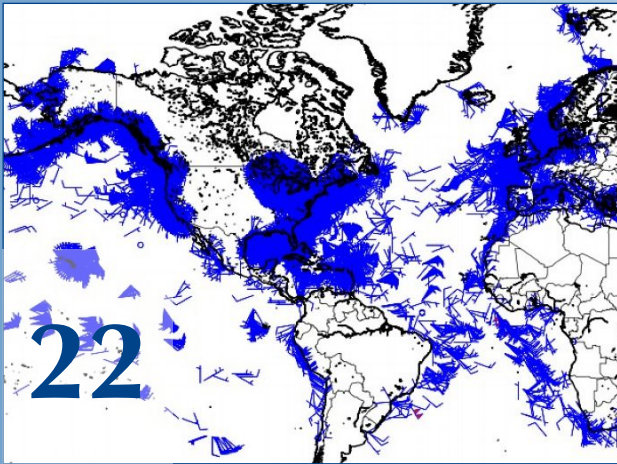
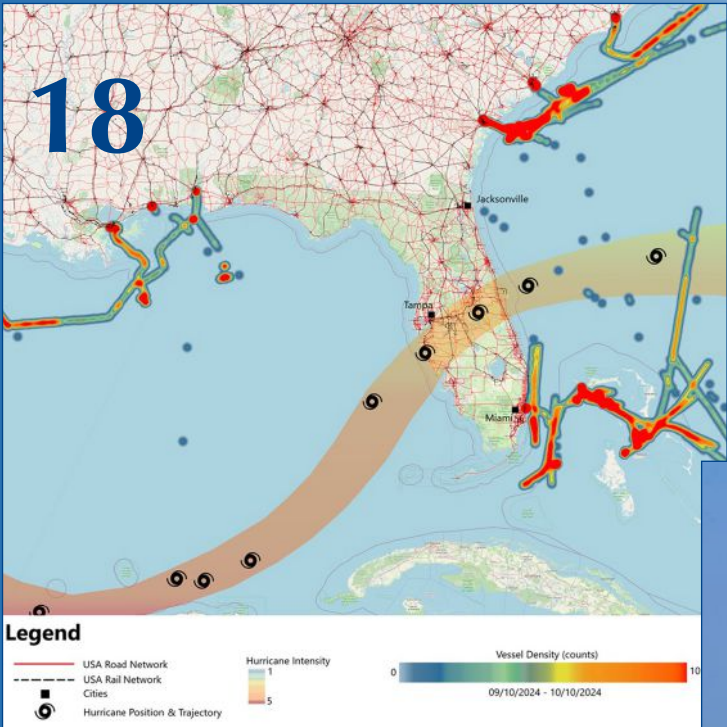


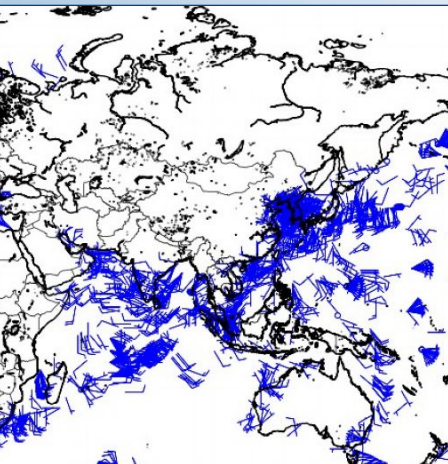
Smart Subsea Solutions

- intelligent vehicles
- reliable communication
- accurate positioning
- modern sensor networks
- diver navigation systems



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A technician handles In-Situ's Rugged Buoy and Aqua Troll 800 multiparameter sonde in Florida. (Credit: Noah Starling)

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)) 800+ New Marine Species Discovered. The Nippon Foundation-Nekton Ocean Census, the world's largest collaborative effort to accelerate the discovery of marine life, has announced the discovery of 866 new marine species. An estimated 1 million to 2 million marine species remain undocumented. The identification and official registration of a new species can take up to 13.5 years—meaning some species may go extinct before they are even documented. To address this, The Nippon Foundation and Nekton jointly launched the Ocean Census in April 2023 to transform species discovery, accelerating the identification of marine life to close critical knowledge gaps before it's too late. The Ocean Census global alliance has conducted 10 global expeditions, hosted eight Species Discovery Workshops and bestowed 19 Species Discovery Awards to taxonomists worldwide. New species of shark, sea butterfly, mud dragon, bamboo coral, water bear, octocoral, sponge, shrimp, crab, reef fish, squat lobster, pipehorse, limpet, hooded shrimp, sea spiders and brittle stars—encompassing dozens of taxonomic groups—have been registered to the Ocean Census Biodiversity Data Platform (formerly the Cyberbiodiversity System). The beta version, developed in partnership with the UN Environment Programme World Conservation Monitoring Centre, is now accessible to researchers and the public alike. Using divers, submersibles, and ROVs, new species have been identified from depths of 1 to 4,990 m, with analysis conducted by collaborating scientists from the Ocean Census Science Network. Building on the initial findings, the Ocean Census will provide dozens more Species Discovery Awards, undertake 10 new expeditions, and host seven additional Species Discovery Workshops in 2025 across the Pacific, Indian, and Southern Oceans. All further data will be added to the Ocean Census Biodiversity Data Platform.

)) Policy to Sustain Trillion-Dollar Ocean Economy. While the ocean economy doubled from \$1.3 trillion in 1995 to \$2.6 trillion in 2020, coordinated policy action is essential to safeguard its long-term prosperity and sustainability, according to a new OECD report. The OECD Ocean Economy to 2050 identifies key priorities for policymakers to secure a resilient and sustainable future ocean economy, balancing economic opportunity with environmental responsibility. Over the past 25 years, the ocean economy, driven by offshore oil and gas, marine and coastal tourism, marine fishing and aquaculture, maritime transport, and port activities, contributed between 3 and 4 percent of global gross value added and grew steadily with no substantial contractions. But various forces, including climate change, demographic shifts, trade disruptions, and insufficient investments in productivity and green energy, could slow or even reverse growth. In a future scenario where investment in productivity is not forthcoming and the energy transition stalls, global ocean economic activity could decline by around 20 percent below 2020 levels by mid-century. Key policy recommendations from the report include: strengthening policy action and collaboration to enhance ocean management, accelerating the energy transition away from fossil fuels, and adopting advanced digital technologies and data collection systems. In addition, the report calls for deeper cooperation with developing countries on the ocean economy, maximizing the benefits of ocean economic activity to livelihoods and wellbeing, and promoting the conservation, sustainable use, and restoration of fragile marine ecosystems.

)) JIP to Develop Carbon Capture Tech. HD Korea Shipbuilding and Offshore Engineering (HD KSOE), HD Hydrogen, and DNV have signed a joint industry project (JIP) agreement to develop and validate pressure swing adsorption (PSA) technology for carbon capture in solid oxide fuel cells (SOFC). SOFCs are high-efficiency fuel cells that generate electricity using natural gas, ammonia or hydrogen as fuel. PSA technology is a key enabler in the era of carbon capture, utilization and storage (CCUS). Integrating this technology with SOFCs, one of the most efficient power generation systems available, can substantially contribute to maritime decarbonization. As part of the JIP agreement, HD KSOE and its subsidiary HD Hydrogen will explore the integration of PSA-based carbon capture technology into SOFCs for shipboard power generation. The ultimate goal is to replace conventional ship propulsion and power generation engines with SOFC systems, significantly reducing maritime carbon emissions. PSA technology selectively captures and releases CO₂ by cyclically altering pressure within a capture chamber. This approach is expected to be at least 40 percent more energy-efficient than conventional CO₂ absorption technologies used in marine applications.

)) Report Advocates UK Nuclear Energy. The technology company CORE POWER, global marine insurer NorthStandard and Lloyd's Register (LR) have jointly published "Advanced Maritime Nuclear: A unique opportunity for the UK," which sets out a policy framework for the U.K. government to support the deployment of advanced small nuclear reactors on commercial ships and floating nuclear power plants. The Department for Transport should include nuclear-powered shipping and FNPPs in an updated Clean Maritime Plan and long-term nuclear strategy, the report argues. Global shipping currently depends on fossil fuels for close to 99 percent of its energy consumption, but the International Maritime Organization aims for its greenhouse gas emissions to reach net zero by around 2050. Alternative fuel options, including biodiesel, methanol, hydrogen, and ammonia, currently face major cost, production, transportation, and use challenges. Leveraging the U.K.'s decades of experience with small reactors for the Royal Navy can help decarbonization. The U.K. pledged to triple nuclear energy generation capacity at COP 28. **ST**

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Integrating Global Connectivity and Compliance

The maritime sector is undergoing profound shifts as digitalization takes center stage, offering the potential to drive efficiency, enhance security, and improve global maritime practices. Central to these advancements are new international regulations—UR E26 and UR E27—designed to elevate cybersecurity and digital compliance.

Digital transformation has become imperative, revolutionizing operations and safety protocols across the sector. Today's vessels utilize sensor networks to capture real-time data on everything from fuel efficiency to cargo conditions, enabling better-informed decisions and reducing operational costs. For example, McKinsey reports that data analytics has led to significant fuel savings in the industry, offering both cost efficiencies and environmental benefits.

Digitalization connects entire fleets and port networks. Ports in Rotterdam and Singapore have adopted integrated digital solutions to streamline logistics and manage congestion, fostering a more seamless global supply chain. As cloud-based platforms and IoT continue to grow, the industry is moving toward a highly connected ecosystem that responds dynamically to regulatory and market pressures.

More digital connectivity increases cybersecurity risks, which can impact everything from vessel operations to financial stability. The Allianz Risk Barometer 2024 identifies cyber risks as the leading concern for global industries, emphasizing the rising frequency and severity of cyberattacks, such as ransomware and data breaches. Adhering to industry standards is now fundamental to maintaining a resilient digital infrastructure and improving international competitiveness. Countries such as Japan and Germany have prioritized cybersecurity in their maritime policies, setting a global precedent.

Emerging digital solutions are critical enablers of compliance. IoT sensors and data analytics platforms allow continuous monitoring of essential metrics, from fuel consumption to route optimization. Automated systems simplify regulatory reporting. Cybersecurity frameworks, such as IEC 62443, further support these efforts by reinforcing digital security.

While digital solutions present a path forward, several challenges remain; for instance, ensuring seamless integration between modern digital solutions and legacy systems. Misaligned systems increase security vulnerabilities and inefficiencies, complicating compliance efforts. As vessels grow more data-reliant, safeguarding data is essential for adhering to cybersecurity regulations. Cyber incidents that compromise data integrity can disrupt certification, leading to operational delays. Implementing compliant digital technologies can strain budgets, but the cost of noncompliance—from operational disruptions to penalties—can be even higher. Cybersecurity standards continue to evolve, requiring agile digital solutions and proactive compliance strategies.

Strategic actions can be taken for streamlined compliance, such as leveraging platforms that automate data collection and create documentation to facilitate audits, accelerating certification. Cybersecurity frameworks such as IEC 62443 help fortify operational networks and lay the groundwork for secure, compliant operations. Real-time data analytics can pre-emptively identify and resolve potential issues. Regular engagement with regulatory bodies and a focus on continuous learning are critical for adapting to regulatory shifts.

In a data-driven international industry, staying ahead of compliance is essential for resilience and competitiveness. By integrating secure, data-centric solutions, companies can meet regulatory standards while enhancing performance in a more connected maritime global market. **ST**

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JANUARY

Annual Review & Forecast

FEBRUARY

Instrumentation: Measurement, Processing & Analysis

***Undersea Defense Technology (UDT), March 25-27, Oslo, Norway*

MARCH

Electronic Charting/Vessel Management/
Ports & Harbors/Dredging/Homeland Security

***Ocean Business, April 8-10, Southampton, U.K.*

APRIL

Offshore Technology/Alternative Energy & Ocean Engineering

MAY

Communications, Telemetry, Data Processing

***OCEANS 2025 Brest, June 16-19, Brest, France*

JUNE

Seafloor Mapping/Sonar Systems/Vessels

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JULY

Deck Gear, Cable, Connectors, Power Systems & Salvage

****IMAGE 2025**, August 24-29, Houston, Texas

AUGUST

Ocean Resources Development & Coastal Zone Management

****MAST AUKUS 2025**, September 3-4, Glasgow, Scotland, U.K.

****OCEANS 2025 Great Lakes**, September 29-October 2,
Navy Pier, Chicago, Illinois

SEPTEMBER

Geophysical Exploration/Seafloor Engineering

OCTOBER

Environmental Monitoring, Remote Sensing & Pollution Control

****CLEAN GULF**, November 18-20, New Orleans, Louisiana

****Offshore Energy**, November 25-26, Amsterdam, The Netherlands

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Maritime Intelligence at Scale

How Autonomous IaaS Is Reshaping Global Ocean Surveillance

By Graeme Naylor • Seamus Miller • Robert Dane

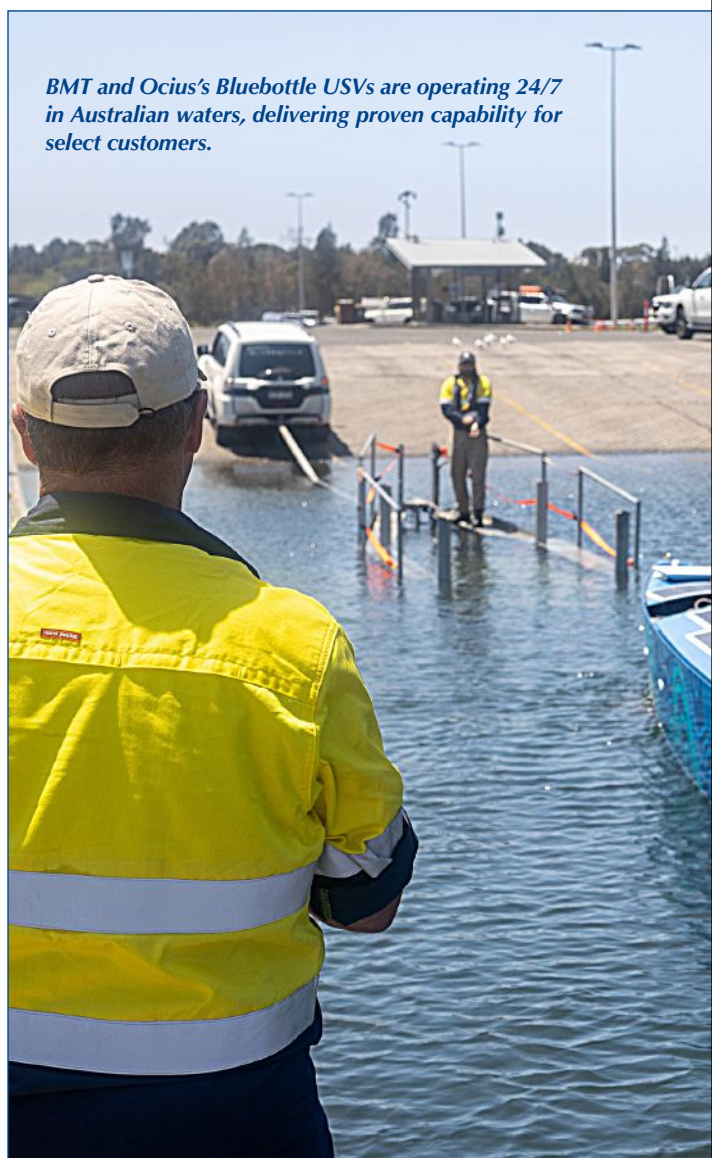
The integration of autonomous maritime systems into the naval and commercial sectors is accelerating, driven by AI, distributed sensor networks, and long-duration autonomous platforms. A significant enabler of this shift is low Earth orbit (LEO) satellite constellations, which are transforming maritime connectivity by providing seamless, high-bandwidth, low-latency communications. As seen in recent trials, these advancements enhance real-time situational awareness, enabling autonomous vessels to deliver continuous, scalable maritime intelligence.

The traditional paradigm of episodic, human-intensive ocean surveillance is being replaced by persistent, autonomous information-as-a-service (IaaS) models. LEO satellite technology is a key driver in this transformation, supporting real-time analytics, remote monitoring, and predictive modeling—critical for sectors spanning defense, environmental monitoring, and offshore energy.

At the forefront of this shift is autonomous USV deployments, such as the Deep Blue Project, which integrates AI-driven analytics with autonomous maritime platforms to deliver high-resolution, real-time intelligence. These advancements are shaping a new era of digitally enabled, data-rich maritime operations, where intelligence-led decision making is not just an advantage but a necessity.

The Changing Landscape of Maritime Intelligence

The increasing complexity of global maritime operations—driven by factors such as security threats, climate change and offshore energy expansion—demands a fundamental shift in how persistent wide-area data is collected. Traditional surveillance models, reliant on manned patrols, periodic surveys, and legacy satellite systems, often lack efficiency, cost-effectiveness, and resilience in dynamic ocean environments. Autonomous platforms and AI-powered analytics now offer an alternative: one that is scalable, cost-efficient, and persistent.



BMT and Ocious's Bluebottle USVs are operating 24/7 in Australian waters, delivering proven capability for select customers.

Specifically, the vastness of the maritime domain presents inherent challenges for data collection. Regions such as the South China Sea, Strait of Malacca, and Bab el Mandeb Strait are not only strategic trade corridors but also high-risk zones for environmental impact and maritime security. Here, continuous, real-time ocean intelligence is critical, not just for governments and naval forces but also for commercial sectors managing climate-driven risks, regulatory compliance, and sustainability.

By integrating USV-collected ocean intelligence with AI-powered analytics, the Deep Blue Project is demonstrating how autonomous IaaS models can support a range and variety of applications, including offshore wind project planning, biodiversity conservation, climate risk forecasting, and subsea infrastructure monitoring.

The industry is transitioning from ad-hoc, project-based data collection to a continuous, intelligence-driven service model. Autonomous fleets such as the Deep Blue Project offer a game-changing alternative, capable of persistent ocean monitoring, real-time data fusion and actionable environmental insights. By integrating AI analytics and LEO connectivity, these systems

not only enhance efficiency and reduce costs but also drive sustainability by lowering CO₂ emissions and minimizing reliance on traditional crewed platforms. This is a pivotal shift in how governments, commercial operators, and environmental agencies approach maritime intelligence and mitigate risk.

Scaling Autonomous IaaS for Global Impact

The next leap forward in maritime domain awareness lies in the seamless integration of autonomous fleets, AI analytics and cloud-based decision support systems. The BMT DEEP platform is a prime example of how multi-source maritime data sets can be processed, visualized, and delivered as real-time insights to government, industry, and environmental stakeholders.

BMT and Ocious are collaborating at a pivotal moment in history, a time when technology and corporate expertise matches vision. We are part of a revolution driven by Moore's Law, where sensors are becoming smaller, lighter, more powerful and cheaper. Combined with low-Earth orbit satellite communications and the power of artificial intelligence, autonomous, persistent and reliable data collection is not just possible—it is now disruptively affordable.

Today, BMT and Ocious's Bluebottle USVs operate 24/7 in the waters off Australia for select customers, proving the capability. But we want to take another step forward: Our mission is to break down barriers and put real-time ocean intelligence into the hands of scientists, sailors, and CEOs through a transformative new business model.

With autonomous USV networks, the future of maritime data intelligence will be driven by: persistent environmental monitoring for climate impact assessments; continuous hydrographic and meteorological data collection for offshore energy optimization; maritime security surveillance to track illicit activity and emerging threats; and infrastructure resilience modeling for under-sea cables, ports, and offshore platforms.

By adopting a networked approach, the industry is moving beyond legacy survey models toward a system that reduces costs, increases efficiency and enhances sustainability.

The Deep Blue Project in Action

A key validation of autonomous IaaS at scale comes from the Deep Blue Project's technical trial in Australia's Gippsland region. Over a 22-day period, from November 19 to December 11, 2024, the Bluebottle USV fleet surveyed 46 km² of ocean, capturing 25 TB of environmental data under Sea State 5 conditions, proving its resilience and long-duration operational viability.

Simultaneously, BMT has been advancing the DEEP platform, which serves as the backbone of its autonomous intelligence solutions. This trial in Australia demonstrated how continuous, cost-effective data collection can drive commercial and operational efficiencies in offshore wind development, marine transport, conservation, and real-time security monitoring.

As AI capabilities within the DEEP platform continue to evolve, the project is now entering its commercializa-





The future of maritime domain awareness is the seamless integration of autonomous fleets, AI analytics and cloud-based decision support systems.

tion phase, marking a significant step toward real-world deployment. The next phase of maritime intelligence will focus on predictive analytics, edge computing, and near-instant decision support—transforming how industries and governments interact with autonomous intelligence at scale. Additionally, this initiative delivers crucial maritime governance value, enhancing regulatory compliance, operational transparency, and data-driven decision making to support safer, more sustainable, and resilient maritime operations.

The shift from fragmented, localized data collection to persistent, global-scale intelligence is already happening. Maritime autonomy is not just an efficiency tool; it is essential for operational maximization. The ability to fuse AI, edge computing and autonomous platforms into a cohesive data ecosystem is defining the next generation of maritime decision making. As we refine the scalable DEEP platform architecture, the future of ocean intelligence will be shaped by predictive analytics, seamless multi-source data integration and real-time decision support.

Investing in the Future

The maritime sector is at an inflection point, where the integration of AI, autonomy and scalable IaaS solutions is redefining data-driven ocean intelligence. As proven through the Deep Blue Project's successful trial, autonomous platforms are no longer experimental—they are operational, commercially viable and ready to be deployed at scale, offering game-changing capabilities for domain-agnostic operators.

With LEO satellite connectivity, AI-driven analytics and multi-source data fusion, real-time ocean intelligence is becoming a new industry standard. The ability to continuously monitor and analyze vast maritime regions is not simply about cost reduction; it is about delivering mission-critical, intelligence-led decision making.

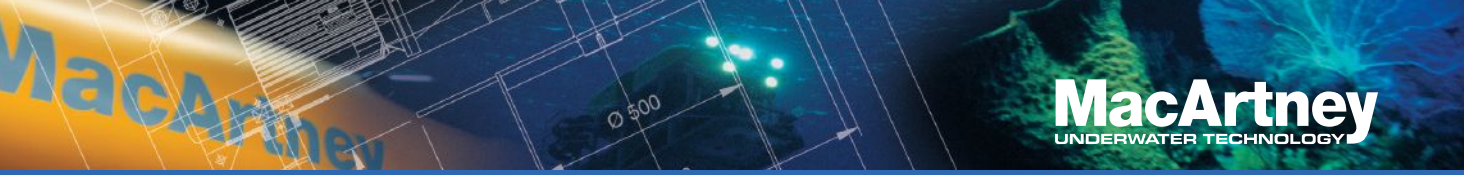
The demand for real-time maritime intelligence is soaring across sectors, from offshore wind operators needing continuous metocean data to governments and defense agencies requiring persistent situational awareness. With exponential investment in autonomy across the Asia-Pacific region, including significant government funding in Australia and Japan, BMT is poised to support this transformation. Our Deep Blue Project is not only proving the operational resilience of autonomous systems but also demonstrating their value in delivering scalable, cost-effective intelligence for environmental monitoring, infrastructure resilience and maritime security.

As the industry morphs toward scalable, autonomous maritime solutions, the focus is now on fully optimizing these capabilities to enhance security, resilience and sustainability. Rather than simply adopting new technologies, the future of maritime operations lies in their seamless platform integration: ensuring they work in concert to maximize operational efficiency, de-risk decision making, drive sustainability and provide a strategic advantage in an increasingly complex maritime domain. **ST**

Graeme Nayler is the regional business director of BMT in Asia-Pacific. He has more than 30 years of experience in defense, maritime and engineering consultancy, driving multi-million-dollar growth. Nayler is instrumental in BMT's collaboration with Ocious on the Deep Blue Project.

Seamus Miller is BMT's technology program manager. He has more than 23 years of experience in defense, aerospace and autonomous systems, specializing in AI/ML-driven solutions for uncrewed platforms. Miller leads the Deep Blue Project and delivers cutting-edge IaaS solutions to the commercial, defense, and environmental sectors.

Robert Dane is the founder, CEO and executive director of Ocious, an innovator in uncrewed surface vessels. After patenting the SolarSail in 1996 and developing hybrid solar ferries, he pivoted Ocious toward autonomous maritime technology. Under his leadership, Ocious has successfully delivered USVs for the Royal Australian Navy, Royal New Zealand Navy and prime defense contractor ThayerMahan.

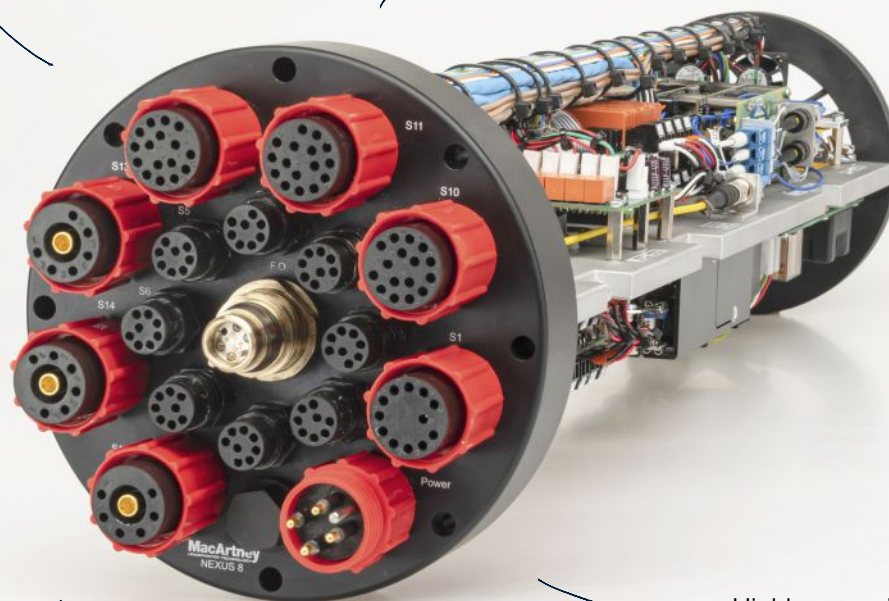


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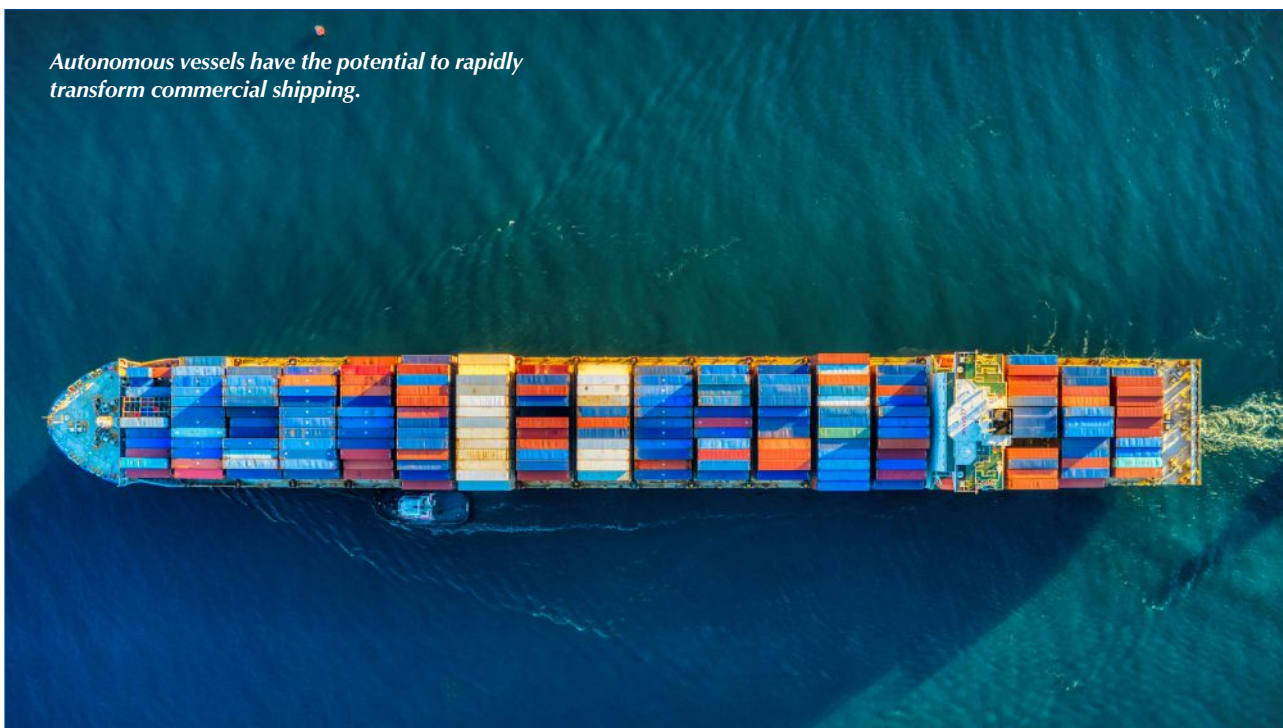


The Cloud Over the Sea

How Satellite Innovations Are Evolving Autonomous Shipping

By Caroline De Vos • Dr. Ghazaleh Kia

Autonomous vessels have the potential to rapidly transform commercial shipping.



Advancements in the satellite sector are expanding the possibilities of autonomous shipping. The rise of automation and artificial intelligence (AI) promises enhanced efficiency, optimized operational performance and greater safety for unmanned vessels. However, widespread adoption hinges on one critical factor: seamless, reliable connectivity.

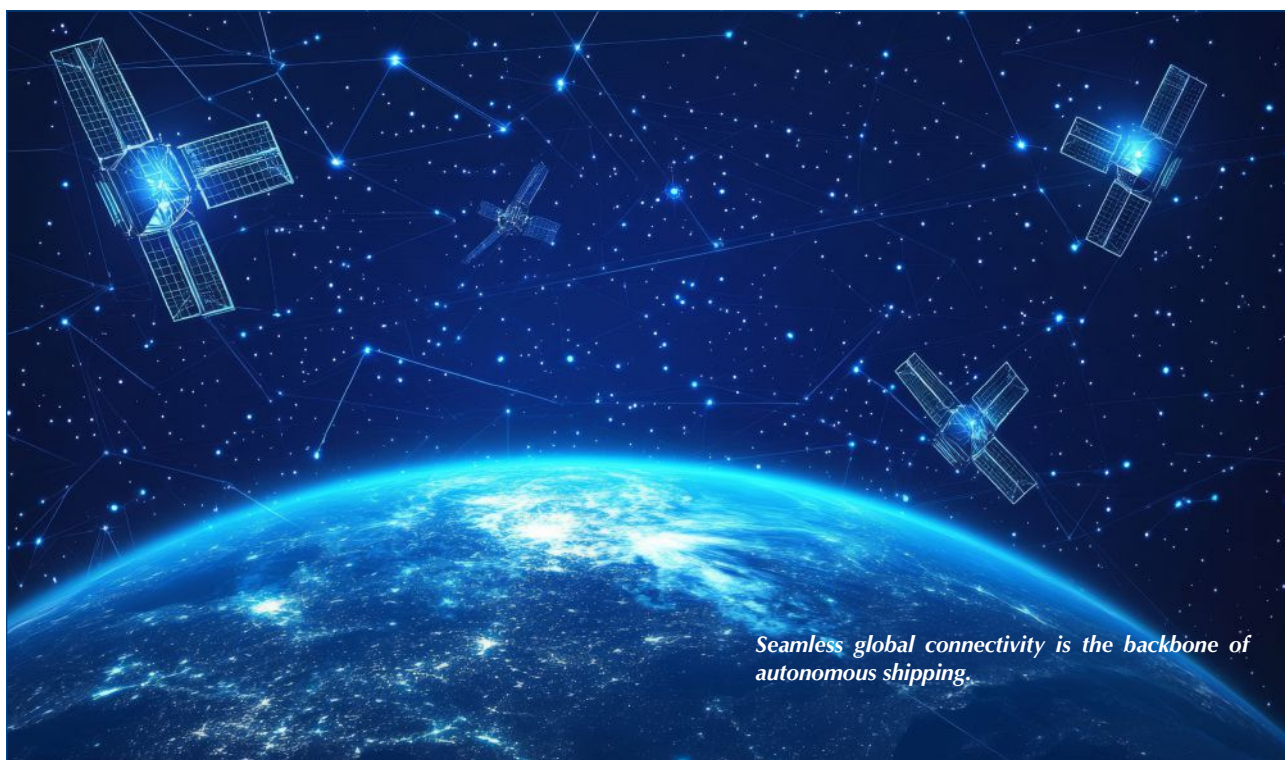
For autonomous vessels to operate effectively, continuous data exchange between ships and control centers is paramount. Real-time monitoring, predictive maintenance and split-second decision making depend on uninterrupted connectivity. For the maritime sector to truly propel into the future of shipping, embracing advance-

ments from the satellite communications sector is critical to success.

An Anchor for Autonomous Shipping

The availability of satellite internet has grown rapidly in recent years to offer an alternative to terrestrial connectivity, but challenges persist in delivering reliable, uninterrupted connectivity at sea. Unpredictable weather conditions, remote coverage gaps and network latency have the potential to compromise real-time operations.

The mitigation of such challenges is being achieved through satellite networks' transition to a more virtual architecture, leveraging advanced network orchestration



Seamless global connectivity is the backbone of autonomous shipping.

techniques that boost data flow optimization and reduce latency. This shift enables more efficient bandwidth allocation and dynamic network management, ensuring vessels remain connected even in the most remote waters.

Yet connectivity alone is not enough. Autonomous vessels demand high bandwidth and ultralow latency to support critical functions, such as real-time navigation, collision avoidance and situational awareness. Delayed data transmission can lead to miscalculations, increasing the risk of maritime incidents.

Seamless global connectivity is essential for AI-driven vessel management systems, allowing for continuous data exchange between ships, shore-based control centers and other maritime stakeholders. By integrating satellite, terrestrial, and hybrid communication networks, the industry is moving toward a more resilient and adaptive connectivity ecosystem—one capable of ensuring autonomous shipping can operate safely and efficiently across the world's seas.

Bridging the Gaps

Despite the proliferation of low Earth orbit (LEO) satellites and the introduction of multi-orbit connectivity that offers greater coverage and satellite connectivity options, global coverage gaps still exist. This is particularly apparent in remote maritime regions where service disruptions can impact automated navigation and decision making.

One solution to this challenge is service orchestration. The integration of multiple communication pathways—including satellite, terrestrial and 5G networks—allows autonomous vessels to switch dynamically between connectivity sources. This ensures critical operations remain unaffected, even in connectivity blackspots.

Real-time service monitoring and predictive maintenance

play an essential role in sustaining uninterrupted operations. AI-driven monitoring systems can detect connectivity weaknesses and pre-emptively adjust network configurations to avoid disruption. Predictive maintenance further enhances reliability by addressing potential hardware failures before they impact vessel performance, reducing downtime and increasing reliability.

Steering Modern Maritime Operations

Beyond connectivity, virtualization has become a fundamental component of autonomous shipping. Without virtual management tools, many of the technologies enabling automation—such as AIS, high-resolution camera feeds, real-time vessel performance tracking and precise positioning—would not be possible.

Virtualization allows these technologies to be integrated into centralized dashboards, providing a comprehensive view of a vessel's operations. This level of visibility is critical for remote monitoring, ensuring that ship operators can intervene when necessary to prevent accidents or inefficiencies.

Cloud computing further enhances this capability by providing scalable data storage and processing power. Real-time analytics, machine learning algorithms and predictive modeling all benefit from the cloud's ability to process vast amounts of data instantaneously. Additionally, cloud-based solutions enhance security by offering encrypted data transmissions and robust cybersecurity protocols, protecting ships from potential cyber threats.

Cloud Integration, Smooth Sailing

Cloud platforms are not only essential for data storage and processing but also for remotely managing autonomous fleets. One significant advantage of cloud

integration is scalability. Cloud solutions are capable of handling increasing data loads as more ships become automated, ensuring seamless fleet expansion. Additionally, cloud platforms offer enhanced security through advanced encryption and cybersecurity protocols, which protect operational data from potential cyber threats.

Another key benefit is centralized management. Cloud systems enable ship operators to monitor multiple vessels from a single platform, streamlining decision making and reducing operational inefficiencies. Cloud-based systems also improve collaboration by facilitating better coordination between ship crews, port authorities and logistics providers, thus enhancing overall supply chain efficiency. Furthermore, cloud computing's ability to process real-time data plays a critical role in optimizing operational performance. By analyzing navigation patterns, fuel consumption rates and environmental navigation, cloud-based solutions help improve efficiency and support sustainability efforts.

As the maritime industry progresses toward full-scale autonomy, the importance of investing in cloud technologies cannot be overstated as essential solutions for ensuring smooth, efficient and secure maritime operations in the future.

SeaNext Project

Autonomous shipping is no longer a futuristic concept—it is a rapidly growing necessity for the maritime industry's competitive capabilities. Shipping companies must embrace automation to optimize costs, reduce environmental impact and enhance safety. However, this transition will require a collaborative effort from technology and connectivity providers and regulatory bodies to ensure seamless service delivery.

One notable initiative working toward this goal is the SeaNext project, a collaboration between the Belgian software provider neXat and SEAFAR, a provider of remote control technology and technology for unmanned and crew-reduced shipping. The two-year project, co-funded by the European Space Agency (ESA), aims to provide uninterrupted connectivity between semi-autonomous vessels and remote operation centers. SeaNext is developing solutions to improve connectivity in remote maritime environments, focused on enhancing real-time coastal navigation and operational efficiency, positioning itself as a key driver of the future of autonomous shipping.

In July 2024, the project successfully completed the factory acceptance test milestone review with ESA, demonstrating the monitoring aspect of remote operations and providing an early report on LEO satellite utilization. Early testing results indicate that LEO satellites can effectively compensate for areas lacking terrestrial network coverage, though further investigation is underway using different connectivity monitoring tools to ensure the safety of remote operations.

The next step in the SeaNext project is the on-site acceptance test milestone review, which was scheduled for April, involving the remote control methodology and the utilization of the monitoring dashboard. This milestone

review will ensure that the safe automated control methodology, combined with seamless connectivity, enables the efficient and reliable semi-autonomous operation of vessels.

To fully enable autonomous vessels, it is vital that projects like this are developed and invested in, to create robust digital infrastructures, including high-speed satellite networks, cloud-based analytics, and AI-driven service management systems. These technologies will be instrumental in overcoming the remaining challenges associated with autonomous maritime operations.

Navigating the Regulatory Landscape

While the potential benefits of autonomous shipping are significant, several challenges must still be addressed before widespread adoption can occur.

The international regulatory landscape must evolve to accommodate autonomous shipping, ensuring compliance with safety and operational standards. Furthermore, increased reliance on digital systems demands the implementation of robust cybersecurity measures to prevent cyber threats and data breaches.

Widespread adoption of autonomous shipping will also require trust from both the public and industry stakeholders, highlighting the need for transparency and demonstrated safety records. Finally, the transition to autonomous vessels will require substantial upfront investment, making it crucial for companies to evaluate cost-benefit scenarios ahead of the new technology adoption.

Staying the Course

The shipping industry is at a critical juncture. Autonomous vessels offer a crucial opportunity to improve efficiency, safety and cost-efficiency in global maritime trade. However, achieving this vision requires substantial investment in reliable connectivity, virtualization and cloud integration.

Technology providers must prioritize the development of seamless communication networks and advanced automation tools to support the growing demands of autonomous shipping. By doing so, they will play a crucial role in shaping the future of the maritime sector, ensuring that autonomous vessels may operate efficiently and safely on a global scale.

For shipping companies and technology providers alike, the message is clear: The future of maritime automation is here. Investing in the right technologies today will determine who leads the next wave of innovation in global shipping tomorrow. **ST**

Caroline De Vos is the COO at neXat.

Dr. Ghazaleh Kia is the R&D project manager at SEAFAR.

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Advanced Emissions Calculations

Platform Provides Advanced Data Processing, Digital Twin Technology

By Constantine Komodromos

In today's increasingly regulated shipping environment, accurate measurement of maritime emissions has evolved from a mere sustainability goal to a critical business requirement, especially for shippers. With the implementation of the European Green Deal, the Science-Based Targets initiative (SBTi, a corporate climate action organization), and the International Maritime Organization's ambitious targets to reduce carbon intensity by 40 percent by 2030, shipping companies face mounting pressure to provide precise emissions data.

The challenge, however, goes beyond simple compliance. Default values and industry averages—the traditional approach to emissions calculation—fail to capture the complex dynamics of modern maritime operations. Each voyage is subject to unique conditions: varying weather patterns, specific vessel characteristics, fuel types and operational decisions all dramatically impact the actual carbon footprint of maritime transportation.

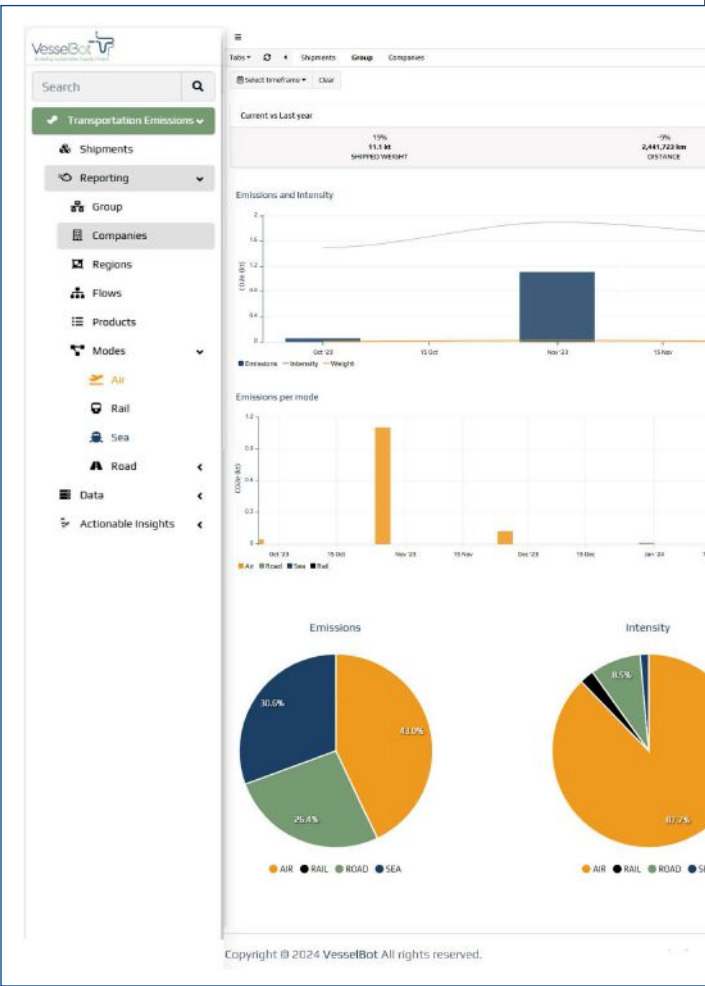
This data gap represents not just a regulatory challenge but a significant obstacle to meaningful climate action in one of the world's most carbon-intensive industries. It's within this context that VesselBot has developed its Supply Chain Sustainability Platform, ranked #1 in Drewry's Emissions Measurement Providers Comparison Guide for 2024, with a remarkable score of 9.89 out of 10 for ocean freight emissions calculations.

The Power of Primary Data

The foundation of VesselBot's approach is the prioritization of primary data—real-time, specific information collected directly from the source. Unlike conventional methods that rely on default values and generalized assumptions, VesselBot integrates actual operational data to incorporate transport-specific, route-specific, and fuel-specific values.

"Companies must use data that is most representative of the actual fuel and energy consumption," states the SBTi, highlighting the importance of this approach.

Similarly, the GHG Protocol, comprising comprehensive global standardized frameworks to measure and manage greenhouse gas (GHG) emissions from private and public sector operations, value chains and mitigation actions,



prioritizes primary data for its accuracy and reliability, and the European Sustainability Reporting Standards require companies to disclose their materials’ impact using “primary data obtained from suppliers or other value chain partners.”

VesselBot’s Supply Chain Sustainability Platform captures five critical primary data elements that directly affect emissions calculations. One is actual distances traveled, using real-time AIS tracking systems rather than straight-line, port-to-port minimum feasible distance calculations. Another is vessel-specific characteristics, including size, type, deadweight tonnage, engine and propeller data, fuel type, and capacity. A third is real-time utilization rates, measuring how many containers are being carried on each voyage. A fourth is precise fuel consumption, based on vessel operations, speed and engine performance. A fifth is weather conditions, incorporating real-time weather data that can significantly impact fuel usage.

The difference from conventional methods is substantial. For example, during Hurricane Milton in 2024, vessels diverted from their planned routes in the Gulf of Mexico faced both longer journeys and challenging weather conditions. VesselBot’s calculations showed that these diversions and weather impacts significantly increased fuel consumption as shipping companies struggled with unexpected increases to navigate longer or less

direct paths. These variations in fuel consumption and emissions due to weather and rerouting are completely missed by default calculation methods that don’t incorporate real-time operational data.

The Core of Advanced Maritime Data Processing

At the heart of VesselBot’s technology lies an innovative application of digital twin modeling. These digital twins create dynamic, advanced simulations of real-world physical parameters, systems, and processes related to maritime transportation, enabling precise emissions calculation and optimization.

With digital twins for more than 40,000 vessels, VesselBot maintains an extensive virtual fleet that mirrors the exact characteristics of ships in real-world conditions, providing accurate models for emissions calculations. This model incorporates: vessel characteristics—size, type, deadweight tonnage, fuel type, engine characteristics, propeller characteristics, drafts and total TEU capacity; voyage information—departure and arrival ports, speeds per waypoint, duration, intermediate stops, rerouting data, and anchorage and berth time; vessel performance—speed, draft, engine power required per waypoint, fuel consumption, weather impact and vessel utilization; and telematics—AIS position data for real-time tracking and monitoring.

Digital twin technology enables VesselBot to calculate emissions with unprecedented accuracy while providing a continuous feedback loop that allows for dynamic updates based on changing conditions.

The Supply Chain Sustainability Platform handles everything automatically, from data collection across the entire carrier network to data cleansing, harmonization and analysis—delivering actionable intelligence without requiring manual intervention.

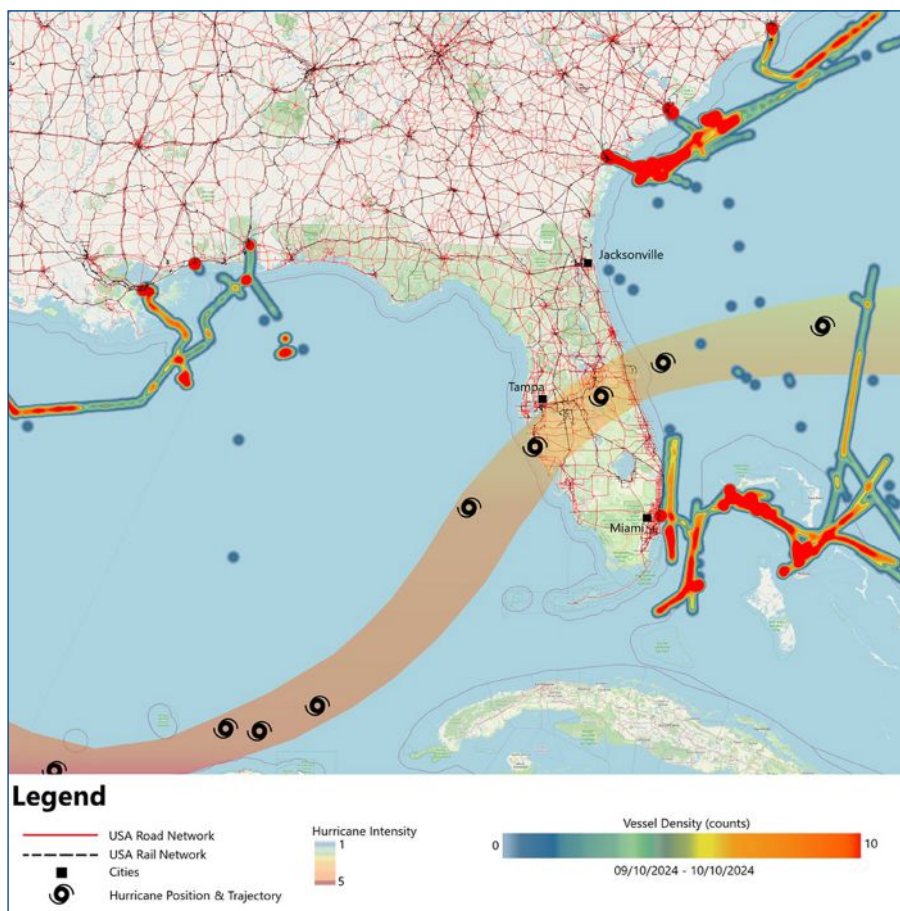
Red Sea Crisis Response

The 2024 Houthi attacks in the Red Sea created significant disruptions to global shipping routes, forcing carriers to divert around the coast of Africa and the Cape of Good Hope. VesselBot’s data processing systems monitored this situation in real time, capturing how these longer routes affected delivery times and emissions.

Our analysis found that goods arriving in Europe faced an average 15-day delay when rerouting around the Cape of Good Hope. More critically, total GHG emissions increased significantly while emissions intensity (gCO2e/km TEU) remained relatively stable, indicating that de-



A sample screenshot of VesselBot’s platform, showing: (top) an interactive graph that visualizes trends in a company’s emissions, including total tons, intensity, and weight, across days, months, and years; (middle) an interactive graph that displays trends in emissions intensity by mode of transportation over days, months, and years; and (bottom) pie charts that illustrate emissions (total tons), intensity, shipment weight, and distance traveled, categorized by mode of transportation.



Hurricane Milton's path and voyage disruption during the period of October 8 to October 10, 2024. Calculated vessel density shows how ships diverted to avoid affected areas of Florida.

spite the operational challenges, carriers maintained efficiency in their extended voyages.

By incorporating geospatial data into its algorithms VesselBot manages to capture all significant geopolitical and trade pattern changes that occur, such as the Houthi attacks that have caused a 73.12 percent reduction in container vessel traffic through the Suez Canal in 2024 compared to the previous year. These types of changes, apart from the direct trade consequences that they cause, bring significant changes to the emissions output of the global fleet. Therefore, shippers that have a real-time depiction of such incidents can utilize the intelligence gained to make informed data-driven decisions about alternative schedules and route planning and more accurately communicate expected delivery times and environmental impacts to their customers.

Weather Impact Analysis at Scale

In February 2024, a severe winter storm brought heavy snow and ice to ports of Northern Europe, affecting Rotterdam and Hamburg. VesselBot's systems captured how extreme cold and poor visibility hampered port operations, leading to significant delays in cargo handling and a buildup of ships waiting to enter the ports.

By processing weather data alongside vessel positioning information, our platform quantified the additional emissions generated by these delays. For the Netherlands' ports alone, cumulative emissions related to anchored times equaled 31,336.05 tons in 2024.

Integrating Communications and Telemetry For Advanced Emissions Management

VesselBot's Supply Chain Sustainability Platform doesn't operate in isolation—it seamlessly integrates with existing communications and telemetry systems, creating a unified data ecosystem for emissions management.

The platform utilizes multiple data sources to give shippers complete visibility: shipment tracking data—automatic collection of transportation data across all carriers in a shipper's network, providing complete visibility of goods movement; emissions calculations—precise calculations of emissions for each shipment based on vessel-specific performance characteristics rather than industry averages; weather impact analysis—incorporation of weather data to understand how external conditions affect shipment timelines and associated emissions; and port performance metrics—information about port operations that helps shippers understand congestion and delays affecting their cargo and emissions profile.

Beyond data collection, VesselBot's platform transforms complex data into clear insights that shippers can immediately act upon. Carrier performance dashboards provide comprehensive visualizations that enable shippers to compare emissions performance across their carrier network and make more sustainable decisions. Compliance reporting is done via automated generation of emissions reports to satisfy regulatory requirements and support sustainability disclosures for shippers' Scope

3 emissions. Transportation optimization is achieved through actionable insights that help shippers select more efficient routes, modes and carriers to reduce emissions while maintaining optimal service levels. Supply chain collaboration is enabled via a shared information platform that facilitates shippers work with their carriers and suppliers to collectively address emissions challenges.

The Evolution of Maritime Data Processing

As the maritime industry continues its decarbonization journey, the role of advanced data processing will only grow in importance. Looking ahead, several trends are likely to shape the future of emissions calculation, reporting and optimization. One is the integration of alternative fuel data: As the adoption of LNG, methanol, ammonia and hydrogen increases, data systems must evolve to accurately track the complex emissions profiles of these fuels across their entire life cycle. Another is predictive analytics for emissions forecasting: Machine learning algorithms will increasingly leverage historical emissions data to predict future patterns, enabling proactive emissions management. A third is regulatory convergence around primary data: As regulators recognize the limitations of default values, reporting requirements will increasingly mandate the use of primary data for emissions calculations.

VesselBot's platform, with its foundation in primary data collection and digital twin technology, is well-positioned to evolve alongside these industry trends. The system's ability to integrate multiple data sources makes it adaptable for alternative fuel tracking as the industry transitions. Its communications infrastructure supports enhanced port-vessel coordination, while the comprehensive data modeling capabilities across more than 40,000 vessel digital twins provides a robust foundation for advanced analytics. As regulatory frameworks increasingly emphasize primary data—the approach VesselBot has championed from the beginning—the platform offers a future-proof solution for maritime emissions management.

The challenge of maritime decarbonization is, at its core, a data challenge. Without accurate calculations, stakeholders cannot effectively manage their environmental impact or make informed decisions about efficiency improvements.

VesselBot's state-of-the-art technology, combining primary data collection, digital twin modeling and advanced data processing, represents a significant advancement in addressing this challenge. By providing unprecedented precision in maritime emissions calculation, reporting, and optimization, the platform enables shippers, cargo owners, and carriers to move beyond compliance and toward meaningful climate action.

What sets VesselBot apart is its frictionless approach to data management. With a single connection to its Supply Chain Sustainability Platform, customers gain access to a fully automated system that handles everything from data collection to analysis, with no manual data entry required. The platform's nearly perfect score in Drewry's evaluation (9.89 for ocean freight) underscores the ex-

ceptional accuracy and capability of this approach.

As regulatory pressures increase and stakeholders demand greater transparency, the value of accurate emissions data will only grow. The future of sustainable shipping depends not just on technological innovations in vessel design and alternative fuels, but on the sophisticated data systems that enable their effective deployment.

Through continued innovation in communications, telemetry and data processing, VesselBot is committed to supporting the maritime industry's transition to a low-carbon future—one accurate measurement at a time. **ST**

Constantine Komodromos is the founder and CEO of VesselBot. He is a fellow of the Association of Chartered Certified Accountants (U.K.) and has more than 23 years of experience working in multinational organizations and building startups. He has acquired significant market experience and knowledge of the logistics industry via collaborations with NASDAQ and NYSE-listed organizations. Since 2015, Komodromos has led VesselBot in providing the market with accurate GHG emissions monitoring for the main supply chain transportation modes: vessels, airplanes, trucks and trains.



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Crowdsourcing Weather Data

Real-World Data to Verify Satellites for Voyage Optimization

By Dr. Craig Summers

Ship routing based on reducing weather resistance slows fuel costs and helps to meet emissions requirements (such as the Carbon Intensity Indicator, or CII, grading) and reduce carbon taxes. Weather routing for ships is currently done using satellite weather forecasts, which can be unreliable.

We are entering a new era, where connected internet of things (IoT) sensors provide weather maps based on measurement, not on forecast models. Unlike satellite forecasts, ship wind measurements are actual measurements of precise wind speed and direction. SailTimer has compared satellite forecasts against 103,000 measurements of wind direction on ships and weather buoys. The results show that satellite forecasts have an average error in wind direction of $\pm 35^\circ$.

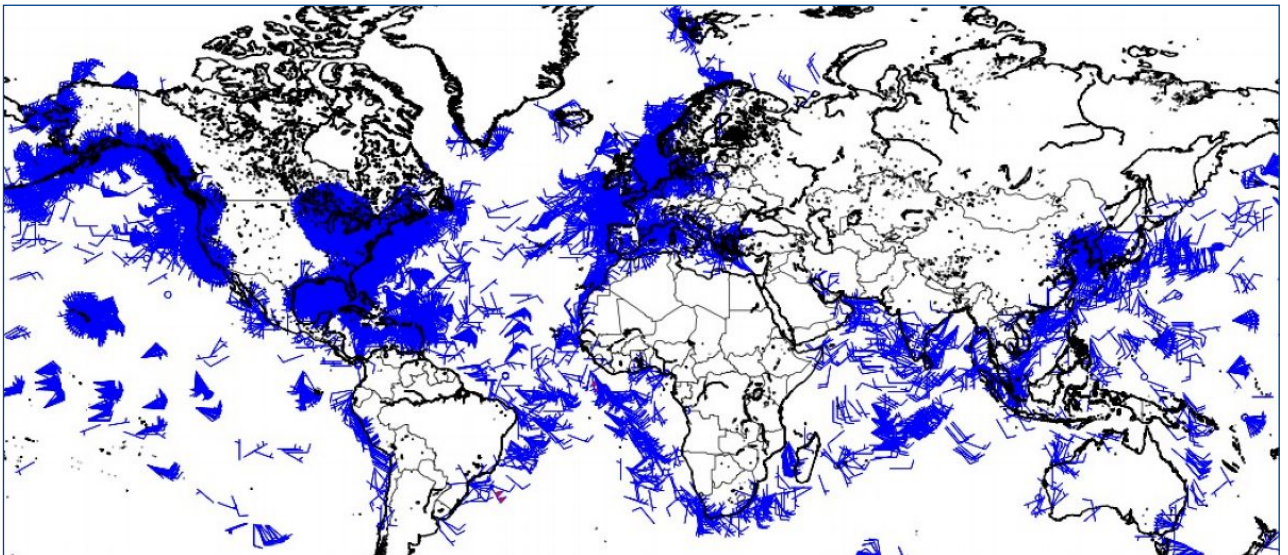
The SailTimer database is a crowdsourcing platform

that pulls from yachts in coastal areas and public sources offshore, including ships, weather buoys and drift sensors. Compared to satellite forecasts, SailTimer offers more accurate measurements of wind data to improve voyage optimization. The crowdsourced data can verify the accuracy of satellite forecasts.

Case Study: Container Ship from Busan to Los Angeles

Having more accurate weather data helps ships to continuously monitor arrival time. The common logic is that weather routing can take the ship around bad weather to arrive on time with lowered fuel costs and emissions.

A study done in South Korea by Kim and Roh (2020) provides data on seven repeated containership trips from Busan to Los Angeles. The fuel consumption data along



Offshore wind measurements in SailTimer database May 2024.

Wind Angle	Fuel Consumption
0	6.4%
15	7.0%
30	6.1%
45	3.7%
60	2.3%
75	2.0%
90	2.8%
105	0%
120	-3.3%
135	-6.5%
150	-7.9%
165	-7.9%
180	-6.1%

Effect of wind angle on fuel consumption.

Conceptually, the goal is to be able to determine the probability of arriving on time at the lowest speed possible through each wind zone. Crowdsourced data from other ships in upcoming wind zones is therefore useful for reducing uncertainty in the arrival time.

SailTimer Red-Green Trust Maps

Ships are only able to conserve fuel by reducing speed if they have confidence that they will arrive at the expected time given the sea state up ahead. There are not enough ships offshore to provide crowdsourced blanket coverage, but monitoring crowdsourced data

from ships up ahead as they move around helps to show which satellite forecast model is most accurate at a particular location and time.

SailTimer's interface is designed to be intuitive and easy to interpret at a glance. The green dots are locations where the satellite GRIB forecast is consistent with actual wind measurements from ships (with a threshold of less than 30° error). The red dots show locations where the satellite forecast is not verified by actual measurements (and has more than 30° error).

Using this Red-Green Map, a ship captain can check wind and sea state with actual measurements in real time from ships up ahead. The captain can see where the forecast is accurate, with a visual indicator of when and where the ship can slow-steam to reduce fuel consumption.

Crowdsourcing Data via Air Link

SailTimer's low-cost Air Link sends real-time measurements of wind direction and wind speed from a vessel to an online database. The Air Link could also send boat performance data, such as RPMs and fuel consumption; information for CII grading; and sensor data for predictive maintenance.

Crowdsourced weather data is a public good that benefits the whole industry, and no one company is large enough to create this network independently. The more ships providing real-time data on wind and sea state, the more accurate the arrival time and boat speed calculations. When the arrival time calculations are more accurate, the vessel can take the most direct route while slowing down as often as possible to reduce fuel costs and emissions to arrive on time.

Conclusion

If you want to go slow, you need better weather data. You can't *always* slow down because you can't tell if you

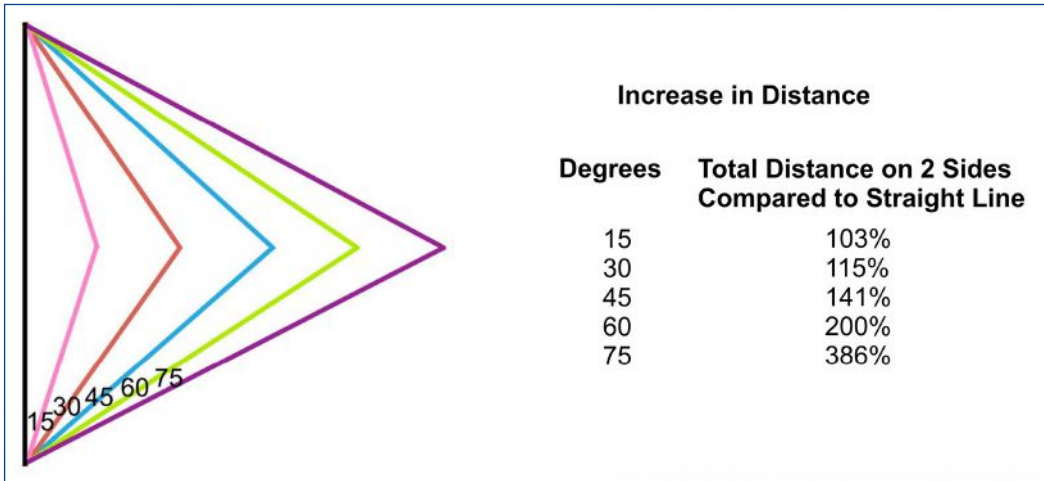
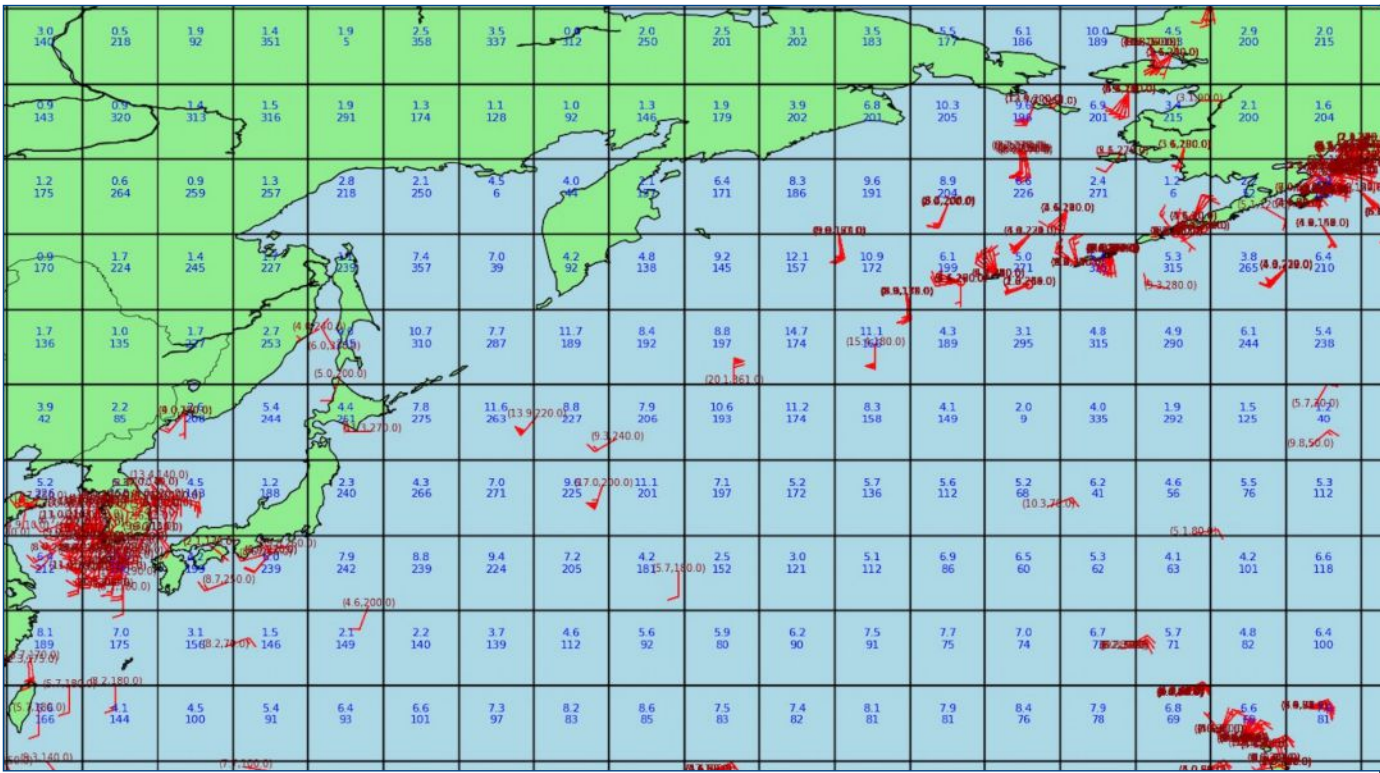
the route is from March to June 2014, with a ship that carries 4,600-TEU containers.

The Kim and Roh study shows that boat speed has a much larger effect on fuel consumption than good/bad weather. Fuel consumption more than doubled to about 2.5 times as much when the boat speed was increased from 12.2 to 20.6 kt., for example. Changing course to reduce the weather resistance also does not usually help because it trades off against much larger distances.

Therefore, crowdsourced weather data from vessels up ahead may be most useful for going as slow as possible. You can't go as slow as possible without accurate weather data. If the ship is approaching a wind zone where the weather load is going to increase fuel consumption by 7 percent, with accurate weather data, the routing software could then work backward from the arrival time to define boat speeds that will reduce fuel consumption by more than 7 percent.

It seems common practice for a ship to travel at its normal cruising speed on every trip, regardless of the weather—better to sail quickly and get there early than risk being late. This is the traditional strategy of “sail fast, then anchor.” But with this strategy, 50 percent of all container vessels arrive more than 8 hr. late, according to eeSea. The arrival times web page for the Port of Halifax, Canada, confirms this. Vessel scheduling starts more than a month ahead and is continuously updated based on ship location and congestion in previous ports. It shows about half of the ship arrivals in red, indicating arrival more than a day late.

Knowing that satellite weather forecasts have an average error of +/-35° in wind direction, it is easy to see how these delays can happen. More accurate measurements of wind and sea state from ships up ahead can help manage vessel speed to arrive on time. Avoiding excess speed also has a monetary savings by reducing fuel costs, as well as lowering greenhouse gas emissions for regulatory compliance.



(Counterclockwise from top left) Satellite GRIB forecast (blue numbers in cells) and wind measurements from ships (red arrows). Changing heading to reduce weather resistance creates a large increase in travel distance. SailTimer Red-Green Map indicates where a weather model is accurate. The low-cost Air Link installs on a ship in seconds to enable crowdsourcing of wind and other data.

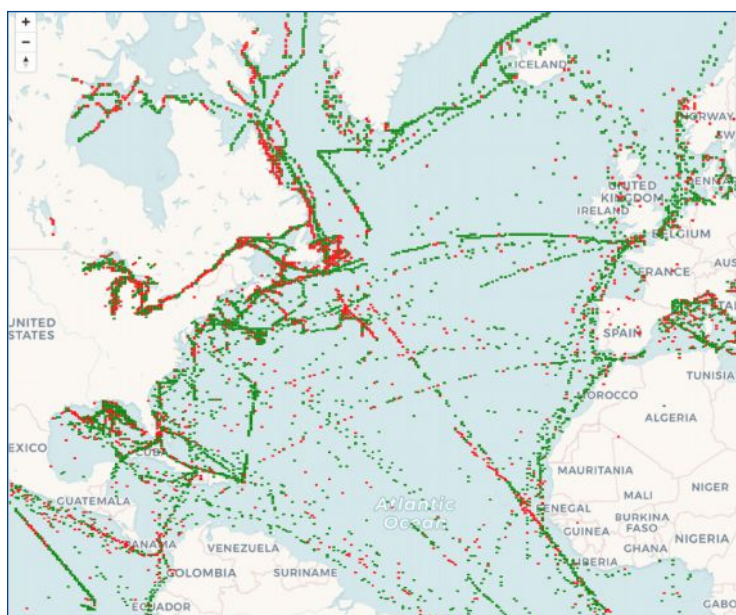
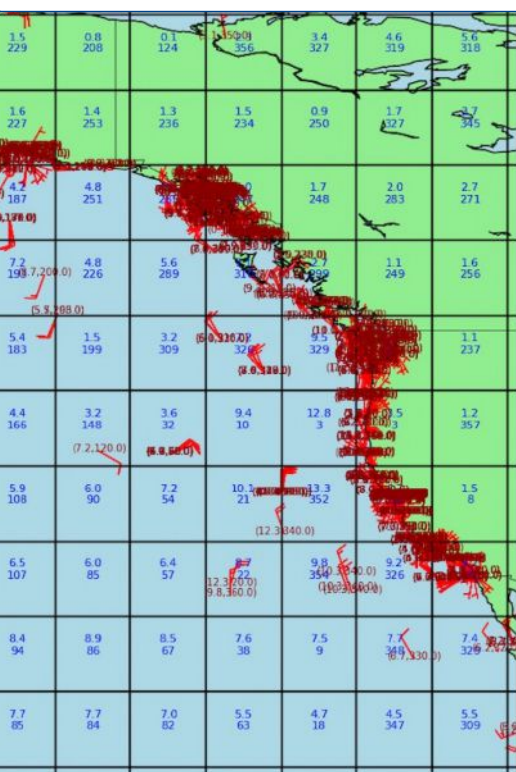
will be too early or too late. With accurate crowdsourced marine weather data, a ship can arrive more accurately on time at a speed that optimizes fuel consumption.

More accurate data from crowdsourced measurements on other vessels has two main benefits. The direct benefit is that the calculations of arrival time are more reliable, allowing improved reductions in fuel costs and emissions. The indirect benefit is that, if captains trust the data and routing, they will use them more, which also reduces fuel costs and emissions. Voyage optimization services that have more reliable results will get more customers.

There may be occasional situations where it is worth-

while to take a longer course around a storm in order to reduce weather resistance and fuel consumption, but simply slowing down on the direct route can have a far larger reduction in fuel costs and emissions. From the Kim and Roh study, we calculated that there were no alternate routes that could achieve the expected 3 percent fuel savings that is often claimed for satellite weather routing. But we did calculate that if the ship reduced its speed from 21 to an average of 13.7 kt., there was a 55 percent reduction in fuel costs and related greenhouse gas emissions.

SailTimer Red-Green Maps indicate where the satellite forecast model matches actual wind measurements



from ships. The Red-Green Map provides an intuitive interface that shows whether the weather routing is reliable (green areas) or not (red areas).

The Red-Green Maps evolved from discussion with companies making weather-routing software. We discovered that one of their major problems is that they are selling expensive software, but ship captains often don't trust the satellite weather forecast and, hence, don't trust the weather routing calculations. So, using more accurate data would create more trust, better results and better profits.

Time-series modeling of crowdsourced ship measurements may help to clarify how weather systems are

changing, as ships up ahead continue on their paths. Crowdsourced data from ships may also be a better foundation for machine learning to predict weather than satellite forecasts.

Weather routing companies can use our Red-Green Maps to know the predictive accuracy of satellite weather zones up ahead, calculate different possible speed combinations along the route, and achieve the lowest fuel consumption and emissions. The more crowdsourced measurements there are, the more accurate the estimated arrival time will be, enabling the ship to slow down as much as possible for optimal fuel and emissions management.

Reducing boat speed can produce a dramatically large reduction in fuel costs and emissions. If there is enough time to slow down, fuel consumption can be reduced by up to 55 percent, as we calculated. Greenhouse gas emissions would lower proportionately. If the estimated annual worldwide vessel fuel costs of \$157 billion are reduced by up to 55 percent, simply slowing down has a value across the global industry of \$86 billion annually.

Acknowledgments

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References

For a list of references, contact: CS@sailtimer.co. **ST**

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Monitoring Offshore Wind Operations

Onboard Wireless Connectivity Platform for Personnel Tracking

By Sven-Eric Brooks

As offshore wind farms expand in scale and complexity, so too does the need for efficient, safe, and data-driven operations. Service operation vessels (SOVs), crew transfer vessels (CTVs) and wind turbines must function as a unified ecosystem, yet connectivity challenges have long hindered real-time tracking and data consolidation.

ScanReach's onboard wireless connectivity (OWC) platform is transforming this landscape, enabling seam-

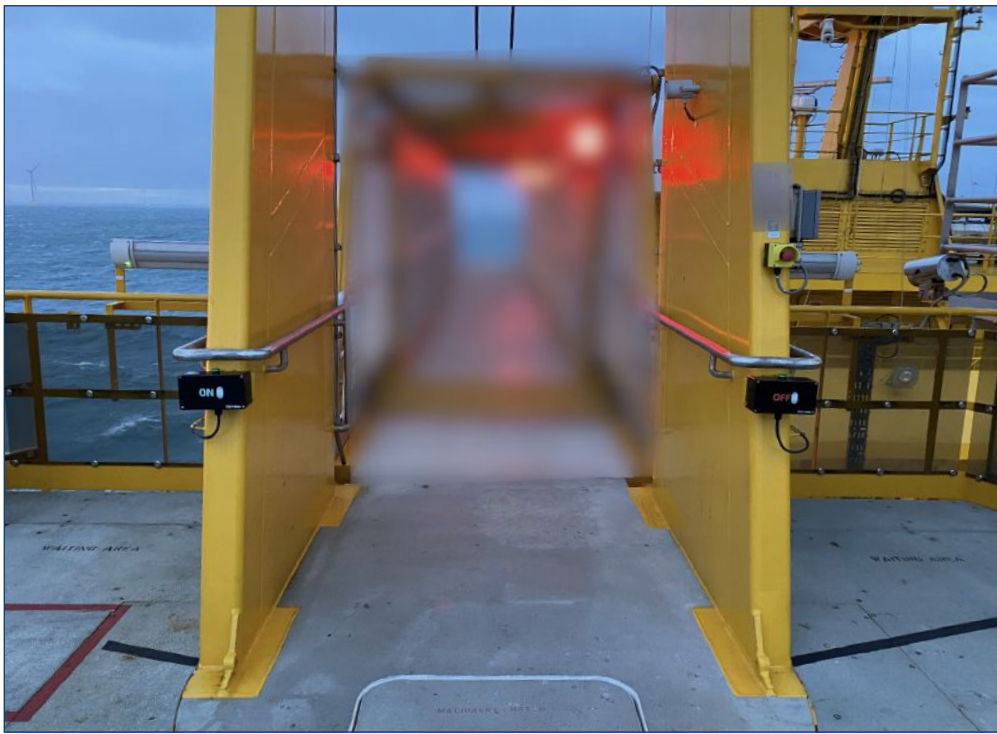
less crew tracking, automatic turbine detection, and gangway data sharing—all on a single, robust wireless network.

Wireless Mesh Network

Maintaining visibility of personnel across multiple offshore assets has historically relied on fragmented systems and manual logs. ScanReach's OWC solves this challenge with a wireless mesh network that integrates ves-



ScanReach's onboard wireless connectivity platform enables seamless crew tracking, automatic turbine detection and gangway data sharing for offshore wind farm operations.



OWC allows for monitoring gangway transfers between vessel and wind turbine.

sels, turbines and offshore platforms, providing real-time tracking without relying on external infrastructure.

OWC integrates multiple data streams across different platforms for a unified operational overview. This technology enables operators to automatically detect turbine transfers. By using GPS correlation, OWC logs every personnel transfer between vessels and turbines, removing the need for manual records. Crew members can be continuously monitored as they move between CTVs, CSOVs and turbines. Wearable smart tags register when personnel cross gangways, enhancing safety and reporting accuracy. These capabilities not only enhance efficiency but also improve safety compliance by ensuring accurate personnel on board (POB) data in real time.

Automatic Turbine Detection: A Game Changer

One of the most impactful features of ScanReach's OWC platform is its automatic turbine detection capability. By leveraging GPS data from the vessel's NMEA node, the system automatically correlates a ship's position with a wind turbine's location, ensuring that drop-off points are logged instantly and accurately.

This innovation significantly reduces administrative workload. Each personnel movement is logged automatically, eliminating the potential for human error while ensuring that all transfers are

accurately recorded. The system produces detailed reports for offshore wind operators, contextualizing walk-to-work transfers and fuel consumption per turbine visit. This level of transparency allows operators to better plan transfers, optimize routes, and reduce unnecessary fuel expenditures.

Furthermore, the combination of turbine detection and crew tracking allows for enhanced safety monitoring. Should an emergency arise, operators can instantly determine where a worker is located—whether the person is still on a vessel or has transferred onto a turbine. This reduces emergency response times and provides instant accountability.

Auto turbine detection is now used by over a quarter of vessels also equipped with ScanReach's ConnectPOB solution, a real-time personnel tracking system designed for offshore wind operations that uses wearable smart tags and a wireless mesh network to provide continuous visibility of crew members across vessels, turbines, and offshore platforms.

Companies already utilizing the auto turbine detection in daily operations include: REM Offshore AS, Olympic Subsea ASA, Norwind Offshore and Purus. It is also in use by vessels operating in more than 10 different wind farms, including Dogger Bank, Kaskasi and Gode Wind.

Gangway Data Sharing: Enhancing Safety, Compliance

Crew movements across gangways represent one of the most critical safety concerns in offshore wind operations. ScanReach's OWC now provides an automated gangway tracking solution, ensuring that every crew member's movements are recorded in real time.

With wearable smart tags, each crossing is automatically logged as personnel transition between a CTV and a wind turbine or an SOV. This eliminates the need for



(Right) ScanReach's wearable smart tag on a wristband. (Below) A screenshot detailing gangway transfers between vessel and wind turbine.



manual check-ins, which are prone to errors and delays. The data are then shared via API with wind farm operators, ensuring complete alignment between vessel operators and turbine maintenance teams.

ScanReach has already demonstrated this capability in real-world applications. On Norwegian offshore vessels servicing oil and gas fields, gangway data were successfully shared between vessels and the platform operator. This seamless data exchange improves logistical planning, enhances compliance with safety regulations, and ensures that offshore operators always have accurate crew status reports at their fingertips.

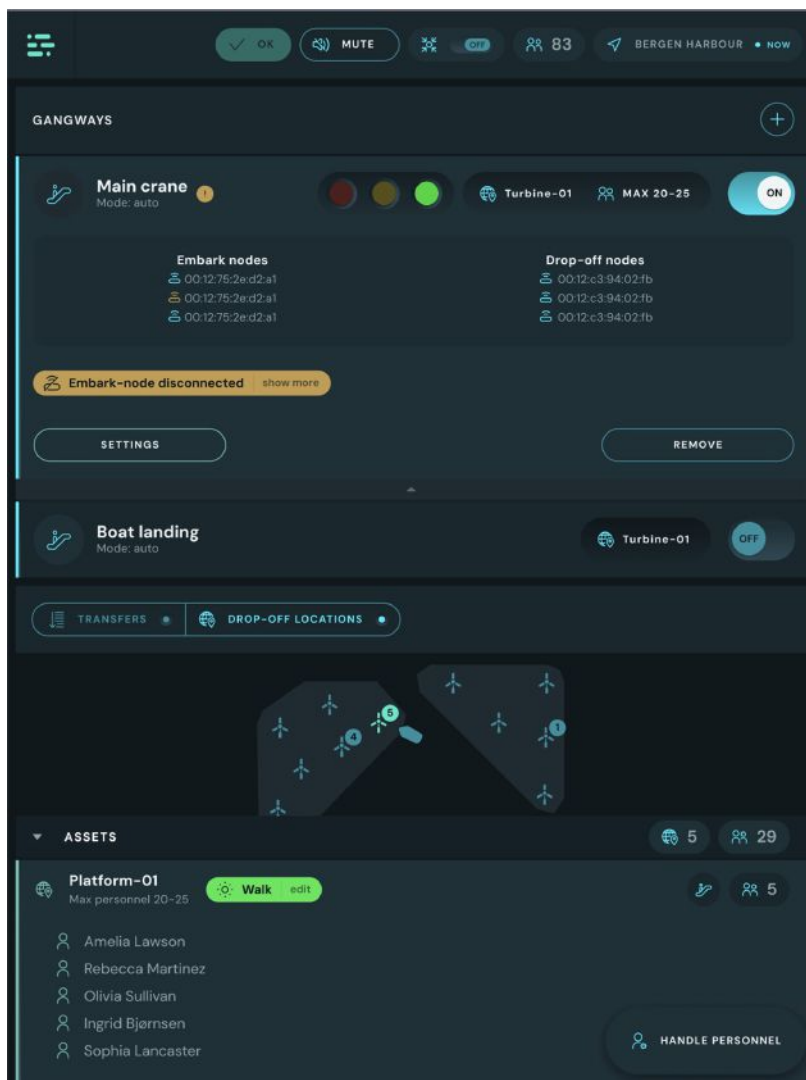
The Future of Offshore Wind Operations

Beyond individual vessels, ScanReach's OWC ex-

tends its capabilities across entire fleets, enabling operators to aggregate data from multiple CTVs, SOVs and wind farms into a single, accessible platform. By consolidating these data, offshore wind operators gain unparalleled visibility into crew transfers, fuel consumption, and vessel activity, allowing for better operational planning and cost reductions.

With OWC, operators are able to monitor vessel performance and crew logistics in real time, optimize fuel usage by analyzing transit times and waiting periods, improve compliance by ensuring that POB data are accurate and readily available, and enhance safety by automating personnel tracking across multiple assets. The ability to correlate crew movement data with environmental conditions also opens the door to further efficiency improvements. For example, by linking motion sensors to OWC's data platform, operators can predict unfavorable sea states and adjust scheduling to minimize seasickness among crew members.

As the offshore wind sector continues to grow, the need for seamless, automated and real-time data integration will only become more critical. ScanReach's OWC platform has been developed through a decade of experience in maritime IoT, and its track record in wind farm logistics, personnel tracking and data consolidation has established ScanReach as a trusted partner for offshore wind operators worldwide. **ST**



Sven-Eric Brooks is the CEO of Scandinavian Reach Technologies AS (ScanReach), the company that developed the breakthrough wireless IoT connectivity network for complex and confined steel environments in the maritime market. Brooks has more than 25 years of experience in the maritime industry, with expertise in navigation systems, smart and connected vessels, autonomous surface ships, and IoT solutions. Prior to joining ScanReach, he worked for KVH Industries, Northrop Grumman Sperry Marine and SAM Electronics in commercial roles.



international

New Investors in OSM Thome

Institutional investors advised by J.P. Morgan Asset Management's Global Transportation Group will acquire a stake in the global ship management company OSM Thome, subject to regulatory approval. The investors will help support the future growth of the business. OSM Thome's founding shareholders, OSM Maritime Partners and Skagerak Holding, will continue as shareholders, resulting in a long-term ownership constellation that ensures both continuity and growth. Existing financial investor funds managed by Oaktree Capital Management LP will fully exit the business in the transaction.

Climate KIC Becomes Independent

Climate KIC is celebrating 15 years of driving transformative climate action and innovation across Europe and beyond. As part of this milestone, the organization is entering a new chapter, transitioning to independence from the European Institute of Innovation and Technology and unveiling a new brand identity.

This new independence allows the organization to expand its global reach, diversify funding sources and scale climate action beyond Europe. Climate KIC is now positioned to act nimbly and forge innovative collaborations that will accelerate systemic change worldwide.

Seabed 2030 Adds Partners

The Nippon Foundation-GEBCO Seabed 2030 Project has a new partnership with the Kenya Marine and Fisheries Research Institute (KMFRRI). KMFRRI will contribute valuable expertise on compilation and collection of existing and new bathymetry data, respectively, furthering the global understanding of the ocean and promoting informed decision making for marine conservation and economic development.

The Seabed 2030 Project has also partnered with Ocean Mapping Training, a provider of specialized training in hydrography and ocean mapping. This collaboration will enhance capacity building efforts, equipping ocean professionals with expertise to support the global mission of mapping the entire seafloor by 2030.

Germany's Energy Transition Outlook

For the first time, DNV has applied its independent Energy Transition Outlook (ETO) model—incorporating the latest technology trends and policy developments—to Germany. The inaugural German ETO report finds that Germany is on track to electrify nearly half of its electricity demand by mid-century, but it will fall short of its 2045 climate neutrality target.

Germany's energy mix will shift dramatically. Imports, which currently make up 70 percent of Germany's primary energy, will fall to 27 percent by 2050. Imported coal and oil will decline by 99 and 79 percent, respectively. By mid-century, natural gas and hydrogen will be equal,

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Emissions are forecast to drop by 89 percent by 2045 and 95 percent by 2050 compared to 1990 levels, leaving policymakers with a challenge to plug the remaining gap.

By 2050, 46 percent of Germany's energy demand will be electrified: more than double today's 19 percent. The electrification is driven by declining cost of new technologies, such as batteries and heat pumps, and policy drivers, such as carbon price. Electricity production is expected to double from today to reach 1,000 TWh by 2050, 90 percent of which will be renewable.

Next Geo Wins Awards

Next Geosolutions, specializing in marine geosciences and offshore construction support services, has been recognized with the EQUITA Award and "Company of the Year" Award at the Subsea Expo Awards 2025.

The EQUITA Award celebrates companies that have demonstrated originality and effectiveness in their operations in the Italian market. Next Geo was honored for the Best Capital Markets Strategy in the Equity Fundraising category. Last May, Next Geo raised €57.5 million, making it the largest IPO in 2024 on the Euronext Growth Milan market.

MacArtney Opens in Dubai

MacArtney Group has opened a new office in Dubai to enhance its presence in India, the Middle East and North Africa. This adds to the 20 strategically situated offices across Asia-Pacific, Europe and the Americas, supported by a dedicated network of distributors.

Kaushal Sinha is the new sales manager for the Dubai office. He will manage daily business activities to develop new and existing clients in the marine, offshore, ocean science, and naval industries.

European Defense Company Launches

In response to Europe's growing maritime security challenges, FLANQ has launched in Germany to provide autonomous defense products. The company offers a comprehensive suite of commercial-off-the-shelf (COTS) USVs, underwater drones, and sensor payloads, powered by FLANQ's proprietary artificial intelligence software and hardware stack.

Saildrone Partners with Palantir

Saildrone has established a partnership with Palantir for maritime security operations. Saildrone will use a range of Palantir products, including the new Warp Speed manufacturing operating system, to support rapid scaling across Saildrone's entire operational spectrum.

The partnership will accelerate the deployment of autonomous systems by developing advanced AI-driven maritime solutions at scale.

USS *Monitor* Conservation Work

The tank that holds the iconic revolving gun turret from the ironclad warship USS *Monitor* has been drained for the first time since 2019 while undergoing conserva-

tion at The Mariners' Museum and Park in Virginia. The primary goal of the conservation treatment is to remove corrosion-inducing ocean salts before the artifact can be dried and put on display.

The turret was the first of its kind to be used in combat. The 115-ton revolving gun turret represents a major technological advancement that changed the course of naval warfare.

The turret spent nearly 140 years on the ocean floor after the ironclad tragically sank in a storm off Cape Hatteras, North Carolina, in 1862.

The warship's wreckage was discovered in 1973 and designated as the first U.S. national marine sanctuary in 1975 under the management of NOAA. In 1987, The Mariners' Museum and Park was selected by NOAA to be the principal repository for materials recovered from the wreck.

The turret was raised from the Atlantic Ocean in August 2002, through the collective expertise of divers, archaeologists, engineers, the U.S. Navy, NOAA, Mariners' personnel and others. The massive artifact was transferred to The Mariners' via barge, launching a conservation journey that continues today.

Geotechnical Project off Trinidad

TDI-Brooks has completed a third-party geotechnical coring project for Geohidra. It was conducted from the Dragon field to the Hibiscus platform off the coast of Venezuela and Trinidad, aboard the *Dona Jose II*. TDI-Brooks performed 18 cone penetration tests (CPTs) using its Neptune 3,000 miniature coiled rod CPT system in water depths of 130 to 150 m, plus 18 box core samples.

Greensea IQ Expands in Florida

Greensea IQ, a subsea robotics and autonomous solutions provider, has expanded its EverClean hull maintenance operations with a new facility in Hialeah, Florida, and a new service center in Miami. This expansion will service the Ports of Miami and Everglades as the company grows its presence in the Caribbean market.

The new facility in Hialeah will house office and workshop space. The Miami location will accommodate an expanded EverClean support team dedicated to servicing customers in the region, providing ship operators with an efficient and environmentally responsible hull maintenance solution.

Investment in SIDUS

Industrial Device Investments (IDI) has invested in SIDUS Solutions. SIDUS designs, services, and manufactures complete, integrated security and surveillance solutions for marine, defense, and subsea applications. Leonard Pool will remain SIDUS's president while IDI seeks to build infrastructure and continued growth.

Kraken to Acquire 3D at Depth

Kraken Robotics Inc. has signed an agreement to acquire all the shares of 3D at Depth, a specialist in high-resolution LiDAR imaging and measurements. This is expected to create a strong R&D feedback loop. **ST**

AGU Urges Commitment to Climate Science

AGU, home to the world's largest community of climate scientists, urges the Trump Administration to immediately renew U.S. federal commitment to climate science, including the restoration of data, personnel, grants and collaborations. The U.S. must restore critical climate science leadership for a secure, prosperous future for the country and the world, AGU says.

President Trump has signaled an aggressive retreat from climate science commitments since the start of his second term, retracting clean energy programs and announcing imminent withdrawal from the Paris Agreement under the United Nations Framework Convention on Climate Change and other international climate agreements. The new administration has removed mentions of climate change from government websites, targeted grants that mention climate, instructed NOAA to identify all climate-related grants, and directed staff cuts at NOAA.

The administration has also pulled U.S. participation in the Intergovernmental Panel on Climate Change (IPCC). The IPCC is a massive organizational effort by leading scientists worldwide to assess the state of global warming and its impacts. U.S. researchers typically serve as a large proportion of the authors.

Further global warming increases the risk of reaching climate tipping points, which are critical thresholds beyond which a system reorganizes, often abruptly and irreversibly, such as ice sheet collapse and rainforest dieback, according to AGU. Ignoring warming trends threatens food, water, and energy security, risking costly social and environmental disruption, AGU says.

Lawsuit Against Offshore Drilling Access

Groups concerned about the threats from offshore drilling have filed environmental legal challenges against the Trump Administration's attempt to open nearly the entire Arctic Ocean to drilling.

One group is challenging an order by President Trump to revoke former President Biden's withdrawal of vulnerable areas of the ocean from future oil and gas leasing.

Another set of groups is asking a court to reinstate a federal court ruling that invalidated an attempt by the first Trump Administration to undo Obama-era offshore protections.

Both cases have been filed in the U.S. District Court for the District of Alaska.

In the new case, Earthjustice is representing Oceana, the Center for Biological Diversity, the Surfrider Foundation, Greenpeace, Healthy Gulf, Northern Alaska Environmental Center, Alaska Wilderness League and Turtle Island Restoration Network. Plaintiffs Sierra Club and the Natural Resources Defense Council are each representing themselves.

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The plaintiffs in the related litigation to reinstate protections for the Arctic Ocean and parts of the Atlantic Ocean include: the League of Conservation Voters, Defenders of Wildlife, Natural Resources Defense Council, Sierra Club, Center for Biological Diversity, Northern Alaska Environmental Center, Greenpeace and Alaska Wilderness League. These groups are represented by Earthjustice and the Natural Resources Defense Council.

Greenlight for Deepwater Oil, Gas Ports

The U.S. Department of Transportation's Maritime Administration (MARAD) has issued the Texas GulfLink LLC (TGL) record of decision to Sentinel Midstream LLC, which will own, construct and operate a deepwater port for the export of domestically produced crude oil.

MARAD and the U.S. Coast Guard received an application from TGL in 2019 for a license to construct, own and operate this proposed port.

The deepwater port will be located approximately 26.6 nautical mi. off the coast of Brazoria County, Texas, and will establish a shoreside support facility at an operational commercial site within Freeport Harbor. The project will also utilize dock space at the Port Freeport Public Docks located in Freeport, Texas.

MARAD has also issued a license authorizing Delfin LNG LLC to own, construct, operate and eventually decommission a deepwater port to export LNG from the U.S. The Delfin deepwater port facility will transport LNG to the global market from federal waters, approximately 37.4 to 40.8 nautical mi. off the coast of Cameron Parish, Louisiana.

License Application for Tidal Energy Project

ORPC has filed a draft pilot license application with the U.S. Federal Energy Regulatory Commission to develop the East Foreland Tidal Energy Project in Cook Inlet, Alaska, which ORPC has deemed as the site with the highest potential for tidal energy development in the U.S.

ORPC proposes to deploy its TidGen technology and the Proteus Marine Renewable's AR Series tidal turbine technology for the project.

US Senate Passes USCG Reauthorization Act

The U.S. Senate has unanimously passed the bipartisan Coast Guard Reauthorization Act of 2025 that would reauthorize \$30.45 billion for the U.S. Coast Guard (USCG) for fiscal years 2025 and 2026. The bill has headed to the House of Representatives for consideration.

The bill includes: increased authorized funding by 30 percent, compared to 2024 appropriated funding levels, to finance polar icebreakers, heavy-weather lifeboats, and other priority acquisition programs; required analysis of projected traffic in the Bering Strait; a required plan to increase international training opportunities in the Pacific, including with the Taiwan Coast Guard, to strengthen American relations, combat illegal fishing, and boost international security in the Pacific; and improved oversight of derelict and abandoned vessels, including a new federal penalty for abandoning vessels. **ST**

offshore oil & ocean engineering

OSVs for Africa Oil Company

The Singapore shipbuilder Strategic Marine has commissioned a series of three new offshore supply vessels (OSVs) with a maximum speed of over 53 kt. They will be the fastest of their kind in the world.

Each vessel will be powered by four 16-cylinder mtu Series 2000M72 engines from Rolls-Royce. The vessels will be used by a national oil company in Africa for passenger transfer to offshore platforms and FPSOs.

To enable fast and safe passenger transfer to offshore platforms, the 35-m-long vessels have been designed as "surface effect ships" that use air-cushion technology in a catamaran hull form. This is the first time the design has been used for the offshore oil and gas industry.

The boats have an optimized power-to-weight ratio and use powerful fans to generate an air cushion between the hulls that minimizes hull drag and resistance. Combined with the mtu propulsion package (each delivering 5,760 kW of power), the vessels can travel at much higher speeds than conventional monohulls and catamarans, with consumption remaining at the same level per hour of operation. The high speed ensures shorter transit times, and the low hull resistance saves fuel and reduces emissions.

Oceanengineering Orders AHRS

Oceanengineering has ordered a minimum of 100 units of Exail's new Octans 9 attitude heading referencing systems (AHRS).

The Exail Octans 9 systems will be integrated into a variety of offshore applications, including high-specification offshore field support vessel navigation suites, deepwater drillship remotely operated survey positioning systems, dynamic positioning platforms and general USBL positioning systems.

Load-Out of Wind-Powered Offshore Gas Platform

The N05-A platform is the first offshore gas platform in the Dutch

North Sea to be powered entirely by wind power, harnessing electricity via cable from the nearby 113.4-MW Riffgat offshore wind farm.

The platform is part of the GEMS (Gateway to the Ems) project, developing field N05-A and other fields in the area, situated in the waters on the border of Netherlands and Germany. The electrification of the N05-A platform is expected to reduce carbon emissions by more than 85 percent throughout the project's duration.

Mammoet was approached by HSM Offshore to support the load-out of the 3,050-t N05-A topside and 3,150-t jacket at HSM's quayside fabrication facility in Rotterdam. Mammoet's scope for the project was to successfully load-out both components onto a barge for shipping to sea.

Offshore sailing and installation were managed by ONE-Dyas, the owner of the platform.

Mammoet's engineering approach enabled the jacket to be assembled more efficiently, close to its installation location, and reduced the lead time for construction.

Seismic Surveys off Nigeria

TDI-Brooks has secured a contract with Compass Survey Ltd. to conduct a series of 2D ultra-high-resolution seismic site surveys and pipeline route assessments for SPDC offshore Nigeria.

The scope involves the acquisition of conventional geophysical data and high-resolution seismic imaging to assess potential hazards, ensuring safe well site clearances and optimal pipeline route planning.

Shell Penguins FPSO

Fulkrum, a specialist in inspection, expediting, auditing and technical staffing services, has successfully completed its vendor surveillance work for Shell's pioneering Penguins project. The contract spanned five years, and the project has now reached the production stage.

Fulkrum played a key role in ensuring the quality and compliance of equipment manufactured for the project, conducting extensive vendor surveillance across multiple locations.

With numerous vendor visits over the years, Fulkrum's expert team worked closely with suppliers to uphold the highest industry standards, ensuring that all equipment met the strict requirements necessary for Shell's first new operated facility in the U.K. North Sea in more than 20 years.

The Penguins FPSO is one of the most advanced platforms of its kind. It is expected to produce up to 45,000 barrels of oil equivalent per day at peak production and provide enough natural gas to heat approximately 700,000 U.K. homes annually. The new FPSO will have around 30 percent lower operational emissions compared to its predecessor, Brent Charlie.

Wellhead Installation off India

Dutch contractor and consultant Marine Masters is set to install two offshore wellhead platforms in the Gulf of Kutch, India, for India's second largest private oil producer, SunPetro. The greenfield Bhasker A and B platforms have been designed and constructed by SunPetro.

Marine Masters will deploy the 1,400-ton crane barge Conquest MB1 to lift the 800-ton jackets. The company's scope includes engineering, lifting, and mooring preparation, execution, installation, and more.

The project is managed by the main installation contractor ACE Pipeline and overseen by CSS.

SCRs Reduce NOx on Carrier

Damen Shipyards Group has installed a series of selective catalytic reduction systems (SCRs) on Van Oord's *Nexus*, a Damen Offshore Carrier 8500 delivered in 2014.

The 122.68-by-27.45-m vessel undertakes cable laying operations, principally in the offshore wind sector. With the SCRs installed, Van Oord has reduced the NOx emissions of its vessel by up to 80 percent. **ST**

environmental monitoring

Field Testing Red Tide Tech

Mote Marine Laboratory and partners have successfully conducted the first-ever field test deployment of two Florida Red Tide Mitigation and Technology Development Initiative products and technologies to an active red tide bloom.

The two products, Mote's CLEAR and Heartland Energy Group's Xtreme, which have completed rigorous laboratory testing and received regulatory approvals, were deployed by Mote scientists in collaboration with Heartland Energy Group and A-C-T Environmental & Infrastructure in select canals during an active bloom in Venice. These advancements mark a historic step forward in the fight against impacts of red tide blooms (*Karenia brevis*) in Florida's coastal waters.

Post-deployment analysis of both products demonstrated significant reductions of *K. brevis* cells, as ex-

pected based on years of successful large-scale multi-species mesocosm laboratory testing.

CLEAR, a natural biocide designed to target *K. brevis*, was applied through a boat-dispersed liquid treatment targeting the mid-depth of the water column. Xtreme, another liquid treatment solution, was applied using the same specialized sprayer system from a boat, optimizing its distribution.

This innovative research represents a critical milestone in applying science-based solutions to mitigate the devastating ecological and economic impacts of red tide.

Florida red tides, or red tide harmful algal blooms, are a higher-than-normal concentration of microscopic algae that occur in ocean and coastal waters. Red tides can harm sea life, for example, by leading to massive fish kills; cause human respiratory problems and

beach closings; and impact the fishing, restaurant, recreational, and tourism industries.

To address this challenge, in 2019, Mote partnered with the State of Florida through the Florida Fish and Wildlife Conservation Commission to establish the Florida Red Tide Mitigation and Technology Development Initiative. This is an independent and coordinated effort among public and private research entities to develop prevention, control, and mitigation technologies and approaches that will decrease the impacts of Florida red tide.

The initiative has funded more than 50 external partners, supported more than 40 projects, and evaluated hundreds of potential mitigation compounds and technologies. Three of these innovations have progressed to field deployment testing, marking a critical phase toward large-scale application.

Scientists will closely monitor the deployment sites to collect data on water quality, marine life impact and red tide concentration changes.

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Findings will be shared with state agencies, environmental partners and the public.

Proposal to Protect Neris River

Scientists from Vilnius University in Lithuania are advocating for the protection of one of Europe's last free-flowing rivers, the Neris.

The Neris River, which runs between Vilnius and Kaunas, is facing potential modifications to accommodate human navigation, including deepening and dredging.

Researchers warn that such interventions could disrupt the river's natural ecosystem, affecting water quality, biodiversity and Lithuania's compliance with EU environmental commitments.

The researchers are responding to plans by Lithuania's Inland Waterways Directorate to revive navigation on the river between Vilnius and Kaunas. The researchers call for the removal of the Neris from Lithuania's list of operated inland waterways of national importance in order to preserve the river's natural state and limit recreational use in urban areas.

This debate over the Neris reflects broader discussions across Europe on balancing economic development with environmental responsibility. With the EU aiming to restore 25,000 km of rivers by 2030 under the Nature Restoration Law, the case of the Neris highlights the challenges and opportunities in safeguarding natural waterways. The scientists' recommendations align with Europe's green policies and could serve as a model for other regions navigating similar decisions.

Saildrone Starts Mapping Florida Seafloor

Saildrone has launched two of its larger Voyager USVs from its facility in St. Petersburg, Florida, to begin a portion of the Florida Seafloor Mapping Initiative, a multi-year effort to survey the state's coastal waters within the continental shelf.

At 2,170 km long, Florida's coastline is second only to Alaska among U.S. states. Many parts of the Florida coast remain unsurveyed, and existing nautical charts rely on out-

dated and low-resolution data.

The data collected will be used to: update coastal maps and navigational charts, provide information for emergency responders, aid in flood risk mapping and coastal resilience efforts, provide data for scientific research, and other purposes.

UN Water Report

The United Nations World Water Development Report 2025 has revealed that climate disruption,

biodiversity loss, and unsustainable activities are transforming mountain environments at an unprecedented rate. Mountains provide up to 60 percent of the world's annual freshwater flows. More than 1 billion people live in mountainous regions, and more than 2 billion directly rely on water from mountains for drinking, sanitation, and livelihoods. Water security worldwide must be strengthened via science, policy and action, the UN said. **ST**

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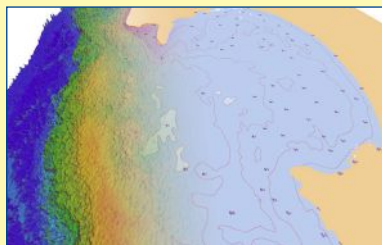


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Shallow-Water Satellite Charts



Shallow coastal zones are where most ship groundings occur, and they are also where the most inaccurate and outdated information on official nautical charts resides. Satellite reconnaissance charts supplement official marine navigation maps in shallow waters. These digital maps are derived from recently acquired satellite imagery, adhering to International Hydrographic Organization S-57 and S-100 data model standards with the same appearance and symbology as official navigation aids. TCarta Marine.

Ultrahigh-Definition Camera

OPT-25UHD Mini-OceanCam PTZ camera is a pan-tilt-zoom camera for underwater exploration and research. It captures 1080-p HDTV at up to 50/60 frames per second or 4K video at 30 fps, ensuring crystal-clear footage of fast-moving subjects with minimal noise and motion blur. The housing stands 9 in. high with a 5-in. diameter. AI enables precise subject tracking for marine biology, environmental monitoring and underwater research. You can manage multiple cameras effortlessly via LAN connections. Ocean Presence Technologies.

North America Charts Update

This comprehensive update includes the latest NOAA ENC navigation data; improved satellite imagery for the coastal areas in Seattle, Texas, Louisiana, and the East Coast; and improved shaded relief and high-resolution bathymetry across the Florida Keys, Gulf Coast, Chesapeake Bay, the Great

Lakes, and 264 water bodies across 16 states. C-MAP.

Stern Tube Lubricant

BioStat ST is a stern tube oil range for use in stern tubes, CPP systems and stabilizers. It is based on selected synthetic esters and an optimized performance additive system. The lubricant provides lubrication, corrosion protection, good oxidation performance and hydrolytic stability. Castrol Ltd.

Commissioning Service Op Vessel



Featuring the innovative TWIN X-STERN design, the Yno 320 CSOV is equipped with advanced technology, such as a 3D-compensated crane and a walk-to-work gangway, ensuring safe and efficient personnel and cargo transfer to offshore wind turbine facilities. Its diesel-electric propulsion system and substantial battery energy storage significantly reduce its environmental footprint and prepare it for methanol as fuel. The CSOV supports the offshore wind industry. Ulstein Verft.

Anti-Corrosive Fan

By using advanced brushless DC technology, the EMEC Marine Fan delivers exceptional energy efficiency while keeping noise levels low. Available in 250 and 315 mm, the fan provides air volume flow rates of up to 0.658 m³/s and can reach static pressures of 683 Pa. The motor carries an IP56 protection rating and is powered by a 24-V DC supply, making it ideal to resist corrosive environments while per-

forming reliably in temperatures up to 40° C. Elta.

Methanol-Ready Engines

DNV-approved, the retrofitable QSK60 IMO II and IMO III engines, available from 2,000 to 2,700 hp, are a methanol dual-fuel solution for the global marine market. These kits are suited for diesel-electric systems that can be integrated with a battery, optimizing efficiency and sustainability. Cummins Inc.

Uninterruptible Navigation

SAL SPU-200 is an anti-jamming and anti-spoofing solution designed to safeguard vessel operations for commercial and government clients. It maintains GNSS integrity where traditional systems fail and provides precise, uninterrupted positioning, speeds, heading, and rate of turn, ensuring vessels stay on course. SAL Navigation AB.

Air Cavity System



Damen's ACS has demonstrated its fuel-saving credentials during an independent verification by Lloyd's Register. This air lubrication technology maintains a thin layer of air over the flat bottom of the vessel's hull, lowering resistance in the water and, thereby, fuel consumption. Damen Shipyards Group.

Corrosion Protection

SeaShield Series 2000HD, a cutting-edge anti-corrosion protection system to safeguard marine structures in challenging coastal and offshore environments, combines petrolatum tape technology with a robust HDPE outer cover. It encapsulates and protects various marine structures, including dock piles, riser pipes, and exposed piping in splash and intertidal zones. Denso Inc.

Acoustic Multi-Spectrum Source

AquaStack AMS, part of the AquaPulse series for seismic, sub-bot-

tom, and 3DUHR survey applications, enables operators to switch the output spectrum on the fly. This revolutionary capability enables users to select a lower frequency mode for deeper penetration when surveying challenging geologic formations or a standard frequency for higher resolution imaging—all from a single, versatile source. Falmouth Scientific Inc.

Positioning Firmware Upgrade

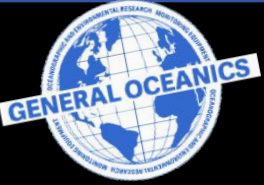
Whether you are using an attitude and heading reference system or INS version, the New Ellipse is a simple and free firmware upgrade that will transform your trusted hardware into a more accurate, reliable, and versatile solution. Powered by the latest generation sensor fusion algorithm, it enhances navigation, attitude, and heave performance, which ensures stable and accurate positioning even in high-dynamic environments and challenging conditions. The New Ellipse introduces advanced GNSS-denied capabilities. SBG Systems.

Motor Controller

The D-FIN electronic speed controller and motor controller device is engineered for efficiency, compactness, and precision for brushless permanent magnet DC motors and thrusters. It can fit into the smallest robotic vehicles and can be stacked on a proprietary backplane to optimize space constraints and reduce cabling. Multiple digital interfaces provide flexibility for system integration. Hydromea.

3D Marine Data Management

Hydrophis is a platform to host marine data. Georeferenced 3D photogrammetry and real-time data integration enables visualization of the seabed in detail, tracking of environmental changes over time, and overlay of multiple data sources, including bathymetry, ecological surveys, and structural assessments. Hydrophis provides AI-powered analysis, time-based comparisons and millimeter-precision 3D models to streamline decision making. Tritonia Scientific Ltd. **ST**



General Oceanics, Inc. introduces its new 2nd Generation model 8060 autonomous pCO₂ monitoring system.

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- Efficient continuous equilibration of sea surface water
- High accuracy Infrared analysis of CO₂ with a Licor 7815
- Automatic calibration for long-term deployment
- Autonomous operation; minimal user intervention
- Flexible integration with other oceanographic sensors
- User-friendly interface: intuitive software for data collection
- Robust design for marine environment and long-term deployment
- Onboard laptop computer



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contracts

Valmet, Espoo, Finland, has received an order for a marine methanol fuel automation control system for two cable-laying vessels from a value-added reseller partner. The vessels will be built in the China Merchants Heavy Industry (Jiangsu) shipyard for Jan De Nul. China Merchants Industry Digital Technology Co. Ltd.

Wärtsilä Gas Solutions, Asker, Norway, will supply the cargo handling systems for three 45,000 m³ capacity gas carrier vessels being built in Korea. Two of the ships have been contracted by Singapore- and Hong Kong-headquartered ship owner/operator Purus, and the third by Pasco Gas, based in Istanbul, Turkey. Hyundai Mipo Dockyard.

MacGregor, part of Cargotec, Helsinki, Finland, has been awarded a contract to deliver a 100T AHC crane for a dive support vessel. The crane delivery to the Guangzhou Salvage shipyard is scheduled in the second quarter of 2026, with vessel delivery later that year. Jana Marine Service Co.

Chantiers de l'Atlantique, Saint-Nazaire, France, has entered a collaborative agreement with a global provider of maritime software and digital services to enhance the efficiency of its hull design process by co-developing advanced 3D software and digital workflows. NAPA.

Telesat, Ottawa, Canada, has signed a term sheet for Telesat Lightspeed low Earth orbit (LEO) connectivity services. Space Norway plans to integrate a multi-Gbps Telesat Lightspeed capacity pool into its services portfolio to provide secure, low-latency connectivity services for its defense, enterprise, maritime and land customers. Space Norway.

VideoRay, Pottstown, Pennsylvania, a BlueHalo company, has been awarded a five-year contract to provide systems engineering and support services for Mission Specialist

Defender systems, the Maritime Expeditionary Standoff Response ROV. Naval Information Warfare Center Pacific. **ST**

meetings

JUNE

June 1-6—Aerospace Medical Association & Undersea and Hyperbaric Medical Society Annual Scientific Meeting, Atlanta, Georgia. <https://asma-uhms-asm.org>.

June 2-5—Capitol Hill Ocean Week, Washington, D.C., and virtual. <https://marine-sanctuary.org/chow-2025>.

June 3—Offshore CCS & Emerging Technologies Symposium, Houston, Texas. www.noia.org.

June 10-12—Seawork, Southampton, U.K. www.seawork.com.

June 11-12—European Wind Blade Recycling Summit, Berlin, Germany. www.wplgroup.com/aci/event/european-wind-blade-recycling-summit.

June 16-19—OCEANS 2025 Brest, Brest, France. <https://brest25.oceansconference.org>.

June 19-20—East Med Maritime Conference, Athens, Greece. <https://emmc.me>.

June 24-26—Electric & Hybrid Marine Expo, Amsterdam, Netherlands. www.electricandhybrid-marine-world-expo.com/en.

SEPTEMBER

September 10-11—Digitalisation in Shipping: Europe Summit, Rotterdam, Netherlands. www.wplgroup.com/aci/event/digitalisation-in-shipping-europe.

September 10-11—International Antifouling Conference, Gothenburg, Sweden. <https://international-antifouling-conference.confetti.events>.

September 10-12—INMEX SMM India, Mumbai, India. www.inmex-smm-india.com.

September 15-19—London International Shipping Week, London, U.K. www.LISW.com.

September 24-25—European Carbon Dioxide Utilisation Summit, Antwerp, Belgium. www.wplgroup.com/aci/event/co2.

September 26—The Maritime Standard Transportation and Climate Change Conference, Abu Dhabi, United Arab Emirates. <https://tmstaccc.com>.

September 29-October 2—OCEANS 2025 Great Lakes, Chicago, Illinois. <https://greatlakes25.oceansconference.org>.

OCTOBER

October 6-8—AAPA Annual Convention, Québec City, Canada. <https://aapa.getregistered.net/2025-annual-convention>.

October 7-9—International Boat Builders' Exhibition and Conference, Tampa, Florida. www.ibexshow.com.

October 15-16—Decarbonisation in Shipping: Europe, Hamburg, Germany. www.wplgroup.com/aci/event/decarbonisation-ship-ping-europe.

October 22-24—WISTA International AGM & Conference, Barcelona, Spain. <https://wistainternational.com>.

NOVEMBER

November 4-6—Deepwater Operations and Topsides, Platforms & Hulls Conference and Exhibition, Galveston, Texas. www.offshore-event.com.

November 4-6—Sustainable Ocean Summit and Global Blue Finance Summit, Barcelona, Spain. www.oceancouncil.org.

For more industry meetings, visit sea-technology.com/meetings. **ST**

HII Opens VR Welding Lab

HII's Ingalls Shipbuilding division has opened a virtual reality (VR) welding lab at its shipyard in Mississippi. The new facility makes it easier and safer for welders to hone their skills, and it enhances HII's ability to grow the number of proficient shipbuilders with this essential skillset.

Working with the U.S. Navy and regional workforce partners, this new facility integrates VR technology into the shipyard's existing welder certification curriculum, providing new and current Ingalls shipbuilders with an immersive, hands-on experience to develop critical shipbuilding skills.

The establishment of the VR welding lab is part of Ingalls Shipbuilding's broader workforce development efforts, made possible through federal and state partnerships that are bringing cutting-edge training technology to the shipbuilding industry.

New Range of Naval Support Vessels

Damen Shipyards Group has introduced a new range of naval support vessels. The Logistics Support Ship (LSS) series will play an important role in extending the operational reach of naval forces, enabling sustained deployment and enhancing logistical support capabilities in a cost-effective manner.

The LSS range consists of two vessel types, the LSS 9000 and LSS 11000, 127 and 140 m in length, respectively. Damen has designed the vessels to meet the diverse needs of the modern navy.

The vessels will be equipped with NATO-standard replenishment-at-sea technology, RoRo capabilities and substantial cargo transportation capacity. They will be installed with modern navigation and communication systems to ensure safe and efficient operation. Advanced propulsion systems will reduce fuel consumption and emissions.

Riverine Vessels for Kenya Navy

Tuco Marine has sold ProZero Riverine vessels to the Kenya Navy. This follows the recent sale of two ProZero vessels to the Ghana Navy.

With this new sale, Tuco expands its presence in East Africa and contributes to the modernization of the Kenya Navy's fleet. The ProZero Riverine vessels are designed to operate under demanding conditions and meet specific requirements for rapid and efficient operations in shallow rivers and coastal areas. The vessels are equipped with the Swamp Shark Drive, built to absorb shocks without damaging the gearbox or drive system.

AASB Delivery for US Marine Corps, Navy

Silver Ships has completed, tested and delivered a new assault amphibian safety boat (AASB) for the U.S. Marine Corps and the U.S. Navy.

Silver Ships has now delivered 25 of 31 AASBs on schedule. The AASB is used for the U.S. Marine Corps amphibious training with amphibious assault vehicles and the follow-on amphibious combat vehicles in the continental United States and overseas. The vessels can carry 28 passengers and have tailored communications, safety, and rescue equipment to support offshore and night-time operations. AASBs feature a 2-ft. draft that enables quiet navigation through shallow waters.

Collaboration on Frigates for Norway

Thyssenkrupp Marine Systems and Ulstein Verft have signed a letter of intent for joint efforts to deliver the next advanced frigates to the Royal Norwegian Navy.

Norway's 2024 Fleet Plan outlines the acquisition of five or six frigates to replace the *Fridtjof Nansen*-class frigates. Potential candidates include the British Type 26, the German F127, the American *Constellation*-class and the French FDI.

MCM Vessels for Belgium, Netherlands

The *Vlissingen*, the second of the series of mine countermeasures (MCM) vessels of the Belgian-Dutch rMCM program, first intended for the Royal Netherlands Navy, has begun sea trials in France. Delivery is expected at the end of 2025. The rMCM program is led by Belgium Naval & Robotics, a consortium of Naval Group and Ex-ail, involving Kership (a joint venture between Piriou and Naval Group) as industrial prime contractor. Eight ships are under construction. All 12 vessels ordered within the frame of the rMCM program will be delivered before the end of 2030. **ST**

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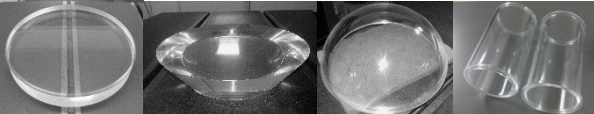
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Making the Business Case for EO-Based Ocean Surveillance—Dr. Jonathan Williams

Dr. Jonathan Williams is the CEO of MSE International, which he founded in 2005. The company has become a catalyst for business-led investment in innovation across the blue economy. MSE is internationally recognized as a leading European marine cluster organization. Williams's role at MSE includes consortium building, securing investment and technology commercialization planning.



There are growing demands for ocean surveillance and environmental monitoring using Earth observation (EO) technologies for the purposes of compliance, consenting and/or operational efficiency. A new project aims to exploit the expanding European capabilities in both Earth observation and marine monitoring technologies to build solutions for these evolving market needs.

The project will look at the industry sectors of renewable energy, ports and infrastructure, fisheries and aquaculture, tourism, emerging pollutants, and others. It will cover the Atlantic Ocean Basin area, which is the second largest ocean basin in the world, spanning about 20 percent of the Earth's surface.

The project is being funded by the European Space Agency (ESA) within its Atlantic Regional Initiative and is being led by MSE International, a maritime industry consortium with a focus on the blue economy.

There are three broad domains of EO technology that the project addresses. One is sensors: traditional satellite imaging and detection devices, as well as advanced in-situ sensors such as multibeam echosounders. Another is platforms, including airborne drones, sea surface vessels (both crewed and autonomous), underwater vehicles, and satellites. A third domain is analytics; this covers a broad, generic

set of technologies, including data fusion and artificial intelligence/machine learning (AI/ML) analytics that use data from easily accessible EO-based maritime services, such as the Copernicus Marine Environment Monitoring Service (CMEMS), as well as more fundamental analytical tools and models.

The primary goal of the project is to kick-start innovation that fills capability gaps and presents opportunities for organizations that serve the marine surveillance and monitoring market. Collaboration between expert organizations and target users will be intrinsic to these activities, building on leading-edge capabilities and exploiting novel data streams and services.

Innovation clusters play a crucial role in building such international partnerships and in mobilizing initiatives that can greatly enhance cross-sector solutions. In collaboration with these clusters, this project will create a framework that enables acceleration of innovative EO-based application developments in order to utilize the world-leading expertise that exists within Europe's Atlantic Ocean region.

The project is currently identifying the market and innovation needs to target and mapping centers of expertise alongside current innovation projects within Atlantic cluster organizations. This process will identify possible synergies with space agencies outside of Europe, including those in the Americas, Asia, and Africa, and funding bodies, such as development banks, that are interested in projects to build and demonstrate novel EO-based solutions.

Such solutions are becoming increasingly vital in the global push toward sustainability, for example, in terms of carbon accounting; impact monitoring, such as from offshore wind farm developments; and nature-based solutions, including for coastal protection and the man-

agement of marine protected areas. The integration of Earth observation and drone solutions could offer wide spatial coverage at relatively low cost, as well as fine-resolution results for accurate and detailed characterization.

The blue economy depends on accurate metocean forecasting in order to plan effectively for marine industry operations, such as offshore renewable construction and maintenance. Metocean forecasting is also vital in order to optimize wave and tidal energy devices and to provide the forcing data sets needed for modeling pollution in coastal waters and the forecasting of spill trajectories.

The main stakeholder engagement phase of the project kicked off at the International Symposium for Remote Sensing of Environment (ISRSE-40) at Farnborough, U.K., in March 2025. This summer, MSE will be developing business-led consortia that share a common interest in novel solutions in the three priority domains.

Progress will be shared with ESA to explore opportunities for attracting investment in solution development and scaling. Organizations potentially interested in participating in these actions are invited to register their interest with MSE International.

Through extensive stakeholder and user engagement, the project aims to put together the case for investment, supported by an evidence base of technological advances and policy development impacts. The project will interact with businesses, research centers and public authorities to collaborate on market development.

If you'd like to learn more about the project, including events and workshops, you may sign up for the MSE International Surveillance, Earth Observation Interest Group at: https://mseinternational.org/interest_groups/surveillance. **ST**

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