

UNDERWATER R·O·B·O·T·I·C·S



ISSUE

14



VORTEX

Survey Arms

Vortex Subsea Solutions introduces their 4 function Vortex Full Reset (FR) survey arms.

Featuring 4 functions, the arms offer unprecedented flexibility for visual access, especially in scenarios like assessing pipeline free spans where zooming in the camera alone may not suffice.

Vortex strikes a balance between simplicity and practicality, providing pressure-compensated flow controls for the eight arm functions. This allows ROV crews to independently control function speed with depth changes, enhancing the overall versatility of the arm.

The extensive range of movement provided by these arms allows clients to push the boundaries in surveying pipelines, umbilicals, and power cables. To facilitate installation, hydraulic hoses from the arms to the host ROV come pre-assembled. Mobilisation is further simplified with sacrificial mounting plates included for easy attachment to the host ROV.



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Society for Underwater Technology

SOCIETY FOR UNDERWATER TECHNOLOGY

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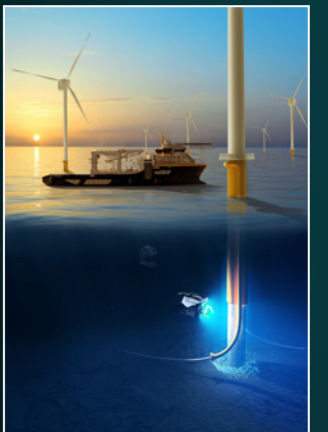
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UNDERWATER R·O·B·O·T·I·C·S



Oceaneering's NEXXUS ROV preparing for intervention in an offshore wind farm

FIVE FALCONS

Underwater Contracting (UCO), already owner of the world's largest fleet of Saab Seaeye Falcon ROVs, has added to its pool through the purchase of five new machines, giving a total of 38 Falcon systems.

The Aberdeen-headquartered company, a leading provider of underwater services to the offshore energy, inspection, construction, and aquaculture markets, expanded its fleet in response to major new multi-year contract wins across all sectors which will see it provide a range of services in Europe, North America and the Middle East.

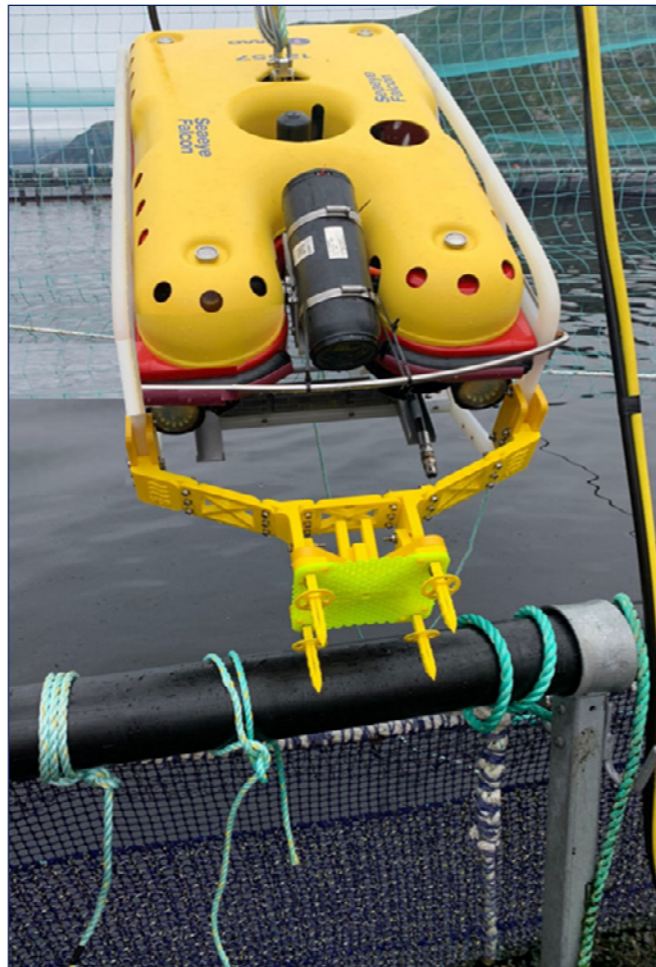
In addition, UCO has made significant investment in additional equipment and now holds a stock of £250,000 dedicated Saab Seaeye Falcon spares and more than £350,000 worth of auxiliary equipment ranging from manipulators to station holding and everything in between.

In 2022, UCO won what is still believed to be one of the largest ROV contracts awarded to the global aquaculture sector.

The multi-million-pound contract represented more than 27,000 ROV days over a five-year period, breaking down to 15 ROVs, working 365 days a year over five years in projects in Europe and North America.

UCO is part of Ocean Marine Group with sister companies Pirie & Smith and ETPM.

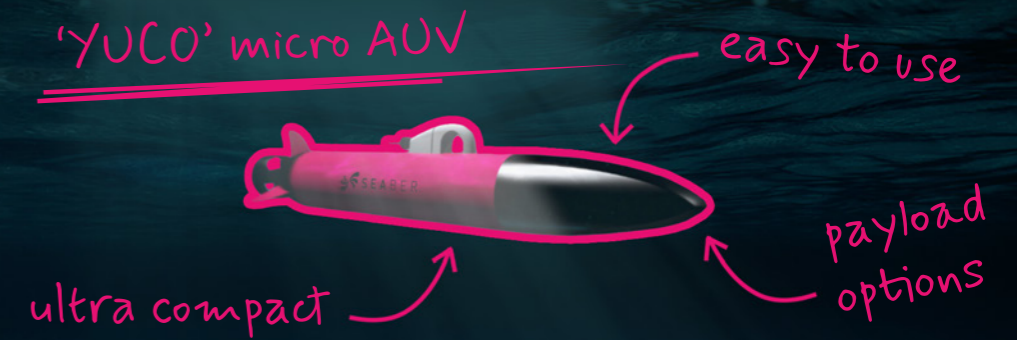
Image: A Saab Seaeye Falcon preparing to deploy the NetFix



FINCANTIERI SAIPEM MOU

Fincantieri and Saipem have signed a Memorandum of Understanding to evaluate commercial and industrial opportunities for cooperation in the field of autonomous subsea vehicles and their integration with surface and underwater units.

The Memorandum is among the initiatives aimed at promoting and developing excellence in the Underwater sector. The agreement aims to enable the two companies to participate in major programmes in the Italian and international markets in the area of surveillance and control of critical underwater infrastructure and rescue activities, through the use of specific complementary technologies.



See the SEABER YUCO | Oceanology International 2024 | Stand G501, 12-14 March

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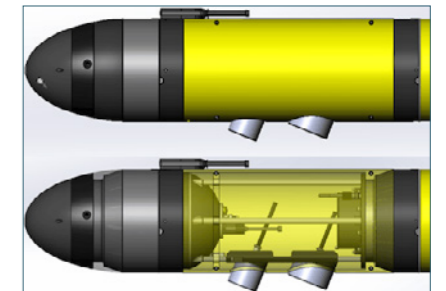
EK80 WBT MINI INTEGRATION FOR SLOCUM GLIDERS

Teledyne Marine and Kongsberg Discovery have made a collaborative effort to integrate the Kongsberg EK80 WBT Mini Scientific echo sounder onto the Teledyne Slocum G3s Glider.

The Kongsberg EK80 WBT Mini is a compact version of the highly efficient Wide Band Transceiver (WBT) used by marine research vessels worldwide. Its compact size and energy-efficient design make it perfect for installation on subsea platforms such as the Slocum Glider.

The combination of these technologies allows for long term data gathering of acoustic target density and dispersal throughout the water column of a specified area.

The Slocum glider-mounted EK80 echo sounder provides a solution for many applications across several fields, including Fisheries Research, Biological Oceanography, Chemical Oceanography, Environmental monitoring, and more.



The EK80 integration on the Slocum houses the WBT Mini electronics in a pressure vessel forward of the glider's buoyancy engine, behind the nose sonar dome.

Two transducers are mounted in a flooded wet bay between this pressure vessel and the glider's forward section. Users are offered frequency options of 120kHz / 200kHz or 200kHz / 333 kHz, either upward or downward facing.

It allows users to understand how changes in climate, environment, or human-driven factors affect the ecology of a water mass, especially when combined with other available sensing options on the glider that collect biogeochemical and physical ocean data.

Teledyne has previously installed the EK80 onto its Slocum glider on a project basis for multiple customers with great early success. The University of Alaska Fairbanks' glider, Gretel, has been deployed several times with the EK80 gathering valuable data for fisheries research.



SEA-KIT LR CERTIFICATION

SEA-KIT International has been awarded the first ever Unmanned Marine Systems (UMS) certificate by Lloyd's Register(LR), representing a key milestone for the maritime industry.

Since then, SEA-KIT has continued to work closely with LR to achieve the highest standards for the USV sector. The company's latest 12m SEA-KIT X-Class USV, *Fugro Blue Essence*, was recently also awarded LR UMS certification, marking the company's 5th certificate and the first LR UMS certificate for a Category 0 certified vessel

SEA-KIT USVs are at work on commercial projects around the world. The company has several vessels in build and on order, including the next-generation, 18 metre, SEA-KIT XL-Class USV, which will also be certified against LR's UMS Code. The vessel is currently preparing to start sea trials in Ipswich, Essex.



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BELGIUM SELECTS EXAIL'S R7 ROVS TO ENHANCE ITS EOD CAPABILITIES



Belgian Defense has ordered six R7 Remotely Operated Vehicles (ROVs) from Exail. This state-of-the-art underwater vehicle will play a pivotal role in enhancing the Belgian Armed Forces capabilities for inspection and disposal of underwater explosive ordnance (EOD), safeguarding harbours, coastal areas, ships and key infrastructures.

The R7 ROV is a cost-efficient, compact, and versatile Remotely Operated Vehicle that is easy to deploy and operate from small boats such as RHIBs or from the shore.

This cutting-edge ROV can easily accommodate a robotic arm and

several payloads, making it a versatile robot capable of carrying out a wide range of missions.

For EOD neutralisation missions, the R7 carries a special payload equipped with a neutralisation charge. Highly accurate positioning is ensured by the R7's embedded INS, DVL and USBL sensors.

In addition, the ROV is equipped with a multibeam sonar and an Orphie 12S camera for precise target detection and identification in the most challenging conditions.

"This order from a nation renowned for its expertise in underwater operations, confirms the R7's capabilities for critical infrastructure

Exail's R7 ROV

protection, explosive ordnance disposal and inspection missions up to 300m depth," said Nicolas Astruc, Managing Director of ROV at Exail.

"The introduction of ROV R7s in the Belgian Navy marks a significant advance in the protection of Belgian waters; for underwater explosive ordnance disposal (EOD) inspection and removal, security of ports, coastal areas, ships and key infrastructures.

"This initiative demonstrates the Navy's commitment to continuously improving its capabilities and ensuring the safety of both its personnel and the environment in which they operate."

Improve Your Position

Integrate the Benthos DAT Into Your System for Greater Navigational Flexibility



Directional Acoustic Transponder (DAT)

OEM Board Set Kit Available

The Benthos Directional Acoustic Transponder's (DAT) compact size and low power consumption make it optimal for both surface and subsurface platforms. Acoustic modem and USBL functionality can be integrated on Autonomous Underwater Vehicles in one system. Mounting our DAT on an AUV, as an inverted USBL, can provide homing, tracking, and navigational capabilities unavailable with other systems.

Our Passion Runs Deep



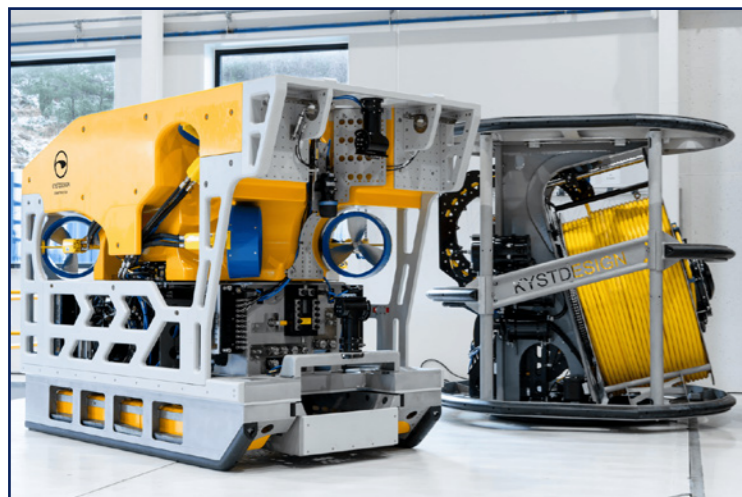
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KYSTDESIGN CONSTRUCTOR COMPACT

Kystdesign has secured a new contract with DOF following the placement of an order for two complete Constructor Compact ROV systems.

The Constructor Compact is a newly developed compact version of the robust and powerful Constructor ROV, and it has already shown success, with four systems sold to date.

DOF has an outstanding track record with Supporter 12, demonstrating about 14 years of successful operation.



DOF Constructor Compact

Kystdesign also recently announced that Reach Subsea commissioned the delivery of two new Constructor ROVs. These state-of-the-art, work-class ROV are renowned for their robustness and versatility.

"The Constructor ROV, engineered to carry and operate a diverse range of large tools, is a testament to Kystdesign's commitment to innovation and excellence in underwater technology. With a depth rating of 3000m, these ROVs are ideally suited to perform a wide array of subsea operations," said a spokesman.

This also follows the company signing a frame agreement with Subsea Composite Solutions for delivery of buoyancies to future ROV projects. This agreement guarantees production capacity at a key supplier.

The company has also been looking at certifying its subsea Pan & Tilt units for full ocean depth operation.

"Our team recently had the opportunity to visit the headquarters of DeepSea Power & Light in San Diego," said a spokesman. "Our Pan & Tilt units have now been certified for operation at the deepest known points of the ocean.

"This achievement was made possible due to the exceptional pressure testing services provided by DeepSea Power & Light. Pressure testing is a critical process that verifies the mechanical and electrical integrity of equipment under extreme conditions.

"It involves subjecting the equipment to pressures far greater than it would experience during normal operation, ensuring its reliability and performance under the most challenging circumstances.



Pan and Tilt Unit



Delivery for Reach



The latest evolution in bathymetric measurement

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MARINE IMAGING

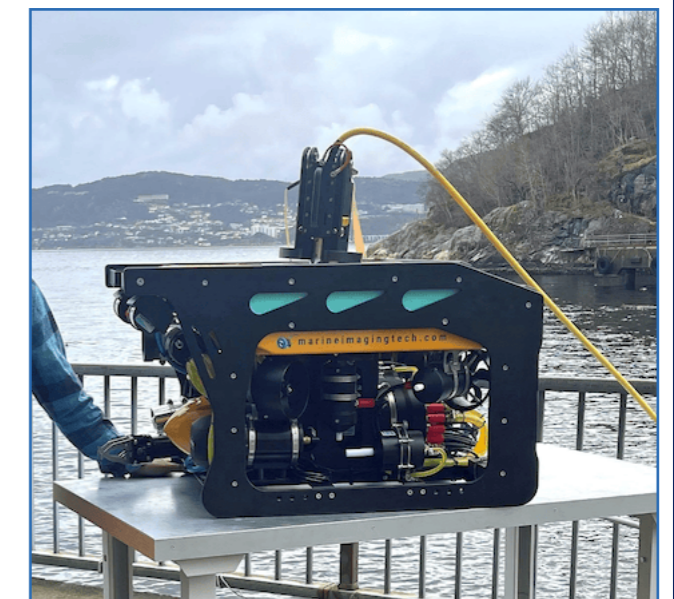
Argus Remote Systems has delivered an ROV to Marine Imaging Technologies, LLC, based in Cape Cod, USA.

This ROV represents the 150th vehicle manufactured by Argus, marking a milestone in its journey of delivering innovative and reliable electric ROV systems.

The ROV is equipped with dynamic positioning and our well-recognised Poseidon control system.

Its first project will be in Puerto Rico, but it will be used throughout the summer off Cape Cod on Marine Imaging's RV

Catapult for wind farm surveys and shipwreck exploration off New England.



ROV to Marine Imaging Technologies

GREENSEA IQ PARTNERSHIP WITH BLUEZONE GROUP

Greensea IQ has announced a strategic partnership with BlueZone Group (BZG) to expand the reach of its Bayonet Autonomous Underwater Ground Vehicles (AUGVs) in Australia and New Zealand.

This collaboration marks a significant step forward in enhancing the operational capabilities of specialized marine systems in the region.

As the leading supplier and sustainer of specialised marine remote and autonomous systems in Australia and New Zealand, BlueZone Group will integrate Bayonet AUGVs into its existing portfolio, which includes beach and surf zone survey, mine clearance/explosive ordnance disposal, and special forces capabilities.

This partnership will enable Australian and New Zealand partners to operate effectively in challenging surf zone environments, leveraging the advanced technology and reliability of Bayonet AUGVs.

Bayonet AUGVs offer flexible configurations, allowing users to scale the vehicles' size and power requirements to meet the demands of various payloads, operations, and environments.

The integration of the OPENSEA platform enhances the vehicles' capability to rapidly deploy new sensor suites, ensuring exceptional performance in detecting, identifying, and neutralising naval mines and other explosive hazards.



EVERCLEAN

Greensea IQ has released a new white paper detailing the significant impact of its EverClean service on fuel consumption and powering efficiency for two cruise vessels.

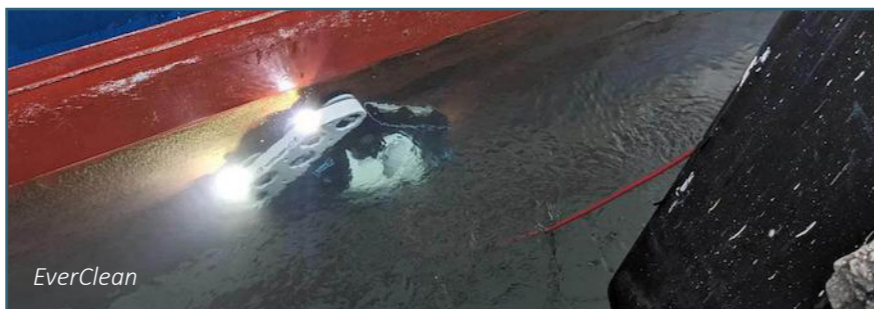
The white paper, titled "Powering and Fuel Consumption Impact of EverClean Service on Two Vessels," presents comprehensive data demonstrating the benefits of proactive hull cleaning.

The study highlights remarkable fuel savings and reduced greenhouse gas

emissions achieved through regular use of EverClean robots.

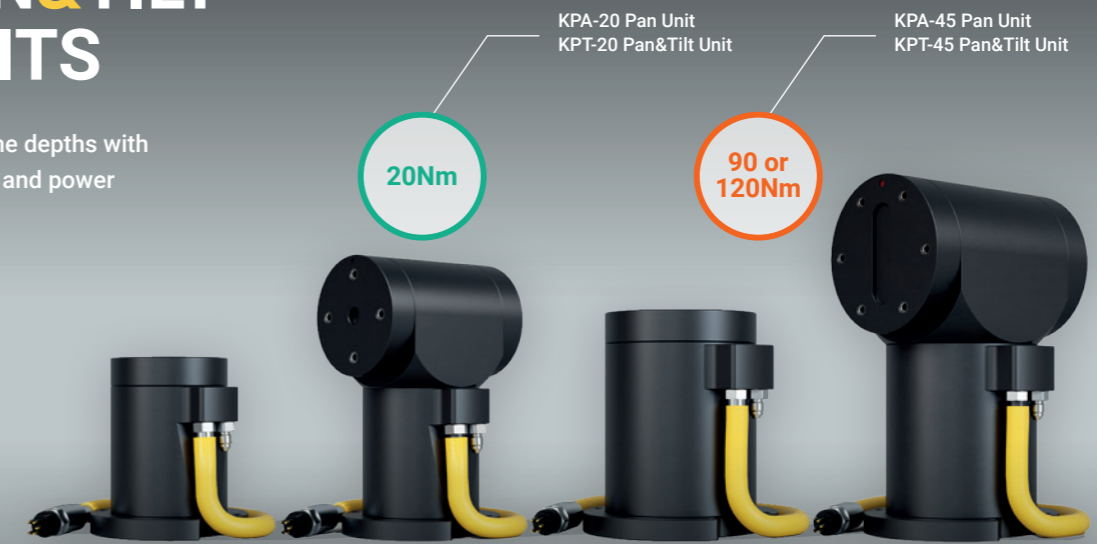
Key Findings:

- Vessel 1 experienced a 2.5% reduction in powering needs, saving approximately 80t of fuel and reducing CO₂ emissions by 256 metric tons over 90 days.
- Vessel 2, benefiting from seven months of proactive cleaning, saw a 20% improvement in powering performance, saving 320t of fuel and cutting CO₂ emissions by 1024t.



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Explore the depths with precision and power



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TERNA SURVEYS

Autonomous Underwater Vehicles (AUV) are being employed for marine geophysical surveys during the planning of important infrastructure, guaranteeing full respect for the environment. This is the goal of the project "Odisseo", launched by Terna, the Italian transmission grid operator led by Giuseppina Di Foggia, in cooperation with Terradepth, a leading provider of marine survey services and ocean data solutions.

The security of submarine assets is one of the main drivers of design and involves the adoption of appropriate cable laying and protection techniques. In this context, the implementation and adoption of cutting-edge technology is an enabling factor.

In the context of the "Odisseo" project, the first test was conducted off the coast near the port of Casamicciola Terme, on the island of Ischia (Naples, Italy). During geophysical surveying of the seabed, Terna's technicians were able to test the performance of the "Gavia" drone, the AUV from Terradepth employed for the purpose, equipped with advanced sensors, including Echo Sounder (MBES), Side Scan Sonar and HD Camera.



Gavia AUV from Terradepth

"The partnership with Terradepth has enabled testing of innovative technologies, such as submarine drones, which can supplement and integrate traditional tools used to examine the seabed. Terna invests significant resources in marine surveying, which is a strategic practice for effective planning of technologically advanced submarine electrical connections", said Terna's Major Projects and International Development Director, Giacomo Donnini.

SAIPEM

Saipem's underwater intervention drone Hydrone-R, currently operating on Equinor's Njord Field development project offshore Norway, has achieved the milestone for continuous subsea residency of 167 days.

The project, for which Saipem's Hydrone-R is deployed, is part of a ten-year contract signed in 2019 with Equinor. The drone is tasked to carry out inspections and interventions on subsea assets, thus providing valuable information about potential hazards and ultimately improving the overall integrity and safety of Equinor's subsea systems.

This agreement was the first ever worldwide service contract for subsea drones signed in the offshore energy sector.

The Hydrone-R had been operating uninterrupted for nearly six months, performing remotely operated works as well as autonomous missions. Saipem's onshore control centre, located in Stavanger, Norway, is fully

supervising the operations via the communication link to the rig: Saipem's drone pilots can either command the Hydrone-R or upload purposely designed missions onboard the vehicle for autonomous tasks.

The Hydrone-R is part of Saipem's Hydrone Program, with a fleet of next-generation drones and advanced ancillary equipment.

As further proof of Saipem's commitment to continuous improvement and innovation, the Njord project will be the location of the imminent first launch of Hydrone-W, the full-electric heavy-duty subsea drone, bringing the electrification process of underwater robotics to the next level.

The Hydrone-W will supplement Hydrone-R for tandem operations and simultaneous underwater works necessary to serve the entire Njord field. This makes the Hydrone Program a veritable game changer for the offshore energy industry, resulting in lower costs and a reduced carbon footprint while improving safety and operational efficiency.

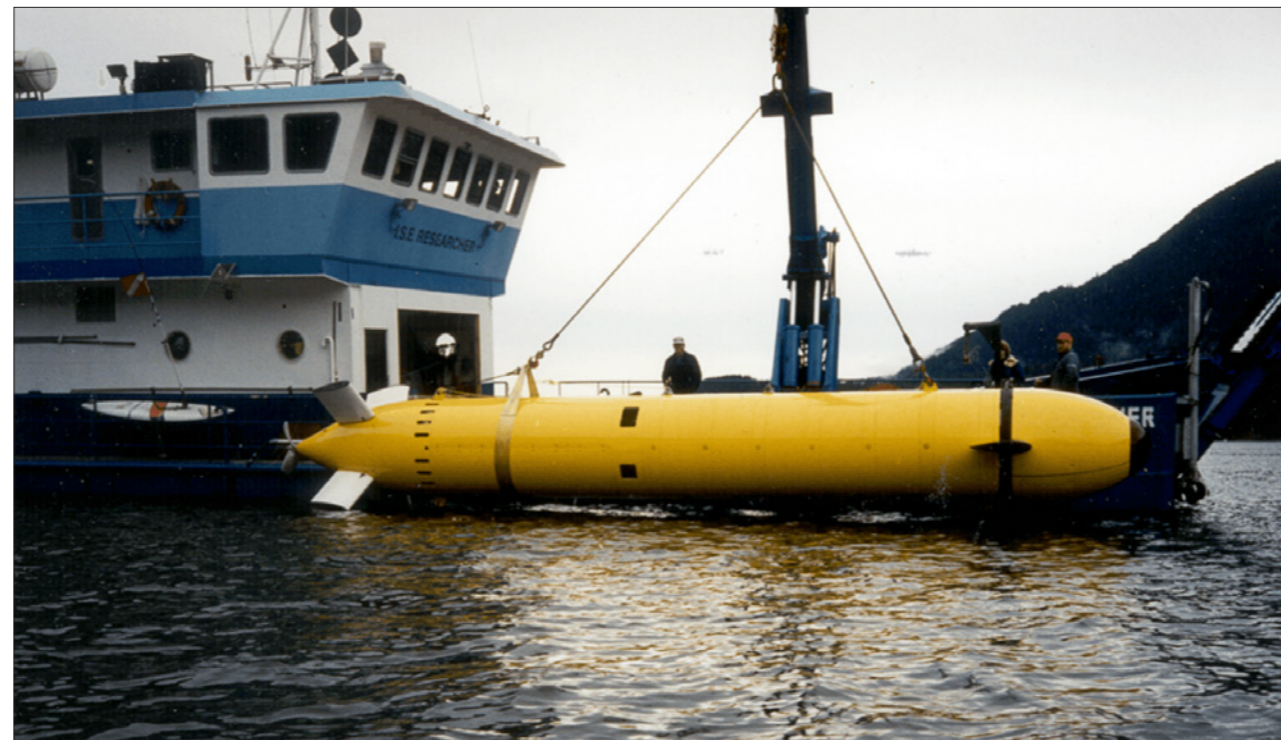


ISE

International Submarine Engineering (ISE) has announced the launch of its Revolutionary Subsea Surveillance Team, featuring the groundbreaking integration of our XL UUV and Subsea Docking System. This dynamic duo offers unprecedented range and endurance, making surfacing optional.

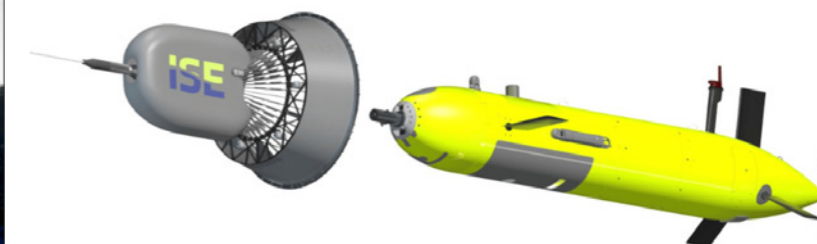
ISE's innovative docking system revolutionizes the management of Autonomous Underwater Vehicles (AUVs) at sea, eliminating the need for challenging and potentially hazardous recovery operations.

The ISE dock enables seamless data transfer and recharging while the AUV remains submerged at depths up to 200 meters.



XL UUV

Docking System



With impressive charge rates up to 400 VDC @ 120 A and data transfer rates of 400 Mb/s, the dock can be adapted to suit most AUVs on the market.

First introduced in 1994 with Theseus, the XL UUV combines proven technology with the versatility and adaptability of our popular Explorer line of AUVs.

This unique XL UUV has accumulated thousands of hours of operation worldwide and can be equipped with a wide variety of payloads and sensors from most manufacturers.



A new vehicle to search all environments safely and quickly...
JW Fishers SeaLion-3 ROV



- Front & rear HD cameras standard
- 7 thruster, vectored system
- 15.6" LCD display monitor
- 12.1" LCD touchscreen Control Monitor
- Speeds up to 3.5 knots
- Operating depth of 1,000' (305m)



ROVS SUCCESSFULLY PROVIDE OFFSHORE WIND INSTALLATION SERVICES

By Ben Hooker, Director Global Business Development – Renewables, Oceaneering

The offshore wind and renewables market faces several significant challenges, including the need for precise, efficient, and safe operations in harsh underwater environments.

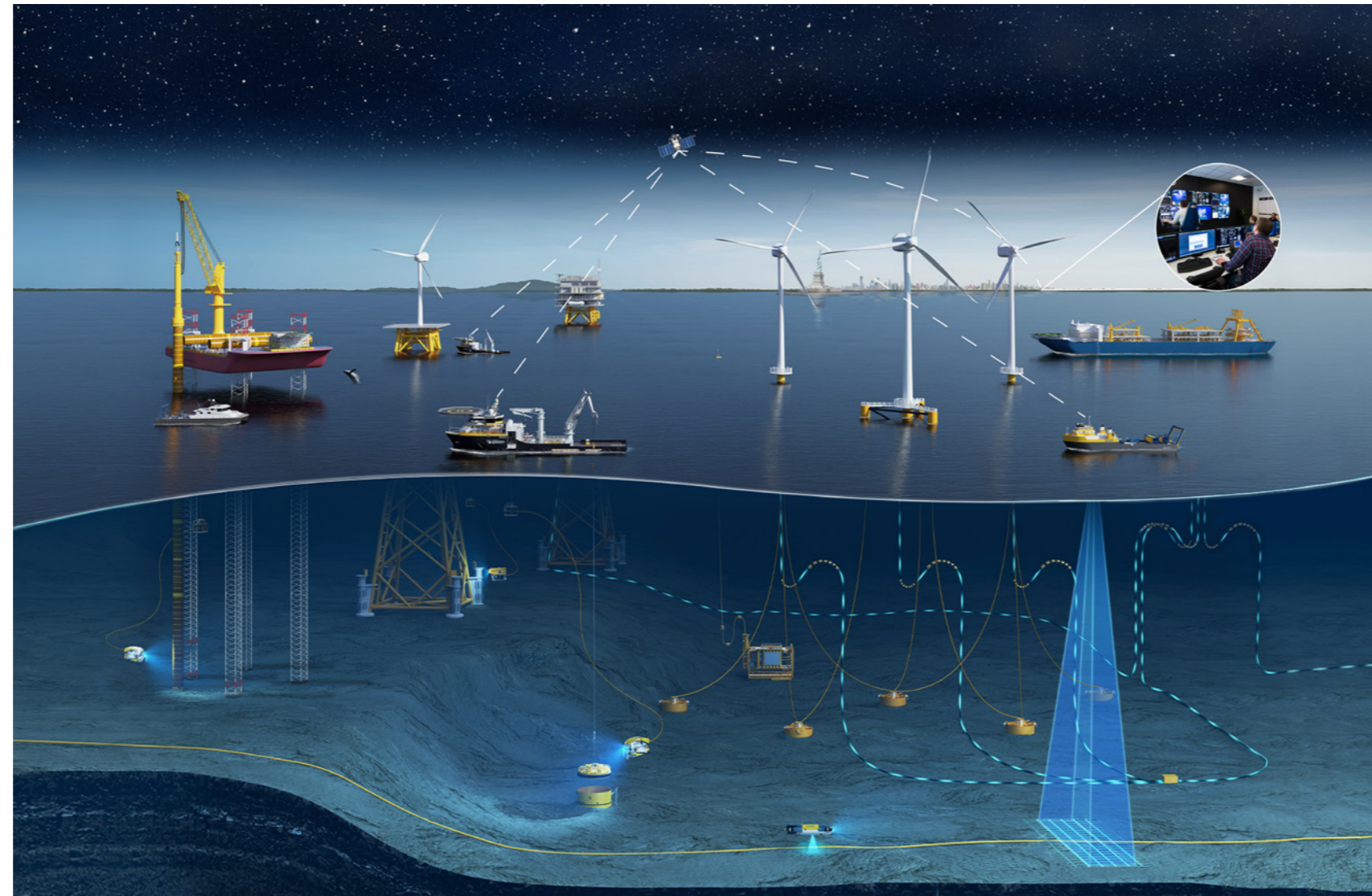
Traditional methods relying on human divers can be risky and less effective, particularly in deep or murky waters. Remotely operated vehicles (ROVs) present a superior alternative, offering enhanced safety, operational efficiency, and the capability to perform complex tasks in challenging conditions.

Over the last decade, Oceaneering has built a successful track record in the renewable energy sector by delivering safe, cost-effective, and environmentally-friendly offshore projects – from development to decommissioning.

DYNAMIC INTER-ARRAY CABLE INSTALLATION

In the second quarter of 2023, Oceaneering contributed to a groundbreaking project off the Norwegian coast, supporting the installation of dynamic inter-array cables at the world's largest offshore floating wind farm. The project, executed in collaboration with Ocean Installer and their Normand Vision vessel, leveraged two Millennium ROVs from Oceaneering to perform a series of intricate tasks.

The 12-person Oceaneering team embarked on a 45-day mission, which involved extensive tooling reconfigurations of the ROVs. The primary technical challenge was ensuring precise load transfers from the installation vessel to the



floating structures. This was achieved using clump weights deployed to the seafloor and a modified ROV interface frame designed to relieve the ROV manipulators. The expertise of Oceaneering's ROV pilots was pivotal, as they managed the project's complex operations without incident.

Following the installation, the ROVs

conducted post-installation surveys using multibeam echo sounder (MBES) equipment mounted on the vehicles.

These surveys confirmed the successful deployment of the inter-array cables, which linked existing turbines to five new units commissioned in August 2023. This

connection enabled a significant reduction in CO2 emissions by providing cleaner energy to nearby oil and gas assets.

ROV INSTALLATION SUPPORT FOR FRENCH PROJECT

In October 2023, Oceaneering's ROVs facilitated the installation of three floating wind turbines off France's southern coast. The operation, conducted from the Normand Installer vessel, involved two Millennium ROVs and a seven-person Oceaneering crew.

Despite the project scope requiring only one ROV, having a second ROV on standby ensured operational continuity and enhanced safety. The primary technical challenge involved executing precise manoeuvres in shallow waters with poor visibility. The ROVs were equipped with a suction skid to enable the landing of suction piles. This required the pilots to perform precise reverse manoeuvres onto an orientation plate, secure the piles, and hold their position while the piles were lowered into the seabed.

Additionally, the ROVs were tasked with installing mooring lines, engaging locking pins, and securing tension lines at the seabed. These operations were completed efficiently and without incident, underscoring the reliability and effectiveness of Oceaneering's ROV technology in challenging conditions.

Oceaneering's involvement in these global floating offshore wind projects highlights the company's technical proficiency and adaptability in the sector. Our technologies and services support low-carbon and renewables projects, including fixed and floating offshore wind, hydrogen, and carbon capture and storage developments.

By employing advanced ROV technology and a skilled workforce, we consistently deliver high-quality, efficient, and safe solutions. Oceaneering's successful track record in renewable energy projects positions the company as a key service provider in the transition to cleaner energy sources.

For further details on Oceaneering's renewable energy solutions, please visit [Oceaneering.com/renewables](https://www.oceaneering.com/renewables)

QUADROIN

EvoLogics, the Berlin-based provider of high-tech underwater robotics, data networks, positioning and sensor technologies, has announced the launch of the next iteration of the Quadroin AUV.

Originally introduced in May 2021, the Quadroin vehicle garnered attention for its distinctive, penguin-like design. Engineered for monitoring and surveying, the fast and manoeuvrable Quadroin leverages EvoLogics' expertise in low-drag bionic design.

Dr. Rudolf Bannasch, EvoLogics founder, delved into years of research on penguin locomotion, resulting in the AUV's remarkable hydrodynamic properties. With its low-drag

shape, the Quadroin achieves speeds of up to 10kts, minimising energy consumption and enabling versatile deployments.

The initial series of Quadroin prototypes, developed in collaboration with Hereon for the Helmholtz Association's MOSES initiative, focuses on monitoring ocean eddies.

These vehicles are equipped with sensors for collecting geo-referenced data on various physical water parameters, including temperature, pressure, oxygen, conductivity, and fluorescence, at different depth levels.

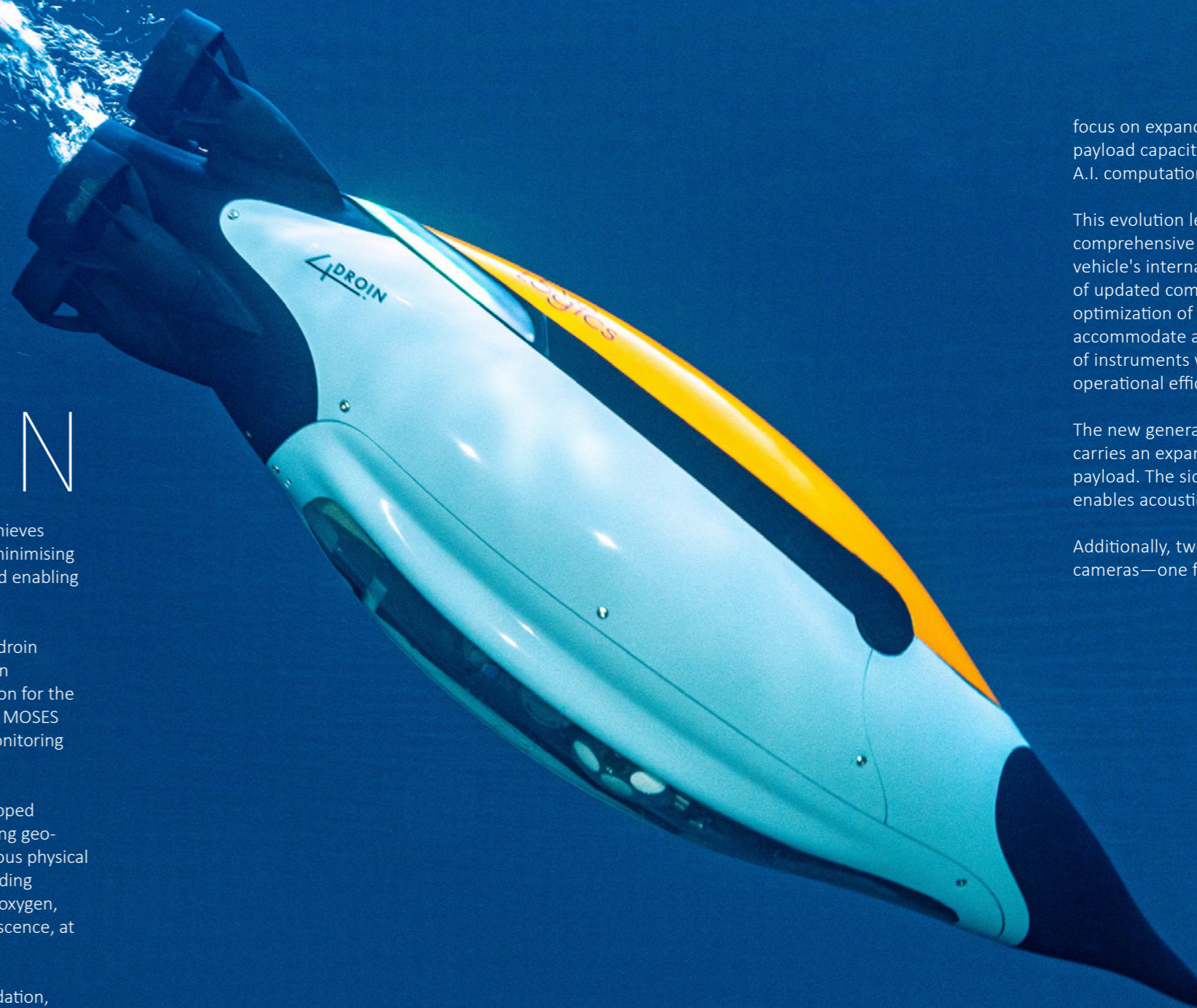
Building upon this foundation, EvoLogics has undertaken significant enhancements to the Quadroin platform, with a primary

focus on expanding its instrument payload capacity and underwater A.I. computations.

This evolution led to a comprehensive redesign of the vehicle's internal layout, integration of updated components, and optimization of sensor systems to accommodate a broader range of instruments while maintaining operational efficiency.

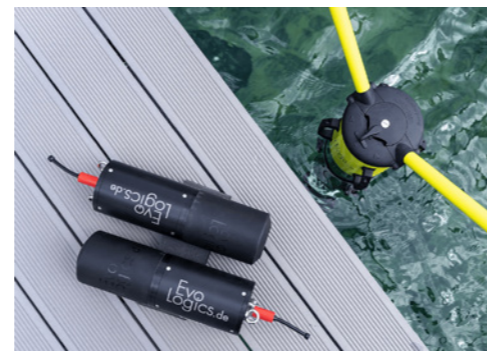
The new generation Quadroin now carries an expanded instrument payload. The side-scan sonar enables acoustic seafloor imaging.

Additionally, two full-HD underwater cameras—one forward-facing



QUADROIN

EvoLogics Modems



at a 45-degree angle and one downward-facing—equipped with dimmable LED lights, provide a visual identification of the vehicle's surroundings.

The newly integrated EvoLogics AI-powered object recognition module allows detecting objects in the side-scan sonar and video feeds live during the mission with processing carried out onboard the vehicle. It is also to enable automatic collision avoidance through a front-looking sonar system.

The hardware and propulsion systems were redesigned with next-generation components for optimal performance.

EVOLOGICS MODEMS SUPPORTING JANUS AND SWIG

Standardising subsea communication is essential for future-proofing underwater technologies, and EvoLogics invests significant development efforts into the interoperability of the company's underwater acoustic modems lineup.

By providing a common framework, standards encourage innovation among manufacturers and foster a collaborative approach to addressing the unique challenges of underwater communication.

NATO's ANEP-87 standard (commonly known as JANUS) was first recognised in 2017, with the most recent version released in 2024. The standard defines an underwater

communications protocol to support the interoperation of acoustic modems from various manufacturers. Being an active member of the JANUS community, EvoLogics fully implements the JANUS Band A in its S2C 7/17 modems line, and development work is ongoing for bands C, D and E.

The Subsea Wireless Group (SWiG) is an international consortium promoting interoperability for subsea wireless communications. Released in 2022, the group's SWiGacoustic standard aims to improve communication between offshore vessels and the uncrewed vehicles used in underwater inspection, maintenance, and repair.

The Quadroin now features a Nortek Nucleus1000 integrated subsea navigation package that couples Nortek's DVL technology with additional position-aiding sensors for reliable vehicle control.



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Connecting What's Needed with What's Next™

AUTONOMOUS DEPLOYMENT

The Freedom™ AUV is the most advanced, resident-capable underwater vehicle, offering the data resolution and completeness of coverage in a single pass usually only obtainable using an ROV – but with the speed and mission efficiency of a traditional AUV.



 YEARS
1964 - 2024

■ Connect with what's next at oceaneering.com/rov

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OCEAN AURORA

Offshore Contractors MCS has developed an innovative remote survey system to increase the speed of inspection. Called the *Ocean Aurora*, the company believes that it can reduce the cost by 50% or more depending on the type of operation.

Units 1 and 2 will be operational this year and we hope to be building further units through 2025 and 2026.
John Howes Reports

A perennial challenge with deploying underwater vehicles, is physically getting them to the site.

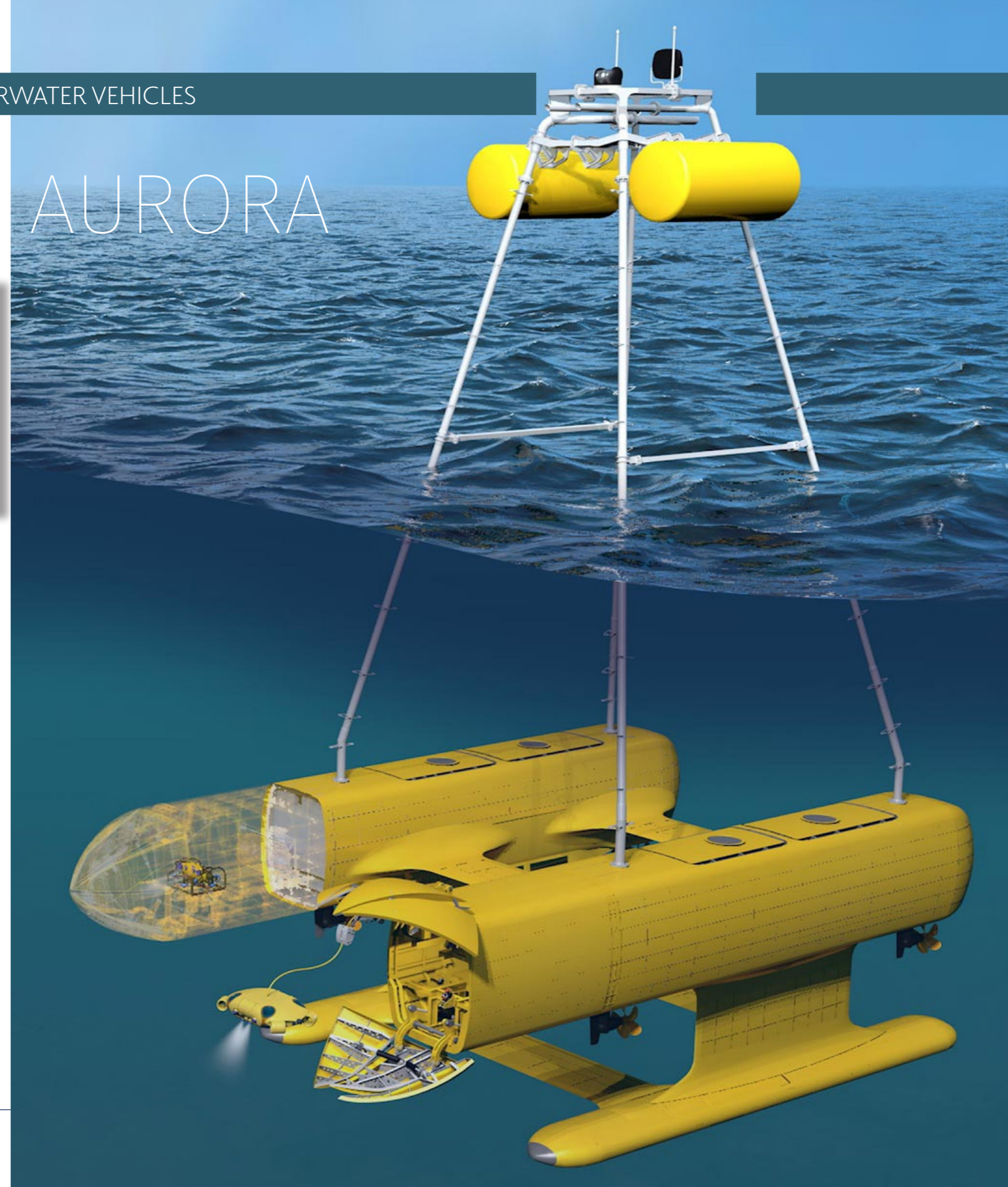
Traditionally, the vehicles were launched from surface support vessels, from which they were also controlled. ROV data could be processed in real time by the support staff.

The downside was the cost.

In recent years, the development of smaller uncrewed support vessels (USVs) has revolutionised the sector. In addition to delivering the underwater vehicle to site, the USV can also act as a gateway, allowing vehicle to be controlled, sometime in real time, from a remote onshore location.

A limiting factor of a small surface vehicles, however, is that they cannot operate in the sort of seas that a traditional heavier support vessel would be comfortable with. Typically, the light vessel would be more easily thrown around by the high-energy waves, making launch and recovery of the ROV much more difficult.

"We were looking to design an autonomous deployment system,



but wanted to move away from a surface vessel arrangement," said Alasdair Cowie, MCS Group Business Development Director. "No matter what you do, you're always going to be dependent upon surface conditions to be able to deploy and recover normally.

"We wanted a dynamically positioned submersible to perform shallow to deepwater geophysical survey, tethered and non-tethered ROV & AUV operations. We took a blank sheet of paper and arrived at the Ocean Aurora concept."

The Ocean Aurora is based on twin submarine hull- structure. The hulls are connected together to form a rigid structure, but an ingenious design feature is that it is hard-connected by a gantry piercing the water surface.

"The ocean Aurora is designed to do is operate as a submarine," said Cowie. "It can transit on the surface but on demand, can de-ballast down to around -6 to -8m.

This immediately cuts out the weather-affected zone during harsh weather conditions. The lack of a weather window, therefore, improve the economics of the project.

The small waterplane area of these gantry tubulars means that they are virtually unaffected by high-energy waves, while allowing over-the-horizon communications and the ability to make real time decisions

HULLS

One of the major drawbacks of uncrewed vessels is in the event of failure. There is no crew available to repair the system and in response to any debilitating failure, the entire vessel and vehicle has to return to port immediately.

With its robust redundancy, the Ocean Aurora is capable of handling single-point failures and can navigate to a safe zone even in emergency situation.

To minimise the ramifications of offshore failure, therefore, the designers promulgated the idea of twin hulls to provide redundancy for all major systems ensuring.

"It is a very stable platform to operate from and is very much designed in the concept of what a submarine is meant to do, whether it's a military or a civil submarine design.

"Each submersible hull has a dry and wet compartment. The dry compartment houses the power facilities, fuel globe etc. It is based on a diesel electric system with an engine in each compartment. The air intake and the exhaust feeds through the gantry tubulars to the surface.

REMOTE CENTRE

In parallel, to the Ocean Aurora vessel, we have developed a remote onshore centre which connects to the offshore facilities via satellite.

The centre is fully equipped with state-of-the-art software. Through satellite and 4G communication systems, it can carry out monitoring, data delivery and real-time execution of tasks. This enables fast decision making, mitigate risks and reduce costs while allowing our experienced personnel to manage projects from start to finish.

"There is also a battery system on board for emergency backup. This gives a 24 hours of capacity to take the Ocean aurora from point A to B in an emergency situation.

"There are also a number of pumps within the body to control the ballast and allow the vessel to submerge or return to the surface."

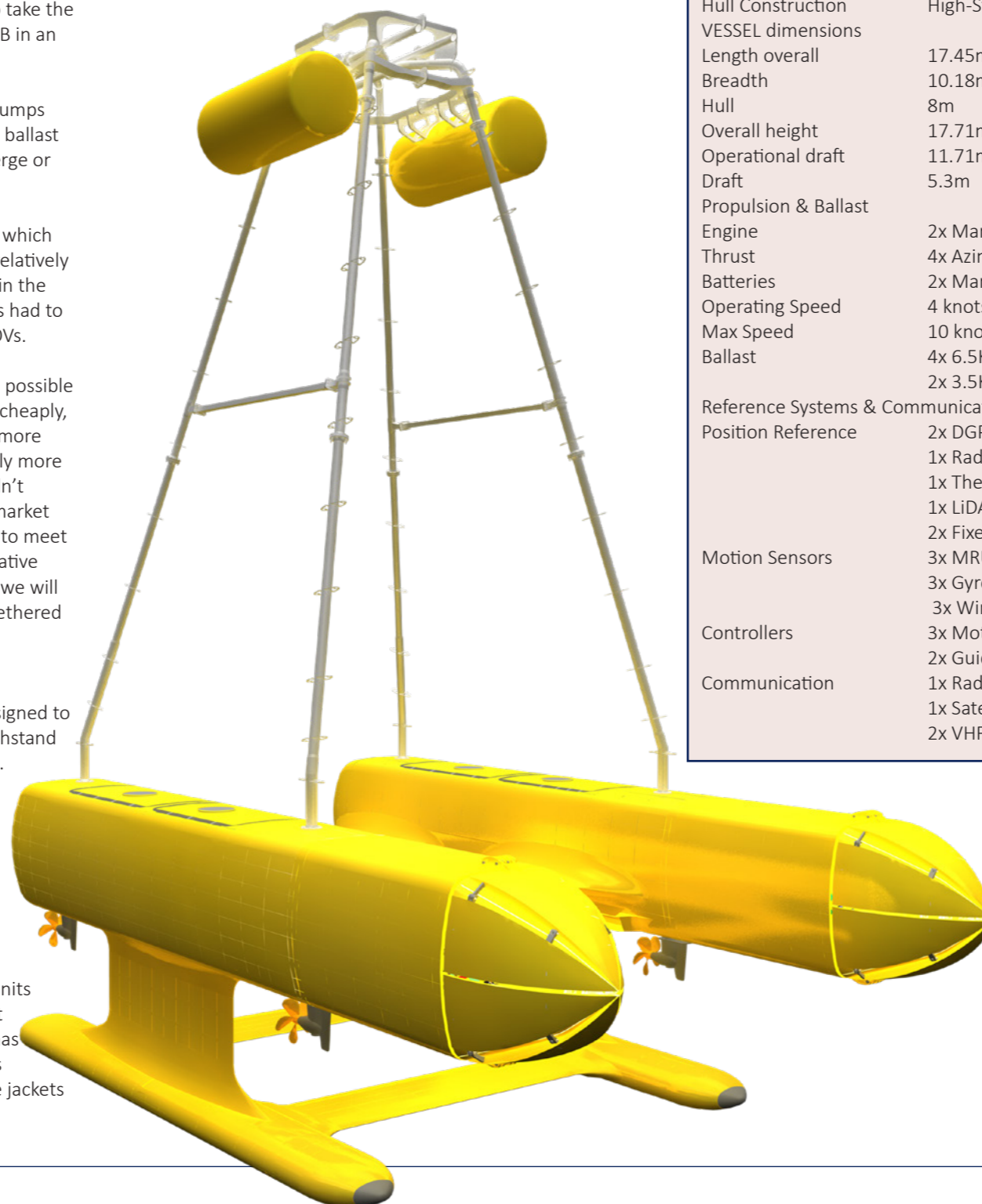
At the front is the wet section which contains an ROV or AUV. The relatively small underwater garage within the hulls means that the designers had to look at reducing the size of ROVs.

" Around five years ago, it was possible to purchase an ROV relatively cheaply, but since then, they have got more sophisticated and consequently more expensive. We felt that we didn't want to be so dependent on market trends so we decided to build to meet our specifications as an alternative to larger ROVs. In due course, we will go from tethered ROVs to untethered autonomous ROVs.

MINISPECTOR

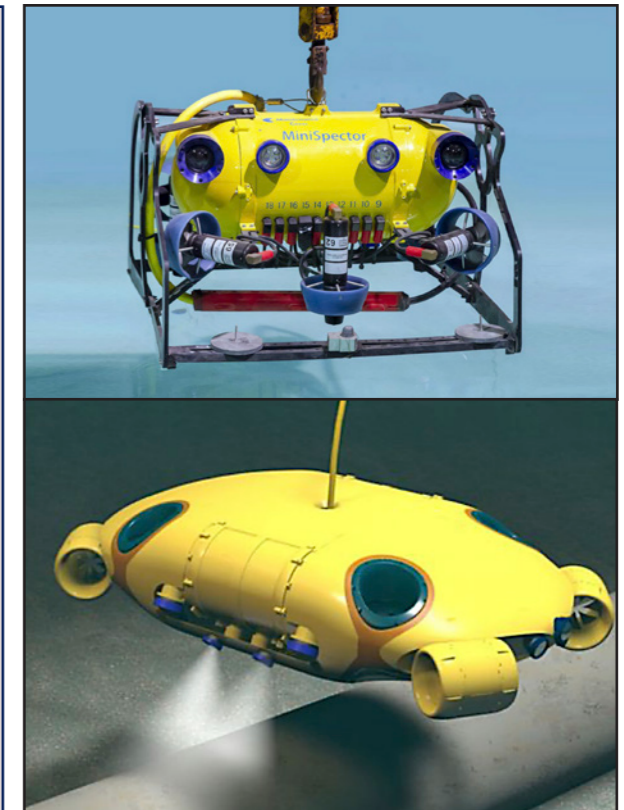
The MiniSpector has been designed to be small while also able to withstand currents up to sea state seven. It can carry out inspection and 3D metrology, this mini-ROV is easy to deploy and can be used. It can work semi-autonomously with the capability to go fully autonomous in the future.

We have around 10 of these units in operation at the moment. It can work in up to 3kts and it has a depth limit of 300m which is normally ample to work inside jackets and other structures.



VESSEL SPECIFICATIONS

Design and Construction	
Design	Multi-Hull
Hull Construction	High-Strength Steel
VESSEL dimensions	
Length overall	17.45m
Breadth	10.18m
Hull	8m
Overall height	17.71m
Operational draft	11.71m Min.
Draft	5.3m
Propulsion & Ballast	
Engine	2x Marine diesel genset
Thrust	4x Azimuth thrusters
Batteries	2x Marine battery banks
Operating Speed	4 knots
Max Speed	10 knots
Ballast	4x 6.5KW Pumps, 2x 3.5KW Compressors
Reference Systems & Communications	
Position Reference	2x DGPS, 1x Radar, 1x Thermal PTZ Camera, 1x LiDAR, 2x Fixed Cameras
Motion Sensors	3x MRU, 3x Gyro Compass, 3x Wind Sensors
Controllers	3x Motion & DP 2x Guidance System
Communication	1x Radio Comm, 1x Satellite, 4G, 2x VHF



We believe we can cut costs to 50% or more depending on the type of operation.

MCS are also developing the Prospector, slightly larger than the MiniSpector, dedicated for pipeline cable inspection. It can be fitted with a manipulators to carry out specific tasks. It gives a very good speed of inspection, rate, economy, pipeline, or cable. It can travel in excess of 6 kts. to give a good inspection speed.

"It can work in 300 m water depth but is designed to be upgradable for going deeper in due course," said Cowie. "The first units are being developed in Egypt at present, one for Aurora and the other as a back up.

"Going forward, we are developing a fully autonomous battery-powered ROV." "The challenge is to get enough battery power to make it work so we are currently appraising the technology but we see this being available in 2 months. We are looking at 500m water depth and 24 hour range. We anticipate it being ready by 2025."

BLUE WHALE

Just ahead of UDT, Israeli company IAI formally unveiled the Blue Whale. This XLUUV is designed for high-endurance and stealthy intelligence gathering, anti-submarine warfare (ASW), mine countermeasures (MCM) and other critical missions operating in open seas, hard-to-access littoral waters and choke points.

The vehicle is 10.9m long and the body is 1.12m high. It weighs 5.5t and has an endurance of 10- 30 days depending on mission and battery configurations.

When submerged, it can travel at operational speeds of 2-3 kts up to a maximum of 7 kts

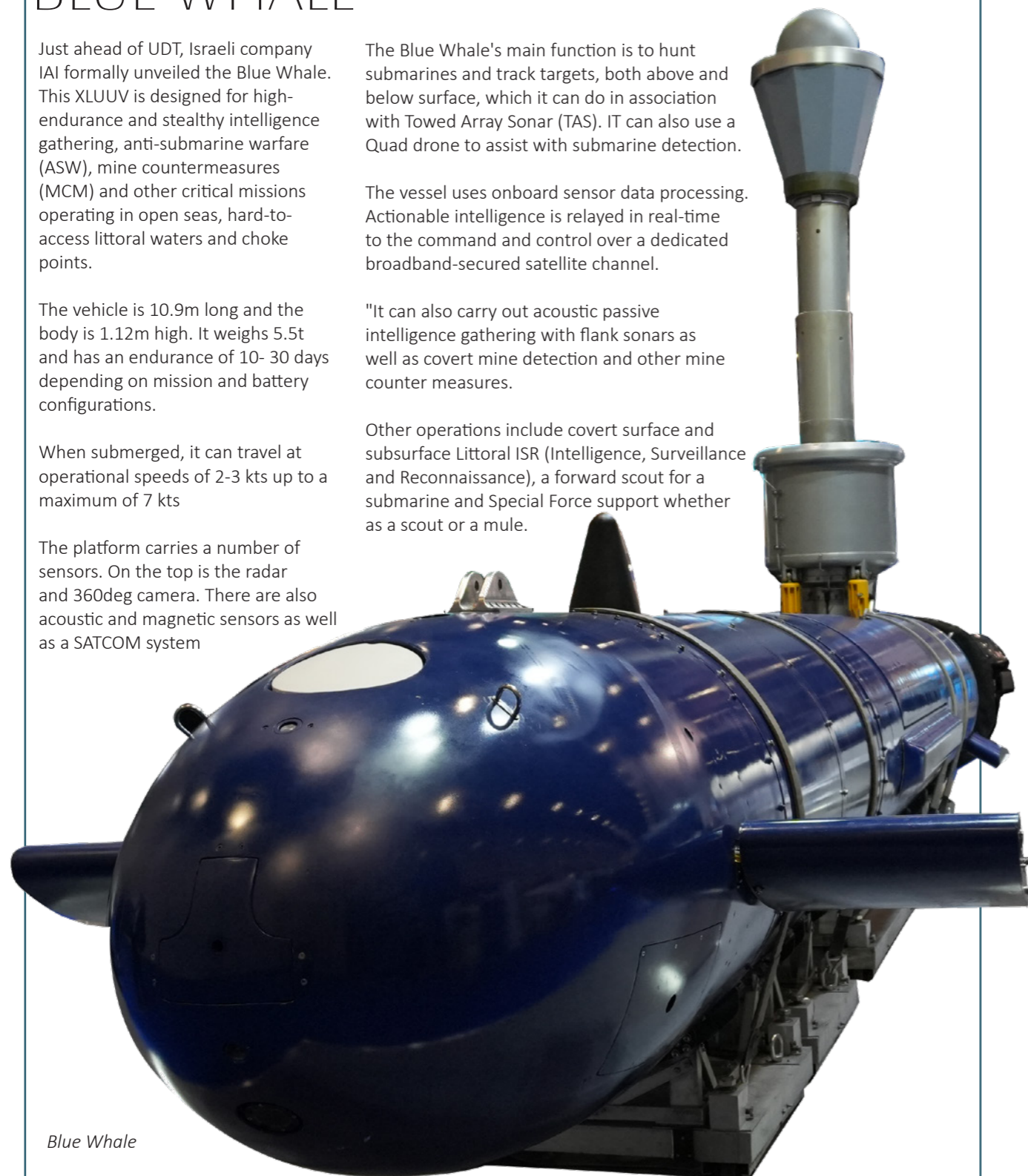
The platform carries a number of sensors. On the top is the radar and 360deg camera. There are also acoustic and magnetic sensors as well as a SATCOM system

The Blue Whale's main function is to hunt submarines and track targets, both above and below surface, which it can do in association with Towed Array Sonar (TAS). IT can also use a Quad drone to assist with submarine detection.

The vessel uses onboard sensor data processing. Actionable intelligence is relayed in real-time to the command and control over a dedicated broadband-secured satellite channel.

"It can also carry out acoustic passive intelligence gathering with flank sonars as well as covert mine detection and other mine counter measures.

Other operations include covert surface and subsurface Littoral ISR (Intelligence, Surveillance and Reconnaissance), a forward scout for a submarine and Special Force support whether as a scout or a mule.



Blue Whale

MEET YOUR NEW UNDERWATER ALLY!



Introducing **Ally**—VideoRay's latest Mission Specialist underwater robot

Compact yet powerful, VideoRay's new four-thruster Remotely Operated Vehicle (ROV) offers top-notch agility with speeds of 4 knots. Compatible with our full line of Mission Specialist topsides and vehicles, Ally is the ideal tool for your day-to-day operations and/or fleet expansion.



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POWER +

In order to greatly extend the endurance of its M5 and M25 AUV, EcoSub has developed a power bus module

EcoSub's new Power+ is a 27cm-long pressure housing that incorporates an additional set of batteries that effectively doubles the amount of power on the board the M5 and M25 AUVs. It also increases the space for dry electronic payloads.

Weighing only an additional 5kg, the ecoSUBm-Power+ still gives a very portable 17kg total weight (excluding payload).

"The Power+ module has a depth rating of 2,500m," said Ian Vincent, Business Development & Sales Manager, Planet Ocean.

"This allows us to run much higher power payloads than the smaller vehicles. We've also increased the level of buoyancy to accommodate this.

"This extra payload space allows us to accommodate a number of extra items. This includes a Nortek Doppler velocity log (DVL) system and a Marine Sonic Technologies side-scan sonar. We can use systems from 900 to 1800 kHz.

"We're also running the Sonardyne acoustic modem so we can use the Ranger 2 series USBL system. With USBL navigation and a DVL, we can run the advanced navigation using the INS system To greatly increase accuracy.

In addition we've also got a 4K video and stills camera on board. It lies in a housing that can rotate

"The camera has a 1in sensor so it is really good for low-light environments and it uses the USB3 subsea connector that streams directly onto Jetson or a Nano graphics processing unit GPU.

"This encodes the video and allows the user to run machine vision applications. We are still in the early days of this but we have been experimenting with target recognition, detecting people, and plan to use the same system underwater for subsea tracking.

"On the front of the vehicle are a pair of fins. The Power + system uses the standard moving mass for pitch control. We have a moving carriage inside the vehicle which drives forward and aft on a linear actuator.

This system works especially well for the smaller vehicles. It's centrally positioned but the larger Power Plus system sits back slightly further and we don't get quite the same level of authority from that.

"What we've done, therefore, is added a secondary controller with retractable bow planes. So these can be retracted inside the nose cone. When the mission starts, they push



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SAMPLING NOSECONE

One device exhibited at the MATS show last November involved the novel design of a water sampling system by the University of Southampton in conjunction with an EcoSub.

The system uses a magnetically attached cartridge with 50ml tubes that work like water syringes. Each of the syringes are spring loaded. This means that they are very low power yet reliable in terms of its release. There is also a small motor inside.

This nosecone allows the EcoSub to collect up to six samples. Upon recovery, it is straightforward to switch out the old cartridge, attach a new cartridge and use it again pending sufficient battery life left on the circuit board.

"The ability to analyse samples has advanced considerably in recent years" said Terry Sloane, Managing Director at

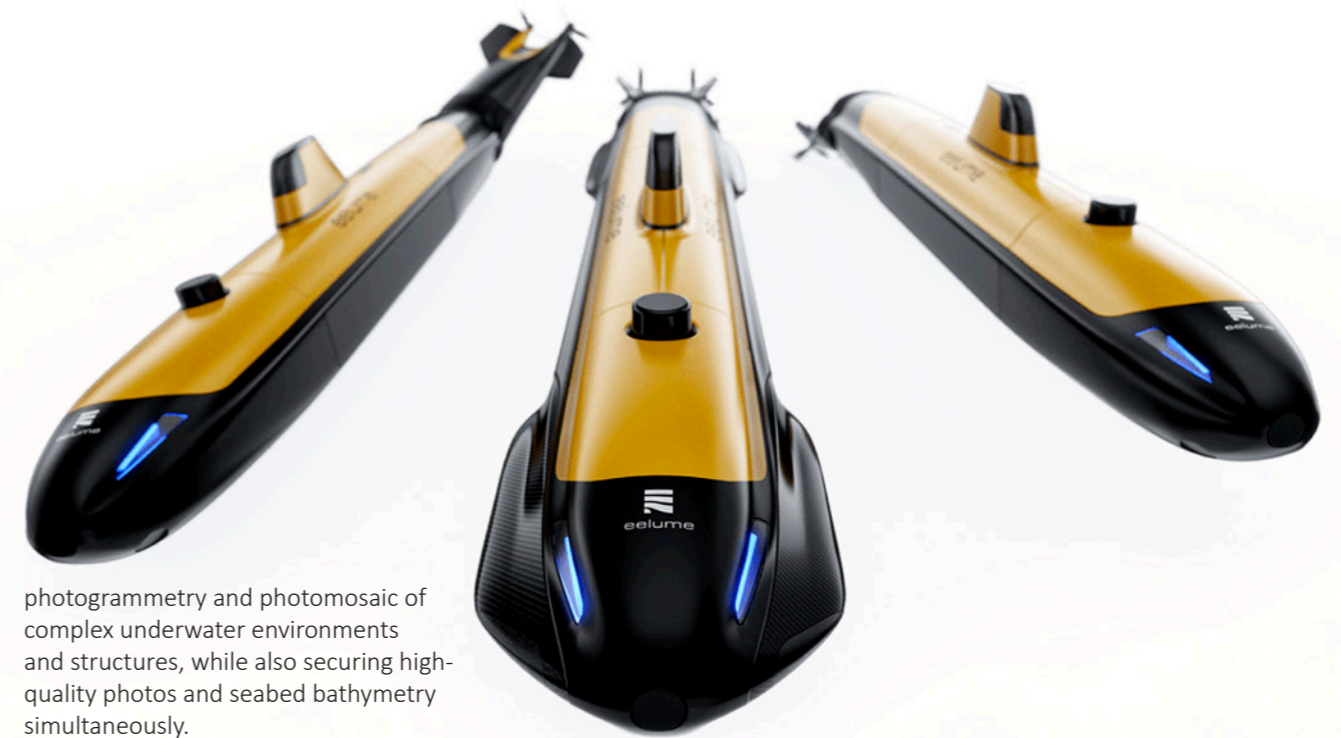


Water sampling nosecone

Planet Ocean. It is now possible to extract critical marine information from such a small 50ml samples. Around 20–30 years ago, this wouldn't have been enough water to do any kind of analytical chemistry sampling system.

This 3D printed nosecone was developed as part of the Engineering course.

EELUME S-SERIES



photogrammetry and photomosaic of complex underwater environments and structures, while also securing high-quality photos and seabed bathymetry simultaneously.

"The system is designed for simplicity, allowing users to focus on ocean discoveries without worrying about complex mission planning or traditional survey constraints."

The All-Terrain AUV offer 360 deg of freedom in roll and pitch, enabling safe exploration of underwater environments like hill-sides, underwater structures, under-ice areas, vessels, harbours, and more.

The 2-person portable vehicles weighing from 45 to 65 kg are easily deployable and retrievable, even from small inflatable RHIBS or from shore.

The company says typical applications include complex underwater surveys like under-ice research can be achieved with a fraction of the carbon footprint and costs compared to traditional methods. They also expand the operational envelope for inspecting and monitoring critical underwater energy infrastructure.

M-SERIES



Eelume first entered the market with its M-series AUV. Its keynote is its motorized articulation modules.

Very basically resembling an eel, the long slender hydrodynamic body can be fly to site powered by sets of thruster pairs, but either end can incorporate cameras/sensor or grabs, effectively acting as arms, optimising the position and orientation of sensors.

They can traverse large distances and conduct conventional surveys and their shape allows access to confined spaces inaccessible by conventional underwater vehicles.

When deployed as a resident system, the M-Series offers rapid response and thus, a IMR (Inspection, Maintenance, and Repair) capability, often eliminating the reliance on surface vessels. The company says that autonomous subsea residency could potentially reduce the cost of subsea operations by up to 90%. It can also be launched from a ship or shore for shorter duration operations.

Norwegian company Eelume, known for its M-series of modular Autonomous Underwater Vehicle (AUV) vehicles, has recently introduced the S-series. This comprises a range of small to medium-class All-Terrain vehicles engineered to operate in close proximity to challenging underwater topographies.

Of particular interest is the articulated tail with twin thrusters.

"Despite a decade of traditional AUV utilisation, there remains untapped potential for expanding the deployment of environmentally sustainable AUVs in underwater environments that are currently inaccessible or only accessible via ROVs," said a spokesman.

"In addition to carrying out conventional AUV applications, Eelume's designers say that the new All-Terrain AUVs can revolutionise new applications such as close-proximity imaging, photomosaic generation of subsea environments, photogrammetry, bathymetric mapping of intricate underwater terrain and structures, under-ice mapping, stop-and-inspect functionalities, and more."

"The range of All-Terrain AUVs two-person portable units can provide high-quality data at an attractive cost point."

According to the designers, the new system has a number of key features:

"Importantly, by bringing sensors closer to areas of interest, it will be

able to produce Ultra high-quality data. Capturing high-resolution data elevates autonomous ocean space discovery. They can also capture 3D

MODELS

	Eelume 300 S	Length: 200 cm	Width: 20 cm	Weight: 45 kg	Depth: 300 m	Speed: 0-5 knots	Endurance range: 11 h / 64 km
	Eelume 600 S	Length: 250 cm	Width: 20 cm	Weight: 45 kg	Depth: 600 m	Speed: 0-5 knots	Endurance range: 11 h / 64 km
	Eelume 300 CS	Length: 200 cm	Width: 20 cm	Weight: 50 kg	Depth: 300 m	Speed: 0-5 knots	Endurance range: 10 h / 52 km
	Eelume 600 CS	Length: 250 cm	Width: 20 cm	Weight: 50 kg	Depth: 600 m	Speed: 0-5 knots	Endurance range: 10 h / 52 km
	Eelume 300 CXS	Length: 200 cm	Width: 30 cm	Weight: 60 kg	Depth: 300 m	Speed: 0-5 knots	Endurance range: 8 h / 43 km
	Eelume 600 CXS	Length: 250 cm	Width: 30 cm	Weight: 60 kg	Depth: 600 m	Speed: 0-5 knots	Endurance range: 8 h / 43 km

REMUS 100

REMUS 100

Around 22 years ago the Remus 100 was developed as a spin-off from the work carried out at Woods Hole. The 130 is the third generation of that first vehicle. Since then, the designers have kept

Same design ethos of enhancing underwater operations with maximum flexibility, advanced capabilities and innovative features.

Like its predecessor, the compact two person portable design is operational down to 100m depths. The battery life, however, has been extended to approaching 10hrs for sustained operations with easy field battery change.

“The REMUS 130 is built on the same proven technology platform as the REMUS 300 and offers customers a highly capable vehicle at reduced cost and risk,” said Duane Fotheringham, president of Mission Technologies’ Unmanned Systems business group.

The REMUS 130 was developed with HII’s internal funding specifically for customers seeking the long service life of REMUS UUVs, along with the proven modularity and open architecture of the REMUS 300 and 620 models at a reduced cost.

The REMUS 130 is built for a variety of missions and operations, including:

- Data collection and research.
- Offshore oil and gas exploration.
- Search and rescue.
- Mine countermeasures operations.

The REMUS 130 features modern core electronics, navigation and communications systems with modular, open architecture interfaces to accommodate wet or dry payloads, including custom payloads developed by the user.

HII RECEIVES ORDER TO BUILD REMUS 620

HII has received an order for a REMUS 620 unmanned underwater vehicle (UUV) from an international customer in the Indo-Pacific Region.

The customized, medium-class REMUS 620 UUV will be built and delivered in 2024 by HII's Mission Technologies division and will be used for monitoring and data collection missions.

Unveiled in 2022, the REMUS 620 has a battery life of up to 110 hours and a range of 275 nautical miles, providing unmatched mission capabilities for mine countermeasures, hydrographic surveys, intelligence collection, surveillance and electronic warfare.

The REMUS 620 achieved two significant development milestones in 2023 with a successful in-water test in October and first sea test in December.

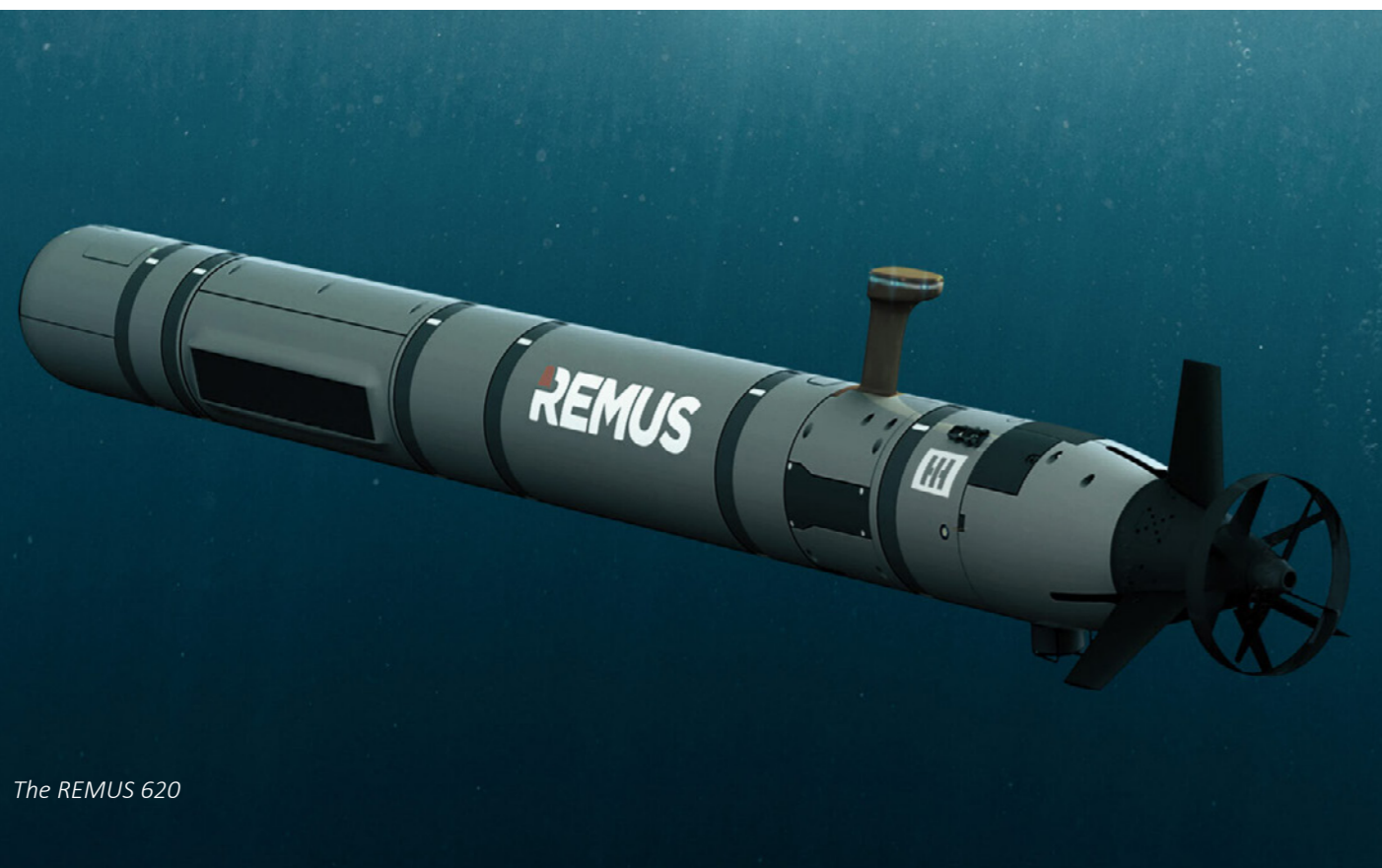
"The REMUS 620 is the premier medium-class UUV designed for adaptability, versatility and long range operations," said Duane Fotheringham, president of Mission Technologies' Unmanned Systems business group.

"Its adaptability to a wide range of missions, from oceanographic research to defence operations, showcases the innovative spirit

of our team and the advanced capabilities of our technology." This is the second REMUS 620 order.

In August 2023, the U.S. National Oceanic and Atmospheric Administration (NOAA) announced the order of two REMUS 620 UUVs for higher-resolution mapping of the Gulf of Mexico and NOAA's effort to restore the seafloor habitats damaged by the 2010 Deepwater Horizon oil spill.

The agency has previously used other REMUS models for habitat characterisation, marine archeology and other ocean mapping and exploration activities.



The REMUS 620

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SAAB





DriX O-16



Within a week, Exail's new transoceanic Uncrewed Surface Vessel (USV), DriX O-16, was launched and tested at sea, and demonstrated to high-profile customers and partners, including major worldwide hydrographic institutes and navies.

Unveiled last March at Oceanology International in London, the

DriX O-16 was first put to sea on Wednesday, May 29th in its home port of La Ciotat (South of France). After undergoing a first series of sea trials within the next couple of days, it was showcased in action to selected partners and customers on Wednesday, June 5th.

Twice the length and five times the displacement of the legacy DriX H-8,

the latest addition to Exail's USV product line, DriX O-16, is designed for long-duration operations of up to 30 days.

It benefits from an autonomy of 3,500 nm and can deploy multiple payloads and subsea assets. Its larger size allows for a wide range of payloads, including Multibeam Echosounders (MBES), Sub-Bottom

Profilers (SBP), and acoustic subsea positioning and communication systems (USBL).

Additionally, the USV features a launch and recovery system to deploy Remotely Operated Towed Vehicles (ROTVs), inspection-class Remotely Operated Vehicles (ROVs), and Autonomous Underwater Vehicles (AUVs).

The new transoceanic USV is particularly suited for full ocean depth scientific and hydrographic surveys, geophysical and UXO surveys, and subsea infrastructure inspections, which may require the deployment of multiple robots.

"We are very proud to have demonstrated to our clients, in such a short time, our capacity to

deliver a new fully functional USV that meets the demand for larger capacity, endurance, and multi-mission capabilities, while maintaining high reliability and efficiency at sea," says Sébastien Grall, Director, Maritime Autonomy Solutions at Exail. "We are convinced that platforms such as DriX O-16 will support the marine industry's transition to more reliable and efficient autonomous operations".

ALLY

VIDEORAY AS LAUNCHED THE LATEST VEHICLE IN ITS MISSION SPECIALIST RANGE. IT HAS MUCH OF THE DEFENDER'S CAPABILITY BUT AT A MUCH LOWER PRICE POINT



In 2023, VideoRay announced that it planned to discontinue the production of its highly popular, but outdated Pro 4 ROV. The company had compiled a road map of where it saw its future and the model no longer fit into this vision.

This caused alarm, particularly from the pipeline and tank inspection market sector.

Responding to this, VideoRay has now released its latest vehicle, the Mission Specialist Ally. At around 24ins in length and 12in diameter, it is compact, but still offers the

versatility required for operations. It has two float options- a rounded float for tasks requiring movement in tight spaces, and a squared float for handling heavier payloads and subsea batteries.

"One difference between the new Ally and the other mission specialist vehicles is the number of thrusters," said Marcus Kolb, Chief Product & Innovation Officer.

"The larger Defender has four horizontally vectored thrusters and three vertical thrusters. When designing the Pro 5, the company opted for a much simpler arrangement of two vectored and one vertical thruster.

With the Ally, however, the design team reasoned that if it was to have the necessary lifting capacity and high manoeuvrability, it would require a fourth thruster.

"Interestingly, we use exactly the same thruster modules in all of our systems, said Kolb. "If a company already owns a mission specialist vehicle, they will recognise that the thruster, topside control system, and AHRS are all the same. The Ally shares all the same modules as the Defender for 100% cross-compatibility - an entire family of systems running off the same backbone.

"Of the four thrusters, the two horizontal units can power the vehicle at a speed of 4kts while the other pair can move the Ally at 0.8 meters per second vertically. Because of the vectored angle of the vertical thrusters, these can also achieve a 1kt lateral movement capability. This was something that the Pro 5 was unable to do."

"We discovered that when moving laterally, the hull form and tangential thruster means that sometimes

MODULARITY

"The keynote of the Mission Specialist design is its modularity," said Kolb. "This means, that if the system experiences a technical issue, only very rarely does the vehicle have to be returned to the factory for any kind of maintenance. Most work can be carried out by the operators while still in the field.

A common cause for any underwater vehicle not working is thruster failure. In the Ally, the thrusters are held securely with a pair of plastic mechanical fasteners and so in order to replace them, the operator simply has to undo the two screws, unplug the thruster and insert the replacement.

By simply copying the serial number of the thruster into the control software and its location within the vehicle, the software automatically remaps it to that position.

This means that the time taken to replace the thruster and have the vehicle back in operation is around five minutes.



The Ally with its flotation top removed

the body is susceptible to roll. It soon corrects itself, but during this sideways roll, it does mean that the cameras may be temporarily tilted," said Kolb.

"We have now eradicated that problem because our new 4K Ultra Smart camera is digitally stabilised so that the image will stay level even though the vehicle experiences movement.

"All Ally vehicles will be delivered with our new smart camera, which has a resolution of 4.7K. The camera also has inbuilt intelligence which will give us give more processing power on the vehicle.

Below the camera is the sonar.

"It is configured with the Oculus 750 as standard but the frame is already designed to mount the Tritech 702 or 1200ik sonars as well as others down the road.

"Another difference between the Ally and the Pro 5 is the is former is designed to carry a WaterLinked DVL for positioning and station keeping.

"The other novel feature about the Ally is the lights are no longer fixed into it. They can be moved about and oriented in multiple positions to provide the best viewing performance on the camera. At the front is the Reach Robotics Alpha manipulator which comes as an option.

"When a large ROV picks up a heavy object, its own mass and its multiple thrusters are often



sufficient to ensure the vehicle does not destabilise.

"Smaller vehicles have a different response to picking up a weight with a front facing manipulator- it tips the vehicle and the thrusters from the horizontal.

"As soon as Ally picks up a point load greater than 3lbs, however, the manipulator is free to swing from the horizontal to the vertical. This effectively repositions the load below the thrusters to provide stability.

"Instead of the ROV fighting to balance itself, it can focus on exerting maximum lift. The Ally can fly around carrying weight of around 21lbs.

"It is also possible to lock the manipulator up or at a 15 degree down angle. This is achieved from locking pins located near the manipulator mount, along the bottom edge of the vehicle.

SPECIFICATIONS

Length	64.1cm
Diameter	30.5 cm
Depth Rating:	300 m (984 ft)
Weight in Air:	13.6 kg (301b)- No Payloads
Manipulator:	90- 180deg Spring Loaded
Propulsion	2 Horizontal Thrusters: 16.8 kg / 37 lbs, 4 Knots
Thrusters	2 Vertical: 9.5 kg / 21 lbs (lift) 1.5 Knots
Lateral Thrust:	6.1 kg / 13.5 lbs, 1 Knot
Subsea Processor:	NVIDIA
Image Quality:	12MP Resolution (4.7k) 150ms Latency Up to 60 fps 3.5- 15Mbps Bandwidth
Features	1 TB SSD Auto-White Balance Electronic Focus Image Unwarp Digital Pan, Tilt

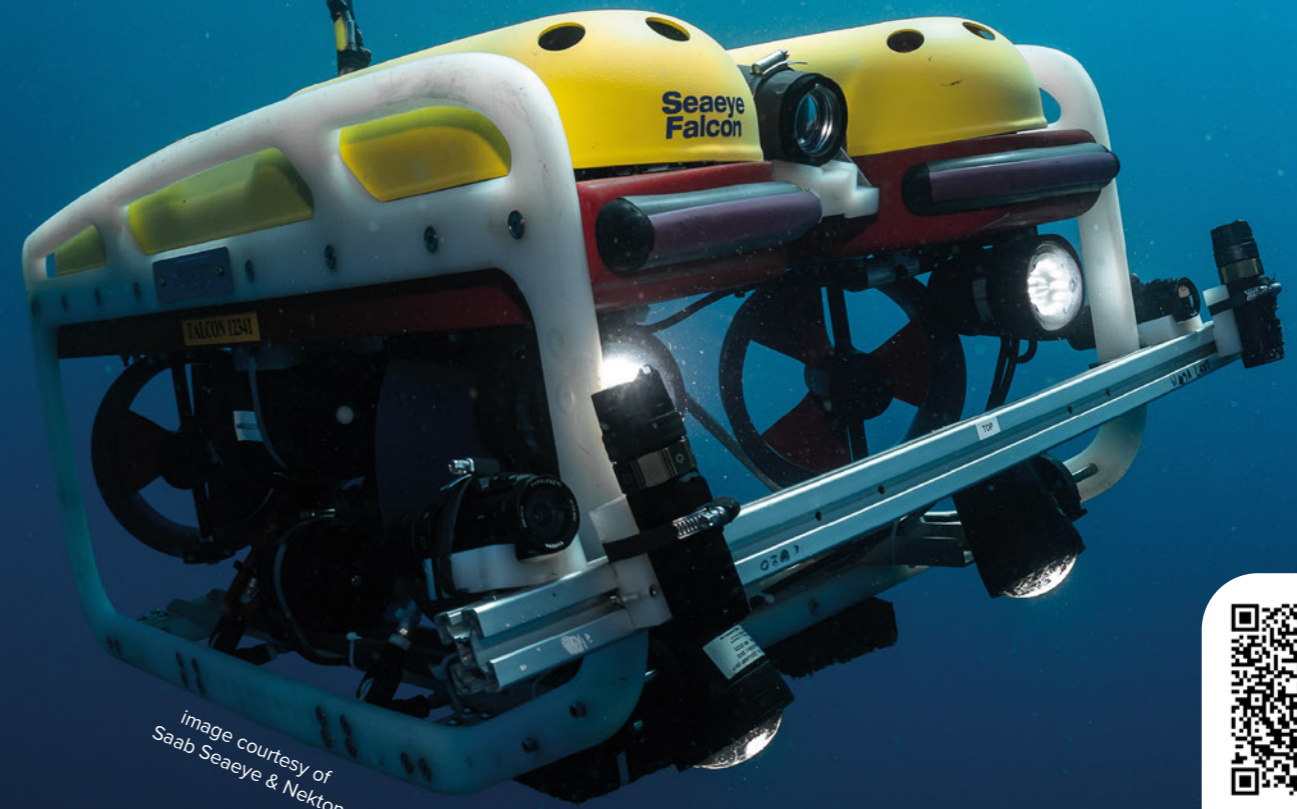


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view event

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EXRAY

Last March, Hydromea officially launched the EXRAY – its advanced underwater inspection ROV equipped with state-of-the-art proprietary wireless communication technology LUMA.

The Hydromea team has dedicated significant time and resources to develop a robot that will transform the landscape of inspection and monitoring of submerged assets. The proprietary wireless communication technology LUMA not only ensures seamless communication between the robot and the operator but also enhances the efficiency and speed of inspection and monitoring jobs performed underwater.

Key Features of Hydromea's Underwater Inspection Robot

- **Real-time Wireless Data Streaming:** Operators can receive real-time data and video feeds wirelessly, enabling immediate decision-making and response to underwater conditions.
- **High-Resolution Imaging:** The robot is equipped with cutting-edge cameras and sensors, providing unparalleled clarity in capturing images and videos of underwater structures and environments.
- **Versatility and Manoeuvrability:** Designed for versatility, the robot can navigate through tight spaces and challenging underwater terrains, offering a wide range of applications for confined flooded spaces.
- **Data Management:** Thanks to its highly modular build, the robot can integrate various sensors required for asset integrity inspections and provide automated data analytics and reports.

"Our underwater inspection robot with LUMA wireless technology is a testament to our commitment to pushing the boundaries of what is possible in submerged infrastructure integrity assurance," said Hydromea's CEO, Igor Martin, "We believe this technology will significantly reduce cost of integrity assurance of submerged assets."

"Beyond that, EXRAY truly demonstrates what our proprietary high-bandwidth wireless communication technology LUMA can provide to the industry. It can connect various mobile autonomous inspection systems next to offshore submerged assets, making it a critical enabling link on the path to reducing reliance on supply vessels for such jobs in the future, driving down cost and CO₂ emissions."



ARGUS NCT

Argus remote systems has won a contract with the Danish company NCT Offshore to deliver two Ultra Compact Worker ROV systems.

NCT offshore approached Argus with specific requirements for a compact yet robust vehicle capable of executing precise tasks under challenging conditions.

The primary application of these ROVs will be touch-down monitoring during cable laying processes as well as messenger line retrieval, two critical operations requiring precision, reliability and durability.

The vehicles will be mobilised onboard NCT Offshore's newest super-hybrid cable lay vessel which is currently under construction. Delivery is planned for later this year.

In response to NCT Offshore's requirements, Argus developed a new Ultra Compact Worker ROV model. This combines the latest underwater technology with Argus' expertise in engineering ROVs that can withstand the rigours of subsea environments.

"The Ultra Compact Worker ROV is designed to meet the demanding conditions of operations in strong current areas and specifically tailored for the offshore wind industry," said Frode Gaupaas, chief commercial officer at Argus.

"The new system has advanced navigation and control systems, ensuring unparalleled



Argus Worker

performance in areas with strong currents

INSPECTOR

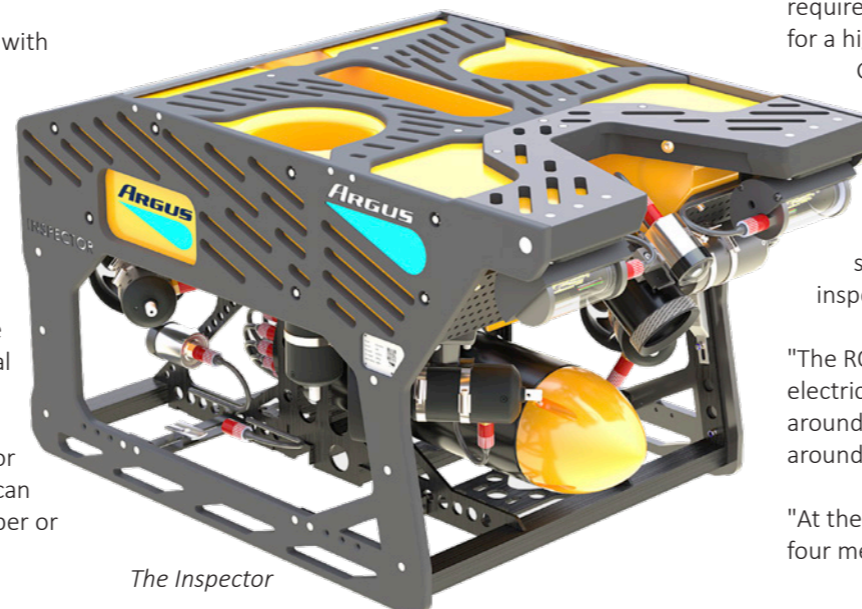
Last February, Argus renamed its Mini Compact Observation ROV, to the Inspector. The company felt that the new name more accurately captures the core functions typically associated with this class of vehicle.

To date, Argus has deployed over 25 mini vehicles globally, and has received very positive feedback for their performance.

The Inspector is a 3kw vehicle with four vectorized horizontal and two vertical thrusters designed as a robust platform that enhances video quality for inspection tasks. The vehicle can also be equipped with a grabber or a small manipulator.

Customers can choose between an HD or 4k camera configuration, depending on their specific needs.

"This flexibility, combined with the inspector's proven reliability, makes it an invaluable tool for



The Inspector



New Design

detailed underwater inspection and monitoring," said a spokesman.

NOVEL ROV FORM

Looking forward to future vehicle developments, Argus are contemplating a new ROV using a completely different hullform

"In the recent past, we have a few requirements from various customers for a high-speed vehicle," said Gaupaas.

"These niche designs are already used for seabed mapping by a high speed multi-beam seabed survey, and for pipeline inspections.

"The ROV we're envisaging is fully electric and will be able to travel around 5-6kts and work down to around 1500m.

"At the moment, this vehicle is about four metres long or closer to a metre

wide. It will include all of the newly developed functionalities present on our current series of underwater vehicles. We believe it will be particularly efficient in detecting unexploded ordnance on the seabed, which is a great challenge to the wind renewables sector.

"While controlled by a pilot, it will include basic autonomy. The vehicle's control system, it will incorporate an obstacle detection facility so when flying on a trajectory and object is detected, the ROV will automatically fly around it.

"If you look at the industry in general, you will note that we are still flying the vehicles the same way we did 30 years ago. I believe that we need to look at what time we improve as a fundamental strategy objective."

Its long thin hydrodynamic design

is very similar to the AUVs on the market. Do Argus plan to go down the fully autonomous route?

"We have considered the idea, but we still believe that ROVs still have a lot of untapped potential," said Gaupaas.

"From a technical point of view, there is no problem adding a battery on a vehicle. Once the engineer removes the cable, however, there are a lot of new challenges. There is suddenly no bandwidth available for video, for example.

"I believe that AUVs are fantastic in their place- very stable and useful for certain types of seabed mapping but there is certainly room for ROVs and AUVs in the market.

"Once we have these designs fully finalised, I believe potential customers will be very interested in what we plan to do. We intend to start building the first system later this year."

UTV600



Li-ion Underwater Power Solutions

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Made for harsh offshore and subsea conditions!

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NEW TRENCHER FOR PHAROS

In response to the surging demand across the global offshore energy sectors, Pharos has announced the latest addition to its fleet — the UTV600 jet trencher.

It has an operational depth of up to 3000m which covers the most demanding deepwater projects. It features Interchangeable jetting swords up to 3m, providing good adaptability.

It is driven by a 600hp system power, ensuring powerful and efficient trenching operations. Operational modes allow for free-fly operations, and both tracked and skid trenching modes offering versatility in approach and execution.

It is supplied with a dedicated

Sea State 6 Launch and Recovery System (LARS) and a newly upgraded control system which provides the interface between LARS, power system and subsea components. A next generation multiplexer supports survey sensor requirements.

The UTV600's operational modes allow for controlled trenching of cables, flowlines and umbilicals through a wide range of project variables. The system ensures that product burial tolerances are easily maintained with precision and reliability.

"The UTV600 is capable of adjusting to project specific variables and can adapt to deliver a wide range of burial depths based on soil conditions and desired profiles to ensure optimal

protection and stability for subsea installations," said Managing Director of Pharos Russell Edmondson.

- After several weeks at sea, Pharos' Q1000 Jet Trencher has now arrived in Indonesia. As the Pharos' flagship jet trencher, it has 1000hp to deliver jetting pressures of up to 15 bar, with a maximum water flow of 1250m³/hr. This enables the Q1000 to bury a wide range of products to a depths of 3m below the surface of the seabed.

In a trenching campaign in Sicily, Pharos' Q1000 jet trencher was tasked with burying over 115km of rigid pipeline, umbilicals, and flexible flowlines. The Q1000 was operating in depths from 8msw to 670msw, with a target trench depth of up to 2m.



FET SUPPLIES SUPPLY WORK-CLASS ROV TO MEXICAN SUBSEA ORGANISATION

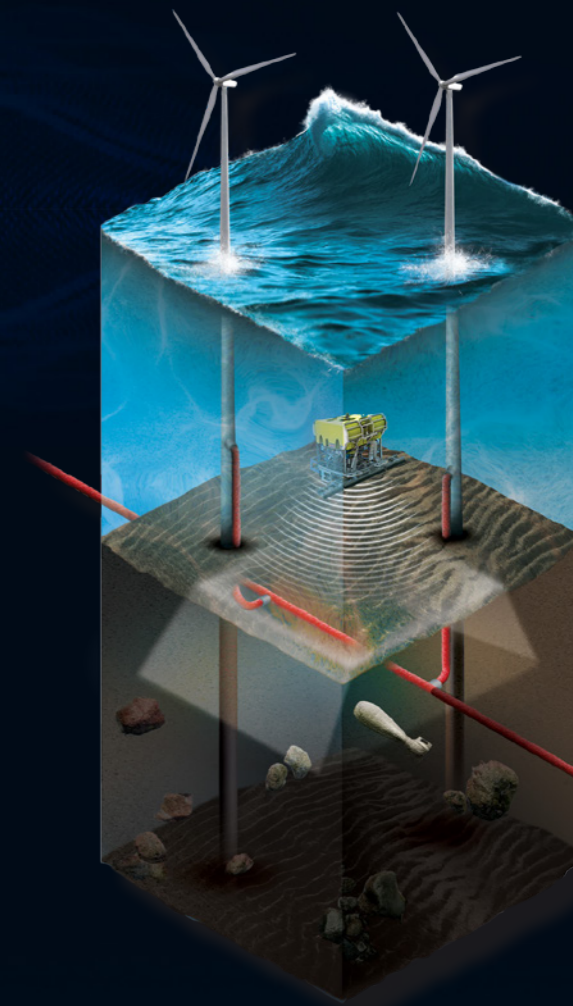
CABLE, UXO & BURIED BOULDER SURVEYS FOR OFFSHORE WIND

Kraken's 3D acoustic cable route surveys are designed to provide wind farm developers, cable owners and cable installation contractors with the most detailed sub-seabed images available in the market.



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Forum has announced that its Subsea Technologies product line has secured a contract from AQUA Exploracion for one of its Ultra Compact Perry XLX-C work-class remotely operated vehicles (ROV).

The XLX-C will be equipped with a comprehensive spare parts package to optimize performance and reliability.

The ROV will complement and increase the company's existing capabilities and will be used to enhance subsea exploration, inspection, and intervention operations in challenging environments.

The Perry XLX-C ROV has advanced features and a robust design, making it ideal for tasks such as pipeline

inspections, underwater structural assessments, seabed mapping, and deep-sea equipment installation and maintenance.

Additionally, the ROV's versatility allows for efficient deployment in various underwater projects, ranging from offshore oil and gas exploration to renewable energy installations like offshore wind farms. Its integration into our fleet underscores our commitment to providing cutting-edge solutions for our clients while maintaining the highest standards of safety, efficiency, and environmental responsibility.

The contract is an example of FET's commitment to recycling systems and refurbishment capabilities. The XLX-C work-class ROV was originally manufactured at FET's UK facility

at Kirkbymoorside, North Yorkshire and will be sent to the factory for a thorough refurbishment and re-testing, ensuring it meets the highest standards.

Additionally, it will be equipped with a comprehensive spare parts package to optimize its performance and reliability.

The ROV has a 2,000m depth rating and, coupled with compact Dynacon LARS design, is ideally suited for inspection, survey repair and subsea maintenance tasks.

Ancillary tools and sensors can also be added to the vehicle for survey and light intervention work. It is equipped to a high specification with a seven-function manipulator arm for complex underwater procedures.

TRITON 660/9



Triton Submarines has reportedly delivered its Triton 660/9 AVA to Scenic, the first free-form acrylic pressure hull submersible model is now aboard the *Scenic Eclipse II*.

With a capacity of carrying a pilot plus eight Scenic passengers to depths of 200m, the modular interior of the submersible can be re-configured in minutes, turning the space into a venue equipped with seating, integrated lighting, a high-fidelity surround audio system and air-conditioning.

In addition, the two companies are understood to be signing of a letter of intent for two further units of this model.

The TRITON 660 AVA series employs our revolutionary Advanced Versatile Acrylics to create the world's first submersibles with a free-form acrylic pressure hull.

Within a footprint comparable to that of previous-generation dual-hulled submersibles, AVA offers a singular acrylic volume up to three times greater, with both parity of viewing for all

TECHNICAL SPECIFICATION TRITON 660/9 AVA- NINE SEAT

GENERAL

Depth	656 f / 200 m
Crew	1 Pilot
Passengers	8 Adults or 6 Adults + 4 Children
Speed	3 kt
Endurance	12 hours
Hatch Inner	23.6 in / 600 mm

SIZE & WEIGHT

Length	9.02 / 2.75 m
Width	14.8 / 4.5 m
Height	7.55 / 2.3m

Weight

	11,000 kg
	24,250 lb

passengers and also, a greater number of seats.

Subsea activities can range from cocktails and casinos to weddings and private dining.

Dynamic Passenger Compensation Ballast

	550 lb / 250 kg
Variable Ballast	550lb / 250 kg
Pressure Hull Internal Volume	6,300
24 V Supply	Dual supply + Emergency

Main Battery	57 kWh
Main Thrusters	4 x 5.5 KW
Manoeuvring Thrusters	4 x 5.5 kW
Control	Joystick, Touchscreen & Manual Override

External Lights	8+ x 20,000 lumen LED
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Lite Support	Oxygen + CO2 Scrubber
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National
Oceanography
Centre

MARINE AUTONOMY & TECHNOLOGY SHOWCASE 2024

MATS is a key event in the marine technology calendar, attracting delegates from around the world, hosted at the National Oceanography Centre's dockside location in Southampton.

Join us for a packed three days of insightful presentations and networking opportunities, focusing on new developments and innovations.

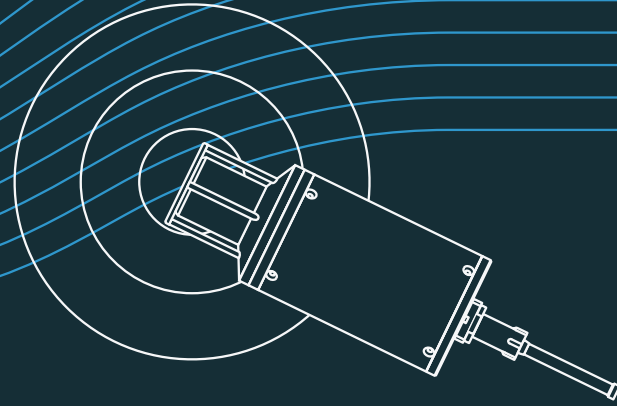
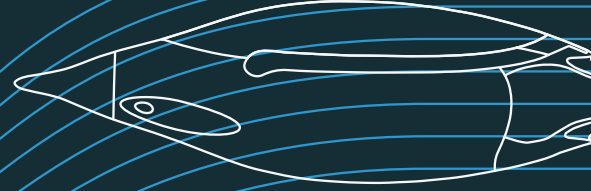


05-07 NOVEMBER



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- Delivering data in most adverse conditions: underwater acoustic modems with advanced communication technology and networking
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- Modem emulator and multiple cost-saving developer tools
- Sonobot 5 - the autonomous surface vehicle for bathymetry, monitoring, search & rescue, and AUV support
- Quadroin - the novel bionic AUV for surveys and monitoring



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