UNDERWATER
R·O·B·O·T·I·C·S

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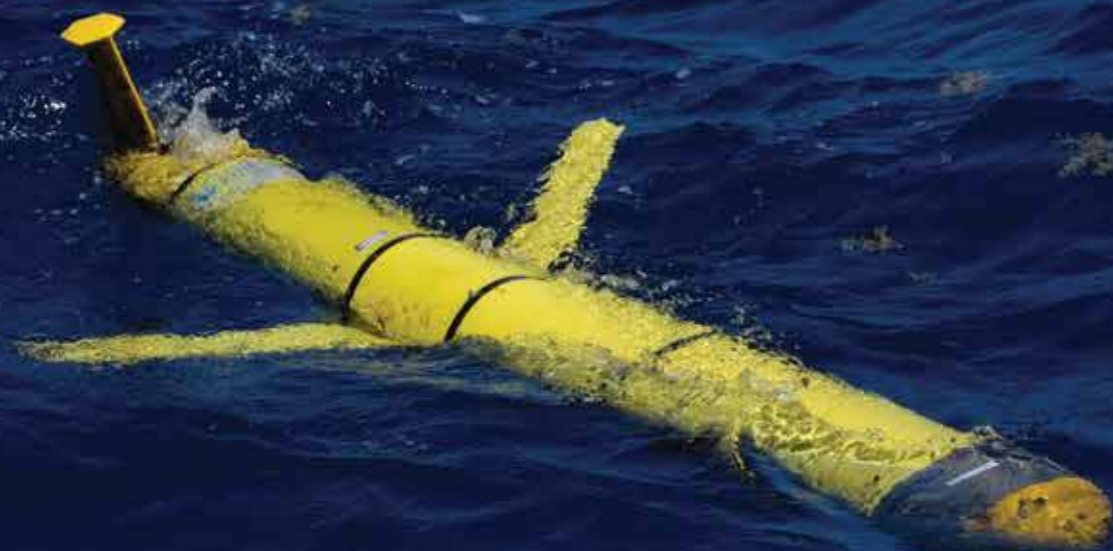Society for Underwater Technology

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marine technology society

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the Slocum G3 Glider

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Argeo has announced the purchase of three new advanced AUV's from Kongsberg – two Hugin Superiors and one Hugin 6000. The contracts for all three vehicles were formally signed recently at Kongsberg's premises in Horten.

"Following this expansion, Argeo will have the most advanced AUV fleet worldwide", stated Argeo's CEO, Trond Crantz back in September.

The purchase is fully financed through a lease agreement with CSI and has a lease term of 4 years. All three parties were present at the signing including representatives from Argeo, Kongsberg and CSI Leasing.

The first Hugin Superior is scheduled for delivery early Q4 2023, and the second Hugin Superior in Q1 2024. The full scope delivery will be finalised with the Hugin 6000 in Q1 2025.

Argeo's AUV fleet will thus consist of a total of 7 units by 2025.

STINGER'S MICRO ROV

Stinger has reported that its Micro ROV, supported by DeepOcean, has achieved an extraordinary underwater exploration feat.

Swimming 240m into a 300mm flexible pipeline at a depth of 277m, this achievement sets a record for ROVs and serves Equinor's exploration goals.

Stinger's micro ROV navigated through challenging obstacles such as manifolds, elbows, and a valve, surpassing expectations in underwater terrain exploration.

Stinger ROV

EXAIL AND KONGSBERG

Exail and Kongsberg Discovery have successfully collaborated in the field of Long Baseline (LBL) subsea positioning solutions.

Kongsberg cPAP LBL transceiver and Exail Ramses LBL transceiver have achieved full compatibility, marking a significant milestone in the LBL positioning industry.

This advancement empowers customers with enhanced capabilities to optimize underwater operations and achieve unparalleled precision in navigation.

In new compatibility, Exail's Ramses system can directly control Kongsberg's cPAP transceiver, and this enables the seamless integration of both devices on the same subsea vehicle.

This achievement unlocks advanced LBL capabilities, offering substantial benefits to customers who are already utilising Kongsberg's HiPAP and cNODE transponders.

They can now incorporate Exail's Inertial Navigation System (INS) technology into their sparse-LBL or LBL operations, allowing any vehicle equipped with the Exail INS system to navigate within an array of cNODE transponders.

This significantly enhances flexibility in offshore operations, with particular relevance to the oil and gas sector, where LBL positioning is widely employed.

Looking ahead, Exail and Kongsberg Discovery are actively exploring further collaborative opportunities.

*Exail and Kongsberg's Long Baseline Systems*

C-DYE ECO

OceanTools has launched the C-Dye ECO. This new variant of C-Dye has been developed by their partner company Subsea Chemistry to work the newly launched range of DyeTectors. Called the ECO series, these comprise the D7-ECO and the ultra-compact D5-ECO.

C-Dye ECO is claimed to be the most environmentally acceptable offshore fluorescent leak tracing dye available in OSPAR countries.

The dye is OCNS Gold / OCNS E qualified with no substitutable components for UK Discharge, Yellow in Norwegian waters. It is also approved for use in Denmark. C-Dye ECO is also fully in line with recent SIS (Substance in Solvent) guidelines.

This environmental pedigree has been aimed specifically towards the OceanTools DyeTectors, making the dye extremely detectable in a subsea environment. C-Dye ECO is typically dosed at a ratio of 100 – 200 ppm depending on application, yielding similar or better brightness intensities when compared to other mainstream conventional dyes.
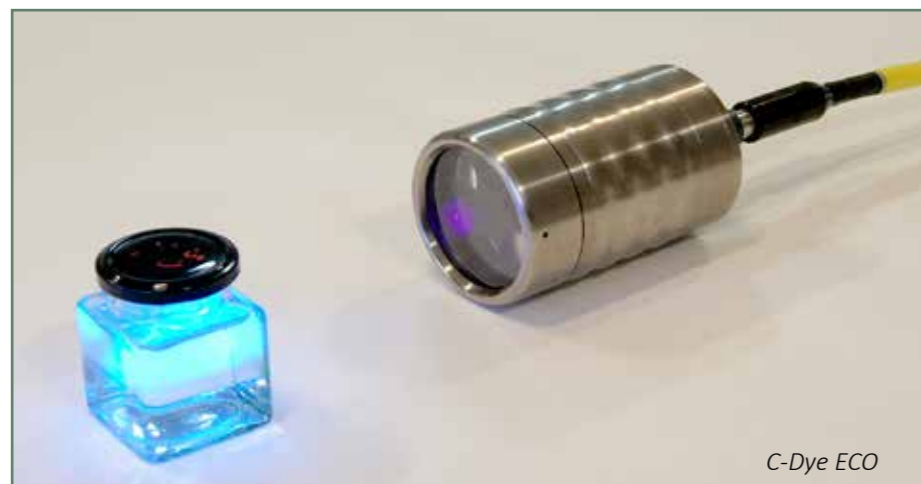
ECO CAM

ecoCAM

ecoCAM is a new 4k video and stills image camera developed in house by the ecoSUB team to be fully integrated into the ecoSUBm5-Power+ AUV system.

The camera system has been designed specifically to provide extremely high-quality video and still images for AUV use, whilst being an ideal solution for machine learning applications.

The ecoCAM overcomes the drawbacks from earlier Go-Pro systems, in terms of operating depth and full integration into the ecoSUB vehicle. Go-Pro mounts are still available for users that require them.

A 1.1in Sony IMX267 global shutter CMOS sensor, coupled with a Computar fixed 8mm lens provides high resolution, high frame rates and noise free image reproduction (8.85 MPix (4096 x 2160 px) at 33.0 fps).

The camera is an underwater first, running with Subsea USBC data transfer to provide excellent data speed for video encoding on a Jetson Orin Nano computer.

Users from the US and Germany intend to use the ecoCAM for machine vision applications, benefitting from the power of the Nvidia Jetson backseat computer, enabling edge computing. In one case the camera feed has been used with a navigation algorithm to pilot the vehicle into a docking station. Subsea lighting packages can be provided for low/zero light applications.

C-Dye ECO

Athena™, unlocking faster response time, every time

Athena™ is not just a manipulator – it is a position-controlled hydraulic tooling interchange system that can be integrated into existing ROVs, providing consistent and reliable results during subsea operations.

Learn more at TechnipFMC.com

TechnipFMC

VORTEX PUMP

Vortex Subsea Solutions has been moving dozens of their patented dredge systems into Brazil One such is on the SMD Quantum 37 using a ScanArm in conjunction with the Vortex T-100 Tornado for soil dredging in the wellhead equalisation process.

"At 100kpa, the Vortex T-100 Tornado makes an unmatched and verified market leading 100kpa of suction," said Joe Goodin.

"That is the level of performance that saves vessel time and keeps our customers competitive. Ashtead Technology has the full range of Vortex tooling globally.

"The dredged space accommodates a magnetic clamp used to hold a spindle tool with drill bit to pierce the layers of the wellhead and remove unwanted fluids between them."
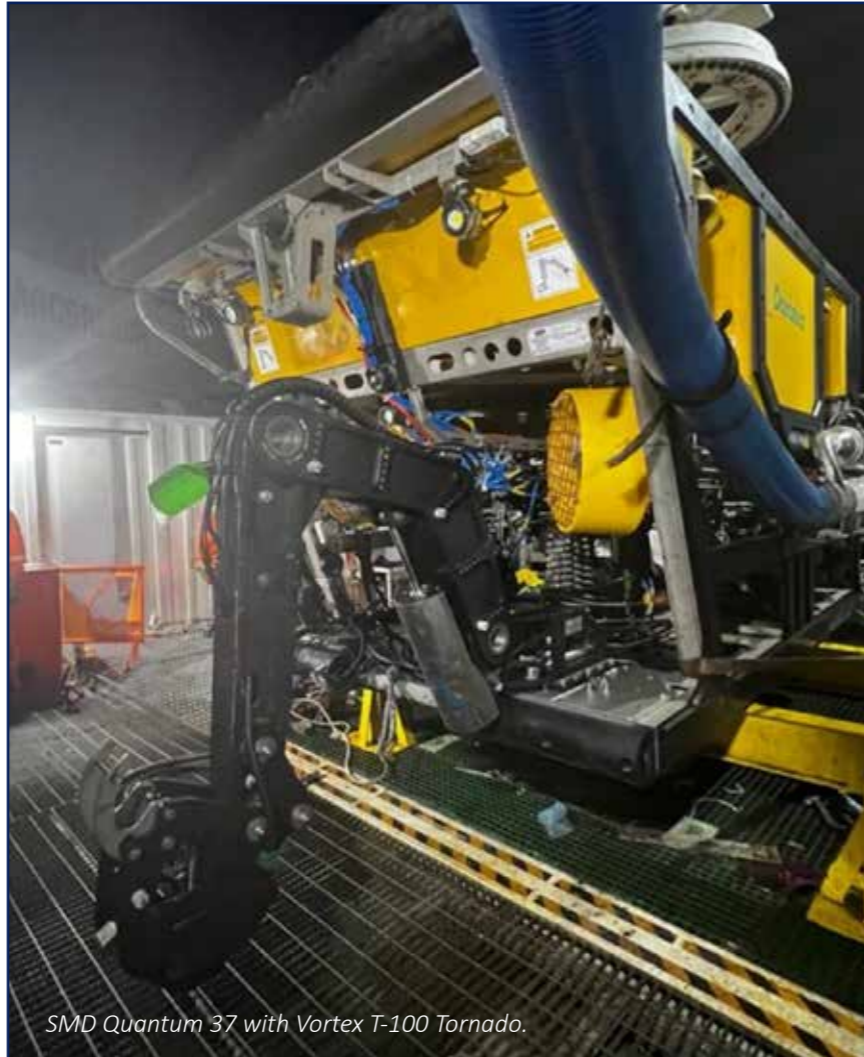
SMD Quantum 37 with Vortex T-100 Tornado.

COMET 300

RTSYS has provided a COMET300 to study the quality of Saudi waters and improve National Centre for Wildlife knowledge in their process for protecting their environment.

The AUV will be used for a variety of scientific missions linked to seabed exploration:

● Seabed mapping and bathymetric surveys using a Klein Marine System Side Scan Sonar

● Measurements of underwater indicators attesting to water quality, using an AML Oceanographic muti-parameter probe

● 4K Video recording, using a Arctic Rays TV camera.

COMET300

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UNMANNED UNDERWATER EXERCISES

Last September, Teledyne Marine deployed multiple Unmanned Underwater Vehicles (UUVs) during REPMUS 23 experimentation and DYNAMIC MESSENGER 23 exercise which took place in Troia and Sesimbra, Portugal.

REPMUS (Robotic Experimentation and Prototyping with Maritime Unmanned System) is the largest unmanned system experimentation exercise, with participation broadly across NATO nations. It represents an ideal opportunity to experiment with new capabilities and test the interoperability between unmanned systems.

Teledyne Marine deployed its newly developed Osprey Autonomous Underwater Vehicle (AUV), from the Portuguese Navy *NPR Dom Carlos I* in support of a Critical Undersea Infrastructure (CUI) protection experiment as part of the broader Undersea Warfare experiments.

Osprey is a 2000m rated modular, 324 mm diameter AUV and was fitted with an EdgeTech 2205 Side Scan Sonar with bathymetry and gapfill option during REPMUS 23. Using its interferometric sonar Osprey was able to generate high resolution images of a 18 mm diameter cable and identify the emplacement of multiple inert explosive ordnance devices via change detection from the side scan sonar images.

Teledyne Marine also contributed its T20-S Multibeam Module, a new payload now available for Teledyne's 200 mm diameter, 1000-m rated commercial Gavia AUV.
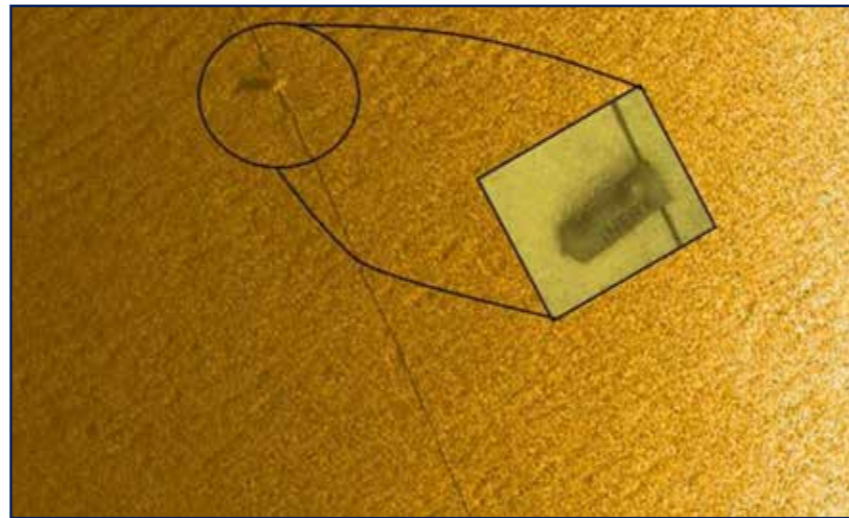
OSPREY High Frequency sonar image of 18 mm cable with an inert target

Leveraging the true modular design of the Gavia AUV, the T20-S Module was fitted to the Royal Danish Navy Gavia system and operated during the Distressed Submarine (DISSUB) experiment.

A Portuguese Navy submarine simulated a major failure by bottoming at approximately 100m depth. The GAVIA AUV was used to survey the orientation of the submarine to facilitate a rescue.

Royal Danish Navy GAVIA AUV fitted with T20-S Multibeam Module deployed from NPR Dom Carlos I

VORTEX

WORK WHEEL

Vortex Subsea Solutions fleet of offshore support tooling continues to grow with the addition of our hydraulic operated Work Wheel.

Designed and built specifically to assist deck operations overboarding and retrieving diving umbilicals, hydraulic hose bundles, electrical cables, ropes and more. Working smarter, not harder Vortex is making the back deck safer for crew and equipment.

Contact your regional Ashtead Technology sales team for all of your tooling needs from the deck to the depths.

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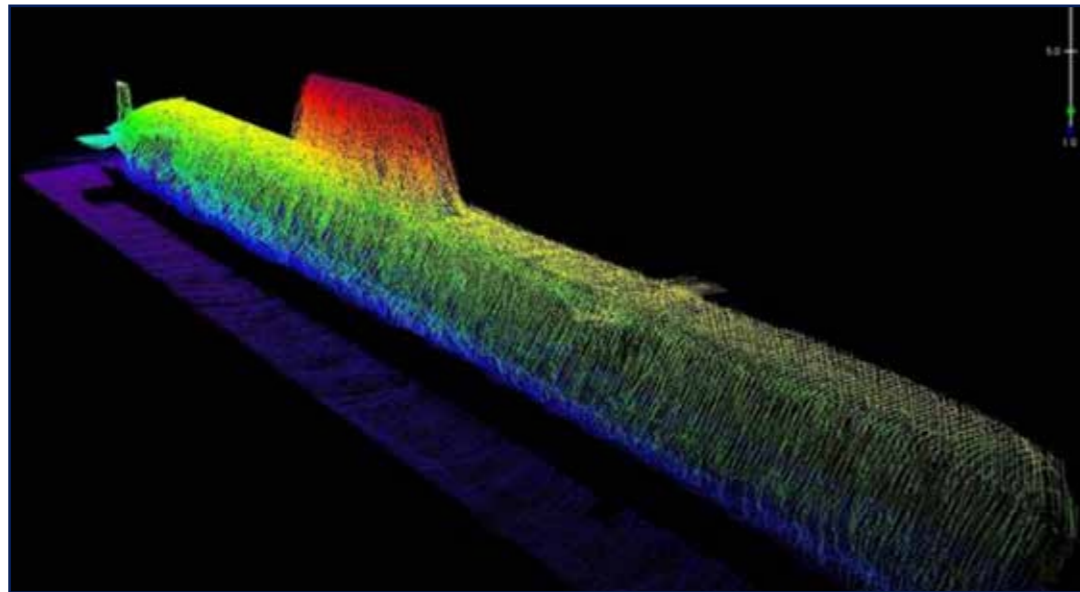
Point cloud image from T20-S Multibeam Module viewed in Teledyne Caris generated by the Portuguese Navy

The T20-S Module features a 400kHz Multibeam with 1deg by 1deg beam angle, 1024 beams, and maximum pulse rate of 50Hz, offering high resolution images in .s7k data format. The data was processed in Teledyne PDS and Teledyne Caris software.

The T20-S Module was also fitted to one of the Polish Navy Gavia AUV to illustrate the true interoperability in between Nations and assets. The Polish Navy operated the T20-S Module as part of the Naval Mine Warfare portion of REPMUS to achieve mine like objects classification using backscatter and bathymetric data.

Teledyne Marine contributed additional unmanned systems to REPMUS 23 including an APEX-EM Profiling Float which was fitted with conductivity, temperature, and depth (CTD) and Electro-Magnetic sensors and a Slocum glider with CTD and a JASCO Applied Sciences OceanObserver Snout with four hydrophones.

The APEX-EM measures water motion through induced electromagnetic currents during profiling. The data collected during REPMUS was fed to the Rapid Environmental Assessment (REA) team and the NATO GEOMETOC Center of Excellence (COE) in Portugal. The APEX-EM float was air deployed by the Schiebel S-100 Vertical Takeoff and Landing (VTOL) Unmanned Air System (UAS) demonstrating a new rapid deployment method directly to the mission area.

Teledyne Marine deployed an acoustic G3 Slocum Glider to support the REA effort and the NATO GEOMETOC COE with valuable oceanographic water column data. The Slocum glider was equipped with a JASCO Applied Sciences

OceanObserver with a spatial acoustic array allowing ambient noise recording and directional detection of any identifiable target.

APEX-EM Float being deployed from Schiebel S-100 VTOL UAS
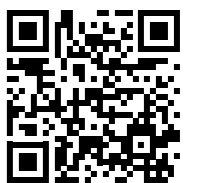
UNDERWATER ROBOTICS CONFERENCE

LAST NOVEMBER, THE GLOBAL UNDERWATER HUB CONDUCTED ITS ANNUAL UNDERWATER ROBOTICS CONFERENCE. TWELVE SPEAKERS TALKED ABOUT THE LATEST TECHNOLOGY AND DISCUSSED ISSUES IN A ROUND TABLE WHILE ANSWERING QUESTIONS FROM THE AUDIENCE

David Hall
TechnipFMC, Manager of OneROV

"TechnipFMC's OneFleet operates 37 ROV systems, 34 of which are heavy work class," said Hall. "We also have two observation class vehicles and a light work class ROV, so our focus tends to be on heavier projects. EPCI tends to be the most common type of project, with pipe lay, heavy construction, etc. rather than pure inspection or survey work.

"Whilst not our core area of work, we are seeing a strong uptake in new technologies, particularly in the space of pure inspection and survey work including an increasing use of autonomous equipment, uncrewed systems and potentially resident vehicles. However, with our heavier work activities, we don't see this replacing our asset pool in the short term.

"To be more efficient we are looking at all ways to work smarter, including more multitasking. With a heavy vessel on station to lay pipe or install large structures, could we also deploy drones, AUVs, etc to perform other tasks simultaneously? We are always looking at the most efficient, most reliable, and fastest way to do things and sharing that across all of our vessels, with the aim of being more sustainable – to lower cost and have a lower impact on the environment.

"We are seeing more interest and more involvement in new energies, but the ramp up is slower than expected as the market is taking time to shift in this direction.

"My particular area of the business is focusing on trying to find where we can be more efficient and sustainable, where we can draw on technology to improve how we work in that space. We are constantly looking at what data we can pull back and analyse, what methods we're using to do things, and what is the right way to do things."

Scott Griffiths
Geoscience Manager at Kraken Robotics.

After a subsea cable has undergone trenching, sometimes it is necessary to carryout remedial trenching to ensure the cable has been buried to the required depth of lowering. It's possible that the shallow soils where the trenching takes places contain coarse sediments or boulders, which may prevent the cable from reaching the required depth of lowering

Kraken Robotics are able to assess the success of remedial trenching using a 3D acoustic system called the Sub-Bottom Imager (SBI). The system works by propagating acoustic energy into the seabed and recording the reflections caused by acoustic impedance in the shallow soils to show buried cables and other sub-seabed objects, either natural or man-made.

"There are two variants of the SBI," said Scott Griffiths. "One is an ROV-mounted unit with a 40 channel receiver array, arranged in the across track direction of travel. It has three chirp sources, with the central chirp source facing downwards and the other two angled slightly outwards. The three sources fire incrementally from the starboard, centre and port side, repeating continuously and this enables the SBI to investigate the seabed and shallow soils up to 80 degrees in the across track direction.

"The second variant is a remotely operated towed vehicle (ROTV), known as the SeaKite and this system has

exactly the same equipment as the ROV mounted system. However, the main difference is the SeaKite can be towed at a faster speed over ground compared to the ROV mounted system, typically up to 3.7 knots.

The frequency range of 4.5 to 12.5 kHz allows the SBI signal to penetrate through the seabed to approximately 5 m below seabed. It uses a 60-degree beamwidth in the along track direction, with 30 degrees looking forward and 30 degrees looking behind, which is part of the synthetic aperture sonar (SAS) protocol used in the system. The SBI data is recorded in two-way travel time (TWTT) and is then converted to depth using a suitable acoustic velocity prior to interpretation.

In some cases, following remedial trenching, the results show exactly the opposite of what was expected- a so-called 'see-saw' effect. Following remedial trenching, it is possible for a section of cable to reach the target depth of lowering and an adjacent section may be pushed up, resulting in a worst scenario than before the remedial trenching started.

One of the consequences following remedial trenching is the potential introduction of free span to a cable. This occurs when the seabed is jetted away, however the cable depth has not increased. This can lead to possible cable damage due to the exposure of the cable.

Kraken Robotics has completed numerous cable surveys around the world and in varying shallow soil environments.

Maverick Piccinini, Sales Manager for Exail

Exail is the relatively recent marriage of two companies, ECA Robotics and iXblue.

The core technology focus of Exail was fibre optics or photonics and this formed the basis of their inertial navigation systems (INS). Exail also manufactures subsea acoustic positioning systems with USBL (Gaps Series) and LBL (Canopus) systems on offer, and together with surface and subsea navigation systems (AHRS and INS) their subsea positioning and navigation ecosystem is created.

From components and sensors and now to platforms, Exail has an extensive offering of subsea robotic systems for both civilian and military applications such as the R7 Remotely Operated Vehicle (ROV), a lineup of man-portable and mid-sized Autonomous Underwater Vehicles (AUVs), and Uncrewed Surface Vehicles (USVs) like the DriX and Inspector 125.

Exail's track record in autonomy include decades of development. "In 2004, we worked on the AUV Alistar which was able to autonomously dive, find and track a pipeline, send information back to the surface, and then resurface." Said Piccininni.

"Whilst not adopted at the time in the oil & gas market, nearly two decades on we've continued to develop that AUV technology in the defence and academia side of the industry, and this has been strengthened now with the merger of the two companies."

Lee Wasling
Business Development Manager at EODEX

EODEX has addressed the lingering issue of unexploded ordnance (UXO) left over from World War II hostilities. Post-war disposal methods involved dumping munitions in designated underwater sites, resulting in approximately 500,000 items, or 100,000 tons, scattered across the UK seabed.

This raises safety and environmental concerns as wind energy projects increasingly seek to develop these areas. The North Sea is generally rife with different types of UXO, from air-dropped bombs to sea mines and torpedoes, posing a significant challenge for safe offshore operations.

Traditionally, UXO removal involved explosive detonation, creating destructive blast zones that could harm marine life and disrupt safe turbine installation. However, EODEX applies a groundbreaking deflagration system that neutralizes munitions without detonating their explosive content. This innovative approach safely renders the UXO inert, allowing for its removal as scrap material without causing any environmental damage or acoustic disturbance.

Currently, EODEX is engaged in a project in the US, addressing unexploded ordnance near the nation's second-largest offshore wind farm site. Employing vessels equipped with work-class remotely operated vehicles (ROVs) EODEX has conducted extensive surveys, investigating over 2,000 potential UXO targets. Out of these, over 200 have been identified as viable candidates for deflagration disposal or remote relocation.

EODEX completed a similar project recently for OceanWinds' Moray West site and due to the proven "no-noise" benefits of the deflagration technology, no bubble curtain was required by the Marine Management Organisation, unlike traditional methods of UXO disposal which require costly noise mitigation.

With expertise in inertial navigation, acoustic positioning, robotics and some photonics, the applications served mainly revolve around the marine industry, but we also have quite a large presence in defence and security, aeronautics and now the space frontier.

"A new IMU that we developed and released last year will form the basis of our new generation of INS we are bringing out, but it's also available to the market. Imenco have already taken advantage of this in developing their own inertial solution for their own subsea positioning offering.

Exail systems are typically the predominant choice for inertial systems on board the majority of AUVs and other subsea platforms available in the market. We also supply a range of the acoustic systems from USBL to sparse LBL positioning."

Exail recently announced a new collaboration with Kongsberg to be able to offer compatibility with their LBL system, unlocking the power of the Canopus Ramses transceiver and INS for sparse navigation with the Kongsberg cPAP transceiver. A welcomed addition to the market offering.

The use of the company's DriX vehicle has increased rapidly, being used by Ocean Infinity and Guardian Geomatics (now part of Reach Subsea). Ocean Infinity took delivery of their two DriX earlier this year and have already completed 18,000km of survey in New Zealand and Australia. Another manifestation of DriX for the naval market is being trialled and tested in naval exercises put on by the US Navy and NATO.

Exail's Drix

Saab Seaeye

EMPOWERING

World leading electric underwater robotics
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SAAB

A key to the success of Exail is collaboration. On the sensor side, Exail has been able to revamp the line of inertial products including launching a new all-in-one INS DVL with a Nortek DVL on board. And their work with Kongsberg, Teledyne, and Valeport, to name a few, has continually increased DriX's survey capabilities.

"Our INS and acoustic lines are entering a new generation next year and we will also introduce a level of autonomy into our ROV lineup." Said Piccininni.

"Through our new INS line, we're getting more compact without sacrificing performance, enabling some smaller platforms to do more. By introducing some capability of autonomy in even our ROVs... will help with remote operations and help de-risk some of those operations."

Cristian Nevoso
Sonsub Solution Manager ROVs & Subsea Drones (Saipem)

Saipem's Hydrone platform can improve performance and reduce both the cost of operations and environmental impact. The traditional method of IMR is to use a vessel with an ROV which requires a team of personnel deployed offshore.

One of the main reasons for moving to a different technology is to try to remove or reduce the use the expensive support vessel as much as possible.

In 2016, Saipem started the development of these new family of vehicles called Hydrone. They are designed for work up to 3000m water depth but the main characteristic is subsea residency for six to 12 months, controlling

the vehicles from a remote control station, without the need of a support vessel.

There are a number of vehicles in the Hydrone range. The first vehicle developed was called the Hydrone-R, a hybrid ROV-AUV vehicle with manipulation capability and able to carry out light intervention work. It has, among other sensors, stereo cameras pointing both sideways and downwards for pipeline or structure inspection.

It also has the ability to disconnect its own tether management system which is embedded inside the vehicle. This can be especially useful if used for more than one subsea base. If the vehicle is needed in another part of the field, the vehicle can disconnect the TMS, autonomously travel to the next base, then reconnect the TMS and restart tether operations.

The Hydrone

Completed in 2019, the Hydrone-R passed through a shallow-water qualification process at Sonsub's Trieste premises.

"We then signed a contract with Equinor for 10 years inspection and intervention services for Njord field. The mobilization of the vehicle in the field has been completed in June of this year. It was installed in residence configuration using a subsea base that has been developed by Equinor and other partner. The Hydrone-R is

the first vehicle working in resident configuration in a subsea field for more than 4 months continuously.

We will Recover the vehicle soon, for general maintenance, and check how both the vehicle and components performed in this first residency application.

The second vehicle, originally developed by BG/Shell and continued by Saipem is the Flatfish. This advanced AUV vehicle can be

controlled as an ROV, but is much more focussed for AUV inspection. Differently from a standard AUV, it can control the 6 degrees of freedom allowing hovering around the structure and even navigate vertically for a riser and mooring lines inspection.

The third vehicle that we are completing soon, is the Hydrone-W. This is similar to a conventional work-class ROV, but fully electric – even the manipulation . It will join the Hydrone-R already working for Equinor carrying out inspection service in the field. We are also just starting, the development is the Hydrone-D, that is focused to defence application.

In January 2023, we had the possibility to deploy the FlatFish for the first time in a real subsea field offshore Brazil at 1,700 meter water depth.

We spent a few weeks on inspecting flow lines, manifold, Christmas tree, and we carried out the riser inspection functionality. This was probably one of the most challenging task because the vehicle needed to recognise the riser, keep a safe distance through the means of sonar and stereo cameras system.

FUGRO
GAINS
SEA-KIT

Fugro has reached a binding agreement for the acquisition of the remaining shares in SEA-KIT International, a long-standing partner in the development of hi-tech uncrewed surface vessels (USVs) for low carbon emission maritime operations and research.

For several years, Fugro and SEA-KIT have collaborated closely to push the boundaries of USV technology, achieving numerous breakthroughs and milestones along the way, including:

⬤ Delivery of the first commercially available remotely operated USV and electric powered remotely operated vehicle (ROV) combi solution to the offshore asset inspection and monitoring market;

⬤ Approvals from various authorities in Europe, Middle East and Australia to operate the jointly developed USV and ROV combi solution through a global network of remote operations centres;

⬤ Delivery of five Fugro *Blue Essence* 12m USVs spread across all key regions;

⬤ Completing the world's first fully remote inspection of offshore wind farm assets carried out by an USV and integrated ROV;

⬤ Winning multiple awards globally for our innovations contributing to safer, faster and more sustainable offshore operations.

The transaction is expected to be completed before the end of 2023, subject to customary closing conditions.

New advancements to look forward to in the wake of this acquisition includes the launch of the next generation of USVs, the *Blue Eclipse* 18m USV specially designed for fast pipeline and deep-water asset inspection activities, as well as a zero-emissions hydrogen-powered USV.

BATS!

Saildrone, and Bat Conservation International have completed a first-of-its-kind mission to study bats in an offshore environment using an ultrasonic microphone mounted on a Saildrone USV.

There are more than 1,400 species of bats, and bats make up about 25% of all mammals. In North America, bats contribute about $23 billion in pest control services to the agricultural industry. Around the world, bats are crucial for pollination and seed dispersal and consume insects that transmit diseases.

US Geological Survey researchers, who partnered with BCI on this research, have been studying bats along the US West Coast in the coastal and offshore environment. Offshore sites are typically deployed on coastal rock formations and islands, which are difficult to reach and maintain. They are focusing on migratory bat species like the hoary bat, the silver-haired bat, the western red bat, and the Mexican free-tailed bat.

"With a zero operational carbon footprint, no impact to the marine ecosystem, a diverse payload, and the ability to stay at sea for extended lengths of time, Saildrone is ideally suited to provide never-before-collected information about offshore bat migration patterns. This important information will allow us to understand and minimize the potential impacts of offshore wind energy development on bat populations," said Michael Whitby, BCI director of Bats & Wind Energy Program.

The mission is funded by the US Department of Energy's Wind Energy Technologies office and the Bureau of Ocean Energy Management as part of a project led by EPRI, an independent, non-profit energy research and development organization. Along with BCI and USGS, Stantec and Woods Hole Group are also project partners. The goal is to help demonstrate the viability of the Saildrone platform as a tool for bat research and environmental impact assessments to evaluate the risk of offshore wind energy development to bats.

"The need to monitor bats in the offshore environment is increasing," said Christian Newman, technical executive for environmental aspects of renewables, EPRI. "EPRI's expertise and focus on collaboration supports the project team well, helping test a new type of technology that can help fill in data gaps for offshore wind decision-makers."

One Saildrone USV equipped with an ultrasonic microphone in addition to the standard Saildrone sensor suite spent 31 nights sampling near a known offshore bat migratory roost on South Farallon Island, approximately 25 nm west of the Golden Gate Bridge. During the mission, the saildrone recorded at least three species of bats and 830 individual bat calls.

Saildrone's underwater acoustic data collection includes surveys of fish biomass for sustainable fisheries management and has previously used sound to track sharks, marine mammals, and crustaceans. The company is currently developing new underwater acoustic technology to detect, classify, and localize marine mammals, especially whales, which are highly sensitive to underwater noise.

AUTONAUT SURVEY

Heralding a new zero-carbon era for ocean observations, a wave-propelled uncrewed surface vessel (USV) has for the first time successfully recovered scientific data from a sensor moored 1,800 metres deep in the Rockall Trough.

The USV, deployed by SAMS and manufactured by AutoNaut in the UK, remotely collected data from the Sonardyne Fetch AZA bottom pressure recorders (BPRs), before sending it back to oceanographers on shore via satellite.

Scientists say the successful mission is a step change in how oceanographic data is collected and reduces the reliance on ships for deep sea fieldwork.

Prof Mark Inall, an oceanographer SAMS, said: "This is an incredible achievement by the team at SAMS and our partners at AutoNaut and Sonardyne. We believe it is the first example of through-water communications of ocean climate research data to an autonomous vehicle, and instant transmission of data to shore.

"It has never been more important to have accurate and up-to-date measurements about what is happening in our ocean, which is undergoing major and rapid changes in the face of climate change.
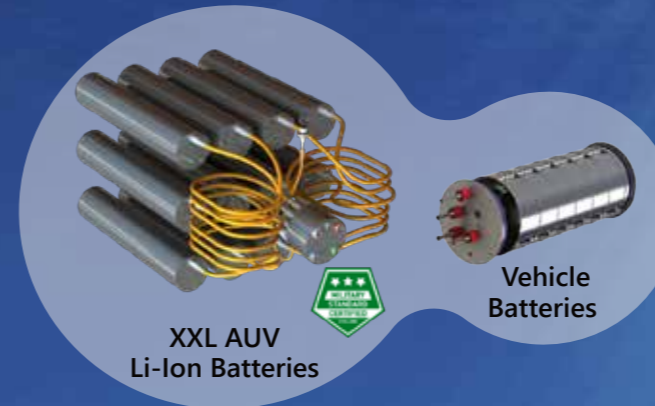
"While traditional ship-based observations provide the most reliable data, such scientific cruises

take some time to organise, are expensive and produce a large carbon footprint. This Autonaut mission feels like a major milestone for oceanography as it opens up a new way of collecting more data, more regularly, which is key to improving climate predictions and helping us to prepare for what the future may hold."

Last year SAMS deployed two BPRs on the seabed of the Atlantic Ocean: in the Rockall Trough, west of the UK, and in the Labrador Sea, east of Canada. Based on the weight of the water above it, the instrument can detect a change in pressure that is the equivalent to a sea-surface height change of one centimetre.

AutoNaut wave-powered vehicle

By comparing the sea surface height on the western and eastern flanks of the Atlantic Ocean, oceanographers can calculate the speed and strength of vast ocean currents that dictate much of Earth's climate.

As the BPRs will remain on the seabed for up to 10 years, the previously held expectation was that ship-based cruises would be the only way to remotely retrieve their data.

However, by equipping the five-metre AutoNaut USV, named Jura, with a Sonardyne HPT 3000 transceiver it was able to link to the acoustic through-water comms transmitter on the bottom of the mooring to successfully retrieve the data recorded so far. After analysis of the data, scientists sent Jura back and over several days fine-tuned the calibration of the bottom sensor.

AutoNaut founding Director Mike Poole said: "This is the first time in the 10 years of AutoNaut's experience we have been asked can we get zero carbon data, not the cheapest data. It is a practical and positive response to climate change.

"As wave propelled USVs that are self-righting in the event of capsize, AutoNauts are well suited to very long endurance missions in the open ocean. Importantly, this will probably become much cheaper than sending manned, diesel-fuelled ships."

The mission was part of the Future Marine Research Infrastructure (FMRI) programme, funded by UK Research and Innovation's Natural Environment Research Council.

Leigh Storey, Senior Responsible Owner for FMRI, applauded the

ambition shown by SAMS and welcomed the successful result. He said: "As we carefully consider what the UK's future marine research infrastructure needs to include to enable frontier science, the innovative use of new technology and the adoption of novel scientific techniques demonstrated here is hugely important."

Through the FMRI programme, NERC is considering what mix of technologies (sustainably fuelled 'green' research ships, autonomous robots fitted with novel marine sensors and the digital infrastructure required to optimise its use) will be required in the next decade. Extensive engagement with the science community, ongoing trials of new technology and early engagement with UK industry will be prioritised over the next 12 months.

Li-Ion Ocean Power

XXL AUV Li-Ion Batteries

Vehicle Batteries

Standard Li-Ion Batteries

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Charging Units

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And yes: Air-cargo.

Our new production building is designed for subsea series production according to your requirements..

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FORECASTING/MAPPING

MIROS

Global ocean insights specialist Miros has advanced its offering to the maritime sector by integrating weather forecast layers into its Miros Cloud Home solution.

The new version of Miros Cloud Home incorporates popular weather forecasting conditions from Windy with its proprietary accurate real-time wave, current, and weather measurements- bridging the gap between actual measurements and weather projections. The innovative solution offers maritime professionals access to an extensive range of forecast map layers visually animated on a global scale to customize their user experience and receive valuable insights into current and future weather conditions.

Weather conditions significantly impact the daily operations at sea and maintenance of the offshore equipment. By integrating forecast data with real-time measurements in one single application, maritime professionals can make decisions based on a holistic understanding of the situation without switching between many applications. This results in the optimization of offshore activities, increased safety, and an improvement in project efficiency.

The platform provides 17 interactive map layers that allow users to visualize factors such as wind, waves, and currents, utilizing various forecast models. Using an interactive menu, users can access short-term or long-term predictions up to 10 days of future conditions to explore how these are likely to evolve.

Aurelia Paraschiv, Miros' IoT product manager, said: "The update to our offering in Miros Cloud Home supports daily offshore operations because it empowers users not only to plan ahead based on forecast predictions but also to make timely decisions by staying informed with the real-time sea state and weather conditions. With both datasets now under one umbrella, decision-makers are instantly granted a holistic view of offshore conditions.
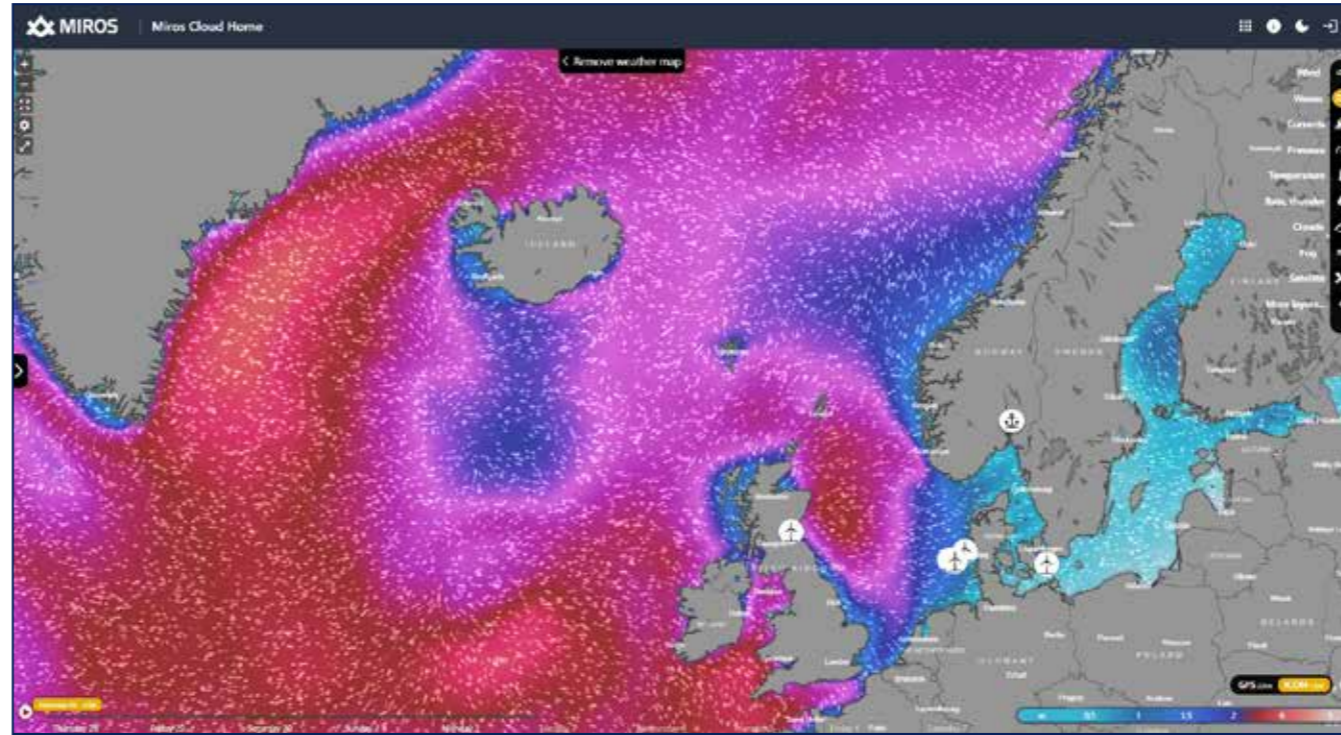
Example of wave visualization easily accessible on miros.app. Explore 17 interactive map layers that allow users to visualize factors such as wind, waves, and currents, utilizing various forecast models.

Example of current visualization easily accessible on miros.app.

FARSOUNDER JOINS SEABED 2030 IN MAPPING THE WORLD'S OCEANS

FarSounder is partnering with The Nippon Foundation-GEBCO Seabed 2030 Project to work together to advance the collective understanding of the ocean floor in pursuit of the complete map of the entire seabed.

This partnership coincides with FarSounder's recent Small Business Innovation Research (SBIR) Phase I grant awarded by the National Oceanic and Atmospheric Administration (NOAA).

This award is providing funding for the research and development of a new project that will develop a cloud-based service to shareFarSounder/NSSL Global survey data collected by FarSounder customers.

The project – Enabling Expanded Crowdsourced Bathymetry Contributions With High-Quality Metadata via Commercially Sustainable Incentives to Contributors – will allow for data sharing with others across the FarSounder customer fleet and with Seabed 2030 via the International Hydrographic Organization's (IHO) Data Centre for Digital Bathymetry (DCDB), which archives over 30 terabytes of oceanic depth soundings and serves as the long-term archive for Seabed 2030.

Seabed 2030 is a collaborative project between The Nippon Foundation and the General Bathymetric Chart of the Oceans (GEBCO), which seeks to inspire the complete mapping of the world's ocean by 2030, and to compile all the data into the freely available GEBCO Ocean Map.

The Project is formally endorsed as a Decade Action of the UN Ocean Decade. GEBCO is a joint programme of the IHO and the Intergovernmental Oceanographic Commission (IOC), and is the only organisation with a mandate to map the entire ocean floor.

All data collected and shared with the Seabed 2030 project is included in the free and publicly available GEBCO global grid.

DOUBLE EAGLE TO KUWAIT

Double Eagle Semi-Autonomous Remotely Operated Vehicle (SAROV)

Saab has received a contract from the U.S. Navy for a Double Eagle Semi-Autonomous Remotely Operated Vehicle (SAROV) for the Kuwait Naval Force.

The Double Eagle family of undersea vehicles is a safe and operationally proven ROV system, used by navies around the world supporting mine countermeasure (MCM) missions. In the SAROV configuration the vehicle can be used both as an Autonomous Underwater Vehicle (AUV) for detection, classification and identification, and as an ROV for mine disposal.

The U.S. Navy is procuring this system as a Foreign Military Sales (FMS) program for the State of Kuwait's Naval Force.

Developed and produced at Saab in Linköping, Sweden, this sale represents a milestone in expanding the production of this Swedish technology to the U.S. Saab, Inc.'s Autonomous and Undersea Systems Division will produce parts of this system in close collaboration with other production sites in Sweden, the United Kingdom and Denmark.

"We're excited to introduce production of this undersea vehicle

capability to the United States. The Autonomous and Undersea Systems team has established both a highly experienced team of undersea vehicle experts and significant new production capabilities for Saab that position us for greater U.S. market expansion," said Erik Smith, President and CEO of Saab in the U.S.

These highly manoeuvrable vehicles can be launched from any type of ship, from the shore, or from a craft of opportunity. All Double Eagle systems can be housed in a standard container, providing a deployable solution across a variety of platforms enabling rapid response to mine threats.

MBARI LINK

Saab has announced a new commercial licensing agreement with the Monterey Bay Aquarium Research Institute (MBARI) to bring their Long-Range Autonomous Underwater Vehicle (LRAUV) to the US market under the name Tethys.

Saab will domestically produce and offer the Tethys vehicle for the oceanographic research, commercial, and defence markets.

Tethys is an innovative, field-ready vehicle capable of travelling more than a thousand kilometers for weeks at a time. MBARI developed this now mature technology over the past decade to better explore, map, and monitor the ocean.a thousand kilometers for weeks at a time. MBARI developed this now mature technology over the past decade to better explore, map, and monitor the ocean.

Tethys's low-power transit mode and over-the-horizon, internet-based remote control allows users to launch the vehicles from shore and conduct sophisticated missions at remote locations without a support ship. With a track record of over 40,000 operational at-sea hours logged on MBARI's LRAUV fleet, this 12-inch diameter AUV can
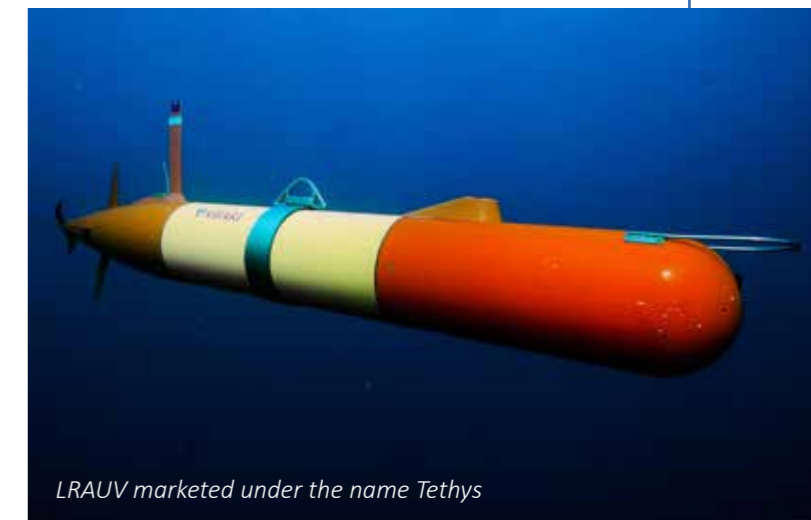
LRAUV marketed under the name Tethys

dive up to 1,500 meters below the surface and is capable of larger, more powerful payloads than oceanographic gliders. Tethys can be tailored to satisfy a broad range of subsea missions and requirements, including military applications such as intelligence, surveillance, & reconnaissance (ISR) and Anti-Submarine Warfare (ASW), as well as scientific applications such as oceanographic research and environmental monitoring. Tethys can be outfitted with a variety of payloads.

SEAMOR AND VOYIS COLLABORATION

SEAMOR and Voyis, have begun a collabpation which brings together the powerful capabilities of the SEAMOR Mako ROV and the precision of the Voyis Discovery Stereo Camera, to transform underwater inspection and exploration across various industries.

The Mako ROV isused for a wide range of underw ater applications, like aquaculture, port security, marine research, pipe inspection and hydro dams. The Mako ROV boasts an impressive depth rating

of 600 meters (2,000 feet) and can be remotely operated using standard umbilical lengths of up to 950 meters (3,000 feet).

Voyis, has garnered acclaim for its innovative underwater imaging solutions, including the highly regarded Discovery Stereo Camera. This state-of-the-art camera system delivers unparalleled clarity and precision in capturing underwater environments, with real-time 3D models, setting a new standard for high-quality underwater imaging.

ROVS

Meet zeerov, the future unveiled

Introducing KD300E, our new electric thruster

Introducing ZEEROV (Zero Emission Electric Remotely Operated Vehicle) - the latest work-class ROV from Kystdesign. Designed to push the boundaries of subsea exploration, ZEEROV delivers a new level of performance, versatility, and sustainability. With its advanced electric propulsion system KD300E, ZEEROV is a zero-emission vehicle that offers a more environmentally friendly alternative to traditional ROV´s.

● **kystdesign.no**

KYSTDESIGN

The integration of the Voyis Discovery Stereo Camera with the SEAMOR Mako ROV opens a world of possibilities for various industries. Two key sectors that stand to benefit immensely from this collaboration are aquaculture and hydroelectric.

With SEAMOR's expertise in the aquaculture industry, where efficiency and cost-effectiveness are paramount, the SEAMOR ROV equipped with the Voyis stereo camera will improve:

● Routine net inspections
● Regulatory compliance work
● Mort recovery
● Inspection of cages, docks, pipes, cables, and moorings
● Recovery of expensive lost equipment
● Surveying and sampling of seabed

These tasks, among others, can now be easily completed without the

need for expensive commercial dive teams, resulting in significant cost savings.

Environmental specialists can leverage the capabilities of the SEAMOR ROV and the Voyis Discovery Stereo Camera to conduct high-resolution photographic surveys and other ocean bottom deployments.

The result is a more comprehensive understanding of underwater environments, facilitating early detection of issues such as seabed pollution, fish disease, or pen leaks.

In the realm of hydro dams, the collaboration between SEAMOR and Voyis addresses the critical need for secure power supplies. Hydroelectric companies worldwide prioritize the reliability of their systems, and the SEAMOR ROV, equipped with the Voyis stereo camera, is now an invaluable tool for ensuring system integrity.

These ROVs perform routine underwater inspections and tooling tasks, ensuring the consistent and secure supply of electricity and gas to millions of users.

With their reasonable pricing, lightweight design, and ease of deployment, SEAMOR ROVs are becoming the preferred choice for hydro companies looking for a versatile solution for underwater inspections.

The Discovery Stereo enables users to capture high resolution stills images, as well as real-time 3D models of critical structures, for more precise decision-making.

This collaboration marks a significant milestone in underwater exploration and inspection. By combining the expertise of SEAMOR Research and Voyis, industries that rely on underwater operations can now access technology that enhances safety, efficiency, and cost-effectiveness.

EverClean

Greensea IQ has announced the launch of its most advanced, next-generation EverClean service robot. The innovative improvements represent a significant leap forward in the realm of supervised reliable autonomy with Over the Horizon (OTH) operational capability for underwater hull maintenance.

EverClean is the first and only service ready to ensure that ship owners and operators can enjoy the benefits of an always clean hull, today. Whether it is in port, or through resident systems onboard the ship, the latest robots take full advantage of the 17 years of development in control, autonomy, and navigation Greensea IQ has to bear on the hull fouling problem.

The latest enhancements underscore Greensea IQ's commitment to the global shipping industry and its efforts to reduce carbon footprints by managing marine biofouling in a completely new way.

OPENSEA is Greensea IQ's extensively refined and modified software system that provides the next generation EverClean robots' tremendous capability to deliver fast and efficient hull cleaning today. The EverClean robot is packed with features like depth aided navigation, smarter obstacle avoidance, improved manoeuvring and enhanced user interaction capabilities.

EverClean service robot

The EverClean robots can autonomously cover areas up to 50m^2 on a ship's hull, significantly reducing the level of operator oversight required at the ship's side, effortlessly detecting obstacles, and pausing only where required for human intervention. Keep out zones are more intuitively defined within the software and the likelihood of brush or coating damage, already very low, has been reduced even further.

The robot intelligence isn't the only upgrade to the new EverClean robot though, it has also had significant improvements in the robot itself, starting by an increase in the brush deck size. The EverClean robots will be able to double their production rate over that of the first EverClean robots meaning any given area can be cleaned twice as fast in half the 'stick time' (duration of operator supervision), optimizing cleaning efficiency and reducing operational drag for customers.

The EverClean robots also benefit from enhanced thrusters, markedly elevating responsiveness and control between operator and robot. These thrusters have already been proven to bolster the service robots' stability, agility, and adaptability in dynamic conditions.

Not only this, but the thrusters have also been engineered for more efficient power utilisation and optimised distribution within the system. This means that the robots can do more with fewer amps of power, both significantly prolonging cleaning times on hull, while reducing recharging frequency to enable maximum robot availability.

EverClean service robot
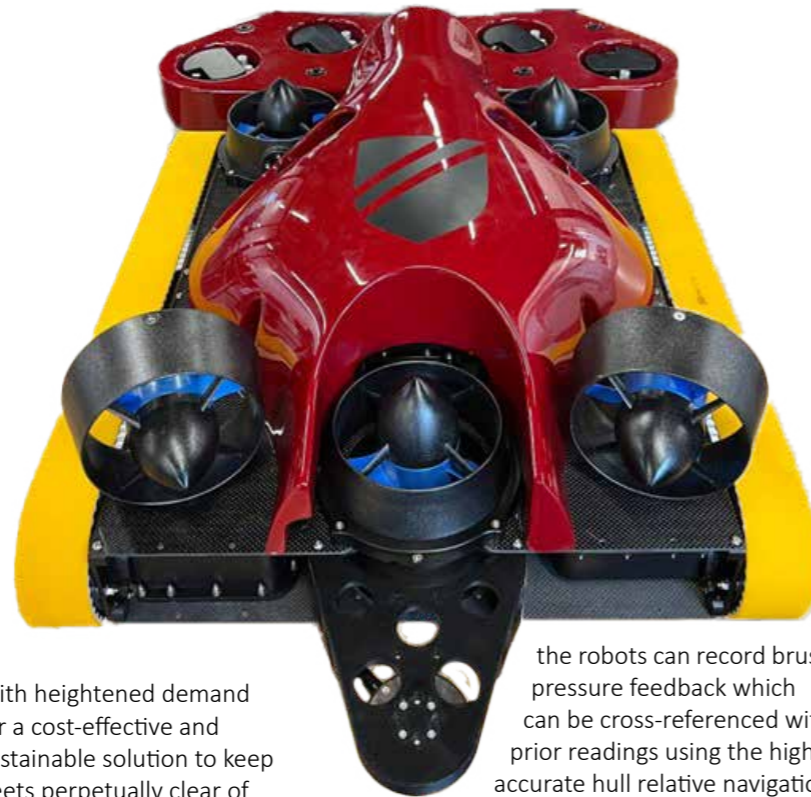
With heightened demand for a cost-effective and sustainable solution to keep fleets perpetually clear of biofouling, it is also worth noting that the EverClean robots use fewer outsourced parts than predecessors, reducing production costs and improving manufacturability. Fewer high-risk and sole-source components mean a smaller, more robust supply chain leading to shorter build times to meet increased market demand.

These latest advancements in the robot follows EverClean's recent launch of EverClean IQ.

EverClean IQ is revolutionary in underwater vessel maintenance, leveraging intelligent data collected during cleaning operations for the very first time. Equipped with cutting-edge sensors and cameras, the robots can record brush pressure feedback which can be cross-referenced with prior readings using the highly accurate hull relative navigation system.

This allows the EverClean IQ system to build a unique data set on each of the hulls it services. More than just a very accurate 3D, XYZ-referenced hull map, this data set is also an ever-evolving knowledge base of areas of the hull where biofouling happens faster or more slowly, informing future coatings management and enhancing future robot cleaning efficiencies.

EverClean IQ not only manages this data for its own future use but also transforms it into clear, concise reports for customers, offering insights into hull conditions over time through a user-friendly interface.

Inclination Monitoring Has Never Been So Easy
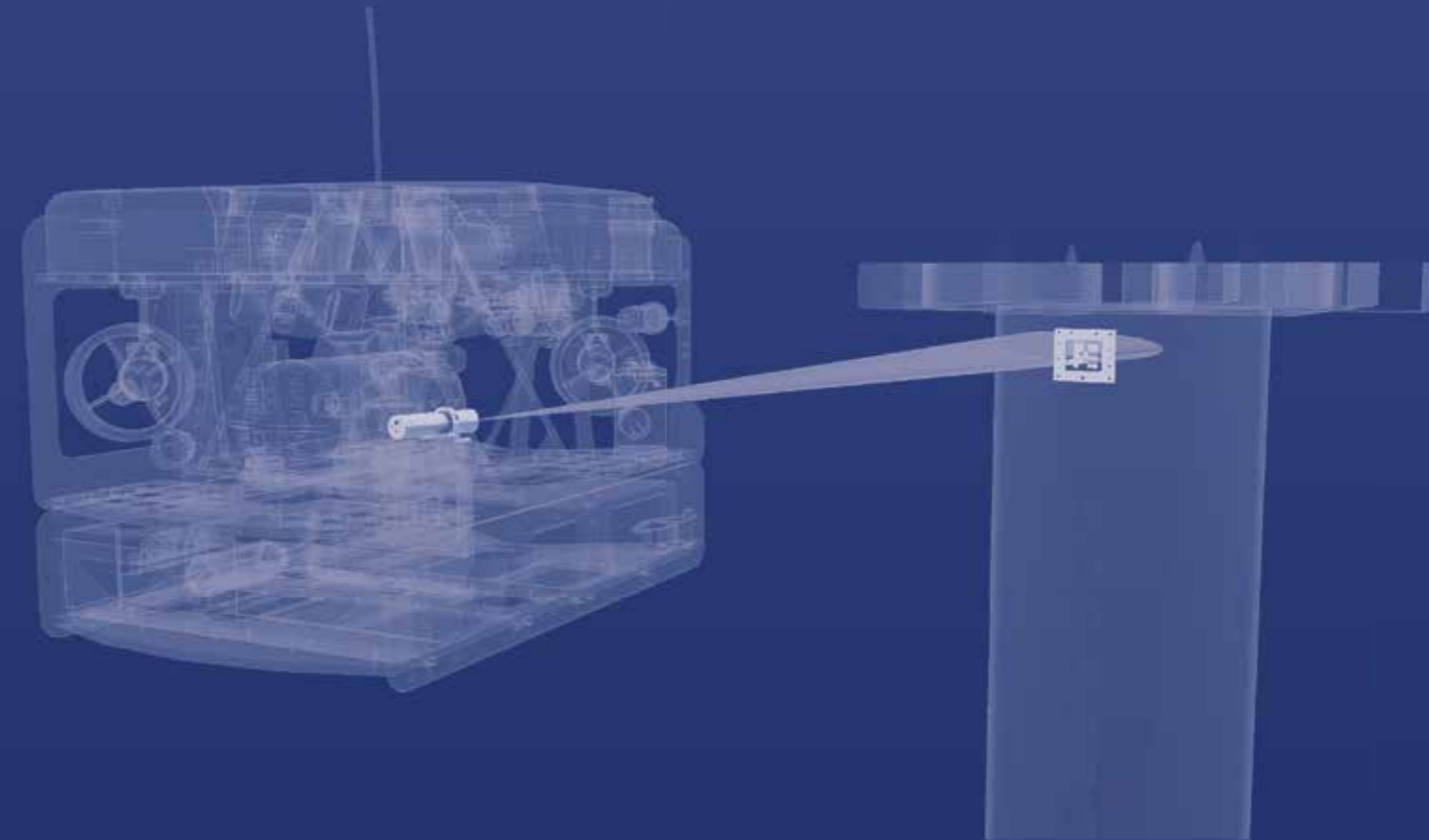
Ready-to-use & Service Free Technology for Marine Construction

V-LOC calculates your assets real-time coordinates thanks to open-source tags which are affixed to them. Our technology is embedded inside a calibrated camera which exists in both air and subsea versions for highly accurate marine surveys.

FORSSEA ROBOTICS

SALMO

Forum Energy Technologies has secured a contract from the UK Ministry of Defence Salvage and Marine Operations (SALMO) team to supply a work class remotely operated vehicle.

The system has been acquired by SALMO following an Urgent Capability Requirement (UCR) from its customer, which was announced in May. The ROV will complement and increase the existing UK Defence salvage capabilities managed by SALMO and will be used to support salvage and wreck surveys.

The XLX-C Work class ROV was manufactured at FET's UK facility at Kirkbymoorside, North Yorkshire, and will be delivered this year.

The contract includes a two-year support solution, warranty and spares package, vessel integration and sea trials support, a training package and the potential for upgrades and additions.

XLX-C Work class ROV

ARGOS

Forssea's ARGOS ROV has been mobilised onboard Louis Dreyfus Armateurs (LDA) Crew Transfer Vessel to execute subsea monopiles inspection on the Saint-Nazaire offshore wind farm. This project was sponsored by O&M department of the Saint-Nazaire offshore wind farm to validate the capability to dive directly from the field asset and avoid external vessel mobilization expenses.

An autonomous flight was successfully demonstrated, opening the door to fully remote operation from USV (Unmanned Surface VesseL) in a near future. A field where Forssea is also involved with a French industrial consortium led by EXAIL.

Method statement showed that the ARGOS compact ROV spread facilitates metocean window selection while reducing maintenance cost and associated CO2 emissions, even in harsh Atlantic coastal environment with significant tide amplitude.

🔴 Forssea Robotics has been awarded a €1 M contract from the French Naval forces for the delivery of one ARGOS ROV full spread. This is Forssea Robotics's first step in the Defence market.

Argos ROV

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Connecting What's Needed with What's Next™

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Gather high-quality survey data at a lower operational impact. Our integrated USV services deliver an efficient, environmentally friendly alternative to vessel supported operations.

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3D RECON

Navigation has traditionally relied on known positions and landmarks to establish accurate coordinates, whether above or below water. While navigating above water has the luxury of utilizing satellites and existing reference points, the subsea world presents a unique challenge, and precise navigation (localization) becomes a far more complex endeavour. Precise localisation subsea is where the advantages of Zupt's subsea imaging system, 3D Recon, come into play by offering a solution to aid positioning in the absence of Global Navigation Satellite Systems (GNSS) or other subsea positioning solutions like LBL or USBL.

Underwater, traditional positioning methods often rely on acoustic transponders placed on the seabed. Once placed and calibrated, these transponders provide fixed reference points for a long baseline acoustic positioning solution. These subsea long baseline acoustic arrays have traditionally provided positioning for marine construction and subsea infrastructure installation. However, this approach consumes significant vessel time to install and calibrate, and once a field matures into production, these arrays are usually removed.

The algorithm known as Simultaneous Localization and Mapping (SLAM) is one technological advancement

that addresses this problem. SLAM involves two interconnected tasks: localization, determining your current position, and mapping, establishing the positions of landmarks in your environment. The complexity arises from the need to perform these tasks simultaneously. Essentially, SLAM allows 3D Recon to build its own map while navigating within it.

At the heart of SLAM lies the ability to detect and track features in the environment. In the case of subsea navigation using 3D Recon, it creates references by identifying distinctive features within its imagery while looking at its surroundings. These features are recognized by comparing images from the left and right cameras and identifying corner points or areas with significant intensity changes.

Once these features are automatically detected, 3D Recon examines the surrounding pixels, creating a description that can be matched with similar features in subsequent imaging frames. This feature matching allows the system to establish a connection between different frames and estimate its movement between them.

3D Recon integrates Inertial Measurement Unit (IMU) data to refine navigation accuracy. IMUs provide information about the vehicle's rotation and translation, including acceleration and angular velocity

data. By combining feature matching with IMU data, 3D Recon can more precisely determine its movement between frames, or precise "pose determination," enhancing navigation accuracy.

To further refine the accuracy of navigation, bundle adjustment is used. This process optimizes the positions of both the camera frames and the detected features to minimize the error between where a feature is seen and where it should be projected in the image. Bundle adjustment fine-tunes the entire navigation trajectory, ensuring that the 3D coordinates are aligned with the image data, resulting in highly accurate positioning or localisation.

ADVANTAGES
3D Recon's Subsea Imaging System offers several advantages for underwater navigation:
1.   Enhanced Precision: The system's relative positioning accuracy to the structure it is imaging is easily sub-centimeter, outperforming traditional underwater navigation methods like USBL, where accuracy is dependent on water depth, or LBL, where accuracy depends on constant speed of sound updates.
2.   Autonomous Mapping: 3D Recon's system allows for autonomous mapping of the environment, eliminating the need for external aiding reference points.
3.   Improved localization: The system's accuracy is instrumental for applications like structure-relative navigation for autonomous intervention into structures.

Additionally, Zupt has found that one of the most significant benefits of

using 3D Recon is the ability to supply clients with precisely positioned metadata around their work area. After the contracted deliverables have been made, clients have returned to the data sets and asked for additional deliverables due to the quality measurements available within the models.

CONCLUSION
Zupt's Subsea modeling System, 3D Recon, transforms underwater navigation. It achieves centimeter-

level precision without relying on external references by utilizing Simultaneous Localization and Mapping (SLAM) and integrating Inertial Measurement Units (IMUs). This system's autonomous mapping capabilities make it invaluable in subsea environments where traditional positioning methods are unavailable. 3D Recon excels in applications requiring structure-relative navigation, opening a new era of accuracy and autonomy for navigating subsea.
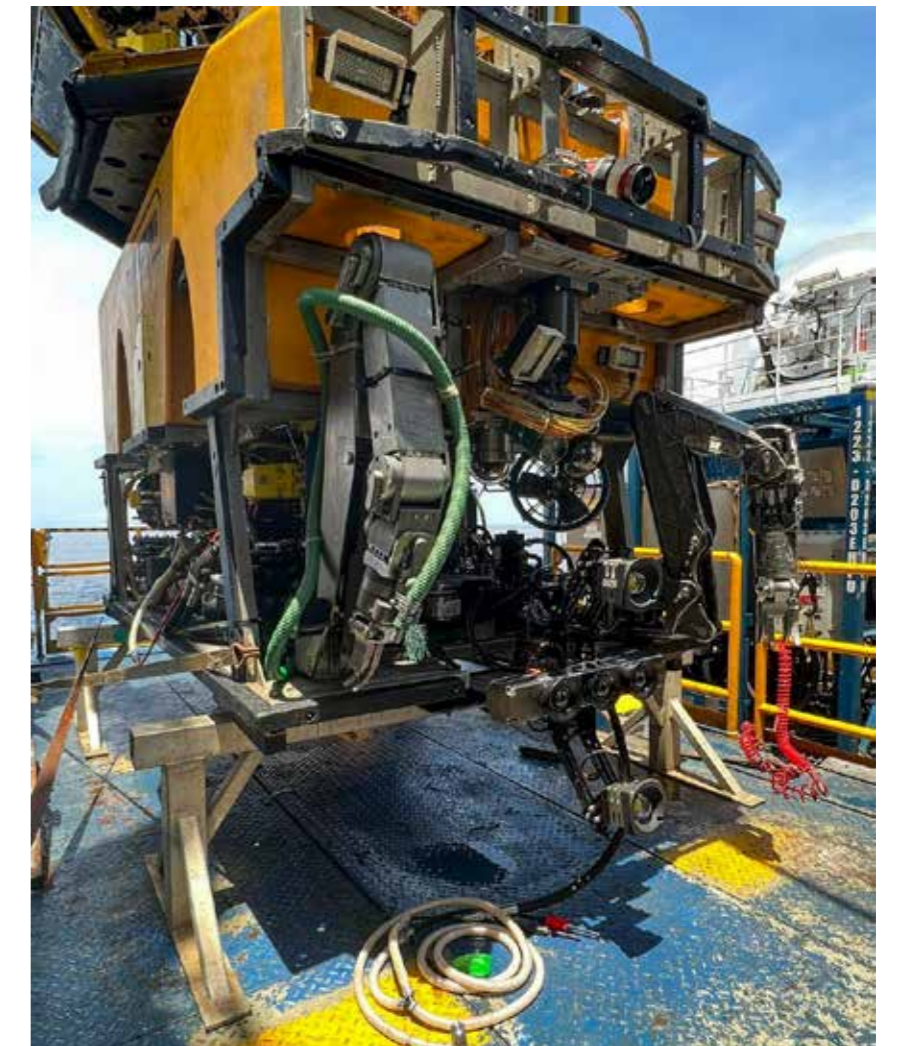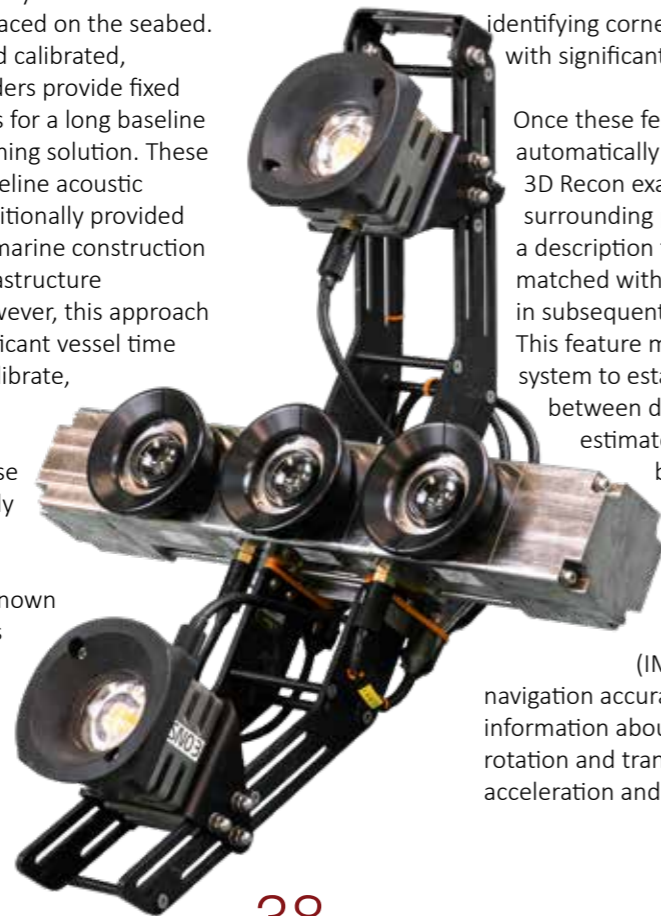
Reach X

Over the past few decades or so, the use of small electric ROV has expanded rapidly. They have broadly divide into two main designs.

One began to evolve into small and dexterous observation vehicles able to navigate small spaces and manoeuvre around objects to provide the user with a clear picture of the underwater target. In addition to cameras, these could also could carry a variety of equipment items such as sonars and probes with some being equipped with grabbers.

The second type were typically larger vehicles that could not only use its cameras to view the underwater subjects, but were able to carry out intervention work. The were equipped with manipulators, either added to the ROV itself, or housed in purpose-designed skids underslung from the ROV. These skids were incompatible with other ROVs

Recently Reach Robotics has recently blurred the boundaries by launching its new Reach X Advanced Intervention System (RX-AIS) manipulator skid system has been designed to provide a new or higher level of manipulators to observation vehicles.

"The Reach X Advanced Intervention System (RX-AIS) is the world's most compact, versatile, and power-dense manipulator system for expeditionary underwater vehicles," said Anders Ridley-Smith, Director of Business Development at Reach Robotics.

"It multiplies the capability of a standard observation ROV by enabling complex human-like intervention and inspection.

The ability of many small ROVs has always been limited and so human divers are still needed to complete tasks such as manipulating, cutting, or untangling a line, attaching a hook, or retrieving and placing objects in precise locations.

"The problem is that existing robotic arm systems either lack dexterity or are too bulky and heavy to provide a useful capability to military operators. Furthermore , the control systems are often primitive or complex and uncomfortable. Control systems that aren't intuitive fall out of favour and consequently use by operators and this renders a significant robotics investment wasted."
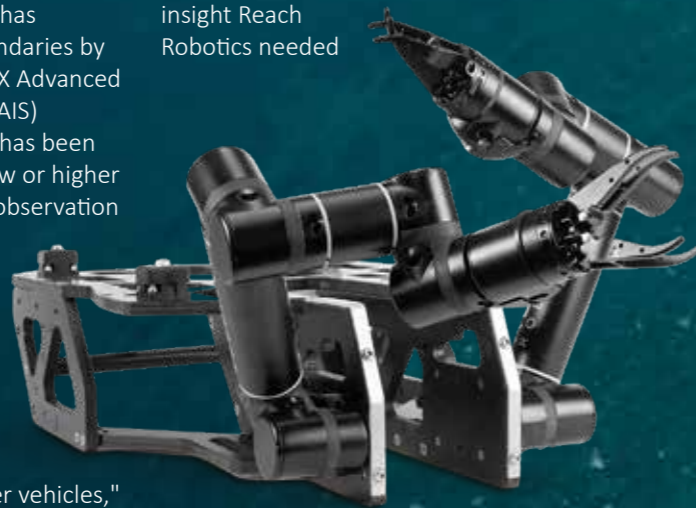
Five years of collaboration with US and Australian DoD operators provided the insight Reach Robotics needed

The Reach manipulators can lift 6.5kg and move in 6+ Degrees of Freedom

to address these shortfalls through the release of the Reach X.

"Today, human divers still have to go into harm's way to deal with a variety of underwater threats," said Ridley-Smith. "That is still a problem. One of the reasons we created the Reach X to provide a useful step-change in capability to the Clearance Diver and Mine Warfare community."

DESIGN
"Making underwater robotic arms is hard. Within the design of any Reach Robotics product resides the lessons learnt and expertise gained from seven years of innovation and real-world deployments in the Defence and Offshore Energy sectors. The Reach X is a new manipulator, but it draws on the track record of manufacturing excellence that comes from building, testing, and shipping almost 1000 systems to date.

VideoRay Labs

VideoRay has long been recognised as in the ROV (Remotely Operated Vehicle) industry as delivering cutting-edge underwater robotics technology to a global customer base. The new Mission Specialist systems take inspection-class robots to a new level, delivering the power and functionality expected from larger, more expensive systems in a modular, one-man-deployable footprint, significantly reducing operational costs while streamlining logistics.

VideoRay recently acquired Blue Ring Imaging, a small team comprised of innovative technologists and engineers who developed operational Mixed Reality software, multi-view camera systems, and photorealistic simulation environments for the unmanned industry to increase situational awareness and autonomy.

To harness the synergies of this acquisition and accelerate the adoption of emerging technology, VideoRay proudly introduces VideoRay Labs. Under the leadership of Casey Sapp, former CEO of Blue Ring Imaging, VideoRay Labs aims to serve both new and existing VideoRay customers through applied research and the utilization of the Blue Ring technology suite to pioneer next-generation man-machine teaming and autonomy. Some of the customers already collaborating with VideoRay Labs include Lockheed Martin, the Office of Naval Research, Navy PMS 408, and Navy PMS 420.

VideoRay Mission Specialist Defender ROV with OctoCAM™ Multi-View 360-Degree Underwater Camera

UNI-MINI AND UNI-MAX

UNIQUE GROUP BROADENS UNMANNED SURFACE VESSEL (USV) PORTFOLIO WITH THE LAUNCH OF TWO NEW MODELS

Unique Group has announced the launch of two Unmanned Surface Vessels (USVs), the Uni-Mini and Uni-Max. The USV systems have been developed entirely in-house, designed for surveying operations and engineered to meet diverse operational needs across challenging environments.

The new addition of these USVs further enhances Unique Group's USV fleet as the company can now provide clients with specific USVs ranging from small, medium and large sizes based on project applications.

The **Uni-Mini USV** is an economical, compact and lightweight vehicle that can be effortlessly operated by just two people, ensuring quick and hassle-free deployment.

The **Uni-Max USV** incorporates a Hybrid Power System, integrating a

It has been specifically engineered for shallow water surveys, offering an unprecedented level of convenience and versatility. With the ability to integrate seamlessly with a wide range of transducers and GPS systems, the Uni-Mini can execute various survey tasks with minimal effort and manpower.

generator with a diesel tank and solar PV cells. This new addition significantly extends operational capabilities, enabling prolonged missions in remote or demanding terrains.

This advanced USV is designed to allow surveying in locations and situations where deploying conventional platforms proves impracticable.

Featuring two Torqeedo Cruise 6.0RS Engines with Hydraulic Steering, the Uni-Max is said to ensure unparalleled performance and manoeuvrability.

Sahil Gandhi, CEO of Unique Group commented: "Our first mid-range USV, Uni-Pact, introduced in 2020, has gained global acclaim for its capabilities. The Uni-Mini and Uni-Max, underscore Unique Group's commitment to providing cost-effective solutions."

Unique Group's Unmanned Surface Vessel (USV) Fleet
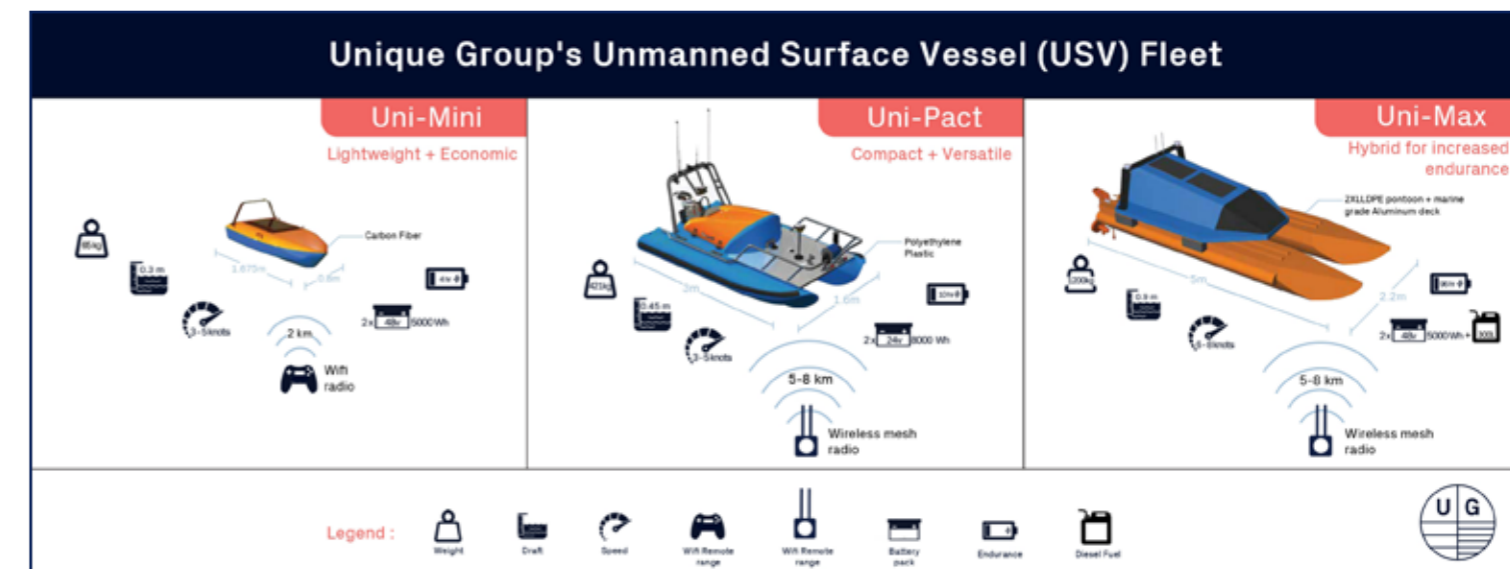
KIMBERLEE McHUGH

TELEDYNE

Kimberlee McHugh has joined Teledyne Marine-Vehicles, located in North Falmouth, Massachusetts, as the organization's new marketing manager.

Ms. McHugh, former marketing director at the Steamship Authority, has over 15 years of senior level marketing experience in the maritime transportation, hospitality, and tourism industries.

Her career highlights include digital marketing development and execution, HR recruitment advertising planning and execution, increasing market share, sales and revenue growth, website development and launch, 360 marketing strategy, project management, event planning, attending trade shows, and digital content planning and execution.

Kimberlee's role at Teledyne encompasses the planning, development and implementation of internal and external marketing strategies, marketing communications, event coordination and planning, social media, web presence and messaging, and public relations activities, and coordinating the development and implementation of support materials and services day-to-day for Teledyne Marine located in North Falmouth, Massachusetts.

JEFFREY TRUSSLER

TERRADEPTH

Terradepth has engaged Vice Admiral (ret.) Jeffrey Trussler as a senior advisor. Vice Admiral Trussler just retired from a 39-year career in the US Navy where he served as a submarine and nuclear power officer before transitioning to intelligence, information warfare, and advanced technology development.

He commanded the ballistic missile submarine *USS MARYLAND* (SSBN 738), Task Force SIX NINE in Naples, Italy where he was in charge of US Navy and allied undersea operations in the European and African theatres, and the Undersea Warfighting Development Center responsible for innovation, technological, and tactical development.

He finished his Navy career as the Deputy Chief of Naval Operations for Information Warfare and as the 69th Director of Naval Intelligence.

As a senior advisor to Terradepth, Jeffrey Trussler will provide strategic guidance across the Terradepth business; his role will be instrumental in shaping Terradepth's strategy and ensuring that the company remains at the forefront of ocean exploration and innovation.

EVOLOGICS

After 23 years in Berlin-Mitte, EvoLogics moved its headquarters to a new the technology park Berlin-Adlershoft

EvoLogics GmbH
Wagner-Régeny-Straße
12489 Berlin
Germany

The headquarters relocation to a larger premises allows Evologics to expand production, research and development capacity going forward.

ØRSTED'S BENJ SYKES BECOMES PRESIDENT OF THE SUT

The AGM of the Society for Underwater Technology marked the official hand over to new elected officers in three senior posts – The President, Hon Secretary and Hon Treasurer.

Benj Sykes, Vice President, Head of Environment, Consenting and External Affairs at Ørsted has been elected SUT's President, Nick Swift becomes Hon Secretary, and Mick Cook returns as Hon Treasurer.

Sue John continues in her role as SUT's Chair.

The SUT also announced winners of four Awards.

Outgoing SUT President, Moya Crawford, revealed that this year's winner of the SUT President's Award for outstanding achievement is Mr Ali Hynd, Vice Principal of Mintlaw Academy in Buchan, NE Scotland
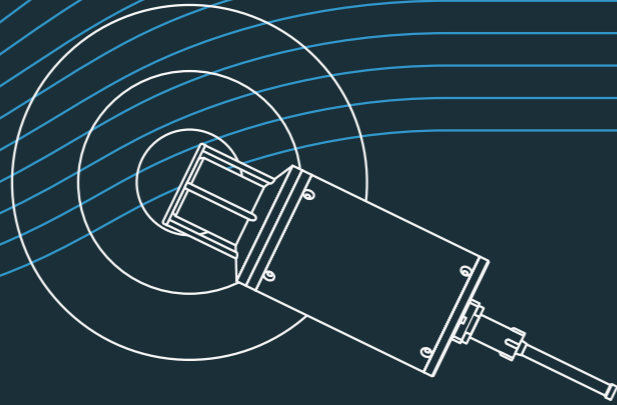
Norma Hogan of Highlands and Islands Enterprise was the recipient of the 2023 Lennard-Senior Memorial Prize. The prize is awarded in recognition of outstanding individual achievement in the field of Marine Renewable Energy.

Benj Sykes has been elected SUT's President

The 2022 Captain Don Walsh Award for Ocean Exploration, presented jointly with the Marine Technology Society (MTS), was awarded to University of Georgia oceanographer Dr Samantha Joye.

The 2023 Gwyn Griffiths Award for Underwater Robotics was presented to Rustom Jehangir of Blue Robotics at Ocean Business 2023.