



ON&T

OCEAN NEWS & TECHNOLOGY | oceannews.com

JUNE 2024

UNDERWATER IMAGING



COMET-300

STELLAR U V

**Portable & enduring solution
for demanding missions**

- > 2-man portable
- > 10 knots speed
- > INS, DVL, SSS, CTD, TV CAM, MAG, LBL
- > Real time tracking
- > Live communication
- > High-resolution data acquisition



RTSYS

Underwater Acoustics & Drones

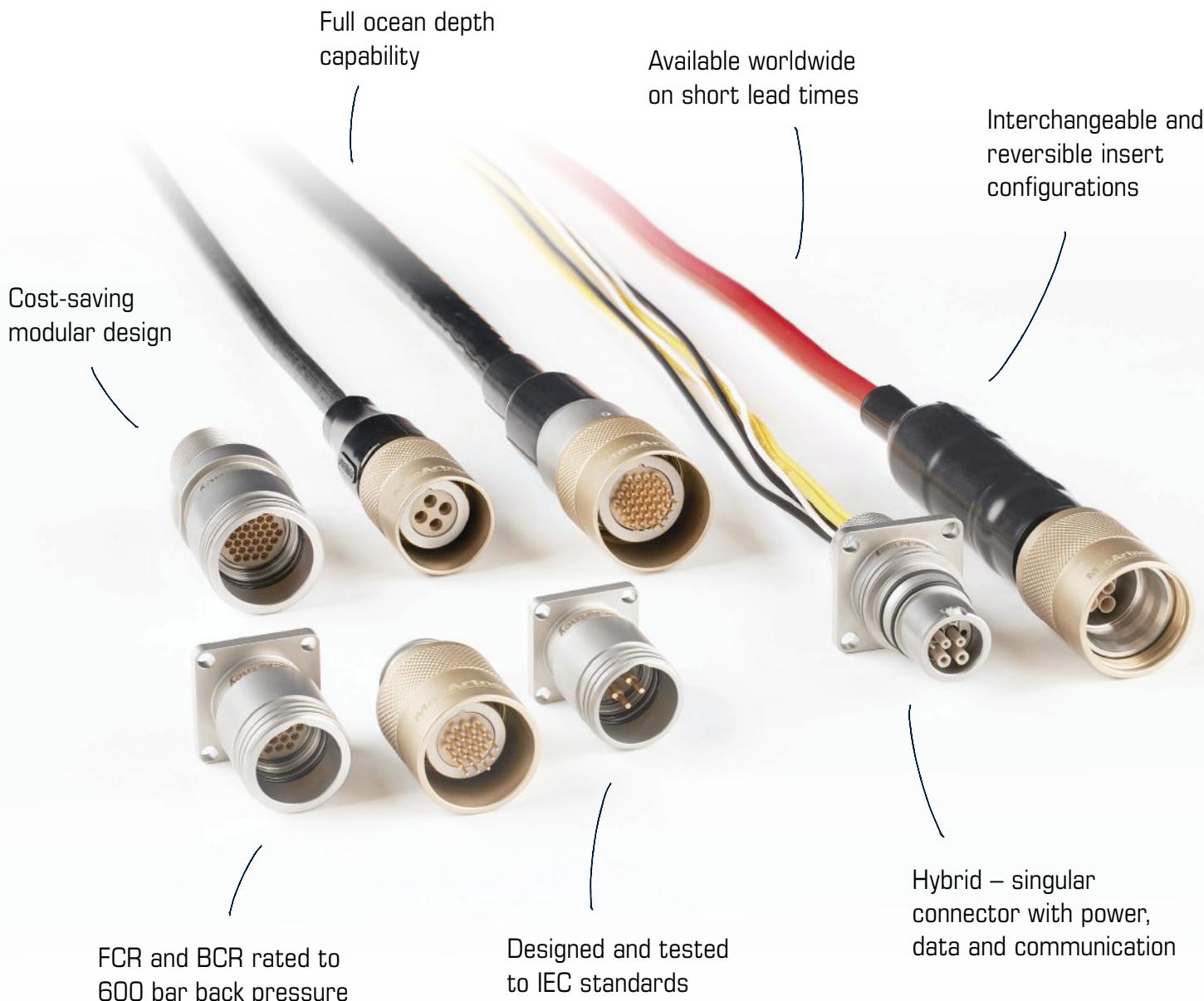
Data processing by SEA360

rtsys.eu



TrustLink

Metal Shell Connectors



MacArtney global solutions

Denmark | Norway | Sweden | United Kingdom | France
Italy | Germany | Netherlands | USA | Canada | Brazil
India | Singapore | China | Australia



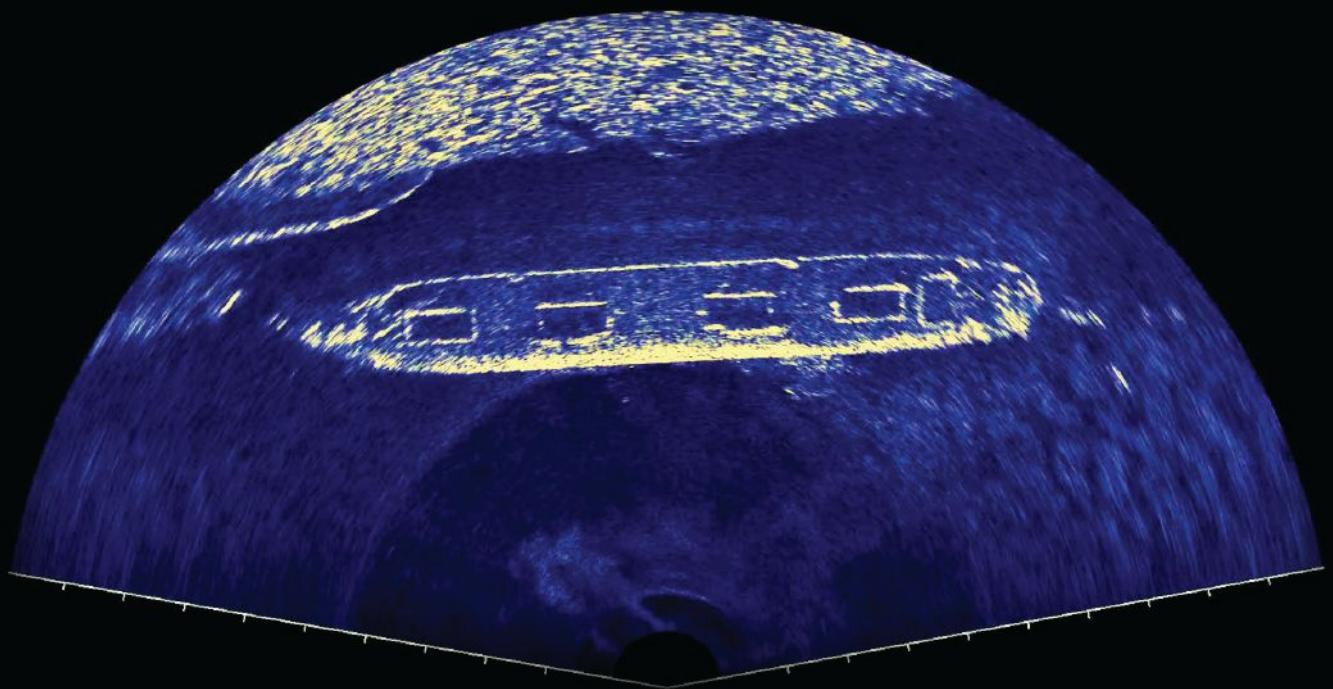
Superior Performance Ultra High-Resolution Forward Looking Sonar



NORBIT WINGHEAD F11

Features

- Superior Processing Architecture
- Industry Leading Resolution
- Long Range Performance
- Detailed Shadowing / High Contrast
- Compact and Simple to Integrate
- Search & Recovery • Underwater Security • Rapid Environmental Assessment



NORBIT
- explore more -



CONSTRUCTING UNDERWATER 3D MODELS WITH ROVS

IMPROVED UNDERWATER ASSET MANAGEMENT

Create 3D models of critical assets using scanners and high-res cameras to proactively identify issues before they escalate into serious problems.



3D MODELING FOR STRUCTURAL ANALYSIS

Leveraging imagery for 3D models of structures and environments provides detailed insights and facilitates historical records.

REDUCE INSPECTION COSTS

Don't be held back by having to work around the schedules of divers, and rushed by their hourly rates. Instead, deploy ROVs to conduct thorough inspections and build 3D models to monitor assets strategically and tactically.



Experience a wider video field, enhanced clarity, and automatic color correction with our ROVs equipped with a 4K camera, unlocking advanced 3D modeling for comprehensive photogrammetry projects. Using imagery to create 3D models of complex structures provides operators with detailed insights into the environments they are inspecting.



PHOTON ROV



PIVOT ROV



REVOLUTION ROV



deeptrekker.com

CONTENTS



16

FRONTLINE

TAKE 5

16 THE ON&T INTERVIEW

ON&T spoke to Daniel Lockney, Technology Transfer Program Executive at NASA Headquarters, about exploring novel ways of mapping the seabed and more.



30 OIL AND NATURAL GAS

Prices continue their meandering journey higher

CHECK THE TECH

35 WIDEFIELD CAMERA ARRAY

New technology for immersive imaging and visualization

EDITOR UPFRONT

Current advances in underwater imaging technology help us see, in every sense, just how far ocean exploration has come in recent decades.

The speed with which we can now deploy intelligent vehicles and devices with exacting precision to capture pristine footage and process accompanying data in near real time is transformative. Today, we have the sophisticated tools and know-how to chart previously unfathomable depths and map the seafloor—the vast majority of which remains a relative mystery—to a revealing resolution.

This month, we meet a crew of pioneers bringing newfound definition to subsea environments: Our thanks go to Voyis, Magellan, SEARCH, Advanced Navigation, NASA, Deep Trekker, and Verlume.

A handwritten signature in black ink.

editor@oceannews.com



10

MONTHLY EXCLUSIVES

8 OUT OF DARKNESS COMES CLARITY

James P. Delgado, Senior Vice President, Exploration Sector Leader, SEARCH

10 REVOLUTIONIZING UNDERWATER IMAGING

Micro-AUVs offer a cost-effective way to capture game-changing detail
Xavier Orr, CEO, Advanced Navigation

22 A NEW ERA FOR SUBSEA ASSET INSPECTION

The integration of ROVs for photogrammetry and 3D modeling
Chad Gillen, Content Strategist, Deep Trekker

27 FULLY CHARGED

Delivering reliable power offshore through compact battery packs
Andy Martin, CCO, Verlume

FRONTIERS

- 12 OCEAN SCIENCE & TECHNOLOGY
- 24 OFFSHORE ENERGY
- 36 SUBSEA INTERVENTION & SURVEY
- 44 DEFENSE & SECURITY
- 50 OCEAN MILESTONES

CONTINUUM

- 40 OCEAN PREDICTIONS
- 54 EVENTS
- 55 EDITORIAL CALENDAR
- 60 OCEAN INDUSTRY DIRECTORY
- 66 ADVERTISERS INDEX

ON THE COVER



Image reproduced with kind permission from Magellan, captured during the 2022 Magellan Titanic expedition. Image captured using the Voyis Observer & Nova subsea Imaging System—for more information visit: magellan.gg. (Credit: Voyis)

EMPOWERING

World leading electric underwater robotics

Seaeye eM1-7

Electric Manipulator

- Seven function work class manipulator
- Compatible with most work class ROVs
- Maximum reach 1,990mm
- Lift capacity 122kg/454kg (max/min reach)
- Precise position and force feedback
- Modular self-contained joints
- Wrist camera option
- Diagnostic power and status LEDs
- Interchangeable parallel and intermeshing jaw options
- On-board processing for advanced kinematics

saabseaeye.com



SAAB



OUT OF DARKNESS COMES CLARITY

MANAGING EDITOR

Ed Freeman

EDITORIAL

Haley McQueen
G. Allen Brooks
Inger Peterson
Jenna Holleran

PRODUCTION

Lisa D. Ferrari
Keith Meinholt
Patrick Lyons

DISTRIBUTION

Whitney Schwerin
Kadesha Dsilva

ADVERTISING

Lisa Chilik
Tel: +1 574 261 4215
Lchilik@tscpublishing.com

Mimi King

Tel: +44 77 7601 7564
mking@tscpublishing.com

FOLLOW US:

-  [oceannews](#)
-  [oceannews](#)
-  [OceanNewsandTechnology](#)

TO SUBSCRIBE:

www.oceannews.com/subscribe
subscriptions@oceannews.com

Ocean News & Technology ISSN# 1082-6106
is published 10 times a year in print and digital by Technology Systems Corporation, 8502 SW Kansas Ave, Stuart, FL 34997, telephone 772-221-7720. Copyright ©2024 Technology Systems Corp. All rights to editorial content are reserved. No article, photograph, or illustration may be reproduced in whole or part without the written permission of the publisher. Unless otherwise stated in writing by the contributor, all images submitted to TSC may be used in other promotional materials belonging to TSC without permission. Subscriptions are free to qualified individuals or companies. For all others, call TSC for subscription information.

PRINTED IN THE USA



James P. Delgado

Senior Vice President,
Exploration Sector Leader



Recent advances in underwater imaging continue to deepen our understanding of the planet's oceans, not only through increasingly detailed images but also thanks to the measurable data that accompanies them. All science begins with measurement, wrote scientist John Arthur Thomson in his book *Introduction to Science* in 1911.

When trying to gauge just how far underwater imaging has come over the last few decades, look no further than this month's cover shot of the RMS *Titanic*. The discovery of the wreck site in 1985—73 years after its fabled sinking in 1912—was a pivotal moment for ocean exploration and served as fresh impetus for developing novel technologies and techniques designed to shed light on a cold, dark, and often hostile frontier.

The first published images of the *Titanic* were caught using the towed sled ANGUS's three 35-mm color cameras, which systematically fired every twenty seconds. No one aboard RV *Knorr* knew what had been photographed until the sled was hauled up, the cameras were unloaded, and the film was processed. From the 20,000 frames of film and some 8,000 scenes, grainy, blue-toned images of the wreck site—like that featured on the cover of *National Geographic Magazine* in December 1985—were beamed around the globe.

EARLY DEPICTION AND COVERAGE

However, the first comprehensive images of the wreck in its entirety relied on the masterful hand of Ken Marschall, who was able to piece together details in highly accurate paintings of the wreck in its eerie, photographically captured dark blue. In the decades that followed, larger, full-color images were taken from submersibles that dived the wreckage, such as those featured in Stephen Low's IMAX film, *Titanica*, and James Cameron's stunning footage of both the exterior and the interior of the *Titanic*. These images, when paired with computer graphics, brought a new sense of scale and context to

the wreck; they brought the ill-fated ocean liner to life—as it steamed, as it sank.

DATA BRINGS DEFINITION

Further efforts to digitize the *Titanic* included a photomosaic made from 756 images captured by cameras on remotely operated vehicles (ROVs) in a 2004 NOAA mission that generated 400 gigabytes of data.

That was followed by the 2010 mission with two REMUS autonomous underwater vehicles (AUVs) and a specially outfitted REMORA ROV that produced the first detailed sonar map of the entire wreck site. The mapping documented scattered wreckage within a mile by a 1 x 1.5-mile area, followed by higher resolution sonar maps of focused areas of the site that gave not only a visual sense but measurable data.

Then, thanks to the work led by William Lange, Evan Kovacs, and Maryann Morin from Woods Hole Oceanographic Institution's Advanced Imaging and Visualization Laboratory, full-color images of the entire bow section, the stern, and selected concentrations of wreckage and artifacts were produced.

A NEW PERSPECTIVE

Then, a decade after the publication of the 2010 results, a new mission by Magellan Ltd., working with Atlantic Productions, captured 700,000 images to develop what has been heralded as an "exact 3D reconstruction" of the wreck. The images provide stunning clarity, and the three-dimensional data enable true measurement—the starting point in all scientific inquiry—and an entirely novel aspect to exploring a notoriously volatile and remote subsea environment, 3,800 meters below the surface.

As with most scalable technological progress, the associated costs of exploration below the waterline will continue to fall. The pace at which underwater imaging is advancing is a clear cause for celebration, anticipation, and discovery.

SMART SUBSEA SOLUTIONS

- Delivering data in most adverse conditions: underwater acoustic modems with advanced communication technology and networking
- Accurate USBL, LBL and hybrid positioning of underwater assets, navigation for divers
- 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



NEW
**DIVER NAVIGATION
SYSTEM**

AVAILABLE NOW

REVOLUTIONIZING UNDERWATER IMAGING

Micro-AUVs offer a cost-effective way to capture game-changing detail



Xavier Orr
CEO
 ADVANCED NAVIGATION

Exploring the depths of the ocean has always been a complex undertaking. Indubitably, it is exponentially more difficult to explore the deep sea than it is to venture into space. Unlike the cosmos, the ocean has extreme pressures, no natural light source and limited visibility.

Unfathomably, only 24% of the ocean floor has been explored and charted by humans. It not only serves as a habitat for countless marine life, but it also plays a vital role in regulating the Earth's climate by absorbing carbon dioxide and releasing oxygen. The more we know about the ocean, the more effectively we can ensure its health for generations to come.

THE NEED FOR SUBSEA IMAGING

Subsea imaging is crucial in various fields. For industrial engineers, underwater imaging allows for detailed inspection and maintenance of offshore infrastructure, such as pipelines and cables, helping to identify and prevent catastrophic failures.

Archaeologists use high-resolution imagery to study submerged historical sites and artifacts, while marine conservationists depend on it for regular monitoring of marine ecosystems. Defense operators leverage underwater imaging for reconnaissance and surveillance purposes, making it an essential tool for military intelligence.

As the demand for underwater exploration grows, it is increasingly critical to develop versatile subsea imaging solutions that

AS THE DEMAND FOR UNDERWATER EXPLORATION GROWS, IT IS INCREASINGLY CRITICAL TO DEVELOP VERSATILE SUBSEA IMAGING SOLUTIONS THAT CAN ADAPT TO EVOLVING NEEDS AND ONGOING CHALLENGES.

can adapt to evolving needs and ongoing challenges.

THE CHALLENGES

Taking high quality underwater imagery contrasts starkly with land surveying because of the unique challenges presented when under the sea.

One of the primary differences is visibility. Underwater environments are often murky and turbid, with particles suspended in the water scattering and absorbing light rapidly. This can lead to significant lens distortion and image blurring. To further complicate matters, darkness at greater depths compounds the problem. This makes capturing clear, high-resolution imagery particularly challenging, necessitating advanced technology and techniques to mitigate these issues.

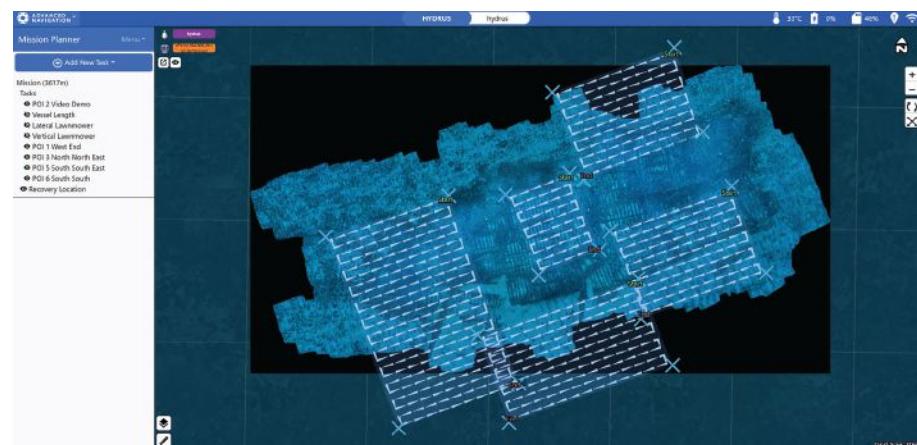
Another difference is due to the unstable and dynamic conditions of underwater environments. Strong currents, waves, and other factors not only make it challenging to capture high quality imagery, but they can also pose safety risks to divers and equipment.

The biggest hurdle for underwater exploration, however, is accessibility in terms of expense.

Traditional methods, such as divers, ROVs, and conventional AUVs require specialized equipment and expert personnel, leading to significant operational costs, which deter most organizations from making subsea dives on a regular or meaningful basis.

OVERCOMING CHALLENGES

Hydrus, a micro-AUV by Advanced Navigation offers a groundbreaking solution to



Hydrus mission planning software utilizing georeferenced data. (Credit: Advanced Navigation)

the challenges of underwater exploration, providing an easier and more cost-effective way to explore the ocean and capture unprecedented detail.

The micro-AUV features the most advanced navigation and communication systems of any underwater vehicle of its size, including:

- **Doppler Velocity Log:** designed for relative motion tracking and obstacle avoidance underwater.
- **Ultra-short Baseline Acoustic Positioning:** designed to provide absolute underwater position.
- **Inertial Navigation System:** AI aided data fusion from all navigation inputs.
- **Acoustics:** tetherless commands can be sent to the vehicle while underwater.
- **Imaging System:** computer-vision aiding on the camera feed for object detection and classification.

Another innovation is the thruster design. Equipped with hubless thrusters, the in-house design allows seaweed and particles to move directly through, without entanglement. Several thrusters are located at various orientations, giving the vehicle six degrees of freedom of movement, and the ability to rotate and translate direction, even in high currents or rivers.

Additionally, Hydrus is equipped with AI-driven obstacle avoidance systems, allowing it to navigate complex terrains autonomously and avoid collisions. Its compact design allows for easy transportation and hand-deployment from a small boat, eliminating the need for larger vessels and expert teams. This simplicity reduces operational costs, minimizes downtime between missions and maximizes time for data capture.

By combining these advanced features, Hydrus not only overcomes the traditional limitations of underwater exploration but also sets a new standard for efficiency, accuracy, and affordability in subsea data imaging.

4K CINEMA-GRADE CAMERA

At the core of Hydrus' imaging capabilities is its 4K camera and advanced sensors capable of submillimeter resolution. This precision is crucial for capturing fine details and measurements, enabling Hydrus to detect subtle changes and anomalies which would otherwise be missed. For example, in coral reef monitoring, this precision allows



▲ Close-up of 3D model from structure-from-motion photogrammetry. (Credit: Advanced Navigation)

the growth of coral to be tracked over time. Similarly, it proves incredibly powerful for the inspection of underwater assets, enabling users to note and measure the size of defects naked to the human eye.

Impressively, Hydrus' camera can be used to capture video and high-resolution imagery simultaneously, preserving color information and other visual details despite underwater visual degradation. Intelligent camera controls featuring auto-adjusting ISO, lights, and white balance further enhance image quality.

BATHYMETRY AND PHOTGRAMMETRY

Hydrus excels in capturing data with such precision that it enables advanced bathymetry and structure-from-motion (SfM) photogrammetry.

Traditional bathymetry involves using acoustic sensors to map underwater topography, offering low-resolution scans. SfM photogrammetry, on the other hand, reconstructs 3D structures from 2D image mosaics of multiple overlapping photos taken from different positions.

As light does not travel far underwater, capturing large areas, for example shipwrecks, can be challenging. Hydrus, however, can complete multiple survey missions of its target and piece diverse images to produce a complete picture. The results can then be combined with bathymetry data to obtain a map of the area with submillimeter resolution.

GEOREFERENCED DATA

Data captured by Hydrus also includes georeferencing. This georeferenced data can then be used with Hydrus' inbuilt mission planning software to conduct repeat missions and long-term monitoring. By tagging each image and video frame with GNSS coordinates, Hydrus enables operators to return to specific locations and create underwater digital twins for data comparison.

When combined with Hydrus' onboard

object identification and sophisticated third-party software, Hydrus becomes a powerful tool for underwater investigations like evidence collections and search and recovery missions.

UNDERSTANDING THE OCEAN

Hydrus represents an important breakthrough in underwater imaging, overcoming many of the limitations of traditional methods. Its incorporation of state-of-the-art sensors and cameras enable it to capture data in unprecedented detail, making it a powerful tool for various applications in environmental monitoring, infrastructure inspections, marine engineering, underwater archaeology, and surveillance applications.

With its robust capabilities, Hydrus not only promises to change the way we explore underwater frontiers but also ensures high quality data acquisition. The ocean intelligence gathered will help us make more informed decisions regarding marine conservation, resource management and climate change, while adding to our collective understanding of the sea.

[i advancednavigation.com](http://advancednavigation.com)



▲ Hydrus micro-AUV. (Credit: Advanced Navigation)

ATLANTIC HURRICANE SEASON OUTLOOK PREDICTS ABOVE-NORMAL CYCLONE ACTIVITY

NOAA National Weather Service forecasters at the Climate Prediction Center predict above-normal hurricane activity in the Atlantic basin this year. NOAA's outlook predicts an 85% chance of an above-normal season, a 10% chance of a near-normal season, and a 5% chance of a below-normal season.

NOAA is forecasting a range of 17 to 25 total named storms (winds of 39 mph or higher). Of those, 8 to 13 are forecast to become hurricanes (winds of 74 mph or higher), including 4 to 7 major hurricanes (category 3, 4 or 5; with winds of 111 mph or higher). Forecasters have a 70% confidence in these ranges.

The above-normal activity is due to a confluence of factors, including near-record warm ocean temperatures in the Atlantic Ocean, development of La Niña conditions in the Pacific, reduced Atlantic trade winds and less wind shear, all of which tend to favor tropical storm formation.

As one of the strongest El Niños ever observed nears its end, NOAA scientists predict a quick transition to La Niña conditions, which are conducive to Atlantic

hurricane activity because La Niña tends to lessen wind shear in the tropics. At the same time, abundant oceanic heat content in the tropical Atlantic Ocean and Caribbean Sea creates more energy to fuel storm development.

This hurricane season also features the potential for an above-normal west African monsoon, which can produce African easterly waves that seed some of the strongest and longer-lived Atlantic storms. Finally, light trade winds allow hurricanes to grow in strength without the disruption of strong wind shear, and also minimize ocean cooling. Human-caused climate change is warming our ocean globally and in the Atlantic basin, and melting ice on land, leading to sea level rise, which increases the risk of storm surge.

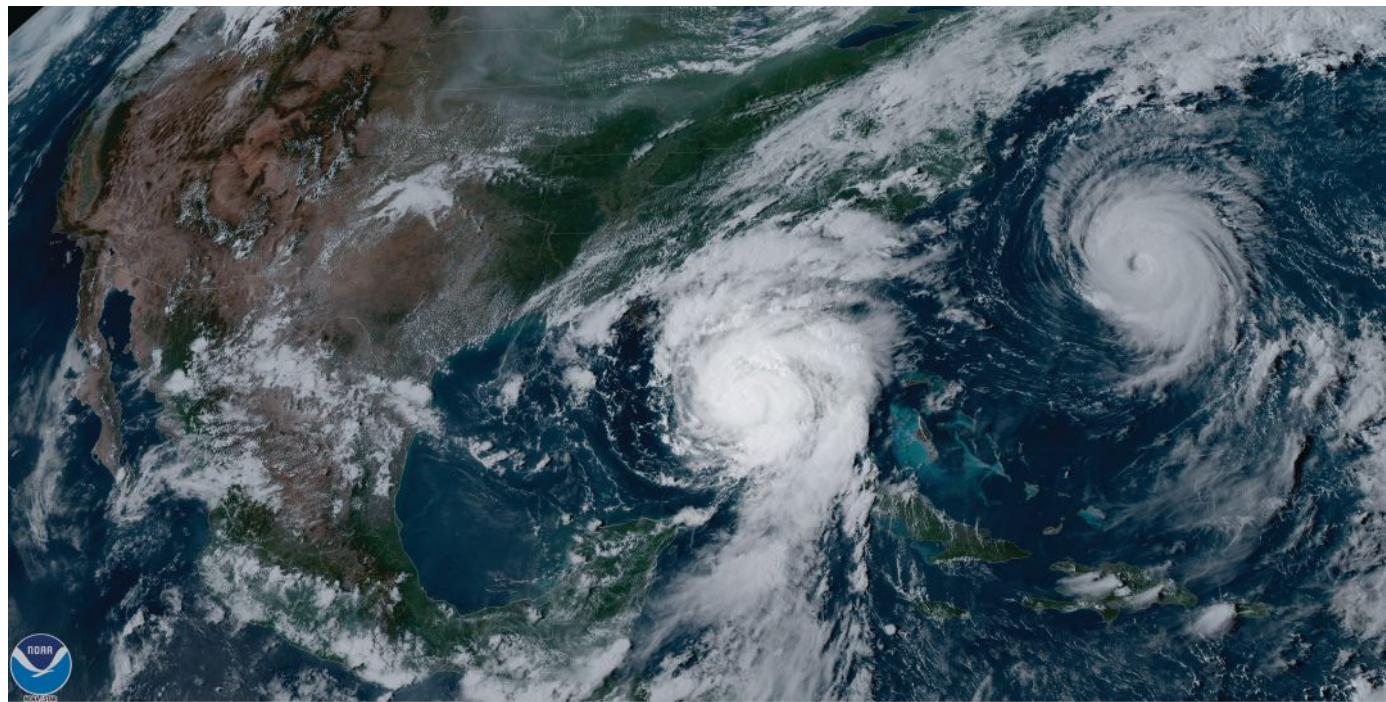
NOAA will upgrade its observing systems critical in understanding and forecasting hurricanes. NOAA's National Data Buoy Center recently upgraded many coastal weather buoys in the tropical western Atlantic and Caribbean to include time of occurrence and measurements of one-minute wind speed and direction, 5-second

peak wind gust and direction and lowest 1-minute barometric pressure to support tropical cyclone forecasting.

New this year, NOAA will gather additional observations using Directional Wave Spectra Drifters (DWSUs), deployed from the NOAA P-3 hurricane hunter aircraft and in the vicinity of Saildrones, uncrewed surface vehicles which will be deployed at the start of the hurricane season, providing one-minute data in real time. A minimum of 11 Saildrones are planned for deployment in 2024.

Starting in June, dozens of observational underwater gliders are planned to deploy in waters off the Caribbean, Gulf of Mexico and the eastern US coast. Additionally, a new lightweight dropsonde called Streamsonde will be deployed into developing tropical storms, collecting multiple real-time observations to collect valuable wind data.

The CHAOS (Coordinated Hurricane Atmosphere-Ocean Sampling) research experiment aims to improve the understanding of air-sea interactions, providing sustained monitoring of key ocean features.



↗ NOAA's GOES-16 satellite captured Hurricane Idalia approaching the western coast of Florida while Hurricane Franklin churned in the Atlantic Ocean at 5:01 p.m. EDT on August 29, 2023. (Credit: NOAA Satellites)

FIVE RESEARCH PROJECTS RECEIVE FUNDING TO STUDY OCEAN SYSTEMS IN CHANGING CLIMATE

Five global science and technology projects have been selected to join the Ocean Biogeochemistry Virtual Institute (OBVI), addressing gaps in ocean data and modeling efforts by improving the breadth of research in the field and expanding capacity to understand ocean resources. Schmidt Sciences, started by Eric and Wendy Schmidt, will bring together 60 scientists from 11 countries. The research will provide clarity on how much carbon dioxide the ocean can hold and the resilience of marine ecosystems in a rapidly warming world.

OBVI, through a joint call for proposals with Schmidt Ocean Institute, received 117 expressions of interest from 48 countries. Final proposals were selected through a two-stage submission process and reviewed by a panel of scientific experts and the OBVI Advisory Board.

Together, the five selected teams will make up a global research network and receive financial support from Schmidt Sciences and access to Schmidt Ocean Institute's RV *Falkor* (too).

They will also receive expert shipboard assistance to tackle the challenges associated with collecting large amounts of biological, chemical, geological and physical oceanography data. Through this research, the teams will develop accurate modeling across ocean systems to address ocean processes in climate projections and mitigation.

Schmidt Sciences is partnering with the Schmidt Ocean Institute in order to maximize opportunities to support ocean observing and data collection at sea through the use of RV *Falkor* (too), a state-

of-the-art 110-meter global-class research vessel.

The following five projects and teams will form the inaugural membership of OBVI, which has committed \$45 million to fund their research over the next 5 years:

1. Integration of models and observations across scales (InMOS)
2. Oxygen and biogeochemical dynamics along the west African margin: Processes and consequences (WAM)
3. Ocean Margins Initiative (OMI)
4. Subtropical Underwater Biogeochemistry and Subsurface Export Alliance (SUBSEA)
5. Animals as Living Bioreactors: The role of animal gut microbiomes in shaping oceanic carbon cycling and export.



The New Pinnacle of High Ampacity

The 225 Amp BIRNS Meridian™ connector series brings a new level of high amperage power transfer. This robust 6km-rated line is perfect for battery packs and thrusters for crewed and uncrewed subsea systems, and offers both standard and reverse gender configurations. All withstand reverse pressure, ideal for installation into both dry and oil-filled canisters, and feature exclusive design features for ease of use and mating.



www.birns.com



High Performance ...
Under Pressure®

Quality Management System
AS9100 Certified by DNV®

VOYIS HELPS SHED NEW LIGHT ON TITANIC AND BUILD FIRST COMPLETE DIGITAL TWIN

Voyis, a leading provider of advanced underwater imaging systems in Waterloo, Canada, joined forces with subsea technology partners Sonardyne and EIVA to provide sensor systems to Magellan for their ground-breaking survey that captured the first complete Digital Twin of the RMS *Titanic* wreck site.

This collaborative effort has resulted in an extraordinary scaled digital twin of the entire bow and stern of the famous wreck, along with the surrounding debris field, enabling researchers and scientists to start to re-explore the vessel with the greatest level of detail ever recorded.

This 3D model showcases the site as if the ocean had been drained away, offering a snapshot in time of this iconic historical asset before it degrades beyond. The survey was completely non-intrusive thanks to Magellan's deep water survey expertise, inhouse cameras systems, proven mapping equipment, and Voyis' long range optical systems. This offered a sustainable way to further understand the conditions of the *Titanic* without compromising the wreck or surrounding ecosystem.

The *Titanic*, resting at a depth of approximately 3,800 meters (12,500 feet) in the Atlantic Ocean off the coast of Newfoundland, Canada, has long been a subject of fascination and mystery since its tragic

sinking in 1912. The aim of this ambitious project was to shed new light on the circumstances surrounding the disaster and utilize cutting-edge underwater optical technology to record the current state of this iconic wreck.

In summer 2022, Magellan, a leading deep-sea mapping and survey company, was provided with Voyis' Observer and Nova subsea imaging system in support of this endeavor. With an actively cooled high-dynamic range camera and more than half a million lumens of flash lighting, this setup enabled the best possible color images of the wreck.

Over 700,000 images were reliably captured during the multi-day survey of the region, recording millimetric details of every aspect of the site. At 3,800 m below the sea, the Observer Pro delivered clear, accurate images that were automatically corrected for both color and lighting. This delivered the image quality and consistency needed to produce Magellan's seamless Digital Twin. This resolution and color accuracy, powered by Voyis' proprietary True Color correction, has never been deployed on a wreck of this size, and was key in removing the blue and green hues that are typical in subsea optical survey.

Magellan also trialed a Voyis Insight Pro laser system to scan the wreck and debris



field. The Insight Pro underwater laser scanner may provide researchers with the quantitative capability to directly measure even the smallest features. The laser model can complement the image-based Digital Twin to help further understand the rate of degradation of the historic site and measure the profile and scour on the feature-limited seabed. Voyis is also sharing limited exports from the laser model.

Precise and accurate positioning throughout the survey was also essential to ensure that complete coverage was achieved. Sonardyne supplied Long BaseLine (LBL) equipment and an acoustically aided SPRINT-Nav Hybrid Navigator. Real-time data feedback to the topside survey team was also critical and facilitated by EIVA's NaviSuite software during the survey.

SAILDRONE NAMED IN TIME'S 100 MOST INFLUENTIAL COMPANIES FOR 2024



Saildrone has been named in TIME's list of the 100 Most Influential Companies for 2024. The annual list includes leaders, disrupters, innovators, and titans making an impact across a range of business and humanitarian sectors.

"We are honored to be recognized for our work to make ocean data collection more accessible, supporting a range of activities from maritime security to scientific research," said Saildrone CEO Richard Jenkins.

The news follows Saildrone's launch of its first production Surveyor, a purpose-built 65-foot platform for autonomous deep-water ocean mapping missions and maritime defense and security missions, and the announcement of Saildrone's first Carbon Impact Report, which shows that the use of Saildrone USVs for maritime data collection avoids 99% of the carbon emissions that would have been generated by comparable vessels.

NEW ELECTRIC WORK CLASS ROV SETS NEW STANDARDS IN TESTING

SMD recently announced the successful full-power testing of its electric work class remotely operated vehicle (ROV), the Quantum EV. Demonstrating capabilities in speed, maneuverability, and bollard pull, the Quantum EV sets a new benchmark in subsea technology and aims to facilitate the growth of the \$45 billion renewable energy market in the US.

SMD anticipates the Quantum EV to support underwater operations globally and has already sold the first to Luxembourg-based marine contractor, Jan De Nul Group.

SMD's Business Development Manager, John McCann, said: "We are delighted to share the success of the Quantum EV's full-power testing, which demonstrates our relentless pursuit of engineering excellence. With the White House aiming for 80 percent renewable energy generation by 2030, we have noticed a distinct upward trend in the growth of America's clean energy market. At SMD, we feel confident that our technology will facilitate this crucial transition."

"During rigorous testing, the Quantum EV reached a top forward speed of 4.5 knots and a top lateral speed of 3.5 knots. Significantly higher than current industry standards, this enables rapid and precise operations in challenging subsea environments. As well

as operating efficiently in currents up to 3 knots, the Quantum EV also achieved a bollard pull of 1,400 kg. This exceptional strength makes the ROV perfectly suited for handling heavy loads and overcoming adverse underwater conditions, ensuring operational reliability and safety across numerous industries."

These enhancements in speed and power will enable clients to complete tasks more efficiently, saving time and resources while increasing operational scope.



▲ Quantum EV. (Credit: SMD)

TRANSFORM YOUR CAPABILITY
REAL-TIME IMAGING IN ALL CONDITIONS

bp blueprint subsea

Oculus Multibeam Imaging Sonars

High resolution imaging in turbid water for improved situational awareness and target identification. Available in 375kHz to 3.0MHz.

Depth rated to 500m, 1000m, or 4000m.

oculus



www.blueprintsubsea.com
enquiries@blueprintsubsea.com

NASA is perhaps more immediately associated with mapping the stars, but the agency also has an extensive Earth Science program, one that traditionally has focused on using the latest technologies to observe the planet from orbit but is now also exploring novel ways of mapping the seabed. We spoke to **Daniel Lockney, Technology Transfer Program Executive at NASA Headquarters** in Washington, DC, to find out more.

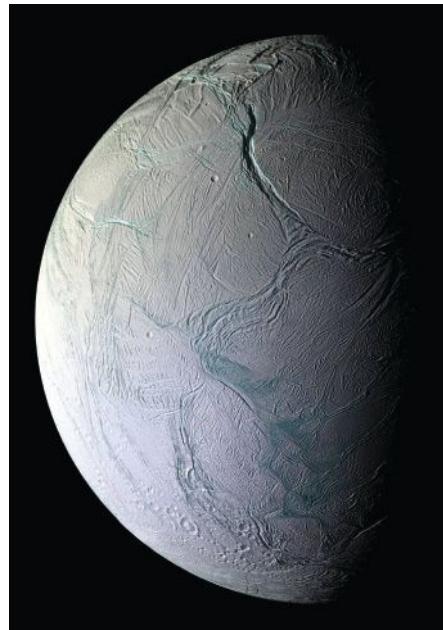


with Daniel Lockney
Technology Transfer
Program Executive
at NASA HQ

1 ON&T: What is NASA's role in mapping the seabed?

DL: Only about a quarter of the Earth's oceans have been mapped to any meaningful resolution, so there is a lot of interest in charting the rest for a multitude of reasons. NASA's direct involvement in an effort to map the seabed was triggered by a mission to measure the salinity of Earth's oceans led by the agency's Jet Propulsion Laboratory (JPL) in Southern California.

The satellite instruments had to be calibrated with sensors in the water, and this is how mission project scientist Yi Chao became familiar with the power limitations of subsea robots—their operation is limited by battery life.



▲ Saturn's moon Enceladus hides an ocean beneath its icy crust. Water interacting with rock on the seafloor could potentially yield chemical reactions that would make microbial metabolism possible. (Credit: NASA)

Chao and a couple of colleagues at JPL set out to design a device that could use changes in ocean temperature to charge batteries. Once they had working prototypes, Chao founded Seatrec and licensed the technology he had invented at NASA. As the company brought its technology to market, it identified a number of potential applications, including mapping the seafloor.

As many of your readers no doubt will attest, mapping from vessels on the surface is extremely costly and requires a high-powered sonar to cut through noise in the upper ocean. Mapping with robots just half a kilometer down could be done with far less power consumption and disruption to marine life.

specifically for use in the seas, it's not at all uncommon for technology NASA develops for space exploration to be repurposed for use in the oceans. Both space and the deep sea are harsh, remote environments that present many of the same challenges. The agency's Spinoff publication has documented a number of commercial adaptations of space technology for deep-sea use, including underwater robots based on robots for space, rugged deep-sea fuel cells stemming from work on space shuttle fuel cells, and offshore oil rig blowout preventers powered by solid rocket propellants, among others.

2 ON&T: How does this new technology work?

DL: Seatrec's technology is based on a phase-change material. NASA often uses phase-change materials, which transition between liquid and solid at a certain temperature of interest, to manage the extreme temperatures of space. Seatrec chose a paraffin-family material with a melting point around 50°F, which is between the temperatures deep in the ocean and at the surface.

As a power module rises into warmer water, its phase-change material melts, causing it to expand. This increase in volume turns a motor that charges the battery—much like a steam engine works, except the change from solid to liquid produces only about a 10% expansion, so Chao and his JPL colleagues had to make the devices extremely efficient to run on such a small amount of energy.

Although Seatrec's technology was created

3 ON&T: How is NASA partnering with the private sector in such endeavors?

DL: Through its Technology Transfer program, NASA has a number of avenues for working with businesses to help the private sector benefit from the agency's technology development. One is the patent license, such as Seatrec's licensing of the technology Chao developed at JPL. The agency works tirelessly to patent its inventions and get them into the hands of companies and entrepreneurs. The Technology Transfer program has compiled a portfolio of around 1,500 patents that are available for licensing under various terms, including startup and evaluation licenses that come at no cost for limited times.

The Technology Transfer program also partners with academic institutions, entrepreneurial and investment communities, and others through events and outreach initiatives to assist and encourage licensing of NASA technology.

The program also manages a similar NASA Software Catalog that makes over 1,000 programs invented at the agency available

through Software Usage Agreements, often free of charge.

NASA also frequently enters into Space Act Agreements—and occasionally other agreements such as Cooperative Research and Development Agreements and Announcements of Collaboration Opportunity—to develop technologies together with private companies. And the agency funds private technology development through Small Business Innovation Research contracts, Tipping Point funding, and other mechanisms.

4

ON&T: So, how does NASA see the growing utility of subsea drones in future scientific exploration?

DL: In its hunt for signs of extraterrestrial life, NASA has, in recent years, been eyeing icy moons around Saturn and Jupiter that are thought to hide vast oceans beneath their frozen crusts. Engineers at JPL are exploring several robotic concepts for accessing and exploring these alien oceans.

These would face far greater challenges than any oceangoing robots on Earth, including the need to penetrate miles of ice, send communications back through that icy mantle, and operate under extreme pressure. Among the approaches under development are the Buoyant Rover for Under-Ice Exploration, which would roll



▲ The use of underwater robots to explore the environment around a deep-sea volcano off the coast of Hawaii that has similar conditions to what may exist on Saturn's moon Enceladus. (Credit: NASA)

along the underside of the ice; the Sensing With Independent Micro-Swimmers concept, which would deploy a swarm of cell-phone-sized robots to explore subsurface oceans, and the snake-like Exobiology Extant Life Surveyor that would slither through narrow vents in the icy crust.

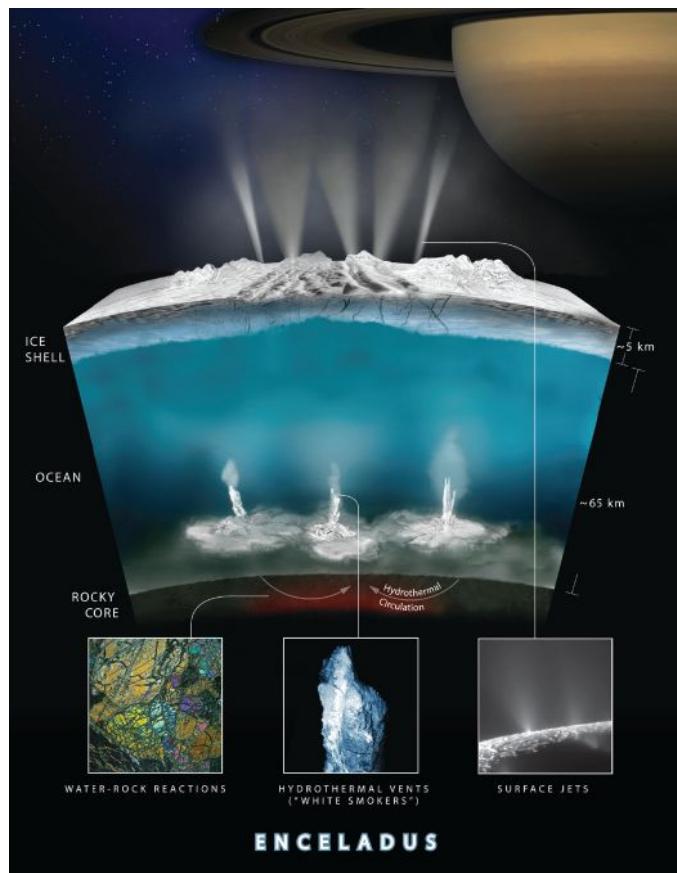
No concept is likely to be finalized, however, before the Europa Clipper spacecraft arrives at Jupiter's moon Europa in 2030 and begins gathering data about the moon, including images of its surface, radar sounding below the surface, and chemical analysis of the water expelled from vents in the ice.

5

ON&T: How will NASA's Technology Transfer program continue to influence ocean tech development?

DL: The upcoming Artemis missions—to begin long-term operations on the Moon—will require a lot of technology capable of functioning at least semi-autonomously under harsh conditions in a distant location, much of which is likely to be relevant to deep-sea operations. Projects for exploring icy moons will ultimately need to overcome far greater challenges, likely necessitating even more innovative technological approaches.

As NASA's engineers invent the technology that will be necessary for these missions to succeed, the agency's Technology Transfer program will evaluate their applicability to industry, patent those with possible applications, and reach out to the business and academic communities, inviting them to explore possible uses and benefits of these innovations. Eventually, at least some of that technology is almost sure to make its way to the bottom of the sea.



▲ Artist rendering showing an interior cross-section of the crust of Enceladus, which shows how hydrothermal activity may be causing the plumes of water at the moon's surface. (Credit: NASA)

nasa.gov

FOR MORE TAKE 5 INTERVIEWS, VISIT:
oceannews.com/featured-stories/take-5

CELLULA ROBOTICS UNVEILS VIGILUS FOR UNDERWATER SURVEILLANCE

Cellula Robotics has announced the launch of its latest innovation in underwater robotics, Vigilus, a state-of-the-art submersible surveillance array, comprising of acoustically meshed environmental sensor nodes, poised to revolutionize underwater monitoring and security.

The Vigilus nodes, strategically positioned on the seafloor multiple kilometers apart from one another, form an interconnected network of listening stations that act as an underwater trip wire. Notably, these nodes boast a compact, cableless design, facilitating effortless deployment from small watercraft or covertly via a large uncrewed underwater vehicle (UUV), even in challenging environments such as beneath ice sheets. This adaptability positions Vigilus as the ultimate tool for sophisticated surveillance and environmental monitoring operations in hard to access areas, including chokepoint surveillance in the Arctic region.

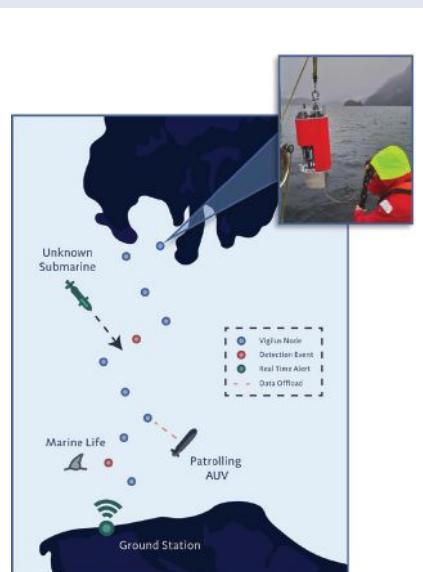
Each Vigilus node is equipped with sensors capable of seamlessly collecting, processing, encrypting, and responding to acoustic and environmental data. This functionality ensures the rapid generation of alerts, which can be effortlessly shared among

nodes and transmitted to other assets in the vicinity, including UUVs, as well as to Vigilus' shoreside gateway, which provides secure, near real-time alerts for timely data-driven decisions. Furthermore, Vigilus offers an additional layer of strategic advantage, as each node can emit acoustic pings to serve as a deterrent while deployed.

The genesis of Vigilus can be traced back to a successful prototype developed for the Royal Australian Navy (RAN). This innovation represents a monumental leap forward in underwater surveillance technology.

Innovation, Science, and Economic Development Canada has awarded a contract to Cellula Robotics for its Vigilus array following a successful call for proposals under the Innovative Solutions Canada Testing Stream. Transport Canada is acting as the technical authority for the contract.

Neil Manning, CEO of Cellula Robotics, said: "We are excited to bring this innovation to the market. Vigilus will empower our customers to operate with enhanced confidence and security in the most challenging underwater environments, including the Arctic region."



Cellula's Vigilus acoustic surveillance array (prototype pictured in top right corner being deployed) represents a cutting-edge advanced submersible surveillance system designed for underwater monitoring and security purposes. (Credit: CNW Group/Cellula Robotics Ltd.)

GREENSEA IQ'S HULL CLEANING SYSTEM SAFE FOR SILICONE COATINGS



Greensea IQ, the provider of the pioneering in-water hull cleaning service EverClean, has been named an Approved Supplier by Chugoku Marine Paints (CMP). This approval comes after CMP independently confirmed that, when applied properly, EverClean does not damage CMP's silicone hull coatings.

"Receiving the letter of approval from CMP marks a significant milestone for the marine industry," said Rob Howard, CGO of Greensea IQ. "Addressing the immense challenge of reducing biofouling without harming our environment is crucial. EverClean stands out as the first in-water service provider recognized by a coatings manufacturer for

preserving the integrity of marine coatings. This achievement represents a substantial advancement toward environmentally responsible solutions."

EverClean, is a subscription-based hull cleaning service tailored for the commercial shipping industry, utilizing compact, autonomous robots. Scheduled to optimize cleaning efficacy without disrupting ship operations, the service ensures that vessels maintain pristine hull conditions. Greensea IQ is committed to ongoing collaboration with coating manufacturers to guarantee that EverClean customers receive the most effective anti-fouling solutions available for their fleets.

CSIGNUM LAUNCHES EM-2 WIRELESS PLATFORM TO ENHANCE MARITIME SECURITY

CSignum, a leader in underwater and underground data networking, has launched the EM-2 wireless platform for IoT sensor data and control from above the surface to below. The EM-2 interfaces to many common underwater sensors to wirelessly communicate data from under the water to above the surface or directly on land.

EM-2 represents a breakthrough in wireless communication technology employing electromagnetic fields to pass data through water, ice, concrete, and rock to overcome the limitations of traditional wireless technologies. By harnessing electromagnetic field signaling (EMFS), data can be transmitted from below the water's surface or underground to above-surface devices with unparalleled reliability.

EM-2 offers a robust solution for enhancing maritime security by providing real-time data transmission from below the water's surface to above-surface devices. This enables continuous monitoring of critical infrastructure such as ports and offshore structures, ensuring early detection and response to security threats.

By facilitating wireless communication across the air-water boundary in both fresh and saltwater scenarios, is the ideal solution for water quality monitoring. It ensures reliable transmission of data from underwater sensors to above-surface devices, enabling timely

assessment and management of environmental conditions in inland and coastal waterways, around offshore structures, and aquaculture installations.

EM-2 is also perfectly suitable for offshore energy applications by enabling seamless communication between subsea infrastructure and topside facilities. This enhances operational efficiency and safety in offshore energy operations, including wind farms and oil and gas platforms as well as inshore hydropower facilities.

"EM-2 represents a quantum leap in underwater and underground communications technology," said Jonathan Reeves, CEO at CSignum. "With its ability to transcend the barriers of traditional methods, EM-2 empowers industries to explore, monitor, and protect our waterways and subsea environments with unprecedented efficiency and reliability."

EM-2 establishes a wireless communication link that transcends the limitations of acoustic, optical, and cabled underwater communications. With bidirectional data transfers of up to 200 meters, EM-2 ensures successful deployment in both saltwater and freshwater environments. Its unique electromagnetic field-based communication method enables effective data transmission through mixed media scenarios.

Welcome to the World of ROS Positioners



The Most Complete Line of Reliable and Accurate Positioners in the Industry

Remote Ocean Systems offers the most complete line of positioners in the industry, engineered for payloads from 10, 20, 100 and up to 350 pounds. All positioners are available in Aluminum housing (standard) but are offered in Stainless Steel and Titanium for maximum longevity in seawater. ROS positioners offer accuracy from +/- 1.5° to 0.1°. ROS AccuPositioner™ is ideal for Sonar applications where precise, computer-controlled accuracy is required. ROS positioners are available as single axis (pan rotation) and dual axis (pan & tilt rotation) configurations with numerous connector options.

For More Information and Technical Specifications
Contact: sales@rosys.com or
Visit: www.rosys.com



Headquarters – San Diego, CA USA
Phone: (858) 565-8500
Email: sales@rosys.com
www.rosys.com

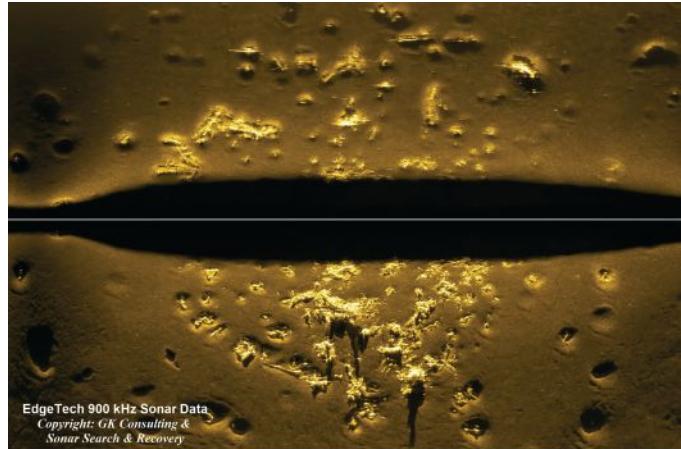
EDGETECH SONAR PROVES INSTRUMENTAL IN DISCOVERY OF MISSING AIRCRAFT

EdgeTech, a leader in high resolution sonar imaging systems and underwater technology, recently learned that its industry leading side scan sonar technology was used to help find an aircraft that has been missing for over fifty years.

In 1971 a plane departed from Burlington International Airport bound for Providence, RI but crashed enroute, presumably in Lake Champlain. Searches were carried out at the time of the crash, but weather made the operations difficult. In subsequent years many other searches were completed to no avail. In May of this year, Garry Kozak—utilizing pieces of information from prior surveys, along with Hans Hug, Tim McDonald and Bruce Stebbins—did a search for the missing Rockwell Jet Commander utilizing a high resolution EdgeTech 4125i Side Scan Sonar. The Rockwell Jet Commander was successfully located and imaged with outstanding, almost photographic, resolution.

EdgeTech's 4125i Side Scan Sonar System was designed with both the Search & Recovery (SAR) and shallow water survey communities in mind. The 4125i utilizes EdgeTech's Full Spectrum® CHIRP technology, which provides two dual simultaneous frequency sets ideal for maximizing range and resolution during searches.

A more detailed narrative surrounding the events of this fateful 1971 plane crash and the ensuing years of search will be printed in the coming months.



▲ EdgeTech Side Scan Sonar Image of N400CP Debris Field C.
(Credit: EdgeTech)

POWERCELL TO SUPPLY FUEL CELL SYSTEMS TO O.S. ENERGY FOR RESEARCH VESSEL

PowerCell, a world leader in hydrogen electric solutions with unique fuel cell stacks and systems, has signed a contract for two 100 kW marine fuel cell systems from O.S. Energy for the Transship II sustainable vessel project. This order represents a significant expansion of PowerCell's offerings into the segment of smaller commercial and leisure vessels, including both retrofits and new builds and shows that the technology is ready for wider uptake.

This initiative focuses on retrofitting the research vessel *Prince Madog* with a cutting-edge hydrogen-electric hybrid propulsion system, showcasing the potential for sustainable propulsion solutions in the maritime industry.

The retrofit work is to be completed in early 2025 with a demonstration planned for March 2025. The Transship II project is supported by the UK Department for Transport as part of the Clean Maritime Demonstration Competition Round 3 (CMDC3)—delivered in partnership with Innovate UK.

The *Prince Madog*, co-owned by Bangor University, is set to become a trailblazer in green maritime technology through this pioneering £5.5 million initiative. The retrofit is expected to reduce the vessel's emissions by up to 60%, aligning with global efforts to minimize the environmental impact of the shipping industry.

The Transship II project is the largest retrofit of its kind, involving a consortium of major UK innovators in green maritime technology and hydrogen systems. The project aims to enable zero to low emission operation of the *Prince Madog* in 2025, making it a model for sustainable marine research and operations.



▲ RV Prince Madog. (Credit: Bangor University)

EMPOWERING SUBSEA CONNECTIVITY WITH MACARTNEY EMO OMNI

The customizable EMO Omni multiplexer meets the evolving needs of underwater operations, from offshore energy projects and marine research to environmental monitoring.

Built on the tried and trusted MacArtney EMO and NEXUS platforms, the new HD fiber optic video and multibeam EMO Omni multiplexer represents a significant advancement in underwater data acquisition, enhancing the performance and scope of subsea projects.

Andrew Palmer, the General Manager of MacArtney Canada, said: "With the EMO Omni, we've expanded our lineup of dependable multiplexers, aiming to design a flexible product addressing varied industry demands worldwide. This achievement reflects our operations' adept collaboration across borders, illustrating our ability to oversee the entire product development process internally while benefiting from our

global cohesiveness for success."

The compact EMO Omni ensures seamless data collection and analysis, enabling informed decision-making and streamlined operations. High data output and real-time communication capabilities support multiple instruments and sensors with integrated diagnostics and remote monitoring features.

This functionality enhances operational efficiency and minimizes manual interventions, ensuring consistent connectivity and efficient data transmission and management in diverse underwater environments.

At the core of the EMO Omni lies its highly customizable nature, tailored to meet the unique requirements of a diverse range of subsea applications. The EMO Omni's adaptability extends to system integration, power supply, and material requirements, drawing on decades of MacArtney's indus-

try experience and exceptional workshop capabilities. Swift customization, including bespoke harness cables, is readily available globally through our local workshops.

The connectors mounted will typically be from MacArtney brands, such as SubConn®, OptoLink™ and TrustLink™. However, the versatility offers flexibility in choosing from a wide selection available at MacArtney.



▲ The EMO Omni multiplexer is compact, versatile and efficient. Includes high data output, real-time communication capabilities, multiple instrument and sensor options with integrated diagnostics and remote monitoring features.
(Credit: MacArtney)

NORBIT LAUNCHES AUTOPILOT SOLUTION FOR USV MISSIONS

NORBIT has introduced an Autopilot Solution for USVs equipped with a NORBIT integrated multibeam echo sounder. NORBIT AutoPilot enables fully automated line planning without operator intervention.

The vehicle is remotely controlled using NORBIT's data acquisition software DCT, which initiates data recording upon reaching the first survey line. Once the current line is completed, the USV will seamlessly transition to the next survey line. This innovative solution offers a convenient and efficient method for collecting survey data.

The AutoPilot Solution is compatible with all NORBIT WINGHEAD and iWBMS sonar series integrated with Applanix or SBG GNSS/INS.



Ocean Power & Monitoring

Transform into the cost-efficient and sustainable future

Ocean Power & Monitoring
Transform into the cost-efficient and sustainable future

GHG Monitoring
Modular, easy to use and reliable monitoring incl. pCO₂ and Microplastic

Subsea Li-ion Batteries
Highly reliable, efficient and safe underwater power solutions for DC + AC

Standard Batteries
AP117F Offshore certified

Vehicle Batteries
Energy Storage & UPS Systems

SubCtech GmbH
www.subctech.com
info@subctech.com

ISO 9001
UN ECE R102
United Nations Decade
2020-2030 for Sustainable
Development

SubCtech

A NEW ERA FOR SUBSEA ASSET INSPECTION

The integration of ROVs for photogrammetry and 3D modeling



Chad Gillen
Content Strategist
 DEEP TREKKER

“
BY CAPTURING HIGH-RESOLUTION IMAGES AND DATA OF SUBMERGED STRUCTURES, ROVS PLAY A PIVOTAL ROLE IN CREATING ACCURATE DIGITAL TWINS OF UNDERWATER ENVIRONMENTS.

The need to inspect and monitor underwater assets presents many challenges and risks for operators. Traditional methods can be costly, time-consuming, and potentially dangerous for teams.

By leveraging emerging technologies and robotics, inspections can be completed much more cost-effectively, in a fraction of the time, while mitigating the risks involved with having to hire dive teams to perform these tasks.

The adoption of imaging technologies to create 2D and 3D models is becoming much more common in the management of critical infrastructure. In many cases of submerged infrastructure, remotely operated vehicles (ROVs) are the only way to easily capture reliable data for modeling.

Utilizing ROVs, operators are not required to obtain expensive or time-consuming certifications and can immediately begin remotely surveying assets. This empowers

nearly any member of a team to have the ability to inspect and scan structures in complex underwater environments, without any of the dangers associated with entering the water.

Photogrammetry is also invaluable in conditions that are unsafe or challenging to access, allowing data capture without physically touching or disturbing objects, making it ideal for documenting fragile or sensitive cultural artifacts, archaeological sites, and natural environments.

UNDERWATER ASSET MANAGEMENT

ROVs have emerged as the ideal solution for achieving high-quality and comprehensive underwater data in various fields such as defense, offshore energy, hydroelectric dams, infrastructure, and port security, to name a few; offering a range of advantages that make them exceptionally suited for underwater photogrammetry projects.

The advanced maneuverability of ROVs contributes significantly to their effec-

tiveness in underwater photogrammetry. Equipped with vectored thrusters, sophisticated automated waypoint tracking, and positioning and stabilization systems, ROVs can maintain positions and follow predetermined paths, resulting in consistent imaging with minimal disturbances to the surrounding environment.

This stability is crucial for capturing clear and distortion-free images, which are essential for generating accurate 3D models.

ROVs can also be equipped with a range of advanced sensors and imaging technologies, including:

- **Ultra-high-resolution cameras:** Serving as the primary source of situational awareness, high-definition cameras provide operators with real-time video feeds.

- **IMU (Inertial Measurement Unit):** Incorporating a compass, gyroscope, and accelerometer, the IMU tracks the ROV's orientation and motion in three-dimensional space. This data is necessary for stabilizing the vehicle and executing careful maneuvers.

- **DVL (Doppler Velocity Log):** By measuring changes in sound wave frequencies, DVL systems determine the ROV's speed, direction, and altitude relative to the seabed.

- **USBL (Ultra-Short Baseline):** Integration with USBL enhances navigation accuracy and enables autonomous navigation and position holding in challenging underwater conditions.



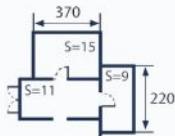
THE DIFFERENCE

2D MODELS

2D models are an effective tool for visualizing concepts where depth is irrelevant.

BEST FOR:

- Urban Planning
- Architecture
- Product Designs
- Site Mapping
- Construction



VS

3D MODELS

For complex structure or product modeling, where depth is integral, 3D models are more appropriate.

BEST FOR:

- Seafloor Mapping
- Bridge/Pipe/Tunnel Inspections
- Canal Surveys
- Product Engineering
- Identifying Defects



- Multibeam Imaging Sonar:** Utilizing sound waves for real-time imaging, multibeam sonars offer detailed underwater visibility even in low or zero-visibility environments. They play a crucial role in navigation, object detection, and seabed mapping with exceptional resolution, serving as the primary visual aid when water clarity is compromised.

- Laser scalers:** Estimates sizes of objects, pits, cracks, and more by comparing the distance between laser sights.

This sensor versatility allows ROVs to capture data across different wavelengths, enhancing the comprehensiveness of the collected information.

Integration of real-time positioning systems, such as Deep Trekker's innovative work on Dead Reckoning for ROVs, also ensures precise georeferencing of the collected data, enabling accurate mapping and analysis. By capturing high-resolution images and data of submerged structures, ROVs play a pivotal role in creating accurate digital twins of underwater environments.

IMPROVED DATA ACQUISITION

ROVs are a valuable tool for data collection, observation, and monitoring in underwater environments, significantly improving the accuracy and reliability of underwater modeling processes. They enhance the quality and quantity of data available for modeling, facilitating better understanding, analysis, and management of underwater environments and structures.

The synergy between ROVs and photogrammetry allows for the creation of detailed, time-varying digital twins of underwater assets. These digital twins serve a multitude of purposes, from asset inspection and maintenance to subsea surveys and mapping.



From left to right: DTG3, PHOTON, PIVOT, REVOLUTION. (Credit: Deep Trekker)

The data collected by ROVs can be used to continually update and refine these digital twins, providing a dynamic and evolving representation of underwater ecosystems, opening up new avenues for scientific discovery and industrial applications.

ROVS FOR PHOTGRAMMETRY

Photogrammetry finds applications across a spectrum of industries, providing an invaluable means of capturing and analyzing visual data.

In the maritime sector, ROVs equipped with photogrammetry capabilities prove indispensable for hull inspections, subsea inspections, subsea mapping, and seawall inspections.

The offshore energy industry benefits from the technology's prowess in dam inspections, creating digital twins of assets, subsea mapping, offshore inspections, and managing subsea cables.

In the defense industry, the use of Deep Trekker ROVs for photogrammetry projects enhances situational awareness, aids in threat detection, and improves mission planning and execution.

In aquaculture, the ability to capture high-quality images and 3D models supports efficient management and environmentally responsible practices, ultimately contributing to the sustainability and success of aquaculture operations.

In ocean Science, photogrammetry aids in coral reef mapping and subsea mapping, facilitating the creation of digital twins for research.

Deep Trekker ROVs, with their compact and portable design, are particularly well-suited for search and recovery operations in a wide range of underwater environments, including lakes, rivers, and oceans. They provide a cost-effective and efficient means of conducting photogrammetry to document and analyze underwater scenes, contributing to the success of search and recovery missions and providing critical insights for investigations.

In infrastructure, ROVs are instrumental in tank inspections, generating digital twins, and conducting stormwater inspections.

The versatility of ROVs enables operators to harness the power of photogrammetry for enhanced data-driven decision-making and assessments.

NEW ERA FOR ROBOTICS

As the application of underwater robotics broadens, ROVs have proven to be the ideal solution for underwater photogrammetry due to their safety, maneuverability, sensor versatility, and adaptability to diverse underwater conditions.

Their capability to capture detailed and accurate imagery while mitigating human risk positions them as indispensable tools for researchers, scientists, port authorities, and industries seeking to unlock the secrets of the underwater world through comprehensive and high-quality 3D mapping.

By utilizing ROVs, operators can access and gather data from these challenging underwater environments, reducing risks to human divers and expanding the scope of data collection for modeling purposes.

deeptrekker.com

Stantec Markham 3D model of a submerged dam structure in Nassau Mills, created utilizing a Deep Trekker ROV. (Credit: Stantec)

RWE INSTALLS FIRST TURBINE FOUNDATION AT SOFIA OFFSHORE WIND FARM

RWE has taken a huge step forward in delivering its flagship Sofia Offshore Wind Farm with the installation of the project's first offshore turbine foundation. With a capacity of 1.4 GW, Sofia is RWE's largest offshore wind farm to date. After its expected commissioning in 2026, the project will be capable of generating enough electricity to power the equivalent of 1.2 million typical UK homes.

Following the installation of the essential subsea cable infrastructure, this installation marks the start of offshore construction within the array itself. It is the first of 100 foundations to be installed at the 593 km² array.

Sven Utermöhlen, CEO RWE Offshore Wind, said: "Sofia is RWE's largest offshore wind construction project to date, and its furthest from shore. Installing the first monopile is a highly symbolic moment in the construction of every offshore wind farm. After 14 years of planning and preparation, this is a great achievement for the entire RWE team."

Sofia Offshore Wind Farm is located on Dogger Bank, 195 kilometers from the nearest point on the UK's northeast coast, and will have a single offshore converter platform, with the electricity generated transported to landfall 220 kilometers away in Redcar, Teesside.



RWE

The wind farm will use 100 Siemens Gamesa 14 MW offshore wind turbines (SG 14-222 DD), the most advanced offshore wind turbine technology available, and is scheduled to be completed by the end of 2026. A total of 44 of the project's 100 turbines will be equipped with recyclable blades. Once completed, each 14 MW turbine will be 252 meters tall, with a 108-meter carbon and fiberglass blade and a 222-meter diameter rotor sweeping an area of 39,000 m².

Van Oord, an international marine contractor, owns and operates the vessel Aeolus

that carries out the work to install the foundations at the wind farm array on Dogger Bank.

The vessel and crew will deliver the installation of three foundations per cycle, with a transit time of up to 16 hours. The total duration of this campaign phase will depend on sea conditions, but all 100 foundations are expected to be installed by spring 2025. This follows the installation of the high voltage direct current (HVDC) export cable which started during 2023.

BOEM RELEASES TWO NEW STUDIES ON OFFSHORE WIND ENERGY IN GOM

The Bureau of Ocean Energy Management (BOEM) has published two new studies on offshore wind energy in the Gulf of Mexico. The US Department of Energy's National Renewable Energy Laboratory (NREL), the National Oceanic and Atmospheric Administration's National Centers for Coastal Ocean Science, Applied Research Associates, Inc., and CSS, Inc. collaborated on these studies, funded through an interagency agreement between NREL and BOEM.

The first study, *Gulf of Mexico Offshore Wind Energy Hurricane Risk Assessment*, analyzed hurricane risk to wind turbines operating in the Gulf of Mexico. This study concluded that as a minimum, an IEC "Typhoon Class" wind turbine would be needed for

the design of offshore wind turbines in more hurricane prone areas, such as in the Gulf of Mexico.

The second study, *Assessment of Offshore Wind Energy Opportunities and Challenges in the US Gulf of Mexico*, identifies and discusses opportunities and challenges for offshore wind energy development in the Gulf. The results indicate that offshore wind energy has the potential to be a viable clean energy option, and help the region achieve US carbon neutrality goals by 2050.

The results of these studies will inform federal, state, and local strategic renewable energy planning over the next decade.

THE FUTURE OF FLOATING WIND STILL FACES MAJOR HURDLES

A survey by Westwood Global Energy Group, the specialist energy market research and consultancy firm, has revealed a lack of standardization of floating technology (55%), manufacturing capability and capacity (51%), and port infrastructure (50%) as the most commonly cited major hurdles and risks to floating offshore wind progress, indicating a need for accelerated investment, regulation and supply chain coordination globally for the sector to achieve its ambitions.

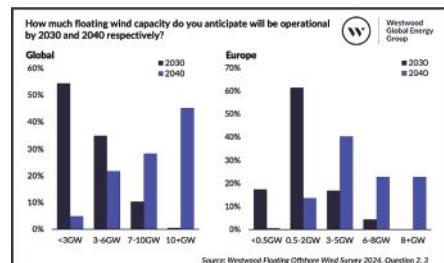
The research, developed in partnership with Norwegian Offshore Wind and World Forum Offshore Wind (WFO), surveyed 184 floating offshore wind stakeholders on industry sentiment and attitudes across the value chain. Aligning with the hurdles, calls are ringing out for governments to provide more specific policy and regulatory support for technology development in addition to

cost reduction and investment in port infrastructure to accelerate adoption.

Consensus deviates when it comes to the question of optimism when compared to sentiment two years ago: 42% of European respondents are less optimistic about the floating offshore wind sector than they were 24 months ago. Globally, however, 44% of developers are more optimistic about the sector than two years ago.

Additional analysis from Westwood's Wind-Logix solution notes that the recent market upheaval caused primarily by cost inflation, together with the subsequent re-focusing of developer strategies, will mean global floating offshore targets will all be missed. The majority of respondents (54%) expect <3 GW of global capacity to be operational by 2030, with Europe reaching 0.5–2 GW in the same timeframe (61%).

David Linden, Head of Energy Transition, Westwood, said: "The enthusiasm accompanying the flurry of activity following the 2022 leasing rounds and target setting has naturally waned, but our survey results demonstrate the appetite in the sector. Right now, it's a question of pace. Direct investment in infrastructure and technology coupled with more focused policy are likely to be pivotal pace setters."

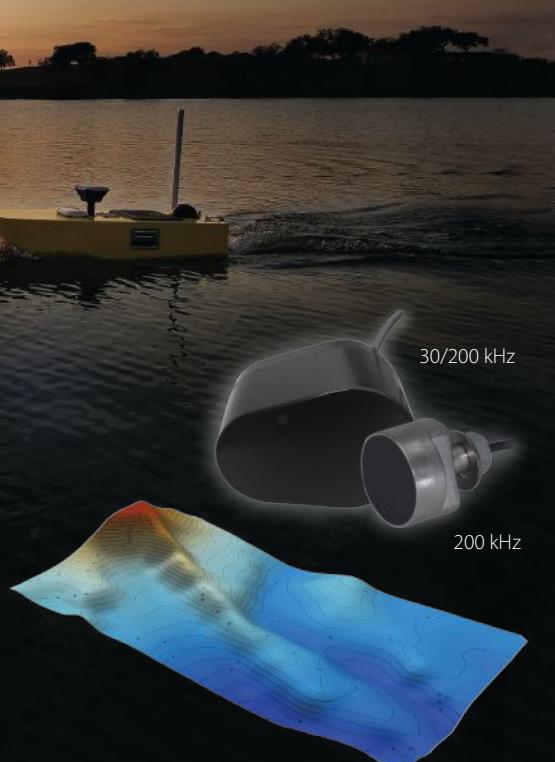


The report suggests that Europeans are more cautious about the long-term prospects of floating offshore wind. (Credit: Westwood)

The Smart™ Choice for Hydrographic Survey

EchoRange™ Smart™ Sensors deliver depth and water temperature data to any NMEA device. EchoRange+ with Echo Envelope Option enables user-defined performance and echo waveform for bottom detection to 200 m. Compact and cost effective, with multiple mounting options, EchoRange+ is the most versatile line of field survey transducers available for autonomous hydrographic survey and fixed applications.

Photo and 3D Bathyscape courtesy of SimpleUnmanned, LLC



Talk with us about how EchoRange+ can integrate into your next survey project.

AIRMAR.COM/ECHORANGE

AIRMAR®
TECHNOLOGY CORPORATION

PBS ANNOUNCES CONTRACT EXTENSION FROM TOTALENERGIES IN NORTH SEA



PBS has secured an extension to the General Maintenance and Operations Contract (GMOC) awarded by TotalEnergies to cover its North Sea assets. This agreement extends GMOC services through to May 2026.

The GMOC was initiated between TotalEnergies and PBS (an Aberdeen-based consortium comprised of Ponticelli UK, Brand Energy & Infrastructure Services and Semco Maritime) in 2020 and after a challenging start which included navigating the COVID pandemic,

PBS has established themselves as an exemplary choice for integrated services delivery under the GMOC model.

Commenting on this success, PBS GMOC Director Adam Mason, said: "We're delighted and proud to have the opportunity to continue to strengthen our relationship with TotalEnergies through this contract extension which adds longevity and security for our team. The decision to proceed with PBS is testament to our safe and efficient delivery of the GMOC services. During 2023 we saw a step-change improvement in critical work-streams including reduction of SECE backlog, safe and timely shutdown delivery and an excellent overall safety record which involved two million man hours liquidated in the year."

Nicolas Payer, Managing Director, TotalEnergies E&P UK, added: "Safe and efficient operations remain at the center of the GMOC partnership between TotalEnergies and PBS. Following progress in these areas, we look forward to continuing that good trend over the next two years."

The largest GMOC of its kind in the UK, PBS delivers integrated operations, maintenance, engineering, construction, facilities management, and access solutions through its 1,100 highly skilled staff on TotalEnergies' offshore sites, at Shetland Gas plant and onshore at the PBS headquarters in Westhill.

SUBSEAPARTNER SECURES OFFSHORE WORK ON THE NORWEGIAN CONTINENTAL SHELF

Norwegian Diving Contractor, SubseaPartner, has won offshore work at the Goliat and Balder fields on the Norwegian Continental Shelf (NCS). The contracts have been awarded by Vår Energi under the existing frame agreement for offshore contingency and diving intervention services.

At the Goliat field, SubseaPartner will execute a continuous 24-hour IMR operation on the Goliat FPSO, with a duration of three weeks. The operation will utilize the highly efficient Light Diving Craft (LDC) method at a depth range from 15–29 meters of seawater (msw). Additionally, at the Balder field, the company will provide diving intervention contingency and tooling during the scheduled SURF operations on the Balder FPU.

Project Management and Engineering activities for both operations have already commenced at SubseaPartner's headquarters in Haugesund. The offshore activities

will be executed during the upcoming summer season. Diving personnel and the LDC Venturer spread will be mobilized on the Olympic Ares and Edda Freya.

"These two projects underscore our position as a leading diving contractor in the shallow-deep segment, improving access

sibility and versatility where remote intervention proves challenging or not feasible," said Anders Remøy Bertelsen, Managing Director of SubseaPartner. "We aim to deliver 'Life in Field Extension' of floating assets, safeguarding our customers' operability and production targets, while maintaining safety and efficiency."



FULLY CHARGED

Delivering reliable power offshore through compact battery packs



Andy Martin
Chief Commercial Officer



ONE OF THESE SUCH TECHNOLOGIES IS A COMPACT, RECHARGEABLE BATTERY KNOWN AS CHARGE, A BATTERY UNIT WHICH OFFERS HIGH DENSITY ENERGY STORAGE FOR MAXIMUM BOTTOM TIME DEPLOYMENT AND APPLICATION FLEXIBILITY IN UNDERWATER APPLICATION.

Recently described by the International Energy Agency (IEA) as a technology that is 'a linchpin in delivering clean energy transitions and protecting energy security' in the intergovernmental organization's 2024 *Batteries and Secure Energy Transitions: World Energy Outlook Special Report*, batteries will be a crucial enabling technology as part of the worldwide push to net zero.

Specializing in intelligent energy management and subsea power solutions, Aberdeen-based Verlume has a successful track record in delivering underwater, seabed-based battery technology in use cases across the environment.

SCALABLE SOLUTION

One of these such technologies is a compact, rechargeable battery known as Charge, a battery unit which offers high density energy storage for maximum bottom time deployment and application flexibility in underwater applications. The product is scalable by stacking the 35/55 kWh base units. The units can be configured as

standalone or integrated within existing infrastructure such as environmental monitoring units.

The development of Charge began after Verlume identified numerous power delivery challenges present across the underwater market, where operators and other users of the offshore environment were subject to high costs for reliable power delivery, experiencing problems with resident autonomous underwater vehicle (AUV) charging capability, as well as being under increasing scrutiny of carbon emissions.

PROVEN UTILITY

The rechargeable, compact battery solution is commercially available to solve a broad range of industry challenges. An example of a recent deployment of a Charge system was for an offshore oil and gas operator client in offshore North America, in collaboration with J+S Subsea.

Here, Charge was supplied as a power delivery solution following severe insulation resistance (IR) problems in the umbil-



Charge before deployment in North America. (Credit: Verlume)



Charge and its deck charger. (Credit: Verlume)

ical cable which were posing a high risk for the client, potentially contributing to decreased operability of the field and multi-billion-dollar costs.

As part of a wider umbilical protection system, Charge was utilized to provide the underwater battery power for the solution. The Charge systems were 55 kWh each, to provide circa 90 days of operation. In total, three Charge systems were provided as part of this project with two systems simultaneously deployed and the third as a duty rotation device.

In addition to this use case, Charge can also enable long-duration seabed monitoring for stationary systems for extensive surveys without the need for a vessel. There are also key use cases for Charge within offshore wind, where the technology can be used in underwater environmental monitoring/data acquisition applications either before the construction of a wind farm for site surveys or as part of an operational wind farm. Furthermore, there are applications around AUV residency within offshore wind for inspection, repair and maintenance routines.

www.verlume.world

FIRST AMERICAN-BUILT OFFSHORE WIND SERVICE OPERATIONS VESSEL

America's offshore wind energy supply chain is marking a major milestone, with the christening of the first-ever American-built, owned, and crewed offshore wind service operations vessel (SOV), which will play a key role in enabling domestic energy production and strengthening America's energy independence.

The *ECO EDISON* is an example of the major financial investments into US ports, maritime activities, manufacturing, workforce and domestic energy by Ørsted, the vessel will play an integral part of the operation and maintenance of Ørsted and Eversource's South



Fork Wind, Revolution Wind, and Sunrise Wind projects.

The *ECO EDISON* was built by more than 600 workers—across nearly one million work hours—at ECO in-house shipyards in Louisiana, Mississippi and Florida, with components of the vessel sourced from 34 states, from Alabama to West Virginia.

The state-of-the-art, 262-foot long liveaboard *ECO EDISON* will serve as a floating, year-round homebase for 60 of the first American offshore wind turbine technicians, who will work at-sea over the life of the wind farms, servicing and maintaining the wind turbines.

The *ECO EDISON* will be powered by two Cat® 3512E engines from key supplier, Houston-based Caterpillar Marine, underscoring the vast opportunity offshore wind offers existing American manufacturers and shipyards.

The *ECO EDISON*'s special-purpose design is focused on passenger safety and comfort, enhanced maneuverability, extended offshore endurance and reduced emissions. It includes special features like a "walk to work" motion-compensated gangway that allows technicians to easily and safely access the wind turbines. A smaller, so-called "daughter" craft onboard can be deployed to efficiently maneuver crew across the wind farms.

PETROBRAS AWARDS SEATRIUM WITH FPSO NEWBUILD CONTRACTS

Petrobras has signed contracts with Seatrium O&G Americas Limited to acquire the P-84 and P-85 vessel platforms. Both units will be self-owned and installed in the Atapu and Sépia fields, respectively, in ultra-deep waters of the pre-salt of the Santos Basin, with first oil date between 2029 and 2030.

The model of these two new platforms is FPSO (Floating, Production, Storage and Offloading) and they will be installed in water depths exceeding 2,000 meters. The P-84 (Atapu) and P-85 (Sépia) platforms will have a daily production capacity of 225,000 barrels of oil/day and a processing capacity of 10 million cubic meters of gas/day, each. The P-84 and P-85 platforms will be constructed in shipyards in Brazil, China, and Singapore, with local content reaching 20% in P-84 and 25% in P-85.

Currently, the Atapu and Sépia fields are producing with two platforms, with the P-70 being in the Atapu Field and the FPSO Carioca in the Sépia field. The new P-84 and P-85 platforms will be the second units in their respective fields.

The P-84 and P-85 projects are expected to reduce the intensity of greenhouse gas emissions by 30% per barrel of oil equivalent produced, being among the most efficient FPSOs to operate in Brazil. This reduction is due to the benefits of the all-electric configuration, optimizations in the processing plant to increase energy

efficiency, and the use of several technologies, such as: zero routine ventilation (recovery of ventilated gases from cargo tanks and the processing plant), capturing of deep seawater, use of speed variators in pumps and compressors, cogeneration (Waste Heat Recovery Unit), zero routine flaring (torch gas recovery—closed flare), valves with requirements for low fugitive emissions and capture, use and geological storage of CO₂ from gas produced.



ODFJELL TECHNOLOGY SECURES CONTRACTS FOR WELL SERVICES CONTRACTS IN MALAYSIA



Odfjell Technology, an integrated supplier of well services technology and engineering solutions, has been awarded three well services contracts in Malaysia, marking a significant milestone in the company's position in the Asia Pacific region.

The company has won two contracts in the region to deliver wellbore clean-up equipment and services to operators. Odfjell Technology will provide its innovative DrillRdillo tool, which increases well productivity, improves integrity and reduces operational costs. The company will also provide its Advanced Jetting Tool and Riser Combi Tool, as well as scrapers, brushes, magnets, filter equipment,

weight set circulating tools, weight set swivels and circulating tools as part of both wellbore clean-up contracts.

Odfjell Technology has also won a contract for the provision of tubular running services to an operator, in which the company's Casing Running Tool (CRTi) and Flush Mounted Spider (FMS) will deliver enhanced efficiency and safety to the customer's drilling program. A range of slips, elevators, torque-turn monitoring systems and rotary tables will also be provided within this scope of work.

All three contracts will be serviced by Odfjell Technology's facilities in Malaysia.

"Asia Pacific is a key growth market for Odfjell Technology. With these three contracts, we are building on our track record of delivering our suite of technology, equipment, and services to our customers, resulting in the highest standards of well integrity and intervention," said Gary Marshall, Area Manager Asia Pacific at Odfjell Technology. "The dedication and expertise from our local regional teams has resulted in securing these significant contracts, underscoring our commitment to delivering exceptional service and further solidifying our position in the Malaysian market."

QATARENERGY INVESTS IN OFFSHORE EGYPT

QatarEnergy has signed a farm-in agreement with ExxonMobil to acquire a 40% participating interest in two exploration blocks offshore Egypt.

Under the terms of the agreement, which is subject to customary approvals by the government of Egypt, QatarEnergy will acquire a 40% working interest in each of the "Cairo" and "Masry" Offshore Concession Agreements, while ExxonMobil—as the operator—will retain the remaining 60% working interest.

Commenting on the signing of this agreement, His Excellency Mr. Saad Sherida Al-Kaabi, the Minister of State for Energy Affairs, the President and CEO of QatarEnergy, said: "We look forward to working with our valued long-term strategic partner ExxonMobil, as well as with the Egyptian Natural Gas Holding Company (EGAS) and the Egyptian Ministry of Petroleum and Mineral Resources, in this promising and prospective region. I would like to take this opportunity to thank the Egyptian authorities and our partners for their valuable support and cooperation."

The Cairo and Masry offshore exploration blocks were awarded to ExxonMobil in January 2023 and cover an area of approximately 11,400 square kilometers in water depths of 2,000 to 3,000 meters.

DIGITAL VIDEO RECORDING & INSPECTION SYSTEMS

SD HD 4K H.264 H.265

4U RACK MOUNTED

EDGEDVR IS MOBILE

The EdgeDVR Laptop - an Industry First

- Diving
- Workclass & Inspection ROV
- Platform & Pipeline Inspections
- Construction & Decommissioning

DIGITAL EDGE SUBSEA

digitaledgesubsea.com

OIL AND NATURAL GAS

Prices continue their meandering journey higher



G. Allen Brooks
ON&T's Offshore Energy Expert
 Energy Musings
energymusings.substack.com

CRUDE OIL

The roller coaster ride for crude oil prices continues. After recently retreating near the \$70 a barrel price support level, crude oil prices reversed and climbed back to \$80. Why? Demand data was slightly stronger than expected due to improving global economic activity.

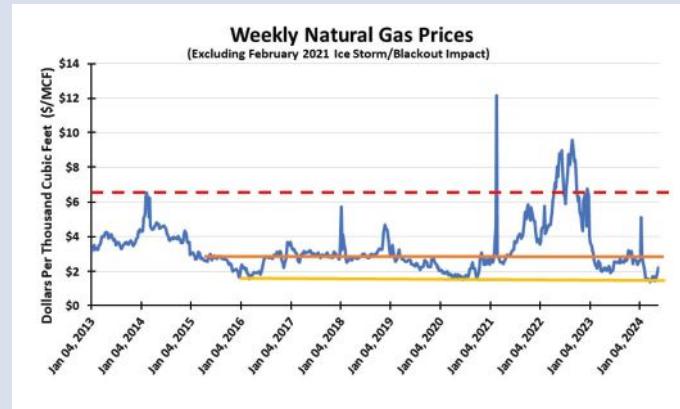
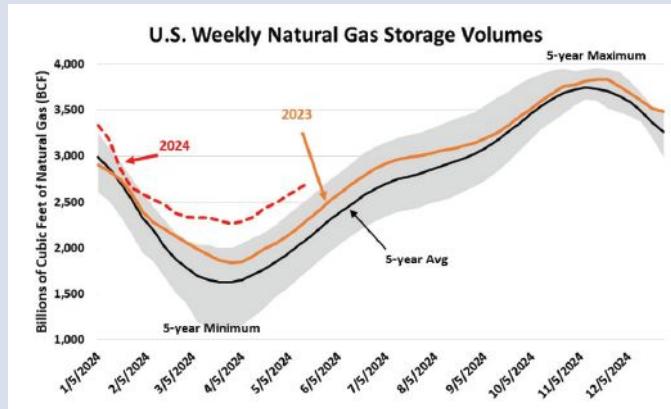
US oil production, as estimated by the Energy Information Administration (EIA), continues at 13.1 million barrels per day. Independent analysts question if production is that high, given the multitude of restraints on output caused by associated natural gas takeaway problems. When both oil and gas are produced from a well, both hydrocarbons must be moved to market for the well to operate. Increasingly, there are pipeline hookup challenges for the associated gas output. Those limitations are usually because a pipeline needs high volumes to justify adding new capacity or expanding the existing pipeline capacity. Interim solutions involve temporary hookups to pipelines with spare capacity, but they are not a permanent solution.

From a macro view, oil prices are driven by global oil demand. With the US summer driving season underway, Memorial Day's weekend travel set records suggesting petroleum consumption over the long weekend was strong. Will it continue for the summer? Traders will be watching for signs of demand strength or weakness, and they will respond by pushing up oil prices or sending them down.

One ingredient in current oil pricing that seems to have little impact is the geopolitical risk premium. It impacted oil prices last fall following the October 7 Hamas attack on Israeli citizens and communities, killing 1,200 and seeing 240 kidnapped. Oil traders expected a vicious response from the Israeli military following the attack. They saw a risk the response could spark a regional confrontation involving Iran and its proxy militias. When that did not happen, the risk premium nearly disappeared. Since then, the war risk premium has ebbed and flowed as different battles were waged. Major Israeli allies backed the country but they are slowly backing away from their support because of the brutal door-to-door fighting necessary to eradicate Hamas.

As the erosion of Western support for Israel gains traction, Israel made progress in destroying Hamas strongholds in Gaza. Maybe an end to the miliary action is on the horizon. However, across the Arabian Gulf, Iran acknowledged it is accelerating its efforts to develop a nuclear weapon. Not a positive development for peace. Suddenly, a helicopter crash killed the Iranian president and its foreign minister. The president was considered the leading candidate to replace the country's current supreme leader, 85-year-old Ayatollah Ali Khamenei. Whether a power vacuum could lead to greater instability in Iran is unknown, but its possibility could impact crude oil prices.

NATURAL GAS MARKET STILL OVERSUPPLIED WHILE AWAITING AIR CONDITIONING DEMAND, MORE LNG, AND STRONGER ECONOMIC CONSUMPTION





With above-average cyclone activity in the Atlantic Basin forecast, predicting possible impacts on gas demand and supply is almost impossible.

Oil prices depend on demand trends, but one cannot rule out how geopolitical events could explode the price if traders see an increased risk of oil supply disruptions. The most likely scenario is for oil prices to continue their roller-coaster journey within the guardrails of too cheap and too expensive.

NATURAL GAS

Natural gas storage volumes remain above their 5-year maximum. That is because production remains healthy while demand is subdued since summer heat has only appeared in isolated areas. Annual maintenance of the nation's liquefied natural gas export terminals has cut their feed gas demand. When that happens, those volumes back up into the production system creating additional supply indigestion.

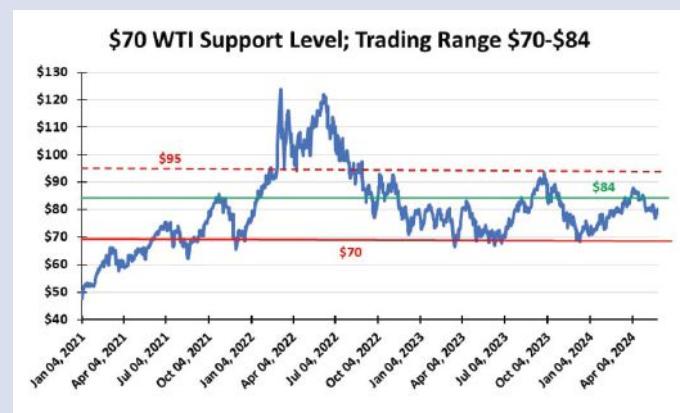
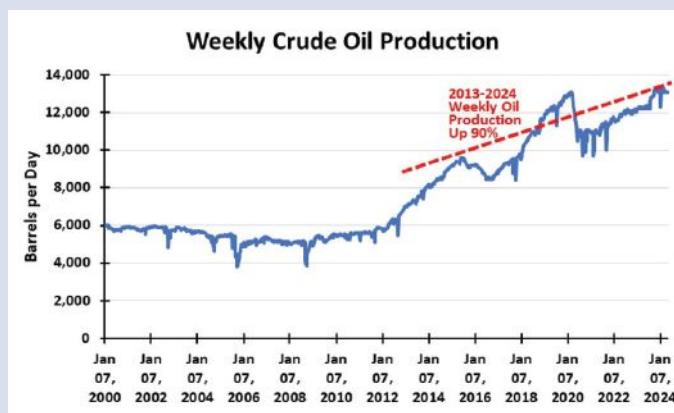
Without widespread air conditioning load, currently, there are few sources of gas demand to push up prices. Therefore, they continue languishing, but at higher levels than earlier this spring. Current gas prices are about \$2.50 per thousand cubic feet, which is over a dollar higher than the late April low price.

At April's low gas price, producers with no options were left with sending gas to storage, assuming customers would purchase it. Since some wells cannot be throttled back or shut in, producers opted to take whatever price they could obtain. The problem pro-

ducers faced was that in some supply basins, the prices of gas had crashed. In the Permian Basin, the nation's largest crude oil producer but a huge source of associated natural gas volumes, gas prices turned negative. Producers had to pay buyers—pipelines or industrial customers—to take their gas. That seldom happens. When it does, it lasts briefly, corrected by market forces. This negative pricing episode continued for longer than normal. Oil producers, selling their output for high \$70s to low \$80s a barrel prices, were willing to absorb negative gas prices to be able to sell their oil. This is a rare market dynamic that travels below the radar screen.

Summer gas price dynamics will revolve around the weather and LNG exports. A stronger US economy will boost gas consumption for power generation and chemical feedstocks. We know LNG feed gas demand will return once terminal maintenance is completed and shipments resume. That will help the supply/demand balance and should provide support for gas prices until air conditioning demand boosts electricity generated from natural gas. Until then, we do not expect much movement in gas prices. However, a tropical storm or hurricane, depending on its path and severity, could impact both gas demand and supply with appropriate price responses. Predicting storm impacts is impossible.

CRUDE OIL PRICES RALLYING AS DEMAND IS STRONGER AND THE GEOPOLITICAL RISK PREMIUM RETURNS



EQUINOR AND PARTNERS INVEST TO FURTHER GAS PRODUCTION AT TROLL



The Troll A platform in the North Sea. (Credit: Øyvind Gravås/Even Kleppa – Equinor)

Equinor and the Troll partners have decided to invest just over NOK 12 billion to further develop the gas infrastructure in the Troll West gas province.

This will accelerate production from the reservoir and thus maintain the current high gas export levels from the Troll and Kollsnes value chain leading up to 2030.

Stage 2 of the Troll Phase 3 project includes eight new wells from two new templates

with subsea controls extended from existing templates. A new gas flowline will be laid as a tie-back to the Troll A platform, and the project will also perform modification work on Troll A. The first wells are scheduled to come on stream at the end of 2026.

"This is a highly profitable project that will secure high gas production from the Troll field. The partnership's decision is important in order for us to fully utilize the capac-

ity of existing infrastructure. We've chosen to use solid, familiar suppliers, most of which already have framework agreements with us," said Geir Tungesvik, Equinor's Executive Vice President, Projects, Drilling & Procurement (PDP).

The new infrastructure will accelerate production from the reservoir equivalent to about 55 billion standard cubic meters of gas. At its peak, the annual contribution from the new development will amount to around 7 billion standard cubic meters of gas.

The first stage of gas production from the Troll West gas province started in 2021 and included eight wells and a new pipeline to the Troll A platform, as well as a new inlet module. This part of the project helped extend plateau production by 5–7 years. Stage 2 will further extend plateau production by around four years and reduce the production decline over the next 10–12 years.

Plateau production of Troll gas has increased as a result of recent upgrades at the Kollsnes processing plant. Maximum production from Troll used to be 121 million standard cubic meters of gas per day. This has now been increased to 129 million. Production from the new Troll wells will amount to about 20 million standard cubic meters of gas per day.

WORLEY TO SUPPORT BAYOU BEND CCS ALONG GULF COAST IN SOUTHEAST TEXAS

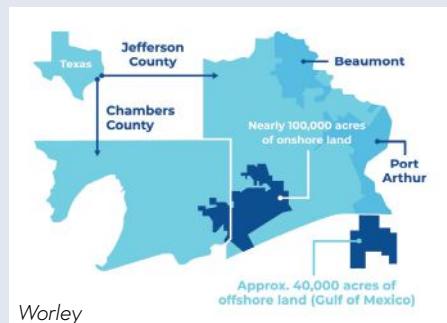
Worley, a global professional services company of energy, chemicals, and resources experts, has been selected to design and evaluate CO₂ gathering, handling, and sequestration facilities for the Bayou Bend CCS joint venture located along the Gulf Coast in Southeast Texas. The Bayou Bend project includes a CO₂ storage footprint of nearly 140,000 acres of pore space.

The Gulf Coast has one of the heaviest concentrations of CO₂ emissions in the US, making this project pivotal in enabling hard-to-abate industries, such as refining,

cement, steel, chemicals, and manufacturing, to meet their climate goals. Carbon sequestration along the Gulf Coast helps to support a broader national effort to reduce carbon emissions.

Mark Trueman, Group President, Americas for Worley, said: "We're committed to a strong partnership with Bayou Bend, drawing on our global CCUS knowledge and project execution experience. Innovative projects like Bayou Bend will potentially enable CCS at scale and help many more companies achieve their net zero goals,

supporting Worley's purpose of delivering a more sustainable world."



SLB ONESUBSEA AND SUBSEA7 AWARDED CONTRACT FOR OKEA'S BESTLA PROJECT



SLB has announced the award of a sizeable integrated engineering, procurement, construction, and installation (EPCI) contract by OKEA to its OneSubsea™ joint venture and Subsea7. The contract will see the partnership develop the Bestla (formerly known as Brasse) Project in the North Sea, offshore Norway, specifically to accelerate the subsea tieback delivery to aging platforms for profitable and sustainable marginal field development.

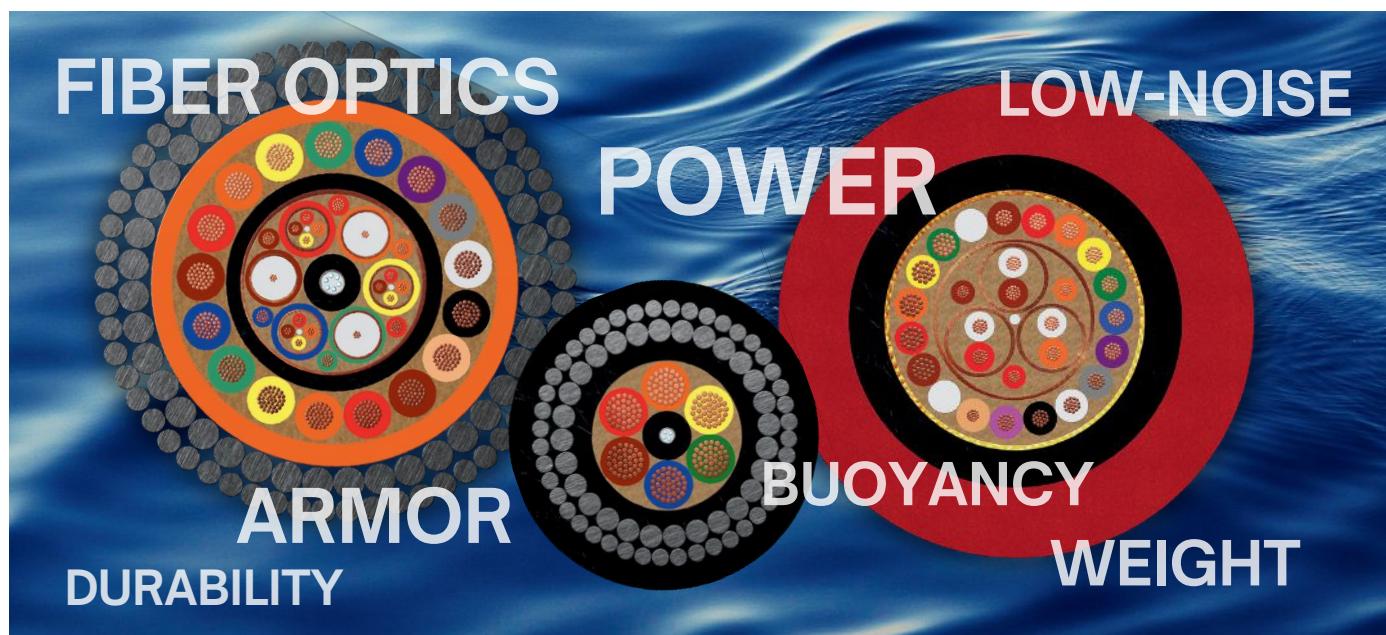
The two-well project, with a 13-km tieback to the Brage Platform, is the latest to be signed under the frame agreement signed with OKEA in 2017 and furthers SLB OneSubsea and Subsea7's partnership under its Subsea Integration Alliance.

Early engagement and collaborative field development planning combined with North Sea compliant configurable equipment will be critical for enabling profitable and sustainable marginal field development.

SLB OneSubsea will deliver the subsea production system which will include two subsea trees, a two-slot template, an umbilical, and a control system. Subsea7 will install the subsea production system and design and install the flowline systems, spools, and protection measures, including rock installation.

Bestla was discovered in 2016 but this solution proposed by Subsea Integration Alliance represents the first commercially viable field development plan submitted for the Brasse development.

The field is estimated to contain 24 million barrels of oil equivalent, of which two-thirds is oil and the remaining one-third is gas and natural gas liquids. First oil is targeted for Q4 2026.



Celebrating **65** Years in Business



(951) 659-2183

sales@southbaycable.com

southbaycable.com



U.S. Manufacturer Based in Idyllwild, Calif. | Est. 1957

What do you need in a cable?

ROV Tethers | Umbilical Cables
Towed Array Cables | Mux BOP Control Cables
Video Inspection | Faired Cables

*Highly Engineered,
Customer-Specific Cable Manufacturing*

SURVITEC LAUNCHES CONTAINMENT DEVICE TO PROTECT AGAINST ACTUATOR FAILURE

Global Survival Technology solutions provider Survitec has launched a pioneering new energy containment safety device designed to reduce the risks associated with catastrophic valve actuator failures.



▲ Survitec Gauntlet. (Credit: Survitec)

Compatible with all valve actuator types, the Survitec Gauntlet is a protective sleeve constructed from lightweight "bullet-proof" para-aramid armoring, ten times as strong as steel, and designed to contain the unpredictable forces of failure.

Technically qualified by the classification society Lloyd's Register, the Survitec Gauntlet provides immediate containment protection, enhancing safety measures and minimizing potential hazards. It is of minimal weight, placing no additional stress on the actuator, and protects the workings of the actuator from further corrosion and component degradation.

Valve actuator failures offshore are often due to corrosion and the age of the units, with hundreds of actuators in service on each offshore installation.

"There have been a lot of occasions where the spring has eroded to the point of failure, then failed catastrophically, or the retaining bolt and end cap have failed and been ejected. So much so that the UK Health and Safety Executive has advised all operators to enforce action in this area. The force and impact of an actuator failure can be violent and often potentially fatal, impacting people, critical plants and even pipelines," said Paul Gwynne, Sales & Contracts Manager at Survitec.

The concept of the safety device was developed due to issues identified in the North Sea oil and gas sector, oil rigs, platforms, and floating installations, such as FPSOs and FSRUs. The Survitec Gauntlet can be applied to any facility that operates actuator valves and where risks need to be mitigated.

MINESTO'S TIDAL KITE DRAGON 12 SUCCESSFULLY GENERATES FIRST POWER

Minesto, a leading ocean energy developer, recently announced that for three months, since its initial installation in February 2024, the tidal kite Dragon 12 has been successfully grid connected and delivers as expected at the site in Vestmanna.

In addition, for the first time, an array of tidal kites is in operation—the 1.2 MW D12 and one 100 kW D4, adding valuable production data for array build-out. This is the world's first mini array of tidal energy kites is in operation.

Operating two systems in parallel contributes to new ways of verification and learning in core areas, such as kite-park design, product range modularity, and performance optimization.

Minesto plans to continue electricity production and testing as an integral part of the ongoing commercial roll-out agenda. The purpose of the continued testing is three-fold: continue to demonstrate the competitive advantage of Dragon class technology; secure capability to deliver

commercially viable products; and push performance to further expand the exploitable market.

"It is both satisfactory and vital to see that the February installation of Dragon 12 has resulted in a three-month period of successful production testing. Our major investments in a full-scale D12 powerplant

and extensive test-site infrastructure delivers full value in generating production data that show evidence of commercial readiness. This is crucial technical data that our partners and site project investors have been asking for and we now are providing to reduce perceived risks in multiple ongoing sales and project investment-dialogues," said Dr. Martin Edlund.



Minesto

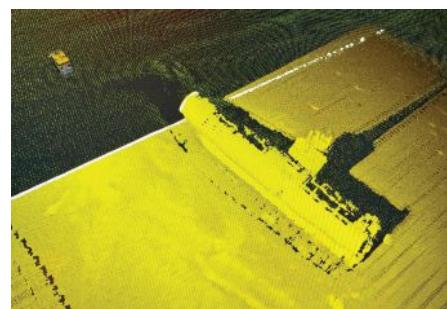
WIDEFIELD CAMERA ARRAY

New technology for immersive imaging and visualization

Over the past few years, the Ocean Exploration Trust (OET)—a non-profit that owns and operates exploration vessel (EV) *Nautilus*—has been developing and testing a new piece of immersive imaging technology: the Widefield Camera Array. Supported by the Office of Naval Research, this system seeks to enhance how we document the deep ocean.

The Widefield Camera Array was custom-built by The Sexton Corporation to mount onto remotely operated vehicles (ROVs) to capture immersive, high-resolution cinematic footage of deep ocean discoveries. When integrated with OET's other data systems, these cameras collect high-fidelity reference imagery suitable for advanced three-dimensional modeling and simulation.

Rated to a depth of 6,000 meters, the system consists of three genlocked cinema cameras selected for their exceptional low-light capabilities and image fidelity. Each camera features a 24-megapixel full-frame sensor capable of capturing images at 60 frames per second with a resolution of 6064 x 2560 pixels.



▲ The Widefield Camera Array was used during the rapid immersive survey of the wreck of the Japanese submarine I-201. Three-dimensional scans of the submarine were generated in near real time during the ROV survey. (Credit: OET)

When operating as an array, two cameras are configured to record stereoscopic images, each providing a 180-degree field of view, while the third camera provides a rectilinear image of an additional 60–107 degrees. This setup enables the generation of content ready for virtual reality and advanced 3D reconstruction, offering an unprecedented panoramic view of the underwater world.

TRIED AND TESTED

This new technology was first deployed and tested in October 2023 during the EV *Nautilus* Exploration Through Advanced Imaging expedition (NA156). Over the two-week expedition, some of the most complex and stunning underwater terrains throughout the Hawaiian Archipelago were explored, including submarine cliffs, pinnacles, large WWII submarine wrecks, and the active submarine volcano Kama'ehuakanaloa Seamount. Throughout the expedition, cameras collected over 8.5 terabytes of high-resolution video and photos. These files were used to test near-real-time generation of seafloor models using edge-based processing techniques.

The technical innovation of the camera array lies in its ability to utilize the entire forward light pool generated by OET's ROVs while collecting spatially-referenced imagery across different angles of view. The two stereoscopic cameras enhance depth perception in surveyed areas, whereas the third camera collects high-fidelity still images, which are spatially calibrated to other data systems on the ROV. During the expedition, a Norbit wideband multibeam sonar was mounted on the ROV and used to generate ultra-high-resolution maps of the seafloor.

In tandem, a customized software package was developed to take raw data collected by the Norbit sonar and allow the onboard



▲ The Widefield Camera Array was mounted on ROV Hercules in Fall 2023 during the NA156 expedition. (Credit: OET)

team to visualize it in three-dimensional space in real time.

RAPID DATA ANALYSIS

High-resolution visual and acoustic data collected by the ROV-mounted sensors can be used to develop high-fidelity georeferenced models of surveyed landscapes. While similar technology has been applied before in deep ocean exploration, recent advances in commercially available data processing tools now significantly narrow the time delay between data collection and analysis, thereby allowing models to be built in near real time and support decision-making in the field.

Talking exclusively to ON&T, Jonathan Fiely, OET Media Production Specialist and lead designer of the system, said: "The Widefield Camera Array has the potential to transform our immersive exploration and understanding of the oceans. Data collected with the system has equipped OET and our partners with the tools to create photorealistic virtualized deep-sea environments. In the years ahead, we see this new technology as instrumental to the accurate visualization of underwater landscapes throughout the Pacific Ocean and beyond."

nautiluslive.org

HYDRONE-R ACHIEVES KEY MILESTONE AT EQUINOR'S NJFORD FIELD

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.

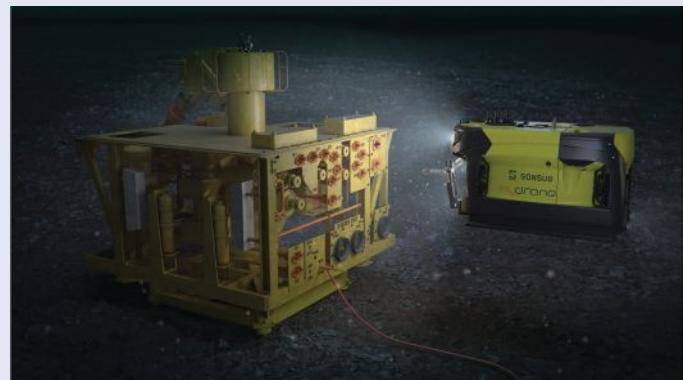
The project, for which Saipem's Hydrone-R is deployed, is part of a ten-year contract signed in 2019 with Equinor. The drone is tasked to carry out inspections and interventions on subsea assets, thus providing valuable information about potential hazards and ultimately improving the overall integrity 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 uninterruptedly for nearly six months, performing remotely operated works as well as autonomous missions. Saipem's onshore control center, 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.



▲ Hydrone-R. (Credit: Saipem)

NKT COMPLETES SURVEY AND REMEDIATION WORK ON EAST WEST HVDC INTERCONNECTOR

NKT has completed inspection survey and remediation work on the East West interconnector that links Ireland and Great Britain. The specialized inspection and remediation work allows the owner, EirGrid Interconnector Designated Activity Company (EIDAC), a subsidiary of the EirGrid Group, to ensure that the cable is brought back to optimal conditions.

To optimize performance and enhance longevity of its interconnector, EIDAC, recently had NKT inspect the East West HVDC interconnector between Ireland and Great Britain. The inspection survey is part of a long-term service agreement between the two companies.

The survey conducted by NKT including characterization of seabed conditions along the cable led to concrete mattresses and rock bags being placed above exposed sections of the East West interconnector.

Carrying out periodic cable inspection sur-

veys ensures that the cable can withstand extreme conditions and perform safe operations. A precise analysis and mitigation plan is a key element for preventing cable failures and reducing downtime. NKT's offshore engineering center can analyze cable survey data, providing the customer with 360-degree cable expertise.

As offshore assets are placed in harsh environments, subsea cables are continuously subjected to extreme conditions. This

exposes them to different kinds of surface or subsurface objects around the cable. Anchoring or fishing gear may also strike exposed sections of the cable or mechanical faults may happen in areas where the seabed is uneven.

With regular inspection, emerging changes to the cable's environment can be identified and potential cable failures can be prevented contributing to improving the operational performance of the cable.



NKT

AQUATERRA GROUP SECURES CONTRACT FOR SEVERAL DECOMMISSIONING PROJECTS

AquaTerra Group has announced four significant decommissioning contract wins totaling a seven-figure sum. These latest projects represent a notable increase in AquaTerra's roster of decommissioning projects between 2023 and 2025.

While late life and decommissioning services are not new areas of work for AquaTerra, the past year has marked several firsts including the first time that the company has been subcontracted by Dutch offshore contractor, Allseas.

Allseas has entrusted AquaTerra with a contract on Enquest's Heather Alpha platform supporting the EPRD project through the provision of engineering, fabrication, access, and construction teams to complete underdeck preparation scopes for topside removal.

On TAQA's Cormorant Alpha platform, AquaTerra supported Allseas by removing underdeck obstructions in preparation for topside removal. Following on from the success of this project, AquaTerra was then subcontracted by Wood for a further scope of work on the same platform.

By utilizing the company's lifting and rigging equipment and services, including QuikDeck, its modular suspended access platform,



AquaTerra

AquaTerra also won its first decommissioning contract with CNR International on the Ninian South platform, supporting conductor decommissioning.

Stephen Taylor, Managing Director of AquaTerra Group, said: "The team and I are delighted that we were selected by Allseas through what a competitive tendering process for the Enquest was and TAQA projects. This is also the first time that we have worked with Wood in several years, so it is great to be supporting them again."

In 2021, AquaTerra were finalists in the 'Best Lifting Operation' category in the LEEA awards for its work on the Dunlin Alpha decommissioning project.

Logistics Anchored by Logic

The advertisement features two side-by-side photographs. The left photo shows a worker in a red shirt and orange safety vest standing on the deck of a ship, looking up at a yellow metal structure being hoisted by a crane. The right photo shows two workers in hard hats and safety vests standing next to a large shipping container, reviewing a clipboard together. Between these images is a central vertical bar containing a list of services.

Transportation Services

Customs Brokerage

Import/Export Compliance

Supply Chain Management

Warehousing & Distribution

Travel Agency Services



Tie down your next
logistics project

ASSO.SUBSEA AND NEXANS JOIN FORCES ON HISTORIC CELTIC INTERCONNECTOR PROJECT

Asso.subsea, a global leader in the submarine cable installation field, has announced a strategic partnership with Nexans, a world-renowned submarine cable manufacturer, to undertake the subsea burial operations for the groundbreaking Celtic Interconnector project, under development by EirGrid, the operator and developer of Ireland's electricity grid, and its French counterpart, Réseau de Transport d'Électricité (RTE).

This ambitious venture is set to become Ireland's first power connection with continental Europe, boasting a total capacity of 700 MW, and will facilitate the import and export of electricity sufficient to power 450,000 homes.

The Celtic Interconnector spans an impressive 575 km, constituting a high voltage direct current connection across the Celtic Sea, from east Cork to the north-west coast of Brittany, France.

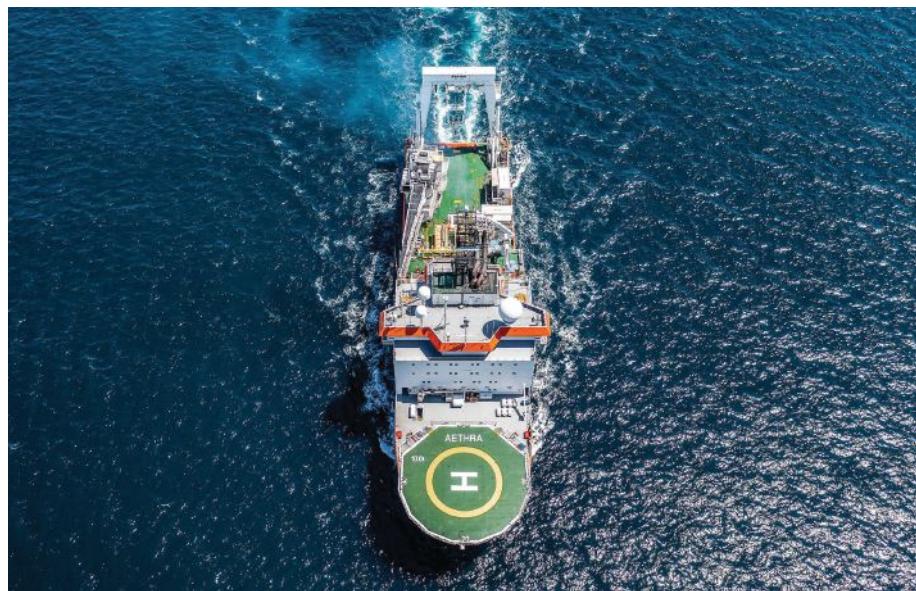
The initial campaign, scheduled for 2024, will include boulder clearance and pre-trenching activities. Subsequent campaigns are planned for 2025 and 2026, focusing on post-trenching operations. Asso.subsea's Trenching Support Vessels Aethra, Athena, and Argo will be deployed to ensure the project's success. The Asso-Jet III, Asso's newest jetting remote operated vehicle (ROV), will also play a crucial role in supporting the operation, by offering

the required flexibility to address a diverse range of underwater tasks.

Asso.subsea's Project Director of Interconnectors, Mr. Giannis Kyridis, said: "We are thrilled to collaborate once more with Nexans, on yet another noteworthy project, as it has been identified as one of the most critical energy infrastructure projects in Ireland and France for this decade. By supporting the development of a more sustainable electricity mix and facilitating cross-border electricity flows on a European scale, Asso.subsea actively contrib-

utes to the realization of the EU's goals for affordable, secure, and sustainable energy."

The Celtic Interconnector project serves as a catalyst for enhancing Europe's energy security. Beyond its significant environmental impact, the initiative aims to reduce electricity costs for consumers in both Ireland and France. Aligned with the European Union's vision of achieving electrical solidarity, the project is co-funded by the EU through its Connecting Europe Facility (CEF) and holds the prestigious designation of a Project of Common Interest (PCI).



Aethra, one of three trenching support vessels to be deployed on the project. (Credit: Asso.subsea)

ELEMENTAL ENERGIES AWARDED GOM CONTRACT FOR MAJOR WELLS DECOMMISSIONING

Leading independent wells specialist, Elemental Energies, has secured a major master services contract to support the decommissioning of nine orphaned wells in the Gulf of Mexico from Promethean Energy (Promethean), a late life oil and gas operator focused on delivering safe, cost-efficient and timely decommissioning of mature assets.

The first phase commenced in February with Elemental Energies providing well

management services from its Houston office for the plugging and abandonment of wells in the Matagorda Island area, off the Texas coast. The work comes as part of a five-year contract awarded to Promethean by the Department of the Interior's Bureau of Safety and Environmental Enforcement (BSEE) to decommission orphaned offshore wells.

Elemental Energies' Julie Copland, Head of Decommissioning and Low Carbon, said:

"We're thrilled with this award as it marks a significant expansion of our efforts in the Gulf. Our rich history in decommissioning, uniquely equips us to address the Gulf's orphaned wells, applying our expertise to mitigate environmental risks, navigate complex regulations, and reduce the associated OPEX of decommissioning work. This project and partnership is a testament to our commitment to meeting evolving industry standards and safeguarding our environment."

PGS GETS GREEN LIGHT FOR PETROBRAS 4D CONTRACT

The Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) has now issued the final permit for the large 4D survey over the Barracuda Caratinga fields and the survey is about to start.

PGS announced the 4D contract award from Petrobras in December 2022 and the original project start-up was June/July last year. To optimize vessel resources during the 2023 summer season, the *Ramform Victory* was reactivated and earmarked for this project. While permitting was pending she undertook a series of attractive multi-client programs.

The *Ramform Victory* has completed final preparations and is on her way from Rio de Janeiro to Campos, to start data acquisition for Petrobras in early June.

The contract has a duration of approximately eight months and will be completed in 2025. In September, the *Ramform Victory* will be joined by the PGS *Apollo*,

as a source vessel, to complete the more complex areas of the survey.

"We are very pleased that all permits are obtained and that we are about to start on the large Petrobras 4D contract. PGS has acquired multiple 4D surveys offshore Brazil and gained significant operational experience in the region. We appreciate Petrobras' recognition of our *Ramform* vessel acquisition platform in combination with our GeoStreamer technology, which are well suited for large, high-quality 4D acquisition programs," said Rune Olav Pedersen, President & CEO of PGS.



1 Ramform Victory passing through the Guanabara Bay. (Credit: PGS)

JAMES FISHER COMPLETES DECOMMISSIONING IN THE GULF OF THAILAND



James Fisher

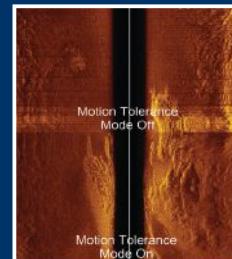
James Fisher Decommissioning, part of James Fisher and Sons plc, extended its contract with a major offshore engineering, preparations, removal, and disposal (EPRD) operator, making the project the largest to date for the offshore decommissioning specialist. The multi-million-pound offshore decommissioning project utilized real-time cutting verification technology to remove 25 dormant gas platforms in support of the client's wider asset end-of-life campaign.

During jacket removal, the visualization of each abrasive cut made using James Fisher's cut verification system ensures operations are completed successfully on the first attempt and without the need to reevaluate the initial cut. This saved valuable project time and improved efficiency for the client by reducing cutting times by 50 percent.

Mark Stephen, Decommissioning Director for James Fisher, said: "This type of operation was a first for James Fisher Decommissioning in terms of jacket removal volume and duration, and we are extremely proud to have been part of the project. Utilizing our strong in-house decommissioning capabilities and real-time monitoring technology, we saved valuable project time during the cutting process while ensuring the project was completed to the highest standards for our client."



4205 MULTIPURPOSE SIDE SCAN SONAR SURVEY SYSTEM



- Dual & Tri-Frequency Options
- Motion Tolerant
- Increased Power
- New Low Noise Electronics
- Superior Resolution



EdgeTech.com

info@edgetech.com
USA 1.508.291.0057



Remote and real-time monitoring technologies have improved observational capabilities for ocean surveillance, modeling, and more. Ocean information and communication (ICT) innovations, like the ocean monitoring systems provided by MicroStep-MIS—featured in this OceanICT spotlight—can play a vital role in collecting real-time data and providing early warning alerts.

MicroStep-MIS provides turnkey marine environment monitoring systems. As a manufacturer, system integrator, and service provider, their portfolio includes developing marine and harbor monitoring systems, software and hardware development, database and collection systems, modeling and forecasting, and early warning systems. The entire cycle—from concept design to customization, configuration, site deployment, and long-term maintenance—is managed by a team of experienced marine scientists, oceanographers, and site technicians.

Commenting on the recent breakthroughs in ICT capabilities for the ocean industry, MicroStep-MIS Director Abubakar Omer Elkhider Hajelamin told ON&T: "Site visits for troubleshooting, as well as routine maintenance of marine and offshore stations, call for significant resources (e.g., chartering support vessels, helicopter journeys, special permissions, etc.); therefore, improvements to reliable anti-fouling technologies for sensors in water, offshore anti-vandalism systems, robustness of power packs, and multi-mode communication layers in all weather conditions all contribute to a longer deployed system transmitting reliable data with fewer interventions."

Read ON&T's exclusive interview with MicroStep-MIS at oceannews.com/take5



ASHTEAD TECHNOLOGY TO PROVIDE SCANFISH KATRIA FOR UXO SURVEYS

Ashtead Technology, the underwater technology experts for the global offshore energy industry, has further expanded its service offering in North America through a new rental share partnership with EIVA. This agreement offers Ashtead Technology the ability to provide EIVA's ScanFish Katria for rental in the region.

Recognized as the best-in-class technology for wide-area UXO (Unexploded Ordnance) surveys, ScanFish Katria is an intelligent, wide sweep ROTV (Remotely Operated Tow Vehicle) solution for magnetometer surveys. The proven technology facilitates safe and cost-effective UXO detection and clearance operations, critical to the development of offshore wind farms and other subsea infrastructure.

The provision of the ScanFish will be managed from Ashtead Technology's Houston

hub, by experts with comprehensive training in maintenance and operation of the system. The agreement adds to Ashtead Technology's technology portfolio, enhancing the company's position as the leading subsea technology provider in the region.

Phil Middleton, Ashtead Technology's Head of Survey and Robotics, said: "This agreement builds on our developing relationship with Covelya Group companies, which includes EIVA. The ScanFish Katria solution significantly expands Ashtead Technology's growing capabilities in site characterization, UXO identification, and clearance.

"With a focus on geographic expansion along the East Coast of North America, this technology will play a significant role in the safe development of offshore wind farms in the region."

TECHNIPFMC AWARDED CONTRACT BY WOODSIDE ENERGY

TechnipFMC has been awarded a significant integrated Engineering, Procurement, Construction, and Installation (iEPCI™) contract by Woodside Energy in Australia.

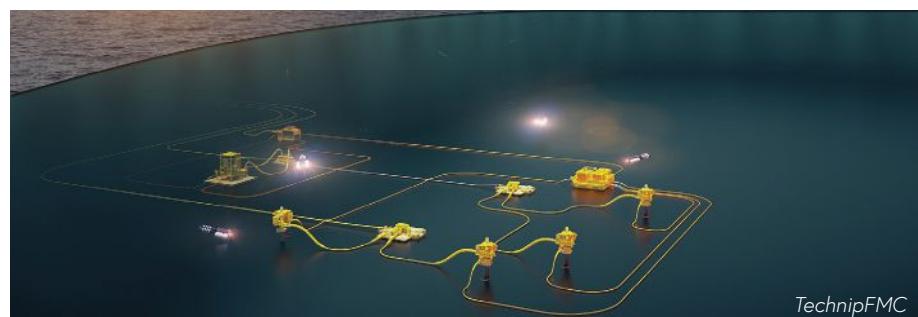
TechnipFMC will design, manufacture, and install the subsea production system, flexible pipe, and umbilicals for the Xena Infill well (XNA03) to support ongoing production from the Pluto LNG Project. The award follows an integrated front end engineering design (iFEED™) study.

The project will use the Company's Subsea 2.0® production system. Xena Phase 3 will

be tied back to existing subsea infrastructure previously supplied by TechnipFMC.

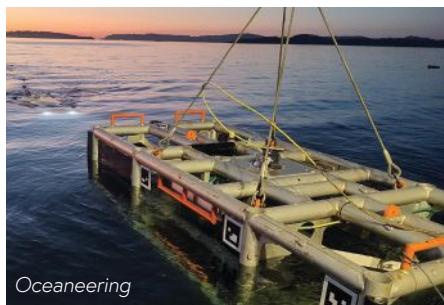
Jonathan Landes, President, Subsea at TechnipFMC, commented: "We are proud to be delivering a fully integrated project from concept to execution. This project will help our long-term client meet their objectives, demonstrating the favorable impact iFEED, iEPCI, and Subsea 2.0 can have on project economics."

The contract is the latest call-off on the framework agreement between Woodside Energy and TechnipFMC.



TechnipFMC

PIPELINE INSPECTION PILOT COMPLETED BY OCEANEERING AUV



Oceaneering

TotalEnergies and Oceaneering International, Inc. recently announced the successful completion of a Pipeline Inspection Industrial Pilot using the Freedom™ autonomous underwater vehicle (AUV), demonstrating its capabilities for sustainable commercial pipeline inspection missions.

The capabilities observed during the pilot delivered on the ambition of TotalEnergies to reduce the environmental impact while assuring the integrity of sub-marine pipelines, contributing to TotalEnergies ambi-

tion to be Net Zero by 2050, together with society. The application of the technology represents a reduction in time, and emissions, of an estimated 50% compared to existing methods with equivalent quality of the inspection and opportunity to exceed data quality provision through continuous improvement.

The North Sea pilot for TotalEnergies resulted in an inspection of over 120 km of submarine pipelines, to add to 60 km of near-shore pipelines inspected during an earlier deployment for TotalEnergies. Utilizing the onboard adaptive behaviors, developed to provide additional insights into subsea features, Freedom demonstrated that it is capable of performing high quality operations, with the required data gathered in a single pass of the pipelines.

The onboard autonomous capabilities, together with high specification instruments—including a laser scanning system

and multibeam sonar technology—result in a detailed external inspection of sub-sea pipeline features. Autonomous pipeline tracking capability ensures Freedom remained directly above the pipeline at low altitudes, providing a detailed external view of the pipelines and the surrounding seafloor.

On completion of the pipeline inspection missions, onboard automated data processing allowed the assessment of the mission effectiveness and the confirmation of pipeline condition. Freedom provides high quality data sets at a significantly increased speed compared with legacy ROV pipeline inspection methods.

Freedom, a hybrid AUV/ROV system, is the result of a long-term collaborative relationship between Oceaneering, TotalEnergies, and Chevron dating back to 2014, with Equinor joining the collaboration in 2019.

The logo for AEF Engineered Inflatables features a red circle with a stylized white 'AEF' monogram inside. Below the circle, the words 'AEF ENGINEERED INFLATABLES' are written in a bold, sans-serif font.
The logo for Subsalve features a yellow circle with a white silhouette of a hot air balloon inside. Below the circle, the word 'SUBSALVE' is written in a bold, sans-serif font, followed by 'ENGINEERED INFLATABLES' in a smaller font.
The logo for Aeré Docking Solutions features a blue circle with a yellow 'AE' monogram inside. Below the circle, the word 'AERÉ' is written in a bold, sans-serif font, followed by 'DOCKING SOLUTIONS' in a smaller font.

A large blue, semi-circular liquid containment bladder is shown resting on a sandy beach. A person in a wetsuit is standing next to it, holding a camera to take a picture of the product.

LIQUID CONTAINMENT

- LIQUID CONTAINMENT FOR FUEL & WATER
- BERM LINERS
- EMERGENCY WATER DISTRIBUTION SYSTEMS
- AIR CUSHION VEHICLE SKIRTS

www.AEF-Performance.com

A large blue and white industrial vessel is shown floating in the water, supported by several large, cylindrical yellow buoyancy inflatables underneath its hull.

BUOYANCY INFLATABLES

- UNDERWATER LIFTING BAGS
- AIRCRAFT LIFTING BAGS
- WATER LOAD TESTING BAGS
- UNDERWATER EOD SYSTEMS

www.Subsalve.com

A large, modern white superyacht is shown docked in a harbor, surrounded by several large, cylindrical yellow buoyancy inflatables used for docking.

DOCKING SOLUTIONS

- INFLATABLE/DEFlatable FENDERS
- STANDARD & CUSTOM FENDER COVERS
- INFLATABLE DOCKS & PLATFORMS
- DOCKING KITS & LINES

www.AereDockingSolutions.com

The logo for Performance Inflatables features a stylized black circle with a white wave-like pattern inside. To the right of the circle, the words 'PERFORMANCE INFLATABLES' are written in a bold, sans-serif font.

DEEPOCEAN COMPLETES REMOTE DREDGING OPERATIONS FROM SHORE FOR FIRST TIME



DeepOcean

DeepOcean has announced the successful completion of remote seabed dredging operations—from shore—for Aker BP ASA. This significant milestone demonstrates the potential of conducting advanced ROV operations from an onshore operations center.

By utilizing low bandwidth satellite technology, the vast majority of the North Sea and other offshore basins, are covered, surpassing the limitations of 4G solutions which depend on proximity to existing offshore infrastructure.

Subsea dredging involves excavation and sediment disposal on the seabed, while a reliable satellite connection and a state-of-the-art remote operations center (ROC) opens for a wide range of subsea services to be performed from onshore.

DeepOcean's ROVs onboard the vessel, *Edda Fauna*, were utilized for the dredging. Onshore operations were run from Remota's ROC at outside Haugesund, Norway. Remota is a joint venture between DeepOcean, Solstad Offshore ASA and Østensjø Rederi.

This latest advancement for remote subsea operations is paving the way for an unmanned service vessel (USV) to be delivered later in 2024 and enter a long-term charter with DeepOcean. Remote operations are key to unlocking significant emission reductions and cost savings.

ROVCO SELECTED FOR SITE CHARACTERIZATION FOR OUTER DOWSING OFFSHORE WIND

Rovco has been selected for site characterization work on the Outer Dowsing Offshore Wind project in the southern North Sea. The project is a joint venture between TotalEnergies, Corio Generation, and Gulf Energy Development. With a planned installed capacity of 1.5 GW, it will be one of the UK's largest offshore wind farms upon completion.

Rovco will be responsible for carrying out a full geophysical investigation of several key sites at Outer Dowsing Offshore Wind off the Lincolnshire coast. This will involve mapping both the seabed and sub-seabed conditions to identify hazards that may affect the future installation of wind turbines & subsea cables.

Rovco will also conduct benthic environmental surveys of the site, helping to better understand and minimize any disruption to local wildlife.

The work will be carried out by one of Rovco's dedicated survey vessels, *Glomar Supporter*, which is permanently mobilized with the latest survey technology, providing a state-of-the-art survey solution. With a USV onboard, it is equipped to deliver

simultaneous data collection with instant upload to the vessel. This enables rapid processing of the data gathered and accelerates overall project timelines. The vessel also has a work-class ROV for concurrent inspection activities.



OKEANUS LAUNCHES STACKABLE WINCH DESIGNED TO OPTIMIZE DECK SPACE

Okeanus Science & Technology has introduced the firm's new all-hydraulic Stackable Winch. This ruggedized compact 3 HP winch, which is supported by a 28' x 12' x 18' drum and 0.450" cable, is capable of a variable line speed of 100 ft/min and a line pull maximum of 700 lbs.

The Stackable Winch is constructed primarily of Aluminum 6061-T6 and, with its multi-coat marine grade coating, is primed for the rigors of offshore operating conditions and with full adherence to ABS standards. The "stackable" design feature enables operators to optimize precious space aboard smaller vessels.

"We are thrilled to launch the first model in our new line of compact, lightweight Stackable Winches," said Okeanus COO Don Brockett. "This new product line has been designed to offer offshore operators an intuitive, easy-to-maintain, and affordable option for survey vessels with limited available deck space, with the option to deploy up to three winches at the same time in a stacked formation."

The all-hydraulic Stackable Winch has been engineered to support a wide range of oceanographic equipment and marine instrumentation, including towed side-scan and magnetometer systems, water samplers, CTDs, and various other oceanographic winch operations.

The Stackable Winch is also equipped with an automatic failsafe brake and locally mounted operator control, with an optional for either tethered or wireless remote control. Options include a level-wind, slipring, grooved drum cover, lifting bridle, and cable data display, with additional customization available on request.



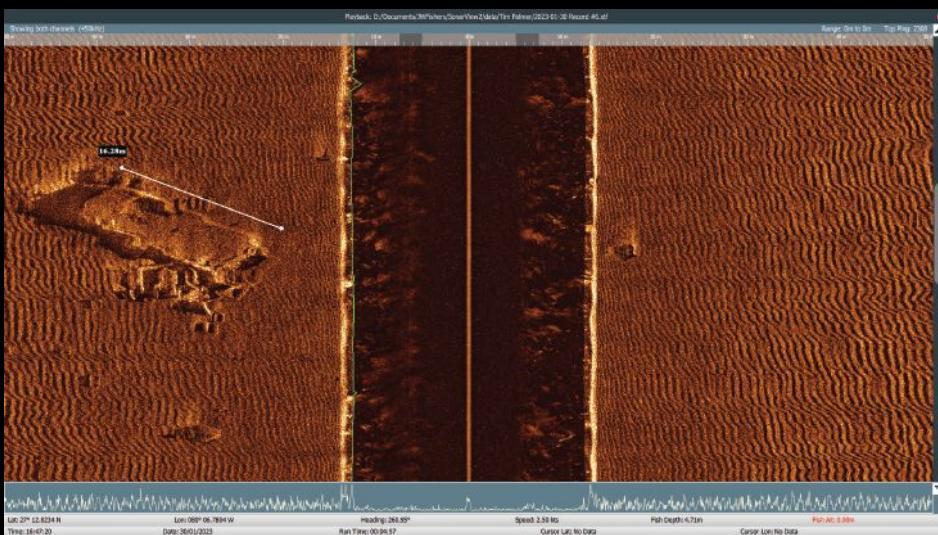
Okeanus

Remove the water

with the help of a JW Fishers Side Scan Sonar



- Simple to operate
- Simultaneous dual frequency operation (450kHz / 900kHz)
- Displays images on tablet
- CHIRP technology
- Commercial construction
- Ultra High Resolution



* A broken shipwreck and scattered pieces ~17m long on water floor



JW Fishers Mfg., Inc.

(800)822-4744

(508)822-7330

Email: info@jwfishers.com

www.jwfishers.com



VIDEORAY WINS US NAVY MESR CONTRACT FOR MISSION SPECIALIST TECHNOLOGY



VideoRay has announced the award of a \$92.6 million, five-year indefinite-delivery/indefinite-quantity (IDIQ) contract for the continuous production, sustainment, and development of the MK20 Defender remotely operated vehicle (ROV) platform for the US Navy's Maritime Expeditionary Standoff Response (MESR).

This contract provides access to VideoRay's Mission Specialist family of underwater robotics systems to support the Navy's Explosive Ordnance Disposal Underwater Response Vehicle program and the MESR program of record. Administered by Naval Information Warfare Command, Pacific, the contract provides for the delivery and support of the Navy's next-generation ROVs that will be used to conduct critical undersea missions to support our warfighters.

The MK20 Defender ROV, based on VideoRay's Mission Specialist Defender, is a highly robust, man-portable, expeditionary ROV that offers modularity and an open architecture design that allows for the easy integration of third-party sensors, software applica-

tions, and versatile, field-swappable payload options to meet the Navy's expanding needs for expeditionary mine countermeasure operations.

Core technology onboard this platform has been developed by industry partners and includes: EOD Workspace control software and autonomy platform by Greensea IQ, multibeam sonar and USBL positioning system by BluePrint Subsea, Doppler Velocity Log (DVL) for navigation by Nortek, and a two-function manipulator by Eddyfi, which all combine to significantly expand vehicle capabilities while maintaining the size, weight and power (SWAP) specifications required to meet the Navy's challenging requirements.

Designed and built in Pottstown, Pennsylvania, the Mission Specialist Defender has quickly become the cornerstone of VideoRay's Mission Specialist family of products, boasting a rapidly growing number of domestic and international defense and commercial customers worldwide.

"This production contract with the US Navy marks an exciting new chapter for VideoRay, acknowledging the dedication and hard work of our team to achieve this significant milestone," said Chris Gibson, Chief Executive Officer of VideoRay.

"We are grateful for the opportunity to collaborate with the Navy and to receive valuable feedback, which has been instrumental in continuously enhancing our next-generation Expeditionary EOD and MCM systems to meet the fleet's requirements. We look forward to continuing our partnership with the US Navy, along with our partners to advance our technology and capabilities to meet the needs of our defense and commercial customers alike worldwide."

US COAST GUARD AWARDS BOLLINGER TWO FAST RESPONSE CUTTERS

The US Coast Guard has exercised a contract option to award Bollinger Shipyards two additional Sentinel-Class Fast Response Cutters (FRC). This announcement brings the total number of FRCs awarded to Bollinger up to 67 vessels since the program's inception. To date, the US Coast Guard has commissioned 55 FRCs into operational service.

"We're incredibly proud of our long history supporting the US Coast Guard that now stretches four decades," said Bollinger Shipyards President and CEO Ben Bordelon. "Our unique experience building for the Coast Guard is unparalleled and has shown time and time again that we can successfully deliver the highest quality and most capable vessels. We look forward to continuing our partnership with the Coast Guard."

Both FRCs will be built at Bollinger's Lockport, LA, facility that supports over 650 direct jobs in Lafourche Parish out of the nearly 4,000 shipbuilders supporting Bollinger's 13 facilities across Louisiana and Mississippi.

The FRC program has had a total economic impact of over \$2 billion since inception in material spending and directly supports more than 650 jobs in Southeast Louisiana. The program has indirectly created 1,690 new jobs from operations and capital investment and has an annual economic impact on GDP of \$202 million, according to the most recent data from the US Maritime Administration (MARAD) on the economic importance of the US Shipbuilding and Repair Industry. Bollinger sources over 271,000 different items for the FRC consisting of 282 million components and parts from 965 suppliers in 37 states.

SIX NEWBUILD AMPHIBIOUS WARSHIPS ANNOUNCED BY ROYAL NAVY

The Royal Navy will have up to six new state-of-the-art amphibious ships to bring the punch of the Royal Marines Commandos ashore wherever in the world they are needed.

The new Multi Role Support Ships (MRSS) will replace HMS *Albion* and HMS *Bulwark*, the Royal Navy's current amphibious flagships which will remain in service until 2033/2034.

The MRSS will also take place of the three Bay-class amphibious support vessel, RFAs *Lyme Bay*, *Mounts Bay*, *Cardigan Bay*, and support ship RFA *Argus*.

MRSS will be extremely versatile warships, able to deploy on a wider variety of operations, and designed to carry vehicles, aircraft, insertion craft and a broad range of uncrewed systems for complicated missions. They will also be able to act as primary casualty receiving ships, providing

urgent medical care to British forces wherever they are deployed.

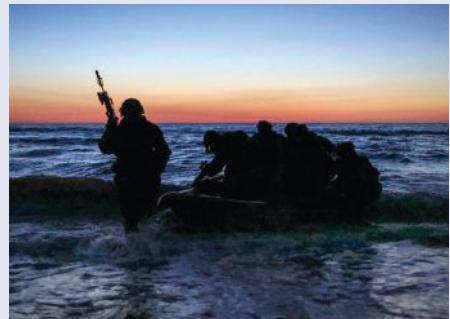
The MOD has entered the first, or concept, phase of the MRSS Program and will work with industry as part of early market engagement ahead of developing the vessel design.

MRSS Program Director, Commander Alex Allen, said: "Adaptability and flexibility will be central to the Multi Role Support Ship design, as will interoperability with our NATO allies. This announcement is a significant step in the program bringing these ships into service and modernizing the Royal Navy's littoral strike capability."

In a host of announcements made by Defence Secretary Grant Shapps at the First Sea Lord's Sea Power Conference 2024 in London, it was also stated that two stalwart Type 23 frigates will be retired.

HMS *Argyll* has been sold to BAE Systems and will be used within the UK's shipbuilding sector, supporting apprentice training in line with the government's agenda on skills and shipbuilding capacity.

HMS *Westminster* will be decommissioned, but both ships depart as the next generation of frigates—the Type 26 and 31—continue to be built.



▲ Royal Marines land ashore in the Baltic during NATO exercises. (Credit: Royal Navy)

LOCKHEED MARTIN CANADA AWARDS L3HARRIS INTEGRATED COMMUNICATIONS SYSTEM CONTRACT

Lockheed Martin Canada has awarded L3Harris Technologies the Integrated Communications System for the Canadian Surface Combatant (CSC) of the Royal Canadian Navy (RCN), aimed at bolstering their operational efficacy and security on maritime missions.

The CSC program, spearheaded by Irving Shipbuilding Inc., Lockheed Martin Canada and a consortium of partners, is a beacon

of maritime innovation and revitalization within Canada's shipbuilding sector. With Irving Shipbuilding leading the construction efforts under the National Shipbuilding Strategy (NSS), Lockheed Martin Canada is at the helm of the design team, collaborating with L3Harris to integrate systems in Canada.

The program marks a significant milestone in Canada's defense industry, with prom-

ising prospects for market expansion and global exports. Initial deliveries for the first three ships of the 15-vessel program are slated to commence in 2027, signaling a bright future for growth and advancement.

Central to L3Harris' Integrated Communications System is the assurance of reliable and effective communication capabilities for RCN vessels, amplifying maritime safety, operational efficiency and mission success. This emphasizes the pivotal role played by L3Harris in supporting Canada's maritime interests and national security imperatives.

The Integrated Communications System developed by L3Harris is indispensable for enhancing situational awareness, operational efficiency, and safety aboard RCN vessels. It aligns seamlessly with the ship's primary mission objectives and contributes to overall effectiveness in maritime operations. Importantly, this initiative aligns with the Canadian NSS, representing a cornerstone in modernizing Canada's naval fleet by constructing Type 26 Global Combat Ships.



BAE Systems

US NAVY ESTABLISHES USVRON THREE TO OVERSEE USV FLEET

Commander, Naval Surface Force, US Pacific Fleet (CNSP) recently established Unmanned Surface Vessel Squadron (USVRON) Three at Naval Amphibious Base Coronado.

USVRON Three will oversee a fleet of small, unmanned surface vessels (USVs) known as Global Autonomous Reconnaissance Craft (GARC).

During the ceremony, Capt. Derek Rader assumed command of the newly established USVRON Three. "Our Sailors are the essential key for integration of unmanned surface vessels in the Navy and joint construct," said Rader. "This will be accomplished through experimentation with the fleet testing and doctrine drafted by operators you see today, who embody and execute the warfighting that we need to achieve to enable the full potential of unmanned systems."

USVs, including the GARCs, will provide additional warfighting capability and capacity to augment the Navy's traditional combatant force, providing commanders with a greater range of capabilities and employment options to increase the Fleet's tactical and strategic advantages. The goal for USVs is to provide the fleet with operations in conjunction with carrier strike groups, surface action groups, or even independently.

Manufactured by the Maritime Applied Physics Corporation, GARCs are 16-foot USVs that enable research, testing, and operations that will allow integration throughout the surface, expeditionary, and joint maritime forces.

Commander, Naval Surface Forces US Pacific Fleet Vice Adm. Brendan McLane delivered the keynote speech at the ceremony. "With challenging obstacles to overcome, we have put the right team in place at USVRON Three, and I believe we have done just that," McLane said. "The Navy is placing unmanned systems in the hands of 400 of our most talented warfighters to help integrate, scale, experiment, and employ these systems."

USVRON Three will also incorporate the newest rating, the robotics warfare (RW) specialist into their teams. The rating was announced in February by the Chief of Naval Operations (CNO). They will enable Robotic Autonomous System (RAS) operations and maintenance at the tactical edge and be the subject matter experts for com-

puter vision, mission autonomy, navigation autonomy, data systems, artificial intelligence, and machine learning on the RAS platforms.

USVRON Three will report to Surface Development Group (SURFDEVGRU) One, under the direction of Cdre. Shea Thompson.

"There are currently no boundaries, and we have an incredible opportunity to determine what right looks like within our sphere of influence," said Thompson. "And the SURFDEVGRU One and USVRON Three teams are manned by like-minded surface warriors who are making considerable strides in validating small USV capability while laying out a clear path to achieving full operational capability by a timeframe that matters."

The mission of USVRON Three is to deliver the most formidable, unmanned platforms in the maritime domain. The squadron will be a cornerstone in building the foundational knowledge required to operate and maintain small USVs and will spearhead the development of TTPs for small USV operations and sustainment. USVRON 3's motto is "Victory Through Ferocity."

SURFDEVGRU 1 is responsible for the maintenance, training, and manning oversight for USV, Zumwalt-class guided missile destroyers, and the future USS Lyndon B. Johnson (DDG 1002).

The mission of CNSP is to man, train, and equip the Surface Force to provide fleet commanders with credible naval power to control the sea and project power ashore.



US Pacific Fleet Vice Adm. Brendan McLane is rung in upon his arrival to the establishment ceremony for Unmanned Surface Vessel Squadron 3 (USVRON 3) on Naval Amphibious Base Coronado on May 17, 2024. (Credit: US Navy/Mass Communication Specialist 1st Class Claire M. DuBois)

BEING RESOURCE READY

Defense and security leaders urge investment in uncrewed technologies



George Galdorisi

US Navy—retired

The Reagan National Defense Forum (RNDF), held every year on a Saturday in early December at the Ronald Reagan Presidential Library, is one of the most important national security dialogues of the year. In 2023, attendees included the US Secretary of Defense, secretaries and uniformed chiefs of the military services, key innovation and acquisition leaders such as the DIU Director, and senators and congressmen from key defense committees.

KEY REFLECTIONS

US Secretary of Defense, Lloyd Austin stressed the need for the United States to "sharpen its edge" in emerging technologies such as autonomy, artificial intelligence (AI), and machine learning (ML) to prevent China from destroying the Rules Based International Order. This sense of urgency was echoed by Mr. Doug Beck, the Director of the Defense Innovation Unit (DIU), who suggested that the current conflicts in Gaza and Ukraine offer important lessons about the application of disruptive technologies in the modern-day battlefield.

These are lessons that other countries are also keen to observe. PACOM Commander Admiral John Aquilino reminded delegates that China is also accompanying developments closely in pursuit of a force structure, doctrine, tactics, techniques and procedures to pose a significant threat to the US, and that the capacity to synchronize allied efforts across all domains would be the key to deterring a numerically superior and geographically advantaged PRC.

UNCREWED TECHNOLOGIES

Secretary of the Air Force, Mr. Frank Kendall, called out Israel's Harpy system (an uncrewed, loitering, weaponized autonomous UAS) as one kind of weapon that could be important in any potential Indo-Pacific conflict. Mr. Kendall also noted that the ability to implement manned-unmanned teaming to fully exploit the best attributes of both human and machine would prove decisive.

Chief of Naval Operations, Admiral Lisa Franchetti, made specific reference to USVs—used to deadly effect in the war in Ukraine—and cited the work of the US Navy's Unmanned Task Force as well numerous hands-on exercises, experiments, and demonstrations. Admiral Franchetti spoke explicitly about the work of Commander Task Force 59 in the Arabian Gulf as well as the Integrated Battle Problem series of exercises as critical to USV technology development.

USV DEVELOPMENT

Like their air and ground counterparts, USVs are tactically valued because of their ability to reduce the risk to human life in high threat areas, to deliver persistent surveillance over areas of interest, and to provide options to warfighters that derive from the inherent advantages of uncrewed technologies. This is why momentum is building for the US Navy to continue designing, testing, and fielding USVs to help secure the global commons and enhance the security and prosperity of the nation.

The US Navy's efforts to accelerate the insertion of USVs into the Navy fleet are well documented, but events such as RIMPAC, International Maritime Exercise (IMX), the Australian Exercise Autonomous Warrior (AW) and Robotic Experimentation and Prototyping Exercise Using Maritime Uncrewed Systems (REPMUS) highlight how important USVs are becoming to other naval forces around the world.

As more world navies recognize the potential of USVs to accomplish a plethora of missions—all while keeping people out of harm's way—opportunities to demonstrate their application in the modern-day battlefield through carefully orchestrated exercises will accelerate their trial and adoption. What is clear, both from the keynote remarks at the Reagan National Defense Forum and the subsequent uptick in public-private sector collaboration, is that uncrewed technologies will prove instrumental to future naval defense and security operations.



▲ A MANTAS 12 USV participating in one of Task Force 59's international demonstration exercises. (Credit: MARTAC)

METAL SHARK WINS IDIQ CONTRACT FOR 40 US NAVY 40 PATROL BOATS



Louisiana-based boat builder Metal Shark is one of two builders awarded a seven-year indefinite delivery/indefinite quantity (IDIQ) contract worth up to \$290 million to produce up to seventy-three 40-foot "40 PB" patrol boats for Naval Expeditionary Combat Command.

Designed by Metal Shark's in-house engineering team specifically for the Navy, the 40 PB has been built by Metal Shark since award of the 40 PB Flight 1 contract in 2017. With the Flight 2 award, 40

PB production will continue in force at Metal Shark's South Louisiana production facilities. ReconCraft, of Clackamas, Oregon was also awarded a 40 PB Flight 2 contract.

Metal Shark is still building fourteen 40 PB vessels under the 40 PB Flight 1 IDIQ, with a total of 42 units delivered to date. With the award of Flight 2, the Navy has placed an initial, immediate order for an additional two vessels from Metal Shark, which will be delivered in 2025. Under the terms of the award, Metal Shark will supply spares, training, engineering, and technical support in addition to the vessels.

Visually distinctive thanks to its chiseled, angular profile and a unique faceted hull, 40 PB is a ballistic-protected combatant craft powered by twin diesel inboards and water jets. Metal Shark designed a moderate aft deadrise, wide-waterplane, sharp-entry hull form that not only achieves 35+ knot sprint speeds while displaying superb dynamic stability in a range of conditions, but also offers enhanced handling and greatly reduced operating cost at the 10-15 knot escort and cruise speeds where the vessel spends the bulk of its operational life. 40 PB features an advanced C4ISR suite and can be armed with a range of crew-served and remotely operated weapons systems.

EXAIL TO EQUIP SPANISH S80 SUBMARINES WITH WECDIS NAVIGATION SYSTEM

Exail, a global leader in naval navigation, along with its distributor in Spain, GRAFINTA, S.A. has secured a contract with Navantia to supply its Gecdis-W Warship Electronic Chart Display and Information System (WECDIS) for the four Spanish S80 Plus-class submarines.

Developed by Navantia for the Spanish Navy, the S80 Plus-class submarines are designed with operational mobility to navigate discreetly and swiftly at high speeds, enabling them to complete missions involving potential threats. The integration of Exail's Gecdis-W system will further enhance the submarines' capabilities, supporting the crew with electronic navigational charts. IMO-certified as ECDIS software and fully compliant with NATO's STANAG standards, Exail's Gecdis-W system will serve as a cooperative navigational asset for the Spanish Navy during sea-based military operations.

"Exail and Grafinta are honored to maintain the level of close collaboration with Navantia and contribute our expertise to the Spanish S80 submarines," said Alexandre Maia, Regional Sales Manager at Exail. "Aligned with the S80 submarines' core design objectives of stealth, endurance, and operational flexibility in remote and potentially hostile areas, our WECDIS system is set to contribute to the operational effectiveness and safety in submarine naviga-

tion within challenging underwater environments."

This latest success confirms Exail's leadership in naval navigation for Electronic Chart Display and Information Systems. Exail has already been selected to equip all the platforms of the French Navy, as well as platforms of the navies of Latvia, India, Greece, UAE and New-Zealand.



KONGSBERG COMPLETES AUV DEMONSTRATIONS FOR DIU AND US NAVY

Kongsberg Discovery recently completed in-water demonstrations of the HUGIN autonomous underwater vehicle (AUV) as part of the commercial evaluation of Large Diameter Unmanned Underwater Vehicle (LDUUV) systems by the Defense Innovation Unit (DIU) and the US Navy.

It was announced in January this year that Kongsberg Discovery was awarded a contract with the DIU to rapidly deliver HUGIN AUV capabilities for the US Military. In April a delegation from the US traveled to Norway for a comprehensive week-long demonstration.

Topics covered included operations, design philosophy, systems approach, sensors, batteries, navigation, autonomy, manufacturing, physical vehicle portfolio, and hands-on familiarization of user interfaces.

Kongsberg produces three models that fall into the LDUUV category as defined by US Navy, the newest and most capable of those being the HUGIN Endurance. In addition to Kongsberg's standard compliment of mapping sensors, this vehicle includes a large configurable volume that can be used to carry a mixture of batteries and custom payloads as needed. The system is designed to allow autonomous operations directly from shore, and with a full com-



plement of batteries, it can spend up to 15 days at sea, traveling up to 1,200 nm.

Today there are 12 navies using HUGIN in real world missions such as IPoE (Intelligence Preparation of the Operational Environment), MCM (Mine Counter Measure), SSW (Subsea and Seabed Warfare), and seafloor mapping operations. Since the start of the HUGIN program, Kongsberg has delivered more than 100 HUGIN AUV systems globally for both commercial and government customers.

A white and green Autonomous Surface Vehicle (ASV) is shown operating in a body of water. The vehicle has a green hull and a white superstructure. It is equipped with various sensors and a small red boat-like device attached to its side. In the background, there is a white boat with "LAW ENFORCEMENT" written on it, a wooden dock, and some trees. A 3D point cloud map of the seabed is overlaid on the water, showing a yellow line indicating a survey path. The text "Intelligent Marine Robotics" and "Solutions that put you in control" is displayed in the bottom right corner of the image.



Autonomous Surface Vehicles



ROVs for Hull & Tank Cleaning



Engineering & Design



Manufacturing & Fabrication



Visit SeaRobotics.com to learn more about our
Unmanned Marine Systems and Services

DNV OFFSHORE RULES AND REGULATIONS TO BE PUBLISHED IN JULY 2024

DNV recently announced that its new rules and standards for the offshore industry will be published in July 2024, following industry feedback. The new DNV rules cover several segments, including underwater systems and installations, offshore units, diving systems, structural design, and drilling systems. The DNV rules and standards undergo an extensive external hearing process before their publication and entry into force.

"The offshore sector is one of the most innovative in the world," said Torgeir Sterri, Director of Offshore Classification, at DNV. "For DNV this means we constantly have to be looking ahead to where our partners are moving, finding the areas where they need a platform to help unlock the next generation of technologies and helping to enable these with well-tested rules and standardized processes."

Some of the highlights from the new rules and standards for the offshore sector include:

- Addition of the new service notation for floating spaceports which covers the requirements for units and installations intended for launch and/or recovery of spacecraft.
- A significant update to the diving systems standard (DNV-OS-E402) to simplify its use and align it with the IMO diving code.
- Consolidation of the rules covering remotely operated and autonomous underwater systems.
- Reworking of the structural design standards (DNV-OS-C101, DNV-OS-C102, DNV-OS-C103 and DNV-OS-C104) to enhance ease of use and clarity. Cyber secure notation added as mandatory for offshore units in line with the IACS unified requirements.
- New fish welfare and ocean health class notations for floating fish farms.

After DNV received feedback from its customers and stakeholders from the rules hearing, this input is processed and incor-

porated into the rules. The launch and publication of the new rules takes place in July and the new rules will enter into force on January 1st, 2025.



▲ Torgeir Sterri, Director of Offshore Classification at DNV. (Credit: DNV)

ISLAND OFFSHORE AND VARD SIGN CONTRACT FOR HYBRID OCEAN ENERGY CONSTRUCTION VESSEL

April 2024 marked 20 years since the shipping company Island Offshore was established. Now, Island Offshore is again making a bold move by ordering a large Ocean Energy Construction Vessel from VARD with options for two more, designed and equipped to continue the transition from oil and gas-related activities to more work in new energy markets related to the sea. This is based on a new and improved design, modern low-emission technology, and efficient maritime operations.

When Island Offshore Management AS took over MV *Island Frontier* from Søviknes Yard, on April 27, 2004, the UT 737 L was the first design built according to DNV's rules for Ship-Shaped Well Intervention Units and the Norwegian Maritime Authority's require-

ments for Mobile Offshore Units. This also began the company's focus on light well intervention.

For many years, the Ulstein family had been co-owners of several ships operated by other shipping companies. These projects were terminated before and after the delivery of *Island Frontier*, and the long-term collaboration with the Chouest family was established. Since then, Island Offshore has taken delivery of more than fifty offshore vessels—all from Norwegian shipyards and with Norwegian suppliers as essential partners.

The upcoming fleet vessels are of the VARD 3 25 design, developed in collaboration with Island Offshore. They are designed for stable, flexible, and efficient operations, boasting excellent seakeeping qualities and a strong environmental profile. The vessels are highly versatile and capable of flexible applications such as subsea operations, including IMR (inspection, maintenance, and repair), pipe laying, seabed installations, W2W, cable laying, and repairs.

The first ship, to be named *Island Evolution*, will be 120 meters with an accommodation capacity of up to 130 persons. The DP2 vessel will feature a load-compensated offshore subsea crane of 250 tons, an energy storage system (battery) for hybrid propulsion with a capacity of 1 MHW, and 2 ROV LARS. Delivery is scheduled for Q1 2027.



DAMEN SHIPYARDS AND SAFEEN GROUP BRING FIRST ELECTRIC TUG TO THE MIDDLE EAST

Damen Shipyards and SAFEEN Group, part of AD Ports Group, have signed an agreement for the lease and purchase of an all-electric Damen RSD-E Tug 2513. The RSD-E Tug 2513 will be the first fully electric tug to operate in the Middle East.

The powerful yet compact new tug, which is just 25 meters in length but has a bollard pull of 70 tonnes, is capable of maneuvering even the largest vessels and can undertake two or more assignments before being recharged, which takes just two hours.

Following the successful launch of the class in August 2022 in the Port of Auckland, New Zealand, Damen Shipyards began series production on speculation with an initial run of six vessels. The first to be completed has now departed Damen Song Cam Shipyard in Vietnam and is en-route for Khalifa Port in Abu Dhabi. There it will

join the tug fleet operated by SAFEEN Group, the region's leading maritime services provider.

Damen's Financial Services (DFS), a subsidiary of Damen Shipyards, is providing a leasing package to support the purchase. DFS offers this service as it enables clients to finance their transition to a more sustainable future. DFS has recently acquired a second RSD-E Tug 2513 which is available on a lease-to-own basis.

The contract was signed in May in Abu Dhabi by Capt. Adil Banihammad and Mr. Kommer Damen. The vessel will enter service in Khalifa Port, handling container ships, car carriers, and other traffic. With shore-based charging facilities, it will operate initially in hybrid mode with the Tier III compliant generators being used to charge the batteries.



▲ L-R: Kommer Damen (Chairman of Damen Shipyards), Pascal Slingerland (Damen Shipyards Regional Sales Director, Middle East) and Capt. Adil Banihammad (CEO Marine Services & General Manager SAFEEN Marine Services)

RENEWABLE ENERGY PRODUCTION MILESTONE FOR OCEAN POWER TECHNOLOGIES

Ocean Power Technologies, Inc. (OPT) recently announced it is approaching 15 MW of renewable energy production from its family of PowerBuoys®. The recent launch of its Next Generation PB off the coast of New Jersey has materially accelerated average energy production by combining solar, wind, and wave energy production capabilities.

The energy generation numbers are based on deployments in the Atlantic, Pacific, Mediterranean, and North Sea. These deployments came from a mix of renewable energy investments from government backed development programs and commercial leases and sales, for customers including ENI, EGP, Office of Naval Research and the DeepStar consortium inclusive of Chevron, CNOOC, Equinor, ExxonMobil, JX Nippon, Occidental, PetroBras, Shell, and Woodside. OPT has demonstrated and delivered use cases as a proven solution for anti-submarine warfare, intelligence, surveillance and reconnaissance, unmanned surface vehicle (USV) charging, and environmental sensing.

Philipp Stratmann, CEO and President of OPT, said: "These numbers show that non-grid connected marine energy production is not just for the R&D community, but is a commercially available solution. Charging USVs, monitoring the marine environment, including during whale migration season, and supporting the defense and security industry is all possible. We have worked with customers in defense, offshore wind, oil and gas, and general ocean sciences and look forward to announcing more deployments."



▲ OPT's PowerBuoy. (Credit: OPT)

MARITIME PARTNERS SIGNS WITH US COAST GUARD FOR MV HYDROGEN ONE POWER SYSTEM

Maritime Partners, a leading provider of maritime financing solutions primarily focused on Jones Act vessels, has received a Design Basis Agreement (DBA) from the US Coast Guard for the MV *Hydrogen One* towboat that includes e1 Marine hydrogen generator technology that will be utilized for the vessel's power plant.

MV *Hydrogen One* is being designed as a first-of-its-kind vessel using new, cleaner, fuel cell technology that works by converting stored methanol to hydrogen. The produced hydrogen is output, on-demand, to the fuel cell to generate power for the vessel. A successful string test of this technology was completed in Gothenburg, Sweden, in June 2023, proving it to be a viable option as the sole power generation source for vessel propulsion.

"The signing of this agreement opens the pathway for us to deploy our technological capabilities," said Bick Brooks, Co-Founder and CEO of Maritime Partners. "With this, Hydrogen One is one step closer to becoming

the world's first vessel to utilize hydrogen generator technology greatly reducing emissions, increasing efficiency and providing a model for cleaner energy use as the industry continues to seek ways to decarbonize."



Maritime Partners

The DBA process was established by the US Coast Guard to set the rules for new and novel technology proposed for installation on marine vessels. Maritime Partners worked with several industry leaders on the Hydrogen One project, including Seattle-based Elliott Bay Design Group, who

is designing the towboat; Bourg, Louisiana-based Intracoastal Iron Works who is the selected shipyard; e1 Marine, RIX Industries, Power Cell Group, among others, in order to work through the US Coast Guard requirements.

"Maritime Partners is strongly committed to developing and utilizing sustainable, clean energy solutions, as the entire maritime industry continues to seek alternative fuel options that are cleaner, greener, and more efficient. The development of *Hydrogen One* is part of that commitment," added Dave Lee, Maritime Partners' VP of Technology & Innovation.

The signing of this DBA ensures that as the MV *Hydrogen One* project advances Maritime Partners will be working towards an agreed upon framework with the US Coast Guard for the design, arrangement, and engineering aspects of the power system and associated safety systems for plan review, inspection, and eventual certification of the MV *Hydrogen One*.

TSUNAMI OCEAN-OBSERVING SYSTEM FUNDING TO IMPROVE TSUNAMI WARNINGS

The US Department of Commerce and NOAA has announced \$30 million to modernize and replace the equipment on the Deep-ocean Assessment and Reporting of Tsunamis (DART) Ocean Observing System as part of President Biden's Investing in America agenda. The contract, funded by the Bipartisan Infrastructure Law, was awarded to the Science Applications International Corporation (SAIC) to develop equipment to support improved tsunami detection and warning.

The DART system was developed to detect tsunamis and forecast their impact along vulnerable coastlines. NOAA owns and operates an array of 39 DART buoys in the Pacific and Atlantic ocean basins, including the Gulf of Mexico and Caribbean basins.

When a tsunami wave moves across the ocean and reaches the DART, the surface buoy—utilizing data from a highly-accu-

rate pressure sensor on the ocean floor—reports sea level information measurements back to the National Weather Service's Tsunami Warning Centers, where the informa-



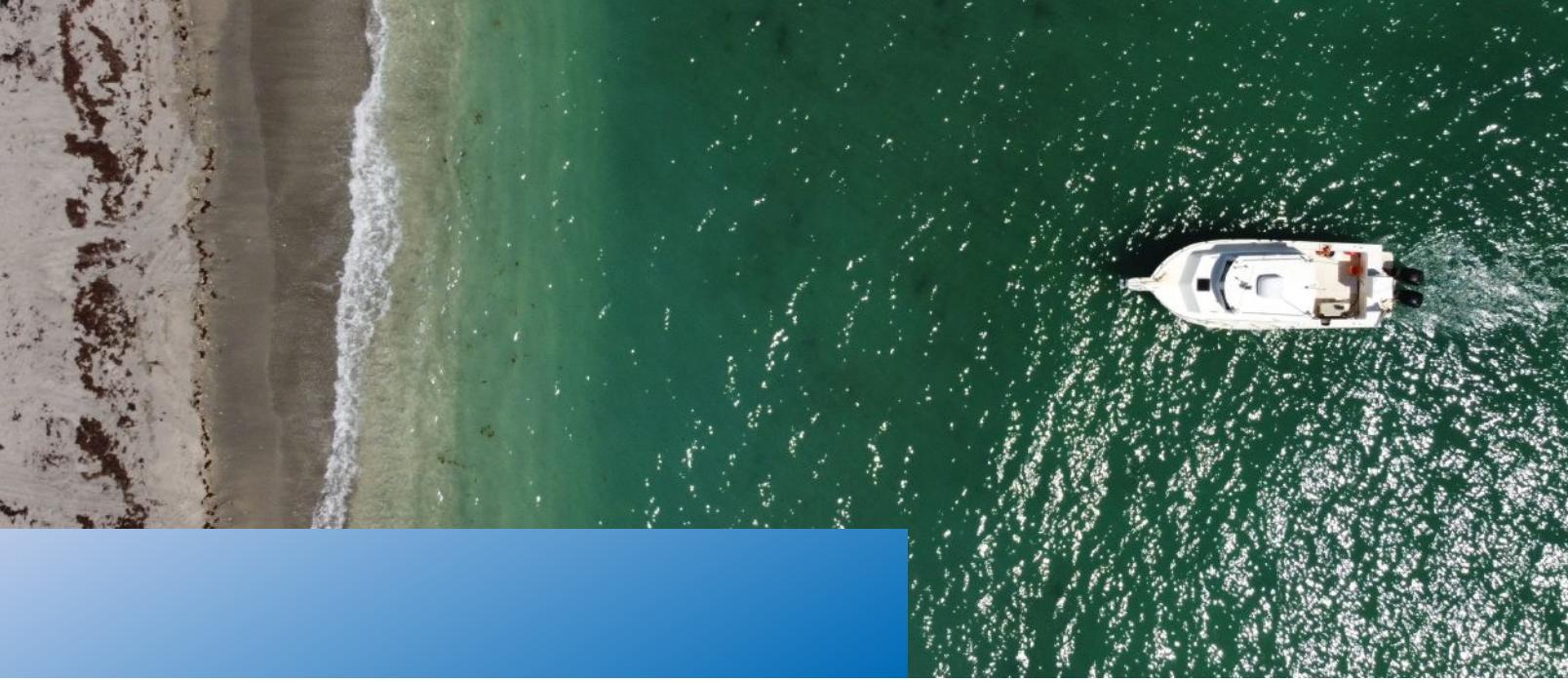
NOAA's National Data Buoy Center will modernize and replace equipment on its DART buoys to improve availability and reliability of data. (Credit: NOAA)

tion is used to produce a tsunami forecast and fine-tune watches and warnings.

"Early detection and real-time reporting of tsunamis is critical to reducing the loss of life in US coastal communities," said NOAA Administrator Rick Spinrad, Ph.D. "This investment to upgrade the DART network will help improve tsunami detection, warnings and the forecast for intensity and arrival times."

SAIC will develop more modern equipment to replace the existing equipment on the DART buoys, which is 20 years old. The new systems will make the data used to detect tsunamis more available and reliable and improve the forecast of tsunami intensity and arrival times, as well as the predictions for how tsunami wave inundation would affect coastal communities.

Replacement of the equipment is expected to begin in 2025 and conclude in 2028.

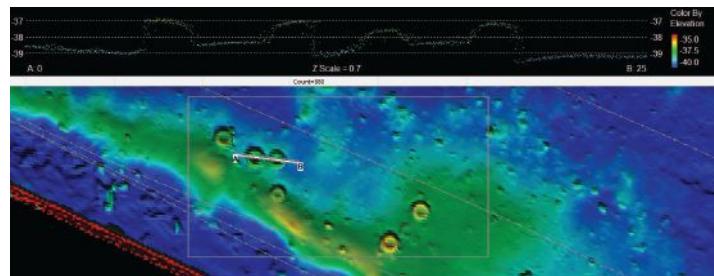


BY LAND AND SEA

BETTER DATA WHERE YOU NEED IT MOST

M&E specializes in the design and execution of coastal data collection and site characterization services, including bathymetric, topographic, and GPS surveys for critical offshore infrastructure, beach restoration campaigns, and dredging projects.

Learn more about M&E's advanced marine robotics and remotely operable technologies at:
www.morganeklund.com



(772) 388-5364

www.morganeklund.com

linkedin.com/company/morgan-eklund

Vero Beach and Miami, Florida



AMERICAS

Unmanned Maritime Systems Technology USA

Arlington, VA | September 23–25

www.smgconferences.com/defence/northamerica/conference/umst-usa

OCEANS Halifax

Halifax, Canada | September 23–26

<https://halifax24.oceansconference.org>

American Floating Offshore Wind Technical Summit

Portland, ME | September 24–25

<https://umaine.edu/afloat/>

Industrial Decarbonization North America 2024

Pittsburgh, PA | October 1–2

<https://events.reutersevents.com/energy-transition/industry-usa>

ACP Offshore WINDPOWER

Atlantic City, NJ | October 28–30

<https://cleanpower.org/offshore-windpower>

International Workboat Show

New Orleans, LA | November 12–14

www.workboatshow.com

Underwater Intervention

New Orleans, LA | November 12–14

www.workboatshow.com/underwater-intervention

EUROPE

Offshore Wind Foundations & Substations

Bremen, Germany | August 26–28

www.ipc.com/events-offshore-foundations-substations

Offshore Northern Seas

Stavanger, Norway | August 26–29

www.ons.no

WindEnergy Hamburg

Hamburg, Germany | September 24–27

www.windenergyhamburg.com

Sea Tech Week

Brest, France | October 15–17

www.seatechweek.eu

Marine Energy Transition Forum

Antwerp, Belgium | October 22–23

www.petrospot.com/events/metf24

Euronaval

Villepinte, France | November 4–7

www.euronaval.fr

Ocean Energy Europe

Aviemore, Scotland | November 5–6

www.oceanenergy-europe.eu/annual-event/ocean-energy-europe-2024

Marine Autonomy and Technology Showcase (MATS)

Southampton, UK | November 5–7

<https://noc-events.co.uk/mats-2024>

OTHER REGIONS

Australia Wind Energy

Melbourne, Australia | July 10–11

www.windenergyaustralia.com

Underwater Minerals Conference

Rarotonga, Cook Islands | September 15–21

www.underwaterminerals.org

International Conference on Ocean Energy (ICOE)

Victoria, Australia | September 17–19

www.ocean-energy-systems.org/icoe/conferences/icoe-2024-melbourne/

WIND EXPO

Chiba, Japan | October 2–4

www.wsew.jp/hub/en-gb/about/wd.html

All-Energy Australia

Melbourne, Australia | October 23–24

www.all-energy.com.au

ADIPEC

Abu Dhabi, UAE | November 4–7

www.adipic.com

MAST Australia

Adelaide, Australia | November 19–21

<https://mastconfex.com/australia2024>

OSEA Energy Week

Singapore | November 19–21

www.osea-asia.com



PLATINUM SPONSOR



REGISTER NOW

| 2024 EDITORIAL CALENDAR |

MONTH	DEADLINES	EDITORIAL FOCUS AND SHOW DISTRIBUTION	THEME FOCUS
JULY (DIGITAL ISSUE)	Editorial: June 18 Ad: June 28	UNCREWED VEHICLE BUYERS' GUIDE	<i>Special Edition</i>
AUGUST	Editorial: July 15 Ad: August 2	SUBMERSIBLES & THE DEEP SEA • OCEANS Halifax September 23–26	Subsea vehicles, naval archaeology, bathymetric studies, geotechnics
SEPTEMBER	Editorial: August 12 Ad: August 30	REMOTE MARINE OPERATIONS • Sea Tech Week® October 15–17 • ACP Offshore WINDPOWER October 28–30 • Ocean Energy Europe November 5–6 • Offshore Energy Exhibition & Conference November 26–27	Marine autonomy, digital twins, remote monitoring and intervention
OCTOBER/ NOVEMBER	Editorial: September 9 Ad: September 27	UNCREWED VEHICLES & MARINE ROBOTICS • Marine Autonomy and Technology Showcase (MATS) Nov 5–7 • International Workboat Show November 12–14	USV R&D, emerging applications, breakthroughs in remote ops
DECEMBER	Editorial: October 17 Ad: October 28	THE FUTURE OF OCEAN TECHNOLOGY	<i>Special Edition</i>



2020

COMING DECEMBER 2024

THE FUTURE OF OCEAN TECHNOLOGY

VOL. 5



2022



2021



2023

BE PART OF THE FUTURE

editor@oceannews.com

POTENTIAL FOR MINI-MASS IN UK WATERS BOOSTED BY INNOVATIVE INITIATIVE

Unmanned Survey Solutions (USS), in close collaboration with Stehr Consulting Ltd, has launched a groundbreaking project, *Unlocking the Potential for Mini-MASS in UK Waters*. This innovative initiative, funded by Innovate UK under the Launchpad: Marine and Maritime in the Great South West – R1 MFA competition, aims to revolutionize the smaller Marine Autonomous Surface Ship (MASS) market.

The partnership with Stehr Consulting Ltd brings together a wealth of technical expertise and extensive experience, making this collaboration the perfect fit to address a significant regulatory and certification challenges hindering the widespread adoption of smaller uncrewed surface vessels (USVs) in UK waters.

The recent updates to the Workboat Code Edition 3 (WBC3) by the Maritime and Coastguard Agency (MCA) represent a major step forward, incorporating provisions for remotely operated unmanned vessels (ROUVs). However, WBC3 predominantly focuses on larger, higher-risk vessels within the sub 24-m market, overlooking the unique characteristics and lower risk associated with 'Mini-MASS.' As a result,



Unmanned Survey Solutions

the current requirements present significant challenges for these smaller vessels, creating a barrier to innovation.

This project aims to break down these barriers by providing a comprehensive open-source report and templates that meticulously analyze WBC3 requirements. It also aspires to minimize certification burdens while maintaining safety standards.

James Williams, CEO of USS, and chair of the subgroup has championed engagement with the Department for Transport (DfT) and the MCA on 'Mini-MASS' matters.

The results of this project are expected to unlock the potential of 'Mini-MASS' in UK waters, catalyzing business growth, and fostering innovation and economic development in the Southwest's maritime sector.

TGS SECURES CONTRACT IN NORTH AMERICA FOR OCEAN BOTTOM NODE DATA ACQUISITION



TGS, a leading global provider of energy data and intelligence, has announced the award of an Ocean Bottom Node (OBN) data acquisition contract in North America. This six-month-plus contract, granted by a returning client, reinforces TGS' position in the market and underscores its commitment to delivering high-quality seismic data solutions.

The project is expected to enhance the client's seismic data acquisition capabilities, facilitating more informed decision making.

Kristian Johansen, CEO at TGS, said: "This initiative demonstrates the vital role that OBN acquisition plays in providing our clients with superior seismic data. We are pleased to continue our efforts in North America and look forward to supporting our client's needs with our advanced data solutions."

NASA SELECTS BAE SYSTEMS FOR NOAA OCEAN COLOR INSTRUMENT

NASA, on behalf of the National Oceanic and Atmospheric Administration (NOAA), has selected BAE Systems to develop an instrument to analyze ocean data as part of NOAA's Geostationary Extended Observations (GeoXO) satellite program.

This cost-plus-award-fee contract includes the development of two flight instruments as well as options for additional units. The anticipated period of performance for this contract includes support for 10 years of on-orbit operations and five years of on-orbit storage, for a total of 15 years for each flight model. The work will take place at BAE Systems, NASA's Goddard Space Flight Center in Greenbelt, Maryland, and the agency's Kennedy Space Center in Florida.

The GeoXO Ocean Color instrument (OCX)

will monitor US coastal waters, the exclusive economic zone, and the Great Lakes. The instrument will observe ocean biology, chemistry, and ecology to assess ocean productivity, ecosystem change, coastal and inland water quality, seafood safety, and hazards like harmful algal blooms. With updates at least every three hours, the instrument will deliver a more frequent and comprehensive view of ocean and coastal conditions than is currently available.

Frequent observations will show daily changes in ocean biology and rapid coastal ocean dynamics. The instrument will also track and assist in the response to climate-driven ocean and coastal ecosystem changes, supporting ecological forecasters, marine resource managers, fisheries, health departments, water treatment managers,

and the commerce, recreation, and tourism industries.

The GeoXO Program is the follow-on to the Geostationary Operational Environmental Satellites-R (GOES-R) Series Program. The GeoXO satellite system will advance Earth observations from geostationary orbit. The mission will supply vital information to address major environmental challenges of the future in support of weather, ocean, and climate operations in the United States. Advanced capabilities from GeoXO will help address our changing planet and the evolving needs of NOAA's data users. NOAA and NASA are working to ensure these critical observations are in place by the early 2030s when the GOES-R Series nears the end of its operational lifetime.

**OFFSHORE ENERGY24**
EXHIBITION & CONFERENCE
26 & 27 NOVEMBER 2024
AMSTERDAM | THE NETHERLANDS

Book
your
stand



Showcase your company, products and services to a diverse audience of industry experts and stakeholders at Offshore Energy Exhibition & Conference 2024



OEEC.BIZ

Created and produced by

 **NAVINGO**

ZYCRAFT DEVELOPS UNMANNED VESSEL WITH WATER SAMPLING SYSTEM

Zycraft USV has announced the development and successful application of a multiple depth water sampling system onboard an unmanned boat, the SE40MD.

Traditionally, water sample collection at depth is done manually using a Niskin bottle but this is laborious and inefficient in terms of resources in labor and time.

The fully autonomous SE40MD, which measures 1.6 m in length and weighs 35 kg, offers a new approach. The vessel can collect up to four one-liter samples or eight half-liter water samples at different depth intervals of 0.5 m down to 10 m in a single deployment. With an endurance of six hours, it is possible to carry out many sample collections. The vessel can be controlled using cellular mobile network which means an operator can monitor the progress from a sheltered control center via an internet connection.

To deploy the SE40MD, a program is used to create the sampling plan of collection at different locations and water depths. The SE40MD then autonomously goes about its task of water sampling. The collection hoses are flushed after each sample collection to ensure no cross contamination of the water sample at the next collection point. After the sampling collection is completed, only one person is needed to transfer the samples from the vessel to bottles for further laboratory analysis. The SE40MD is easily turned around within an hour for further work.

With a position accuracy of less than 1 m and a depth accuracy of 0.5 m, the SE40MD provides excellent comparative analysis of water quality. The data from the computer software can be further collated with the laboratory results for more in-depth analysis ashore.

AUTOMATED WINCHES FOR SVP AND CTD WITH WIRELESS CHARGING AND COMMS

Bespoke marine engineering experts Ocean Scientific International Ltd. (OSIL), in conjunction with AML Oceanographic Ltd., have developed a wireless charging and data transfer system for their Micro Profiling Winches, designed to be used seamlessly with an AML-3 LGR instrument.

The compact and programmable winches are designed to equip USV systems with the ability to collect SVP or CTD profiles from user specified depths during live operations, enabling surveys to be carried more quickly and cover a wider area in a given deploy-

ment. The winches are fitted with an instrument capture mechanism which allows for seamless recharging on recovery of the instrument to the surface. Wireless data transfer is accomplished simultaneously using the instruments integrated WiFi transmitter.

The winches are easily integrated into most USV control systems, with status notifications for docking, zero position and payout readings. Each winch can accommodate a wide variety of ropes/cables and slippings combinations, with 5 kg line pull at the first layer and a 200 m drum capacity (based on 1.6 mm dyneema).

FOURTH TYPE 218SG SUBMARINE NAMED AT THYSSENKRUPP MARINE SYSTEMS SHIPYARD

The fourth submarine in the Type 218SG construction program was recently named at the thyssenkrupp Marine Systems shipyard in Kiel.

The design of the Type 218SG submarines is based on a low signature. The air-independent propulsion system gives the boats a long underwater endurance. With a length of about 70 meters and a displacement of around 2,000 tonnes, they are currently the largest submarines ever built at Marine Systems. Following the "Invincible" in 2019 and the double launching of the "Impeccable" and "Illustrious" in December 2022, the fourth boat has now been launched. The "Inimitable" will be handed over from 2025 after intensive testing.

Following the naming ceremony, thyssenkrupp Marine Systems and ST Engineering signed a Memorandum of Understanding to jointly enhance the capabilities of Singapore's Type 218SG submarines over their operational lifetimes. It expands on the earlier Teaming Agreement signed in December 2022 to cover collaboration on

selected technologies and applications in the areas of additive manufacturing (3D printing), maintenance training, data analytics and obsolescence management.





Integrated Solutions for Offshore Challenges

MARINE
OPERATIONS

PROJECT
MANAGEMENT

SUBSEA
NETWORKS

ENGINEERING
& PROTOTYPE

INSTALLATION &
COMMISSIONING

TEST &
EVALUATION



oceanspecialists.com



OCEAN INDUSTRY DIRECTORY

The OID is featured in every regular issue of ON&T and available at oceannews.com.

Online listings are free, with additional packages to suit all budgets.

**TO CHOOSE THE RIGHT PLAN
FOR YOUR LISTING, VISIT:**

oceannews.com/get-listed

ON&T
OCEAN NEWS & TECHNOLOGY

CATEGORIES

- ADCP/DVL
- BUOYANCY PRODUCTS
- CAMERAS/LIGHTS/LASERS
- CABLES
- CONNECTORS
- DIGITAL VIDEO RECORDING SYSTEMS
- EQUIPMENT RENTAL
- FIBER OPTIC PRODUCTS/SERVICES
- GEOTECHNICAL SERVICES
- GYRO COMPASSES
- LIQUID STORAGE
- MARINE ENVIRONMENTAL CONSULTING SERVICES
- MOTION SENSING EQUIPMENT
- NAVIGATION & POSITIONING SYSTEMS
- NETWORKS & DATA COMS
- OCEANOGRAPHIC INSTRUMENTS/
SERVICES
- ROPE
- SONAR SYSTEMS
- SOUND VELOCITY PROBES/CTDS
- SUBSEA TECHNOLOGY
- TELEMETRY
- TRANSDUCERS
- UNCREWED MARITIME VEHICLES
- WINCHES, HANDLING, & CONTROL SYSTEMS

OCEAN INDUSTRY DIRECTORY

ADCP/DVL



NORTEK AS

Vangkroken 2 1351 Rud, Norway
 ☎ +47 67 17 45 00
 ☐ inquiry@nortekgroup.com
 ☒ www.nortekgroup.com

Nortek excels in the development and manufacture of acoustic Doppler instrumentation. Doppler Velocity Logs (DVLs) are used for subsea navigation. Acoustic Doppler Current Profilers (ADCPs) are used to understand physical processes in the ocean, rivers, lakes, and laboratories. We pride ourselves on being innovative in product development and production processes. Nortek provides solutions to engineers and scientists by offering real-time data collection and support from our responsive technical team.

BUOYANCY PRODUCTS



NAUTILUS MARINE SERVICE GMBH

Alter Postweg 30
 Buxtehude, 21614, Germany
 ☎ +49 (0) 4161 55903 16
 ☐ sales@nautilus-gmbh.com
 ☒ www.vitrorex.com
 ☐ Steffen Pausch

Nautilus Marine Service provides the finest VITROEX® glass housings that are capable of operating in the most extreme regions of the Earth. VITROEX® glass enclosures offer the dual advantage of buoyancy and pressure proof housings—a perfect combination for small and autonomous underwater instrumentation packages. Simple, reliable and affordable.



SUBSALVE USA

P.O. Box 2030
 North Kingstown, RI 02852
 ☎ +1 401 884 8801
 ☎ +1 401 884 8868
 ☐ richard@subsalve.com
 ☒ www.subsalve.com
 ☐ Richard Fryburg

Since 1977, Subsalve USA has been America's #1 manufacturer of standard and custom flotation devices and we are the innovators in buoyancy and engineered inflatables. Our products include: Professional, Commercial, Standard, Shallow Water, Enclosed Flotation Bags, Cable & Pipeline Floats, Water Load Test Bags, Rapid Recovery & Mark V/ ORCA EOD Systems.

CAMERAS/LIGHTS/LASERS



ARCTIC RAYS LLC

600 Jackson Ct.
 Satellite Beach, FL 32937 USA
 ☎ +1 321 610 4635
 ☐ info@arcticrays.com
 ☒ www.arcticrays.com
 ☐ Dirk Fieberg

Arctic Rays specializes in deep-sea lighting, imaging and surveillance systems and other subsea technologies, custom-engineered to the demanding requirements of deep ocean use on AUVs, ROVs, manned submersibles, landers, and other offshore and underwater structures. This tailor-made tech meets the demands of your project with small size, low power consumption, responsive service and the right price—all without sacrificing quality.



DEEPSSEA POWER & LIGHT

4033 Ruffin Rd.
 San Diego, CA 92123
 ☎ +1 858 576 1261
 ☎ +1 858 576 0219
 ☐ sales@deepsea.com
 ☒ www.deepsea.com

For over 40 years, DeepSea Power & Light has provided high-quality and innovative products to the oceanographic community. This extensive portfolio includes underwater cameras, video systems, lighting solutions, pressure relief valves and lasers along with pressure-testing services. Products are rigorously tested in both the initial design process and manufacturing stage to consistently perform in the harshest environments—from wet/dry surface applications to full ocean depth deployments. From offshore oil fields to oceanographic exploration, DeepSea delivers ease of service, reliability, high performance and cost effectiveness to meet the challenging demands of any subsea application worldwide.



SUBC IMAGING

327 Memorial Drive
 Clarenville, Newfoundland and Labrador
 A5A 1R8, Canada
 ☎ +1 709 702 0395
 ☐ team@subcimaging.com
 ☒ www.subcimaging.com
 ☐ Ian McMillan, Director of Sales & Partnerships

SubC Imaging pioneers cutting-edge subsea imaging solutions for marine research, offshore energy, aquaculture, fisheries, and more. Our globally acclaimed equipment includes specialized camera systems, cameras, LEDs, and lasers. Committed to innovation, we also offer DVRs and remote operations solutions, enhancing efficiency and accessibility. With clients in over 30 countries, SubC Imaging leads in advancing technology for intelligent and high-performance subsea inspections and surveys.



REMOTE OCEAN SYSTEMS

9581 Ridgehaven Ct.
 San Diego, CA 92123
 ☎ +1 858 565 8500
 ☐ jamesc@rosys.com
 ☒ www.rosys.com
 ☐ James Connell

Remote Ocean Systems has been an industry leader in the design and manufacture of reliable, high-tech equipment and systems for the most severe subsea, oceanographic, shallow water, industrial, commercial and military environments since 1975. Our product line includes high accuracy and robust positioners and rotators and a wide variety of lighting including: halogen and LED technology offering 10,000+ lumens, flood, spot, dimming and non-dimming types. Our cameras offer exceptional sensitivity in low light conditions, high definition color, ethernet control, compact size rated to 6,000-meter depth. We also have a fully staffed engineering department to help with your special requirements.



SUBSEA DATA SYSTEMS

8502 SW Kansas Avenue
 Stuart, FL 34997
 ☎ +1 202 430 7074
 ☐ info@subseadatasystems.com
 ☒ www.subseadatasystems.com

We provide SMART Cable hardware, software, and data management solutions. SMART (Sensor Monitoring and Reliable Telecommunications) Cables are submarine telecommunications cables equipped with sensor packages inside their repeaters (amplifiers). SMART Cables will enable transformative advancements in Tsunami and Earthquake Early Warning monitoring, global climate monitoring, and network integrity, providing substantial societal benefits through enhanced protection of life, property, and global telecommunications infrastructure.



Home of Xtreme Cables

WINCHESTER INTERCONNECT

(Formerly Falmat Cable)
 1810 Diamond Street
 San Marcos, CA 92078
 ☎ +1 760 471 5400
 ☐ s.amirehsani@winconn.com
 ☒ www.winconn.com
 ☐ Shawn Amirehsani

For nearly six decades, Winchester Interconnect has been a key supplier and a solution provider to the oceanographic and maritime industries supporting a wide range of subsea applications. We design and manufacture high performance cables for use in harsh and demanding environments. Our rugged Xtreme Cables are known and preferred worldwide for superior reliability and durability in commercial and military projects. Innovative cable solutions for ROVs, instrumentation, towed array and many others, ranging from high flex miniature cable designs to rugged EOM steel cables incorporating high performance optical fibers and Ethernet pairs. Visit our website: winconn.com

CABLES



SOUTH BAY CABLE

54125 Maranatha Drive
 P.O. Box 67
 Idyllwild, CA 92549
 ☎ +1 951 659 2183
 ☎ +1 951 659 3958
 ☐ Sales@southbaycable.com
 ☒ www.southbaycable.com
 ☐ Bill Tell, Sales Manager

Established in 1957, South Bay Cable designs, manufactures and tests specialized Electro-Optical-Mechanical Cables for use in demanding marine environments. Our cables tackle stringent customer requirements which include ROV Tether and Umbilical Cables, Towed Array Cables, Mux BOP Control Cables, Video Inspection, Fairied Cables and a host of other customer-specific applications.



BIRNS, INC.

1720 Fiske Place
 Oxnard, CA 93033-1863 USA
 ☎ +1 805 487 5393
 ☎ +1 805 487 0427
 USA ☎ +1 888 247 6788
 ☐ service@birns.com
 ☒ www.birns.com
 ☐ Eric Birns

BIRNS has served the subsea industry since 1954, and is an ISO 9001:2015 certified global leader in the design and manufacturing of high performance connectors, cable assemblies and lighting systems. With a NAVSEA PRO-020 certified molding facility, it offers sophisticated connector lines, including 6km-rated electrical, electromechanical, coaxial, electro-coax, optical, electro-optical and electro-opto-mechanical hybrids. BIRNS provides the industry's highest volume of cost-effective hydrostatic and helium pressure testing, and has a wide range of ABS Product Design Assessment (PDA) certified fiber optic and electrical penetrators. BIRNS' LED and tungsten-halogen marine, chamber, security and commercial diving lights are trusted in the world's most extreme environments.

OCEAN INDUSTRY DIRECTORY



BIRNS AQUAMATE LLC

111 Middle Road
Acushnet, MA 02743 USA
 ☎ +1 508 998 2001
 ☎ +1 508 637 8002
 ☐ sales@birnsaquamate.com
 ☐ www.birnsaquamate.com
 ☐ Michelle DeTerra

Birns Aquamate designs and manufactures underwater electrical connectors, cable assemblies, and cable terminations. The company produces a wide range of standard industry products such as the 5500 Series, SC, MC, LP, FAWL/FAWM, NANO, TC, Rubber Molded, etc. Birns Aquamate is the only manufacturer to guarantee compatibility with other UW connectors. Birns Aquamate also specializes in fast turn-around for custom design of special connector solutions. All connectors are manufactured under IEC ISO 9001:2015 certification. Dealers in Canada, Brazil, UK, Belgium, Holland, Norway, Germany, South Africa, Holland, Italy, and China.

DIGITAL VIDEO RECORDING SYSTEMS



DIGITAL EDGE SUBSEA, LTD
Doubletree Court, Cavendish St.
Ulverston, Cumbria LA127AD
 ☎ +44 (0) 1229 206456
 ☐ john@digitaledgesubsea.com
 ☐ www.digitaledgesubsea.com
 ☐ John Benson

The EdgeDVR is currently used worldwide by most of the major ROV and Diving contractors. With our present Version 4 software, we have six models. The EdgeDVR has become an essential part of any ROV and Diving system offshore, easy to use and reliable. The system is capable of recording simultaneous High Definition and Standard Definition video, together with auto creation of Dive, Video, Photo and Anomaly logs. Multi channel digital overlay is also available for all recorded channels, logos and realtime survey data can be displayed. With around 500 systems now offshore, we have a proven record of reliability.

Our version 5 software is currently in development and full details will be released soon...

EQUIPMENT RENTAL



OKEANUS SCIENCE & TECHNOLOGY, LLC

255 Equity Blvd.
Houma, LA 70360
 ☎ +1 985 346 4666
 ☎ +1 985 346 8444
 ☐ Bleblanc@oceanus.com
 ☐ www.oceanus.com
 ☐ Benton LeBlanc

Oceanus Science & Technology is an established market leader for field-proven deck handling systems, including an exclusive series of winches, LARS, and A-frames. Whether we are custom-fitting a heavy pull multi-purpose winch or developing a prototype sample collector for deep-sea exploration, we have the industry expertise, marine engineering experience, and technological know-how to deliver failproof, mission-critical assets. Oceanus also owns an expanding portfolio of rapidly mobilized rental equipment and instrumentation to manage your operations with optimal flexibility. Oceanus has offices in Houston, TX and Houma, LA.

SeaCatalog Vendor

FIBER OPTIC PRODUCTS/ SERVICES



OCEAN SPECIALISTS, INC.

8502 SW Kansas Avenue
Stuart, FL 34997
 ☎ +1 772 219 3000
 ☎ +1 772 219 3010
 ☐ contact@oceanspecialists.com
 ☐ www.oceanspecialists.com

Ocean Specialists, Inc. (OSI) is a system development and advisory firm for underwater cable projects and technology with global capabilities. OSI works with clients during all project phases of subsea network development, from planning and design to procurement and implementation. Our customers, primarily representing Oil and Gas, Telecommunications and Ocean Observing, recognize the value of fiber optic networks to their field and services solutions, and look to OSI to deliver the skills and experience that developing these networks require.

GEOTECHNICAL SERVICES



BLUEFIELD GEOSERVICES

Stuart, Florida 34997 USA,
Bath, BA1 5EB, UK
 ☎ +1 772 219 3000 (US Office)
 ☎ +1 44 (0) 7962 041451 (UK Office)
 ☐ info@bluefieldgeo.com
 ☐ www.bluefieldgeo.com

Bluefield Geoservices was established in 2018 to provide the ocean industries with a fresh approach to offshore geotechnical survey. Our mission: to leverage the team's 100 years of combined offshore geotechnical engineering and geosurvey experience to devise and deliver innovative solutions to the most persistent problems in offshore developments. We develop and deploy progressive in situ seabed investigation methods and custom technologies that deliver best-quality geotechnical and related site data and analysis.

GYRO COMPASSES



KONGSBERG

KONGSBERG DISCOVERY

Pirsenteret
N-7462 Trondheim, Norway
 ☎ +47 73 54 55 00
 ☎ +47 73 51 50 20
 ☐ km.seatex.sales@km.kongsberg.com
 ☐ www.kongsberg.com/discovery
 ☐ Finn Otto Sanne at finn.otto.sanne@kongsberg.com

Kongsberg Discovery develops, manufactures and delivers innovative technology to enhance knowledge, surveillance and sustainability in the ocean space. From the deepest sea to outer space, our unique offering allows our customers to understand complex environments, mitigate risk and achieve ambitious objectives. The Kongsberg Discovery portfolio spans hydro acoustics with sonars and echo-sounders, marine robotics, inertial navigation, communication, and underwater and above surface position reference systems using laser, radar and GNSS technologies. Our technology, combined with deep application knowledge and software expertise, provides significant value for our customers.

LIQUID STORAGE



AERO TEC LABORATORIES, INC. (ATL)

45 Spear Road Industrial Park
Ramsey, NJ 07446 USA
 ☎ +1 201 825 1400
 ☎ +1 201 825 1962
 ☐ atl@atlinc.com
 ☐ www.atlinc.com
 ☐ David Dack

ATL specializes in the design/manufacture of custom bladder-type fluid containment systems, including tanks, inflatables, pillows and bellows for surface and subsea. ATL's flexible fluid containers boast unparalleled chemical tolerance, abrasion resistance, and remarkable durability - used with methanol, diesel fuel, gases, ethylene glycol, hydraulic fluids and chemical cleaning cocktails. Expedited deliveries are also available.

MARINE ENVIRONMENTAL CONSULTING SERVICES



CSA OCEAN SCIENCES INC.

8502 SW Kansas Avenue
Stuart, FL 34997
 ☎ +1 770 828 5464
 ☐ gstevens@conshelf.com
 ☐ www.csaocean.com
 ☐ Gordon Stevens

CSA Ocean Sciences Inc. brings more than five decades of experience in marine environmental assessments in the US and internationally, with offices in the United States, the Eastern Mediterranean, Trinidad, Suriname, Brazil, and Australia. CSA's expertise in coastal, marine, and deep ocean surveys is built on the integration of science, operations, and an understanding of environmental data collection, management, and analysis within geospatial domains.



MORGAN & EKLUND, INC. (M&E)

4909 US Highway 1
Vero Beach, FL 32967
 ☎ +1 772 388 5364
 ☎ +1 772 388 3165
 ☐ info@morganeklund.com
 ☐ www.morganeklund.com

Morgan & Eklund provides accurate and reliable hydrographic and geophysical survey services in support of marine and coastal infrastructure projects, beach restoration, and large-scale water management projects. M&E clients include engineering firms, government entities and construction contractors. We own and operate state-of-the-art land and hydrographic survey equipment including RTK/GPS, digital levels, Invar rods, bathymetric charting equipment, electronic total stations and data collectors.



MARINE VENTURES INTERNATIONAL, INC. (MVI)

8524 SW Kansas Avenue
Stuart, FL 34997
 ☎ +1 772 419 9627
 ☎ +1 772 419 9628
 ☐ info@marineventures.com
 ☐ www.marineventures.com

Marine Ventures International, Inc. (MVI) provides high quality, marine environmental and technical experts to conduct coastal and offshore field operations worldwide. We leverage our wealth of talent and resources to bring you a customized team of independent contractors, subject matter experts and specialized equipment to get the job done. Our professionals work in a variety of sectors from submarine cable projects and engineering services to protected species observation and environmental consulting.

MOTION SENSING EQUIPMENT



KONGSBERG

KONGSBERG DISCOVERY

Pirsenteret
N-7462 Trondheim, Norway
 ☎ +47 73 54 55 00
 ☎ +47 73 51 50 20
 ☐ km.seatex.sales@km.kongsberg.com
 ☐ www.kongsberg.com/discovery
 ☐ Finn Otto Sanne at finn.otto.sanne@kongsberg.com

Kongsberg Discovery develops, manufactures and delivers innovative technology to enhance knowledge, surveillance and sustainability in the ocean space. From the deepest sea to outer space, our unique offering allows our customers to understand complex environments, mitigate risk and achieve ambitious objectives. The Kongsberg Discovery portfolio spans hydro acoustics with sonars and echo-sounders, marine robotics, inertial navigation, communication, and underwater and above surface position reference systems using laser, radar and GNSS technologies. Our technology, combined with deep application knowledge and software expertise, provides significant value for our customers.

NAVIGATION & POSITIONING SYSTEMS



ADVANCED NAVIGATION

255 George St, Sydney NSW 2000

+61 2 9099 3800

info@advancednavigation.com

www.advancednavigation.com

Advanced Navigation is a global leader in AI robotics and navigation technologies for land, air, sea and space applications. Our team specializes in developing low SWaP-C (Size, Weight and Power, Cost) solutions for inertial navigation, GNSS, underwater acoustic navigation and robotics, all integrated with proprietary artificial intelligence.

Our cutting-edge micro-AUV, Hydrus, is revolutionizing the cost of subsea data collection, enabling organizations to conduct more frequent and comprehensive seabed verification and surveying missions than ever before.



EVOLOGICS GMBH

Wagner-Régeny-Straße 4,
12489 Berlin, Germany

+49 30 4679 862 - 0

sales@evologics.com

evologics.com

EvoLogics, founded in 2000, focuses on pioneering maritime technologies. Specializing in underwater smart robotics, sensor systems, acoustic communication and positioning networks, EvoLogics integrates advanced engineering with bionic principles.

The company's development strategy centers on an underwater "Internet of Things" for intelligent vehicle and sensor cooperation. Smart underwater networks build on EvoLogics' S2C spread-spectrum communication technology that combines underwater acoustic data networks with integrated real-time positioning. The company designs highly capable underwater solutions for complex mission scenarios with advanced sensor systems, AI-based object recognition and analytics, diver navigation systems, and autonomous subsea and surface vehicles for survey and support operations.



KEARFOTT CORPORATION

19 Chapin Road, Building C

Pine Brook, NJ 07058

+1 973 785 6000

marketing@kearfott.com

www.kearfott.com

Kearfott is a leader in the design, manufacture, and support of guidance, navigation, and motion-control products for the aerospace, defense, energy exploration, and unmanned system markets.

For over 100 years, Kearfott has been dedicated to providing quality, reliability, and cutting-edge technology to customers worldwide to meet their sea, land, air, and space requirements. Our products guide spacecraft and strategic missiles, navigate autonomously undersea, provide navigation and fire control for ground vehicles, and control motion aboard both military and commercial aircraft.



KONGSBERG

KONGSBERG DISCOVERY

Pircenteret

N-7462 Trondheim, Norway

+47 73 54 55 00

+47 73 51 50 20

km.seatex.sales@km.kongsberg.com

www.kongsberg.com/discovery

Finn Otto Sanne at finn.otto.sanne@kongsberg.com

Kongsberg Discovery develops, manufactures and delivers innovative technology to enhance knowledge, surveillance and sustainability in the ocean space. From the deepest sea to outer space, our unique offering allows our customers to understand complex environments, mitigate risk and achieve ambitious objectives. The Kongsberg Discovery portfolio spans hydro acoustics with sonars and echo-sounders, marine robotics, inertial navigation, communication, and underwater and above surface position reference systems using laser, radar and GNSS technologies. Our technology, combined with deep application knowledge and software expertise, provides significant value for our customers.



KONGSBERG

KONGSBERG DISCOVERY

Pircenteret

N-7462 Trondheim, Norway

+47 73 54 55 00

+47 73 51 50 20

km.seatex.sales@km.kongsberg.com

www.kongsberg.com/discovery

Finn Otto Sanne at finn.otto.sanne@kongsberg.com

Kongsberg Discovery develops, manufactures and delivers innovative technology to enhance knowledge, surveillance and sustainability in the ocean space. From the deepest sea to outer space, our unique offering allows our customers to understand complex environments, mitigate risk and achieve ambitious objectives. The Kongsberg Discovery portfolio spans hydro acoustics with sonars and echo-sounders, marine robotics, inertial navigation, communication, and underwater and above surface position reference systems using laser, radar and GNSS technologies. Our technology, combined with deep application knowledge and software expertise, provides significant value for our customers.

NETWORKS & DATA COMS



EVOLOGICS GMBH

Wagner-Régeny-Straße 4,

12489 Berlin, Germany

+49 30 4679 862 - 0

sales@evologics.com

evologics.com

EvoLogics, founded in 2000, focuses on pioneering maritime technologies. Specializing in underwater smart robotics, sensor systems, acoustic communication and positioning networks, EvoLogics integrates advanced engineering with bionic principles.

The company's development strategy centers on an underwater "Internet of Things" for intelligent vehicle and sensor cooperation. Smart underwater networks build on EvoLogics' S2C spread-spectrum communication technology that combines underwater acoustic data networks with integrated real-time positioning. The company designs highly capable underwater solutions for complex mission scenarios with advanced sensor systems, AI-based object recognition and analytics, diver navigation systems, and autonomous subsea and surface vehicles for survey and support operations.

OCEANOGRAPHIC INSTRUMENTS/SERVICES



Environmental Sciences

ASL ENVIRONMENTAL SCIENCES, INC.

Victoria, BC, Canada

+1 250 656 0177

asl@aslenv.com

www.aslenv.com

- Metcean Equipment Leasing: Acoustic Doppler Current Profiler ADCPs (including StreamPro & RiverRay), Ice Profilers, AZFP, acoustic releases, wave/tide gauges, pingers, satellite beacons, CTD+DO+Tu profilers, DO & turbidity loggers, weather station, cages, floatation, bottom frames.
- Oceanographic Products: Acoustic Zooplankton Fish Profiler (AZFP), Ice Profiling Sonar (IPS) & shallow water Ice Profiler (SWIP), AZFP6-ice (AZFP combined with IPS), instrument cages and bottom frames. Custom acoustic products and system integration.
- Consulting: Field work, data collection, analyses, acoustics, remote sensing, oceanographic mooring design, numerical modelling and system integration.
- Manufacturer's Representative: Teledyne Marine, Deep Water Buoyancy, Valeport, Trimble, Hemisphere, ANB Sensors, SOFAR and WERA Oceanographic HF Radar.

STAR:ODDI

STAR-ODDI

Skeidaras 12, 210

Gardabaer, Iceland

+354 533 6060

+354 533 6069

baldur@star-oddi.com

www.star-oddi.com

Baldur Sigurgeirsson

Miniature data loggers with a wide range of sensors: temperature, depth, pressure, salinity, conductivity, tilt-acceleration and compass heading. From shallow to deep ocean, for short or long-term studies. Used for movement analysis of underwater equipment and environmental monitoring. Choose between small and economical or larger sized higher accuracy, fast response and rechargeable loggers. Easy to mount on gear.



VALEPORT LTD

St. Peters Quay

Totnes TQ9 5EW

United Kingdom

+44 1803 869292

sales@valeport.co.uk

www.valeport.co.uk

Valeport provides leading-edge marine sensing and monitoring solutions. We are a British manufacturer of hydrographic and oceanographic instrumentation, which includes: Bathymetry, CTD and Environmental, Current, Sound Velocity and Tide Gauges. Valeport has supplied the subsea sector for over fifty years, supporting the hydrographic and oceanographic communities with a comprehensive portfolio of products that deliver highly innovative solutions. Valeport's worldwide customer base that includes the environmental monitoring, water survey, energy, dredging, civil engineering and scientific research sectors. Our philosophy of keeping development and manufacturing entirely in-house, assures our customers of our expertise and commitment to providing the highest levels of quality, performance and service.

ROPE

CORTLAND INTERNATIONAL

10633 W. Airport Blvd., Ste. 300

Stafford, TX 77477

+1 706 461 2161

dennis.sherman@cortlandinternational.com

www.cortlandinternational.com

Dennis Sherman

Cortland designs, manufactures, and delivers technologically advanced synthetic fiber braided ropes and other custom high-performance solutions. Examples include deep water synthetic fiber ropes, oceanographic mooring systems, coring lines, synthetic reinforcing over braids, in-line attachments/lifting points (cable grips), and thermoplastic extrusions over high-performance rope.

As the world's largest synthetic rope manufacturing company, our passionate solutioners are continuously pushing the boundaries of what's possible, defining innovative solutions that outperform in the most challenging environments to deliver exceptional value for our customers. Visit us online at CortlandInternational.com.

SONAR SYSTEMS



EDGETECH

4 Little Brook Rd.
West Wareham, MA 02576
+1 508 291 0057
info@edgetech.com
www.edgetech.com
Amy LaRose

EdgeTech designs, manufactures and sells industry-leading side scan sonars, sub-bottom profilers, bathymetry systems and combined sonar systems. Additionally, the company produces world class underwater actuated and transponding solutions including deep sea acoustic releases, shallow water and long life acoustic releases, transponders, reliable USBL acoustic tracking and positioning systems, and custom-engineered acoustic products.

IMAGENEX

IMAGENEX TECHNOLOGY CORP.

209 - 1875 Broadway Street
Port Coquitlam, BC
V3C 4Z1 Canada
+1 604 944 8248
info@imagenex.com
www.imagenex.com
Steve Curnew

Imagenex Technology Corp. is an innovative company that was founded in 1988 by pioneers in the development of high resolution sonar. With thousands of systems in use on imaging and profiling projects all over the world, Imagenex has developed a reputation for products that break new ground for depth capability, size, cost, imaging quality and functionality. Each system in this growing product line integrates the latest in sub-miniature electronics into industry proven, robust underwater housings for a total package that is small, rugged, and will provide years of maintenance-free use. Products include multibeam, mechanical scanning, and sidescan sonars.



GENERATIONS AHEAD IN
SONAR & ULTRASONIC TECHNOLOGY

MASSA PRODUCTS
CORPORATION

280 Lincoln St., Hingham, MA 02043
+1 781 749 4800
JOK@massa.com
www.massa.com
John O'Keefe

Massa Products Corporation designs, engineers, and manufactures sonar and ultrasonic products for use in ocean, air, and fluids. Founded by Frank Massa, the man who pioneered the field of electroacoustics over 75 years ago, Massa is the only company that remains family owned and has continuity in the field since the dawn of the industry. With over 165 US Patents Awarded, Massa has become an industry leader and trusted partner of the US Navy. Massa is also an ISO 9001:2015 Certified company that will tailor designs to fit customer needs. Challenge your perception of what's possible with Massa Products Corporation!

SOUND VELOCITY PROBES/
CTDS

SAIV A/S

Environmental Sensors & Systems

SAIV A/S

Nygardsviken 1, 5165
Laksevag, Norway
+47 56 11 30 66
info@saivas.no
www.saivas.no
Gunnar Sagstad

- STD/CTD, Sound Velocity probes/recorder with optional multi-parameter facilities; Turbidity, Fluorescence, Oxygen etc. The new CTD/STD model SD208 with wireless communication and high accuracy: 0.002 m/s/cm, 0.002 °C.
- Precision pressure /depth (0.01% accuracy) and temperature sensors/recorders. Applications: hydrographic profilings, installation on ROVs and towed systems, etc. Robust and compact designs are combined with accuracy and "plug and play" compatibility. Output format for sonar equipment, e.g. EM1002, EM3000, SSP, HIPAP and Reson 8125

SUBSEA TECHNOLOGY



EVOLOGICS GMBH

Wagner-Régeny-Straße 4,
12489 Berlin, Germany
+49 30 4679 862 - 0
sales@evologics.com
evologics.com

EvoLogics, founded in 2000, focuses on pioneering maritime technologies. Specializing in underwater smart robotics, sensor systems, acoustic communication and positioning networks, EvoLogics integrates advanced engineering with bionic principles.

The company's development strategy centers on an underwater "Internet of Things" for intelligent vehicle and sensor cooperation. Smart underwater networks build on EvoLogics' S2C spread-spectrum communication technology that combines underwater acoustic data networks with integrated real-time positioning. The company designs highly capable underwater solutions for complex mission scenarios with advanced sensor systems, AI-based object recognition and analytics, diver navigation systems, and autonomous subsea and surface vehicles for survey and support operations.



SUBCTECH GMBH

Wellseedamm 1-3, 24145 Kiel, Germany
+49 431 22039 880
+49 431 22039 881
info@subctech.com
www.subctech.com

Ocean Power: Leading manufacturer of Subsea Oil+Gas, Storage, UPS, ROV and AUV vehicle Li-Ion batteries - fully approved according API17F, MIL-STD, UN T38.3 etc. to guarantee highest efficiency, reliability and safety for your jobs.

Ocean Monitoring: Leading manufacturer of autonomous, standardized underway measurement systems for greenhouse gases e.g. pCO₂ and other water quality parameters. Producer of datalogger and CO₂ analyzers with SOCAT standard.

TELEMETRY



EVOLOGICS GMBH

Wagner-Régeny-Straße 4,
12489 Berlin, Germany
+49 30 4679 862 - 0
sales@evologics.com
evologics.com

EvoLogics, founded in 2000, focuses on pioneering maritime technologies. Specializing in underwater smart robotics, sensor systems, acoustic communication and positioning networks, EvoLogics integrates advanced engineering with bionic principles.

The company's development strategy centers on an underwater "Internet of Things" for intelligent vehicle and sensor cooperation. Smart underwater networks build on EvoLogics' S2C spread-spectrum communication technology that combines underwater acoustic data networks with integrated real-time positioning. The company designs highly capable underwater solutions for complex mission scenarios with advanced sensor systems, AI-based object recognition and analytics, diver navigation systems, and autonomous subsea and surface vehicles for survey and support operations.

metOcean telematics

METOCEAN TELEMATICS

21 Thornhill Drive Dartmouth,
Nova Scotia B3B 1R9 Canada
+1 902 468 2505
+1 902 468 4442
emily@metocean.com
www.metoecean.com
Emily MacPherson

MetOcean Telematics provides complete end-to-end telematics services, with a focus on niche MetOcean solutions. As a prominent Iridium Satellite Value-Added Reseller (VAR), MetOcean provides Iridium telemetry for your products and solutions to ensure data is transmitted quickly and reliably. Equipped with the ISO 9001 certification, MetOcean has a long history of assisting customers with integrating Iridium hardware into a range of devices and applications, from Unmanned Surface Vehicles and Autonomous Underwater Vehicles to Buoys and Profiles, and our team understands the challenges you face when deploying your device. When it comes to reliable, global satellite coverage at sea, choose MetOcean.

TRANSDUCERS

AIRMAR TECHNOLOGY
CORPORATION

35 Meadowbrook Drive
Milford, NH 03055, USA
+1 603 673 9570
salesinquiries@airmar.com
www.airmar.com

AIRMAR Technology is a leading developer and manufacturer of acoustic and ultrasonic sensing solutions. We push the boundaries of ultrasound technology to develop advanced products that withstand the harshest ocean environments while reliably facilitating data gathering from surface to full ocean depth. Our comprehensive suites of marine, oceanographic and survey transducers, plus our WeatherStation® instruments, deliver performance that meets the most challenging mission requirements. Ideal applications include shallow and deep-water survey, sub-bottom profiling, navigation, fisheries research, aquatic habitat assessment, underwater scientific applications and more. Customization of transducers for specific marine applications is available.

UNCREWED MARITIME VEHICLES



EVOLOGICS GMBH

Wagner-Régeny-Straße 4,
12489 Berlin, Germany
+49 30 4679 862 - 0
sales@eologics.com
eologics.com

EvoLogics, founded in 2000, focuses on pioneering maritime technologies. Specializing in underwater smart robotics, sensor systems, acoustic communication and positioning networks, EvoLogics integrates advanced engineering with bionic principles.

The company's development strategy centers on an underwater "Internet of Things" for intelligent vehicle and sensor cooperation. Smart underwater networks build on EvoLogics' S2C spread-spectrum communication technology that combines underwater acoustic data networks with integrated real-time positioning. The company designs highly capable underwater solutions for complex mission scenarios with advanced sensor systems, AI-based object recognition and analytics, diver navigation systems, and autonomous subsea and surface vehicles for survey and support operations.

GENERAL DYNAMICS Mission Systems

GENERAL DYNAMICS MISSION SYSTEMS' BLUEFIN ROBOTICS PRODUCTS

553 South Street
Quincy, MA 02169
+1 617 715 7000
justin.reid@gd-ms.com
www.gdmissonsystes.com/bluefin
Justin Reid

General Dynamics Mission Systems' family of Bluefin Robotics products consists of autonomous unmanned underwater vehicles (UUVs) and related technologies for defense, commercial, and scientific customers worldwide. Their core autonomous product line includes Bluefin®-9, Bluefin®-12, Bluefin®-21, and subsea power technologies. General Dynamics offers a full range of modular, free-flooded UUV platforms and products, integrated with over 70 different sensors more than 100 vehicles. We design, develop, deliver, and provide operations and sustainment support for UUVs worldwide to research institutes and industry, providing UUVs and auxiliary equipment to the United States' and International Navies for various defense applications.

ISE | International Submarine Engineering Ltd.

INTERNATIONAL SUBMARINE ENGINEERING LTD. (ISE)
1734 Broadway Street,
Port Coquitlam, BC, V3C 2M8
+1 604 942 5223
info@ise.bc.ca
https://ise.bc.ca/

ISE proudly stands as a global leader in the delivery of modular AUVs, ROVs & submersibles specializing in systems up to 6km. As we mark our 50th anniversary, ISE takes pride in a legacy of innovation at depth, contributing significantly to the evolution of robotics and underwater technology and providing customized solutions for naval, industrial, and scientific companies worldwide.



OUTLAND TECHNOLOGY

38190 Commercial Ct.
Slidell, LA 70458 USA
+1 985 847 1104
+1 985 847 1106
jeff@outlandtech.com
www.outlandtech.com
Jeff Mayfield

Offering the most rugged equipment and unsurpassed customer service, Outland Technology has been the world's leading manufacturer of underwater video, lighting and ROV equipment for over 30 years. We recognize that no two jobs are the same and specialize in products that are customizable for your specific applications.



SEAROBOTICS CORPORATION

7765 SW Ellipse Way
Stuart, FL 34997
+1 772 742 3700
info@searobotics.com
www.searobotics.com

SeaRobotics Corporation, headquartered in Stuart, Florida, specializes in the design and manufacture of intelligent marine robotics, including a line of Autonomous Surface Vehicles (ASVs) for commercial and defense markets around the world. Applications for SeaRobotics vehicles range from bathymetric and hydrographic coastal surveys to, harbor, and riverine inspection and surveillance. From ground-breaking ASV design through to custom manufacturing for theme parks, SeaRobotics designs, engineers and manufactures smart solutions for complex marine challenges. In addition to our ASV line, SeaRobotics also designs and builds hull and tank bio-inspired underwater grooming and cleaning systems.

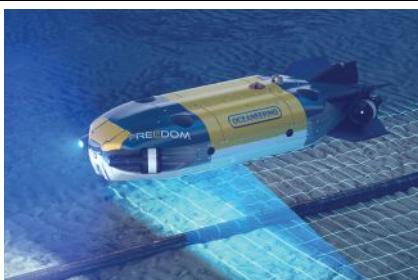
WINCHES, HANDLING, & CONTROL SYSTEMS



OKEANUS SCIENCE & TECHNOLOGY LLC

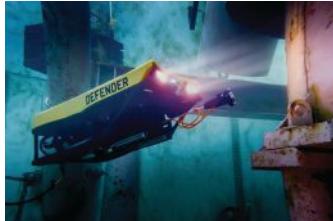
11989-A FM 529
Houston, TX 77041
+1 713 460 1400
Bleblanc@okeanus.com
www.okeanus.com
Benton LeBlanc

Okeanus Science & Technology is an established market leader for field-proven deck handling systems, including an exclusive series of winches, LARS, and A-Frames. Whether we are custom-fitting a heavy pull multi-purpose winch or developing a prototype sample collector for deep-sea exploration, we have the industry expertise, marine engineering experience, and technological know-how to deliver failproof, mission-critical assets. Okeanus also owns an expanding portfolio of rapidly mobilized rental equipment and instrumentation to manage your operations with optimal flexibility. Okeanus has offices in Houston, TX and Houma, LA.

SPECIAL DIGITAL EDITION
COMING IN JULY 2024

UNCREWED VEHICLE BUYERS' GUIDE

2024-2025



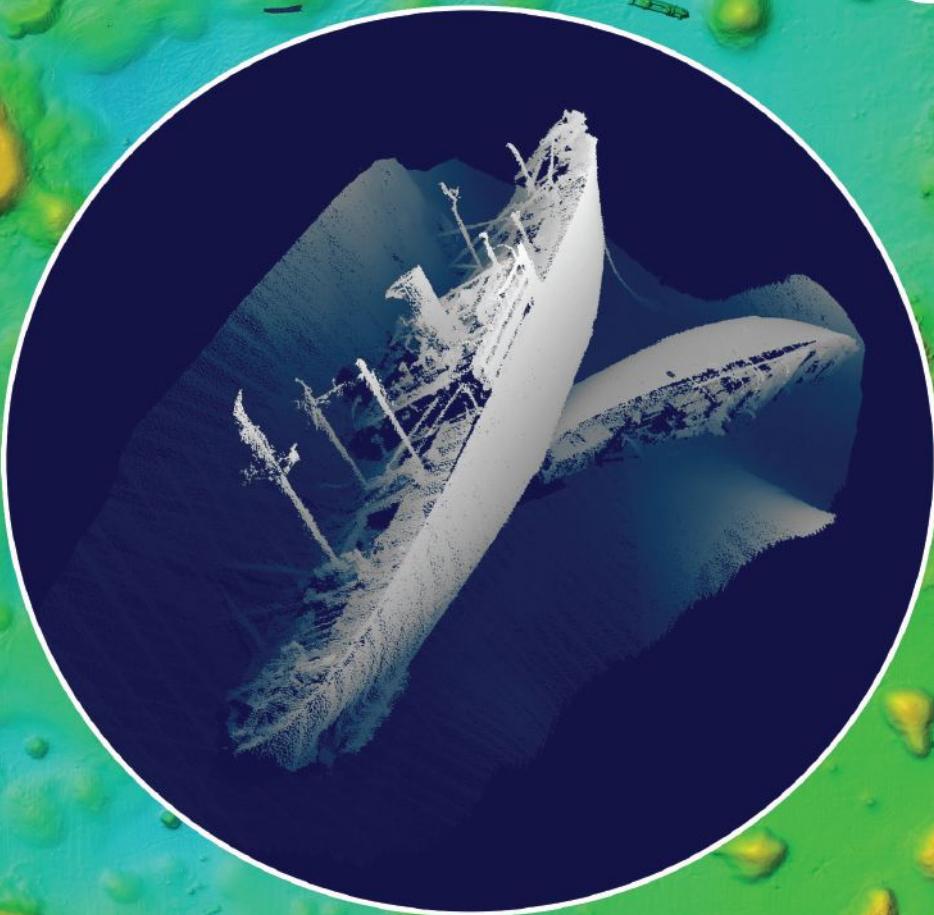
oceannews.com/uncrewed-vehicles



OCEAN NEWS & TECHNOLOGY

| ADVERTISERS INDEX |

Advanced Navigation	68	Norbit.....	4
www.advancednavigation.com		https://norbit.com	
AIRMAR	25	Ocean Energy Europe.....	54
www.airmar.com		www.oceanenergy-europe.eu/annual-event/ocean-energy-europe-2024	
Anchor Logistics Solutions	37	Ocean News & Technology.....	55
https://anchorslog.com		www.oceannews.com	
BIRNS	13	Ocean Specialists.....	59
https://birns.com		https://oceanspecialists.com	
Blueprint Subsea.....	15	Offshore Energy.....	57
www.blueprintsubsea.com		https://oeec.biz	
CSA Ocean Sciences	67	Remote Ocean Systems.....	19
www.csaocean.com		www.rosys.com	
Deep Trekker	5	RTsys	2
www.deeptrekker.com		https://rtsys.eu	
Digital Edge Subsea.....	29	SAAB Seaeye.....	7
www.digitaledgesubsea.com		www.saabseaeye.com	
EdgeTech.....	39	SeaRobotics.....	49
www.edgetech.com		www.searobotics.com	
EvoLogics	9	South Bay Cable	33
https://evologics.com		https://southbaycable.com	
J.W. Fishers Manufacturing.....	43	SubCtech.....	21
https://jwfishers.com		https://subctech.com	
MacArtney.....	3	SubSalve USA	41
www.macartney.com		https://subsalve.com	
Morgan & Eklund.....	53	Voyis.....	1
https://morganeklund.com		https://voyis.com	



Seathe Difference

From Coastal
to Deep Sea



For over fifty years, CSA Ocean Sciences has partnered with leading commercial, academic, and government organizations around the globe to design and implement best-in-class marine environmental programs and mitigation strategies.

Find out how we can help manage your future environmental footprint, today.

csaocean.com

SUBSEA ASSET INSPECTIONS

NOW 75%* MORE AFFORDABLE

*The cost estimates are based on a shipwreck expedition in Western Australia in 2024.



Scan to see how with **Hydrus.**

