

# OCEAN NEWS

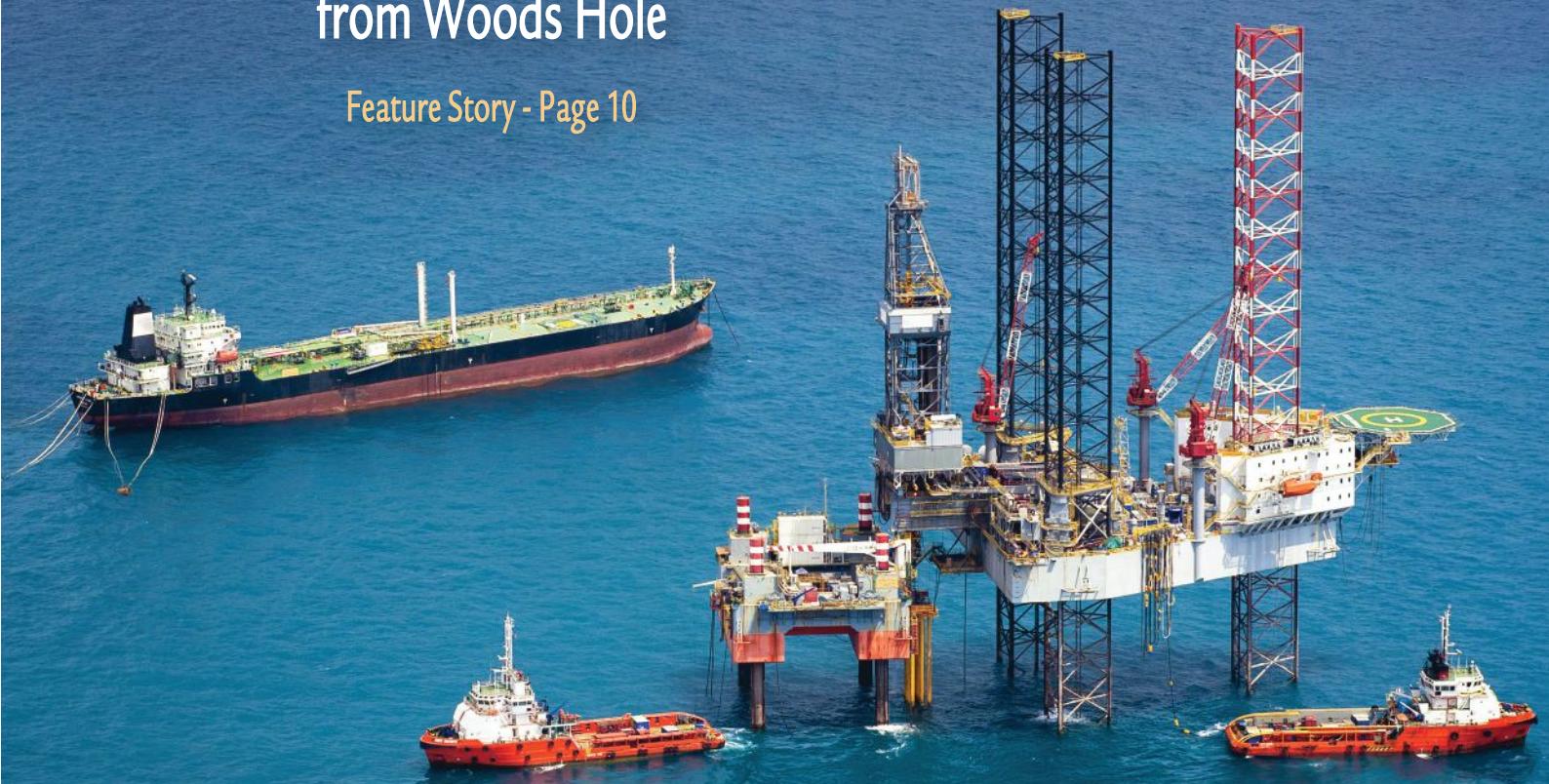
November 2016 [www.oceannews.com](http://www.oceannews.com)

35  
YEARS

& TECHNOLOGY  
*News for the Ocean Industry*

## NEREID: The Latest Deepsea Robot from Woods Hole

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A green sea turtle is swimming towards the camera, its head and front flippers visible above the water's surface. In the background, a large, semi-transparent globe shows the outlines of continents against a blue and white cloudy sky.

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Jack up rig in the Gulf of Thailand. Photo credit: Nattapon Supanawan.

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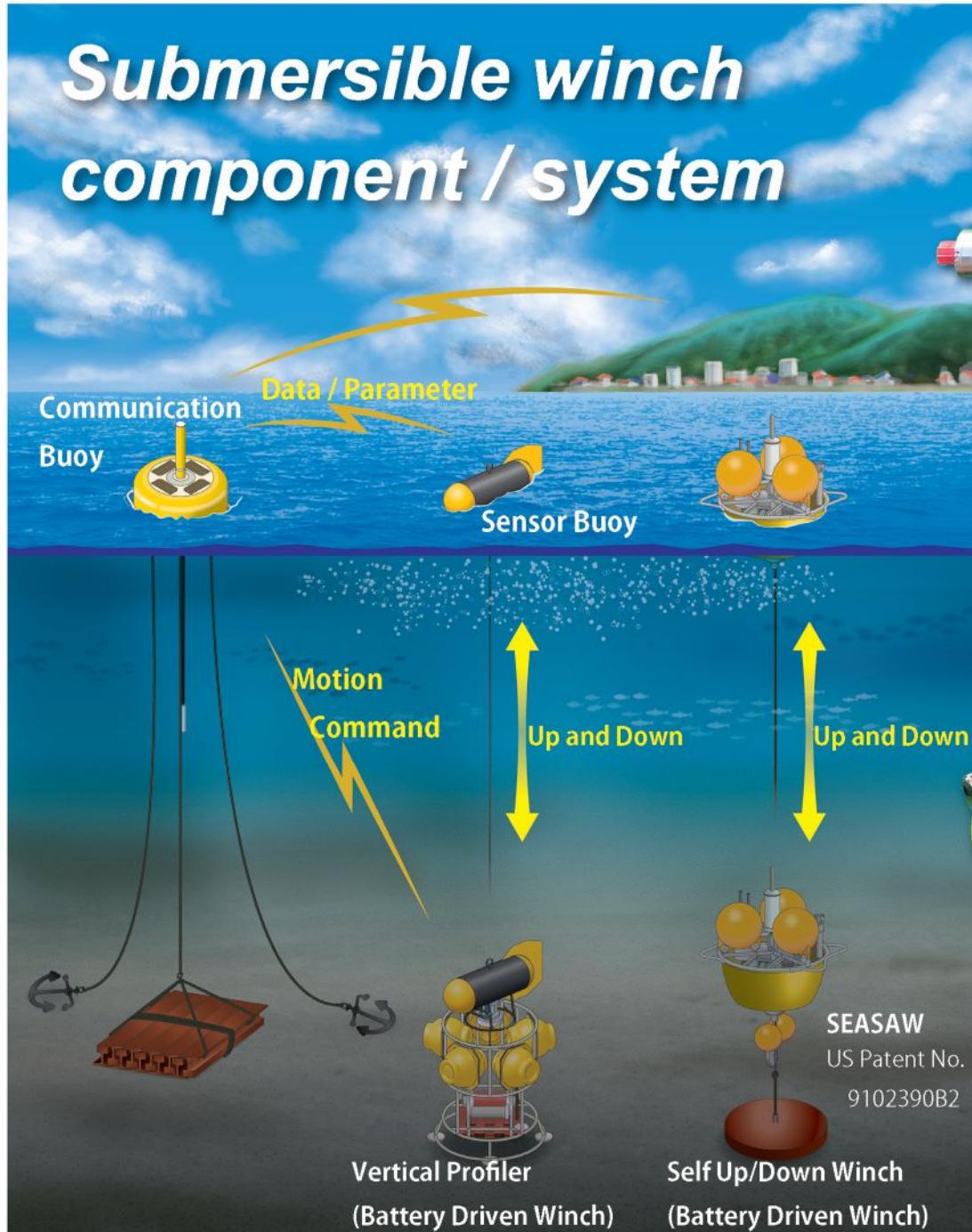
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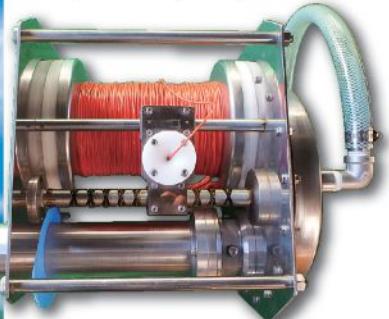




## Submersible winch component / system



Component (AES)



DC24V, Max. 2.5A

Rated Load: 10kgf

Air: approx. 45kg (440N)

Water: approx. 29kgf (285N)

approx. 420 x 600 x H420 mm

Winch Rope: Dia. 2.7mm x 350m

Component (SEASAW)



DC24V, Max. 2A

Rated Load: 10kgf

Air: approx. 16kg (155N)

Water: approx. 11kgf (103N)

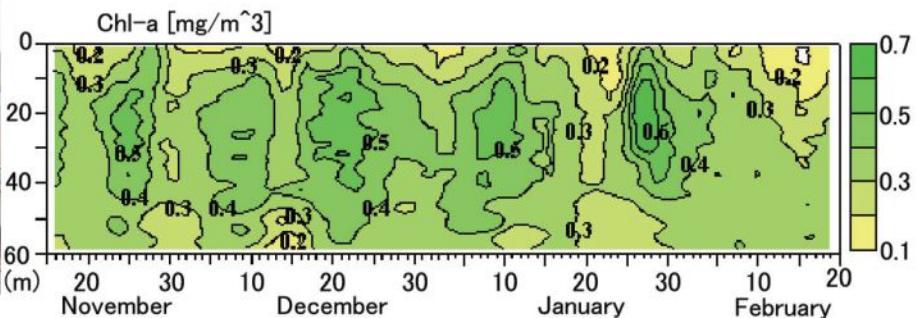
approx. 200 x 300 x H240 mm

Winch Rope: Dia. 2.2mm x 150m

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By Marina Ivanova,  
Analyst, Douglas-Westwood



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# Upstream Investment Outlook

### Introduction

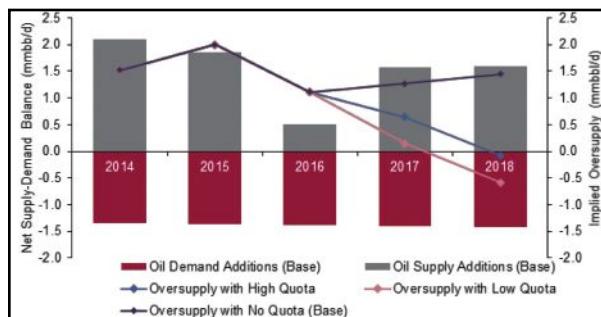
Douglas Westwood's (DW's) soon to be launched Upstream Investment Outlook Q3 2016 presents a granular "bottom-up" (project-by-project) analysis of the near-term market oversupply. The report offers an independent and current view of the long-term state of the upstream oil and gas industry, identifying key business challenges and opportunities. The report also provides a view on the industry competitiveness, supply-chain conditions, and key uncertainties. The data and analysis presented are supported by thousands of man hours of industry research and offer a detailed and realistic evaluation of current, near-term, and long-term activity in the sector.

### Near-term drivers and oversupply

2016 is expected to see narrowing of the supply gap by 0.9 mmbbl/d, provided the unofficial OPEC curtailment of output fails to materialise. This is a result of the anticipated increase in both oil demand and supply by 1.4 mmbbl/d and 0.5 mmbbl/d respectively. Production additions in 2017 will predominantly be driven by key projects on and offshore Middle East and Eastern Europe. The most important widening of the supply gap is expected to come from the Kashagan project off Kazakhstan, contributing nearly 250 kbb/d of additional crude. This effect will likely be compounded by onshore brownfield work at Lukoil's West Qurna field and BP's Rumaila development in Iraq, coupled with ADNOC's Upper Zakum field off United Arab Emirates. Together, these three developments are expected to add an additional 350 kbb/d to oil supply in 2017. Assuming no OPEC output curb, 2018 is also expected to see production gains originating from brownfield development work in Iraq and Iran, projected to add an additional 542 kbb/d of crude relative to 2016.

### OPEC strategy may be changing

Unanticipated OPEC discussions of a preliminary production cut emerged in late September, resulting in two possible oversupply scenarios, outlined below.



*Oil Supply-Demand Balance, 2014-2018*  
*Source: Douglas-Westwood World Drilling and Production Market Forecast.*

OPEC estimates its current output at 33.2 mmbbl/d and has proposed to curb production by 32.5 to 33 mmbbl/d. An agreement to follow the low quota (32.5 mmbbl/d) is expected to result in almost perfect elimination of the supply gap in 2017. On the other hand, a collective decision to commit to the high quota (33 mmbbl/d) is likely to result in a decrease in the implied oversupply to ~0.6 mmbbl/d in 2017. Provided that OPEC is to commit to either quota, the actual reductions in output are expected to be greater than the anticipated 0.7 mmbbl/d and will likely be coming from the marginal cartel members. Should an OPEC curb materialise, however, the market is likely to see an improvement in oil prices and project sanctioning due to improved economic viability of offshore developments. This could potentially offer some basis for a more rapid than expected industry recovery.

### Conclusion

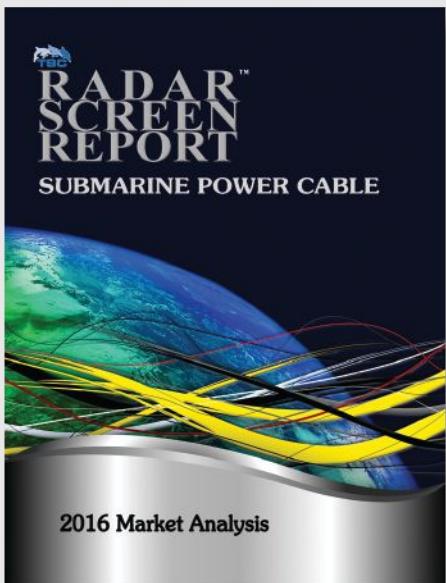
The near-term industry outlook portrays a picture of persistent oversupply, assuming no OPEC cut. Depending on the evolution of OPEC's strategy, in 2017, the market could either face a decrease in oversupply by ~0.4 mmbbl/d, with a high quota, or an almost complete elimination of the supply gap, provided a low quota is held. Should an OPEC deal materialise, oil prices and industry activity are likely to improve. This means that market recovery may be in sight sooner than anticipated.

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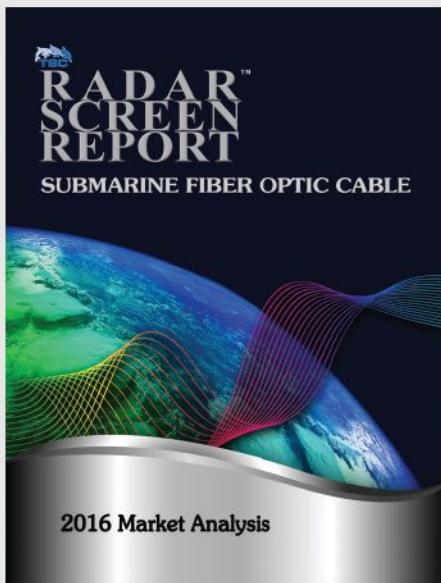
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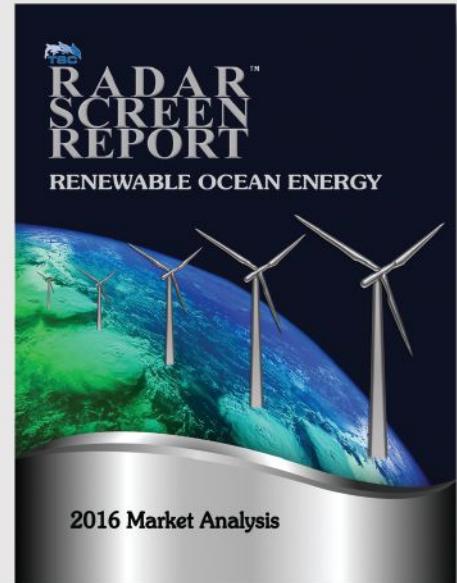
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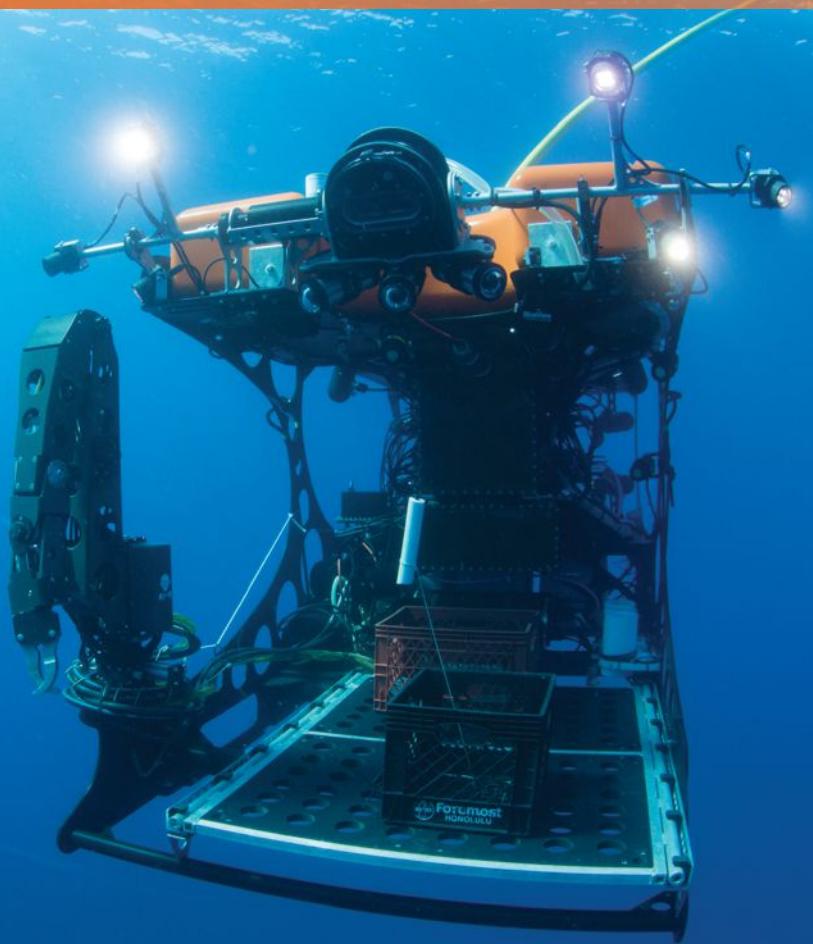


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# NEREID:

## The Latest Deep-sea Robot from Woods Hole

*Nereid HT hybrid ROV and AUV underwater robot on engineering sea trials off Panama, August 2016. Photo credit: Luis Lamar, Woods Hole Oceanographic Institute (WHOI).*

# By: Louise Murray

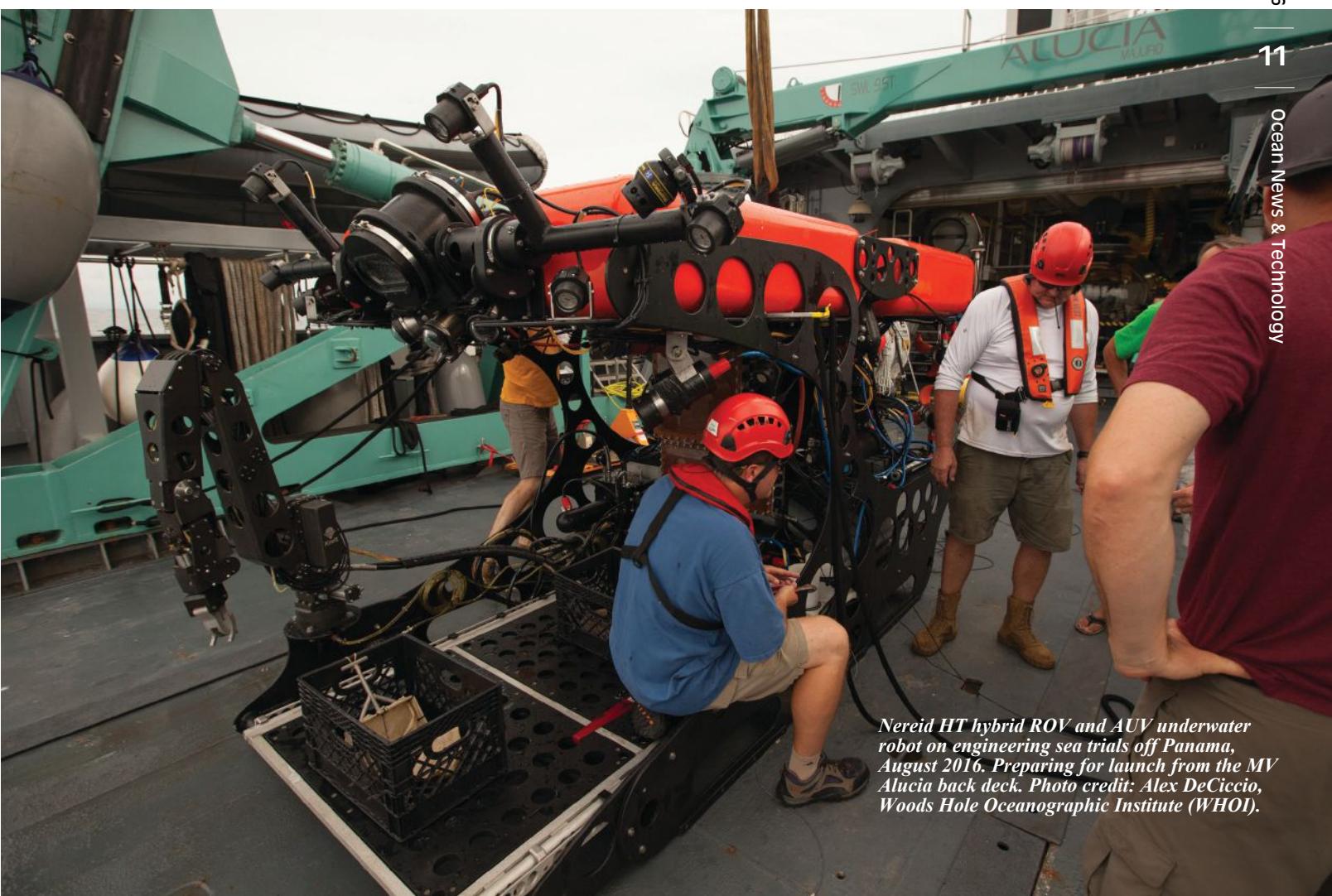
In August 2016, a new hybrid Remotely Operated Vehicle (ROV)/Autonomous Underwater Vehicle (AUV) robot from Woods Hole Oceanographic Institution (WHOI) was sea trialled in Panama to 2,500 m. The innovative design concepts being tested in the Nereid HT will have long-term implications for submarine robotics and control systems in diverse applications from science to oil and gas and the military. Nereid HT was developed for deep-sea scientific and filming missions, and WHOI is actively seeking partners who can apply these new technologies to a range of emerging applications.

Nereid is one of a long line of revolutionary submersibles designed and built at WHOI stretching back to the three-man Alvin vehicle developed in the 1960s. Its most recent antecedent is the Nereus—a full ocean depth capable vehicle that served the scientific community over 8 years before being lost in 2014. At the head of the WHOI team is Andy Bowen, inventor and lead engineer with over 30 years of experience in the field who explained, “Operating Nereus down to 11 km presented us with some serious engineering challenges, particularly with the ship-robot tether system. It had to be extremely lightweight and compact, otherwise shipside handling would have been both massive and very costly. Many of the technologies deployed first in Nereus have been further evolved and refined in Nereid, making it one of the most advanced and versatile unmanned submersibles in the world.”

The compact, two tonne, battery-operated Nereid can store large amounts of rechargeable energy on board. It has a refined manipulator arm design coupled with a very efficient hydraulic power unit and highly effective propulsion, lighting, and control systems, says Bowen. Taken separately, these are all incremental advances in design, but when combined with the powerful software embedded in the Nereid HT are transformative.

Nereid has three distinct operating modes. The first is similar to a conventional ROV, linked to the ship by a reusable reduced diameter oceanographic cable - mode 1. The second is also a tethered mode but uses expendable optical fibre that allows travel up to 20 km from the host vessel - mode 2. This extreme horizontal mode is very unusual and can for example, allow operation under ice where the host vessel remains in ice-free water. In the third operational mode Nereid is controlled through the optical ‘wireless’ link with no physical attachment to the ship - mode 3. In this mode Nereid can venture beyond the range of the wireless link using acoustic communications, operating autonomously. All three modes use new technology to extend the capabilities of the Nereid family of hybrid ROVs, blurring the line between remotely operated and truly autonomous vehicles.

The Dalio Foundation supported the vehicle development and, as part of its Dalio Ocean Initiative, also made the expe-



*Nereid HT hybrid ROV and AUV underwater robot on engineering sea trials off Panama, August 2016. Preparing for launch from the MV Alucia back deck. Photo credit: Alex DeCicco, Woods Hole Oceanographic Institute (WHOI).*

# FEATURE STORY

dictionary vessel Alucia available. The Alucia—a 55-m, 1,396 tonne vessel, originally built in 1974 as a heavy lift ship and launch/recovery platform for diving and submersible operations, was extensively refitted between 2008 and 2012 for its current science and filming role. “What we are trying to do on board Alucia is to give the ship, and others like her, the capability to access depths that would be impossible for a ship of this type using conventional technology—we are aiming for 5,000 m using this novel, lightweight reusable umbilical system. It’s a much smaller diameter tether than would typically be used for ROVs of this size and capability,” said Bowen.

Most ships for deep-sea ROV operations require a dynamic positioning (DP) capability, allowing the vessel to hold a geostationary position above the ocean floor. This is needed to avoid putting undue stress on the umbilical cable running between the vessel and the robot. DP ship charters are costly and can be difficult to schedule, but Nereid’s unique tether design allows it to delink from the ship’s movements, freeing it from the need for a DP vessel.

The Nereid is powered by rechargeable lithium ion batteries in a pressure-resistant custom casing designed by WHOI. The batteries give a 12-hour mission life, but the pace of change in battery technology improvement is now very rapid, going hand in hand with developments in electric car design. Bowen is confident that this will be less of a limiting factor going forward as greater amounts of power can be stored onboard the vehicle. “More on-board power could enable

extension of the vehicle’s capabilities, eventually allowing it to take over some of the tasks normally reserved for heavy work-class ROVs, like cable laying or pipeline work,” said Bowen. Battery power also does away with the requirement for specialized, high-voltage power supplies on board the mother ship.

Research engineer Chris Taylor acted as the pilot for the sea trials in Panama: “The pilot interface has been built to make Nereid as accessible as possible to a wide range of potential pilots.” The software was written by WHOI’s own engineers. Ex-gamer Taylor says it is very easy to use. While providing the usual information for tethered operations, it also allows access to engineering data like motor controller status for the thrusters, battery statistics and status, hydraulic power systems and valves, and—importantly in a battery-powered vehicle—power management systems to monitor and manage overall power and active consumption.

“The thrusters are our number one power consumer on the vehicle,” says Taylor, “with lights and hydraulics being the next largest. We have optimised our hydraulic power unit to minimise power consumption when operating the manipulator arm, grippers, and related systems.” The arm is custom built by Kraft TeleRobotics to a WHOI design that was originally developed for the Nereus project, and has since been refined.

Exploring the deep ocean is fraught with difficulties due to the enormous pressures at depth and the fact that, until now, in-water transmissions were restricted to relatively low bandwidth



*Nereid HT hybrid ROV and AUV underwater robot on engineering sea trials off Panama, August 2016. Control room with Chris Taylor, research engineer and pilot in the centre. screens show the view from the panoramic camera system. Photo credit: Luis Lamar, Woods Hole Oceanographic Institute (WHOI).*

acoustic communications. Nereid can transition between remote and autonomous control modes according to the communication systems available to the robot, ranging from low bandwidth acoustics to WHOI's new optical modem or gigabyte ethernet connections provided by a physical connection through its tether. The modem is in the final stages of a U.S. patent application and provides operators with real-time control, including full motion video uplinks and direct downlink control of thrusters, manipulators, etc. The system allows total control over the vehicle off tether, and Panama was the first test of the modem for bi-directional communications.

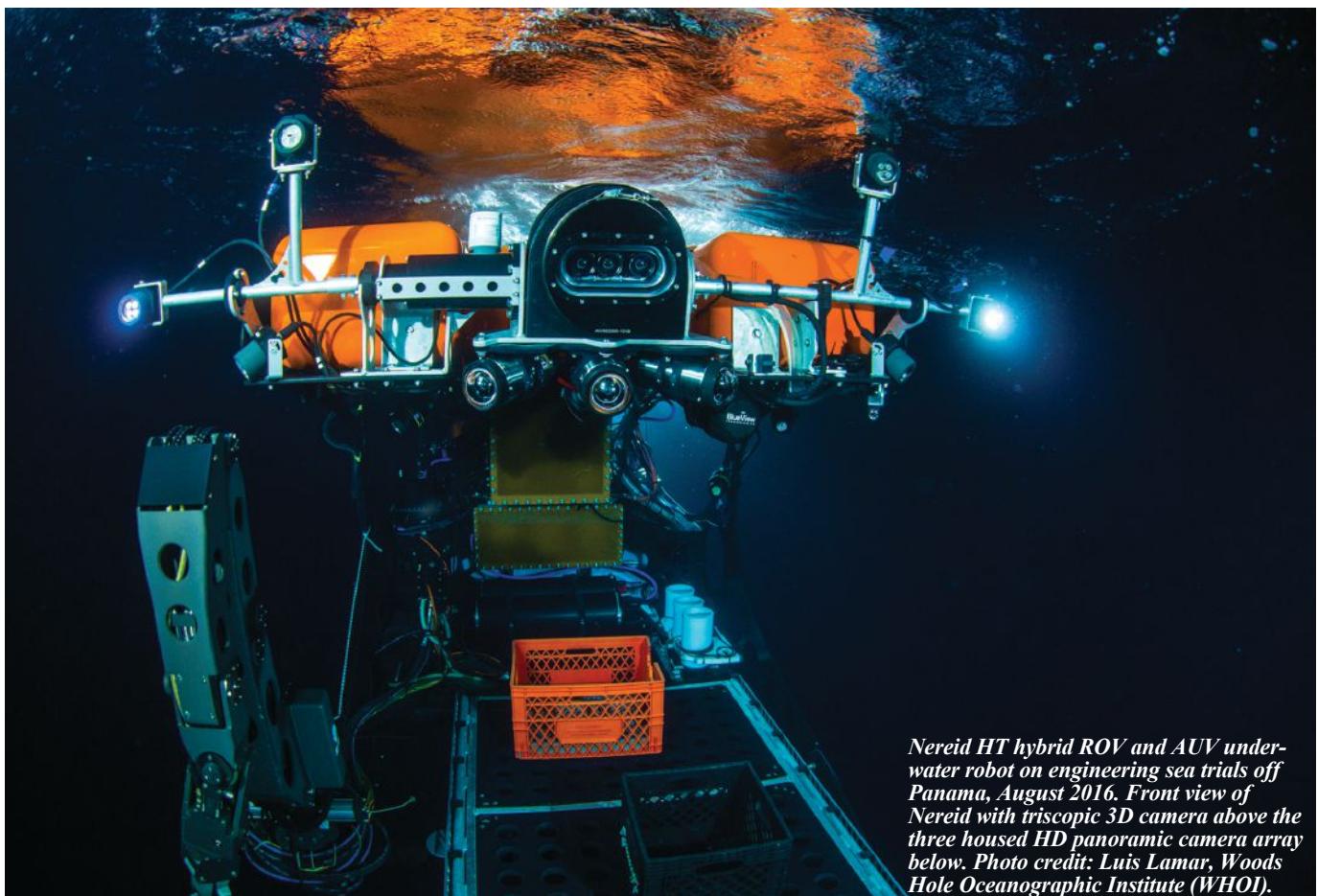
"Wireless control range is limited to 100 m, beyond which acoustics takes over," says optical engineer at WHOI Norman Farr. "But, until now, we've never had high bandwidth under the ocean, it was slow comms or no comms. Transmitting live high-resolution video to and from untethered vehicles has never been possible until now." Virtual tethering via the modem opens up the possibility of entirely new mission types where global experts or remote engineers can tap into its live visual output feeds and participate and contribute remotely to expeditions or inspections without the need of a berth on a ship above site.

As their abilities grow, smaller ROVs like the Nereid class are also increasingly being deployed by navies, coastguards, and ports around the world, including the U.S. Coast Guard, the U.S. Navy, and the Royal Navy. Hybrid ROV/AUV vehicles can be used for a huge variety of underwater tasks such as

explosive ordnance disposal (EOD); meteorology; port security; mine countermeasures (MCM); oil and gas support; marine science and archaeology; and maritime intelligence, surveillance, and reconnaissance. The technologies deployed in the Nereid HT will also have far-reaching implications in the oceanographic science community as vehicles like it open up the deep ocean to more and more scientists as expedition and vessel costs fall.

As the vehicles become more capable and versatile, Bowen envisages a future where ship-less systems could prevail. "I can see a Nereid covering hundreds of kilometres under simple acoustic comms control, then at a work site linking to an optical modem, receiving instructions wirelessly, while working under the control of a human pilot. Or further ahead, actually residing on the seafloor, available to respond when needed, say to harvest data from an undersea observatory or provide timely intervention. The robot can then respond no matter what the sea conditions. Indeed, in locations like the high Arctic, ship-less intervention might be an imperative."

Many airborne drones already operate like this, flying to their operations site under little or no human control. WHOI advances in underwater robotics, autonomy, and communications technology make it extremely likely that we will see these kinds of missions under the surface of the ocean before too long. Small but highly capable hybrid vehicles like Nereid could eventually be as common a vessel staple as the ship's zodiac, ready to deploy at a moment's notice.



*Nereid HT hybrid ROV and AUV underwater robot on engineering sea trials off Panama, August 2016. Front view of Nereid with trisoptic 3D camera above the three housed HD panoramic camera array below. Photo credit: Luis Lamar, Woods Hole Oceanographic Institute (WHOI).*

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## Esri partners with XPRIZE Foundation to map the ocean

Global smart mapping leader Esri and the XPRIZE Foundation announced Esri's partnership in the Shell Ocean Discovery XPRIZE. The new partnership will help accelerate innovative surveys of the ocean, 95% of which remains unexplored.

Esri will donate its award-winning ArcGIS Online platform to support the \$7 million XPRIZE competition. Participating teams will compete to develop fast, autonomous deep-sea technologies that can map the seafloor at high resolutions. Competing teams will submit their maps using Esri ArcGIS Online to ensure all participants are judged from a consistent technology platform.

The National Oceanic and Atmospheric Administration (NOAA) will award a \$1 million bonus prize to incentivize teams to develop complementary underwater sensing technology that can detect and track a biological or chemical signal to its source.

For more information, visit [www.oceandiscovery.xprize.org](http://www.oceandiscovery.xprize.org).

November 2016

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Ocean News & Technology

## Europe collaborates to coordinate open ocean observatories

European scientists are joining forces to better understand oceanic change by coordinating ocean data acquisition, analysis and response on scales ranging from the provincial to the global.

Marking a major milestone, the first Assembly of Members meeting of the European Multidisciplinary Seafloor and water-column Observatory (EMSO) was held 28-29 September in Rome, Italy.

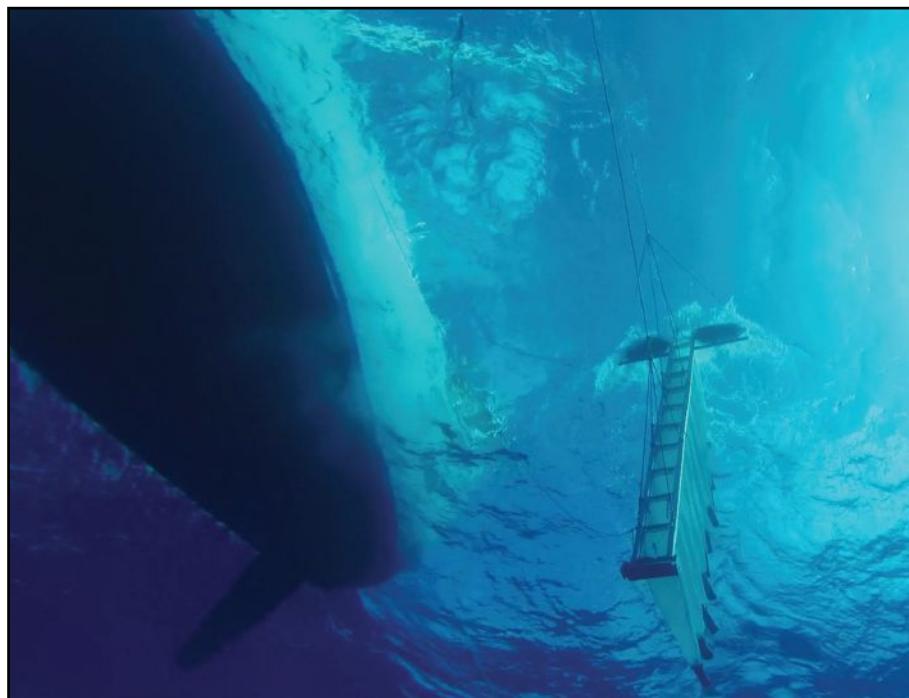
Dr. Henry Ruhl of the National Oceanography Centre (NOC), part of EMSO, said, "Society has an increasing need for improving the availability of high quality data to understanding climate change and geo-hazards. For example, the oceans store large quantities of heat and carbon dioxide, an important greenhouse gas."

EMSO is a distributed research infrastructure, composed of fixed-point open ocean observatory nodes, whose aim is to provide coherent long-term data sets for research and monitoring. This will not only bring together countries and disciplines, but also allow the pooling of resources and coordination to assemble harmonised data into a comprehensive regional ocean picture. This data will be made openly available to researchers and stakeholders worldwide.

For more information, visit [www.noc.ac.uk](http://www.noc.ac.uk).

# OCEAN INDUSTRY

## Teledyne Optech teams with The Ocean Cleanup to study the great Pacific garbage patch



*Part of the objects in the Patch are underwater, so the Optech CZMIL's depth-penetration capability was crucial for surveying. (Image courtesy of The Ocean Cleanup).*

Teledyne Optech is pleased to announce it has partnered with The Ocean Cleanup in their Aerial Expedition research mission, where the Optech CZMIL (Coastal Zone Mapping and Imaging Lidar) successfully carried out the first in a series of low-speed, low-altitude survey flights across the great pacific garbage patch.

Every year, about eight million tons of plastic enters the oceans. Part of the trash accumulates in five ocean garbage patches, the largest located between Hawaii and California. Plastic in these garbage patches over time breaks down into tiny plastic particles that can be eaten by fish and birds, thereby entering the food chain. The Ocean Cleanup's Aerial Expedition uses a combination of experienced human observers and advanced sensors to count the debris in the great pacific garbage patch, with a focus on the presence of so-called ghost nets. The sensors will also be used to convert this count to a weight estimate by registering the size of the found objects. In the case of ghost nets, a substantial part of the net will float underwater. To properly measure how far the plastic reaches under the surface, The Ocean Cleanup project used the CZMIL's green lidar, which can detect objects to depths of tens of meters.

As part of The Ocean Cleanup's Aerial Expedition, the CZMIL surveyed hundreds of square kilometers of the patch aboard a C-130 Hercules aircraft. Its Optech HydroFusion software suite will combine this lidar data with information from the CZMIL's RGB camera and an ITRES SASI-600 short-wave infrared sensor to create the first 3D visualization of the patch and help identify the number, size and type of plastic objects present.

Find more information, visit [www.teledyneoptech.com](http://www.teledyneoptech.com).

## Ancient skeleton discovered on Antikythera shipwreck

An international research team discovered a human skeleton during its ongoing excavation of the famous Antikythera Shipwreck (circa 65 B.C.). The shipwreck, which holds the remains of a Greek trading or cargo ship, is located off the Greek island of Antikythera in the Aegean Sea. The first skeleton recovered from the wreck site during the era of DNA analysis, this find could provide insight into the lives of people who lived 2,100 years ago.

Led by archaeologists and technical experts from the Hellenic Ministry of Culture and Sports and Woods Hole Oceanographic Institution (WHOI), the team excavated and recovered a human skull including a jaw and teeth, long bones of the arms and legs, ribs, and other remains. Other portions of the skeleton are still embedded in the seafloor, awaiting excavation during the next phase of operations.

"Archaeologists study the human past through the objects our ancestors created," said Brendan Foley, a marine archaeologist with WHOI. "With the Antikythera Shipwreck, we can now connect directly with this person who sailed and died aboard the Antikythera ship."

The Antikythera Shipwreck is the largest ancient shipwreck ever discovered, possibly a massive grain carrier. It was discovered and salvaged in 1900 by Greek sponge divers. In addition to dozens of marble statues and thousands of antiquities, their efforts produced the Antikythera Mechanism—an astounding artifact known as the world's first computer. In 1976, Jacques-Yves Cousteau and the CALYPSO crew returned to the wreck and recovered nearly 300 more objects, including skeletal remains of the passengers and crew.

The skeleton discovered on 31 August 2016 is the first to be recovered from an ancient shipwreck since the advent of

DNA studies. Ancient DNA expert Dr. Hannes Schroeder of the Natural History Museum of Denmark in Copenhagen has traveled to Antikythera to view the remains. Once permission is obtained from the Greek authorities, samples will be sent to his laboratory for a full suite of analyses. If enough viable DNA is preserved in the bones, it may be possible to identify the ethnicity and geographic origin of the shipwreck victim.

The project is supported by corporate partners Hublot, Autodesk, Cosmote, Costa Navarino Resort and private sponsors Swordspoint Foundation, Jane and James Orr, Aikaterini Laskaridis Foundation, the Domestic Property Committee of Kythera and Antikythera, the Municipality of Kythera, and private sponsors of WHOI.

For more information, visit [www.whoi.edu](http://www.whoi.edu).



*Archaeologists Brendan Foley, Theotokis Theodoulou and Alex Tourtas excavate the Antikythera's skeletal remains, assisted by*

*Nikolas Giannoulakis and Gemma Smith.  
Photo by Brett Seymour, EUA/WHOI/ARGO.*

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Ocean News & Technology



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## Northrop Grumman Sperry Marine launches CompassNet at SMM 2016

Northrop Grumman Corporation's (NYSE:NOC) Sperry Marine business unit announced the launch of CompassNet, a network-connected ship heading management system that allows for the deployment of different configurations that can be upgraded easily and affordably at the Shipbuilding, Machinery and Maritime technology show (SMM) in Hamburg, Germany.

CompassNet allows multiple ship heading management controls through the groundbreaking use of standard Ethernet connectivity to link the heading sensors and the distribution portion of the heading management system. As a fully type-approved system, it provides improved efficiency for a wide range of sensor and control configurations from a basic setup to more complex arrangements with redundant monitoring stations. CompassNet will benefit a wide range of vessels including high-end commercial ships, cruise liners, and survey vessels as well as military support and control vessels.

CompassNet improves system redundancy and resiliency by offering "plug and play" functionality through the use of fewer required control and display units. With a reduction in cabling requirements of up to 80%, the system reduces installation and commissioning costs. Fewer connections make it easier to enhance heading management requirements with additional equipment. Functionality is further simplified through the use of two 24V DC power sources for all components. Additionally, a Sperry Marine NAVITWIN V control and display unit allows for connecting up to five heading sensors. Besides the installation process, Ethernet technology in a Sperry Marine heading management system facilitates modularity and improves reliability, operational performance, and consequently navigational safety.

For more information, visit [www.northropgrumman.com](http://www.northropgrumman.com).

## Harvey Gulf receives ABS and USCG approvals

Harvey Gulf International Marine (HGIM) announced it has received both ABS class functional approval and USCG design bases approval on a 4,000 cu. m LNG articulating tug barge (ATB) construction drawing package; the design accounts for ship-to-ship transfer and shore side resupply transfers. HGIM chairman and CEO Shane J. Guidry said, "The development of this vessel design highlights our commitment to and involvement in the strengthening of the domestic LNG marine fuel market and our continued commitment to a leadership role in developing a robust supply infrastructure." Working closely with its design partner Waller Marine and in conjunction with ABS and USCG, HGIM has developed the design package ahead of construction thereby minimizing the potential for delays and significant cost impacts to the project during construction.

The ATB has an approved design basis and its design meets all domestic and international requirements of a gas carrier, including the existing regulatory requirements defined in 46 CFR Subchapter D, 46 CFR Subchapter O, the International Code for the Design and Construction of Ships Carrying Liquefied Gases in Bulk, 2016 edition (IGC Code), and applicable American Bureau of Shipping (ABS) Steel Barge Rules: Part 5 Chapter 2 Section 5 Liquefied Gas Tank Barges (as modified per 2016 IGC Code), and ABS Steel Vessel Rules Part 5C Chapter 8 Sections 1-19 (as modified per 2016 IGC Code and referenced within the ABS Barge Rules). "This project and the methodical approach in which it has been developed is very different from any other similar vessel design project undertaken thus far. We are designing a gas carrier that will provide ship-to-ship transfers of LNG to vessels utilizing LNG as a fuel and to do ship-to-shore transfers to small scale marine distribution infrastructure. All while having the ability to load at any Society of International Gas Tanker and Terminal Operators (SIGTTO) compliant off take facility", said Chad Verret EVP of LNG Operation at HGIM.

For more information, visit [www.harveygulf.com](http://www.harveygulf.com).

## Kongsberg Maritime opens world's first official test bed for autonomous shipping



An extensive area of the Trondheimsfjord in Northern Norway was designated as an official test bed for autonomous shipping by the Norwegian Coastal Authority (NCA) during a special event in Trondheim, Norway. As potentially the first coastal area in the world officially dedicated to the development of technology for autonomous ships, the new test bed is set to become a vital facility for the future of shipping. Norwegian maritime technology company Kongsberg has been integral to the opening of the test bed and will become a major user in order to continue its development of sensors, software and systems that enable more autonomy for ships.

Announced in March as a follow-up to the Norwegian government's new National Transport Plan, the fjord offshore Trondheim is an ideal location for the development of technology that will make autonomous shipping a reality. The area experiences light vessel traffic, making it a safe place to conduct autonomous vehicle trials. It is also home to high levels of maritime competence through an extensive maritime technology cluster and several major academic and research organisations. The initiative was established by the Norwegian Marine Technology Research Institute (MARINTEK), the Norwegian University of Science and Technology (NTNU), the Trondheim Port Authority, Kongsberg and Maritime Robotics. Other stakeholders include the Ocean Space Centre and NTNU's Center for Autonomous Operations and Services (AMOS).

Kongsberg has played an important role in the Trondheimsfjord test bed, having already demonstrated the suitability of the area for autonomous technology trials. The company's Trondheim-based subsidiary Kongsberg Seatek tested various new autonomous technology solutions in Trondheimsfjord this June, together with the NTNU and the Norwegian Defense Research Establishment.

Furthermore, the AUTOSEA project with focus on automated situational awareness will use Trondheimsfjord as a test site when utilising sensor fusion to reduce the risk of collisions between ships and vehicles, when increased level of autonomy is introduced. In order to improve detection capabilities also on small objects and improved coverage of the close-range sector, the AUTOSEA project will, in addition to conventional maritime radar, include sensor types not normally used for such purposes in the maritime sector, such as cameras, infrared and LIDAR.

For more information, visit [www.km.kongsberg.com](http://www.km.kongsberg.com).

## Zentech and GE's Marine Solutions Business collaborate to develop tomorrow's vessels

GE's Marine Solutions business and Zentech Inc. announced the signature of a cooperation agreement under which the two parties will work together to provide advanced vessels for their marine and offshore customers.

Covering a range of vessel types, including self-elevating lift boats, drill ships and semi-submersibles, the agreement leverages the strong capabilities from both companies. While Zentech will contribute with its in-depth knowledge and extensive experience in design, GE's Marine Solutions business will provide smart and advanced engineering expertise and technology in power generation, propulsion and control.

Both GE and Zentech Inc. are working together to solve the challenges faced by the industry and meet customer demands for greater levels of coherence in vessel and system design while simultaneously striving to reduce the cost of construction and overall cost of ownership.

The landmark long-term deal has already started to bear results with a first implementation contract that sees GE set

to deliver its electric power and propulsion, dynamic positioning and vessel control system solutions for Zentech's Z-210, currently under construction at CSSC Huangpu Wenchong Shipbuilding Company Limited in China.

The Z-210 is a self-propelled, self-elevating, DP-2 capable, ABS Class, high-temperature rated, four-legged mobile offshore unit capable of operating in water depths of up to 280 ft. Scheduled for delivery in 2018, the Z-210 addresses the growing needs for lift boats in the Middle East, Southeast Asia and Far East markets where the production, well intervention and platform support activities require the capability for a wide range of water depths from as shallow as 13 ft all the way up to 280 ft.

For more information, visit [www.gemarinesolutions.com](http://www.gemarinesolutions.com).

## Canadian operators opt for increased environmental protection with Ecospeed hard coating

Océan Taiga, North America's most powerful ice-going tug, nearing completion at the Industrie Océan shipyard in Ile-aux-Coudres, QC, will feature Subsea Industries' Ecospeed, following

the operational success of the hard coating applied in 2012 to Groupe Océan's 60 t bollard pull ice-going tug Ocean Raymond Lemay.

Océan Taiga, the second 100 t bollard pull ice class 1A Super FS escort tug, will join first of class Océan Tundra, which was coated in 2013 with an Ecospeed application. Subsea Industries will also apply the advanced hull protection system to the existing Océan Ross Gaudreault tug, at Groupe Océan's shipyard in Quebec.

David Flood, managing director, Jastram Technologies, the commercial representative for Subsea Industries in Canada, said, "Groupe Océan specified the coating for the largest tugs in its fleet because of the coatings' lasting performance and environmental compatibility for operations in ecologically sensitive areas. The owner wanted a coating solution that would not impact the marine environment. Chipping an Ecospeed hard coating almost never happens, but when it does, there is no environmental damage and no sediment pollution."

For more information, visit [www.subind.net](http://www.subind.net).

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### Gulf of Mexico research initiative calls for research proposals

The Gulf of Mexico Research Initiative (GoMRI) released a new call for research proposals, which will be the last round of funding by the organization to support research directed at improving our understanding of the effects of oil on the environment and people of the Gulf of Mexico region. The GoMRI program is scheduled to complete its work in 2020.

GoMRI is a 10-year program established by a \$500 million commitment from BP following the explosion of the Deepwater Horizon drilling rig. An independent, 20-member Research Board provides direction and oversight for GoMRI. A competitive, merit review process modeled after that of the U.S. National Science Foundation identifies research programs and projects to be funded by GoMRI. Data from all GoMRI-funded research are made available to the public via a data management system, GRIIDC.

This request for proposals (RFP-VI) will provide funding for up to 2 years (2018-2019). RFP-VI will receive submissions from Individual Investigator/Collaborations and Research Consortia.

"We have been very pleased by the quality of research produced by GoMRI-supported researchers. This science and engineering research has yielded findings that will improve our understanding of the Gulf of Mexico ecosystem. New species have been discovered, and improved understanding of ocean currents and microbial degradation of oil have been gained. These and many other findings are helping us understand the environmental impacts of the release of oil into the environment," said Dr. Rita Colwell, chair of the GoMRI Research Board. "This understanding is critical and brings us to a place where we have a more comprehensive understanding of how an oil spill moves through the Gulf of Mexico and its influence on the environment and the citizens of the region."

GoMRI RFP-VI awards will total about \$32.5 million per year for the next 2 years. It is anticipated that approximately 20 Individual Investigator/Collaborations and 10 Research Consortium awards will be made.

RFP-VI areas of focus are:

- Physical distribution, dispersion, and dilution of petroleum (oil and gas), its constituents, and associated contaminants (for example, dispersants) under the action of physical oceanographic processes, air-sea interactions, and tropical storms.

- Chemical evolution and biological degradation of the petroleum/dispersant system and subsequent interaction with coastal, open-ocean, and deep-water ecosystems.

- Environmental effects of the petroleum/dispersant system on the seafloor, water column, coastal waters, beach sediments, wetlands, marshes, and organisms and the science of ecosystem recovery.

- Technology developments for improved response, mitigation, detection, characterization, and remediation associated with oil spills and gas releases.

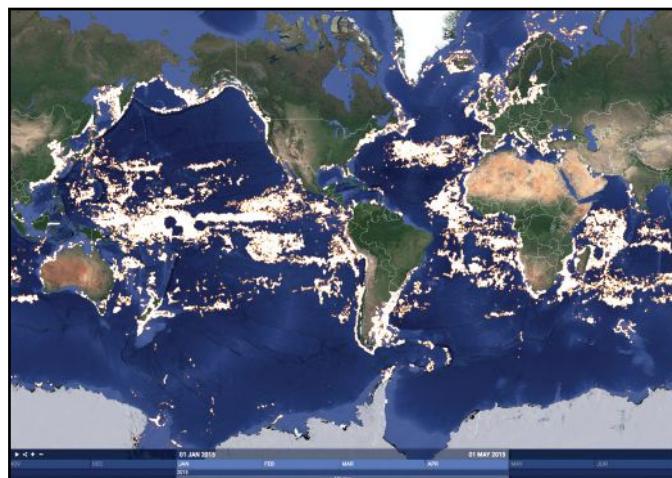
- Impact of oil spills on public health including behavioral, socioeconomic, environmental risk assessment, community capacity, and other population health considerations and issues.

RFP-VI will consider applications focused on the designated research themes and topics, data integration, synthesis across themes and consortia, and overarching science and technology.

Those interested in submitting proposals for RFP-VI must submit a letter of intent by 14 November 2016. Full proposals must be received by 3 March 2017. It is anticipated that awards will be announced in September 2017, with start dates in January 2018.

For more information, visit [www.gulfresearchinitiative.org](http://www.gulfresearchinitiative.org).

### Oceana, SkyTruth and Google launch global fishing watch



Oceana, SkyTruth and Google have launched the public Beta of Global Fishing Watch, a new online technology platform that allows anyone in the world free access to monitor and track the activities of the world's largest commercial fishing vessels in near real-time. By providing the first free global view of commercial fishing, Global Fishing Watch delivers a powerful and unprecedented tool that can help to rebuild fish stocks and protect our oceans, which are threatened by global overfishing, illegal fishing and habitat destruction. The announcement was made in conjunction with the Our Ocean Conference in Washington, D.C., an international gathering of ocean leaders hosted by Secretary of State John Kerry.

The product of a partnership between Oceana, SkyTruth and Google, Global Fishing Watch is an intuitive and free interactive online tool that shows the apparent fishing activity of 35,000 (and counting) commercial fishing vessels operating throughout the world. The platform is regularly updated to show vessel tracks and fishing activity from 1 January 2012 through 3 days prior to present time. By sharing this critical information publicly for the first time, Global Fishing Watch will have immeasurable and wide-ranging positive impacts on ocean health. From allowing fishery managers to better understand and manage fishing activity in their waters to aiding enforcement agencies in deterring illegal fishing, Global Fishing Watch is a powerful tool to help restore our oceans.

Global Fishing Watch is collaborating with governments, private industry, and scientific and international agencies to enable additional transparency and sustainability policies. Indonesia, a leader in fisheries reform and management, has committed to making all of their registered fishing vessels with trackers public to the world through the platform because they believe so strongly in transparency. Trace Register, the leading traceability solution provider for the global seafood industry, is working with Global Fishing Watch to enable its customers to verify that their seafood was legally and responsibly produced.

Funding partners for Global Fishing Watch include the Leonardo DiCaprio Foundation, Marisla Foundation, Bloomberg Philanthropies, The Wyss Foundation, The Waterloo Foundation and Adessium Foundation.

For more information, visit [www.GlobalFishingWatch.org](http://www.GlobalFishingWatch.org).

## As oceans warm, coral reef fish might prefer to move rather than adapt

Ocean warming is occurring at such a rapid rate that fish are searching for cooler waters to call home.

A group of international scientists has new evidence that coral reef fish—which struggle to adapt to the warmer ocean temperatures brought about by global climate change—may instead opt to relocate to cooler parts of the ocean.

In experiments using a common coral reef fish, the blue-green damselfish, *Chromis viridis*, was acclimated to 2°C to 4°C above their normal summer temperatures over a 27-week period.

"When fish have to deal with increased temperature, there are physical consequences. They need more energy to cope, and they may not be able to handle stress or reproduce or even grow," says marine scientist Jacob Johansen of The University of Texas at Austin.

Fish that were acclimated to the highest temperatures lost 30% of their body weight and some of them died, according to the University of Copenhagen's Adam Habary, the lead author of a study published this week in the journal *Global Change Biology*.

"But we found that, when given the slightest chance, fish can seek out temperatures that they've evolved to be in over thousands of years, to mitigate the impact of increasing temperatures and not sacrifice critical physiological processes," says Johansen.

Most prior research has focused on the capacity for animals to adapt to increasing temperatures, given that animals have adapted to changes in temperature in the past. However, previous adaptations happened at evolutionary timescales, about 1°C temperature change per million years. Global climate change is occurring at a much faster rate, with sea surface temperature predicted to increase 2°C to 4°C by the end of the 21st century.

Marine fish are faced with a tough decision. They will need to adapt or move to avoid death.

The research was supported by Generalmajor J.F. Classen Foundation, Frøken Ellen Backe & Margaret Munn Tovborg Jensens foundations as well as the Familien Muller-Geiels foundation and an ARC Super Science Fellowship and infrastructure and research allocation from the ARC Centre of Excellence for Coral Reef Studies at JCU.

For more information, visit [www.utexas.edu](http://www.utexas.edu).

## Gulf Stream slowdown tied to changes in Southern Hemisphere

The ocean circulation that is responsible for England's mild climate appears to be slowing down. The shift is not sudden or dramatic, as in the 2004 sci-fi movie "The Day After Tomorrow," but it is a real effect that has consequences for the climates of eastern North America and Western Europe.

Also unlike in that movie, and in theories of long-term climate change,

these recent trends are not connected with the melting of the Arctic sea ice and buildup of freshwater near the North Pole. Instead, they seem to be connected to shifts at the southern end of the planet, according to a recent University of Washington study in the journal *Geophysical Research Letters*.

"It doesn't work like in the movie, of course," said Kathryn Kelly, an oceanographer at the UW's Applied Physics Laboratory. "The slowdown is

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actually happening very gradually, but it seems to be happening like predicted: It does seem to be spinning down."

The study looked at data from satellites and ocean sensors off Miami that have tracked what's known as the Atlantic overturning circulation for more than a decade. Together they show a definite slowdown since 2004, confirming a trend suspected before then from spottier data.

Looking at other observations to determine the cause, the researchers ruled out what had been the prime suspect until now: that massive melting and freshening in the North Atlantic could stop water from sinking and put the brakes on the overturning circulation, which moves warmer water north along the ocean's surface and sends cold water southward at depths.

"It appears that this 10-year slowdown is not related to salinity," Kelly said. In fact, despite more ice melt, surface water in the Arctic is getting saltier and therefore denser, she said, because of less precipitation. "That means the slowdown could not possibly be due to salinity—it's just backwards. The North Atlantic has actually been getting saltier."

Instead, the authors saw a surprising connection with a current around the southern tip of South Africa. In what's known as the Agulhas Current, warm Indian Ocean water flows south along the African coast and around the continent's tip toward the Atlantic, but then makes a sharp turn back to join the stormy southern circumpolar current. Warm water that escapes into the Atlantic around the cape of South Africa is known as the Agulhas Leakage. The new research shows the amount of leakage changes with the quantity of heat transported northward by the overturning circulation.

For more information, visit [www.washington.edu](http://www.washington.edu).

### Climate warming will mean worse storms

With the climate warming and the sea level rising, conditions are ripe for storms deadlier and more devastating than Sandy that put more people at risk. That's the outlook from David A. Robinson, a Rutgers geography professor who has served as the New Jersey state climatologist for 25 years.

With the warming of New Jersey's climate expected to continue, the atmosphere will hold nearly 4% more moisture for every 1°F rise in temperature, according to Robinson. The increased warmth and moisture will lead to a more energetic atmosphere, and warmer sea surface temperatures will add fuel to the fire. Meanwhile, rising development in coastal areas has put more people in harm's way.

"You still need a trigger, but we're primed for more significant storms that will produce heavy rainfall and heavy snowfall," he said.

That doesn't mean storm frequency will rise because it's unclear whether the conditions that trigger storms will increase or decrease. But storm precipitation and wind speeds should increase, along with freshwater and storm surge flooding and wind damage, according to Robinson. And more intense tropical storms may make it up to the Jersey coastline and beyond, fueled by warmer ocean waters, researchers say.

Anthony J. Broccoli, a meteorologist and professor who chairs Rutgers' Department of Environmental Sciences, said the consensus, based on computer simulations, is that the strongest hurricanes in the North Atlantic basin will get stronger by the end of this century.

But that conclusion is far from ironclad and it's also unclear if the number of hurricanes will increase, decrease or remain the same, Broccoli said.

"A warmer climate could make it easier for storms to maintain their intensity as they move out of the tropics," he said. "So even if there aren't more storms, there could be more storms that survive at a given intensity level and reach our latitude. Storm tracks also could change, and that could lessen or increase the threat to New Jersey."

For more information, visit [www.rutgers.edu](http://www.rutgers.edu).

### Ocean gliders help scientists understand storm intensity

A regional team from Woods Hole Oceanographic Institution (WHOI), Rutgers University, the University of Maine, the University of Maryland, and the Gulf of Maine Research Institute mobilized on 2 September 2 in advance of post-Tropical Storm Hermine's arrival in the northeast to gather data from new ocean instruments that will help better predict the intensity and evolution of future tropical storms along the U.S. East Coast.

The team, part of the TEMPESTS program organized through the Cooperative Institute for the North Atlantic Region, is funded by the NOAA office of Oceanic and Atmospheric Research.

Operating from a boat in the waters south of Martha's Vineyard, WHOI engineers Sean Whelan and Patrick Deane deployed an underwater glider—an ocean robot carrying sensors that can collect data and transmit it by satellite to scientists on shore. The glider will fly underwater across the continental shelf south of New England, in water approximately 100 to 300 ft deep. The glider is capable of sustaining itself at sea for about 1 month. Rutgers

University has also launched two gliders across the New Jersey continental shelf. In addition to the gliders, buoys built by the University of Maine are also in place offshore in Maine, Massachusetts and Maryland. The TEMPESTS program has also deployed ALAMO instruments from Hurricane Hunter aircraft to provide ocean temperature information farther offshore and closer to the storm.

Understanding and predicting hurricane intensity has become a sort of Holy Grail of storm prediction and emergency preparedness along the entire East Coast.

"When Hurricane Irene hit New Jersey and New York, we had a pretty good idea of where the storm was headed in advance," said WHOI physical oceanographer Glen Gawarkiewicz, "we just didn't know how strong they'd be when they made landfall. One of the reasons it's so hard to forecast is that intensity depends on sea-surface conditions directly ahead of and below the storm. Gliders and other new instruments we are testing enable us, for the first time ever, to make measurements in these very harsh conditions."

The team put a glider in the storm's path where it will measure ocean water temperature, salinity, and oxygen in the ocean as the storm approaches land. The data from the glider helps scientists better understand how the ocean changes conditions from depths of hundreds of meters to the surface as the storm passes through. The data will also give them a better picture of how the ocean "recovers" after the storm has passed (storms often leave a "cold wake" behind them), which can affect weather and follow-on storms long after the initial storm is gone.

"The glider will give us a look at how heat from the ocean powers the storm," said Robert Todd, a physical oceanographer who operates the glider lab at WHOI and will watch the glider's progress throughout the storm and even alter the robot's path, if necessary, from his phone or computer anywhere with an internet connection. "We'll see how the ocean heat content over the continental shelf evolves before, during, and after the storm."

Current forecast shows the storm slowing and strengthening as it approaches New England and possibly veering a bit toward land. The gliders will remain in the water through the storm and for a few weeks after to capture how the coastal ocean evolves after the storm passes. The team will fully analyze all the data and their impact on Hermine simulations in the months ahead.

For more information, visit [www.whoi.edu](http://www.whoi.edu).

# PRODUCT SPOTLIGHT

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## KONGSBERG MARITIME - EM 2040P MULTIBEAM ECHO SOUNDER

KONGSBERG

KONGSBERG is a leading manufacturer of multibeam echo sounder systems for seabed mapping. It offers a wide range of systems for all water depths and seabed mapping applications that comply with the performance standards defined by the International Hydrographic Organization's performance standards, S-44 edition 5.

The KONGSBERG EM series of multibeam echo sounders is characterised by high mapping productivity in combination with exceptionally high sounding accuracy and a dense pattern of soundings to cover the seafloor in order to reveal all details on the bottom. In addition to the soundings, KONGSBERG multibeam echo sounders produce seabed image data similar to a side-scan sonar image, which is useful for characterizing the seabed material properties and detecting small features not visible in the sounding data.



*The new EM 2040P is a highly portable shallow water multibeam echo sounder designed for easy transport and quick deployment.*

The EM 2040 multibeam echo sounder is a true wide band high-resolution multibeam echo sounder (200 to 400 kHz) with the highest resolution in the market. The EM 2040C (Compact) is a shallow water multibeam echo sounder based on the EM 2040 technology. It's more compact than the EM 2040, but is still an ideal tool for any high-resolution mapping and inspection applications.

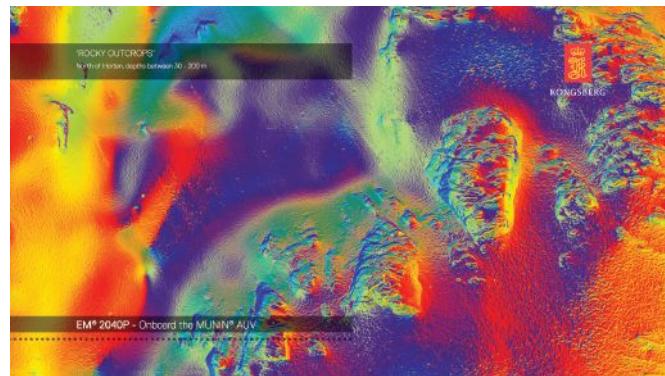
The EM 2040P (Portable) is the latest development of the EM 2040 technology platform. It's a highly portable shallow water multibeam echo sounder designed for easy transport and quick deployment on any vessel, while offering survey performance up to and exceeding the IHO-S44 special order and the more stringent LINZ specification.

Designed for any high-resolution mapping and inspection application, the portability of the new EM 2040P enables straightforward delivery and installation on small vessels of opportunity. A key aspect is that it features three sector transmitters (TX), which allows for active stabilisation for the

vessels roll, pitch, and yaw. The transmit fan is divided into three sectors pinging simultaneously at separate frequencies, which ensures effective dampening of "multi-bounce interference." This enables surveys in rough seas and poor weather and still maintains full seabed ensonification.

Both the TX and the RX transducers are combined into one sonar head for ease of installation and integration. The operating frequency range for the EM 2040P is 200 to 400 kHz and the operator can select the best frequency at any time: 300 kHz for near bottom, 200 kHz for deeper waters, and 400 kHz for very high-resolution inspection.

New features include Extra Detection, which enables the user to identify, classify, and map objects above the seafloor and in the water column (i.e., the shallowest point on a shipwreck). The EM2040P shares several new features with the EM 2040, including a pipe-tracker mode, which increases the number of beams and focuses on the pipe to deliver a higher resolution image, in addition to plug-and-play compatibility with the iLinks InteLAS™ mobile LiDAR system.



*The EM 2040P surveys up to and exceeding the IHO-S44 special order and LINZ specification.*

The EM 2040P utilises the new KONGSBERG EM Portable PU (Processing Unit), a ruggedised splash-proof processing unit created to work with all KONGSBERG shallow water EM-series multibeams. Designed for operation in harsh conditions, the EM Portable PU enables the full feature set of KONGSBERG multibeam technology.

The basic EM 2040P has three units: A sonar head with both the receiver and transmitter integrated, the EM Portable PU, and a workstation. Data input from a motion sensor and a positioning system, such as the new KONGSBERG Seapath 130 which offers the same portability as the EM 2040P, is required. The sonar head may be delivered mounted on a frame together with the motion sensor and a sound speed sensor, factory aligned for ease of mounting.

As the latest addition to the portfolio, the EM 2040P demonstrates KONGSBERG Maritime's commitment to delivering new state-of-the-art technology that supports not only the quality of data, but the productivity and flexibility of the people and vessel's tasked with conducting seabed mapping surveys.

### Prepare for subsea prosperity with 'Radar Screen Report for Offshore Renewable Cable Systems'

The offshore wind industry is expanding at a rapid pace, making timely, accurate intelligence more valuable than ever for companies who install, operate, and maintain subsea cable systems. Of course, the same is true for companies providing products and services in support of these companies.

How much demand is expected over the next 5 years? What are the major factors impacting the market? Where will future projects locate?

Radar Screen Report for Offshore Renewable Cable Systems answers all of these questions. The annual report analyzes, reviews and forecasts the industry. The report also expertly examines the forces driving the market, such as demand for renewable electricity sources, as well as those forces restraining growth (high costs, regulatory obstacles, etc.).

The report analyzes the demand for submarine cable for offshore wind farms and other offshore renewables, such as wave power and tidal. Using data from supply contracts that were awarded over the period from 2011 through the first half of 2016, the report even models demand for cable and forecasts future growth possibilities. It also analyzes market share and profiles the major suppliers' capabilities and activities in the marketplace.

Radar Screen Report for Offshore Renewable Cable Systems analyses timely data on a regional and country basis, including Europe, the U.S. and East Asia, with projections of these highly volatile markets well into the next decade.

Almost exclusively based for decades in a handful of European countries, offshore wind projects are spreading throughout that continent and beyond to the United States, China, Japan, Taiwan and other markets. The result: tremendous growth potential industry-wide for those prepared to take advantage. Radar Screen Report for Offshore Renewable Cable Systems provides an in-depth overview of the state of the subsea cable market for offshore renewables as well as insight into upcoming opportunities over the next 5 years.

For more information, visit [www.subcableworld.com/radar-screen-report](http://www.subcableworld.com/radar-screen-report).

### GE, Citi provide tax equity financing to Deepwater Wind's Block Island Wind Farm

GE unit, GE Energy Financial Services, and Citi announced the closing of tax equity financing on Deepwater Wind's Block Island Wind Farm, the first offshore wind farm in the U.S.

"We're very proud that two world-class, U.S. companies have chosen to invest in America's first offshore wind farm," said Deepwater Wind CEO Jeffrey Grybowski. "Their backing is a testament to the significance of this project and the strength of the American offshore wind industry."

Deepwater Wind completed construction on the 30-MW Block Island Wind Farm in August, and commercial operations are expected to begin in November. The role of the D.E. Shaw group, principal owner of Deepwater Wind, remains unchanged with the addition of the two tax equity investors.

GE Renewable Energy is the project's turbine supplier, providing the five, 6-MW Haliade wind turbines for the wind farm, which is located roughly 3 mi off the coast of Block Island, Rhode Island.

The landmark transaction contributes to Citi's 2015 announced goal to lend, invest and facilitate a total of \$100 billion within the next 10 years to activities that reduce the impacts of climate change and create environmental solutions that benefit people and communities, Salant noted.

In addition to the turbines, GE Renewable Energy's offshore wind business is providing long-term services and maintenance for the project. The Block Island Wind Farm is GE Energy Financial Services' second offshore wind investment this year, building upon the company's \$12 billion renewable energy investment commitments in more than 18-GW of wind and solar projects.

For more information, visit [www.dwwind.com](http://www.dwwind.com).

## America's first wave-produced power goes online in Hawai'i



The Hawai'i Wave Energy Test Site (WETS), the United States' first grid-connected test site of this kind, was completed by the U.S. Navy in mid-2015. The University of Hawai'i at Mānoa Hawai'i Natural Energy Institute (HNEI) is providing key research support to this national effort in the form of environmental monitoring, independent wave energy conversion device power performance and durability analysis and critical marine logistical support.

Recently, the Navy conducted a blessing and dedication ceremony wherein representatives from the federal and state governments were in attendance, as well as key Department of Defense figures.

"There was a high level of enthusiasm for the program to develop this challenging, but potentially extremely rewarding, source of renewable energy," said Pat Cross, research specialist at HNEI and program manager for WETS.

Located offshore the Marine Corps Base Hawai'i on the windward side of O'ahu, a buoy generates electricity from rise and fall of passing waves. Wave energy has enormous potential to address global renewable energy goals, yet it poses daunting challenges related to commercializing technologies that must produce cost-competitive electricity while surviving the energetic and corrosive marine environment. The nascent commercial wave energy sector is thus critically dependent on available test infrastructure to address these issues.

Through a cooperative effort between the Navy and the U.S. Department of Energy, WETS will host companies seeking to test their pre-commercial WEC devices in an operational setting, enabling them to advance their device technology readiness level. Initial funding opportunities by the Navy and Department of Energy have resulted in a set of five devices to be tested through 2018.

For more information, visit [www.hawaii.edu](http://www.hawaii.edu).

### World's largest free stream tidal power project unveiled

Nicola Sturgeon, First Minister of Scotland, officially unveiled Atlantis Resources Limited's MeyGen Project, the world's largest free stream tidal power project, at a ceremony held at the Nigg Energy Park in Scotland.

The four 1.5-MW turbines that make up Phase 1A (three built by Andritz and one AR1500 Atlantis turbine) weigh almost 200 tons each and have now been fully assembled. They will be positioned on top of their foundation structures on the quayside at Nigg ready for deployment to the

MeyGen site in the Pentland Firth. The turbines and their foundations will be transported to the site by the Neptune jack-up vessel operated by Geoseas, a subsidiary of the DEME Group.

Atlantis remains on track to deliver first power to the grid from MeyGen Phase 1A later this year, which will be a landmark event for the global marine power industry. When completed, the MeyGen project will consist of 269 turbines and generate enough energy to power 175,000 UK homes.

For more information, visit [www.atlantisresourcesltd.com](http://www.atlantisresourcesltd.com).

### **Statoil increases shares in UK offshore wind**

Statoil and Statkraft have signed a letter of intent that Statoil takes over as operator of the Sheringham Shoal Offshore Wind Farm in January 2017. Statoil will also through this deal, increase its share in the Dogger Bank projects.

Sheringham Shoal is one of the world's 10 largest producing offshore wind farms providing renewable energy to up to 220,000 UK homes. Located off the coast of Norfolk, it has been in operation since 2012 and has a capacity of 317 MW.

Statoil and Statkraft each hold a 40% share in Sheringham Shoal, with 20% held by the UK Green Investment Bank.

Through the agreement, Statoil is also increasing its share in the Dogger Bank projects, with the desire of bringing Statoil's total ownership from 25% up to a potential of 50% through an acquisition of Statkraft's share in Dogger Bank. The final shareholding in Dogger Bank, and the transfer of operatorship for Sheringham Shoal, is pending partner and government approvals.

For more information, visit [www.statoil.com](http://www.statoil.com).

### **DONG Energy to build 'game-changing' operational hub for offshore wind**

DONG Energy has announced plans for a multi-million GBP investment in Grimsby to create the UK's largest offshore wind operations and maintenance hub.

Subject to planning approval, the new facility will be developed in the town's Royal Dock and will initially support Westermost Rough, Race Bank and Hornsea Project One offshore wind farms. However, it will have the capacity to support other east coast wind farms in DONG Energy's future development pipeline.

Transforming the way wind farms are supported, the hub will be served by

high-tech vessels capable accommodating up to 60 crew and technicians while remaining at sea for long periods. The hub will also include a comprehensive marine coordination center capable of providing 24-7 service to offshore operations across the UK and beyond.

The new hub will sit alongside the existing Westermost Rough operation and maintenance facility, using additional land to be leased from Associated British Ports.

State-of-the-art Service Operational Vessels (SOVs), supplied by Ostensjo Rederi and designed by Rolls-Royce, are being chartered to operate from the new hub. The first vessel will arrive late next year to support a phased activation on the new hub. The vessel will initially support the operation and maintenance of Race Bank, DONG Energy's 580-MW offshore wind farm currently under construction 17 mi off the Norfolk and Lincolnshire coastlines.

For more information, visit [www.dongenergy.com](http://www.dongenergy.com).

### **World's first radar for offshore wind power now delivers data**

DONG Energy and SmartWind Technologies have installed an advanced radar system collecting three-dimensional data on the wind flow in the Westermost Rough Offshore Wind Farm off England's east coast. The project, the first of its kind in the world, represents a paradigm shift in wind measurements.

DONG Energy recently started receiving three-dimensional data from the advanced BEACon radar located at the Westermost Rough Wind Farm on England's east coast. "This is a huge step forward for wind insights," explained Nicolai Gayle Nygaard, BEACon technical manager at DONG Energy. "We're getting minute-by-minute 3D images of the wind flow through the wind power plant. This is a game changer for the industry. We're no longer limited to measuring the wind at just one point, now we can document the wind field across the entire wind power plant and coastal domain. Conventional measurement technologies are like using a torch in a dark room—you have a limited view. With the new radars, the entire room is flooded with light. We get new insights that provide valuable information for the design and operation of future wind power plants."

Texas-based SmartWind Technologies has developed and deployed the BEACon radar system.

For more information, visit [www.smartwindtech.com](http://www.smartwindtech.com).

## **Ultra-Compact Dual Frequency Echosounders**

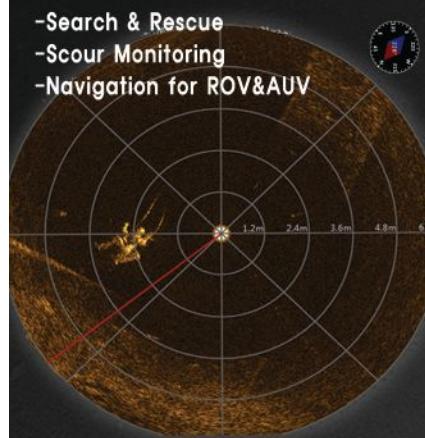


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**Austal awarded EPF contract**

Austal USA has been awarded an A\$434 million contract for the design and construction of two Expeditionary Fast Transport (EPF) vessels (EPF 11 and EPF 12) for the U.S. Navy. This amount includes contracts for long-lead time materials that were previously announced.

This new contract adds to the current block-buy contract for 10 EPF awarded in 2008 and extends Austal's total build for the program to 12 ships, valued at US\$1.9 billion. The two additional EPF grow Austal's extensive order book to over A\$3.3 billion and extend Austal USA's contracted production schedule into CY2022.

The EPF is a unique, 103-m catamaran offering significantly enhanced naval support capability to transport troops, vehicles and cargo quickly and efficiently. With 35 knot performance, a large 1,800 sq. m cargo deck, medium-lift helicopter deck and seating for over 300 embarked troops, the ship has the unique ability to support a variety of operations, including military and civilian logistics missions, humanitarian and disaster relief missions and other maritime law enforcement activities.

For more information, visit [www.austal.com](http://www.austal.com).

**Huntington Ingalls Industries makes strides on CVN 79**

Huntington Ingalls Industries (HII) announced that its Newport News Shipbuilding division placed a 900-ton super-lift into dry dock, continuing construction of the nuclear-powered aircraft carrier John F. Kennedy (CVN 79). As Kennedy begins to take shape in the dry dock, the ship's cost and construction schedule continue on track with significant improvement over its predecessor, the first-of-class Gerald R. Ford (CVN 78).

"We continue to focus on reducing cost, and we are pleased with our progress," said Mike Shawcross, Newport News' vice president, CVN 79 carrier construction. "The incorporation of lessons learned from CVN 78 on to CVN 79—and major build strategy changes to construct the ship a different way—are having a significant impact on our construction efficiencies, just as we anticipated they would."

Like Ford, Kennedy is being built using modular construction, a process where smaller sections of the ship are welded together to form larger structural units (called "superlifts"). Equipment is then installed, and the large superlifts are lifted into the dry dock using the company's 1,050-metric ton gantry crane.

Kennedy is on track to be completed with 445 lifts, which is 51 fewer than Ford and 149 less than USS George H.W. Bush (CVN 77), the last Nimitz-class carrier. "Fewer lifts to the dock means we're building larger superlifts with more outfitting installed prior to erecting the sections in dock," said Mike Butler, Newport News' Kennedy construction program director. "This translates to man-hour savings because the work is being accomplished off the ship in a more efficient work environment."

Close to 90 lifts have been placed in the dock and joined together since the ship's keel was laid in August 2015. Kennedy is scheduled to be launched in 2020 and deliver to the Navy in 2022, when it will replace USS Nimitz (CVN 68).

For more information, visit [www.huntingtoningalls.com](http://www.huntingtoningalls.com).

**Lockheed Martin conducts first underwater UAV launch from AUV**

Lockheed Martin successfully launched Vector Hawk, a small UAV, on command from the Marlin MK2 AUV during a cross-domain command and control event hosted by the U.S. Navy. In addition to Marlin and Vector Hawk, the Submaran, a USV developed by Ocean Aero, provided surface reconnaissance and surveillance.

During the Annual Navy Technology Exercise (ANTX) activities in August, the Submaran relayed instructions to Marlin from a ground control station via underwater acoustic communications. Following these instructions, the Marlin launched the Vector Hawk using a specially designed canister from the surface of the Narragansett Bay. Following launch, Vector Hawk successfully assumed a mission flight track. All three autonomous vehicles—Marlin, Submaran and Vector Hawk—communicated operational status to the ground control station to maintain situational awareness and provide a means to command and control all assets.

Lockheed Martin's Vector Hawk is designed for canister or hand-launch in all-weather maritime environments to provide customers with an organic, tailored intelligence, surveillance, and reconnaissance (ISR) capability at the moment they need it.

Marlin MK2 is a battery-powered, fully autonomous underwater vehicle that is 10 ft long with a 250 pound payload capacity, 18 to 24 hr endurance, depth rating of 1,000 ft and weighs approximately 2,000 pounds. Its open architecture design and modularity allow new mission packages to be quickly integrated into Marlin to meet emerging customer needs.

For more information, visit [www.lockheedmartin.com](http://www.lockheedmartin.com).

**Eastern Shipbuilding to build USCG cutters**

After conducting a thorough evaluation of proposals submitted by competing shipyards, the U.S. Coast Guard has awarded the largest vessel procurement contract in Coast Guard history to Eastern Shipbuilding Group in Panama City, Florida. Eastern Shipbuilding Group was selected to finalize its design and construct the first series of nine Offshore Patrol Cutters to replace the Medium Endurance Cutters currently in service.

The contract is initially for nine vessels with options for two additional vessels. The Coast Guard program goal is to build 25 Offshore Patrol Cutters having a potential total con-

tract value in excess of \$10 billion. Initially, Eastern has been awarded the detail design effort with a value of approximately \$110 million. Construction of the first vessel is expected to commence in 2018.

The Coast Guard's Program of Record calls for procuring a total of 25 Offshore Patrol Cutters as replacements for the 29 Medium Endurance Cutters currently in service. Eight shipbuilders originally provided draft designs for the cutters. The Coast Guard down selected to five shipbuilders to refine designs. In 2014, the U.S. Coast Guard awarded firm fixed-price contracts to three shipyards to develop preliminary and contract design proposals for the project.

For more information, visit [www.easternshipbuilding.com](http://www.easternshipbuilding.com).

#### **General Dynamics AUV launches micro-underwater vehicle**

The General Dynamics Bluefin-21 AUV successfully launched multiple Bluefin SandShark™ micro-autonomous underwater vehicles (M-AUVs) as part of several capability demonstrations at the U.S. Navy sponsored 2016 Annual Naval Technology Exercises (ANTX) in Newport, Rhode Island.

Through several ANTX demonstrations, the Bluefin SandShark M-AUVs surfaced and functioned independent of the heavyweight-class Bluefin-21. In one mission scenario, the Bluefin-21 simulated data collection and transfer of target imagery and other information to two Bluefin SandSharks. Those Bluefin SandSharks then surfaced to communicate with a Blackwing unmanned aerial vehicle. The Blackwing relayed the information back to a submarine combat control system ashore for decision-making authority and subsequent command of Bluefin SandShark M-AUVs.

In a separate demonstration during the ANTX exercise, the Bluefin-21 hosted acoustic sensors from industry and academia.

The Bluefin-21 AUV is modular and designed with the flexibility to carry and launch a variety of AUVs in configurations that include M-AUVs, larger AUVs, and unmanned aerial vehicles. A Bluefin-21 can be reconfigured for multiple missions with varying payloads including intelligence, surveillance and reconnaissance sensors and communications nodes to expand maritime network communications. For example, the Bluefin-21 AUV is the base vehicle for

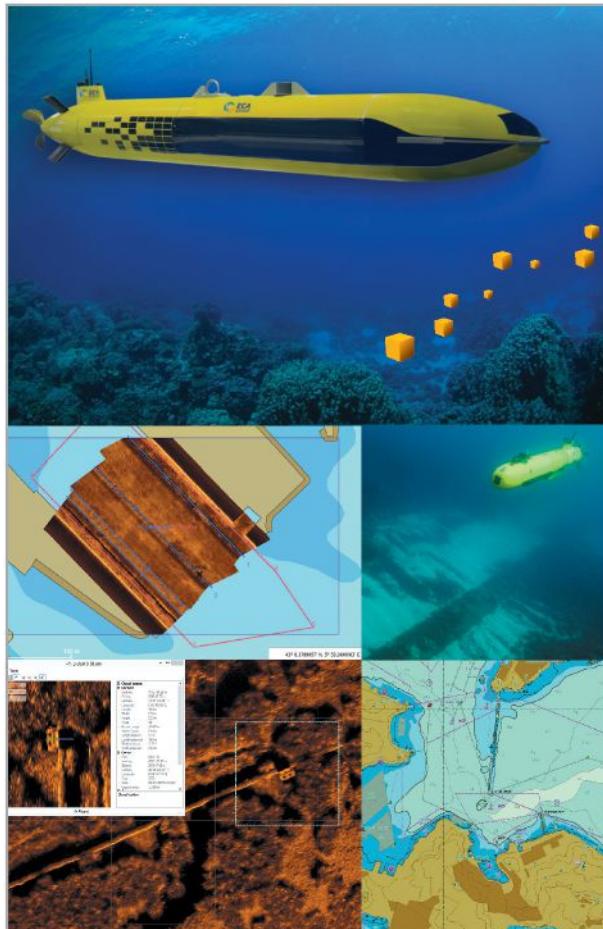


the Navy's Knifefish program, a surface mine countermeasure unmanned underwater vehicle.

The Bluefin SandShark M-AUV weighs approximately 15 pounds without sensors and its potential missions include intelligence, surveillance and reconnaissance, mine countermeasures, seafloor mapping and imaging.

Sponsored by the Naval Undersea Warfare Center, Newport Division, 2016 ANTX is a forum for industry to join with academia and Navy laboratories to demonstrate new technologies that will accelerate technology from development to in-water testing to fielding the new capabilities for the Navy's fleet.

For more information, visit [www.gdmissionsystems.com](http://www.gdmissionsystems.com).



## **Autonomous inspection and survey by AUV**

- ECA Group, a leading company in underwater robotics for 40 years, has developed a wide range of autonomous vehicles for Navy, Hydrography, Oil & Gas and scientific applications. Their modular design and post-processing **TRITON IMAGING™** software, allow to meet customers' needs by creating cost effective solutions, from shallow water up to deep water, for:
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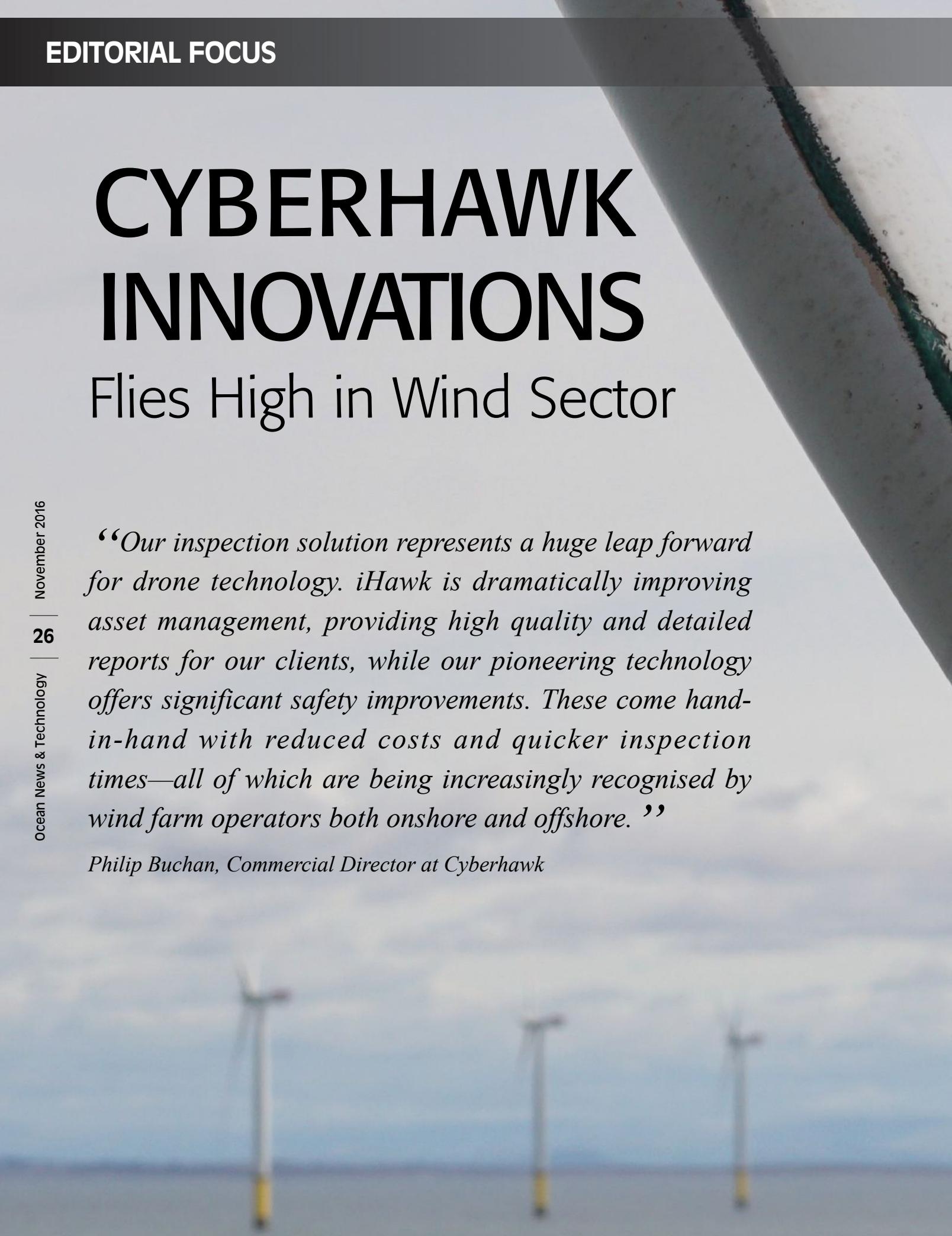
[www.ecagroup.com](http://www.ecagroup.com)

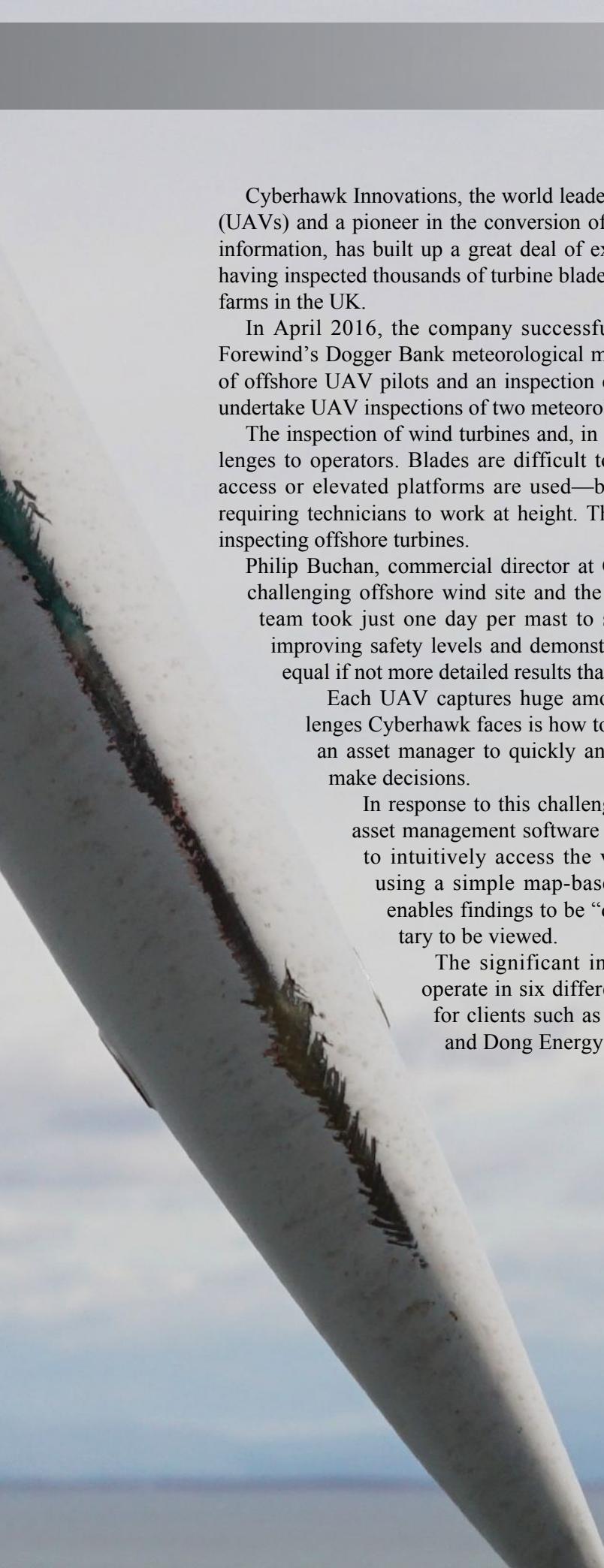
# CYBERHAWK INNOVATIONS

## Flies High in Wind Sector

*“Our inspection solution represents a huge leap forward for drone technology. iHawk is dramatically improving asset management, providing high quality and detailed reports for our clients, while our pioneering technology offers significant safety improvements. These come hand-in-hand with reduced costs and quicker inspection times—all of which are being increasingly recognised by wind farm operators both onshore and offshore. ”*

*Philip Buchan, Commercial Director at Cyberhawk*





Cyberhawk Innovations, the world leader in aerial inspection using Unmanned Aerial Vehicles (UAVs) and a pioneer in the conversion of drone-captured data into powerful asset management information, has built up a great deal of experience in the wind sector over the last three years, having inspected thousands of turbine blades and numerous meteorological masts at offshore wind farms in the UK.

In April 2016, the company successfully completed a close visual inspection project on Forewind's Dogger Bank meteorological masts using UAVs. The project saw a Cyberhawk team of offshore UAV pilots and an inspection engineer mobilise to the Round 3 development site to undertake UAV inspections of two meteorological masts.

The inspection of wind turbines and, in particular, wind turbine blades brings significant challenges to operators. Blades are difficult to access, so traditional access methods such as rope access or elevated platforms are used—but these techniques are costly and time consuming, requiring technicians to work at height. These problems are only emphasised when it comes to inspecting offshore turbines.

Philip Buchan, commercial director at Cyberhawk, explains: "Dogger Bank is a particularly challenging offshore wind site and the furthest offshore wind project from UK shores. Our team took just one day per mast to successfully complete the inspections, significantly improving safety levels and demonstrating that professionally operated UAVs can capture equal if not more detailed results than personnel would be able to achieve."

Each UAV captures huge amounts of photographic data. One of the biggest challenges Cyberhawk faces is how to deliver this huge volume of data in a way that allows an asset manager to quickly and easily understand the condition of their assets and make decisions.

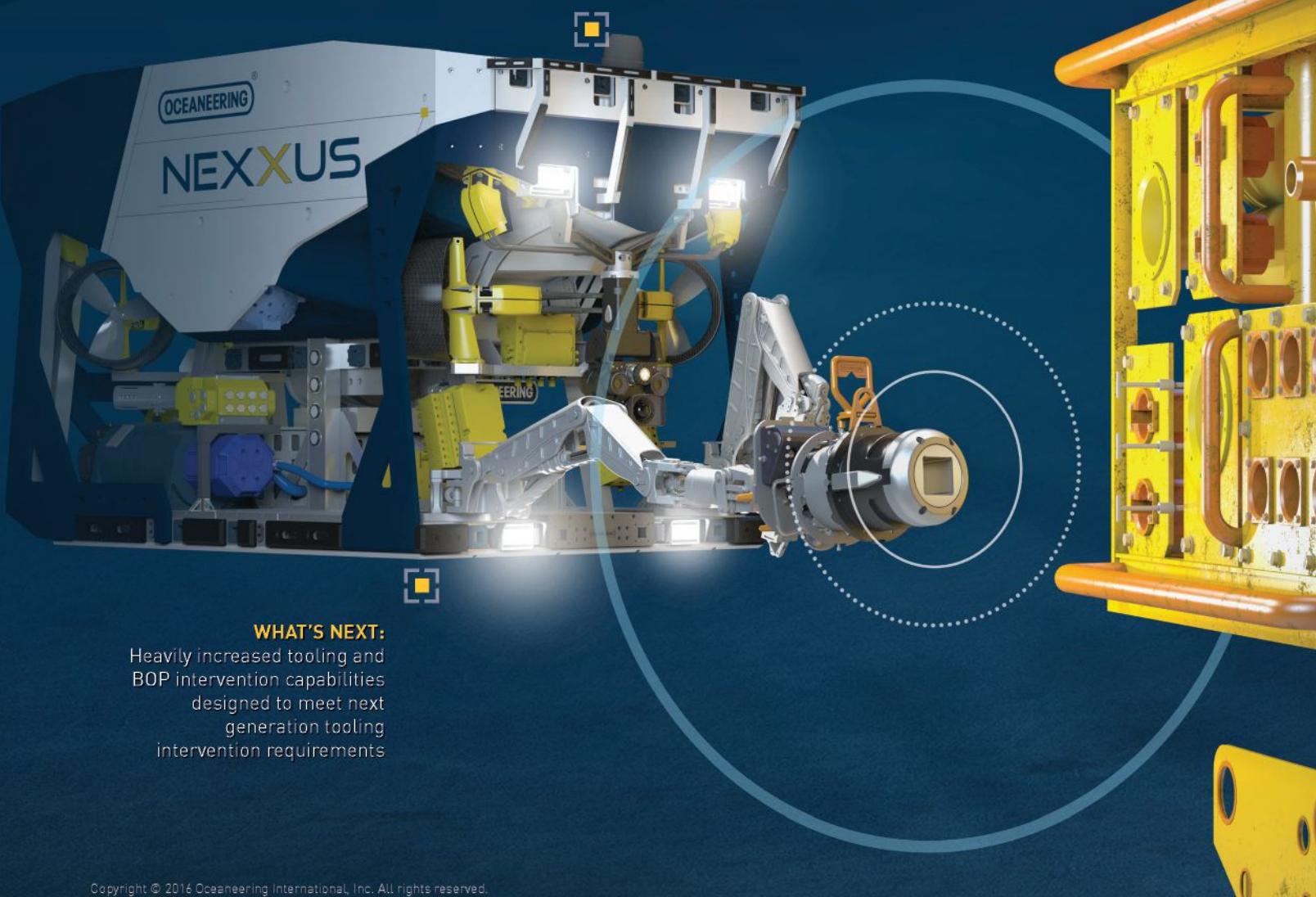
In response to this challenge, Cyberhawk has developed a browser-based visual asset management software called iHawk. The cloud-based software allows users to intuitively access the valuable inspection information captured by UAVs using a simple map-based interface and clear traffic light asset status that enables findings to be "drilled into" and high-definition images and commentary to be viewed.

The significant increase in renewable projects has seen Cyberhawk operate in six different countries throughout Europe, completing projects for clients such as SSE, RWE, Engie, Siemens, Vestas, EDPR, Repsol, and Dong Energy.

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# OFFSHORE INDUSTRY

## Athena decommissioning works – DOF Subsea wins key contract



DOF Subsea, a leading provider of integrated subsea services, has been awarded a contract by Ithaca Energy for phase 1 of the decommissioning of the Ithaca Operated Athena Field in the UK North Sea. The scope of work includes removing the subsea water column infrastructure that has been used on the field.

The contract involves the removal of mid-water arch and risers, and secures utilisation of several DOF Subsea vessels, capable of undertaking both moorings and construction work, operating in the Atlantic region during Q4 2016 and will utilise vessels from DOF Subsea's state-of-the-art fleet. DOF Subsea UK has extensive fleet capability and unrivalled access to the vessels.

DOF Subsea has steadily built its track record in decommissioning projects in both the UK and Norwegian sectors. In recent years the company has seen activity increase with the growing focus in the North Sea.

UK managing director, Robert Gillespie, said "This is a very important project for us. Conditions in the industry are challenging, but the North Sea decommissioning sector is active and we are well positioned to deliver in this market. We have completed several decommissioning projects in recent years, and we are looking forward to working with Ithaca Energy on this scope."

"Project management and engineering are established strengths at DOF Subsea, enabling us to provide a full decommissioning service to a high standard. In everything we undertake, our teams are dedicated to efficient and safe operations, consistently delivering the best results for our clients."

Athena is located in UK Continental Shelf block 14/18B in the central North Sea (Outer Moray Firth area) at a water depth of 130 m. Ithaca ceased production from the Athena field in January 2016, with the FPSO departing the field in February 2016.

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### NOC launches new collaborative platform for oil and gas industry

The National Oceanography Centre (NOC) has launched a new collaborative way of working with the oil and gas industry. NOC will provide innovative science and technology to enable industry to work safely and efficiently, with minimum impact on the marine environment

The launch comes off the back of many years of working with the industry on both an individual and collaborative basis, to develop science and technology to enhance competitive advantage, maximise investment and reduce operational costs during exploration, production and decommissioning.

NOC has unique expertise in marine autonomous and robotic systems and sensors, for operations in challenging, hazardous and deep-sea environments. NOC's fleet of autonomous underwater vehicles, remotely operated vehicles, unmanned surface vehicles and submarine gliders have all been developed to operate in extreme conditions. NOC's science teams have had many years of experience in testing and demonstrating the capabilities of our autonomous platforms and sensors, in such hazardous environments.

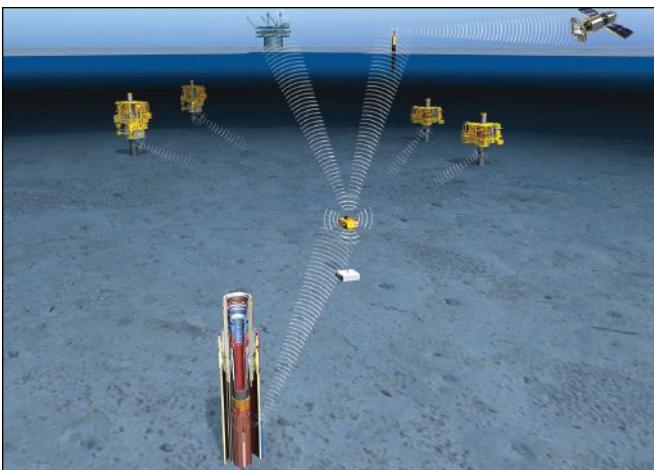
NOC associate director, innovation and enterprise, Kevin Forshaw commented, "Building on our existing relationships, we are hoping that this offer will encourage more oil and gas companies to develop long-term relationships with us, as we believe there are benefits to be gained on both sides. With the many challenges facing the industry, companies are recognising the value of novel science and technology to create real business value. By accessing external funding opportunities and joint-industry funding, companies are benefiting from responsive and flexible innovations to drive down operational costs, maximise existing investments, access and share innovation expertise, and respond to government fiscal and environmental regulations."

The collaboration package is an annual subscription that includes access to efficient, authoritative and rigorous science research services, responsive to the industry's needs, expert interpretation of valuable data-sets, access to software and data products and alerts for public funding opportunities. Collaborators will also have Associate Membership of the NOC's Marine Robotics Innovation Centre.

# OFFSHORE INDUSTRY HEADLINES

Research & Development • Environmental Assessment • Discovery

## FMC Technologies installs Annulus Monitoring System for drilling operations in Malaysia



FMC Technologies announced that it has installed and tested its Annulus Monitoring System (AMS) in an offshore well in Malaysia owned by PETRONAS.

A winner of the 2015 Offshore Technology Conference Spotlight on New Technology award, FMC Technologies' AMS is a wireless communication system that provides crucial, independent condition-monitoring within a subsea wellhead to operators from the onset of drilling and throughout the life of the well. The AMS delivers actionable information to the operator about annular fluid and components during critical phases of well installation and startup when well conditions are most unpredictable.

The system provides real-time data collection and feedback, which would allow operators to complete their drilling and abandonment operations ahead of schedule.

"We are proud of the success of the AMS during this project with PETRONAS. Our Annulus Monitoring System will save rig time and lower operator cost—not only during initial drilling, but also during abandonment operations," said Bernard McCoy, Jr., director of subsea drilling services for FMC Technologies.

## Trelleborg bears weight of largest ever offshore facility



Trelleborg's engineered products operation has supplied a selection of bearing solutions for the world's first floating liquefied natural gas (FLNG) project—Shell's Prelude FLNG.

Trelleborg has manufactured and delivered 52 vertical elastomeric bearings and 156 horizontal bearings for use on

the 13 modules on board the facility, as well as 40 turret bogey bearings to enable natural movements of the turret.

Responsible for procuring bearings for the topside modules, Byoung-Gark Park, topside structural engineer for Samsung Heavy Industries, said: "Many of Prelude's topside modules weigh as much as a single typical offshore platform. In fact, along with its contents, Prelude is expected to weigh a total of 600,000 tons. So, optimum quality and performance of the bearings used to secure each module is vital. We have worked closely with Trelleborg previously and are very confident in their ability to manufacture first class bearings. We were keen to involve their expertise on this prestigious project, too."

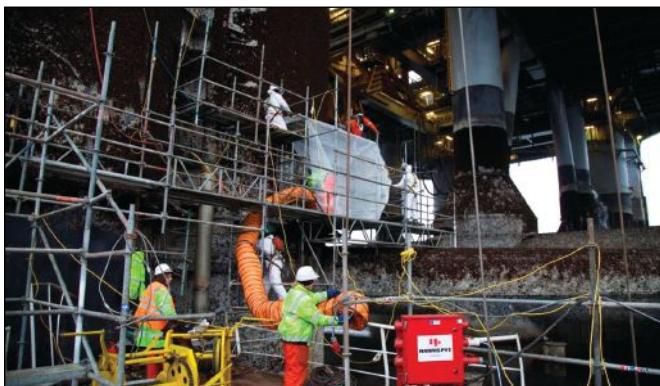
Trelleborg's elastomeric bearings are steel plate laminated and installed between the hull of the facility and its modules. They accommodate axial, shear and rotational movement to keep the modules safe from impact, damage and deformation. Similarly, they prevent the concentration of excessive strains and stresses around the mounting points of the modules and the hull caused by adverse sea and weather conditions.

JP Chia, engineering manager for Trelleborg's engineered products operation, says: "We design and manufacture all of our elastomeric bearings specifically for their application, to ensure that they always perform exactly as required. This approach was especially important for the Prelude topside to guarantee that the record-breaking weight could easily be supported over its life. We are very proud to have been selected to supply such a landmark project."

All of Trelleborg's bearings are tested by its engineering team. They check the design for specified loads and deformations and the fatigue performance by means of crack growth analysis calculations. Additionally, they examine wave action and the resulting multi-directional loads between a facility's hull and topside modules. After production they are a 100% individually tested according a specified test procedure.

For more information about Trelleborg's engineered products operation or any of its products and solutions, please visit the Trelleborg Engineered Products website.

## Harris Pye successfully completes repair projects during demobilisation of Ocean Endeavor



The Harris Pye Engineering Group has successfully completed repair works during the two-stage multi-million dollar Diamond Offshore demobilisation project for their semi-sub rig Ocean Endeavor from the Black Sea, which completed its contract in January 2016.

The initial phase of the repair work, which started in December 2015 while the rig was offshore Constanta, Romania involved cleaning of mud, brine, base oil and skimmer tanks. Steel repairs were carried out on a main column blister. The removal of three Seatrax crane pedestals, which included the supply and installation of internal steel stiffening to the pedestals, guides and jacking points, plus handling trun-

nions, were all required prior to cold cutting of the pedestal, which coincided with the arrival of the heavy lift crane to remove them.

Additional work awarded to Harris Pye in Romania was blasting and painting of four primary column ballast tanks. During the surface preparation, steel renewal was added to the project - steel frames, piping, access trunks etc, out of which approximately 24 tons of steel work was completed in Constanta. The blasting of all four tanks back to white metal was completed, two tanks received a first coat of paint and two tanks were fully coated before Ocean Endeavor departed from Romania to Fincantieri Shipyard in Palermo, Italy via a pre-booked scheduled heavy lift vessel.

"The project was not without its challenges, but we relish those," explains Harris Pye's chief technical officer, Chris David. "Painting and blasting of the four ballast tanks had to be performed within a one month period. An additional 40 tonnes of steel was required to ensure the work on the tanks was completed within the required timeframe; this had to be brought in from other parts of Europe."

"Additionally, a mobile diesel high vacuum grit recovery system was shipped from the UK, due to the large distances involved from the ballast tanks to the recovery system onshore for the purpose of disposal."

"All labour was from the local market, with equipment and materials coming from mainland Europe and the UK. Support to the on-site project team was provided by our workshop in Llandow, Wales which undertook any pre-fabrication required, with Harris Pye UK (HPUK) stores (tools and equipment) and the HPUK purchasing department utilising local suppliers where possible and outsourcing further afield into mainland

Europe for items not available locally, to ensure work was able to continue accordingly."

"Once Ocean Endeavor reached Palermo, the Harris Pye repair team mobilised to work on the remaining steel repairs, and painting of the ballast tanks, including an additional contract to repair a section of column diagonal brace. All works were completed on schedule."

"The 6-month long project enabled us to use specialist equipment including a 40 cu. m per minute high pressure oil free compressor (no oil fumes in the compressed air), which worked 24/7, and Falch 2500 bar hydro blasting equipment."

"The Harris Pye project team had a very methodical and professional approach to all the projects awarded to them," stated Diamond Offshore project manager Dhaval Mehta. "All projects were completed in a timely manner to the satisfaction of Diamond Offshore's stringent standards, Class and Statutory rule requirements."

"The project team worked very well with all the other vendors involved and was accommodating with certain last minute changes, without impacting on the end results of the project. The entire Harris Pye site team was well focused on customer satisfaction while keeping safety as the primary focus during the entire project. They also actively participated in Diamond Offshore safety meetings and provided valuable input. A job very well done by the entire HP team involved with the Ocean Endeavor demobilisation project."

Harris Pye has supported Diamond Offshore on several projects in the past and continues to do so to date in order to build on the existing strong business relations between the two companies.

Further information on Harris Pye is available at [www.harrispye.com](http://www.harrispye.com).

## "Fishers make the most powerful and ruggedly constructed underwater metal detectors you can own"

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## Nexen and PlanSea collaborate on efficiency and cost reduction



Nexen uses optimisation and scheduling technology to realise significant costs savings in marine logistics.

Ground-breaking optimisation and efficiency technology for offshore marine support operations has been developed for the oil and gas industry.

The innovative software, which has been developed by PlanSea Ltd., a spin out company from Robert Gordon University (RGU), has been applied by Nexen to remove significant cost from its North Sea operations.

Working with PlanSea, Nexen was able to simulate 65 weeks of its full North Sea marine operations using different schedules and combinations of its platform supply vessel (PSV) fleet. The results showed that significant reductions in fleet size and improvements in vessel utilisation

could be achieved by re-organising its operations.

Nexen's managing director UK and SVP Europe, Ray Riddoch, is delighted with the progress Nexen has made. He said: "In order to live at a low oil price, operators need to make a step change in eliminating waste in the supply chain and this requires a step change in thinking about new modes of operation. Through working with PlanSea, we have been able to enhance vessel utilisation and so reduce our North Sea PSV fleet from four vessels to two, resulting in a 2016 saving of some £6.5 million."

Prof. John McCall of RGU whose expert team at the university developed the system, explained: "Our system uses advanced algorithms to optimise vessel utilisation while still meeting all operational objectives. We have spent several years working with industry partners to model supply vessel operations so that we can be confident we have captured all of the constraints and delays that make offshore logistics such a complex task."

PlanSea managing director, Jim Cargill, is optimistic about the potential for the newly proven technology. He said: "The ability to accurately identify feasible ways in which reduced fleets can operate and validate that in realistic simulation is a game changer. There is a tremendous opportunity for the industry to collaborate with shared PSV fleets, potentially taking 40% to 50% out of resource costs. In the North Sea that could mean continued viability for assets that are struggling to break even in the current environment. Looking forward to a recovery in price, the value of savings made now will increase - as activity rises the cost base will rise at a slower rate as efficient fleet sizing is maintained."

Stephen Marcos Jones, business excellence director, Oil & Gas UK, was supportive of the initiative. He added: "Oil & Gas UK launched the Efficiency Task Force in September last year to drive forward efficiency improvement across the industry, as such we are delighted to see this collaboration by PlanSea and Nexen achieving these great results. Their work together shows how taking an innovative approach and harnessing technology can drive efficiency improvements and is another small step in the transformational change required by industry to ensure the sustainability of the UK Continental Shelf."

Margaret Copland, senior wells & technology manager, at the Oil & Gas Authority also welcomed the news. She said, "As Operators and the Supply Chain work hard to reduce costs there is a recognition that harnessing new technology to help collaboration and reduce costs is essential to allow the industry to prosper. Technologies such as digital have the potential to transform the industry and this example of utilising algorithms and machine learning to optimise vessel utilisation is part of that journey. The progress that Nexen and PlanSea have made in utilising software technology to make significant savings in offshore supply costs is therefore very encouraging."



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# COMPANY SPOTLIGHT

[www.okeanus.com](http://www.okeanus.com)

Okeanus Science & Technology, LLC (Okeanus), a Houma, LA-based marine and oceanographic equipment company founded in 2013, specializes in the rental and sale of equipment to customers engaged in a wide array of marine survey activities. Okeanus offers the latest technologies in positioning, hydrographic, met-ocean, water quality, ROV sediment collection, flotation, and launch and recovery equipment. Since its founding, Okeanus has become a leading provider of oceanographic rental equipment to the offshore Gulf of Mexico market.



*ECO 2000.*

In September 2016, Okeanus acquired Sound Ocean Systems, Inc. (Sound Ocean). Since 1978, Sound Ocean has designed and manufactured custom marine deck and underwater equipment. This acquisition gave Okeanus exclusive access to Sound Ocean's complete product catalog and a presence in the Pacific Northwest. The Sound Ocean product line includes its "ECO" winches that are all-electric winches ideally suited to permanent and temporary installation aboard small research vessels and vessels of opportunity. ECO winches are currently offered in two sizes, the ECO 500 and the ECO 2000, with a number of available options for each. While the ECO 500 can be ordered with either 1 or 2 HP drives, the ECO 2000 can be obtained in 5, 7.5, or 10 HP configurations (with custom designs accommodating much larger drives). Standard features include 100% duty cycle dynamic braking, automatic failsafe brake, variable speed control, local



controls with joystick and lighted E-stop button, powder-coated aluminum frame, along with stainless steel shafts, bearings, and hardware. Additional options include diamond screw levelwind with manual clutch assembly, wireless or wired remote control, line speed and payout display, line tension display, environmentally sealed slip ring with waterproof connector, grooved drum covers, and UNOLS package.

Okeanus also offers a range of A-frames, davits, and capstans that can be used with the winches or separately. They can be constructed of aluminum or steel and coated with marine grade paint. Other features that can be supplied with these items are stainless steel shafts, hardware and capstan drums. Optional equipment includes over-boarding sheave, ROV or towed body docking head, A-frame mounting of winches or capstans, separate control valve stand, and hydraulic power unit.



*A-frames, capstans, & davits (Photo courtesy of Willard Marine Inc.).*

From its facilities in Houma, LA and Redmond, WA, Okeanus provides customers the opportunity to rent or purchase equipment needed to support both domestic and international projects.



Early in 2017, Okeanus will also launch [www.seacatalog.com](http://www.seacatalog.com), its new online marketplace where it will offer a broad line of products used by marine survey professionals. Visit our website to get updates on how to buy, sell or rent through [www.seacatalog.com](http://www.seacatalog.com).

### ExxonMobil launches Mobil Serv<sup>SM</sup> Lubricant Analysis to the oil and gas sector

- Oil analysis programme helps to maximise productivity and reduce maintenance costs through minimizing unscheduled downtime and extended oil drain intervals.
- New features include mobile app, scan-and-go technology and flexible analysis capabilities.
- Customers can manage all oil analysis activities from their mobile, tablet or desktop.

ExxonMobil has launched Mobil Serv<sup>SM</sup> Lubricant Analysis, a new mobile-enabled used oil analysis service. The service has been developed with a focus on the oil and gas exploration and production industry to help identify equipment issues before they happen and avoid unscheduled equipment maintenance.

In the oil and gas sector, unscheduled downtime of critical applications can bring an entire operation to a stand-still. Mobil Serv Lubricant Analysis, which replaces ExxonMobil's Signum<sup>SM</sup> Oil Analysis, can play a vital role in helping engineers to avoid unscheduled downtime and to maintain a reliable operation. When monitored regularly, the used oil analysis programme helps to enhance equipment reliability and lubricant consumption. It can also help to extend oil drain intervals, which can help to reduce operational costs and improve safety by minimising intervention with machinery.

Designed to streamline the entire used oil analysis process from initial sample gathering to final reporting, the service leverages scan-and-go technology with QR Codes so customers can easily deliver used oil samples to ExxonMobil's oil analysis laboratory. Customers can then access results and customised equipment recommendations on mobile or tablet devices using a cloud-based app and share it with any other parties, as needed. This benefit is particularly critical for the remote locations typical of oil and gas sites, ensuring that on-site engineers, no matter where they are operating from, have full access to their accounts.

While the new services package eliminates labels and paperwork and facilitates real-time communication of sampling scheduling and results, customers will still be able to manage and assess their reporting manually. In addition to the new, user-friendly interface, the system also offers improved response time—all to help operators protect their equipment and business.

"Taking into account the significant capital expenditure required for oil and gas operations, site managers can't afford to not invest in leading oil condition monitoring technology," said Ayman Ali, ExxonMobil's industrial marketing adviser for Europe, Africa and the Middle East. "The launch of this new service builds on ExxonMobil's long tradition of providing innovative oil analysis services to companies around the world, enabling them to extend oil drain intervals and, in turn, benefit from reduced maintenance costs and improved efficiency."

The used oil analysis programme offers an extensive analysis allowing customers to track productivity and spot typical anomalies. With 25 testing options available, users are able to pick and choose the right test package for their operation.

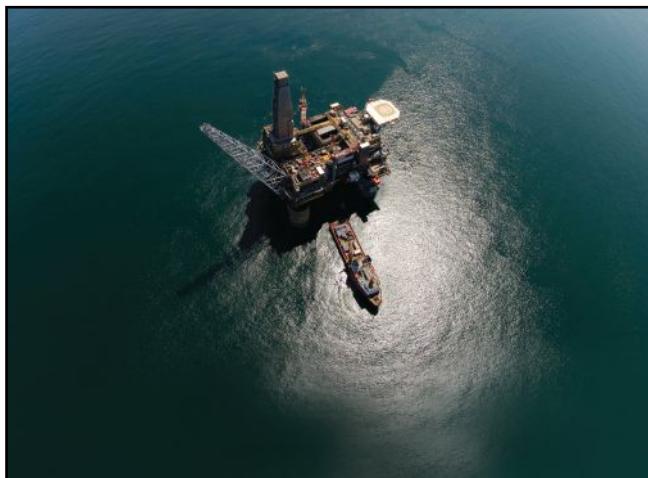
The new service is available now and customers previously registered to Signum will have automatically migrated to the new programme, along with their analysis history.

Mobil Serv Lubricant Analysis is a new addition to the Mobil Serv family, ExxonMobil's new lubricants services brand launched in late 2015.

For more than 100 years, ExxonMobil has delivered an extensive range of leading technical services to help customers optimise their maintenance programs and enhance equipment performance, and it has now brought all these services together under one brand to help deliver these services even more efficiently.

To find out more about Mobil Serv Lubricant Analysis or to join the programme, please visit [mobilserv.mobil.com](http://mobilserv.mobil.com).

## Could becoming creatures of habit help stabilize the oil and gas industry?



*By Luca Passaleva, Oil & Gas Commercial Director, GE's Marine Solutions.*

As human beings, we are creatures of habit. We quickly adapt to routines and like things a certain way, ordering our favourite dish off the menu to avoid disappointment, for example.

The same can perhaps be said of the oil and gas industry. We know this is a cyclical industry with peaks and troughs. For the past two years, we have been stuck in the trough part of the cycle, as oil prices have gone through a period of volatility. Still, at every level of an organization, we all need to focus on what we can control. Only then can we navigate through this challenging time and emerge stronger. As an industry, we need to increase efficiency while maintaining safety and keeping costs under control.

### The current state of play of industry regulation

Great steps have been made through advances in technology and the introduction of digital industrial solutions, however the potential to improve productivity further remains vast.

One challenge that equipment manufacturers face in the oil and gas industry is the differing engineering standards and product specifications of end users. Each operator on the market has its own customized standards by which it works.

Embracing manufacturing standardization, particularly during a down-cycle period—such as the one we're in now—would lead to higher-quality products, better productivity, increased reliability, shorter delivery time and most importantly, lower costs.

A lack of industry-wide standardization means that a large amount of time and money is spent tailoring solutions to each customer's specific requirements. For example, the aviation industry has benefited heavily from industry-wide standardization—it is regulated in such a way that all manufacturers must comply with centralized FAA standards. This means that when an aircraft manufacturer purchases an engine, they know they're getting a product that meets industry-wide regulations.

### Simplifying and standardizing the oil and gas industry

Operators, OEMs and partners are looking at new ways to achieve a unified goal—keeping costs under control, mitigating risks and injecting speed and efficiency in the industry for

the long term. From innovative commercial models to closer partnerships and new collaborative frameworks from the early stages of a project life cycle, there is a lot going on in this sector.

Designing and implementing manufacturing standards would further benefit both end users and providers alike, bringing a number of advantages:

- Enhanced operational excellence—manufacturers would have a part to play in the safety, production and usage of products, making for a more streamlined operation, with the common aim of operational excellence.

- Consistency and repeatability—the largest cost reduction opportunities exist where we can make strategic inputs, reusing parts and redefining standards and designs to build business relevance, flexibility and agility. Strategic inputs are where we deliver real value and leverage collaboration to make fundamental process changes.

- Shorter production cycle and on-time delivery—standardization would mean that productivity gains, therefore enabling operators and suppliers working to more accurate timeframe for delivery and installations. Standardization would drive further collaboration, support and build better relationships between operators and suppliers.

The low oil price environment has put pressure on the industry to drive down cost. Now is the time for the industry to come together, agree on standards and simplify the way we work. If that were to happen, we could all benefit during a future upturn in the oil price.

If you wish to continue this conversation, please visit the online community Tech Talks.

#### **Modifications or operational limitations for a limited number of rigs**

Following the accident involving COSLInnovator on 30 December 2015, some 100 semi-submersible rigs approved by DNV GL will be reviewed. Preliminary assessments indicate that a limited number of rigs will be subjected to modifications or operational limitations.

The semi-submersible rig COSLInnovator was drilling for Statoil in the Troll field when it was hit by a large, steep wave. Several windows on the rig's two lower decks were shattered. One person was killed.

"Since the incident, we have made great efforts to identify what happened, understand how this could happen and, most importantly, implement actions to prevent similar incidents from occurring again," says Ernst Meyer, DNV

GL director for offshore classification. "We have been working with rig owners, designers, operators and authorities towards a common goal: to ensure the safety of all those working on board the rigs."

#### **COSLInnovator**

The incident investigation report presented by the Norwegian Petroleum Safety Authority in April 2016 concluded that the incident involving

COSLInnovator has provided new knowledge that must be utilized in order to prevent similar incidents in the future. DNV GL therefore published a new technical guideline (OTG-13 – Prediction of air gap for column-stabilized units) as early as in June 2016. This gives a consistent and updated approach for calculating the air gap—the clearance between the highest wave crest and the bottom of the deck box in all relevant sea conditions.

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### Most rigs can operate as before

Recently, DNV GL asked all owners of DNV GL-classed semi-submersible rigs to provide updated documentation of each rig's air gap.

Rigs that, based on the new technical guideline (OTG-13), can confirm a positive air gap will be able to operate as before without reinforcement or operational limitations. This is expected to apply to most of the semi-submersible rigs operating on the Norwegian shelf.

"I can't indicate how many rigs have negative or positive air gaps before each rig's calculations have been performed," says Ernst Meyer.

"A limited number of rigs may not have a positive air gap, but most of these will be able to avoid changes. The prerequisite is that they are able to document a positive air gap for a specific location, or that they simply do not have windows that may be exposed to waves."

### Some rigs will need to remove windows

He elaborates on the consequences for the other rigs – those that are unable to prove a positive air gap in all sea conditions—including the hundred-year wave: "Initially (for the next winter), these rigs will be required to remove windows in exposed zones. If the strength calculations show that further structural modifications are necessary, such modifications will be required as part of the permanent solution."

"The most important thing is that the windows are removed before the coming winter. This action eliminates the largest risk elements if a similar incident occurs," Meyer explains. He emphasizes once again that operational limitations and limitations with regard to areas of operation may solve the air gap issue in the short term.

Rigs that are certified for worldwide operation must be documented according to North Atlantic wave data. Most rigs operate in milder areas, such as the North Sea, and can postpone modifications that may be necessary in the Norwegian Sea or Barents Sea.

DNV GL is the classification body that certifies the largest number of semi-submersible rigs, and these rigs operate under the most extreme weather conditions globally. The company works continuously to improve the class regulations used in certification work through future-oriented research and the thorough examination of and learning from incidents and accidents.

"The work behind the new guideline includes the use of updated statistical weather data and knowledge acquired from several independent model tests conducted in light of the COSLInnovator incident. We have also learned from previous-

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ly conducted model tests and from operational experience after 40 years classing hundreds of similar rig types," Ernst Meyer concludes.

For more information, visit [www.dnvg.com](http://www.dnvg.com).

#### **Zenith Energy awarded well project management contract with UK operator**

An Aberdeen-based well engineering and project management company has secured a significant contract to provide a third full well management service for an operator within the last twelve months.

Zenith Energy, which operates and manages projects on and offshore in the UK and internationally, has been awarded its additional contract with Europa Oil and Gas following its success with the onshore exploration well, Kiln Lane-1, last year.

Under the new contract, which is worth a six-figure sum, Zenith will be responsible for the provision of well construction and full project management services on Europa's upcoming Holmwood-1 exploration well on the PEDL143 licence in southern England.

The specialist well firm, which is located on Aberdeen's Bon-Accord Square, will execute all well planning, third-party contracting, rig contracting, well test planning and operations for the onshore well. Recently securing ISO 14001:2015, Zenith is the first well management firm to gain accreditation of the new ISO standard and will be utilising this Environment Management System on the Holmwood-1 project.

PEDL143 is located in the Weald Basin in southeast England where 14 oil and gas fields have been found over the last 30 years, resulting in the discovery of an estimated 50 million barrels.

Drilling operations on the Holmwood-1 are anticipated to commence in H1 of 2017, with Zenith planning to use its wealth of engineering experience, as well as knowledge from its previous Europa contract, to complete on time and within budget.

Managing director of Zenith Energy, Martin Booth, said: "Over the past two years, Zenith Energy has developed a strong relationship with Europa, having successfully drilled and completed their Kiln Lane well early last year, which was a first project management job for us.

"Since then, we have built on this relationship and will again utilise our experienced well engineering team, along with our familiarity and knowledge of Europa, to demonstrate our

ability to deliver superior performance."

CEO of Europa Oil and Gas, Hugh Mackay, said: "We have contracted Zenith for a second time to help us achieve the Holmwood well objectives for what is an extremely important well for Europa. The Holmwood prospect has potential mean gross unrisked prospective resources of 5.5 mmbo and is one of the largest undrilled con-

ventional prospects onshore UK. We look forward to working again with the experienced Zenith team."

Zenith Energy, with over 100 years of professional experience in the industry, is Aberdeen's leading independent well management company. Since the formation of the company in 2012, Zenith has been engaged by 24 clients and delivered more than 70 projects across three continents.

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## Cefas scientists complete world's first "on-demand" autonomous marine water sampling

In what is believed to be a world's first in the scientific community, Cefas (Centre for Environment, Fisheries and Aquaculture Science, UK) and Liquid Robotics®, USA have successfully deployed, tested and recovered a remotely piloted Wave Glider® which allowed scientists to measure water characteristics and selectively collect samples in near real-time.

The Wave Glider called "Lyra" was deployed in the southern North Sea about 60 km off Lincolnshire, UK coastline by RV Cefas Endeavour and spent 48 days at sea before being recovered successfully by Trinity House's vessel Alert, 20 mi off Lowestoft. Whilst deployed, the Wave Glider was remotely piloted 24/7 by the Liquid Robotics Operations Team from their California headquarters almost 9,000 km away and covered over 2,700 km at sea.

The integrated Cefas Water Sampler allowed scientists to collect 11 samples, on demand, over the duration of the mission by sending commands over the Iridium satellite network. This meant that samples could be collected in areas of particular interest, in contrast to the previous mission in which sampling was done at pre-set times regardless of the route taken.

This first test of the remote triggering of the Cefas Water Sampler has been a success. The area in which the Wave Glider operated successfully was extremely challenging for an autonomous surface vehicle. During the trip, "Lyra" picked up transmission of over 350 ships, was closely inspected by two oil/gas industry standby vessels and navigated through many of the southern North Sea gas fields/platforms. "Lyra" also had to navigate around many shallow sandbanks in the southern North Sea and cope with strong tidal currents off East Anglia on her way back to Lowestoft.

For more information, visit [www.cefas.co.uk](http://www.cefas.co.uk) or [www.liquid-robotics.com](http://www.liquid-robotics.com).

## New plug and play science bay module for Gavia AUVs

A global leader in the provision of low logistic AUVs, Teledyne Gavia announced the release of its new science bay module, further expanding the capabilities of the Gavia AUV.

The Gavia science bay module is a standard payload module that comes with several hull penetrations designed to accommodate a variety of scientific sensors. There are four penetrations that can accommodate WET Labs ECO pucks, two external wet plugs to provide power and serial communication for external devices, a slot for a SeaBird CTD, and an Aanderaa Optode oxygen sensor, and a weak link on the bottom for towing external sensors. The new sensor bay gives users added flexibility with multiple ports and plug and play connectivity. The unit can accommodate a number of standard sensors or can be used for custom sensor integration. Unused penetrations can be blinded.

The Gavia AUV is an autonomous sensor platform that is user configurable by the addition of one or more sensor, navigation, or battery modules. The modules are added or removed by means of a unique twist lock system. The Gavia is a fully low logistics modular system designed to be operated from vessels of opportunity and has the greatest depth rating of any vehicle in its class.

For more information, visit [www.teledynegavia.com](http://www.teledynegavia.com).



## Small Cougar eats big work task



Cutting off 194 grouting hoses from 97 structures in 24 days, DCN Diving deployed a compact version of a Saab Seaeye Cougar XT, measuring just 1.3 m x 0.78 m, for a work task typically undertaken by much larger systems - with considerable savings in costs.

The success of the project came from incorporating a tooling package created by DCN Diving into their Cougar XT Compact, a robotic system specially designed for handling strong currents around wind farms with its six thruster power and low profile structure.

Netherlands-based DCN's low-cost solution for removing the grouting hoses following installation of transition pieces on top of the mono-piles at the Godewind 1 & 2 Windfarms, came from combining a Seaeye hydraulic power pack with a miniBOOSTER and a TNT Rescue "Jaws of Life" hydraulic rescue cutter to create a uniquely powerful and effective system.

The task for the compact Cougar also included offloading 58 tons of the grouting hose into containers.

The result was a task completed on time, within budget, and to the full satisfaction of the customer, says Fred Bosman, ROV operations manager at DCN Diving who explained the technique used, "We first attached an hydraulic clamp on the upper part of the grouting hose, which was connected to both Cougar and vessel crane. Once the clamp was secured to the grouting hose the ROV was pulled back from the clamp so the hose was no longer connected to the ROV but only to the vessel crane."

"Our next step was to cut the hose as close as possible to the lower side of the hose, and the last highest cut just underneath the coupling. At this time the hose was no longer connected to the structure and the vessel crane recovered the hose to the deck where it was stored in an open-top container until off-loaded in port."

"Depending on how close we could position the cutter to the couplings, the remaining hose lengths were about 6m long and weighed about 300 kg each."

From the start, DCN Diving were confident they could creatively exploit the Cougar's technological architecture and windfarm-relevant design for their needs by harnessing the vehicle's exceptional power, precise control and low-profile design that minimises the effect of current and a small diameter tether that reduces the effect of drag - all of which enable the Cougar XT Compact to handle strong currents whilst undertaking a wide range of tasks.

For more information, visit [www.seaeye.com](http://www.seaeye.com).

## SMD wins contract for supply of Quasar MKII System

Shanghai Salvage Company (also known as China Offshore Engineering Shanghai, Co), a state-owned entity with a long history in diving and salvage has signed an order with SMD for a Quasar MKII 6,000 m ROV. Scheduled for delivery in the first half of 2017, the system will include a full suite of equipment suitable for both deep-sea salvage and oil and gas operations.

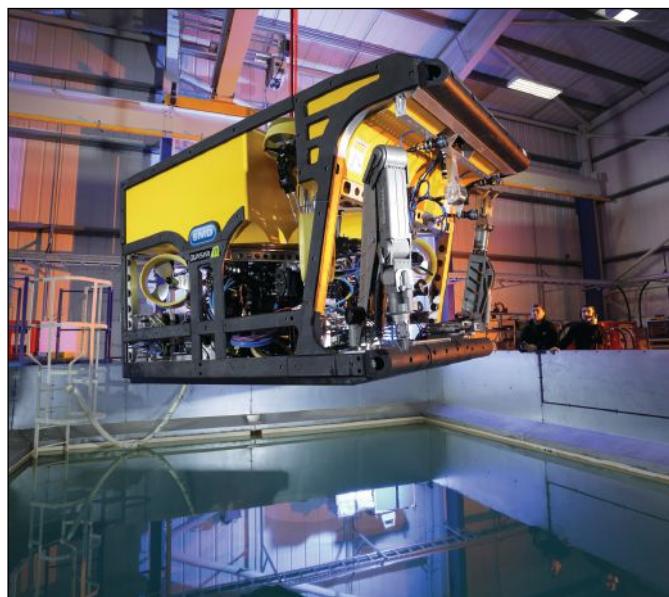
"We are delighted that Shanghai Salvage have chosen SMD as their ROV equipment supplier," said Mark Collins, managing director of SMD ROV Systems. "This system includes some new innovations in ROV modularity that will enable the client to operate across a wider range of markets, maximising revenue potential from their SMD asset. We believe that modular systems, which can be quickly optimised for a particular operation, will become important as clients continue to seek reductions in their operating costs. SMD's ability to offer innovative products coupled with a strong global service network will support Shanghai Salvage as they expand."

The ROV is a deep water version of SMD's standard Quasar which has an extensive track record across various industry sectors. It will be one of the most powerful and capable systems to operate down to 6,000 m.

Deck equipment for the project, which will be designed and manufactured by SMD, includes a dual use 3,000-m / 6,000-m winch and two cursor launch and recovery systems, one of which will be hanger mounted, the other mobile. The umbilical winches will be electrically driven with an axial fleeting configuration and active heave compensation and provide the ability for interchangeable drums to accommodate steel wire armoured and aramid umbilical.

SMD's deck equipment capability has been developed and refined over decades of experience. Leading the deck equipment business, Paul Hatchett explains "SMD has a long track record of designing and building more than four hundred systems with highly capable deck equipment for a broad range of subsea vehicle and cable handling applications. By holding this experience and capability within a dedicated unit in SMD we offer operators such as Shanghai Salvage a reliable and bespoke solution, which is seamlessly integrated with the subsea vehicle system."

For more information, visit [www.smd.co.uk](http://www.smd.co.uk).



## VideoRay adopts the Greensea system

Greensea, creator of OPENSEA™, the universal marine industry operating platform, has been selected by VideoRay as the software provider for the new Mission Specialist ROV. Greensea provides navigation, advanced autopilots, and automation for VideoRay's powerful new customizable vehicle.

The Mission Specialist's modular design maximizes efficiency and productivity by transforming to accommodate a wide selection of interchangeable ROV components. Initial configurations of the vehicle are available for cavitation, tunnel inspection, and destruction of explosive ordnance.



"Modularity allows a product to be adaptable while remaining robust," explains Greensea CEO, Ben Kinnaman. "A decade ago, we began building the OPENSEA operating platform with a modular design because we foresaw the need for flexible software to support the varied needs of the marine industry."

With modular hardware and software, the Mission Specialist delivers impressive performance. "I am extremely impressed with how easily and how well Greensea integrated their software with our new MSS architecture," said VideoRay VP of engineering, Andy Goldstein. "This is a big advance for ease of use and simplifying the operation of such a powerful platform—particularly the dialed-in performance of the automated control modes, such as auto heading and depth. We couldn't be more pleased to add Greensea to the arsenal of solutions we can offer to ensure the success of our customers' missions."

For more information, visit [www.greenseainc.com](http://www.greenseainc.com).

## Teledyne Marine continues to play a key role on-board OceanServer's Iver AUVs

Teledyne RD Instruments (TRDI) has received an order for an additional 10 Explorer Doppler Velocity Logs (DVLs) to provide precision navigation and current profiling capability on board OceanServer Technology's Iver3-580 Autonomous Underwater Vehicles (AUVs), bringing the total number of DVLs delivered to OceanServer to over 75. Teledyne RDI, OceanServer, and local representative OGI have worked in close cooperation since 2011 to develop and refine this custom navigation solution, which is now a key component on-board the increasingly popular AUV. Bob Anderson, president of OceanServer, explains: "The IVER AUV's stringent size, weight and power requirements can be a challenge for sensor companies to overcome, so we partner closely with our vendors to ensure optimal design and performance on-board our vehicles. The Teledyne Marine companies have been dedicated partners for several years; we've absolutely helped each other reach new levels of performance."

In addition to Teledyne RDI's DVL, OceanServer also relies on other Teledyne Marine products on board its AUVs. A popular option for underwater communications in the Iver3 system is the combination of the Benthos ATM-900-BC1 Acoustic Modem in the AUV paired with the Benthos ATM-916-BC1 for topside communications. The vehicles also include a variety of custom Teledyne Marine cables and interconnect solutions.

For more information, visit [www.teledynemarine.com](http://www.teledynemarine.com).

### SeaView Systems executes 10 km tunnel inspection

SeaView Systems, Inc., a leading provider of custom ROVs, underwater survey services and marine technologies, recently performed a comprehensive inspection of a 32,000 ft (10 km) long water intake tunnel operated by a regional water authority. The 43-year-old tunnel draws water from the Great Lakes to provide drinking water to several million residents.

"Getting complete video and sonar coverage of the full perimeter of a 16-ft diameter pipeline over a length of 10 km presented a unique challenge," said Geoff Cook, SeaView's operations manager. "Our design incorporated a set of booms that open in the tunnel, much like an umbrella, to position cameras evenly around the perimeter as well as capture energy from the flowing water to provide locomotion."

High-efficiency LED lighting, powered by SeaView's proprietary battery system, provided sufficient illumination to produce a high-quality video record of the entire length of the survey traverse.

A profiling sonar measures the internal surfaces of the tunnel including sediment depth. Using lithium ion battery technology and a SeaView-designed battery management system, the system was able to operate over the entire length of tunnel with an average survey speed of 40 ft/min. As with many previous surveys, SeaView compiled the resulting data using their proprietary 3DPipeWalk software package to present a unique and practical way to review the extensive data produced by the profiling sonar.

For more information, visit [www.seaviewsystems.com](http://www.seaviewsystems.com).



### OFG expands AUV capability

Building on OFG's strengths in deep water AUV operations and support services, OFG has invested in a 3,000 m-rated Hugin AUV. The AUV Chercheur is equipped with an unsurpassed sensor and software suite for extremely efficient inspection of pipelines and infrastructure, pipeline route studies, site geohazard surveys, environmental monitoring surveys, and other seafloor-based applications such as UXO, archeology, salvage, and minerals exploration.

Chercheur is equipped with state-of-the-art high-resolution interferometric synthetic aperture sonar (HiSAS), the latest in technology multibeam echosounder EM2040, a sub-bottom profiler, a comprehensive environmental geochemical sensing suite, a high-resolution still photography camera, and an OFG Self-Compensating Magnetometer (SCM) system. Chercheur is the most advanced subsea survey platform and comes complete with all ancillary sensors to guarantee precision navigation and positioning.

The combination of Chercheur's technology, OFG's experienced AUV operations team, and the expertise of our technology and commercial partners extends the possibility to unveil seafloor properties and characteristics to new levels of resolution and detection.

OFG offers with Chercheur its AUV services for very shallow water operations allowed by the advanced navigation and positioning systems and the efficient coverage of large areas by the HiSAS system even in shallow water. Detailed camera surveys are also possible in water depths ranging from 10 to 3,000 m with the EM2040-aided acoustic tracking and following capabilities.

The incredible high-resolution imagery produced by the HiSAS system gives offshore oil and gas companies the ability to build and maintain a precise GIS database of the positions and conditions of their seafloor assets, natural features, marine archeology inventories, UXOs and other features of interest such as plumes. Seafloor minerals exploration teams will also benefit greatly with regards to geological interpretation.

For more information, visit [www.oceanfloorgeophysics.com](http://www.oceanfloorgeophysics.com).

### Sonardyne delivers acoustic positioning simulator to Brazilian DPO training school

Equipment that simulates acoustic positioning operations on dynamically positioned (DP) rigs and ships has been supplied by Sonardyne Brasil Ltda. to vessel control and automation company, GE Power Conversion for their new

training school in Macaé.

The Sonardyne Marksman hardware and 6G Sim software will be used to provide student DP Officers (DPOs) with an understanding of the important role acoustic positioning has in assisting a vessel to remain in a specified location whilst underwater operations are being conducted.

The Sonardyne equipment now installed at GE's Macaé facility includes a Navigation PC running the Marksman LUSBL application, along with 6G Sim, a software application that simulates an array of transponders on seabed transmitting signals up to the surface. The system has been interfaced with GE's well-proven 'C' series DP desk to provide DP operators with an onshore training experience that is as realistic as possible to being offshore.

For more information, visit [www.sonardyne.com](http://www.sonardyne.com).

### Archaeologists dive into history

Many universities are adding or expanding their underwater archaeology program in an effort to give students a broader educational experience and a better understanding of our maritime history. The field of underwater archaeology is rapidly growing as more scientists and researchers learn to scuba dive and the equipment required for marine exploration becomes more affordable.

Long Beach City College in California is one of the many institutions involved in these efforts. They recently added the Maritime Archaeology, Science and Technology (MAST) program led by Dr. Laurel Harrison Breece. She is a member of the Registry of Professional Archaeologists and visiting professor at UCLA's Cotsen Institute of Archaeology. An accomplished diver, Breece earned degrees from UCLA from her work on the silver collection from the sunken city of Port Royal Jamaica and the Spanish colonization of Central America. She has worked on a number of high profile projects with husband and colleague Dr. Bill Breece. "I am very excited about the new program and the opportunity it will offer students to both work in marine archaeology and operate the equipment used in these projects." She chose JW Fishers Mfg. as the supplier for the needed equipment acquiring a sub bottom profiler, side scan sonar, magnetometer, underwater video system and metal detector. "I went with Fishers because we could get all of the gear from one source, and they offer free training."

For more information, visit [www.jwfishers.com](http://www.jwfishers.com).

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# MARITIME COMMUNICATIONS

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## Hemisphere GNSS and Carlson Software continue groundbreaking collaboration with new GNSS receiver

Geospatial industry leaders Hemisphere GNSS and Carlson Software recently collaborated to produce the Hemisphere S321 and Carlson BRx6, all-new, compact, state-of-the-art GNSS receivers that are perfectly tuned for the requirements and workflows of their customers' daily projects.

The two companies previously worked together on the design and production of Carlson's groundbreaking BRx5 GNSS receiver (Hemisphere S320), developed using Carlson's widely respected software and interface expertise with Hemisphere's design and manufacturing experience and RTK correction technology leadership.

The new S321 and BRx6 receivers are optimized for land surveying, construction fieldwork, and marine operations. Design and production of the new receiver focused on creating a lightweight and compact receiver with an intuitive interface and state-of-the-art access to multiple satellite constellations—including GPS, GLONASS, BeiDou, and Galileo. The receivers also incorporate world-class RTK and L-band corrections, including optimization for Hemisphere's subscription-based, *Atlas® GNSS Global Correction Service*.

The new receiver is based on Athena™, Hemisphere's RTK engine, and is designed from the ground up to efficiently process multiple constellations and *Atlas* correction signals, resulting in both high-accuracy and robust performance. "Detailed testing performed by Carlson shows that Athena is a world-class RTK engine," says Nicholas. Together with Hemisphere's BaseLink™ technology and a new webUI, the S321/BRx6 serves as a powerful rover or base station, even in locations where control points are not available.

Several features of the new receiver, including the new SureFix™ technology, were specifically designed to make surveyors more productive in the field or on construction sites. "In multi-path conditions, position reliability will often degrade," Nicholas explained. "Surveyors are aware of this, but it's hard to compensate for when they don't have information about what's happening with accuracy. SureFix uses proprietary algorithms and various inputs to give a reliable 'quality indicator' for particular points."

For more information, visit [www.HGNSS.com](http://www.HGNSS.com).

## SES launches global Maritime+ solution

SES S.A. announced the launch of its global SES Maritime+ service that will deliver high-speed connectivity to vessels traversing oceans.

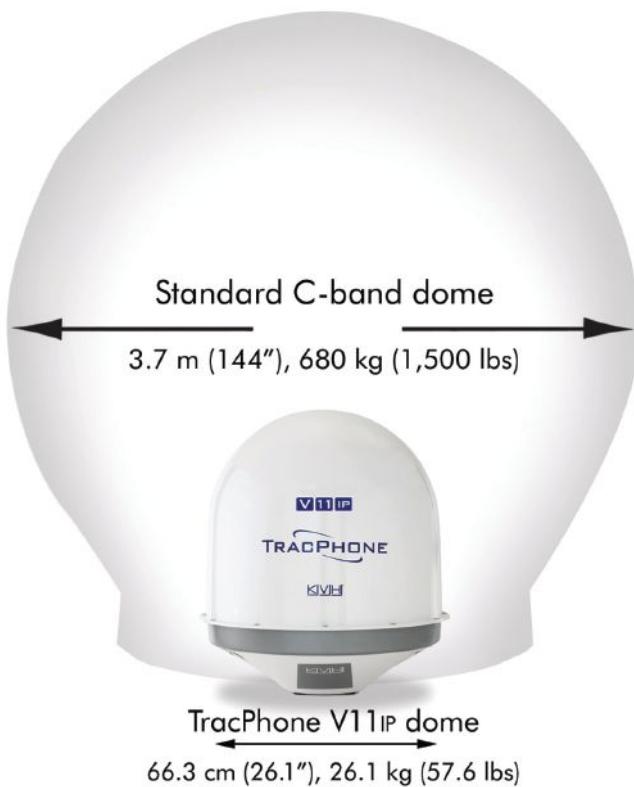
SES Maritime+ will enable maritime customers to have easy access to customizable bandwidth and coverage packages, ensuring satellite capacity is effectively utilized. Vessels traversing the oceans will be offered seamless roaming, leveraging SES's global fleet of over 50 satellites, an extensive ground infrastructure of over 20 teleports and more than 6,000 points of presence.

The managed connectivity service combines SES's global network infrastructure and hybrid satellite capacity with the latest technology from VT iDirect, enabling SES customers to deliver a complete platform solution to maritime users on a worldwide basis. Commercial benefits include customized service level agreements and scalable throughput options, with standardized pricing regardless of region or season of operation.

The global SES Maritime+ product is part of SES's enhanced data network, SES Plus, which is offering customized products and solutions to tackle the evolving needs of the mobility and enterprise markets. In March of this year, a regional Ka-band maritime+ offering was unveiled specifically to target Europe.

For more information, visit [www.ses.com](http://www.ses.com).

## Major commercial fleets committing to new KVH broadband airtime plans



KVH Industries, Inc., usage-based airtime plans now represent a majority of users on KVH's global satellite network, mini-VSAT Broadband, which continues to be the market share leader in maritime VSAT.1

In recent months, many of KVH's largest and most important fleet customers have chosen usage-based plans—including Open plans, the newest set of usage-based airtime plans offered by KVH:

- BW, one of the world's leading global maritime groups, reached agreement with KVH to switch from an unlimited airtime plan to KVH's Open plans for several LNG and LPG vessels that have TracPhone V11-IP systems on board.

- Seaspan, a leading independent owner, operator, and manager of containerships, opted for KVH's Open plans for global connectivity for 35 vessels, which have TracPhone V11-IP systems installed.

- SMIT Lamnalco, a major European maritime operator, selected and is currently conducting a field trial of KVH's mini-VSAT Broadband service with usage-based airtime plans for approximately 100 vessels. KVH's TracPhone V3-IP systems will be used on the vessels.

KVH's usage-based plans provide maritime customers with the fastest speeds on the network, regardless of how much data they have committed to on a monthly basis. This is in stark contrast to the standard practice in the maritime industry of offering speed-based plans, which deliver the fastest airtime speeds only to the customers buying the largest airtime packages.

A key reason that global fleets are selecting KVH's Open plans, which can be used with KVH's TracPhone V7-IP and TracPhone V11-IP, is the improved user experience

of having consistent broadband data speeds of 3 to 4 Mbps. With competing VSAT service providers, research has shown that broadband connection speeds for a vessel that typically uses 50 GB of data per month can average only 160 Kbps, not much faster than outdated dial-up connections.

For more information, visit [www.kvh.com](http://www.kvh.com).

#### **Tampnet to provide fiber-based 4G LTE services in GoM**

Tampnet Inc., the U.S. subsidiary of the Norwegian-based leading offshore high capacity and low latency communications provider Tampnet AS, recently announced the closing of its acquisition of Broadpoint LLC, a pioneer within offshore communications to the Oil & Gas industry in the Gulf of Mexico.

Through the acquisition of Broadpoint, Tampnet will upgrade and expand the current 2G network consisting of 55 base stations and provide GoM-wide 4G/LTE offshore coverage to the O&G industry in the region, its resellers and its roaming partners. All base stations will be connected to a low-latency, high capacity backhaul network.

Separately, BP owns and operates The Gulf of Mexico BP Fiber Optic Network (BP GoM Fiber), a 1,200 km subsea fiber cable system providing BP and other operator's production facilities with high speed data communications. The network runs from landing stations in Freeport, Texas to Pascagoula, Mississippi mostly through the deep waters of the GoM. From this backbone cable, fiber branch leg connections are installed to 4 BP platforms and 10 other platforms.

BP and Tampnet have signed an MoU that establishes the framework for Tampnet to utilize BP GoM Fiber capacity and host LTE base stations on BP-operated platforms. The MoU also allows Tampnet to engage other operators of platforms connected to GoM Fiber to also host their services. Tampnet will be the owner and operator of the LTE network and will expand their 4G LTE coverage in the deepwater region of the GoM using the high capacity, low latency and reliable fiber infrastructure. Details will be finalized in a contract expected to be signed before the end of 2016 and the MoU allows for work to begin immediately.

The additional base stations installed on deepwater assets will provide overlapping 4G LTE coverage to the already planned, ubiquitous GoM coverage in shallower waters—providing a single, unified and consistent service from the coast of Louisiana, Mississippi and Texas all the way out to the deepwater regions.

For more information, visit [www.tampnet.com](http://www.tampnet.com).

#### **Globecomm commissions its first Fleet Xpress installation for Helikon Shipping**

Globecomm has delivered its first Inmarsat Fleet Xpress terminals to Helikon Shipping Enterprises. The two units were commissioned in Globecomm's Biddinghuizen facility and delivered to the Tsuneishi Heavy Industries Cebu shipyard in the Philippines, where the two ships are under construction for Helikon Shipping Enterprises.

The vessels entered service in October and mark the first commission of Fleet Xpress by Globecomm.

Helikon operates a fleet of 10 Supramax bulk carriers trading world-

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wide. The newbuildings are both TESS 58 Aero, a highly efficient design featuring a number of innovative fuel saving features, including aerodynamic optimization with low drag hatch coamings and accommodation block.

Fleet Xpress is a new global service from Inmarsat, combining the high speeds of Ka-band with unlimited L-band back-up for continuous connectivity, designed to provide high-quality voice and data services across the world's oceans.

For more information, visit [www.globecommsystems.com](http://www.globecommsystems.com).

## RigNet wins multi-vessel contract with international energy service company

RigNet, Inc. has been awarded a multi-vessel contract providing RigNet's managed communication network for an international offshore energy service company that performs well intervention, subsea contracting and other services.

RigNet also is delivering communication services to a national oil company and the vessel owner through our customer for their operations in Brazil.

To ensure reliable and secure commu-

nications for these vessels, RigNet will use VSAT technology to deliver a fully managed, end-to-end, network. The contract includes managed communications by RigNet's Global Network Operation Centers (GNOC) for technical support, which will include installation, commissioning, monitoring and maintenance.

For more information, visit [www.rig.net](http://www.rig.net).

## Kymeta® demonstrates mTenna® flat panel satellite communications

As superyacht enthusiasts gathered in Monaco in September, Kymeta® gave a real world view into what is possible when satellite communication solutions become flat, thin, lightweight, quiet, and scalable. Live demonstrations provided owners, captains and designers the opportunity to see how a satellite antenna without any moving parts can deliver a reliable, quiet and seamless solution that eliminates satellite communication domes.

The Kymeta satellite antenna design provides a secure, scalable and future-proof system that will meet the needs of owners and crew while delivering on the promise of global, mobile connectivity and entertainment. Through the

use of software pointing and steering, Kymeta has increased reliability and eliminated noisy and unreliable gimbaled satellite communication systems. The very thin profile of Kymeta's mTenna technology means it can be embedded into the superstructure of a vessel as opposed to having the unsightly domes associated with mechanically steered antennas. In addition, Kymeta mTenna technology gives superyacht owners scalable connection options to increase throughput to meet requirements for large bandwidth.

Joined by partners Intelsat, Panasonic, iDirect, Intellian and e3 Systems, the maritime market will be among the first to benefit from Kymeta's technology that becomes commercially available in 2017.

For more information, visit [www.kymetacorp.com](http://www.kymetacorp.com).

## Omniaccess, Panasonic announce advanced high throughput satellite

OmniAccess, a leading supplier of integrated communications solutions to superyachts and cruise-ships, and Panasonic Avionics Corporation unveiled a tailored XTS "extremely

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OmniAccess and Panasonic began collaborating on XTS high-throughput satellite designs in September 2015 in order to bring unprecedented levels of capacity and performance to OmniAccess' existing Super yacht and cruise customers. Through this agreement OmniAccess has secured access to Panasonic's existing HTS capacity, currently contracted capacity and the future XTS satellite network, bringing industry-leading capacity and performance to its yachting and cruise ship markets. Leveraging Panasonic's existing global high-speed satellite network, OmniAccess is already providing industry-leading connection speeds of over 200 Mbps to select individual customers.

For more information, visit [www.omniaccess.com](http://www.omniaccess.com).

### **Marlink to empower Global Xpress**

The implementation of Inmarsat Global Xpress (GX) across Marlink's global network infrastructure and service delivery platform is now complete. Following successful installation and testing at all three Global Xpress 'Meet Me Points' (Indian Ocean Region, Atlantic Ocean Region and Pacific Ocean Region), Marlink will be able to offer Fleet Xpress globally along with its unique range of maritime digital solutions, such as XChange and SkyFile.

By empowering Fleet Xpress with its proprietary solutions, Marlink will unlock significant operational gain and benefits for customers choosing Inmarsat's new service. The ability to retain Marlink's XChange and digital solutions, will make migration to Fleet Xpress easier and more cost-effective for Marlink's existing customers.

Combined with Fleet Xpress, XChange and SkyFile will enable maritime clients and their vessels to achieve further operational efficiencies and cost reductions, as well as boosting crew well-being on-board. Already installed on thousands of ships, Marlink's digital solutions allow efficient management of communications & IT on board, including remote access from shore. Also available to Fleet Xpress users is Marlink's well established, optimised and user-friendly messaging and data-transfer solution for ship-shore communications, in addition to a powerful cost effective solution offering full control for private crew communications (voice, internet access and social media).

For more information, visit [www.marlink.com](http://www.marlink.com).

### **Thuraya, IEC Telecom partner up at OPV Middle East 2016**

Thuraya Telecommunications Company and its long-standing service partner, IEC Telecom, co-exhibited at the Offshore Patrol Vessels Middle East 2016 conference in Bahrain in September. On display were a number of solutions from Thuraya's diverse range of technologically superior and highly reliable mobile satellite voice and broadband devices that provide ease of use, value, quality and efficiency. The line-up of terminals included the Thuraya Orion IP and Thuraya SF2500, which offers voice and broadband data IP connections that allow users to access navigation charts, weather data, and weather satellite images reporting on their position or keep in touch with their headquarters or remote offices.

Thuraya Orion IP Fahad Kahoor, director of market development at Thuraya, said: "Offshore patrol vessels are intended to carry out a range of missions such as maritime security, border control, routine patrols, anti-smuggling, counter-piracy, and fishery protection, as

well as effective disaster relief. Therefore, clear, reliable, uninterrupted satellite connectivity is vital to achieve these tasks, and Thuraya's easy to install marine terminals are the perfect solution."

Operating over Thuraya's powerful and advanced satellite networks, Thuraya's terminals help ships increase their operational efficiency while ensuring office and welfare communication of their onboard crew by delivering reliable and efficient data and voice capabilities. The SF2500 is a voice satellite terminal that combines voice capabilities, crew calling, GPS tracking, geofencing and SMS services in a compact package designed for small- and medium-sized vessels. The Thuraya Orion IP is a broadband terminal specifically designed for the harsh maritime environment that provides robust and reliable data connectivity at speeds up to 444 kbps with a cost effective price plan commitment and supports use of customer security products such as virtual private networks (VPNs) and third-party government IP crypto.

For more information, visit [www.thuraya.com](http://www.thuraya.com).

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## Balfour Beatty consortium closes on Humber Gateway OFTO

Balfour Beatty announced that its consortium with Equitix has reached financial close for the £162.9 million Humber Gateway offshore transmission project (OFTO). Balfour Beatty will invest £12.5 million of the total required equity of £21 million.

The high-voltage electricity transmission link connects E.ON's 219 MW offshore wind farm in the North Sea, 8km from the east Yorkshire coast, to the onshore transmission grid. The 73 turbines are capable of generating enough electricity for around 170,000 homes each year.

The Balfour Beatty Equitix Consortium will own and operate the offshore transmission link to E.ON's Humber Gateway wind farm for the next 20 years. Balfour Beatty's Power Transmission and Distribution business will be responsible for the operation and maintenance of the OFTO's assets, including one offshore and one onshore substation and two cable circuits consisting of 18 km of subsea and 30 km of land cable.

For more information, visit [www.balfourbeattyinvestments.com](http://www.balfourbeattyinvestments.com).

## NordLink project begins

On 16 September, project partners TenneT, Statnett and KfW (represented by KfW IPEX-Bank) carried out the ground-breaking ceremony for the construction of the German converter station for the NordLink subsea cable project connecting Germany and Norway. A symbolic cable pulling also was held together with the Schleswig-Holstein Minister of Energy, Robert Habeck, the Norwegian ambassador, Elisabeth Waalas, and the mayors of Wilster and Nortorf. Many representatives from federal, state and regional politics, business and public life attended the ceremonial event.

NordLink is the first interconnector to provide a direct link between the Norwegian and German energy markets. This connection promotes the integration of the northwest European energy market, increases market efficiency and contributes to a stabilization of energy prices. When limited activity of wind turbines and solar cells result in higher energy prices in Germany than in Norway, energy generated by Norwegian hydropower plants can be imported via NordLink. The power line connects the capacities of Norwegian hydropower plants with those of wind and solar farms in Germany.

The NordLink project will be realized by the Norwegian TSO Statnett and DC Nordseekabel GmbH & Co. KG, each with 50% ownership. TenneT TSO, and German promotional bank KfW both have shares of 50% in DC Nordseekabel. DC Nordseekabel is responsible for the construction of the German part of the project, including permits.

With its undersea route measuring 516 km, NordLink will be one of the longest interconnectors ever built. The high-voltage direct current (HVDC) transmission cable will have a capacity of 1,400 MW at  $\pm 500$  kV and will begin operations in the year 2020.

For more information, visit [www.tennet.eu](http://www.tennet.eu).

## PT. Telkom selects NEC to build the IGG

NEC Corporation announced the signing of a contract with PT. Telekomunikasi Indonesia, Tbk (Telkom) to develop the Indonesia Global Gateway Cable System (IGG), an optical submarine cable system that will connect the islands of Sumatra, Batam, Jawa, Bali, Kalimantan and Sulawesi with Singapore.

The IGG is a 100 Gigabit per second (Gbps)  $\times$  80 wavelengths  $\times$  4 fiber pairs optical fiber submarine cable system, measuring approximately 5,300 km, that will connect the cities of Dumai, Batam, Jakarta, Madura, Bali, Makassar, Bilikpapan, Takaran and Manado with Singapore. Once IGG is completed in early-2018, this cable system will not only enhance connectivity among these major cities of Indonesia, but it is designed to provide direct connectivity between two international submarine cables, one from Europe landing in Dumai, and the other from the west coast of the U.S. terminating in Manado.

For more information, visit [www.nec.com](http://www.nec.com).

## ABB to divest cable business to NKT Cables



NKT Cables is acquiring ABB's global high-voltage cable system business with a total enterprise value of 836 million euros (US\$934 million). High voltage cables are key components in sustainable energy networks, used for transmitting large amounts of electricity over long distances. The business is part of ABB's Power Grids division, which is currently undergoing a strategic review.

NKT Cables designs, manufactures and supplies power cables for low-, medium- and high-voltage solutions mainly in the Alternating Current (AC)-area. It has major production facilities in Europe and China as well as sales offices around the world, and employs around 3,200 people. In 2015, revenue was 1.2 billion euros.

ABB's high-voltage cable technology and manufacturing as well as service footprint is highly complementary with NKT Cables' activities, making the combined business ideally suited to serve the rising global demand for long-distance power transmission cable systems. The combined operational scale and reach of the two businesses is expected to lead to even better service for global customers.

The transaction is anticipated to close in Q1 2017, subject to regulatory clearances and fulfilment of the closing conditions. Goldman Sachs acted as exclusive financial advisor to ABB and Freshfields Bruckhaus Deringer as legal advisor.

For more information, visit [www.abb.com](http://www.abb.com).

## Fugro's cable lay spread reduces vessel downtime

An innovative development by Fugro for its work-class ROVs has been utilized successfully in cable lay touchdown monitoring operations at the Rampion Offshore Wind Farm.

A new track base unit, fitted to its FCV ROV, has been introduced to ensure highly accurate cable positioning during cable lay operations in strong currents. The unit ensures the continuation of operations in strong currents by enabling the ROV to run along the seabed instead of flying through the water. It is fitted to the existing ROV frame but can be detached easily if required.

The unit was developed following another project for E.ON at the Humber Gateway Offshore Wind Farm in 2015, where Fugro introduced a compact custom-made cable lay spread that included new 3D sonar technology to supplement ROV support and provide precise monitoring of cable touchdown (the point at which the cable meets the seabed). During this project in the North Sea, Fugro experienced currents as high as 3.5 kts.

In August Fugro commenced cable laying operations at

the Rampion site, off the UK's Sussex coast, from its subsea construction vessel, the Fugro Symphony. At the beginning of the month the vessel had loaded the first phase of 57 cables (approximately 75 km) at the cable manufacturer's facility in Hartlepool.

Having joined the project in early September another of Fugro's specialist vessels, Fugro Saltire, is currently conducting cable burial using one of Fugro's Q1400 trenching systems. The project installation is divided into two phases with the first phase due for completion in October this year. After a winter break, the two vessels will resume installation of the remaining 65 cables in spring 2017 and completion is expected by summer 2017.

For more information, visit [www.fugro.com](http://www.fugro.com).

#### **Huawei Marine to build Papua New Guinea domestic cable system**

Huawei Marine announced that it will help Papua New Guinea to build a national broadband transmission network to meet the increasing demand for Internet connectivity and foster social and economic development across the country.

Currently, Papua New Guinea's domestic telecommunications largely relies on satellite and microwave communications. Huawei Marine and PNG DataCo Limited, a telecommunications carrier established by the PNG Government, will construct a national submarine cable network to provide the backbone telecommunications needed by major coastal centers and islands in Papua New Guinea.

At 5,457 km in length, the submarine cable network will provide domestic connectivity across 14 main population center's cities and international connectivity by a link to Jayapura in Indonesia.

The design capacity of the system is 8 Tbps, which will cater for increased bandwidth demand over the next 10 to 15 years. When completed, the network will cover 55% of the population and will provide more than 70% of Papua New Guinea's domestic bandwidth requirements.

For more information, visit [www.huaweinmarine.com](http://www.huaweinmarine.com).

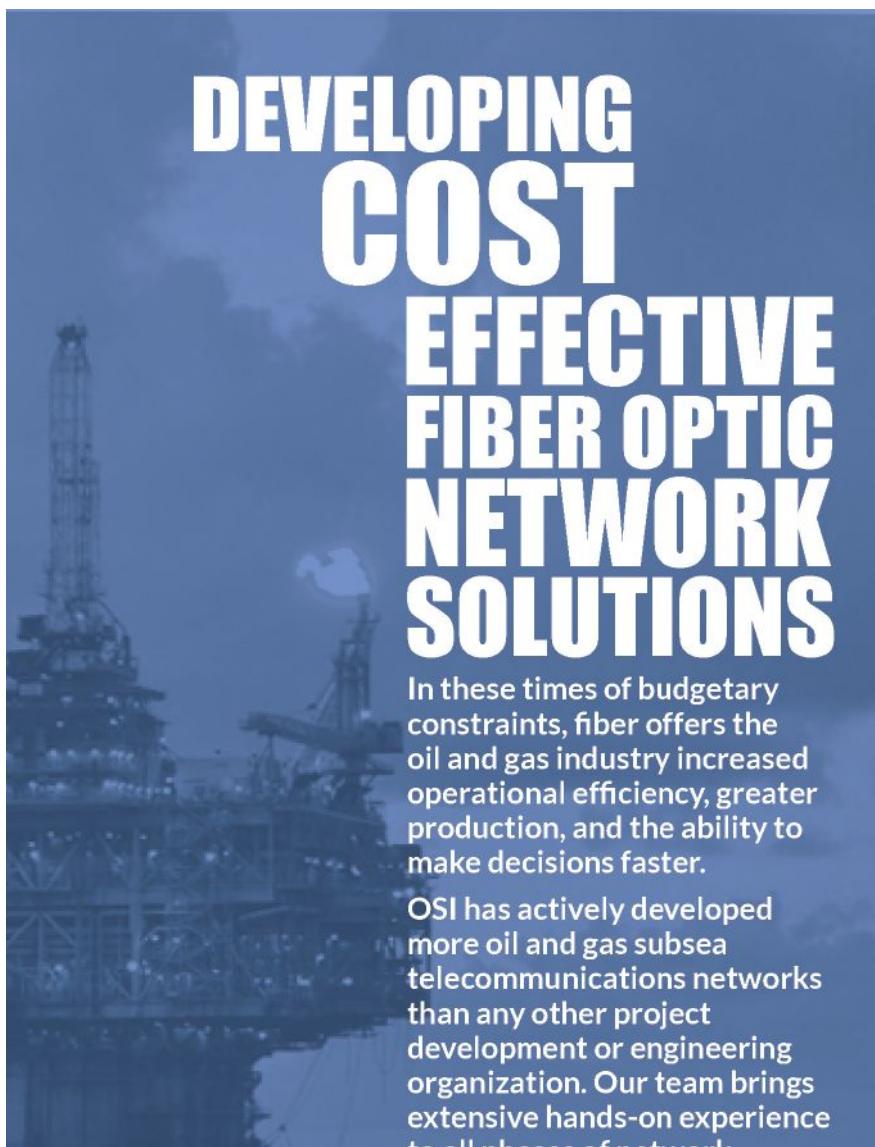
#### **Southern Cross discusses NEXT cable**

Southern Cross Cable Network confirmed an important milestone in the Southern Cross NEXT project. The company held a Customer Information Meeting recently in Sydney, Australia, where the plans and strategy for the Southern Cross NEXT project were outlined to around 30 representatives of its

current customer base. Southern Cross NEXT plans to enhance the existing Southern Cross system with a third route and sought feedback from its existing customers.

Southern Cross NEXT will be a high capacity express route, providing data-center connectivity between Sydney, Auckland, and Los Angeles. Given its design and route, it will be the lowest latency path to the United States by some considerable margin.

The new route will be developed as an extension of the existing Southern Cross eco-system, allowing customers to leverage Southern Cross' extensive POP and access infrastructure already in place, as well as flexibly assign new and existing capacity across the three routes, maximizing diversity and resiliency. The new route will be designed to carry over 60 Tbs of traffic, ensuring Southern Cross can cater for all customers' growing demand requirements well into the



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future. Services offered on the new system will be an extension and integration of the services offered across the current Southern Cross platform.

The Southern Cross NEXT route expansion of the network will come into effect before 2020.

For more information, visit [www.southerncrosscables.com](http://www.southerncrosscables.com).

## Monet selects Equinix for Florida landing station

Equinix, Inc. announced it has been selected by the Monet Submarine Cable investors to provide U.S. facilities and services for the next-generation cable landing station architecture to support the Monet Submarine Cable System. Monet is a planned submarine cable that is currently designed to deliver over 60 terabits of capacity between the U.S. and Brazil. Monet is owned by Algar Telecom (a Brazilian telecom company and ISP), Angola Cables (an Angolan telecom company operating in the wholesale market), Antel (the Uruguayan telecom company) and Google. In addition to being a Monet

investor, Google is also the U.S. landing party for Monet. Construction of the system is underway and is expected to be completed in 2017, terminating in the U.S. at Equinix's MI3 International Business Exchange (IBX®) data center, which services the greater Miami metropolitan area.

Brazil is the largest national economy in Latin America, the world's eighth largest economy at market exchange rates and the seventh largest in purchasing power parity (PPP), according to the International Monetary Fund and the World Bank. As global enterprises look to capitalize on the business opportunity in Brazil, they are finding that they also require more capacity to run IT operations including cloud-based applications. By connecting to Equinix data centers, Monet and its users can leverage Equinix's mature business ecosystems and interconnection platform—Platform Equinix™—which connects more than 8,000 global businesses in 40 markets around the globe.

According to industry research firm TeleGeography's Global Bandwidth

Research Service, over a billion dollars will be spent in construction costs of subsea cables to Latin America and the Caribbean from 2015-2016, the second highest region globally. Currently, more than 99% of global data traffic is carried through submarine fiber cables, with less than 1% of the remaining traffic carried through satellite systems. This increased connectivity is expected to provide an ultra-low latency path for Equinix and Monet customers deployed between Miami and São Paulo.

Networks are an essential part of business, education, government and home communications. Many residential, business, and mobile IP networking trends are being driven largely by a combination of video, social networking, and advanced collaboration applications, termed "visual networking." To remain competitive, network operators are expanding their infrastructures to meet demand for these new services—and are turning to colocation data centers that not only offer all the network-to-network connectivity of a carrier hotel, but also act as aggregation points

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for concentrations of customers in network-centric industries.

Monet will feature the latest high-quality 6-fiber-pair cable and optical transmission technologies, with an initial design capacity of greater than or equal to 60 Tb/s (100 Gb/s x 100 wavelengths x 6 fiber-pairs). This new cable system will be landed at Equinix's Miami (MI3) data center in North America and will feature seamless connectivity to many neighboring cable systems to extend the capacity beyond Miami to other North American and European locations.

In Brazil, Monet will land in Fortaleza and Praia Grande near São Paulo for distribution of traffic into South America. Landing facilities in those markets are to be provided by Angola Cables in Fortaleza and Google in Praia Grande.

The U.S.-Brazil route is an increasingly used route as more businesses deploy in Latin America and require high-bandwidth connectivity between these markets. Equinix has seen a rise in sub-sea cable deployments as part of an increasing trend to upgrade capacity as legacy cables end their lifecycles. Monet continues this trend and is one of the first new fiber-optic networks connecting Brazil and the United States since 2001.

Equinix's Miami data centers are at the heart of one of the largest Internet exchange points in the world and serve as a major communications gateway to the commercial centers of Latin America. Equinix's Miami colocation facilities are home to a dense concentration of financial services companies, cloud and IT providers, network service providers, ISPs, content delivery networks and enterprises, and provide the ability to serve Latin American.

For more information, visit [www.equinix.com](http://www.equinix.com).

### TGA cable on track for completion

The Tasman Global Access (TGA) submarine cable is now in the final stages of construction, with the specialized cable ship 'Ile de Re' heading towards New Zealand shores.

Telecommunications companies Spark, Vodafone and Telstra are investing approximately US\$70 million to build the TGA cable, which will significantly improve New Zealand's international broadband connectivity. The benefits of the TGA cable will include strengthened links into fast-growing Asian markets, important redundancy and resiliency, and better connection with the five main international cable systems currently serving Australia.

Last month, the Ile de Re completed the shore landing at Sydney's Narrabeen Beach before commencing the cable lay across the Tasman Sea. The Ile de Re started on its journey towards New Zealand on 30 August and currently it is working 500 nmi off the coast of Sydney.

The TGA cable will run 2,300 km from Raglan in New Zealand to Narrabeen Beach, just north of Sydney in Australia. To date, the ship has deployed 9 out of a total of 20 repeaters, which are used to amplify the optical signals along the length of the cable.

The 2,300-km length of cable is composed of two fiber pairs, and will have a total capacity of 20 Tbps. The Ile de Re is the property of Alcatel-Lucent Submarine Networks (part of Nokia), which is the company contracted by Spark, Vodafone and Telstra to carry out the TGA cable project.

For more information, visit [www.spark.co.nz](http://www.spark.co.nz).

### Nextgen completes NWCS

Two years and 2,100 km later, Nextgen Group and Alcatel-Lucent Submarine Networks (ASN), part of Nokia,

officially "switched on" Australia's first purpose-built submarine fiber optic network servicing the oil and gas industries and the growing need for world-class telecommunications services in Australia's North West growth corridor.

The NorthWest Cable System (NWCS) creates a link from Darwin in the Northern Territory to Port Hedland in Western Australia, connecting the INPEX-led Ichthys LNG Project offshore facilities and the Shell Prelude Floating Liquefied Natural Gas (FLNG) facility, 200 km offshore in the Browse Basin, to their onshore data centers and business headquarters.

The state-of-the-art, high-speed data communications is now integrated into Nextgen's 17,000-km national transmission network and Metronode's national network of data centers, providing immediate benefits to those communities in the Northern Territory and Western Australia connected to the cable.

The US\$139 million cable system not only provided essential support for Australia's offshore oil and gas projects but promoted competition with new telecommunication infrastructure for businesses and consumers in regional communities at the cable landing points.

Nextgen has included additional capability in the system that allows for enhanced telecommunications resilience for the Northern Territory. It has also provisioned future connections into other locations such as the Tiwi Islands and established infrastructure-based, high-bandwidth capability in the Pilbara region.

For more information, visit [www.nextgengroup.com.au](http://www.nextgengroup.com.au).

Ocean Engineering



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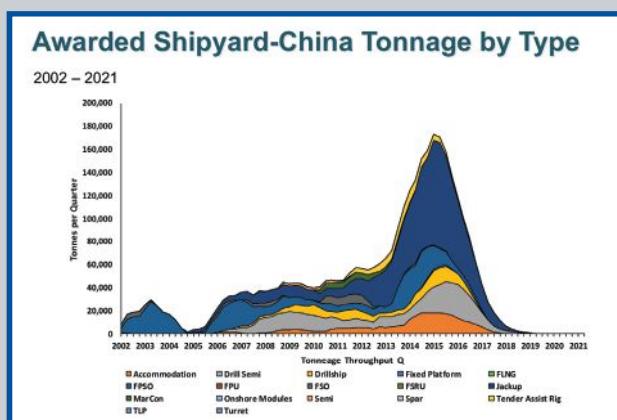
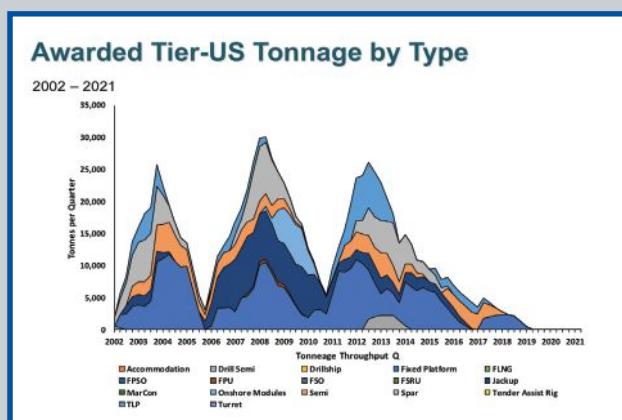
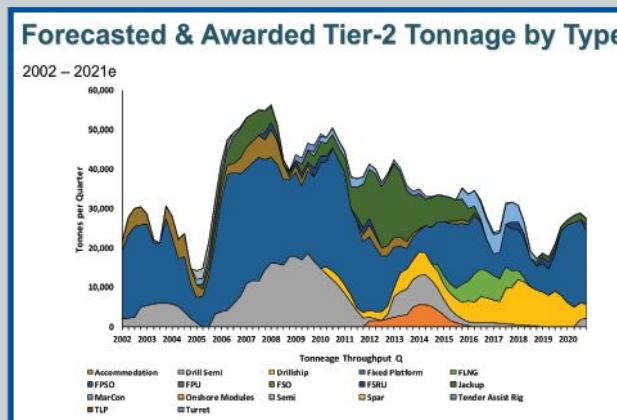
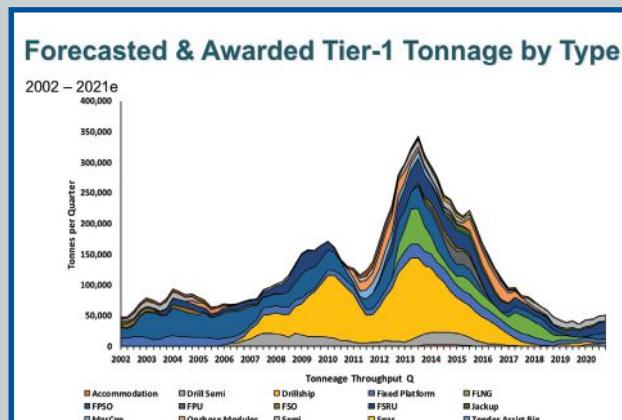
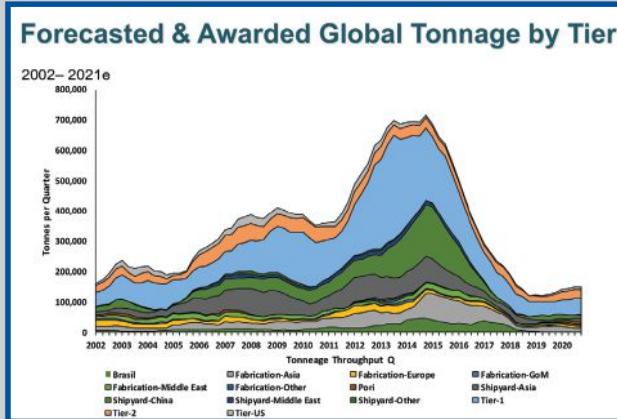
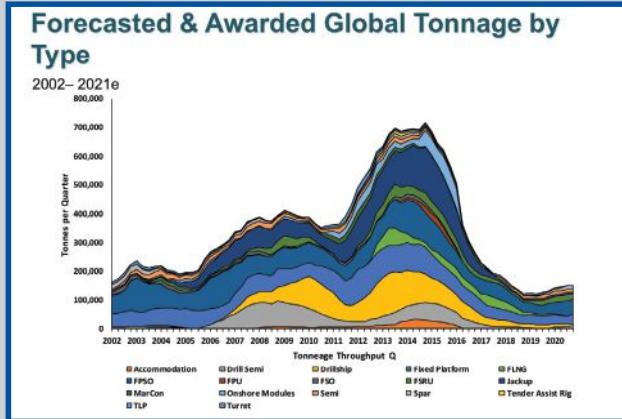
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Ocean News & Technology

# OFFSHORE STATS & DATA

# Quest Offshore Activity Report



# Gulf of Mexico Data

## Current Deepwater Activity

Operator	Area	Block	OCS Lease	Rig Name	Prospect Name	Water Depth (f)
SHELL OFFSHORE INC.	WR	508	G17001	T.O. DEEPWATER THALASSA	STONES	9,552
SHELL OFFSHORE INC.	AC	857	G17565	H&P 205	Great White	7,812
SHELL OFFSHORE INC.	MC	393	G26254	T.O. DEEPWATER PROTEUS	White Ash	7,404
EXXON MOBIL CORPORATION	WR	584	G25251	*WIRELINE UNIT (N.O.DIST)	Julia	7,147
EXXON MOBIL CORPORATION	WR	584	G25251	MAERSK VIKING	Julia	7,147
CHEVRON USA INC	WR	758	G17015	T.O. DISCOVERER CLEAR LEADER	Jack	6,968
BP EXPLORATION & PRODUCTION INC	GC	743	G15607	SEADRILL WEST AURIGA	ATLANTIS(GC)	6,825
LLOG EXPLORATION OFFSHORE LLC	MC	565	G34447	SEADRILL WEST NEPTUNE	Fourier	6,807
BP EXPLORATION & PRODUCTION INC	MC	562	G19966	HELIX Q5000	Isabela	6,435
BP EXPLORATION & PRODUCTION INC	MC	822	G14658	T.O. DEVELOPMENT DRILLER III	Thunder Horse South	6,267
BP EXPLORATION & PRODUCTION INC	MC	778	G09868	THUNDER HORSE PDQ	Thunder Horse NORT	6,034
LLOG EXPLORATION OFFSHORE LLC	MC	427	G31498	SEADRILL SEVEN LOUISIANA	La Femme	5,782
ENI US OPERATING CO INC	MC	773	G19996	NABORS POOL 140	Devil's tower	5,610
ANADARKO PETROLEUM CORPORATIN	GC	859	G24194	NOBLE BOB DOUGLAS	HEIDELBERG	5,355
ANADARKO PETROLEUM CORPORATIN	GC	859	G24194	*WIRELINE UNIT (HOUma DIST)	HEIDELBERG	5,355
CHEVRON USA INC	GC	807	G31752	PACIFIC SHARAV	GC 807 (Anchor Well)	4,954
HESS CORPORATION	MC	726	G24101	STENA FORTH	Tubular Bells	4,611
COBALT INTERNATIONAL ENERGY LP	GB	959	G30876	ROWAN RELIANCE	North Platte	4,566
SHELL OFFSHORE INC.	MC	812	G34460	NOBLE DON TAYLOR		4,479
BP EXPLORATION & PRODUCTION INC	GC	782	G15610	MAD DOG SPAR RIG	Mad Dog Phase 2	4,428
CHEVRON USA INC	GC	640	G16770	CAL-DIVE Q-4000	Tahiti 2	4,292
CHEVRON USA INC	GC	640	G16770	*WIRELINE UNIT (HOUma DIST)	Tahiti 2	4,292
CHEVRON USA INC	GC	640	G20082	T.O. DISCOVERER INSPIRATION	Tahiti 2	4,292
CHEVRON USA INC	GC	640	G16770	*COIL TUBING UNIT (HOUma DIST)	Tahiti 2	4,292
CHEVRON USA INC	GC	640	G20082	T.O. DEEPWATER ASGARD	Tahiti 2	4,251
ANADARKO PETROLEUM CORPORATION	GC	563	G34992	*WIRELINE UNIT	Timon	4,200
ANADARKO PETROLEUM CORPORATION	GC	563	G34992	DIAMOND OCEAN BLACKHAWK	Timon	4,200
CHEVRON USA INC	KC	10	G27698	PACIFIC SANTA ANA		4,020
ANADARKO PETROLEUM CORPORATION	GC	562	G11075	DIAMOND OCEAN BLACKHORNET	K-2	3,926
HESS CORPORATION	GC	512	G34551	DIAMOND OCEAN BLACKLION	Stampede	3,599
SHELL OFFSHORE INC.	MC	762	G07957	ATWOOD CONDOR	Deimos	3,144
LLOG EXPLORATION OFFSHORE LLC	MC	503	G27277	ENSCO 8505	WhoDat	3,099
SHELL OFFSHORE INC.	MC	807	G07957	OLYMPUS N88	MARS	3,039
ENERGY RESOURCE TECHNOLOGY GO	GC	281	G33242	ENSCO 8503	Boris(gc)	2,756
CHEVRON USA INC	VK	786	G10944	NABORS 87	Petronius Compliant	1,754
HESS CORPORATION	GB	215	G09216	NOBLE PAUL ROMANO	Conger	1,450
WALTER OIL & GAS CORPORATION	EW	834	G33140	H&P 203	Hummingbird	1,186
STONE ENERGY CORPORATION	MC	109	G05825	*HYDRAULIC WORKOVER UNIT	(N Amberjack	1,030
FIELDWOOD SD OFFSHORE LLC	EB	160	G02648	*NONE RIG PA OPERATION (LJ)	Cerveza	940
FIELDWOOD SD OFFSHORE LLC	EB	159	G02645	*WIRELINE UNIT (L.J.DIST)	Ligera	924
FIELDWOOD SD OFFSHORE LLC	EB	159	G02646	*WIRELINE UNIT (L.J.DIST)	Ligera	924
EXXON MOBIL CORPORATION	SM	6636	P00188	*WIRELINE (GENERIC)		842
CHEVRON USA INC	GB	189	G06358	*WIRELINE UNIT (L.C.DIST)	Tick	718
FIELDWOOD SD OFFSHORE LLC	EB	110	G02650	*NONE RIG PA OPERATION (LJ)	Tequila	660
W & T OFFSHORE INC	EW	910	G13081	*WIRELINE UNIT (HOUma DIST)		557

Deepwater prospects with drilling and workover activity: 45

Current Deepwater Activity as of Monday, October 17, 2016

### Activity by Water Depth

Water Depth (m)	Active Leases	Approved Applications	Active
0 to 200	1,050	36,346	2,115
201 to 400	70	1,134	20
401 to 800	135	904	10
801 to 1000	184	581	9
1000 and Above	2,062	2,178	30

### Rig Activity Report 14 October 2016

Location	Week of 10/14	+-	Week Ago	+-	Year Ago
Land	513	13	500	-238	751
Inland Waters	3	2	1	0	3
Offshore	23	0	23	-10	33
United States Total	539	15	524	-248	787
Gulf Of Mexico	22	0	22	-10	32
Canada	165	0	165	-16	181
North America	704	15	689	-264	968

Activity by Water Depth Information current as of Monday, October 17, 2016.

Maximum number of rigs operating in the deepwater Gulf of Mexico. The rig unit includes platform rigs operating on deepwater production facilities in addition to the MODU's. The numbers do not distinguish between rigs drilling and those in service for completion and workover operations.

Information provided courtesy of the U.S. Bureau of Ocean Energy Management and Baker Hughes

# Monthly Stock Figures & Composite Index

Industry Company Name	Symbol	Close (Mid) October	Close (Mid) September	Change	Change %	High 52 week	Low
<b>Diversified, Production Support and Equipment Companies</b>							
Baker Hughes, Inc.	BHI	52.24	48.42	3.82	7.9%	56.81	37.58
Forum Energy Technologies, Inc.	FET	21.75	17.26	4.49	26.0%	22.85	8.47
Drill-Quip, Inc.	DRQ	55.20	52.40	2.80	5.3%	66.91	48.88
Halliburton Company	HAL	47.32	41.26	6.06	14.7%	47.96	27.64
Tenaris SA	TS	29.06	26.09	2.97	11.4%	29.89	18.53
Newpark Resources, Inc.	NR	7.25	6.71	0.54	8.0%	7.73	3.35
Schlumberger Ltd.	SLB	81.88	76.37	5.51	7.2%	83.97	59.60
Superior Energy Services, Inc.	SPN	17.90	15.14	2.76	18.2%	19.83	8.25
Weatherford International, Inc.	WFT	6.05	5.92	0.13	2.2%	11.49	4.71
Deep Down, Inc.	DPDW	0.90	0.98	-0.08	-8.2%	0.98	0.83
FMC Technologies	FTI	31.74	27.61	4.13	15.0%	32.22	27.12
<b>Total Diversified, Production, Support and Equipment.....</b>	<b>351.29</b>	<b>318.16</b>	<b>33.13</b>	<b>10.4%</b>	<b>380.64</b>	<b>244.96</b>	
<b>Geophysical / Reservoir Management</b>							
Dawson Geophysical Company	DWSN	7.30	6.73	0.57	8.5%	8.87	2.90
Mitcham Industries, Inc.	MIND	3.37	3.19	0.18	5.6%	5.00	2.24
Compagnie Gnrale de Gophysique-Veritas	CGV	28.79	24.43	4.36	17.8%	29.35	22.89
<b>Total Geophysical / Reservoir Management.....</b>	<b>39.46</b>	<b>34.35</b>	<b>5.11</b>	<b>14.9%</b>	<b>43.22</b>	<b>28.03</b>	
<b>Offshore Drilling Companies</b>							
Atwood Oceanics, Inc.	ATW	9.06	6.91	2.15	31.1%	19.65	4.82
Diamond Offshore Drilling, Inc.	DO	17.01	14.80	2.21	14.9%	26.72	14.18
ENSCO International, Inc.	ESV	8.19	6.89	1.30	18.9%	18.93	6.50
Nabors Industries, Inc.	NBR	12.94	9.24	3.70	40.0%	13.32	4.93
Noble Drilling Corp.	NE	5.86	5.63	0.23	4.1%	14.64	5.09
Parker Drilling Company	PKD	2.35	2.20	0.15	6.8%	3.33	0.98
Rowan Companies, Inc.	RDC	14.42	12.59	1.83	14.5%	21.83	10.67
Transocean Offshore, Inc.	RIG	9.81	9.12	0.69	7.6%	17.17	7.67
<b>Total Offshore Drilling.....</b>	<b>79.64</b>	<b>67.38</b>	<b>12.26</b>	<b>18.2%</b>	<b>135.59</b>	<b>54.84</b>	
<b>Offshore Contractors, Services, and Support Companies</b>							
Helix Energy Solutions Group, Inc.	HLX	9.27	6.8	2.47	36.3%	9.70	2.60
Gulf Island Fabrication	GIFI	10.09	8.72	1.37	15.7%	12.67	6.34
McDermott International, Inc.	MDR	5.12	4.82	0.30	6.2%	6.00	2.20
Oceaneering International	OII	27.41	25.38	2.03	8.0%	47.99	24.33
Subsea 7 SA	SUBCY.PK	11.24	10.24	1.00	9.8%	11.60	4.86
Technip ADS	TKPPY.PK	16.29	14.28	2.01	14.1%	16.54	9.69
Tetra Technologies, Inc.	TTI	5.93	5.75	0.18	3.1%	9.44	4.62
<b>Total Offshore Contractors, Service, and Support.....</b>	<b>85.35</b>	<b>75.99</b>	<b>9.36</b>	<b>12.3%</b>	<b>113.94</b>	<b>54.64</b>	
<b>Offshore Transportation and Boat Companies</b>							
Seacor Holdings, Inc.	CKH	58.87	56.88	1.99	3.5%	65.98	41.24
Gulfmark Offshore, Inc.	GLF	1.62	1.90	-0.28	-14.7%	8.75	1.45
Bristow Group	BRS	11.89	11.09	0.80	7.2%	15.82	10.43
PHI, Inc.	PHII	17.87	17.60	0.27	1.5%	23.00	13.05
Tidewater, Inc.	TDW	3.03	3.23	-0.20	-6.2%	16.64	2.16
Swire Pacific	SWRAY	10.80	11.01	-0.21	-1.9%	12.13	9.06
Hornbeck Offshore	HOS	5.85	5.25	0.60	11.4%	16.71	4.35
<b>Total Offshore Transportation and Boat .....</b>	<b>109.93</b>	<b>106.96</b>	<b>2.97</b>	<b>2.8%</b>	<b>159.03</b>	<b>81.74</b>	

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# Monthly Stock Figures & Composite Index

Industry	Close (Mid) October	Close (Mid) September	Change %	Change	High 52 week	Low
Diversified, Production Support & Equipment Companies	351.29	318.16	33.13	10.4%	380.64	244.96
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Total Offshore Drilling	79.64	67.38	12.26	18.2%	135.59	54.84
Total Offshore Contractors, Service and Support	85.35	75.99	9.36	12.3%	113.94	54.64
Total Offshore Transportation and Boat	109.93	106.96	2.97	2.8%	159.03	81.74
Total Offshore Source Index	665.67	602.84	62.83	10.4%	832.42	464.21

## DISCLAIMER

The information on this page is provided for information and comparison purposes only and should not be used to make financial and business decisions and is accurate to the best of our knowledge for the period indicated.

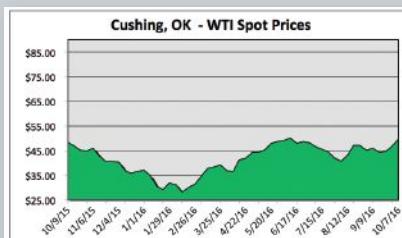
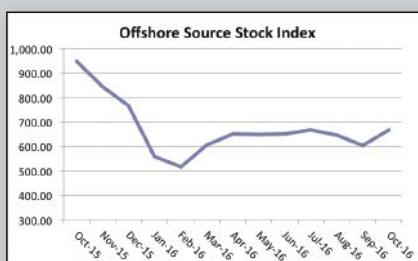
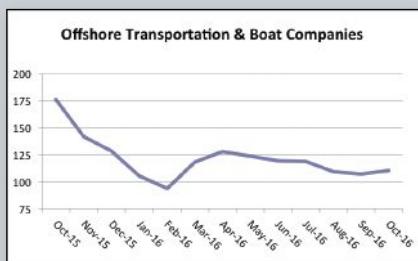
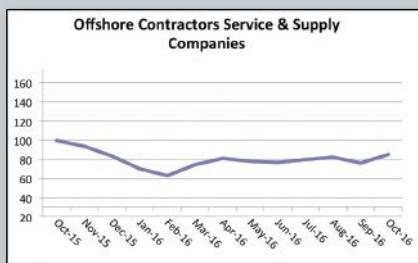
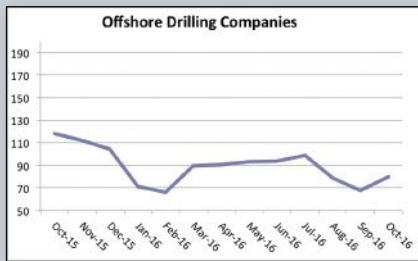
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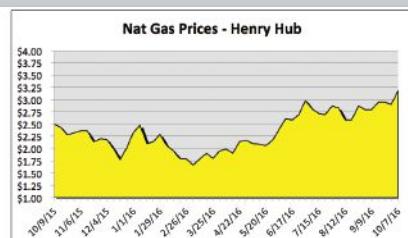
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## Oil & Gas Industry Trends

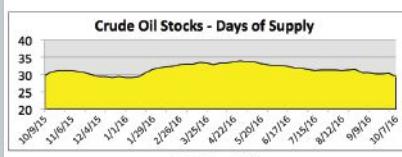
**Monitoring the Pulse of the U.S. Offshore Oil & Gas Industry**



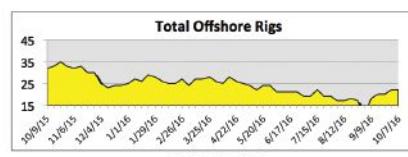
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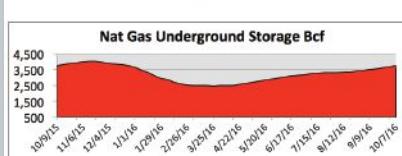
\* NYMEX Close



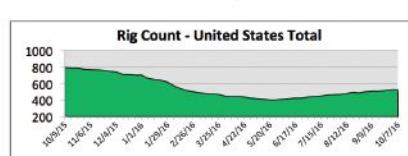
\*Source - EIA



\*Baker Hughes



\*Source - EIA



\*Baker Hughes



**Positive trend, at least 3 weeks**  
**Changing trend, less than 3 weeks**  
**Negative trend, at least 3 weeks**

## MacArtney markets measuring buoy monitoring turbidity at dredging sites

Dredging is a common and economically viable solution for the removal and subsequent treatment of contaminated sediment. Turbidity is thus an ideal surrogate for simple assessment of general water quality and effects of sediment disturbance.

MacArtney's German subsidiary, MBT GmbH, has manufactured a turbidity monitoring buoy, which is intended for deployment for accompanying environmental monitoring during dredging.

Being deployed as a surface buoy, the compact sized, autonomous buoy system intended for determining turbidity in coastal water areas consists of a yellow buoy corpus made from durable GRP, a turbidity sensor, a rechargeable battery pack and a data logger with integrated Inmarsat modem. To fulfill safety regulations, the buoy is equipped with a white flashing LED light being automatically switched on under low light conditions. The system is capable of 14 days of autonomous operation before the batteries need recharging or replacing.

The buoy is equipped with an AQUAlogger 210 TYT turbidity sensor provided with four measuring ranges selected automatically. To avoid biological growth on the optical window, the instrument is equipped with an antifouling wiper. The sensor is protected by a cage firmly attached to the buoyant body.

The buoy and the data acquisition system has an open architecture that allows for integration of other types of sensors like CTDs, fluorometers, etc.

The hollow interior of the buoy contains the satellite modem installed for data transmission. The logger sends tur-

bidity data at a predetermined interval on the satellite modem to the MacArtney developed "MetOcean Gateway" portal, a web-based data acquisition and data storage system that forms an integral part of the buoy system. The buoy is also available with a cellular data transmission system.

The buoy can be used via the satellite data service anywhere in the world. So far, one German customer has already taken delivery of 15 buoys.

Being a privately owned corporation with group headquarters in Esbjerg on the west coast of Denmark, MacArtney Underwater Technology has supplied products and engineering solutions for almost four decades.

For more information, visit [www.macartney.com](http://www.macartney.com).



## ROS introduces new positioner technology

Remote Ocean Systems has developed a new lightweight pan and tilt positioner that can be computer controlled and programmed. The new P15 positioner includes a heavy-duty connector that enables RS485 communication protocol for precise positioning and allows for field firmware upgrades.



The P15 is a smaller, lightweight rugged design that is ideal for small ROV's and bridge and dam inspections. It can handle payloads to 15 lbs with an accuracy level of  $0.1^\circ \pm 0.1^\circ$ . The P15 is available air filled (70 m) or oil filled for depths to 6,000 m.

For more information, visit [www.rosys.com](http://www.rosys.com).

## Star-Oddi announces new temperature-depth recorder

Star-Oddi announces a new robust logger in the Starmon data logger series, the Starmon TD. For 15 years, Star-Oddi has been manufacturing the popular Starmon mini with a temperature sensor but with the option to measure depth being highly welcomed by marine and fisheries scientists.

Starmon TD is designed with a fast response temperature probe. The time constant is only 2 sec which makes it ideal for profile measurements when going through different temperature layers down the water column. It also makes it ideal for fishing gear studies. The durable logger has battery life typically over a decade and battery is user replaceable.

Various depth ranges are available up to 2,000 m. Depth accuracy is better than  $\pm 0.3\%$  of full range. Temperature accuracy is  $\pm 0.025^\circ\text{C}$ . The large memory size can store 8.4 million temp-depth recordings. The sampling interval is user programmable in the application software. The robust housing is designed to make it easy to mount to gear or moorings.

For more information, visit [www.star-odd.com](http://www.star-odd.com).



## FSI announces two products for relocation and recovery

Falmouth Scientific, Inc. (FSI) is pleased to offer two new products to assist in the relocation and recovery of autonomous underwater systems and assets, the SAF-553 stand-alone flasher and the ELPF-553 flash-pinger.

These are extremely small, light-weight, battery-powered, intelligent devices that can be mounted directly on AUVs, gliders, or other underwater equipment for recovery after their mission duration has elapsed. Multiple user-programmable settings allow for selection of delay, timing, flashing, and frequency options that enable use in a variety of different applications.

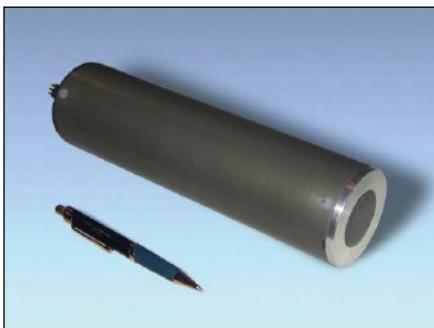


The stand-alone flasher uses high power, high color-temperature LEDs for optical flashing, and the Flash-Pinger adds a pinger transmitter for acoustic tracking below the water surface. Several housing types are available to meet different depth requirements from 100 m down to 1,000 m. Ultra-low power electronics and water turn-on sense circuitry extend battery life for use on long-duration missions. The flasher measures only 4.8 in. tall and 1.4 in. wide, and weighs only 180 g including its three alkaline AAA batteries (substitute lithium AAAs for even longer life). The flash-pinger is only slightly larger at 5.9 in. tall and just under 2 in. wide.

For more information, visit [www.falmouth.com](http://www.falmouth.com).

## FlowScout 2000 acoustic flow meter shortens minimum measurement distance

LinkQuest Inc. recently added a broadband option to its FlowScout 2000 acoustic flow meter product. With this option, the FlowScout 2000 system is capable of measuring current speeds reliably starting from a distance of 16



cm, with a cell size of 2 cm and up to a maximum number of 100 cells.

Since its debut in 2008, the FlowScout 2000 acoustic flow meters have been widely deployed for measuring flows in irrigation channels and rivers for water resource management and environment monitoring applications. The standard FlowScout 2000 acoustic flow meter is capable of reaching up to 18 m in range. Its minimum cell size is 25 cm. With the new user-selectable broadband option, the FlowScout 2000 system will further extend its applications to rivers and irrigation channels with large water level fluctuations, small and shallow creeks and irrigation channels, and small diameter water pipes.

For more information, visit [www.link-quest.com](http://www.link-quest.com).

## OSIL supply Jan De Nul with dredge monitoring buoys

Data buoy manufacturers Ocean Scientific International Ltd (OSIL) have recently supplied eight buoy platforms to Jan De Nul Group, leading experts in dredging, marine construction, and specialised services to the offshore oil, gas and renewables industries.

The robust 1.2-m buoys will be used on different dredging or renewables projects as platforms for environmental monitoring. Each buoy incorporates a variety of sensors from different manu-



facturers, including AML Oceanographic, Campbell Scientific and Nortek, with specialist seabed frames for current monitoring work.

OSIL specialises in providing integrated solutions to customer specifications and worked closely with Jan De Nul Group to establish and meet the exact requirements of the systems and the rapid delivery times necessary. The buoys are uniquely configured to quickly and easily swap between Iridium, UHF and GPRS telemetry methods depending on what comms systems are available at the current or future installation locations.

Data from the buoy systems are emailed to Jan De Nul project workers, and the low power telemetry solution ensures a constant flow of data from the sensors while allowing remote control of measurement interval and data reporting schedules.

The 1.2-m buoys are robust and stable platforms for use in mixed coastal environments and can be moored in a variety of water depths ranging from 3 to 50 m. The hull and top frame are manufactured from rotationally moulded polyethylene, with the hull being filled for added security. The top frame accommodates four solar panels, a built-in radar reflector and a St. Andrews Cross that can fit a wide range of antennae, light and met sensor combinations to suit requirements.

For more information, visit [www.osil.co.uk](http://www.osil.co.uk).

## Sonardyne Syrinx DVL selected for Canadian ocean science ROV

Doppler Velocity Log (DVL) technology from Sonardyne Inc. has been selected to help navigate Canada's flagship undersea research vehicle the Remotely Operated Vehicle for Ocean Sciences (ROPOS). The order for a 4,000-m depth rated, 600-kHz Syrinx DVL was placed by the Canadian Scientific Submersible Facility (CSSF), the not-for-profit corporation who operate ROPOS, following a trial to evaluate its capabilities. This concluded that Syrinx was able to maintain, and regain bottom lock over a wide range of altitudes and seafloor terrains, including soft fine sediment and rugged steep slopes close to hydrothermal vents.

Sonardyne's Syrinx differs from other DVLs through its use of fully linear signal processing, low noise electronics and adaptive bottom lock. These features enable Syrinx to operate at altitudes up to 50% higher than conventional 600-kHz DVLs with the high resolution performance of a 1,200 kHz DVL,



all whilst navigating over undulating and challenging terrain of any type.

Alongside its class-leading precision and accuracy, Ethernet and serial output means that Syrinx can be employed as a standalone DVL, as part of an integrated navigation system, or perform both functions at once, allowing both vehicle pilots and science teams to simultaneously share the output from Syrinx.

Syrinx has been designed to be easy to install, set up and use, and can make use of existing DVL mounting arrangements on host vehicles. Available in depth ratings up to 6,000 m, CSSF selected the 4,000-m rated, corrosion-resistant titanium model for ROPOS. It will be fitted to the vehicle's dedicated navigation instrument skid, which keeps any offset errors between sensors to a minimum.

For more information, visit [www.sonardyne.com](http://www.sonardyne.com).

#### **Teledyne RESON's T-Series next generation modular sonar technology**

Teledyne RESON introduces four new multibeam sonar systems: the integrated dual head SeaBat T20-R & T50-R and the modular SeaBat T20-R & T50-R multibeam sonars. These new multibeam sonars are all built on the cutting edge SeaBat T-series platform that delivers incredible data quality, enhanced sonar capabilities and a selection of sonar processors including the



new rack mount processor—all allowing you to configure the solution to meet your needs and ensure that you maximize your investment.

The new rack-mounted sonar processor (RSP) forms the basis of the SeaBat T20-R, SeaBat T50-R single head, and the integrated dual head products. The RSP comes with an optional industry leading inertial navigation system (INS) for accurate sensor time tagging and motion stabilization securing minimal interfacing. The INS is fully integrated in the RSP, which in total only occupies 2U in an industry standard 19 in. rack, allowing you to save valuable rack space.

The SeaBat T-Series is a unique modularized sonar concept with a distinct design that allows you to build a survey solution based on compact high-resolution sonars that can be scaled to match the needs from smaller survey platforms to larger vessels.

The family includes the SeaBat T20 and T50 sonar receivers, the highly portable sonar processor (PSP) and the new rack-mounted sonar processor RSP. The modular design allows you to start out with a smaller SeaBat T20 and later upgrade your sonar simply by replacing the receiver array. Changing configurations between the super compact and lightweight 1° T20 configuration and the ultra-high resolution 0.5° T50 configuration is easy with the user-friendly SeaBat Updater software.

The new integrated dual head SeaBat T20-R (IDH) and T50-R (IDH) are complete multibeam sonar survey systems with one rack-mounted sonar processor running one fully integrated dual head sonar system. We now provide maximized swath coverage of 220° and 1024 beams with advanced beam forming options. The built-in INS is pre-configured, which, together with the incredibly clean data, makes the system easy to mobilize and easy to use, allowing you to provide survey deliverables faster than ever before.

For more information, visit [www.teledynemarine.com](http://www.teledynemarine.com).

#### **Kongsberg GeoAcoustics and Chesapeake Technology announce real-time SonarWiz interface for PulSAR sidescan sonar**

Marine professionals using Kongsberg GeoAcoustics' PulSAR sidescan sonar now have a powerful new tool for real-time seafloor mapping thanks to a new interface with Chesapeake Technology's SonarWiz mapping software.

The SonarWiz interface, available

now, allows PulSAR users to acquire data from multiple sensors, process imagery in real time, generate state-of-the-art mosaics, create detailed contact reports, and produce sophisticated outputs leveraging a wide range of formats.

The SonarWiz/PulSAR interface is designed to give users more data manipulation and viewing options and to allow for easier identification of small targets and change detection through improved across track resolution.

For more information, visit [www.pulsar-sidescan.com](http://www.pulsar-sidescan.com).

#### **SEAMOR Marine Ltd. announces launch of a new auxiliary camera**

An innovative product has been launched by SEAMOR Marine Ltd: an in-house designed and produced auxiliary camera has been developed to expand the capabilities of ROVs.

SEAMOR, producers of the very popular Chinook and Steelhead ROVs, have found a solution to the need for additional quality cameras that can easily be installed and used with a variety of ROVs. An easily installed and positionable full standard definition colour or black and white camera opens up a world of new possibilities for ROV pilots. Being able to view a different angle, behind the ROV, or close-up on a manipulator will provide even more reliable information for pilots to operate and maneuver their vehicles.

The auxiliary camera produced by SEAMOR Marine features a top-of-the-line full resolution NTSC or PAL camera. This camera has been designed with integrated neutral-white LED lighting, which further enhances the camera's fine sensitivity.

This light weight camera (175 g in the air, 80 g in water) is equipped with industry sub-sea standard connectors that make it compatible with any SEAMOR ROV, or as a stand-alone



camera. These cameras can also be used with other ROVs or mounted onto a divers' helmet if needed.

All aspects of the camera are pressure tested to 600 m. The entire unit is serviceable by SEAMOR or an authorized dealer. In contrast to other companies' cameras that cannot be repaired, the SEAMOR Auxiliary Camera can be repaired. A 1-year limited warranty on failed parts is provided, and further servicing can be specifically targeted to the segment affected, such as the electronics or the camera, without having to repair the entire unit.

For more information, visit [www.seamor.com](http://www.seamor.com).

### **Teledyne Bowtech launches updated L3C-HD and new L3C-HDX underwater cameras**

Teledyne Marine announced that after comprehensive planning and design, Teledyne Bowtech have introduced the updated L3C-HD and the brand new L3C-HDX underwater cameras to add to an already diverse range of high-definition and compact tooling cameras.



The updated release of the L3C-HD camera now features full HD 1080p up to 60 fps to add to the full list of HD-SDI outputs available (720p 50, 720p 60, 1080i 50, 1080i 60, and 1080p 50). The camera also features simultaneous SD and HD-SDI output capability and is fitted with a fixed focus wide angle lens that provides a 67° diagonal angle of view in water. It is housed in 1,000, 4,000 or 6,000 m depth-rated Titanium and is capped by a highly scratch resistant and 99.8% optically pure Sapphire window. Additionally, the new L3C-HD camera is approximately 40% smaller and lighter than its predecessor.

The key feature of the new L3C-HDX camera is that the digital signal from the cameras is a visually lossless compressed signal that will travel up to 250 m on a Teledyne Bowtech coax. This visually lossless compression adds zero latency to the signal and the video is viewed on an HD-SDI capable monitor after going through a small converter box. Built with the same depth rating options, inside the same Titanium housing and behind the same Sapphire window as the L3c-HD, the L3C-HDX only

enhances the capabilities of Teledyne Bowtech's underwater camera products.

Both the L3C-HD and the L3C-HDX cameras are lightweight and compact, and are ideally suited to tooling, diving and ROV/AUV applications.

For more information, visit [www.teledynemarine.com](http://www.teledynemarine.com).

### **Klüber Lubrication introduces eco-compatible open gear lubricant for marine applications**

Klüber Lubrication, a worldwide manufacturer of specialty lubricants, has introduced Klüberbio LG 39-701 N, an eco-compatible operating lubricant for open gear drives used in marine applications.

Klüberbio LG 39-701 N is specifically designed for manufacturers and operators of open gear drives, jack-up lifting systems or other on-board equipment that is frequently in contact with sea water. The lubricant offers excellent adhesion to surfaces, has good low-temperature behavior, and enables operation of open drives in areas with very low ambient temperatures, down to minus 30°C. Special additives reduce wear and extend the service life of components. By spraying the lubricant, consumption can be reduced considerably in comparison to traditional application methods.

The high-viscosity base oil of Klüberbio LG 39-701 N comes from 100% renewable resources and is easily biodegradable. Klüberbio LG 39-701 N also complies with the requirements of Environmentally Acceptable Lubricants (EALs) as defined in Appendix A of the 2013 Vessel General Permit (VGP). The grease is primarily designed for the lubrication of open drives, anchor winches, pinions and racks of jack-up systems as well as low-speed plain bearings in AHTS vessels or rudder systems.

For more information, visit [www.klubersolutions.com](http://www.klubersolutions.com).

### **Impact Subsea release seaView Hydro-Survey**

seaView Hydro Survey provides an easy-to-use and cost-effective hydrographic survey solution. The application operates with the Impact Subsea ISA500—using the unit as a single beam echo-sounder. Each range reading is synchronised with a GPS input, allowing data to be logged and plotted in real-time on screen.

seaView Hydro-Survey is intended to provide a highly cost-effective method of conducting basic underwater surveys using the ISA500.

For more information, visit [www.impactsubsea.com](http://www.impactsubsea.com).

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Phoenix International Holdings, Inc. announces that **Alexander (Jim) Robinson** has joined the company as a senior project manager overseeing oil and gas projects growth and development, safety and operational procedures, and estimating. With more than 30 years experience and knowledge in the offshore construction industry managing projects in the Gulf of Mexico, Mexico, West Africa, SE Asia and the Middle East, Jim brings to Phoenix a unique skill set that will have an immediate impact on the speed and efficiency of how we provide services to our clients worldwide.

**Paul Cooper** has retired after 10 years at the helm of Teledyne CARIS USA. **Karen Hart** has accepted to take on the responsibility of director of the Teledyne CARIS' USA operations and will be spearheading the team to further develop the U.S. market. Also involved in this re-organization is **Tami Beduhn** who will hold the position of NOAA's Account Manager formerly held by Karen.



Robinson

Ardyne has strengthened its senior management team with the appointment of industry-heavyweight **Jochem Scherpenisse** as chief operating officer. Scherpenisse has a wealth of international experience in the oil and gas industry, coming to Ardyne from Baker Hughes, where he spent the past 18 years, exposed to all levels and areas of operation, with particular experience on intervention. Latterly, he served as vice president and managing director for continental Europe and previously covered Europe, Africa, Russia and the Caspian region in roles including operations support director and managing director.



Scherpenisse

long-term strategies for business growth and customer performance in the global severe service mining marketplace. Also, **Donald Polasek**, North American service manager, has accepted the position of board member for the Valve Repair Council.

**Steven Mack Sullivan** has joined MBC Applied Environmental Sciences as a consulting scientist. Sullivan brings hydrographic and geophysical survey capabilities to MBC.

3sun Group, specialist provider of products and services to the global energy industry, has appointed **Paul King** as head of commercial and risk in a move that strengthens the Group's offering to the energy industry. Paul joins the group having most recently held the role of commercial and risk manager at Amec Foster Wheeler. He brings 28 years of experience to this newly created position, having begun his career with Amec in 1988, training as Quantity Surveyor and gaining qualification as member of the Royal Institute of Chartered Surveyors in 1995. Paul was based in London for the last eight years, working extensively on large capital projects in the oil and gas industry, until he moved back to his roots in Norfolk this year.

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**MetOcean Data Systems** and **JouBeh Technologies** will merge to create **metOcean telematics**. The merger will bring together two well-established and innovative organizations with considerable global reach. Collectively, metOcean telematics will be positioned to provide complete end-to-end telematics services—with a focus on niche metocean solutions and custom defence and security products.

**Oceaneering International, Inc.** announced that it is expanding its presence for AUV survey services to the West African region. The company is mobilizing one of its 3,000-m rated AUVs, which is capable of performing deepwater geophysical hazard and pipeline inspection surveys.

Norway headquartered **Kongsberg Maritime**, through its U.S. subsidiary Kongsberg Underwater Technology Inc (KUTI) is pleased to announce that it has entered into a dealer agreement with **Symphtotic Tii Corporation** for distribution of its subsea solutions in California.

**AXYS Technologies Inc.** is pleased to announce the appointment of **Geomarine** of as their new value-added reseller in Italy. Based in Senigallia, Italy, Geomarine is part of the DIMMS group,

offering technical expertise in offshore environments around the Mediterranean.

**ASV Global** has expanded into the Brazilian city of Rio de Janeiro. Working alongside local universities and authorities, ASV is bringing the latest in ASV technology to the emerging South American market. **ASV Global do Brasil LTDA** will offer sales, customer support and operational services.

**Quest Offshore Consulting** inks venture with **Calash Ltd.** to assist the expansion of its services to the U.S., with the opening of offices in both Houston and New York City. A Calash/Quest Consulting combination will offer enhanced services to U.S.-based private equity, debt, and wider investment community, with a focus on strategic due diligence across the energy sector, targeted at the U.S. onshore and offshore oilfield service and E&P markets.

**WFS Technologies** of Livingston, Scotland, has appointed Kuala Lumpur-based independent marine & engineering consultants **Sdn Bhd (IMEC)** as exclusive agents for the Malaysian market. The two companies will work together to expand the use of subsea automation in this key sector. IMEC was founded in 2010 to offer an extensive network of

technical expertise in SouthEast Asia. It operates across a range of engineering and design disciplines including subsea support and installation. The company has a wide array of contacts and the agreement will give WFS access to this important network and local supply chain.

**Unique Group's** India office has been selected by **Trelleborg's** offshore operation as one of its agents in India. As a part of the agreement, Unique Group's base in India will offer the full range of solutions from Trelleborg's offshore operation to customers within the region. The decision was based on Unique Group's successful track record and their dedicated, proactive team in the region.

**BIRNS, Inc.**, an ISO 9001:2008 certified global leader in the design and manufacture of unique lines of high performance lights, connectors, penetrators and custom cable assemblies, has enhanced its existing molding capabilities with the addition of a new custom 40-ton hydraulic transfer press. It will provide additional firepower to BIRNS' molding facility for connector inserts, allowing computer controlled precision for functions like injecting glass reinforced epoxy (GRE) and providing increased speed and output for large orders.

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November 28-29, 2016 <b>Offshore &amp; Deep Sea Mining</b> London, England <a href="http://www.ibcenenergy.com">www.ibcenenergy.com</a>	January 31 - February 2, 2017 <b>Euromaritime</b> Paris, France <a href="http://www.euromaritime.fr">www.euromaritime.fr</a>	March 20-23, 2017 <b>U.S Hydro 2017</b> Galveston, TX <a href="http://ushydro2017.thsoa.org">http://ushydro2017.thsoa.org</a>
November 30 - December 2, 2016 <b>International Workboat Show</b> New Orleans, LA <a href="http://www.workboatshow.com">www.workboatshow.com</a>	February 6-9, 2017 <b>GoM Oil Spill &amp; Ecosystem</b> New Orleans, LA <a href="http://tinyurl.com/GoM-Oil-Spill-Ecosystem">http://tinyurl.com/GoM-Oil-Spill-Ecosystem</a>	March 21-23, 2017 <b>Subsea Tieback</b> San Antonio, TX <a href="http://www.subseatiebackforum.com">www.subseatiebackforum.com</a>
November 30 - December 2, 2016 <b>WOC Sustainable Ocean Summit</b> Rotterdam, The Netherlands <a href="http://www.ilago.ovh/sustainableoceansummit">www.ilago.ovh/sustainableoceansummit</a>	February 14-16, 2017 <b>OI North America</b> San Diego, CA <a href="http://www.oceanologyinternationalnorthamerica.com">www.oceanologyinternationalnorthamerica.com</a>	March 26-28, 2017 <b>Canadian UW Conference</b> Ottawa, Canada <a href="http://www.cuce.ca">www.cuce.ca</a>
December 12-16, 2016 <b>AGU Fall Meeting</b> San Francisco, CA <a href="https://fallmeeting.agu.org/2016">https://fallmeeting.agu.org/2016</a>	February 21-23, 2017 <b>Underwater Intervention</b> New Orleans, LA <a href="http://www.underwaterintervention.com">www.underwaterintervention.com</a>	April 3-5, 2017 <b>MCEED</b> Amsterdam, The Netherlands <a href="http://mceed.com">http://mceed.com</a>

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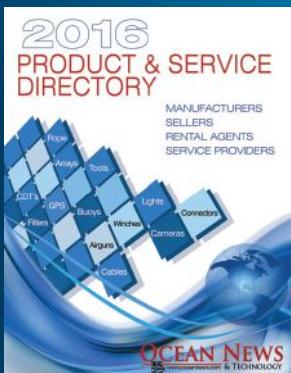
# OCEAN INDUSTRY MONTHLY DIRECTORY



## CURRENT LISTINGS IN EVERY ISSUE

Ocean Industry Directory is featured in every issue of Ocean News, and the industry knows this is the one source they can count on to provide them with up to date listing information for the products and companies they're looking for.

Don't miss the opportunity to provide your next prospect with the information he needs to contact you. Place your listing in the Ocean News & Technology Ocean Industry Directory today! Listing can be changed at any time. Add your QR code to direct print readers to your website.



## ANNOUNCING PRODUCT & SERVICE DIRECTORY:

Produced annually with a mid-year update in digital format, this new comprehensive directory distinguishes between manufacturers, sellers, and rental agents.

### SPECIAL OFFER

Companies listed in our Monthly Ocean Industry Directory will receive a free logo in the company listing section of the Product & Service Directory. Contact your representative for details.

## Directory Sales:

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## CABLES

### Falmat Cable

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For over 50 years, Falmat Cable has been a key supplier and a solution provider to many global OEMs and end users supporting a wide range of marine 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. We offer XtremeMarine cables with precision coaxial components for use with SD/HD video requirements, wet rated submersible pump cables, miniature fiber optic cables, a comprehensive range of highly engineered ROV Tethers plus our well recognized Xtreme Ethernet cables. Falmat is a Certified ISO9001/AS9100 organization. Visit our web site. [www.falmat.com](http://www.falmat.com).

### South Bay Cable Corp

54125 Maranatha Drive  
P.O. Box 67  
Idyllwild, CA 92549  
Phone: (951) 659-2183  
Fax: (951) 659-3958  
E-mail: Sales@southbaycable.com  
Website: www.southbaycable.com  
Contact: Gary Brown, Sales Manager



Since 1957, South Bay Cable Corp has designed and manufactured specialized electrical, electro-mechanical and electro-optical-mechanical cables for use in demanding marine environments. Cables are designed to meet customer requirements and include tether and umbilical cables for ROVs, tow cables, video inspection, faired cables and a host of other customer specific applications.

## CONNECTORS

### AK Industries

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Fax: +1 310 762 1616  
E-mail: sales@ak-ind.com  
Website: [www.ak-ind.com](http://www.ak-ind.com)  
Contact: Allan Kidd



AK Industries is an agile high tech manufacturer of rugged low cost underwater electrical connectors. The HydroVolt line of connectors is the most rugged and reliable low cost connector available. AK Industries is also ideally suited to provide unique solutions engineered to customer requirements.

### BIRNS, Inc.

1720 Fiske Place  
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Fax: +1 805 487 0427  
USA: +1 888 BIRNS 88 (+1 888 247 6788)  
E-mail: service@birns.com  
Website: [www.birns.com](http://www.birns.com)  
Contact: Eric Birns



BIRNS, Inc. has been serving the subsea industry since 1954, and is an ISO 9001:2008 certified global leader in the design and manufacturing of high performance connectors, custom cable assemblies and lighting systems. With a NAVSEA PRO-020 certified molding facility, the company leads the industry with sophisticated connector lines, including exceptional electrical, electromechanical, coaxial, electro-coax, optical, electro-optical and electro-opto-mechanical hybrid options. 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 also delivers brilliant LED and tungsten-halogen marine, chamber, security and commercial diving lights trusted in the world's most extreme environments.

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E-mail: sales@birnsaquamate.com  
Website: [www.birnsaquamate.com](http://www.birnsaquamate.com)  
Contact: Eli Bar-Hai



Birns Aquamate design and manufacture underwater electrical connectors, cable assemblies, and cable terminations. The company produces a wide range of standard industry connectors such as the 5500 Series, SC, MC, LP, FAWL/FAWM, Rubber Molded, etc. BIRNS Aquamate is the only underwater connector producer that guarantees compatibility with other manufacturers. Birns also specializes in fast turn-around for custom design of special connector solutions. Stocking dealers in the UK, South Africa and Holland as well as dealers in Canada, Germany, Belgium, Norway, China, and Brazil.

## SEACON

1700 Gillespie Way  
El Cajon, CA 92020 USA  
Tel: +1 619 562 7071  
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E-mail: seacon@seaconworldwide.com  
Website: [www.seaconworldwide.com](http://www.seaconworldwide.com)



The SEACON Group are world leaders in underwater connector technology and provide an extensive and diverse range of electrical, optical and hybrid connector assemblies, submersible switches and cable system solutions for many applications within the Oceanographic, Defense, Oil and Gas and Environmental markets. With locations in California and Texas, USA, Mexico, Brazil, the United Kingdom and Norway and a worldwide network of agencies and representatives, SEACON is able to supply very quick solutions to any requirements across the globe.

### Teledyne Impulse

9855 Carroll Canyon Road  
San Diego, CA 92131 USA  
Tel: 1-800-327-0971 or  
+1-858-842-3100  
Fax: +1-858-565-1649  
E-mail: impulse@teledyne.com  
Website: [www.teledyneimpulse.com](http://www.teledyneimpulse.com)



Teledyne Impulse designs and manufactures highly reliable electrical and optical interconnection systems for a range of harsh environments. From underwater sensor connectors, to ROV connectors, to the largest vehicle systems, Impulse products are proven performers in demanding applications, which include oceanographic exploration, defense, oil and gas production, and wastewater management.

### Teledyne ODI - A Teledyne Technologies Company

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Fax: +1 386 236 0906  
Toll Free: (888) 506 2326  
E-mail: ODI\_marketing@teledyne.com  
Website: [www.odi.com](http://www.odi.com)



A leader in subsea electrical & fiber optic interconnect systems. Wet-mateable connectors include signal & high-power electrical, optical, and hybrid products. All based on patented PBOF technology. These rugged components are designed for use at any ocean depth, in the harshest environments. ODI also provides top quality custom engineered solutions for any subsea networking challenge.

## DESIGN AND ENGINEERING

### Hydro Leduc NA, Inc.

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Houston, TX 77084  
Tel: 281-679-9654  
E-mail bogden@hydroleduc.com  
Website: [www.hydroleduc.com](http://www.hydroleduc.com)



Hydro Leduc is a specialist in the design and manufacture of hydraulic piston pumps, hydraulic motors, hydro pneumatic accumulators, and customized hydraulic components satisfying customer needs with reliable products from a reliable source. As the leader in micro hydraulics, it is feasible to obtain several tons of force from a minimal power source within a restricted space envelope. The techniques of micro hydraulics allow simple solutions to problems that are often beyond the limits of traditional mechanical options. Hydro Leduc's expertise is at your service in varied applications such as oil service tools, oceanographic instrumentation, aeronautics, and any extreme working condition of temperature, pressure, medium, and environment.

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Hyperbaric Medicine Division  
400 N Ashley Drive, Suite 2600  
Tampa, FL 33602  
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UK 011-44-20-3372-4531  
Email hbo@trilogyhse.com  
Website www.trilogyhse.com



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E-mail: Bleblanc@okeanus.com  
Website: www.okeanus.com  
Contact: Benton LeBlanc



*Okeanus is the premier rental provider for oceanographic and marine scientific research equipment utilized in nearshore and offshore projects around the world. Focused on providing industry-leading customer service, Okeanus offers advanced, high-quality technology coupled with knowledgeable and experienced staff that can deliver dedicated support regardless of a project's location.*

## FIBER OPTIC PRODUCT/SERVICES

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77 Frazee Avenue  
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Canada B3B 1Z4  
Tel: +1 902 468 2263  
Fax: +1 902 468 2249  
E-mail: focal@moog.com  
Website: www.moog.com/marine  
Contact: Shawn Taylor



*Focal, A Moog Inc. Company, specializes in providing electrical slip rings, fiber optic rotary joints, hydraulic utility swivels and fiber optic multiplexer solutions for the worldwide marine industry including ROV, seismic, FPSO turret and oceanographic applications. Product features include hybrid packages that combine fiber, electrical and fluid rotary joints for harsh environments.*

**Ocean Specialists Inc.**

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Email: jbyous@oceanspecialists.com  
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*Ocean Specialists, Inc (OSI) is a submarine fiber optic network development company with global project 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.*

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Website: www.ixblue.com



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- OCTANS surface gyrocompass and motion sensor
- OCTANS NANO compact subsea gyrocompass and motion sensor
- OCTANS 3000 subsea gyrocompass and motion sensor

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**High Tech, Inc.**

21120 Johnson Road  
Long Beach, MS 39560, United States  
Tel: 228 868 6632  
Email: high\_techinc@bellsouth.net  
Website: www.hightechincusa.com  
Contact: Glenn Pollock



HIGH TECH, INC.

*Experts in rugged marine sensor systems utilized in geophysical surveys, anti-submarine warfare, marine mammal monitoring and downhole applications. Products include data acquisition systems, hydrophones, array cables, pressure vessels and peripherals related to marine systems.*

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E-mail: insure@jwfisk.com  
Website: www.jwfisk.com



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Tel: +1 201 825 1400  
Fax: +1 201 825 1962  
E-mail: atl@atlinc.com  
Website: www.atlinc.com  
Contact: 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, ethyleneglycol, hydraulic fluids and chemical cleaning cocktails. Expedited deliveries are also available.*

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Unit 5, Thorney Leys Business Park  
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United Kingdom  
Tel: +44 (0)1993 706565  
E-mail: sales@bartington.com  
Website: www.bartington.com



Bartington Instruments' products include high precision, low noise fluxgate magnetometers, gradiometers and data acquisition units for marine applications. With a reputation for performance, reliability and durability, our instruments are used for detection of magnetic anomalies such as underwater UXO, pipe and cable location, magnetic signature analysis, and oil and mineral exploration.

### Geometrics, Inc.

2190 Fortune Drive  
San Jose, CA 95131  
Tel: +1 408 954 0522  
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E-mail: sales@geometrics.com  
Website: www.geometrics.com  
Contact: Bart Hoekstra



Geometrics, a member of OYO Corporation, manufactures, sells, and services portable geophysical instruments for land, marine, and air investigations of the subsurface. Geometrics' product line includes proton precession and cesium magnetometers, high-resolution seismographs, and electrical conductivity imaging and resistivity systems. Geometrics' instruments are used around the world for natural resource exploration, geotechnical and environmental assessments, ordnance detection, locating archeological and treasure sites, teaching and research.

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8502 SW Kansas Avenue  
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Fax: +1 772 219 3010  
E-mail: gstevens@conshelf.com  
Website: www.csaocean.com  
Contact: Gordon Stevens



CSA Ocean Sciences Inc. (CSA) is a marine environmental consulting firm specializing in multidisciplinary projects concerning potential environmental impacts of activities throughout the world. With extensive experience in environmental sciences and technical field operations, CSA is staffed and equipped to offer a complete range of services for projects in offshore, nearshore, estuarine, wetland, and freshwater environments.

## MOTION SENSING EQUIPMENT

### Kongsberg Seatex AS

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Fax: +47 73 51 50 20  
E-mail: km.seatex@kongsberg.com  
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Kongsberg Seatex is a leading international marine electronics manufacturer specializing in the development and production of precision positioning and motion sensing systems. Our commitment is to provide quality products and solutions for safe navigation and operations at sea in the commercial offshore, maritime, hydrographics and defence industries.

## NAVIGATION & POSITIONING SYSTEMS

### EvoLogics GmbH

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Tel: +49 (0) 30 4679 862-0  
Fax: +49 (0) 30 4679 862-01  
E-mail: sales@evologics.de  
Website: www.evologics.de



EvoLogics provides the world's most advanced spread-spectrum underwater communication systems (SSC) with multi-channel data management, networking capability, built-in tracking and positioning functions with USBL. Data loggers, acoustic wake-up module and releasers optionally included. Deployments in offshore platforms (FPSO, ABS), environmental monitoring, defense systems, ROV and AUV operations and more. Applications include simple positioning and sensor information to transmission of underwater photos.

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Website: www.ixblue.com



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- HYDRINS hydrographic survey INS
- MARINS M-Series first rank and submersible ships INS
- ROVINS subsea INS

iXBlue is a leading global provider of innovative solutions and services for navigation, positioning, and imaging.

## Kongsberg Seatex AS

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## NETWORK AND DATA COMS

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## OCEANOGRAPHIC INSTRUMENTS/SERVICES

**nke Instrumentation**

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Tel: +33 2 97 36 41 31  
Fax: +33 2 97 36 10 12  
E-mail: info.instrumentation@nke.fr  
Website: www.nke-instrumentation.com



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- Dedicated monitoring data loggers and equipment for: sediment transport, underwater systems behavior, marine corrosion, pCO<sub>2</sub> sensor (stand alone or on drifting buoy), density, absolute salinity...

- Intelligent network: environmental parameters (meteorologic and oceanographic), Ecosystems Approach to Fisheries (EAF - Voluntary fishing vessels), Webdata application  
Contact: Valérie Le Pen - vlepen@nke.fr or Gouven Prud'homme - gprudhomme@nke.fr
- Provor and Arvor profiling subsurface floats (ARGO project): CTD, dissolved oxygen, BGC, deep; Argos and Iridium transmission.
- Drifting surface buoys with temperature and GPS receiver for Surface velocity project.  
Contact: Nathalie Le Bris - nlebris@nke.fr

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Fax: +1 613 599 8929  
E-mail: info@rbr-global.com  
Website: www.rbr-global.com



RBR creates instruments to measure the blue planet. From the ocean abyss to the polar ice caps, our sensors track water parameters – temperature, depth, salinity, dissolved gases, pH, and many others. With design and manufacturing centrally located in Ottawa, Canada, our team works in a fast-paced, dynamic atmosphere to serve customers all over the globe.

**ROMOR Ocean Solutions**  
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B0N 1Z0  
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Fax. +1 (902) 466-4880  
E-mail: Sales@romor.ca  
Website: www.romor.ca  
Contact: Darrin Verge, President & CEO



ROMOR Ocean Solutions provides instrumentation solutions for the geophysical, oceanographic, defense, security, oil & gas, and renewable energy industries. By partnering with world renowned manufacturers, ROMOR is able to offer technical knowledge, value added services, logistics expertise, and the most reliable instrumentation on the market.

**Sea and Land Technologies Pte Ltd**  
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Singapore 639508  
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Fax: +65 65630366  
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website: www.sea-landtech.com



A leading solutions provider in Asia Pacific countries for Oceanography, Meteorology, Hydrography, Hi Resolution Marine Seismic studies, Coastal Monitoring, Hydrology and Environmental Surveys. With over 20 years of experience partnering leading worldwide manufacturers, SALT provides advanced technology hardware and software solutions, combined with Calibration, Training, Repairs, Cable Moulding services & RENTAL Equipment to the users in the region. In addition to our 60,000 square foot HQ in Singapore, SALT has offices in Malaysia, Indonesia, Thailand, Philippines and Australia.

**Sea-Bird Scientific**  
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Website: www.sea-birdscientific.com  
Contact: Calvin Lwin, Sales



SEA·BIRD  
SCIENTIFIC

Sea-Bird Scientific, comprised of Sea-Bird Electronics, WET Labs, and Satlantic, provides integrated solutions to customers' measurement needs. Sea-Bird Scientific is the leader in accurate, stable ocean instruments for measuring conductivity (salinity), temperature, pressure, oxygen, pH, chlorophyll, CDOM, turbidity, beam attenuation, irradiance, radiance, PAR, nitrate, and phosphate. Our CTD profilers, water samplers, moored CT recorders, wave/tide recorders, DO sensors, and optical sensors are used by research institutes, ocean observing programs, government agencies, and navies globally.

**Star-Oddi**

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Gardabaer, Iceland  
Tel: +354 533 6060  
Fax: +354 533 6069  
E-mail: baldur@star-oddi.com  
Website: www.star-oddi.com  
Contact: Baldur Sigurgeirsson

**STAR:ODDI**

A manufacturer of miniature data loggers with sensors as temperature, depth/pressure, salinity, tilt/acceleration, compass direction/magnetometer, light levels, acoustic receiving/transmitting. The loggers are used for various researches, including oceanography, fishing gear studies, equipment behavioral monitoring and fish tagging. Data is presented in the application software with a time-stamp for each measurement.

## SMART TELEMETRY

**OceanWise Ltd**

Dovedale House, 16 Butts Road  
Alton, Hants, GU341NB, UK  
Tel: +44 (0)1420 768262  
Fax: +44 (0)8713 140910  
Email: info@oceanwise.eu  
Website: www.oceanwise.eu  
Contact: john.pepper@oceanwise.eu



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- SEAPIX 3D multibeam sonar

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**Klein Marine Systems, Inc.**

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Fax: +1 603 893 8807  
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Web: www.KleinMarineSystems.com  
Contact: Deborah Durgin, Supervisor, Marketing & Sales



Klein Marine Systems, Inc. is the world's leading sensor technology provider that manufactures and designs high-resolution side scan and multi-beam sonar equipment, and radar-based security and surveillance systems. Klein has developed a worldwide reputation of excellence in the industry by providing quality products and excellent customer service. Please feel free to check out our product offerings at [www.KleinMarineSystems.com](http://www.KleinMarineSystems.com).

**Marine Sonic Technology**

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Website: [www.marinesonic.com](http://www.marinesonic.com)



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Marine Sonic Technology builds high quality, high resolution side scan sonar systems. Located in Yorktown, Virginia, Marine Sonic has been in business for more than 25 years. Our towed systems are rugged, easy to deploy and simple to operate. We also offer highly efficient AUV/ROV embedded systems, which occupy minimal space and low power consumption.

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Tel: +47 56 11 30 66  
Fax: +47 56 11 30 69  
E-mail: info@savias.no  
Website: [www.savias.no](http://www.savias.no)  
Contact: Gunnar Sagstad

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Website: [www.ixblue.com](http://www.ixblue.com)



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- ECHOES 5000 full ocean depth sub-bottom profiler
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## SUBSEA FABRICATION

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Contact: Trevor Davis



*Hydra Offshore Construction, Inc. specializes in subsea fabrication and construction, heavy lift, maintenance, repair, and decommissioning. The Hydra 23 acre dockside facility in Port Arthur, Texas is also equipped for SIT (System Integrated Testing), and the fabrication of jumpers, PLETS, PLEM's, manifolds, custom drilling templates, spool pieces, trash caps, and equipment skid packages.*

### New Industries

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Website: [www.newindustries.com](http://www.newindustries.com)  
Contact: Bill New



*New Industries provides quality fabrication services to the offshore oil & gas and marine industries focusing on large diameter pressure vessels, suction piles, DNV buildings and deepwater subsea production equipment such as jumpers, PLETS, PLEM's and manifolds.*

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Tel: +1 985 714 1767 or 985 518-0055  
E-mail: [charles@subseaamerica.com](mailto:charles@subseaamerica.com)  
Website: [www.subseaamericas.com](http://www.subseaamericas.com)  
Contact: Charles Mayea



*Subsea Americas (SSA) is a leading provider of rental ROV tooling equipment on a worldwide basis. SSA is a 24 hr. / 7 days a week service provider of a comprehensive range of standard subsea tooling equipment. From torque tools and flying lead orientation tools to 15k isolated hydraulic intensifiers and wire rope cable cutters - SSA can fully support the client's needs with quality service, and reliable equipment at a most competitive cost.*

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Fax: +1 508 563 4445  
E-mail: [glester@hydroid.com](mailto:glester@hydroid.com)  
Website: [www.hydroid.com](http://www.hydroid.com)  
Contact: Graham Lester



*Hydroid, a subsidiary of Kongsberg Maritime, is the world leader in manufacturing advanced Autonomous Underwater Vehicles (AUVs). REMUS AUVs provide innovative and reliable systems for the marine research, defense, hydrographic and offshore/energy markets. Hydroid vehicles represent the most advanced, diversified and field-proven family of AUVs and support systems in the world.*

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Tel: +1 508 678 0550  
Fax: +1 508 678 0552  
E-mail: [sales@ocean-server.com](mailto:sales@ocean-server.com)  
Website: [www.iver-auv.com](http://www.iver-auv.com)  
Contact: Jim Kirk



*OceanServer Technology, Inc. is a leading provider of man-portable Autonomous Underwater Vehicles (AUVs) with over 250 AUVs deployed worldwide. The Iver AUV is an affordable, commercial vehicle used for general survey and sub-surface security work, and serves as a research platform for autonomy, behavioral and sensor development studies at universities and navy research facilities.*

## UNDERWATER VEHICLES/ROVs

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Tel: 713.329.4500  
E-mail: [info@oceaneering.com](mailto:info@oceaneering.com)  
Website: [www.oceaneering.com](http://www.oceaneering.com)  
Contact: Bill Mallin



*Oceaneering is the subsea connection specialist. We are connecting what's needed with what's next as the world's largest ROV operator and the leading ROV provider to the oil and gas industry with over 300 systems operating worldwide. We push the limits of ROV intervention and meet new, demanding tooling intervention.*

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Fax: 985-847-1106  
E-mail: [jeff@outlandtech.com](mailto:jeff@outlandtech.com)  
Website: [www.outlandtech.com](http://www.outlandtech.com)  
Contact: Jeff Mayfield



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Fax: +1 619 450 4001  
E-mail: [SeaBotixInfo@Teledyne.com](mailto:SeaBotixInfo@Teledyne.com)  
Website: [www.SeaBotix.com](http://www.SeaBotix.com)  
Contact: Alasdair Murrie



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Fax: +1 281 858 6363  
E-mail: [sales@rovoco.com](mailto:sales@rovoco.com)  
Website: [www.rovoco.com](http://www.rovoco.com)  
Contact: Jessica McKenney



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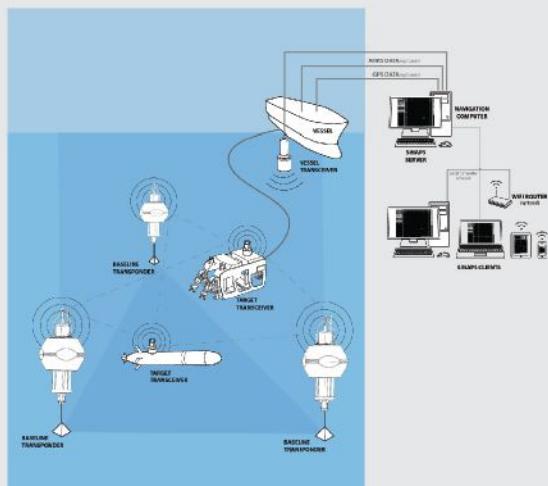
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