

# OCEAN NEWS

March 2016

35  
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& TECHNOLOGY



Innovative Fiber Optic  
Networking Solutions

Page 10



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# in this issue

## Ocean Industry



- |                            |                                |
|----------------------------|--------------------------------|
| 14 Ocean Industry Briefs   | 31 Offshore Industry Headlines |
| 20 Maritime Transportation | 34 Upstream Oil & Gas          |
| 22 Ocean Science           | 40 Underwater Intervention     |
| 24 Ocean Energy            | 48 Maritime Communications     |
| 28 Defense                 | 54 Subsea Cables               |

## Offshore Industry



6

## Departments

- |                      |                             |
|----------------------|-----------------------------|
| 8 Editorial          | 61 Offshore Stats and Data  |
| 66 Product News      | 70 People & Company News    |
| 72 Calendar & Events | 75 Ocean Industry Directory |

## Cover Photo



A diver conducts a visual inspection of a permanently-deployed Sentinel Intruder Detector Sonar supplied by maritime security company, Sonardyne International Ltd, UK. Sentinel is the most widely deployed system of its type in the world and enables underwater threats approaching a protected asset to be detected, tracked and classified at long ranges.

## Feature Story

### 10 Innovative Fiber Optic Networking Solutions

## Editorial Focus

### 18 The Importance of maritime communication security

## Product Spotlight

### 35 SubCtech

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# in the next issue

## Editorial Focus

- Offshore Technology
- Ocean Mapping & Survey

## Product Focus

- Subsea Tools & Manipulators
- Batteries
- Training/Safety



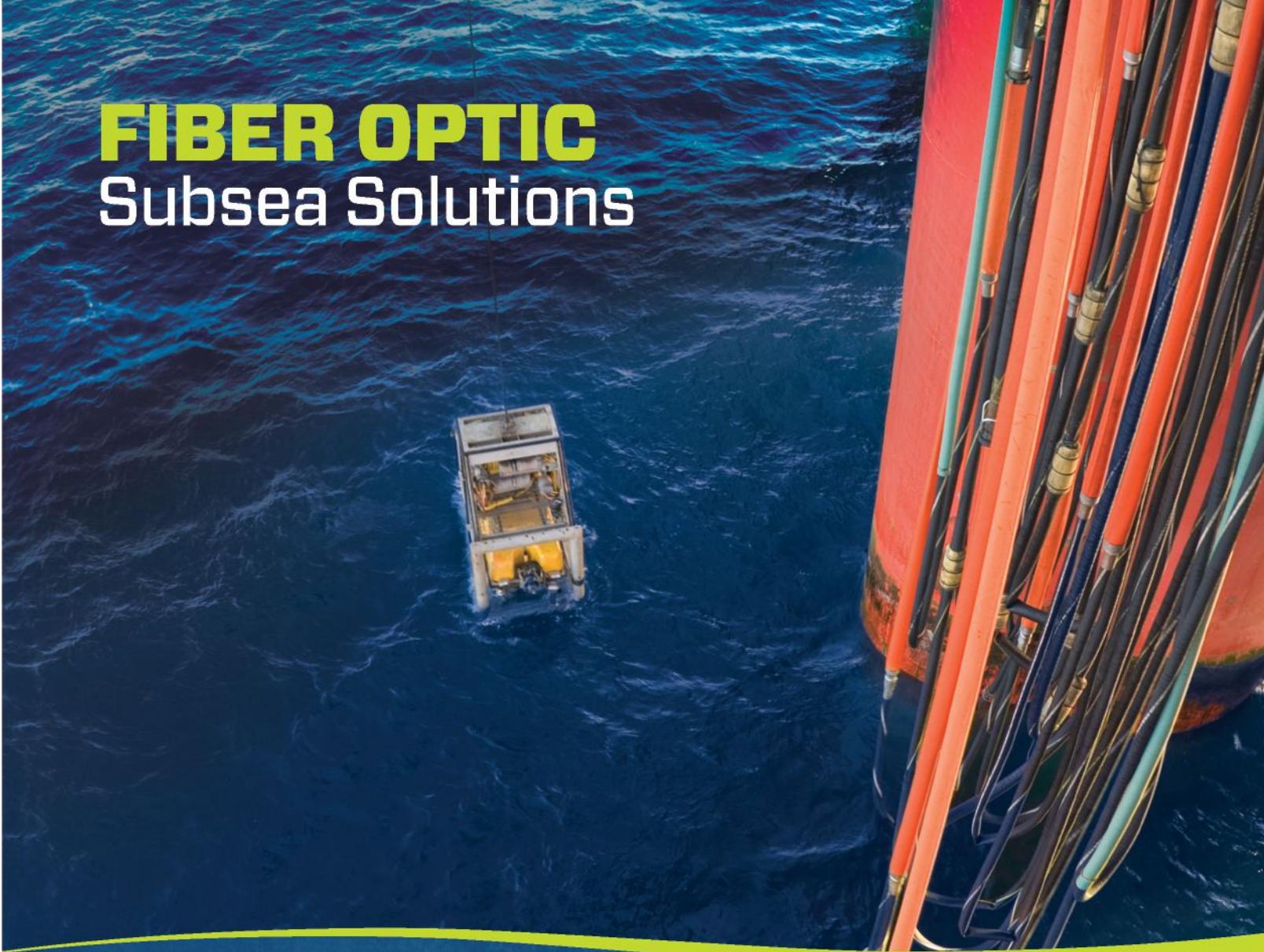
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By John Manock

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## Subsea Fiber's Time Has Come

The search for and production of oil and natural gas in offshore areas is becoming more and more challenging and subsea fiber networks are helping to provide solutions. The oil and gas companies are moving into deeper waters in search of deposits, while new technologies are enabling them to operate their platforms more efficiently. The decline in oil prices is driving operators to innovate and develop ways to maximize production and efficiencies. Meanwhile, the ability to acquire vast amounts of geologic, oceanic and atmospheric data is far greater than at any other time in the history of offshore exploration. This has led to a better understanding of the nature of offshore fields in general and deep ocean fields in particular.

As a result, the telecommunications needs of offshore platform operations are changing. Platform operators are demanding more bandwidth to meet the growing data demands and more cost-effective ways to increase operational efficiency. Meanwhile the critical nature of this data requires greater reliability of their telecom networks to ensure end-to-end connectivity and reduce downtime.

Faced with these challenges, it is easy to understand why some platform operators are turning to subsea fiber networks. Although subsea cables require a higher upfront capital investment to install, fiber optic technology meets the demands of both high bandwidth and greater reliability. Fiber can provide nearly unlimited bandwidth and can be upgraded to meet future needs. Subsea cables are less susceptible to weather-related disruptions, while cable ring networks can provide reliability in the event of a single cable outage.

The history of subsea fiber serving offshore oil & gas platforms goes back to the late 1990s. Today, large-scale systems are providing valuable telecom services to platforms in the North Sea, the Gulf of Mexico, the Mediterranean and the Gulf of Thailand. Last year, a supply contract for another large project was awarded off the coast of Angola. In addition, many small links to individual platforms have been installed, often in conjunction with a power cable to provide electricity from shore.

Subsea fiber fits into the broader sphere of the "digital oilfield" and includes connecting networks of sensors and robotics as well as connecting the platforms to each other and to the shore. It also fits into the offshore "Internet of Things" (IoT) concept whereby objects (such as sensors) in the offshore field have their own IP addresses, allowing them to collect and exchange data over

the Internet. In fact, the offshore IoT can go further than the passive collection of data. It also allows control of certain operations, such as activating and deactivating equipment.

Subsea fiber networks can deliver business benefits to the oil & gas industry, including:

- Increased efficiency of offshore operations and reduce downtime;
- Connection between shore-based and offshore personnel to accelerate and improve decision making;
- Availability of shore-based SME personnel across multiple operations or regions;
- Real-time visibility and oversight to manage exploration and drilling assets; and
- Increased operational safety and security.

At Ocean Specialists, Inc (OSI), we believe that the offshore oil & gas market for subsea fiber networks has reached a defining moment. To keep up with the pace of technological development and accomplish the goals that oil & gas companies have set and will need to embrace for future operating efficiencies, there will be no alternative to subsea fiber.

For several years now, the offshore oil & gas industry has talked about what the future needs to look like. This concept, with new apps, virtualization, big data, etc., is not future, it's now, and fiber is a must-have enabler of those technologies.

OSI has already taken the building of subsea fiber networks for the oil & gas industry to a new level. We have worked with operators in many regions to design, deploy and operate fiber optic networks that are secure, resilient and upgradable for future applications and operations.

We feel that the market for subsea fiber will continue to increase. While the current drop in oil prices is resulting in lower investment across the oil & gas industry, the future points towards exploration and production further from shore in deeper and deeper waters, with equipment using greater degrees of automation and, thus, with higher bandwidth requirements. In conditions where there is downward pressure on capex investment, the need for greater cost efficiency points to subsea fiber. Some operators recognize the cost effectiveness of fiber to their overall efficiency. Although the price per barrel of oil has dropped, their costs have not. As these conditions continue, subsea fiber will become more cost effective and more commonplace in the offshore oil & gas world.

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# INNOVATIVE FIBER OPTIC NETWORKING SOLUTIONS

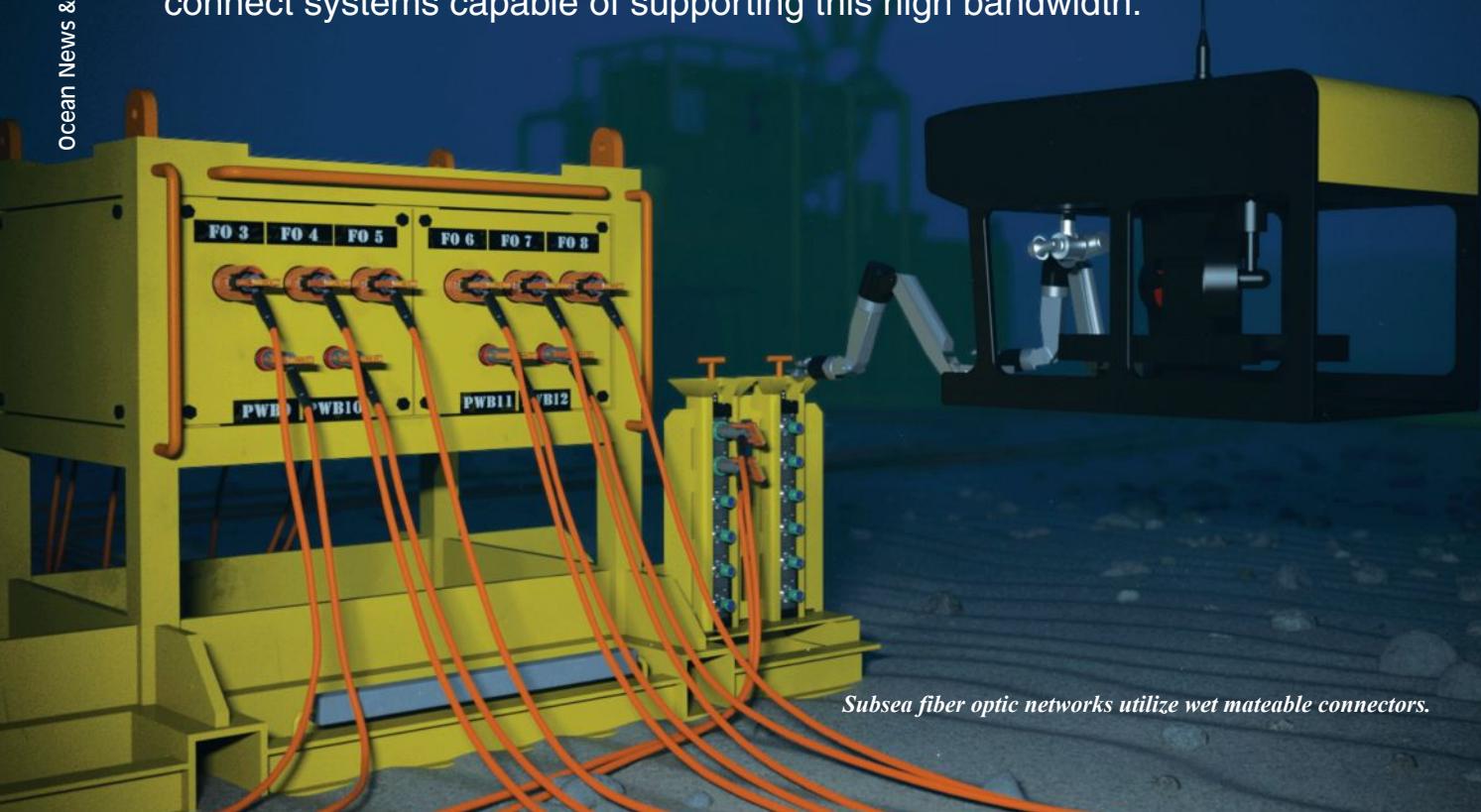
*By: Teledyne Marine Interconnect*

March 2016

10

Ocean News & Technology

Subsea fiber optic networks are an integral part of our modern ocean systems, designed for transmitting and receiving reliable, accurate data among and between the different sources and users of data. These can include downhole sensors, wellhead equipment, subsea infrastructure, subsea pipelines and ship- and shore-based control facilities. The data are used for a myriad of applications, from monitoring the health of a pipeline in an oil and gas field to detecting seismic activity on the seabed to research climate change, among many others. As sensors have become more sensitive and reliable, interconnect systems have also evolved. The need for enhanced reliability and the ability to collect complete data is ever increasing. Data provide a window into a world we can't visually see, and the trend continues to point to gathering more and more data as sensors and systems develop further into longer step-outs and higher bandwidth. Subsea networks will, in turn, require modular connectivity using interconnect systems capable of supporting this high bandwidth.



*Subsea fiber optic networks utilize wet mateable connectors.*

Fiber optic interconnect systems are often found in subsea vehicles that perform a wide range of tasks from surveillance to monitoring and pipe tracking to actuating subsea valves and hydraulic, electrical, and fiber optic connectors. Submersible gliders, autonomous unmanned vessels, and remotely operated vehicles (ROVs) all are important elements in both the oceanographic and energy industries to perform functions in locations that divers or boats cannot access safely or economically. In these cases, it is imperative that the interconnect systems function reliably to justify the economics of these complex instruments.

Interconnect technologies currently available on the market range from small-form-factor, single-channel submersible fiber optic connector sets to multi-channel wet-mateable connectors designed to be mated underwater at full ocean pressure via ROVs or divers. A complete assembly, often referred to as a jumper or flying lead, is designed to connect subsea nodes, junction boxes, and instruments together to comprise a networked system.

Whether the application consists of a complex subsea oil production field or an ROV designed to inspect shipwrecks, the design of the interconnect system demands considerable and critical attention since failure to communicate data properly can result in a costly or even irreplaceable loss. It is, therefore, critical to properly match the connector configuration to the application to optimize the value for the cost while still guaranteeing reliable data relay for the expected life of the system, whether it's 6 months or 30 years.

Fiber optic interconnect technologies currently available to the market are listed below:

- Optical dry-mate submersible connectors
  - Typical applications include cameras, riser monitoring systems, submersible vehicles, and subsea sensors
- Optical wet-mate connectors and penetrators paired with optical cable terminations
  - Typical applications include subsea control modules, data transmission systems, umbilical terminations, and junction boxes
- “Active” Flying Leads for electrical/optical conversion
  - Typical applications include subsea observatories, seismic monitoring systems, subsea oil and gas pumping, processing and boosting, littoral and deep-sea persistent surveillance systems, and configurable port and harbor security system networks

### **Optical dry mate submersible connectors**

Even as subsea instruments are getting increasingly more sophisticated, the demand for small-form-factor optical connectors has increased. With the linking of multiple optical sensors comes the need to reduce weight and size. Smaller connectors are a solution as long as the optical specification requirements are met. In response to this trend, Teledyne Impulse-PDM developed the Omicron, the smallest single-way underwater-capable fiber optic connector in the industry today, rated for an operational depth of 5,000 m and an insertion loss of less than 0.5 dB. The Omicron series is engineered for use on submersible cameras, riser monitoring systems, sensor systems, and other applications that involve data and signal communication in harsh or challenging environments.

Teledyne DGO also offers a 153 series, a fiber optic assembly that accommodates up to 15 channels. The 153 series is rated up to 10,000 psi, with operational temperatures from -50°F to +160°F, allowing reliable operation in challenging conditions where failure is not an option.



*Teledyne DGO's 153 Fiber Optic Connectors.*

### **Optical wet mate connectors and cable terminations**

For fiber optic networks found in both subsea oilfields as well as scientific observatories, reliability and the ability to handle high bandwidth are both crucial elements to a functioning network. Teledyne ODI designs complex engineered solutions for subsea interconnect applications, meeting challenges brought on by high pressures and temperature extremes in turbid and saltwater environments. The Rolling Seal Hybrid (RSH) is the industry-standard, multi-channel, underwater optical connector for subsea field operations requiring high-speed data transmission via optical fiber. The patented Rolling Seal design functions by excluding water and shutting silt away from the region where the optical ferrules are brought into contact, creating a clean, oil-filled conduit for the optical ferrules to connect. The result is a reliable low-loss optical throughput. Coupled with field-proven optical cable terminations, fiber optic networks that operate continuously for over 25 years can be developed for multiple applications.



*Teledyne PDM's Omicron Fiber Optic Connector.*

## Active Flying Leads and E/O conversion

Traditionally, Flying Leads (or jumpers) have been considered a passive element in subsea infrastructure, meaning that power and data move through the system without interference or modification. The introduction of Active Flying Leads and the evolution of subsea fiber optic connectors provide a platform to solve future challenges in subsea data communication.

Identified as Active Flying Leads (AFL), this technology allows for the use of electronics integrated into a connector or in-line with the jumper and, in some cases, converting from different methods of communication that the equipment utilizes, transforming the Flying Lead into an active component in a subsea data transmission system. The AFL platform consists of functional electronics housed within a qualified atmospheric chamber that can be placed within a pressure-balanced, oil-filled (PBOF) hose. Teledyne DGO's glass-to-metal sealed penetrators provide fail-safe pressure barriers within the chamber for reliable performance under the extreme pressures found in deepwater subsea fields.

March 2016

12

Ocean News & Technology



*Teledyne ODI's Electrical Optical Flying Lead.*

The AFLs can also be used to extend communication to lengths that were previously not possible. The flagship product within the AFL family is the Electrical to Optical Flying Lead (EOFL). The EOFL converts a fiber optic signal through a hybrid fiber optic wet-mate connector and produces an electrical Ethernet signal through a 12-way electrical connector on the other end. The conversion from optical to electrical is accomplished in a compact one-atmosphere internal chamber. This new product may be used in place of more complex equipment such as secondary nodes and junction boxes or distribution manifolds, allowing a simplified infrastructure with reduced cost and risk.

The AFLs are retrievable with an ROV for maintenance and upgrades, if necessary, allowing for further operational cost savings. They can also be used to locate sensitive equipment or experiments further from the shore or in more remote areas than previous technology allowed. The EOFL can be used up to depth of 4,000 m (6,000 psi) and at temperatures between -5°C and 40°C. Accelerated Life Testing has determined that the system will operate reliably for 30 years.

Modern and emerging sensors and systems now demand more options for data transmission networks. This trend will drive increasingly complex sensors and systems. Subsea networks will, in turn, require modular connectivity using interconnect systems capable of supporting higher bandwidth requirements. It is critical to understand all the underwater-capable fiber optic technologies available to design a network that is engineered for the application, both in specification and product life expectation, to ensure a cost-effective and reliable data transmission system.

## About Teledyne Marine Interconnect

Teledyne Marine Interconnect provides mission-critical systems to the oil & gas and oceanographic industries. The company's technology and products provide power and broadband data transmission interface assemblies as well as instrumentation for corrosion and erosion monitoring of pipelines. Equipment is designed to operate at high pressure in the harsh subsea environment.

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# in this section

Ocean Industry Briefs	14
Maritime Transportation	20
Ocean Science	22
Ocean Energy	24
Defense	28

## General Dynamics acquires Bluefin Robotics

General Dynamics Mission Systems has acquired Bluefin Robotics, a manufacturer of unmanned undersea vehicles (UUVs) that perform a wide range of missions for the U.S. military and commercial customers.

Bluefin Robotics will become part of General Dynamics Mission Systems' Maritime and Strategic Systems line of business. The value of the transaction has not been disclosed.

## U.S. Coast Guard approves official electronic charts

The U.S. Coast Guard published guidance that allows mariners to use electronic charts and publications instead of paper charts, maps and publications.

The Navigation and Vessel Inspection Circular, NVIC 01-16, establishes uniform guidance on what is now considered equivalent to chart and publication carriage requirements.

Combining the suite of electronic charts from the U.S. hydrographic authorities and the Electronic Charting System (ECS) standards published this past summer by the Radio Technical Commission for Maritime Services, the Coast Guard believes official electronic charts provide mariners with a substitute for the traditional official paper charts.

"After consultation with our Navigation Safety Advisory Committee, the Coast Guard will allow mariners to use official electronic charts instead of paper charts, if they choose to do so. With real-time voyage planning and monitoring information at their fingertips, mariners will no longer have the burden of maintaining a full portfolio of paper charts," said Capt. Scott J. Smith, the chief of the U.S. Coast Guard's Office of Navigation Systems.

The new guidance applies to vessels subject to U.S. chart, or map, and publication carriage requirements codified in Titles 33 and 46 CFR and provides a voluntary alternative means to comply with those requirements.

"Mariners have been requesting the recognition of this capability for some time," said Smith. "When you combine the new expanded Automatic Identification System carriage requirement and the capability that an ECS provides, it should provide a platform to move American waterways into the 21st century."

This technology will also allow mariners to take advantage of information and data to enhance situational awareness during voyage planning and while underway.

For more information, visit [www.uscg.mil](http://www.uscg.mil).

# OCEAN INDUSTRY

## Phoenix International returns to search for Malaysia Airlines flight 370



Credit: Capt. Jelle de Vries

Phoenix International Holdings, Inc. (Phoenix) has been contracted by the Commonwealth of Australia under the direction of Australian Transport Safety Bureau (ATSB) to provide deepwater towed side-scan sonar services in support of continuing the underwater search for Malaysia Airlines Flight 370 (MH370). Phoenix and teammate Hydropheric Solutions, Inc. (HSI) will conduct side-scan sonar operations using the highly capable and technologically advanced SLH PS-60 (ProSAS-60), a 6,000 m depth-rated synthetic aperture sonar (SAS) towed system. Team Phoenix will mobilize aboard the Chinese Rescue Salvage Bureau (RSB) vessel Dong Hai Jiu 101 in Singapore in late January 2016. Following a brief port call in Fremantle, Australia, Phoenix will recommence search operations in February 2016.

Previously Phoenix participated in the search for MH370 from April to June 2014 using their 5,000 m depth-rated Autonomous Underwater Vehicle (AUV) "Artemis." The Phoenix/HSI team was subsequently contracted by Malaysia from October 2014 to June 2015, using HSI's towed SAS system to perform a high resolution search of the seafloor in their assigned area.

Under a tripartite agreement involving the Governments of Australia, Malaysia and the People's Republic of China, the MH370 search team, under the leadership of the ATSB, has searched more than 80,000 km<sup>2</sup> of seafloor and established an extraordinary record of hard work and focused commitment. "We are deeply honored to be asked to rejoin the search for MH370. We fully understand and appreciate the magnitude of this effort and we look forward to assisting the ATSB in finding MH370 and bringing closure to those impacted by this tragic event," said Mike Kutzleb, president of Phoenix.

Phoenix, an internationally recognized expert and proven industry leader in the field of undersea search and recovery, provides quick response and turn-key services for the location and recovery of objects from any water depth down to 6,000 msw (20,000 ft of seawater). Phoenix is an employee-owned, ISO 9001-2008 Management System-certified, marine services contractor providing manned and unmanned underwater solutions and project management services to a diverse set of clients worldwide. Services from our seven regional offices include wet and dry hyperbaric welding, Nondestructive Testing (NDT), subsea engineering services, conventional and atmospheric diving, AUVs, Remotely Operated Vehicles, and other robotic systems.

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

## Subsea UK to sponsor MATE ROV competition for second year

Subsea UK announced that it will sponsor an initiative that inspires budding subsea engineers for a second year. The body that represents the £9 billion subsea industry has now committed £20,000 to the Scottish MATE ROV competition. The initiative, organized by the Robert Gordon University, encourages young engineers to design and test underwater machinery with help from industry mentors.

Subsea UK joins BP, which has supported the competition since its first year, as headline sponsors, with ROVOP and The Underwater Centre in Fort William providing additional support.

The major STEM initiative aims to inspire future engineers through hands-on experience of designing ROVs used underwater in the oil and gas, defense, oceanology and marine renewables industries.

Last year's competition was won by a team from Peterhead Academy who, along with runners up from Mackie Academy, are displaying their winning

ROVs to thousands of delegates at the Subsea Expo 2016 exhibition and conference on 3-5 February at AECC.

The annual event, which is coordinated by the Marine Advanced Technology Education (MATE) Centre in California in partnership with Aberdeen's Robert Gordon University (RGU), involves teams made up of pupils from schools across Scotland.

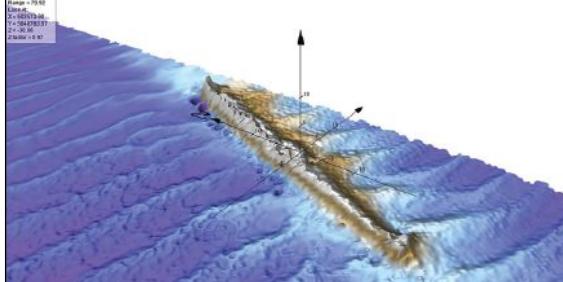
MATE's international student underwater robotics ROV competition consists of an international event and a network of 28 regional contests that take place across the U.S., Canada, Hong Kong, Scotland, Egypt, Russia, and Turkey. The competition consists of four different classes that vary depending on the sophistication of the ROVs and the mission requirements.

For more information, visit [www.marinetech.org/rov\\_competition](http://www.marinetech.org/rov_competition).

## ScottishPower Renewables uncovers WWI German submarine during seabed scanning

While undertaking detailed seabed scanning for the development of wind-

Credit: Fugro / ScottishPower Renewables



farm projects in the East Anglia Zone, off the coast of Norfolk and Suffolk, windfarm developers ScottishPower Renewables (SPR) and Vattenfall uncovered something they weren't expecting—an "uncharted" wreck of a WWI German submarine missing in action since 1915.

Charlie Jordan, ScottishPower Renewables' project director for the East Anglia ONE windfarm says of the discovery: "The scanning team were expecting to see wrecks, but such a discovery was quite a surprise and has been extremely interesting."

SPR and Vattenfall used advanced

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15

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**Leaders in Underwater Connector Technology and System Solutions**

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sonar technology to scan over 6,000 sq. km of the seabed in the Southern North Sea over 2 years, which is nearly four times the size of Greater London (1,583 sq. km). This work is critical to understand seabed conditions and allow the companies to design the layout of their proposed projects. Although more than 60 wrecks were discovered during the scanning work, most of these were anticipated, but the uncharted submarine 90 km from shore was entirely unexpected.

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

## Arctic shipping routes may be open by 2080

Commercial summer shipping across the North Pole may be possible by the end of the century, with the first potential crossings feasible for ice-strengthened ships around 2040.

According to this study, by scientists at the National Oceanography Centre (NOC), Arctic shipping could potentially account for as much as 10% of all cargo transported between Europe and the Pacific. It will help supply commu-

nities and industries along the coasts of Siberia and Canada.

A simulation using NOC ocean models suggests that approximately 40% of Arctic summer sea-ice cover will consist of broken-up ice by the 2040s. This will allow certain classes of ice-strengthened ships to move directly through the high Arctic, saving time and fuel relative to traveling up the Siberian coast.

Although fuel savings could have economic and environmental benefits, soot from ships could also accelerate ice melting by reducing the reflective qualities of the sea-ice. There is also concern that any oil spills might take longer to dissipate in the Arctic due to the lack of bacteria to break it up and lower ocean temperatures.

This research, published in the Marine Policy, will ultimately feed into the COPERNICUS forecasting system—which aims to predict and forecast ocean behavior in a way that helps industry in Europe.

The lead author of the paper, Dr. Yevgeny Aksenov, from the NOC, said,

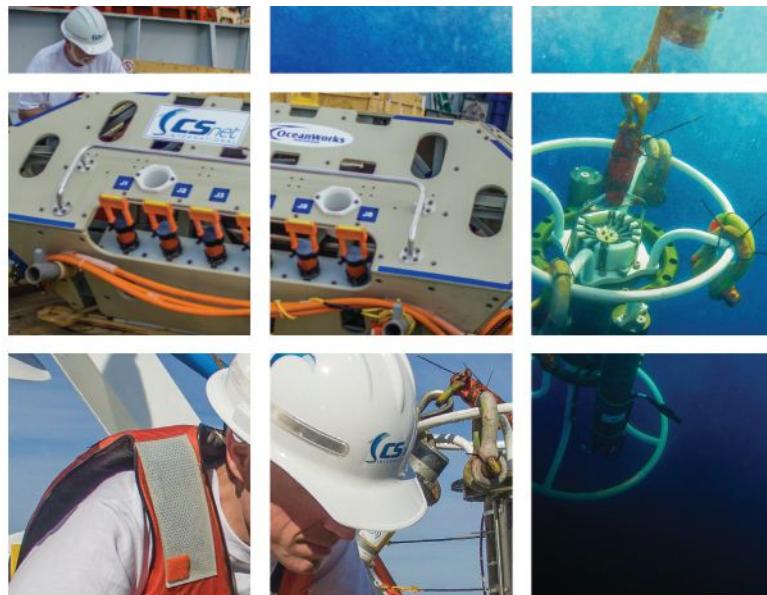
“This is an excellent example of how NOC science can be valuable to industry as well as the scientific community. What became evident while we were conducting this study is that the Arctic is changing so quickly that we will have to reconsider some of the elements we base our models on.”

The area of summer broken-up sea-ice around the margins of pack ice has widened by around 40% over the last three decades. This means that ocean waves can propagate deeper into the Arctic Ocean, further breaking-up the ice. As a result future research will look to include waves in models of the Arctic Ocean.

The study was conducted as part of the EU FP7 funded project “Ships and Waves Reaching Polar Regions (SWARP),” which aims to use oceanographic research to help European industries. In addition, it also received National Capability funding from the Natural Environmental Research Council.

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

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# THE IMPORTANCE OF MARITIME COMMUNICATION SECURITY

*By: Tim Lajza, Maritime General Manager, Harris CapRock Communications*

In today's environment, threats to corporate networks have never been greater while the cost and impact of security breaches have never been more severe. In most consumer-based industries cyberattacks have become the new normal. In recent years, the Target and Sony data breaches made headlines, bringing attention to the vulnerability of large corporations' networks. It has become apparent that no matter the size of the organization, companies are not adequately protected from security threats and, if anything, have become preferred targets for hackers.



## An overlooked industry

One area that is typically overlooked when it comes to cyber threats is the maritime industry. Contrary to the market's approach, maritime is not immune to the dangers of online crime. In fact, maritime networks are no different than any other IP-based network. Cyberattacks have been occurring in the maritime community for years, resulting in mostly financial losses. Globally, it is estimated that cyberattacks against oil and gas infrastructure will cost close to \$1.9 billion by 2018. As threats loom in the distance, security is a major hurdle that companies need to proactively address.

Alternatively, although companies may be aware of potential issues, many are facing internal challenges that stop them from taking action to prevent them. Now more than ever, IT staffs are leaner and resources are limited. One of the main challenges surrounding maritime security is that companies will deploy their own firewalls as a means of protection. This is simply not sufficient. Especially in oil and gas, clients are looking for solutions to provide increased value and enhanced performance to address ever-increasing risks. There can also be difficulty in defending against increased vulnerabilities associated with employees' ability to access more portable and versatile computing equipment.

When evaluating the market, two segments are of growing concern: luxury yachts and commercial maritime.

## Luxury yachts

Although the luxury yacht market is geared toward customers that can afford this expensive mode of leisure and transportation, it's not all champagne wishes and caviar dreams. Owners and guests often work on board with very sensitive information regarding stock trades and high-dollar financial transactions. With such lucrative passengers, yachts have become moving targets for hackers. Researchers recently lured a luxury yacht off course by hacking the GPS signal that it was using for navigation to demonstrate the susceptibility of the vessel. The group not only proved that it could be done, they identified how easy it was to take control of the yacht. With these risks, a secure link on a high-profile yacht is essential.



## Commercial maritime

Although most people would speculate a much smaller quantity, it's estimated that 90% of the world's goods are shipped on boats. That includes everything from electronics to food to household goods and more. For those entrenched in commercial maritime, this comes as no surprise. Within a ship-

ping vessel, there are many operational systems and business applications that could potentially come under attack. Terminal operating systems, industrial control systems, business operating systems, access control, and monitoring systems are perfect targets for hackers to access critical data. Today, most ships are managed by information and communications technology (ICT) systems. From port operations management to ship communication, ICT systems that support maritime operations are typically highly complex, and those used by ships, ports and other facilities are frequently controlled remotely from locations both inside and outside the U.S. This setup presents many cybersecurity risks for commercial maritime including Advanced Persistent Threats (APT). With an APT, companies often don't realize that they're under attack until it's too late. These attacks gain access to a network, acquire data, and then secretly monitor the network for a considerable amount of time. The need for cybersecurity in commercial maritime is greater than ever.



## A proactive approach to maritime cybersecurity

Although the industry is lacking formal regulations, there are service providers that have started to take note of the challenges facing maritime cybersecurity. With this, there are solutions available that defend against malicious intent by offering comprehensive approaches via content filtering, threat monitoring, and management as well as advanced cyber protection services. Service providers, such as Harris CapRock, can offer vulnerability assessments of overall architecture and investigate how companies are partitioning their network on the Local Area Network (LAN). The goal is to defend, monitor, and prevent cybersecurity attacks.

With the increasingly advanced tactics employed by cyber criminals, the need for augmented maritime cybersecurity continues to grow. Is your service provider ready to help you tackle these challenges head-on in the future?

## Wärtsilä and Cavotec to develop world's first marine wireless charging and mooring concept

An agreement has been signed between Wärtsilä and Cavotec to jointly develop the world's first combined induction charging and automatic mooring concept.

Wärtsilä has developed a wireless charging system based on inductive power transfer. Cavotec provides automated mooring systems for various types of vessels as well as shore power and reel systems. By combining the strengths and expertise of the two companies, an integrated wireless charging/mooring concept is to be developed for use in Wärtsilä's ship designs.

Wireless charging eliminates the cable connection between the vessel and shore, thereby securing and facilitating safe connections and disconnections. It also reduces maintenance since wear and tear to physical connection lines is eliminated. Similarly, damage to electrical outlets caused by seawater, snow and ice is also avoided. The new project's integrated system will be capable of transferring more than 1 MW of electrical energy. This is some 300 times more than that of current chargers used by electric cars.

Cavotec's mooring system is a vacuum-based automated mooring technology that eliminates the need for conventional mooring lines. Remote-controlled vacuum pads recessed into, or mounted on the quayside, moor and release vessels in seconds.

The environmental challenge has been the starting point for Wärtsilä's work in developing battery/hybrid technology for marine vessels. By making wireless charging of ship batteries possible, the electrification of coastal shipping is enhanced, resulting in major reductions in harmful exhaust emissions. Wärtsilä has already launched an innovative ferry concept featuring wireless induction battery charging.

## SevenCs supports "MariGreen" project

SevenCs is happy to be part of the EU INTERREG V A cross-border project "MariGreen" to support the maritime industry in the transition towards more efficient, greener and more sustainable shipping.

The MariGreen project develops innovations for greener and low-emission shipping and supports in particular small and medium enterprises. There are 12 innovation projects behind "MariGreen" that are dealt with by a total of 59 partners located in The Netherlands and Germany. Alternative fuel for ships, Wind Energy Systems for freight and passenger shipping, improvement of logistics operations, resource-efficient ship operations and safety issues in nautical education and training are among the main topics.

For more information please visit [www.marigreen.eu](http://www.marigreen.eu).

## Lloyd's Register is awarded a GBP half million contract by LAUGFS in Sri Lanka

Lloyd's Register (LR), world's leading engineering, technical and business services organization, announced that it has been appointed by LAUGFS Gas PLC (LAUGFS) to handle key safety and quality checks of the LPG terminal at Hambantota Port, some 240 km away from Sri Lanka's capital city, Colombo. The contract is valued at GBP500,000.

LR's service offerings under the LAUGFS contract will include initial Hazard and Operability (HAZOP), Hazard Identification (HAZID), Safety Integrity Level (SIL) rating and Fire and Explosion Evaluation (FEE) safety studies, plus inspection of pipe and plate mills at various pre-fabricators' locations across China. The LR teams will also carry out complete site inspections of storage tanks and pipelines stretching from the jetty to the storage field at Colombo. Their work will include the design appraisal of tanks, process piping and pipe lines, together with the inspection of critical equipment imported from the UK, France, Germany and the US.

"This sizeable win underlines LAUGFS' already strong confidence in LR. We are pleased to be able to broaden our service scope for this key client and to further strengthen our foothold in the strategically vital South West Asia market," Pascal Coudeville, senior vice president, Lloyd's Register Inspection Services.

## Unique onboard training system wins award



The ground-breaking Onboard Training System (OTS), developed by recently acquired Kongsberg Maritime company SMSC, won the prestigious Dynamic Positioning Award at the Offshore Support Journal Conference, Awards & Exhibition in London. The sophisticated system, which allows users to control a real vessel under DP, but within a simulated environment, was recognized by the award judges as a completely unique and positive new approach to Dynamic Positioning Operator (DPO) training.

With the OTS concept, the vessel is controlled in a normal manner by a deck officer on the bridge, either by the use of manual controls or by the use of DP. The vessel's motion and position in the virtual world is calculated based on input from the vessel's navigational aids (minimum GPS and Gyro) and shown on a dedicated screen. While the vessel is actually in safe, open waters, the virtual world can contain imaginary objects and installations (such as rigs, buoys, piers, etc.) shown on the screen. Using this setup, the DP operator can simulate approach to a platform or other installations, docking the ship at any port, navigating in narrow and constricted waters, and various other operations.

During training, the real DP system is live, so the vessel physically moves according to input, but the operator sees the results in the simulated visual scene. In this way, instructors can introduce any conditions or combination of targets, allowing them to create exercises that deliver real-life experience, with the flexibility to train on specific operations or areas of competence. The concept, which is already in use on several vessels, enables DPOs to understand how a vessel really responds to their commands, while interacting with virtual objects in a simulated environment, with the flexibility to introduce any tasks or conditions.

For more information, visit [www.smse.no](http://www.smse.no).

## ESI Group joins RINA Academy to become benchmark in maritime training

RINA, the multinational group, well known for testing, inspection and certification services joined with the Enterprise Shipping Agency (ESI Group), specialists in maritime research, staff selection and management. The agreement will result in the restructure of the RINA Academy to deliver a new crew training benchmark standard for ship-owners and operators.

The new RINA Academy shareholding will comprise 57.3% RINA S.p.A., 30% ESI Group and 7.7% by Confindustria Genoa, with the remaining balance held by other partners. The business will advocate training as a route

to safer maritime operations, increased efficiency and highlight it as a key development theme in maritime.

This collaboration of international leaders in the fields of classification, certification, maritime recruitment and training will provide training courses both for cabin and ground crew to the highest professional standards. In addition, the RINA Academy will offer customized training strategy, managerial and behavioral training and management systems accredited courses to its international client base. By adopting the RINA Academy's range of services, ship owners will have the assurance that on-board crew are qualified and compliant with the latest institutional regulations. Training is not just for on-board crew—similar courses are also available for ashore crew.

#### **ABS, COSCO sign cooperation agreement**

ABS, a leading provider of classification services to the global marine industry, has signed a Cooperation Agreement on Trans-Arctic Shipping Development with China Ocean Shipping (Group) Company (COSCO).

ABS greater China division president and COO Eric Kleess and Captain Meijiang Cai, Director of COSCO safety & technology supervision division, signed the agreement in Shanghai, China. ABS senior vice president and chief technology officer Howard Fireman and COSCO executive vice president Mr. Yuhang Wang also attended the signing ceremony.

Changing climate conditions have opened new operational and trading opportunities in previously unnavigable areas, and these new opportunities are attractive to the shipping industry. Using the Northern Sea Route for a voyage between the principal Asian and European ports reduces the distance by nearly 4,000 mi compared to the traditional route through the Suez Canal.

As pioneers in Arctic transportation, COSCO and ABS aim to expand COSCO's use of the Northeast Passage for more regular trading, explore navigation in Northwest Passage, and develop ice-classed vessel types appropriate for Trans-Arctic shipping. The parties will begin by establishing a cooperative initiative on Arctic shipping technology development.

#### **Crowley christens second of four newly built LNG-ready tankers**

As part of the company's industry-leading, vessel build program, Crowley Maritime Corp. christened the second of four new Jones Act product tankers at the South Florida Petroleum Terminal (The Public Dock) in Fort Lauderdale. The 50,000 dead-weight-ton (dwt), 330,000-barrel-capacity Texas joins sister ship Ohio, which was christened by Crowley in November, as the first ever tankers to receive the American Bureau of Shipping's (ABS) LNG-Ready Level 1 approval, meaning Crowley has the option to convert the tanker to liquefied natural gas (LNG) for propulsion in the future.



The advertisement features several images of ECA Group's robotic marine vehicles. At the top, a survey vessel with a helicopter is shown. Below it, a white USV is moving through the water. In the center, there are several yellow AUVs and ROVs of different sizes and shapes, some with manipulator arms. The background is a stylized blue sea with a grid pattern at the bottom.

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### CSA Ocean Sciences receives NOPP Deepwater Canyons award

The Bureau of Ocean Energy Management (BOEM), National Oceanic and Atmospheric Administration (NOAA), and the U.S. Geological Survey (USGS) recently announced that the National Oceanographic Partnership Program (NOPP) will present the 2015 Excellence in Partnering Award to the team, managed by CSA Ocean Sciences Inc. (CSA), which participated in the Atlantic Canyons: Pathways to the Abyss project. The ceremony will take place on Tuesday, February 23, during Ocean Sciences 2016.

Quoting the NOPP announcement: "This accolade is presented annually to the research team that best demonstrates the partnership objectives of the NOPP, recognizing the project's commitment to partnering, the success of the partnership effort, and the impact of the partnership on knowledge and stewardship of our ocean." This was second award received by the team, an unprecedented achievement in the 19-year history of the NOPP. The project also produced a 23-minute HD video on the project that will be aired (<http://www.boem.gov/Atlantic-Canyons-Pathways-to-the-Abyss/>).

As the prime contractor, CSA provided oversight and management through several years of research cruises and subsequent analysis and reporting, including staff from BOEM, USGS, NOAA's Office of Ocean Exploration and Research, and a dozen universities and research institutions. A CSA senior scientist also served as co-chief scientist on several segments of the various cruises. Surveys focused on two deepwater canyons (the Baltimore and the Norfolk) that represent ancient drainage basins, located ~80 km offshore Virginia and Maryland.

Importantly, the study team discovered new shipwrecks, deep, cold-water corals and unexpectedly, extensive methane seeps with exotic biological assemblages. The team also deployed long-term probes to collect ocean currents, chemistry and temperature that significantly expand the understanding of coastal circulation. CSA provides mission-critical support in complex offshore operations worldwide for both private sector and government agencies and the Deepwater Canyons expeditions provide an excellent example of partnership and teaming.

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

### Study shows North Atlantic Ocean CO<sub>2</sub> storage doubled over last decade

A University of Miami (UM) Rosenstiel School of Marine and Atmospheric Science-led study shows that the North Atlantic absorbed 50% more man-made carbon dioxide over the last decade, compared to the previous decade. The findings show the impact that the burning of fossil fuels have had on the world's oceans in just 10 years.

To determine the total uptake and storage of carbon dioxide in the North Atlantic over the last several decades, researchers analyzed data collected from the same locations, but 10 years apart, to identify changes caused by man-made CO<sub>2</sub>. The data were collected during two National Science Foundation-funded international ship-based studies, CLIVAR (Climate Variability CO<sub>2</sub> Repeat Hydrography) and GO-SHIP (Global Ocean Ship-Based Hydrographic Investigations Program).

The oceans help to slow the growth of human produced CO<sub>2</sub> in the atmosphere by absorbing and storing about a quarter of the total carbon dioxide emissions. The North Atlantic is an area of high uptake and storage due to large-scale ocean circulations.

The uptake of CO<sub>2</sub> has many impacts on ocean-dwelling organisms by decreasing the pH. The findings have important implications for marine organisms, such as corals and mollusks, which require a certain pH level in the surrounding water to build their calcium carbonate-based shells and exoskeletons.

The researchers hope to return in another 10 years to determine if the increase in carbon uptake continues, or if, as many fear, it will decrease as a result of slowing thermohaline circulation.

The study, titled "Rapid Anthropogenic Changes in CO<sub>2</sub> and pH in the Atlantic Ocean: 2003-2014" was published in the journal Global Biogeochemical Cycles.

### Safeguarding sturgeon



*University of Delaware graduate student Matthew Breece is shown with a glider (Credit: Lisa D. Tossey/©2015 University of Delaware)*

Researchers at the University of Delaware are one step closer to developing an online map that would help Mid-Atlantic fishermen avoid catching Atlantic sturgeon.

The research team, led by Matthew J. Oliver, Patricia and Charles Robertson professor of marine science and policy, found they could make useful predictions about sturgeon locations using satellite measurements of ocean color and temperature. They reported their findings 3 February in the journal *Methods in Ecology and Evolution*.

"This gets us closer to using habitat preferences as a guide to help fishermen be successful while reducing harm to non-target species," said the paper's lead author, Matthew Breece, a doctoral candidate in UD's School of Marine Science and Policy, which is housed in the College of Earth, Ocean, and Environment. "It's surprisingly accurate, and we see a lot of options for making it even better."

Where exactly sturgeon swim in the marine environment is a big unknown in the coastal ocean. On land, researchers use features of the landscape to predict where a species will be found. The UD team set out to do something similar using "seascapes" or zones of the ocean that can be readily identified.

The research team studied the Delaware Bay and nearby coastal waters in Delaware, Maryland and New Jersey. By analyzing 10 years of satellite data, the researchers classified adjoining ocean areas with similar color and temperature. Their analysis identified six seascapes that form strips roughly parallel to the coast and can be anywhere from 1 to 20 miles wide. Local currents, tides and winds affect the seascapes' location, which can vary as much as 10 or more miles in a single day.

The researchers combined these time-dependent seascapes maps with locations of individual sturgeon. They determined locations using tags implanted in sturgeon that can be detected by a set of 94 stationary acoustic sensors arrayed along the coast.

According to Breece, the maps show that sturgeon seem to prefer a narrow corridor identified as Seaside E, which generally sits near the coast but sometimes expands into open waters south of the Delaware Bay and Atlantic Ocean. Half of the sturgeon detections were in that seascapes, even though it covered only 35% of the available area, indicating selection for environmental factors over geography.

To test this hypothesis, the team deployed a glider in 2013. The glider was equipped with telemetry detectors that enabled the researchers to actively look for the tagged sturgeon.

"We expected to see the sturgeon closer to shore. For 7 to 10 days the glider did not detect any sturgeon, despite being in regions of the water where we had seen sturgeon in the past," said Breece. "I actually thought the glider might be broken or the sensors might be damaged."

As soon as the glider arrived in Seascape E, however, it started detecting tagged sturgeon, 62 of them actually, some from as far away as South Carolina.

"That's when it sunk in that the sturgeon were cuing in on this particular seascape, even though it moves around," Breece said.

### Ocean acidification makes coralline algae less robust

Ocean acidification is affecting the formation of the skeleton of coralline algae that play an important part in marine biodiversity, new research from the University of Bristol has found.

Coralline red algae form mael beds that provide important habitat in shallow waters, including the UK coastal shelf. Maerl hosts a high diversity of organisms by providing habitats, shelter and nursery areas for, among others, fish larvae and young scallops. Both coralline algae and the maerl beds they generate are protected by national and international regulation as they form biodiversity hotspots and support fisheries.

The skeletal structure of coralline algae is composed of high-magnesium calcite, the most soluble form of calcium carbonate, and is therefore potentially vulnerable to the change in carbonate chemistry resulting from the absorption of man-made CO<sub>2</sub> by the ocean.

Previous Bristol-led research has shown that ocean acidification affects coralline algae by reducing the thickness of their cell walls and thus their structural strength, crucial for withstanding natural stresses such as wave movement or grazing. It also showed that, given enough time, the algae can acclimatize and continue to grow.

In a new study, published in *Scientific Reports*, Dr. Federica Ragazzola and colleagues assessed this new growth to see whether it is of the same quality as before and hence whether coralline algae are able to grow as strong a skeleton under climate change conditions. The strength of this skeletal structure is important as it impacts the ability of alga to provide shelter for other species.

The researchers found that, under ocean acidification, the chemical composition of the skeleton is changing, making it potentially more brittle.

Professor Daniela Schmidt, head of global change at the Cabot Institute and senior author of the study said, "Our

research suggests that in the near future these organisms are not sufficiently calcified to provide habitat for other species. Coralline algae support a huge variety of marine life, with more than 460 species associated with their beds, including economically important species such as scallops."

"While a number of studies have now shown that coralline algae can continue to grow even in challenging environmental conditions, it is fundamentally important that we combine these physiological studies with potential impacts on the structural integrity of the skeleton and its consequences to habitat formation."

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

### Female turtles outnumber males due to warming

Florida State University assistant professor of oceanography Mariana Fuentes and a team of Brazilian researchers have been examining Brazilian loggerhead turtles to see how rising temperatures affect that species.

The sex of marine hatchlings is influenced by incubating temperatures, and warmer temperatures produce a higher number of female hatchlings.

Researchers believe projected increases in temperature will cause a gender imbalance in marine turtle populations and are trying to identify best practices to protect the species.

"We're concerned we're going to have a feminization of marine turtles," Fuentes said. "This study came from the need to understand the current sex ratio being produced at loggerhead nesting grounds to establish baseline parameters as climate change progresses and to identify beaches that produce a higher proportion of males."

Fuentes and her team were specifically trying to identify beaches that produce higher numbers of male turtles so they could get a broader view of areas where imbalances were already occurring.

In northern Brazil, an exceptionally strong female bias of 94% was observed in all nesting areas used by loggerhead turtles. But scientists were also able to identify nesting beaches in southern Brazil that were producing a higher proportion of male hatchlings (47%) which is essential to sustain the population.

"It's worrying that you could have an extreme skew in gender one way," Fuentes said. "Any changes in population structure can have real repercussions."

The research is published in the *Journal of Experimental Marine Biology and Ecology*.

The sex of marine turtle hatchlings is influenced by temperature, with optimal hatching temperatures falling between 75.2°F to 93.2°F. But temperatures

below 85.1°F tend to yield more male turtles and temperatures above that mark typically yield more female turtles.

Scientists examined 25 years' worth of data for 21 nesting beaches throughout coastal Brazil, about 373 mi worth of nesting areas, making it the most comprehensive of its kind.

Though Fuentes and her team focused on Brazil, the results are applicable to other regions because all turtles have temperature-dependent sex determination. Fuentes plans to expand the research into Florida in the coming year by examining the gender structure of loggerhead turtles in the Panhandle.

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

### Greenland model could help estimate sea level rise

University of Alaska Fairbanks mathematicians and glaciologists have taken a first step toward understanding how glacier ice flowing off Greenland affects sea levels.

Andy Aschwanden, Martin Truffer and Mark Fahnestock used mathematical computer models and field tests to reproduce the flow of 29 inlet glaciers fed by the Greenland ice sheet. They compared their data with data from NASA's Operation IceBridge North aerial campaign.

The comparisons showed that the computer models accurately depicted current flow conditions in topographically complex Greenland.

The work by the three researchers, all with UAF's Geophysical Institute, is featured in the latest edition of *Nature Communications*.

The time was right for the comparison, said Truffer, a physicist in the Geophysical Institute's Glaciers Group.

"Better computer models and NASA's high-resolution data set made the difference," he said. "Each part needed each other to make sense. It couldn't have happened without either."

The work has taken over a decade, hindered by the ability to understand the thickness of Greenland ice. The NASA campaign provided that information, using an advanced ice-penetrating radar developed by the University of Kansas Center.

"The result has been a substantial improvement in our knowledge of subglacial topography, particularly in the deep channels feeding outlet glaciers," the three wrote in the *Nature Communications* article.

They now want to see if the model can accurately predict how sea levels might be affected by a melting Greenland ice sheet.

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

## DONG to build new record-size offshore wind farm

DONG Energy has made a final investment decision to build the giant Hornsea Project One offshore wind farm in the UK. With a capacity of 1.2 GW, Hornsea will on completion be the world's first offshore wind farm to exceed 1,000 MW in capacity and by a large margin become the world's largest offshore wind farm. It will be able to meet the electricity needs of well over one million UK homes.

Hornsea was granted a Final Investment Decision Enabling contract by the UK Government in April 2014 and will receive a fixed tariff for the first 15 years of production. The wind farm is expected to be fully commissioned in 2020.

Hornsea will be the final stage towards DONG Energy delivering on its strategic target of installing 6.5 GW of offshore wind by 2020 and will surpass Walney Extension, which had a final investment decision in October 2015, as the world's largest offshore wind farm. Walney Extension will have a capacity of 660 MW so Hornsea is almost double the size.

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

## Sotenäs Wave Energy Plant now grid connected

A significant step in the development of the first 1 MW of the Sotenäs Wave Energy Plant on the Swedish West Coast was taken this weekend in that the 120-ton subsea generator switchgear was deployed and connected to the Swedish National Grid via a 10-km subsea cable.

A number of Wave Energy Converters were also connected to the subsea switchgear and the wave park will subsequently go live as soon as the buoys (point absorbers) are connected to the generators.

The Sotenäs Wave Power Plant is financed by Fortum, the Swedish Energy Authority and Seabased. Research and Development within Seabased is carried out in close cooperation with researchers at the Centre for Electric Renewable Energy Conversion at the Ångström Laboratory, Uppsala University. The deployment subsea was done in cooperation with Cecon Contracting AS, Norway.

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

## Sandbank begins to take shape

The construction of Vattenfall's 288-MW offshore wind farm Sandbank in the North Sea is progressing well. Almost all 72 foundations are now in place and the installation of the turbines is scheduled to start in the summer.

The offshore construction work commenced last summer and by now 69 out of the 72 foundations, each consisting of a monopile and a transition piece, have been installed. Rough weather conditions in November and December with almost 12-m waves prohibited offshore works most of the time.

The installation of the 4-MW turbines will commence in the summer. The cable work has already started and two lines of cables have been installed. Sandbank's substation with its heli deck has been assembled and will be installed on site during the spring.

During the installation of the foundations a Hydro-Sound-Damper—consisting of a net with plastic components—was used in order to reduce the underwater noise. A "bubble curtain" around the foundation during hammering was also used.

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



## Harnessing wave energy to light up coastal communities



The National Science Foundation (NSF) is supporting a new player in the wave energy field. Oscilla Power is developing a wave energy converter sturdy enough for the ocean, yet practical enough for the grid.

Despite its massive potential as a source for renewable energy, the ocean is unlikely to contribute meaningfully to electricity supplies without dramatic, innovation-driven reductions in the cost of energy conversion.

That is where engineers Balky Nair, Rahul Shendure and Tim Mundon come in with their company, Oscilla Power. With support from the NSF through a Small Business Innovation Research (SBIR) grant, they are developing a utility-scale wave energy harvester called the Triton. It is a sturdy system with few moving parts—rugged enough to stand up to harsh seas with little need for maintenance. This technology shows promise as a means for delivering utility-scale electric power to the grid at a price that is competitive with conventional fossil or renewable technologies.

The team plans more tests with increasingly larger and more sophisticated prototypes. At full scale, each Triton system will be 30 yards wide and will power more than 650 homes.

For more information, visit [www.nsf.gov](http://www.nsf.gov).

## CorPower signs up to test at EMEC

Swedish wave energy developer CorPower Ocean has signed up to test their novel resonant wave energy converter at the European Marine Energy Centre (EMEC) in Orkney.

The announcement follows CorPower's success in Wave Energy Scotland's (WES) power-take-off (PTO) call that, combined with funding from KIC InnoEnergy and the Swedish Energy Agency, completes a €6.5 million Stage 3 funding round for dry rig testing of a half-scale prototype system followed by an ocean deployment at EMEC's scale test site in Scapa Flow.

The project aims to deliver a highly reliable PTO solution using the innovative WaveSpring control technology offering a step-change improvement in performance and cost to



the wave energy sector.

The unique technology will be taken through a program of structured verification guided by best practice support from EMEC, alongside the experience from offshore power generation company Iberdrola Engineering, the University of Edinburgh, and WavEC Offshore Renewables' expertise in cost and performance modelling.

The project will involve a 5-month program of cyclical dry and wet testing of the system in Orkney, culminating in a performance assessment by EMEC. Prior to arriving in Orkney, the PTO will undergo a 5-month dry test period in Stockholm using the same test rig, thereby significantly de-risking the ocean deployment.

This novel approach to PTO development will incorporate the installation of a bespoke dry test rig at EMEC for hardware-in-the-loop testing. The test rig will have the ability to subject wave devices to the full range of wave loads corresponding to the most challenging sea states.

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

## DONG Energy takes over development project in New Jersey

DONG Energy has agreed to take over RES Americas Developments Inc.'s more than 1,000 MW newly assigned development project rights off the coast of New Jersey.

At the offshore wind auction held by the U.S. Department of Interior's Bureau of Ocean Energy Management (BOEM) on 9 November 2015, RES Americas Development Inc. secured the rights to develop one of the two leases that were awarded. The lease comprises an area that could potentially accommodate more than 1,000 MW of offshore wind. Following approval from BOEM, the lease will be taken over by DONG Energy, the global market leader in developing, building and operating offshore wind farms. RES Americas will continue to support development of the lease area as agreed with DONG Energy.

The New Jersey lease is the second U.S. lease area for DONG Energy. The

acquisition of the company's first U.S. lease area was approved by BOEM in June 2015 along the coast of Massachusetts.

Samuel Leupold, executive vice president of Wind Power, said, "The U.S. is an interesting market for offshore wind with the potential to become a significant area for future development. With the takeover of the offshore wind development projects in the U.S., we are broadening our international scope. The site conditions are quite similar to those we currently work with in Northwestern Europe, which means that the project could be developed using well-known technology."

The New Jersey lease has a total size of 160,480 acres and is located approximately 10 nmi offshore. The average water depth is approximately 25 m.

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

## Siemens' 7-MW turbine reaches final stage in development process

The development of Siemens' offshore flagship wind turbine has reached its final stage: the 7-MW offshore turbine has successfully passed final type certification. Field testing of the SWT-7.0-154 was recently extended with a second prototype. Grid performance, quality and safety are currently being tested on both machines.

Siemens wind turbine SWT-7.0-154 development is well on track: Two prototypes were installed in Østerild, Denmark, to run comprehensive product tests of the 7-MW offshore wind turbine.

Obtaining type certification marked the final milestone in the development process, allowing customers to make final investment decisions for offshore projects. Since many of the technologi-

cal components in this new turbine are the same as those of the proven Siemens SWT-6.0-154—including the 154-m rotor—serial production is scheduled to begin in autumn 2017. While the first prototype, installed in summer 2015, was initially used for achieving the final type certificate, engineers are now able to use both prototypes for accelerated testing of all grid-related aspects such as performance, quality and safety. As the upgrades in the turbine consist mainly of changes to the permanent magnet generator, the power converter and medium voltage transformer, the startup of both SWT-7.0-154 prototypes ran smoothly.

Whereas the generator's permanent magnets and segments as well as the transformer upgrades are required solely for the higher output requirement, the upgraded Siemens Integrated Control System (SICS) with enhanced power converter provides even more flexibility in the turbine response to voltage and frequency, while enabling compliance with the strictest international grid code requirements.

First orders are already in place for the new project including the Walney Extension East project in the UK to be installed in early 2018. Siemens direct drive wind turbines feature a proven and reliable technology with a long-term track record. Over 1,100 of the gearless Siemens wind turbines have been installed since 2010, and more than 60 of them are in operation offshore.

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

## Atkins to design world's first multi-turbine floating offshore wind platform

Swedish company Hexicon has appointed Atkins as engineering partner for the world's first multi-turbine offshore wind floating platform to be deployed at the Dounreay Tri Project off the Scottish north coast.

Atkins' offshore wind team has been working with Hexicon to define the concept since 2015 and is currently in the process of analyzing a two-turbine 8 to 12 MW structure ready for Front End Engineering Design (FEED) and physical model testing of the new design later this year.

Katherine Ward, project manager in Atkins' renewables business, said: "We're really pushing the boundaries of what can be done to support Hexicon in maximizing energy yield through clever design. The team has a great deal of experience in innovative, transforma-



tional work both in the renewables and oil and gas sectors and on this project we are going one step further in making such an exciting concept a reality."

New developments in the design of the floating structure's mooring system have increased the efficiency of the rotating system reducing CAPEX and maximizing energy yield.

Atkins' extensive experience in floating wind has played a key role in developing the concept and originally winning the work. Atkins has been involved in more than half a dozen floating wind projects around the world including:

- Detailed design and analysis for Principle Power's WindFloat prototype in Portugal;
- Design for Pilot Offshore Renewable's Kincardine floating wind project; and
- Winning Statoil's Hywind floating wind demonstrator Installation Challenge competition.

Atkins is one of the leading engineering companies in offshore renewables with a broad portfolio of work in the sector offering a complete and comprehensive service across the entire lifecycle of a project—from assistance during the consenting phases, through to planning, design and analysis work and relationships with turbine suppliers, to executing the construction and deployment.

Atkins' projects include designing fixed XL monopile foundations at Statoil's Dudgeon offshore wind farm; eight offshore substation platforms across four of DONG Energy's planned offshore wind farms; offshore substation platform structures at E.ON's Humber Gateway and the SSE/Repsol/CIP owned Beatrice offshore wind farm.

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

## EnBW, Iberdrola conclude service contract

EnBW Energie Baden-Württemberg AG and Iberdrola have concluded a contract under which EnBW will provide services for the construction of the Wikinger offshore wind farm in the German Baltic Sea.

The contract runs for 2 years and covers services dealing with the coordination of shipping traffic, health and safety, and environmental protection at the construction site. In addition, the EnBW Offshore Team will share their know-how and expertise acquired during construction of its offshore wind farms Baltic 1 and 2.



Jürgen Blume, country manager for Iberdrola in Germany, said, "As the installation of Wikinger project draws nearer, this contract will ensure that the best practices in terms of quality control, health and safety and respect for the environment are implemented throughout the entire construction phase while securing completion and grid connection by 2017. In March, the first foundation piles will be rammed into the seabed and preparations for the cable installation will commence. This agreement showcases the strong partnership between offshore wind developers in the Baltic Sea."

Following construction of the two EnBW offshore wind farms Baltic 1 and Baltic 2, Wikinger will be the third wind farm in the German Baltic Sea comprising 70 wind turbines with a total output of 350 MW.

With an investment of almost €1.4 billion, Wikinger will have a significant economic impact through the entire supply chain and will help create new jobs. Iberdrola is maximizing the benefits created by its Wikinger project by working with local suppliers where possible.

Once in operation, the offshore wind farm will produce electricity equivalent to the consumption of more than 350,000 German households, avoiding the emission of almost 600,000 tons of CO<sub>2</sub>/year.

As with EnBW Baltic 2, the installation and logistical base will be located in Sassnitz-Mukran on the island of Rügen. The system components will be

transported to the construction site from the Port of Sassnitz.

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

## Swedish pension fund buys stake in Ormonde

Vattenfall is selling 49% of its ownership in the Ormonde offshore wind farm in the Irish Sea to the Swedish pension company AMF for an undisclosed sum. Ormonde is located about 10 km outside Barrow-in-Furness in the northwest of England. It consists of 30, 5-MW turbines and was commissioned in 2012.

"The market has shown great interest in Ormonde. This is primarily because the wind farm is profitable and is considered to have excellent prospects for continued stable profitability. AMF is a serious, long-term investor and we are very pleased with the deal," said Magnus Hall, CEO of Vattenfall.

Vattenfall recently announced that it intends to invest more than SEK 50 billion in renewable generation in the next 5 years.

"The reason we are now bringing a partner into Ormonde is that we need to release capital so that we can invest in renewables," Hall said. "We can't manage such growth in new generation capacity on our own. It requires additional capital, and that is what we are bringing in now."

In late 2014, the insurance company Skandia invested SEK 1 billion in four of Vattenfall's wind power projects in Sweden. That was the first time Vattenfall brought in an investment partner in Sweden.

"The partnership strategy has emerged more clearly of late, but it is not actually new for us. We have owned hydro power, nuclear power and heat operations together with others for a long time," said Hall, who does not exclude Vattenfall bringing in partners in business areas other than hydro power in the future. "We might well do that. In terms of wind power in particular our strengths are planning, building and running wind farms. Having 100% ownership is not the most important thing. Bringing in partners is a model that suits us. I am absolutely convinced that more and more financial players will be viewing investments in renewables as an important strategic direction. Many of them see the potential of investing in the renewable energy systems of the future."

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

A green sea turtle is swimming in the ocean, its head and front flippers above the water. Overlaid on the image is a circular graphic of the Earth, showing continents and oceans. The text "REACHING 19,000 GLOBAL PROFESSIONALS" is displayed in green, bold, sans-serif capital letters across the center of the globe.

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The official publication of the  
Gulf of Mexico Foundation

**USNS Maury (T-AGS 66) delivered**

The Navy accepted USNS Maury (T-AGS 66) from builder VT Halter Marine 16 February. The USNS Maury was designed to perform acoustic, biological, physical and geophysical surveys. The vessel will provide the U.S. military with essential information on the ocean environment.

T-AGS 66 is named in honor of Cmdr. Matthew Fontaine Maury, known as the "Father of Modern Oceanography," and nicknamed, "Pathfinder of the Seas." He dedicated his life to the study of naval meteorology and oceanography and made copious contributions to the charting of wind and ocean currents. USNS Maury will continue to contribute to his curiosity and thirst for ocean discovery and understanding.

The vessel is 353 ft in length with an overall beam of 58 ft. Maury is 24 ft longer than the previous T-AGS design to accommodate a moon pool for deployment and retrieval of autonomous underwater vehicles.

Maury will be operated by the Military Sealift Command (MSC). MSC consists of non-combatant, civilian-crewed ships that replenish U.S. Navy ships, chart ocean bottoms, conduct undersea surveillance, tactically preposition combat cargo at sea and move military equipment and supplies used by deployed U.S. forces around the world.

As one of the Defense Department's largest acquisition organizations, PEO Ships is responsible for executing the development and procurement of all major surface combatants, amphibious ships, special mission and support ships, and special warfare craft.

For more information, visit [www.navy.mil](http://www.navy.mil).

**Lockheed Martin-led team launches future USS Sioux City**

The Lockheed Martin-led industry team launched the nation's 11th Littoral Combat Ship (LCS), Sioux City, into the Menominee River at the Fincantieri Marinette Marine (FMM) shipyard.

Following christening and launch, Sioux City will continue to undergo outfitting and testing before delivery to the Navy in early 2017.

"The future USS Sioux City's interchangeable mission modules will empower her to face a variety of high-priority missions, from Anti-Surface Warfare to Anti-Submarine Warfare to Mine Countermeasures," said Joe North, Lockheed Martin vice president of Littoral Ships & Systems. "She is ideally suited to navigate the reefs and shallows in the Asia-Pacific, as USS Fort Worth has demonstrated on her current 20-month deployment."

The Freedom-variant ships have demonstrated their value with successful deployments to Southeast Asia, including USS Fort Worth, which is providing the necessary capabilities for contingency operations in the region today. USS Freedom conducted a successful deployment to Southeast Asia in 2013 and is currently operating out of her homeport in San Diego.

The Lockheed Martin-led industry team is currently in serial production of the Freedom-variant and has already delivered three ships to the U.S. Navy to date. The Sioux City is one of seven ships in various stages of construction at Fincantieri Marinette Marine, with two more in long-lead production.

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

**Ingalls Shipbuilding launches Portland (LPD 27)**

Huntington Ingalls Industries' Ingalls Shipbuilding division has launched the company's 11th amphibious transport dock, Portland. The ship, named for Oregon's largest city, is scheduled to be christened in May.

"It takes a tremendous effort by all of our crafts personnel to accomplish this big milestone," said Bruce Knowles, Ingalls' LPD 27 program manager. "The LPD program continues to improve with each ship, and LPD 27 falls into that same line of success proven by a hot production line."

Portland was translated via Ingalls' rail car system to the floating dry dock prior to launch. The dock was moved away from the pier and then flooded to float the ship. With the assistance of tugs, Portland came off the dock on Saturday morning.

Ingalls has built and delivered nine ships in the San Antonio class of ships, with John P. Murtha (LPD 26) and Portland remaining. Ingalls received a \$200 million advance procurement contract for LPD 28, the 12th ship in the class, in December.

The San Antonio class is the latest addition to the Navy's 21st century amphibious assault force. The 684-ft-long, 105-ft-wide ships are used to embark and land Marines, their equipment and supplies ashore via air cushion or conventional landing craft and amphibious assault vehicles, augmented by helicopters or vertical takeoff and landing aircraft such as the MV-22 Osprey. The ships support a Marine Air Ground Task Force across the spectrum of operations, conducting amphibious and expeditionary missions of sea control and power projection to humanitarian assistance and disaster relief missions throughout the first half of the 21st century.

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

**Elbit introduces multi-mission USV for maritime warfare missions**

Drawing on know-how derived from generations of Unmanned Aircraft Systems (UAS) design, development and operation and its naval capabilities, Elbit Systems' newest offering in the unmanned platform field is Seagull—an organic, modular, highly autonomous, multi-mission Unmanned Surface Vehicle (USV) system.

Seagull is a 12-m USV with replaceable mission modules, with two vessels capable of being operated and controlled in concert using a single Mission Control System (MCS), from manned ships or from the shore.

The system provides unmanned end-to-end mine hunting operation taking the man out of the mine field. It provides mission planning and online operation in known and unknown areas, including area survey, search, detection,

classification, identification, neutralization and verification. It is equipped to search the entire water volume and operate underwater vehicles to identify and neutralize mines.

Seagull changes the dynamics of anti-submarine operations by creating a threat to submarines using a cost-effective and available asset, replacing and augmenting manned assets with minimal threat from submarines. It empowers a surface vessel or naval base commander with off-board, available and rapidly deployable Anti-Submarine Warfare (ASW) capabilities to protect critical sea areas and high-value assets from submarine as well as sea mine threats.

Incorporating Elbit Systems' extensive experience in UAS, Seagull features a robust, highly-autonomous and safe sailing capability as well as modular mission payload suites, selected to match a variety of required missions including EW, surface force protection, hydrographical missions in addition to the core MCM and ASW missions. The sailing suite includes a patented Autonomous Navigation System (ANS), with obstacle avoidance, which considers the international regulations for preventing collisions at sea.

Network ready and long enduring, Seagull features inherent C4I capabilities for enhanced situation awareness and can remain at sea for over 96 hours. The Seagull multi-mission USV system offers navies a true force-multiplier in reducing risk, cost and manpower requirements in performing missions that have only been performed to date by costly manned assets.

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

#### **Dassault Systèmes and DCNS partner on the 3DEXPERIENCE innovation platform**

Dassault Systèmes, the 3DEXPERIENCE Company, world leader in 3D design software, 3D Digital Mock Up and Product Lifecycle Management (PLM) solutions, and DCNS, world leader in naval defense solutions, announced that DCNS has selected the 3DEXPERIENCE platform to pioneer a new era in the design, engineering, construction and lifecycle services of naval defense solutions.

DCNS will deploy the 3DEXPERIENCE platform to manage the entire lifecycle of its products, from new generation submarines to frigates, patrol

vessels, aircraft carriers and landing platform docks (LPDs). From concept through engineering to build, maintain and operations services for its customers, DCNS's transformation will improve operational performance and competitive edge on a global scale.

The design and engineering of high-performing naval defense solutions require a seamless integration of complex systems and infrastructure such as nuclear and conventional propulsion systems, radars, missiles and communications materials. End-users in all disciplines must rely on access to accurate, advanced and up-to-date information to make informed decisions.

DCNS must manage extreme complexity and high-level integration to provide its clients, industrial systems and equipment partners, and supply chain with the most modern cooperation tools and digital interface. Adopting marine and offshore industry solution experiences based on one common 3DEXPERIENCE platform provides the major catalyst to increase capacity and flexibility as well as the most competitive and efficient solutions.

For more information, visit [www.3ds.com](http://www.3ds.com).



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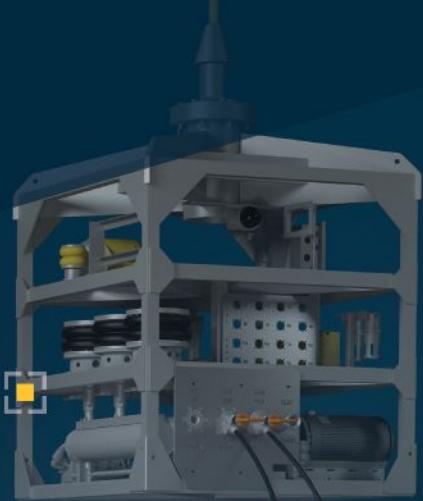


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# OFFSHORE INDUSTRY

## Aquatic joins DNV GL in JIP on development of codes for cable and pipe laying equipment

Aquatic Engineering & Construction Ltd, an Acteon company, is working with DNV GL and other organizations in the subsea supply chain, on a Joint Industry Project (JIP) to develop a set of guidelines to be incorporated into new or existing DNV GL Offshore Standards or Recommended Practices. The guidelines will be "The Development of Codes for Offshore Equipment for Cable and Pipe Laying – Phase 1."

David Tibbetts, vice president, technology, Aquatic, said, "We were eager to get involved with this ground-breaking project due to the lack of coherent standards for the specification, design, manufacture, procurement and approval of equipment intended for use in offshore cable and pipe laying operations. DNV approached Aquatic because we are the obvious supply chain choice due to our market leading reputation, our extensive range of products, four decades of experience and our close working relationships with all of the leading contractors."

"The work involves engineering and technical experts from contractors and equipment manufacturers like Aquatic, collaborating in order to establish joint industry guidelines for our type of equipment, where at present nothing exists.

Subject to satisfactory completion of the first two phases, a third phase undertaken by DNV GL will result in the publication of an Offshore Standard or Recommend Practice for cable/pipe laying equipment."

The road map for the project proposed by DNV GL in November 2014 consisted of the following phases:

- Phase 1: Mapping the Big Picture. This is intended to provide a common, system level understanding of the equipment required for the successful laying of cables and pipes.

- Phase 2: Mapping the Detail. This is intended to focus on the individual components of the system to identify their inputs, outputs and interaction with other system components.

- Phase 3: Following the culmination of Phases 1 and 2, which are scheduled to be completed during 2016 and will result in the creation of industry guidelines and a glossary of common terms for cable and pipe laying equipment, there is potential for a third phase, which will lead to the publication of a DNV GL Standard for Certification or Recommended Practice.

Dr. Eng Marius Popa, lead naval architect, DNV GL, said, "Consistency and collaboration within the industry is essential. Individual practices create unnecessary cost and risk, so the development of a unified approach will ensure standardization across the supply chain. The JIP will deliver a decision tool that can be used by all stakeholders during the specification, design, manufacture, procurement and approval of any equipment intended for use in offshore cable/pipe laying and recovery."

Phase 1 participants include Allseas Engineering; Amclyde Norson Engineering; Aquatic Engineering & Construction Ltd; IHC Engineering Business; IHC SAS BV; MAATS Tech Ltd; NLI Offshore & Marine Products AS; Parkburn Precision Handling Systems Ltd; Reel SAS (IMECA); Saipem Group; Subsea 7; and Technip UK Ltd.



## in this section

Offshore Industry Headlines	31
Upstream Oil & Gas	34
Underwater Intervention	40
Maritime Communications	48
Subsea Cables	54

### Harvey Gulf delivers North America's first LNG marine fueling terminal in Port Fourchon, Louisiana

Harvey Gulf has once again shown its commitment to utilizing LNG as a marine fuel with the opening of the first marine LNG fueling terminal in North America. Less than a year after the delivery of the M/V Harvey Energy, America's first LNG-powered vessel, Harvey Gulf accomplished another first when it completed a successful LNG bunkering of the Energy from the newly constructed LNG terminal facility at its operation base in Port Fourchon, Louisiana. The bunkering included the transfer of 43,000 gallons of LNG in approximately 2.25 hours without incident.

The terminal is designed to meet the requirements of 33 CFR part 127 NFPA 59A and able to deliver LNG at a pumping rate of 550 GMP. The total on site storage is approximately 270,000 gallons contained in three 90,000 USG type "C" vacuum insulated tanks.



Shane Guidry, chairman and CEO of Harvey Gulf, commented: "This a testament to Harvey Gulf's commitment to promoting the use of LNG, a clean, abundant, and cost-effective alternative marine fuel. With the completion of our LNG terminal at Port Fourchon, we are able to provide a LNG bunkering point at the epicenter of marine operations for the Gulf of Mexico, which is vital to continuing the shift to LNG as a marine fuel."

The M/V Harvey Energy and her sister ship the M/V Harvey Power, both LNG-powered Offshore Supply Vessels are under charter to Shell and support Shell's Gulf of Mexico assets.

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

# OFFSHORE INDUSTRY HEADLINES

Research & Development • Environmental Assessment • Discovery

## Bibby Offshore develops collaborative approach to unlock subsea productivity

Bibby Offshore, the leading subsea services provider to the oil and gas industry, has developed an innovative vessel share option for clients, which has the potential to provide the subsea industry with significant savings through encouraging collaboration and cost efficiencies as well as providing increased productivity.

Unlocking Subsea Productivity (USP) re-evaluates the traditional subsea campaign model, proposing a new alternative structure for how Bibby Offshore delivers services to clients. The concept focuses on a vessel share agreement, with collaboration from several clients, to deliver a single linked campaign workscope that addresses each client's individual demands.

To demonstrate the real savings available to clients, a simulation campaign was generated using eight previous campaigns completed by Bibby Offshore that were reconstructed and analyzed in order to quantitatively demonstrate the potential savings arising from USP. The findings were presented to 18 client representatives from six separate operators at a recent USP event held in Aberdeen.



The simulation model calculated an average saving of £235,000 per client, based on an overall project duration of 54 days reducing to 41 days. This resulted in an overall cost saving of over £1.8 million to be shared among the example clients.

Vikki Thom, subsea business manager at Bibby Offshore said, "USP was developed with our client's needs and the future of the industry in mind. The model is aimed at reducing the costs associated with mobilization periods whilst also distributing further cost savings for individual clients, helping to ensure a reduction in non-productive time and an increase in overall work time."

"With the industry currently facing unprecedented challenges due to the continued low commodity price, the future of the North Sea is more testing than ever. The USP proposal provides an efficient model for a cohesive approach to project delivery and provides a viable alternative to deferring work schedules. This demonstrates that we, as an organisation, are doing everything we can to support a more sustainable future for the UKCS Subsea Industry."

## Siemens UK & Ireland joins forces with global oil & gas specialist

Siemens UK & Ireland has formed a strategic partnership with oil and gas control system specialist, EFC Group, in a collaboration that promises to deliver innovative, cost-saving solutions for the industry.

The partnership developed after EFC Group selected Siemens as its preferred supplier of automation and control systems in 2010, following an audit into its Programmable Logic Controller (PLC) supply, usage and technology.

Siemens UK & Ireland's technology has since assisted EFC Group with developing and certifying its Hazardous Area range of Remote I/O (RIO). This is now implemented across its range of drilling safety critical control systems for the oil and gas industry. The RIO solution has a number of benefits over traditional enclosure-based EExD technology, including the ability to deploy at convenient locations, leading to cost savings due to reduced cabling requirements.

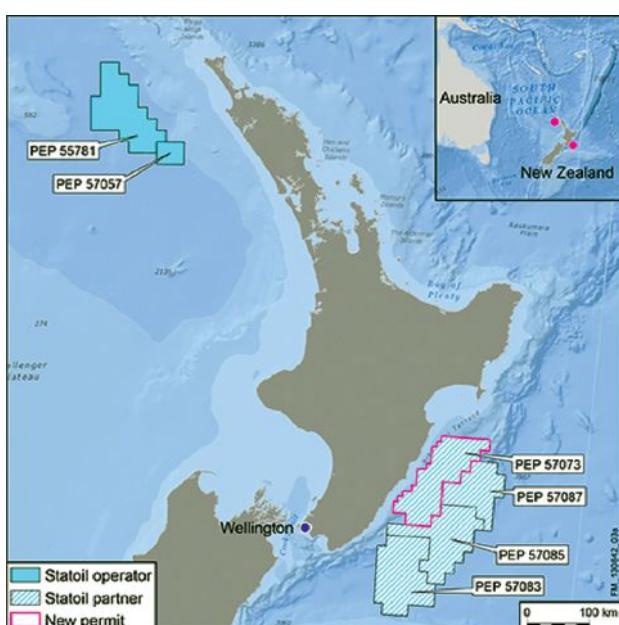
Users of EFC's systems can also make additional savings through preventative maintenance delivered by condition monitoring technology from Siemens. This ensures there is minimal unplanned downtime, increasing a site's operational efficiency. The systems' reduced size is also ideally suited to offshore installations where floor space is at a premium.

Louise Creane-Smith, commercial director at EFC, comments: "We have experienced positive uptake and success using the certified RIO solution across a number of our safety-integrated systems, with benefits being realized for clients at both time of installation and long-term support provision. Thanks to our partnership with Siemens we can offer condition monitoring as standard, which has cemented our position at the forefront of delivering industry compliant systems and ensures our customers can benefit from productivity efficiencies."

Chris McComb, account development manager – oil & gas, Siemens UK & Ireland, adds: "Because of our work to develop solutions to support companies in the oil and gas industry, Siemens is well placed to stand back, take a holistic view of all requirements and help maximize operating efficiencies. Our partnership with EFC Group shows what can be achieved through collaboration to develop a solution to drive tangible benefits for customers."

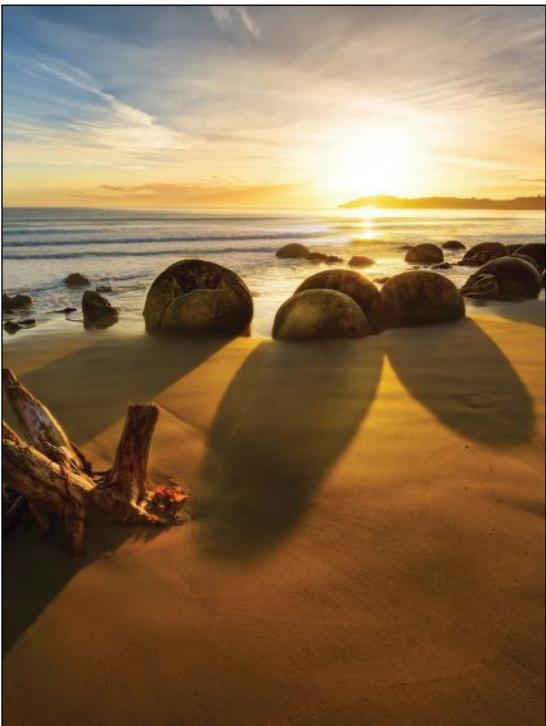
## Statoil agrees farm-in with OMV in New Zealand

Statoil has agreed with OMV to acquire a 30% working interest in Petroleum Exploration Permit (PEP) 57073. This will further strengthen Statoil's position in New Zealand.



The permit covers an area of 9,800 sq. km in the East Coast Basin and sits in water depths of 1,000 to 2,000 m. OMV will remain the operator with 70% working interest. The transaction is subject to regulatory approval.

"This is an underexplored area with the potential for multiple plays, offering a considerable exploration upside," says Nicholas Alan Maden, senior vice president for Exploration.



The permit is adjacent to permits 57083, 57085, and 57087, which were awarded to Chevron and Statoil in 2014.

"We now hold a working interest in more than 46,000 sq. km of exploration acreage in New Zealand, and all of these permits have staged exploration programs. This is in line with our exploration strategy of accessing at scale," says Maden.

OMV and Statoil will work together on the exploration program in PEP 57073. This includes geological and geophysical studies as well as seismic acquisition over the coming years. The work will provide information necessary to decide, in 2021, if a well commitment should be made in the permit.

In addition to the partnerships with Chevron and OMV in the East Coast and Pegasus basins, Statoil also operates two exploration permits in the Reinga basin.

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

### Diamond Offshore and GE Oil & Gas enter into industry's first performance-based subsea blowout preventer service agreement

Diamond Offshore Drilling, Inc. (NYSE: DO) and GE Oil & Gas (NYSE: GE) have announced the offshore drilling industry's first-of-its-kind contractual service agreement (CSA) that transfers full accountability for BOP performance to GE Oil & Gas. In this Pressure Control by the Hour™ model, Diamond Offshore will compensate GE Oil & Gas only when the blowout preventer (BOP) is available. This 10-year collaborative arrangement for GE's engageDrilling™ Services showcases a new way of thinking to drive continuous improvement in deepwater drilling.

The arrangement will include GE purchasing the BOP systems aboard Diamond Offshore's four drillships, currently located in the U.S. Gulf of Mexico, for a total of \$210 million.

"Subsea equipment repair and maintenance is the single largest cause of non-productive time across our industry, resulting in great expense to both drillers and operators," said Marc Edwards, president and CEO of Diamond Offshore. "In today's market, we have to make the economics of offshore drilling more competitive for our clients. The purpose of our new Pressure Control by the Hour service model is to incentivize all parties to prioritize equipment reliability and availability for the ultimate benefit of our customers."

"To deliver a solution that improves drilling efficiency now and in the future, collaboration is essential," said Lorenzo Simonelli, president and CEO, GE Oil & Gas. "We are changing the game by building the new blowout preventer service model for the industry. With improved control, maintenance and servicing of our equipment, we are putting skin in the game and guaranteeing performance."

The GE Oil & Gas engageDrilling™ Services offering enhances BOP system availability by transferring the maintenance and service of pressure control equipment to GE Oil & Gas. This includes on-rig GE Oil & Gas personnel, management of parts, overhaul and repair, continuous certification, data monitoring, and management of change. This new arrangement is a performance-based alliance that leverages the scale of GE data, predictive analytics, insights, and continuous certification, positioning GE as a long-term commercial, operational, and technical partner.

Under the new service model, Diamond Offshore will begin capturing data through GE's monitoring and analytics solutions. Over time, this will enable condition-based monitoring and maintenance, which will drive proactive decision-making and planning to address the requirements of industry standards for drilling systems. By transferring the maintenance and service of well control equipment to GE Oil & Gas, Diamond Offshore is simplifying operations and optimizing between well maintenance to reduce the frequency and duration of downtime.

"This is a key part of GE's business strategy to collaborate with drilling contractors and operators to push the boundaries of our industry," said Simonelli. "Our new CSA model addresses the current needs of drilling companies and establishes the roadmap for smart, predictive, condition-based services and maintenance in our digital-industrial future."

"We look forward to partnering with GE Oil & Gas to lead the way forward in our industry," said Edwards. "By combining Diamond Offshore's operational excellence with the guaranteed performance of GE's BOPs, we are increasing our competitiveness in the market."

For more information, visit [www.diamondoffshore.com](http://www.diamondoffshore.com) or [www.geoilandgas.com](http://www.geoilandgas.com).



### Experts team up to launch MacGregor's technology-leading fiber-rope crane

MacGregor, part of Cargotec, can now offer the offshore industry a technology-leading fiber-rope crane. The crane has been developed by combining MacGregor's proven offshore crane technology with the fiber-rope tensioning technology perfected by Parkburn Precision Handling Systems. The companies have entered into a cooperation agreement to combine MacGregor's offshore crane expertise with Parkburn's fiber-rope tensioning technology.

"MacGregor recognizes that by partnering with experts in specific technological areas, it can deliver solutions that exceed its own capabilities," says MacGregor's vice president, R&D and technology, Baard Trondahl Alsaker. "We see ourselves as being able to integrate the best technology available to deliver systems with technology-leading capabilities."

The new MacGregor crane features a simple-to-operate fiber-rope lifting system that employs Parkburn's unique tensioning technology. The Parkburn equipment eliminates the heating and degradation problems associated with on-load fiber-ropes stored on winch drums.

Importantly, it can accommodate non-uniformities resulting from splices in the rope.

"This is an important advance for handling loads at depth," says Mr. Alsaker. "The great advantage of fiber-rope in

this context is that it weighs virtually nothing in water, so regardless of the length of rope paid out, it does not add anything to the load experienced by the crane. This is in complete contrast to the situation with wire rope, where the ever-increasing weight of wire paid out limits the load permissible in relation to depth."

The new crane will be introduced to the market as a 150T fully heave-compensated knuckle boom crane with capability of reaching 4,000 m of water depth, but the offering will be extended to the complete range of MacGregor subsea crane fleet.

The MacGregor fiber-rope technology is also suitable for retrofit on existing subsea cranes. This enables upgrading the capabilities of existing construction vessel fleet without having to build new vessels, an important feature to meet the requirement for reducing the cost level of the industry.

Parkburn is a UK-based marine handling systems provider that has spent over 40 years perfecting the deep-water handing systems required in fiber-rope cranes. Its fiber-rope winch system can be delivered as digitally controlled, electrically driven, or hydraulically driven. Features include integral active-heave compensation and power regeneration capabilities.

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



## Harkand completes successful campaign in Trinidad and Tobago for BPTT



Harkand has completed an inspection, repair, and maintenance (IRM) campaign for BP Trinidad and Tobago (BPTT) utilizing the Harkand Da Vinci diving support vessel (DSV) and the company's new hyperbaric rescue facility (HRF) in the Caribbean.

The IRM scope included deadleg inspection of BPTT offshore assets, pipeline intervention, caisson repair works, platform and pipeline clamps installation and inspection, and recovery of a caisson section. Harkand provided a full suite of services including saturation and surface diving, ROV, survey, and inspection as well as project management and engineering for the execution of the campaign.

This was also the first project for the new HRF built by Harkand in the Gulf of Mexico in August 2015. The HRF was set up in Chaguaramas on the northwest peninsula of Trinidad for the campaign.

John Reed, Harkand chief executive officer, said: "Securing this contract with BP Trinidad and Tobago was a significant win in the region. The work involved an array of specialist subsea services and engineering, cementing our track record in the area."

Reed added: "This work followed successful campaigns by both the Houston and Aberdeen operation bases in the Caribbean during 2014 and 2015 for major global oil and gas operators. We are extremely pleased to add BPTT to our client base in the area."

Mathieu Guillemin, non-executive director of Harkand and managing director at Oaktree Capital Management, said: "Harkand's collaboration between their global centres during the current market environment is key in successful execution of world class projects. Oaktree continues to demonstrate its support for the financial stability of Harkand in support of the company's strategic priorities."

The IMCA-compliant, DNV-classed Harkand Da Vinci is equipped with a 140 Te active heave compensated (AHC) crane, an 18-man twin bell saturation diving system rated to 300-m water depth, one 3-man wet bell, and one 2-man surface diving system. The vessel was mobilized with two remotely operated vehicles (ROVs)—one light work class and one inspection class.

Harkand provides offshore vessels; ROVs; diving, survey, and inspection services; project management; and engineering to the oil and gas and renewables industries. Headquartered in London with operations bases in Aberdeen, Houston, Mexico, Nigeria, Ghana, and Angola, Harkand aims to be the leading subsea IRM and light construction contractor globally.

# PRODUCT SPOTLIGHT

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### Li-Ion Subsea power – The subsea socket

SubCtech, Kiel's answer to the increasing demand for greater autonomy and long-term deployments underwater is a safe, highly-reliable and efficient family of Li-Ion batteries, the PowerPack™.

A high energy density of 210 Wh/kg on battery level makes SubCtech's Li-Ion batteries with pressure housing made of titanium more efficient than comparable pressure-neutral Li-Pol batteries. Environmentally harmful, disposal alkaline-manganese primary cells and obsolete lead-gel or NiMH technologies are replaced by the latest industrial Li-Ion technology. Long-term deployments for several years as well as very high currents are no longer problematic, thanks to the system design and the low self-discharge.

Battery-Management-Systems (BMS), based on our MicroDI™ controller family, enable us to adjust batteries to customer requirements. The range varies from small batteries at 100 Wh to power stations at 100+ kWh. Voltages are realized from 14.4V to 600V DC, currents up to 100+A per battery string. The BMS controls all safety functions and communicates via simple ASCII NMEA-0183 commands or via MODBUS with a higher-level host system such as SCM or AUV.

Being qualified according to ISO 13628:6, MIL-STD 810G and GL (shock, vibration, temperature, humidity, EMC), the Li-Ion batteries are used for Subsea Oil+Gas. Future systems are designed to meet the safety integrity level SIL 3.

For the commercial and scientific market, standardized COTS (commercial off the shelf) batteries benefit from the high quality level that comes with production in accordance with IPC-A-600/610 class 3. As a result, highly reliable batteries with top capacities are available at a reasonable price, even for standard applications like condition- or environmental-monitoring-systems. Optionally, BMS and data interfaces can be offered as well.

The BMS guarantees high availability, simple operation and diagnosis, even during on-board operation and under rough conditions. Subsea batteries and systems can be controlled via ROV cameras with bright, pressure-tight LED control lights, either on board or already preinstalled.

Regarding small batteries or simple applications, the SmartCharger™ charges the batteries automatically and unattended. It can be connected in every SOC (state of charge) of the battery. Charging can be interrupted anytime to enable a spontaneous usage. It goes without saying that the charger is splash-water protected or even IP68 waterproof for use on the upper deck.

Large batteries, e.g., for AUV, are charged with the PowerCharger™, being centrally controlled by the BMS of the battery. The PowerCharger™ also hardly requires manual operation, except for pressing a "Start"/"Stop" button on the 7 in. touch screen. As a result, operating errors are virtually eliminated; anything else would be recognized by the BMS.

If a more profound diagnosis is required, several menus are available, showing all battery data (like voltage, current, temperature, SOC, etc.) graphically—down on cell level. The data is available for post-processing as an ASCII CVS-chart in NMEA-0183 format on the charger or on the BMS of the battery.

The whole product-portfolio is completed by transport boxes permitted for air cargo, storage boxes with optional cooling and installation tools for AUV. Special charging and diagnostic devices are available for further diagnosis or automatic maintenance.

With approval of the German Federal Aviation Authority, the COTS batteries can fly safely. Due to the current tense situation concerning dangerous goods, we always recommend transportation via land or sea cargo.

UN T38.3 transport certificates are available for some battery types, e.g., Big-Jim 14.4V @ 167Ah (180 mm x 370 mm, titanium housing, up to 6,000 m). In this case air cargo is possible without restrictions.

Installation service and training is provided to the customer. It is our pleasure to offer a 24/7/365 telephone-hotline as well as a lifelong after-sales support. We are pleased to advise you through all phases of your project planning.



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SubCtech Monitoring-System with OceanPack™ CO2-Analyzer and PowerPack™ Li-Ion battery.

## Trelleborg unveils dedicated swivel stack seal inspection facility

Trelleborg Sealing Solutions has opened a dedicated climate-controlled swivel stack seal inspection facility for the validation of custom seals. The global facility is based in Barendrecht, The Netherlands, and has been unveiled in a move to help ensure Floating Production Storage and Offloading (FPSO) operators achieve the highest possible standards in seal quality.

The facility provides a temperature-controlled environment to avoid fluctuations in the dimensions of the seals caused by temperature changes, with specialist storage racks allowing the seals to be acclimatized prior to inspection.

A bespoke inspection table has been installed, on which seals up to 3,000 mm can be measured with special lighting to aid visual inspection.

Trelleborg's FPSO Focus Group, which is based on site, is made up of a team of experts trained to inspect the specialist seals.

Henk-Willem Sanders, technical manager oil & gas and FPSO Focus Group leader at Trelleborg Sealing Solutions, said: "Oilfield operators need to be confident about their equipment—if a seal fails during an operation, this can lead to lost production revenues amounting to millions of dollars."

"The quality of seals for our customers is of the upmost importance and we are continually striving for excellence, which is why we have launched this dedicated seal inspection and validation facility."

"Typical FPSO seals are from 100 mm up to 3,000 mm in large cross sections. The controlled environment in combina-



tion with the fact that large diameter seals can be inspected gives our customers unrivalled reassurance when selecting a seal partner."

## Crowley celebrates over seven million man hours without a Lost Time Injury in Valdez operations

Crowley Maritime Corporation's tanker escort and docking services group in Valdez is celebrating over seven million man hours and more than 6 years since logging its last Lost Time Injury (LTI). In addition to this remarkable number, the company



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### Deep Gulf Energy awards Technip Subsea contract in the Gulf of Mexico

Technip has been awarded a lump sum contract by Deep Gulf Energy III, LLC (DGE) for the development of the South Santa Cruz and Barataria fields. These ultra-deepwater fields are located in Mississippi Canyon in the GoM, in approximately 2,000 m of water depth.

The contract consists of:

- Project management and engineering services;
- Fabrication and installation of approximately 23 km of pipe-in-pipe flowline;
- Design, fabrication and installation of flowline end terminations;
- Fabrication and installation of jumpers; and
- Pre-commissioning for the flowline. Covering all aspects of the field

announced that it had not had an OSHA recordable case in over two million man hours while performing tanker assist and escort work for Alyeska Pipeline Service Company. In 2015, the company logged over one million man hours while safely escorting 236 tankers through Prince William Sound, transporting 185 million barrels of oil in one of the harshest environments in the world.

In Valdez, Alaska, Crowley personnel and tugs help protect the environment through a contract with Alyeska Pipeline Service Company's Ship Escort/Response Vessel System (SERVS). As part of this commercial partnership, the company provides tug escorts for tankers traveling through Prince William Sound to and from the Valdez Marine Terminal, ensuring safe passage, even under the most extreme winter weather conditions. They also provide secure docking and undocking operations at the oil product loading terminals.

In 2015, Crowley continued its support of SERVS by planning and supervising classroom and field training exercises for the spring and fall fishing vessel training program. This training involved over 400 boats and 1,700 attendees, who gained familiarity with the equipment, tactics, and resources needed to quickly and professionally respond to an oil spill incident in Prince William Sound. Crowley's nearshore response barge, 500-2, and company-owned tugs visited the communities of Cordova, Whittier, Seward, Homer, Kodiak and Valdez in further support of the training.

Alyeska Pipeline Service Company's Ship Escort/Response Vessel System (SERVS) is one of the largest oil spill prevention and response organizations in the world, with a mission to prevent oil spills and to protect the environment by providing rapid and effective response services to the Valdez Marine Terminal and Alaska crude oil shippers.

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

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Image courtesy: Technip.

development—from engineering to design, manufacturing, and installation—this new award highlights Technip's unique vertical integration in the subsea business environment.

Technip's operating center in Houston, Texas will manage the overall project. The flowline system will be fabricated at the Group's spoolbase in Mobile, Alabama. The offshore installation is expected to be performed in the second half of 2016 by Technip's vessel the Deep Blue, the Group's flagship vessel for deepwater pipelay.

Deanna Goodwin, president of Technip in North America, commented: "This contract award by DGE is a testament to their continued trust in Technip's execution expertise and asset capabilities. I am pleased that this award comes in conjunction with the successful completion of the Kodiak project

and with the recent award of the Odd Job project. This will allow us the opportunity to further strengthen the relationship with our client into 2016."

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

## RCP awarded six-figure well control agreement in Singapore

A leading control and instrumentation company has been awarded a contract worth nearly £300,000 (approx. 670,000 USD) to supply and install four identical pieces of integrated well control equipment for a Singaporean based client.

RCP, which is headquartered in Aberdeen and also has an office and workshop in Singapore, is due to install and commission the integrated systems on high specification Chinese new build rigs, streamlining the well control process with essentially multiple systems integrated into one.

The integrated system comprises of a main hydraulic console with an all-electric remotely operated panel. Both panels are used to operate and control dual choke valves, dual gate valves (utilising different working pressures), accurately monitor the liquid seal integrity of the mud gas separator and also display three pump stroke counts.

RCP's wealth of oilfield engineering experience enabled the client to resolve unique engineering problems during the initial stages of the design work, ultimately leading to this robust piece of well control equipment.

The equipment was also recently demonstrated to a group of experienced Aberdeen drilling personnel whom commented



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upon both the ingenuity and simplicity of operation of the equipment. After the demonstration, RCP was asked to submit a proposal for a slight variation on the design for China.

The design layout and component selection for this equipment was based upon RCP's successful fully CE and ATEX certified choke control console design, which has been described by existing clients as "highly reliable and a quality piece of drilling equipment".

Under this contract, RCP, which has been supplying control and instrumentation equipment to the global oil and gas industry for over a decade, is due to build and deliver this well control equipment in four stages over the next six months, the first of which will be delivered by mid-February 2016.

#### **Churchill Drilling Tools unveils world's first hydraulic pipe recovery tool in the Middle East**

Churchill Drilling Tools, the specialist engineering company delivering market-leading drilling solutions to the global oil and gas industry, has launched its HyPR HoleSaver™ in the Middle East. The expansion follows successful deployments of the innovative hydraulic pipe recovery tool in the North Sea and Gulf of Mexico.

Stuck pipe situations cost operators hundreds of millions of dollars a year in non-productive time. The HyPR™ cuts that cost significantly by enabling operators to free pipe in just a few hours as opposed to using traditional methods, which can take several days.

The HyPR™ dart will be premiered at the SPE/IADC Middle East Drilling Technology Conference and Exhibition in Abu Dhabi, UAE, 26-28 January 2016.

HyPR™ was developed following extensive collaboration between Churchill Drilling Tools' deepwater Gulf of Mexico drilling teams in 2013. Since then, the tool has experienced rapid up-take, having been deployed by major operators in Houston, Aberdeen, and Norway.

The HyPR™ tool offers the simplest method to recover the drill pipe rapidly and to begin side-tracking right away. It also delivers a clean cut for operators wanting to maximize BHA recovery options.

Mr. Kjaer added: "Despite current challenges facing the oil and gas industry, the outlook of the Middle East market looks promising. As a result, we have recently opened a new

office in Dubai and increased technical support staff to expand opportunities and meet growing demand for the company's products in the region. As we go from strength to strength, our team is committed to continue delivering exceptional value to our clients and provide them with innovative, cost-saving solutions."

The company has recently been

shortlisted as finalists in the Export Achievement category at the prestigious Offshore Achievement Awards. The winners will be revealed at a black-tie dinner, which takes place at the Aberdeen Exhibition and Conference Centre on Thursday, 17 March 2016.

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



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## Fugro delivers surface current data with innovative system

Fugro and technology partner Areté Associates have successfully delivered near real-time, synoptic, surface current data to characterize loop current and loop current eddy conditions in the U.S. Gulf of Mexico during a period of intense current conditions.

The new remote ocean current imaging system (ROCIS) was deployed on its first operational project over the course of the 5-month program. Fugro surveyed currents over a distance of more than 125,000 km—the equivalent of three times around the world.

ROCIS is the first commercially available system of its kind and represents a step change in technology for mapping surface current conditions over a wide area of ocean for current sensitive offshore operations.

Optimizing recent advances in remote sensing and aerial survey, Fugro and Areté Associates developed a system that uses a combination of digital camera technology and highly accurate positioning systems, together with advanced algorithms, to derive surface currents from wave spectra measurements. It can be installed on a suitable survey aircraft, together with an inertial navigation system augmented by Fugro's Starfix® satellite positioning system.

Current data are reviewed in real-time on board the aircraft, providing continuous assessment of data quality and the location of strong currents. Within an hour of the aircraft landing, the system produces a "quick-look" map of the currents over the area while processed data files are available a few hours later. During the program, ROCIS data supported day-to-day operational planning and enhanced the accuracy of 3D hydrodynamic current forecast modeling.

The key technical benefits of ROCIS are the near synoptic, wide area, high resolution, high integrity surface current measurements that allow sub-mesoscale circulation to be measured and monitored. During a 4-hour flight the system can survey ocean currents at 250-m intervals over a track of 900 to 1,100 km. To map currents over a similar distance using traditional methods would take a combination of four vessels 24 hours. Given sufficient daylight hours, two ROCIS flight missions can be conducted each day.

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

## Iver3 AUV sold to Defence Research and Development Canada

OceanServer Technology has received a contract for an Iver3-580 EP system from Canada Public Works and Government Services for delivery to the Defence Research and Development Canada (DRDC).

The Iver3 AUV will be used to augment existing autonomous systems and provide a platform to continue R&D development in underwater research at DRDC Atlantic. OceanServer has sold several systems to DRDC with a wide range of sonar, software and sensors for research into areas such as mine counter measures. DRDC will have access to Iver's mature hardware and software interfaces to further studies in various adaptive behavior "autonomy software" architectures.

The Iver's primary system CPU is capable of outputting vehicle position and trajectory information to a separate payload computer. The primary Iver3 CPU in return accepts input of autonomy decisions such as heading, speed and depth following OceanServer's well documented API for remote helm and other behavior applications. The vehicle will be equipped with an INS for very accurate navigation along with the Klein 3500 side-scan and Bathy system for imaging and mapping the seafloor.

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



## SMD delivers world's first deep sea mining vehicles



Credit: Nautilus Minerals

In late 2007, SMD was awarded with a contract to design and build the world's first deep sea mining vehicles for Canadian listed company Nautilus Minerals. Eight years on, having worked in close partnership with the customer, this massive feat of engineering is complete. The seafloor production tools (SPTs) and associated equipment, totalling over 1,000 tonnes, have now been loaded onto the MV Happy Delta, which has set sail for Duqm Port in Oman where they will undergo further testing.

As well as the three mining machines or SPTs, SMD designed and manufactured the full spread equipment required to remotely operate, launch and recover the SPTs from the deck of the ship onto which they will be installed in 2017.

SMD conducted rigorous commissioning and factory acceptance testing on the full spread of equipment in dry conditions on land at their production facility in Wallsend, North East England prior to shipping. The SPTs will now undergo extensive wet testing at the port facility in Oman that is designed to provide a submerged demonstration of the fully assembled SPTs prior to commencement of the first mining operations in 2018.

The load out operation took place at Swans, an advanced manufacturing site being developed next to SMD's site on the banks of the River Tyne. It was the first operation of its kind to take place at Swans' recently dredged 9 m-deep quay.

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

## Deep Ocean Engineering, Inc. announces Phantom FlyImager

Deep Ocean Engineering, Inc. announced at the Oceanology International 2016 event in London that they are introducing its newest underwater vehicle, The Deep Ocean Phantom FlyImager.

This revolutionary underwater drone is a hybrid system, co-developed with EdgeTech, that allows the user to utilize a sophisticated side scan sonar system, the EdgeTech 4125, combined with the functionality of the powerful, versatile and rugged Phantom T5 ROV underwater drone.

What makes this new system unique is that the side scan sonar system can be pulled behind a powered surface vessel as a towfish while scanning using "wings" that provide stability and constant depth control. This side scan system provides



long range acoustic imaging in the water column to find targets. Once the target is identified, the “wings” are retracted and the underwater drone is converted from a towfish to a free flying ROV for close up optical imaging of the target.

The Phantom FlyImager hybrid drone is designed to be converted to an ROV from a side scan system to become capable of taking immediate action based on real-time data retrieved and analyzed using the side scan sonar by utilizing a single deployed vessel, thereby eliminating the need to deploy a passive side scan sonar unit and separate ROV.

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

#### New VERTEX AUV introduced by Hydromea SA

Hydromea SA will be introducing its underwater, high-resolution environmental sensing service along with the proprietary hardware required to make the service possible at Oceanology International 2016. The new VERTEX AUV with an integrated Xylem EXO2 sonde is capable of sensing a wide vari-



ety of physical-chemical parameters. Its compact size (length: 70 cm), high maneuverability and dedicated vehicle-to-vehicle communication and navigation hardware makes it particularly well suited for swarm operation. A swarm of VERTEX AUVs allows Hydromea to quickly provide a 3D map of water quality parameters with an unprecedented detail and consistency.

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

#### Successful repair for London Array leads to further work for the subsea hydraulic cable grab

Pharos Offshore successfully completed a diver-less export cable repair for London Array using the subsea hydraulic cable grab.

Basslink, a subsea cable connecting George Town in Tasmania and Loy Yang in Victoria, has a possible fault with the cable that is approximately 100 km off the Tasmanian coastline in Bass Strait. Using the Subsea Hydraulic Cable Grab and a team of personnel from Pharos, the cable will be recovered for repair. Pharos delivered a work package with the rapid mobilization of expertise and equipment to locate, and recover the subsea cable.

Reacting quickly to customer requirements the system was prepared and shipped within 2 days.

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



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41

Ocean News & Technology

## New approach to subsea systems will dramatically reduce cost and risk

Ashtead Technology has published a white paper at Subsea Expo to demonstrate how a new approach to the installation and integrity management of subsea systems can significantly reduce risk and cost in subsea operations.

The leading, independent provider of subsea technology and equipment has developed an advanced suite of integrated subsea monitoring and data systems to support critical aspects of construction and integrity management.

Using a building-block philosophy, Ashtead has designed a flexible core system that provides multi-channel communications and data management capabilities. This common data systems application framework delivers precise monitoring of subsea construction, integrity and data integration operations that will reduce cost, eliminate risk and minimize the need for custom engineering.

It focuses on rapid application configuration techniques based on common standardized building blocks and integration techniques. By creating effective and easily integrated building blocks, the system can be used from initial installation through life of field integrity support and eventual decommissioning.

Their newly launched system covers suction piled structures, mono-piles, wind turbine and jacket installation and flowline spool orientation measurement as well as providing short- and long-term fatigue monitoring capabilities on flowlines, risers, mooring systems and critical structures.

Essentially, Ashtead's building block-based systems provide a versatile platform for improved cost and safety performance, integrating into field communications architectures such as long and ultra-short baseline acoustics, while reducing technological and operational risk and capturing key information that can extend the life of subsea assets.

The system is also capable of providing active control to support pipeline commission and subsea intervention operations, allowing fully integrated commissioning and monitoring solutions throughout construction and life of field stages.

Using its common core building blocks, Ashtead has successfully deployed a range of applications with varying degrees of complexity, provid-

ing vital data during subsea construction and life of asset operations.

These applications are the attitude monitoring system (AMS), the deflection monitoring system (DMS) and the vibration monitoring system (VMS). They use common hardware, software and systems integration methodologies to integrate gyro packages, depth gauges, inclinometers and other sensors to provide autonomous packages that can be deployed, used and retrieved by both divers and ROVs.

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

## ROVs work for diving companies and entrepreneurs

Almost every commercial diving company is now employing an ROV in some part of their operation. Most recognize the ROV is not a replacement for the diver, but rather a tool to help make his job safer, faster and easier. Inspecting a site with a remote controlled vehicle before sending someone below allows both diver and topside personnel to better understand the working environment, nature and extent of the job.

One company successfully using the ROV is Works of Diving Hong Kong Ltd, a member of the International Association of Diving Contractors. With more than 30 years' experience in the commercial diving industry, co-owners Albert Lam and Tatsushi Kagaya have gained considerable expertise in marine engineering and extensive knowledge of project management and design. Together they have the capability to execute all aspects of underwater construction, maintenance, repair, and demolition. The company has participated in many of Hong Kong's big infrastructure projects such as the intake installations at the Lamma Island Power Station and KCRC West Rail and the Submarine Outfall Installation. They do plant and facilities maintenance work for the Drainage Services Department and have collaborated with China Guangzhou Salvage on bigger projects. Their extensive line of equipment includes a derrick lighter, tug boats, a full line of commercial diving equipment, underwater still and video cameras, and a JW Fishers SeaLion-2 ROV.

A recent project where the ROV proved essential was the inspection of water storage tank at a local power station. Among the obstacles Works of Diving had to overcome were devising a

way to get men and equipment to the top of the 15-m high structure and determining how to get inside the huge tank with an opening only 0.5 m in diameter. The narrow steel tube leading into the dark interior was a tight fit for an average man, and would have been nearly impassable for a fully dressed diver. The solution proved to be the ROV that was easily lowered through the small opening, eliminating the need to send a person into the confined space. Operations supervisor Andrew Jenner reported, "The SeaLion worked extremely well sending us back some great video of the tank's interior. It helped make this difficult job so much easier."

Another diving company utilizing an ROV is INSUB in Chile. Managing director Pedro Bizama Mundaca is an accomplished oceanographer, commercial diver and graduate of the Chilean Navy's Polytechnic Academy. INSUB offers a variety of services including bathymetric and hydrographic surveys, environmental impact studies, dredging, underwater welding, and inspection and maintenance of marine terminals and navigation aids. To assist in these projects the company acquired a JW Fishers SeaLion-2 ROV with a SCAN-650 sonar and single function manipulator. The sonar scans a 360 degree circle around the ROV providing the operator with a detailed image of the underwater environment and helping him guide the vehicle to the target of interest until it comes within video range of the ROV's cameras. In a recent offshore operation the ROV was put to



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# Caldwell

Marine International, LLC

**Caldwell Marine International is a New Jersey based heavy marine construction firm specializing in the installation of submarine power and fiber cables.**

**Caldwell Marine International, LLC is seeking recent engineering graduates for the following positions:**

## MARINE DIVISION STAFF ENGINEERS

The Marine Division Staff Engineers will be responsible for supporting the Caldwell Marine Director of Engineering and the Project Management team with the following tasks:

- Equipment Design and Fabrication
- Deck Layouts and Load Calculations
- Cost Estimating Support
- Project Management Support
- Project Scheduling Support
- Marine Charting and Route Design

The applicant should be proficient in the following disciplines:

- AutoCAD for engineering and 3D applications
- Mechanical Engineering Theory, Design, and Loading Calculations

Work is divided between the field and the office. Successful candidate must be a team player, able to work with people in a wide variety of circumstances.

44

## MARINE SURVEY AND POSITIONING ENGINEER (FULL TIME)

Caldwell Marine International, a leader in the submarine cable installation industry, is currently seeking a Marine Survey and Positioning Engineer.

Primary duties will include:

- The set up and operation of DGPS positioning systems for offshore operations
- The setup and operation of Marine echo-sounding equipment
- The setup and operation of HyPack and WinFrog survey suites used in cable lay applications as well as cable lay monitoring software
- The setup, operation, and troubleshooting of subsea pressure housings, underwater lighting and cameras, pressure sensors, and USBL systems used on subsea cable plows and ROV equipment

Additional duties include data post-processing, reporting and as-built drawing preparation, and hydrographic survey operations. Special consideration will be given for submarine cable laying and cable route engineering experience. Candidates shall have a minimum of a Bachelors Degree in Ocean Engineering or Marine Survey (or associated technical field) along with 2+ years of marine experience.

Work is divided between the field and the office. Successful candidate must be a team player, able to work with people in a wide variety of circumstances.

For a confidential evaluation, please E-Mail resume along with salary requirements to:  
[Marc.Dodeman@caldwellmarine.com](mailto:Marc.Dodeman@caldwellmarine.com)

CALDWELL MARINE INTERNATIONAL, LLC  
1433 Highway 34, South  
Farmingdale, New Jersey 07727

## UNDERWATER INTERVENTION

work inspecting a buoy marine terminal, a floating hull with a rotating head to which vessels can moor. "The SeaLion worked very well on this job" reported Mr. Mundaca. "We were able to examine the submerged hull, chain, and mooring without having to deploy a diver."

Commercial diving companies aren't the only ones putting ROVs to work. Entrepreneurs, like Australian Steve Robinson, are also discovering how ROVs can provide unique opportunities and make their businesses more profitable. Steve is in the process of setting up a business to collect rare seashells in water depths of 50 to 300 m, far beyond the range of sport diving. These are no ordinary shells, but rather unique specimens in high demand by collectors. The buying and selling of these mollusks is a multimillion dollar worldwide industry. To ensure the harvesting of these rare specimens is sustainable, the industry is regulated by the Australian Fisheries Department, EPA, Conservation Council, and a number of other agencies. In addition to attempting to build a profitable enterprise, Robinson also plans on conducting scientific research in the deep waters off South Australia, an area very little is known about. He will be video mapping the ocean floor, examining the health of fish stocks, and looking for signs of subsea resources that could possibly be developed.

To conduct all of these various tasks, Steve is building a very specialized underwater robotic system capable of working in the high current of these deep water zones, with the capacity to pick up small delicate shells and deposit them in collection basket. At the heart of the system is a SeaLion-2. Steve says, "The key to this business was finding an ROV able to go these depths at an economical cost, which is why I choose Fishers vehicle. It has all the things I needed like auto depth, auto distance off bottom, and on screen display; and its ruggedly built and easy to field service. It just made sense to go with their system."

### Louis Dreyfus TravOcean orders two Saab Seaeye Leopards

Specialist submarine cable installation company, Louis Dreyfus TravOcean, has ordered two Saab Seaeye Leopards for touchdown monitoring and support.

Long-established experts in laying and protecting submarine cable, Louis Dreyfus TravOcean provide turnkey installations worldwide and are specialists in the design and construction of trenching equipment.

The pioneering Leopard work vehicle, with its 11 thrusters and iCON intelligent control system will provide TravOcean with a stable work platform that is unrivaled among ROVs—particularly in strong currents.



Greater flight stability under variable loads is delivered by the iCON system—including pitch and roll stabilisation—to give stable flight even with large tools and sensors deployed.

ICON independently manages each device on the vehicle, including auto redundancy to keep the ROV working even with multiple equipment damage.

Effectively, the Leopard thinks for itself, leaving the operator free to concentrate on the task at hand.

This independent control comes from relocating the brains of the system into sensors and actuators around the vehicle—having refined the main electronics into an intelligent power distribution and data hub. The user also gets greater information, and maintenance is far simpler and quicker.

Free from centralized electronics, the Leopard's distributed intelligence allows for systems to be changed or added without the need to partially dismantle the vehicle. It also offers building-block simplicity for system reconfiguration, along with remote Internet access for upgrades and support.

The chassis has been designed with rapid reconfiguration and easy maintenance in mind. A large open payload bay within the vehicle allows for ample tooling and survey sensors to be installed rapidly on sliding trays.

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

### Kraken sonar gets funding from the Canadian Government

Kraken Sonar Inc. announces that its wholly owned subsidiary, Kraken Sonar Systems Inc. will receive a non-refundable financial contribution of up to \$495,000 from the National Research Council of Canada Industrial Research Assistance Program (NRC-IRAP).

In addition to technical and business advisory services provided by NRC-IRAP, the funding is being used to develop the Kraken Active Towed Fish (KATFISH) for high-speed, high-resolution seabed mapping. The system will enable real-time seabed imagery, bathymetry and advanced 3D digital terrain models of the seabed. KATFISH will enable seabed mapping missions optimized for both manned and unmanned surface vessels.

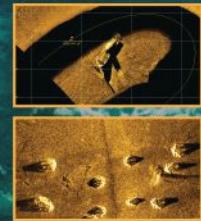
Karl Kenny, Kraken's president and CEO, said, "We are very grateful for the continued support from NRC-IRAP. Their assistance enables us to continue to innovate our seabed survey solutions.



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We've stated on many occasions that cost effective and high resolution seabed mapping is mission-critical for many military and commercial applications. Placing a survey sensor - such as Kraken's Miniature Synthetic Aperture Sonar - closer to the seafloor will result in the acquisition of much higher resolution data. When the sensor is integrated onto a high-speed, intelligently stabilized towed platform such as KATFISH, better quality data is acquired at a faster

rate, thus improving efficiency and lowering both operational and data acquisition costs. In fact, we believe that KATFISH provides the highest resolution seabed pixels at the lowest cost compared to any other competing survey sonar platform."

The business case for the KATFISH system involves two clearly identified and distinct markets: commercial seabed survey and underwater defense.

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

### Seismic handling system success

Kongsberg Maritime's wholly owned deck equipment specialist Kongsberg Evotec reports a strong start to the year with three separate new contracts for advanced seismic handling systems.

Two contracts, for customers located in China, are for delivery of seismic handling systems for a six-streamer vessel and a two-streamer vessel. Both vessels are currently under construction in China and Kongsberg Evotec will start equipment deliveries from October 2016.

Kongsberg Evotec also signed a contract with a Norwegian customer for a seismic handling system featuring a containerized gun system. The equipment is scheduled for delivery in Norway, July 2016.

All Kongsberg Evotec Seismic Handling systems are custom built for specific vessel and client needs, using an established portfolio of reliable, feature-rich equipment that covers streamer handling system, gun handling system, wide tow system, back-deck control system and additional seismic products.

Kongsberg Evotec provides services from design to total engineering, fabrication, installation, commissioning and start up, ensuring that all seismic vessel back deck equipment supports a vessel's ability to operate efficiently, allowing for faster, safer operation that impacts positively on the profitability of any survey project.

"While demonstrating the strength and capabilities of Kongsberg Evotec's technology for handling systems for seismic vessels, the contracts also show our strength in new markets and signal

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the E&P sector's willingness to invest in systems to improve operations, even during the current oil & gas climate," says Torkjell Ringstad, VP handling solutions, Kongsberg Maritime.

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

#### **Plans for a state-of-the-art AUV research facility unveiled by the Australian Maritime College**

Building plans for a new \$750,000 state-of-the-art facility set to position Tasmania as a world leader in underwater robotic technologies were revealed.

AMC's AUV facility in Tasmania will be home to a fleet of robots used to survey the ocean's depths and collect scientific data on research missions.

AMC principal professor Neil Bose said the development would bring a range of social and economic benefits to the Launceston region.

"This is an exciting new development for AMC, the University and the state of Tasmania. It will be unique within Australia and one of just a handful of comparable facilities globally, allowing us to be on the cutting-edge of research in this field," Professor Bose said.

"Building our underwater robotic research capabilities not only enhances our reputation on the international stage, it also helps stimulate the local economy through the recruitment of specialist personnel and the use of a local architectural firm and other related industries."

Five new staff members have been recruited to help run the facility, including facility coordinator Peter King, lab manager Alfian Marzuki and engineers Isak Bowden-Floyd, Nathan Kemp and Konrad Zurcher.

"This facility will be a hub for world-class AUV research and technology. Through local and international collaborations, we aim to develop new data collection capabilities, improve reliability and increase autonomy of underwater vehicles," AUV facility coordinator Peter King said.

"One of these projects, the Antarctic



Gateway Partnership, will see us acquire and develop an AUV that tackles the great engineering challenges of venturing far beneath ice-covered waters to further our understanding of the Antarctic's role in the world's climate."

The facility's fleet of autonomous robots includes UBC-Gavia, Mullaya and the soon-to-be-procured Antarctic Gateway Partnership AUV.

Launceston firm Artas Architects

were tasked with designing a facility big enough to accommodate the Antarctic Gateway Partnership AUV, which will measure up to 8 m long, weigh 3 tons and be capable of transiting more than 100 km while collecting data from the seafloor at depths of about 4,000 to 5,000 m and beneath ice shelves and sea ice.

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

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47

Ocean News & Technology

# MARITIME COMMUNICATIONS

Satellite • Wireless Technology • Contracts

## Panasonic signs contract for capacity Telstar 12 VANTAGE

Panasonic has signed a multi-year contract for Telesat satellite capacity. Panasonic has contracted for nearly all the high throughput satellite (HTS) Ku-band capacity covering the Mediterranean, Europe and Middle East on Telesat's new Telstar 12 VANTAGE. Telstar 12 VANTAGE became fully operational at 15 degrees West in December 2015 and will provide Panasonic with HTS capacity to expand their mobile broadband offerings to growing maritime markets in the Mediterranean and European waterways as well as to oil and gas operators in the North Sea.

Telstar 12 VANTAGE is a powerful high throughput satellite designed to provide customers with important operational and commercial advantages. Telesat adjusted the position of the HTS spot beams on the satellite to meet Panasonic's requirements. Panasonic now has Ku-band capacity on four Telesat satellites and, with this latest contract, for nearly all the HTS Ku-band covering the Mediterranean, Europe and Middle East on Telstar 12 VANTAGE, the company is positioned to expand in maritime markets across Europe.

For more information, visit [www.panasonic.aero](http://www.panasonic.aero).

## NuRAN receives order to connect hundreds of ships worldwide

NuRAN Wireless Inc. has received a repeat purchase order to provide mobile coverage to hundreds of ships from its long-time partner On-Waves, an Iceland-based maritime mobile network operator.

NuRAN Wireless GSM Superfemtos have been used for many years already to deliver voice and data service to the passengers and crew members of several hundred ships, by connecting the vessels to the On-Waves mobile core network through a satellite backhaul being bandwidth optimized directly on the base station. Since satellite communications are extremely costly, keeping the overall amount of data transmitted to a minimum, albeit without compromising the quality of the user's experience, dramatically reduces the operations expenses (OPEX) and contributes to make the Superfemto the lowest cost GSM solution available on the market.

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

## ORBIT receives a follow-on order for OceanTRx™ 7

ORBIT Communication Systems has received another order for OceanTRx 7-500 Ka-band systems, its maritime satellite communication solution, from a global Non-Geostationary Satellite Orbit (NGSO) service provider. The value of this order is \$2.1 million. The systems will be installed on cruise ships and will allow continuous broadband connectivity following similar systems already installed on the vessels of some of the largest global cruise ship operators.

OceanTRx7-500 2.2-m antenna systems provide broadband data communication at exceptionally high traffic speeds and supports Ka-band High Throughput Satellite (HTS) communications, which is considered the most promising and growing segment in the satellites communication industry. Over the past years, ORBIT's 1.2-m and 2.2-m Ka-band systems proved its technological superiority and high reliability in numerous installations among defense and commercial customers.

For more information, visit [www.orbit-cs-usa.com](http://www.orbit-cs-usa.com).

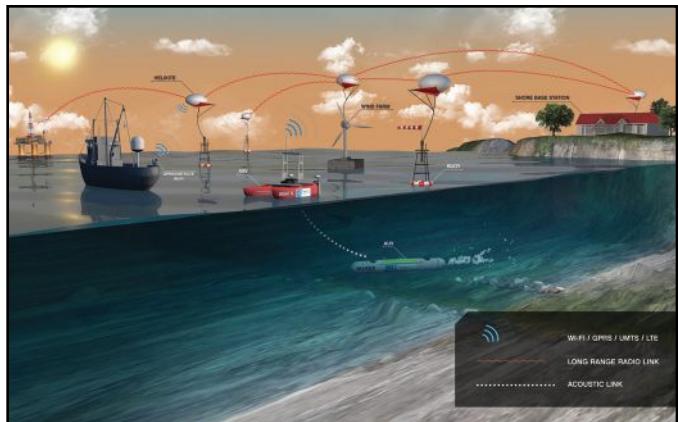
## One Net appointed as global partner by Inmarsat

One Net has been appointed as a global partner for Inmarsat's L-band portfolio, including FleetBroadband, BGAN, IsatHub and IsatPhone. One Net is a fixed and mobile satellite distribution provider with a presence in Europe, the Middle East and Central East Africa.

Ronald Spithout, president of Inmarsat Maritime, said, "Our new partnership with One Net represents the ongoing commitment between our two organizations to provide best-in-class solutions across the maritime market and provides an opportunity for us to expand our footprint in critical regions across the globe. We look to continue developing our relationship in the future with the potential to include Fleet Xpress, our latest hybrid Ka-L-band high-speed broadband service."

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

## Researchers look to bring Internet to offshore regions



A cutting-edge project hopes to provide broadband, low-cost Internet access in remote ocean areas, more than 100 km off the coast, using standard access technologies, such as WiFi and 4G, to support the Blue Economy, including fisheries and maritime transportation.

The goal of the BLUECOM+ project, which is being developed by a group of Portuguese and Norwegian researchers, is to facilitate activities such as the exploitation of mineral resources on the ocean bed, environmental monitoring, or other traditional activities like fisheries and maritime transportation, which increasingly require access to communications at sea.

The concept of the project, which involves the Institute for Systems and Computer Engineering, Technology and Science (INESC TEC), the Portuguese Sea and Atmosphere Institute (IPMA), and MARLO AS (Norwegian partner), is based on the use of helium balloons anchored, for instance, on buoys, vessels or wind farms, forming a flying mesh broadband network operating in TV white spaces in order to guarantee long-range radio connections.

According to Rui Campos, researcher at INESC TEC and coordinator of the project, the BLUECOM+ innovation lies on three components: exploiting TV white spaces in maritime environment; using a combination of helium balloons and kites that work as wireless access points that repeat signals at high altitudes, which is useful for radio signal propagation and consequently to increase the range of communications; and providing broadband Internet access in remote ocean areas using standard access technologies.

"The combination of these three components will make it possible for a user on a ship 100 km off the coast to access broadband Internet using a smartphone, without any hardware or software upgrade. This is a unique project and could be an alternative to satellite communications, which are the only solution available today," as explained by Campos.

The main goal of the project, which will be concluded in December 2016, is to build a prototype of the wireless communications solution and to demonstrate it in maritime environment, in the summer of 2016, using two research vessels provided by IPMA, which will work as anchor points for the helium balloons.

"Taking into consideration the lack of broadband communications in a maritime environment and the growing activity at sea, in our opinion, the project's economic potential is very high," Campos stressed.

According to the researcher, the solution developed may have an impact on the sectors of the Blue Economy, including maritime transportation, fisheries, offshore aquaculture, tourism, recreational sailing and the exploitation of mineral resources on the ocean bed. This will be a step forward to making the digital economy available in maritime environment and close the gap between the terrestrial and maritime communications scenarios that exist today.

BLUECOM+ is aligned with the TEC4SEA initiative, which started in 2012 at INESC TEC with the development of systems such as JANUS, whose goal is to turn fishing ships into Internet relay points that send signals to other ships outside the range of the network on shore, or MARBED, a pilot of a maritime wireless network installed in the Porto metropolitan area.

For more information, visit [bluecomplus.inesctec.pt](http://bluecomplus.inesctec.pt).

#### KVH surpasses 200,000 mobile satellite antennas

KVH Industries, Inc. announced that it recently shipped its 200,000th mobile satellite antenna, setting a milestone in the mobile satellite marketplace. The antennas include KVH's award-winning TracPhone line of satellite communications antenna systems for broadband access at sea and the company's award-winning TracVision line of satellite television receive-only antenna systems. The two product lines provide reliable and robust connectivity and access to satellite television programming for thousands of commercial vessels, pleasure yachts, first responders, and recreational vehicles worldwide on a daily basis.

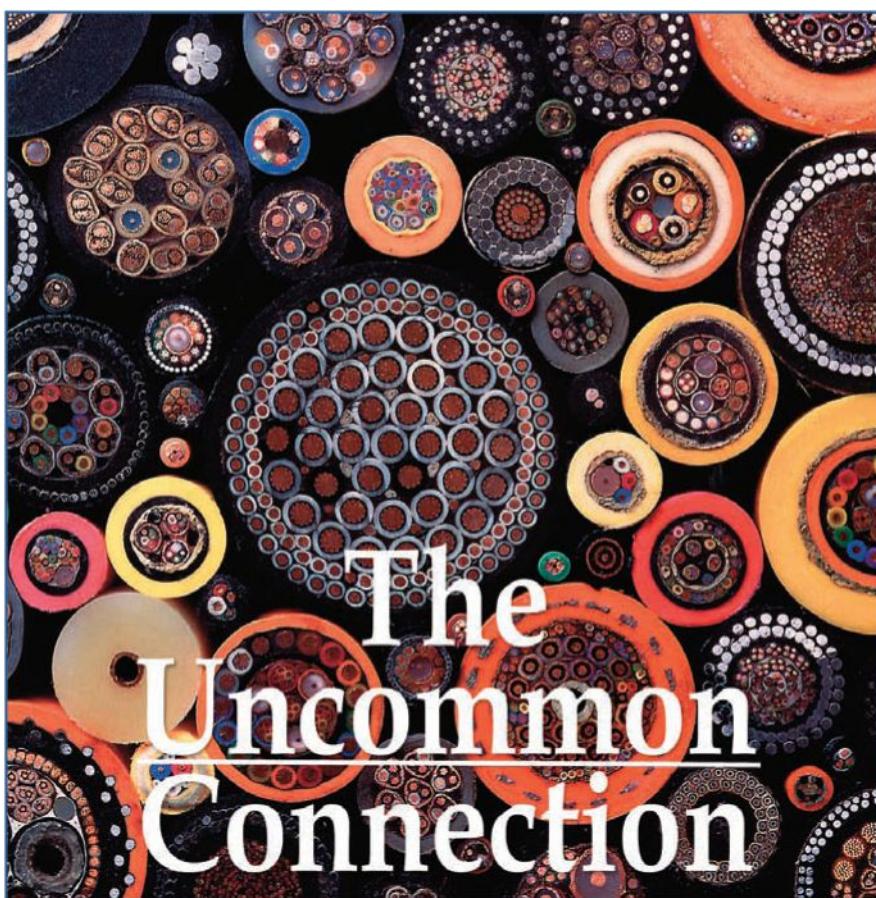
KVH's satellite communications antenna systems include the award-winning TracPhone V-IP series, which is designed exclusively for KVH's mini-VSAT Broadband network. Launched in 2007, mini-VSAT Broadband provides connectivity to commercial vessels and recreational yachts around the world and is the market share leader in maritime VSAT by a 2:1 margin over its nearest competitor, according to an independent industry report. KVH's TracPhone systems have been recognized with 13 awards by the National Marine Electronics Association (NEMA).

KVH's TracPhone V-IP series antennas have enabled seafarers in the middle of the ocean to communicate with their families, ship owners to opti-

mize operational efficiency, cruising yacht owners to stay connected to their onshore life, and fleets of U.S. Coast Guard and government vessels to maintain mission-critical communications. Notes one KVH customer who is currently working from his yacht while voyaging around the world: "We are very dependent upon the KVH TracPhone V7 Ku-band antenna with

the worldwide mini-VSAT Broadband network," says James Hamilton, Amazon Web Services engineer. "We use it for 24/7 data communications. It would be very difficult to do this trip without the KVH TracPhone V7. It's been a real enabler for us."

The company's award-winning TracVision products are powerful satellite TV systems designed to pro-



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vide the tracking, reception, and coverage needed for myriad marine and land applications—whether it is a family out for a day of fishing off the coast or a sports team traveling by bus to a competition. Compatible with nearly all Ku-band direct-to-home (DTH) services around the globe, the TracVision line was a breakthrough development when originally launched in 1994 and has continued to establish technological benchmarks. TracVision advancements include such features as RingFire antenna technology for signal strength, and TriAD technology for simultaneous reception of TV broadcasts from three separate Ku- and Ka-band satellites.

The versatility of the TracVision line means there is a choice for nearly every need - whether a boat owner, commercial vessel, patrol fleet, RV user, emergency responder, or charter bus passenger - to have reliable access to satellite TV programming with affordability and convenience. KVH's TracVision systems have been recognized with product awards from NMEA for 18 consecutive years.

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

## Trelleborg ships its 600th LNG Ship Shore Link

Trelleborg's marine systems operation has passed a major milestone with the shipment of its 600th SeaTechnik™ Ship Shore Link (SSL) system for the Liquefied Natural Gas (LNG) Industry.

The SeaTechnik™ SMART SSL system will be installed on a 174,000-cu. m LNG Carrier (Hull number 2411), being built by Daewoo Shipbuilding & Marine Engineering (DSME) at its Okpo ship yard, Goeje Island, South Korea, for Teekay shipping Limited.

The majority of the world's LNG

cargo fleet and terminals are equipped with SSL technology, a system for communicating the emergency shutdown (ESD) signals, telephone and process data required when cargo transfer is undertaken from ship-to-shore and from shore-to-ship.

Trelleborg views the support service as equally important to the technology itself. A ship costing many tens of thousands of dollars per day to run and carrying a cargo worth several million dollars is an expensive asset to have inactive because the SSL interface cannot be connected to transfer the LNG cargo. Trelleborg's Seatechnik™ SSL technology, and importantly, 24/7 service to test, maintain and repair equipment has a proven track record in making sure this will not happen.

The primary role of the Seatechnik™ SSL-ESD is to ensure secure ESD signaling to mutually shutdown ship and shore pumping and transfer systems in the event of an abnormal condition or emergency.

The SSL-ESD helps avoid damaging surge pressures that could lead to spillages of cryogenic liquid, which could, in turn, compromise the hull integrity through "cold-cracking." The SSL, which should be ATEX, IECEEx and SIL 2 certified, handles the ESD, telephony, process information and mooring load monitor data.

While international regulations require ships and terminals to have two independent links available and also present a minimum of one system for compatibility requirements for passing along mutual ESD signals between ship and shore, the Seatechnik™ SSL system can handle all known types of links from fiber optic to electric (Pyle National, Miyaki, ITT Cannon and "SIGTTO style connectors" and pneumatic).

While a variety of different solutions were used up to the late nineties, the Seatechnik™ integrated SSL assured full compatibility between the ship and any of the main systems installed at terminals around the world.

In line with this continuous innovation, Trelleborg recently announced a new product development at Gastech in Singapore and KorMarine in Korea. The Integrated Ship Shore Link (SSL) and Emergency Shutdown System (ESDS) combines two key systems into one cabinet. Shipyards benefit from a simplified single cabinet solution, replacing the three cabinet footprint currently used. This reduces both space and installation requirements and, subsequently, cost.

For ship owners, the new system provides improved operator feedback on ESD events and also maintenance diagnostics to view.

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

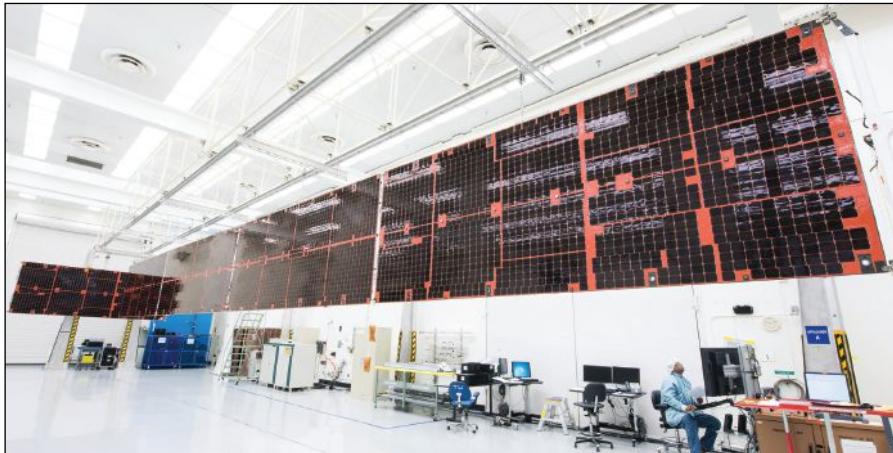
## Intelsat 29e successfully launched into orbit

Intelsat S.A. announced that Intelsat 29e, the first of the Intelsat EpicNG high throughput satellites, was launched successfully from French Guiana aboard an Ariane 5 vehicle. Liftoff occurred at 6:20 pm EST. The Intelsat 29e satellite separated from the rocket's upper stage 30 minutes after launch, at 6:50 pm EST, and signal acquisition has been confirmed.

Manufactured by Boeing and equipped with the most advanced digital payload on a commercial spacecraft, Intelsat 29e will bring high throughput capacity in both C- and Ku-band to North and Latin America and the North Atlantic region for maritime and other applications. Intelsat 29e will be placed into service at 310° East, where it replaces Intelsat 1R.

Intelsat 29e is the first satellite of Intelsat's next generation, all digital EpicNG satellite platform, which combines wide beams and spot beams with frequency reuse technology and the sector's most advanced digital payload. The digital payload will provide customers with unprecedented security and flexibility, enabling customers to seamlessly access and shift capacity to





match their usage needs in a particular region or timeframe. Intelsat EpicNG is optimized to provide satellite connectivity for applications including the Internet of Things, enterprise, wireless infrastructure, aeronautical and maritime mobility, and government, which are expected to provide a combined \$3 billion incremental opportunity by the year 2020.

The Intelsat EpicNG platform design reflects the company's innovative

approach to introducing high throughput technology into the world's largest community of enterprise-grade satellite networks that operate on the Intelsat fleet. Intelsat EpicNG is backwards compatible and fully interoperable with Intelsat's existing satellite fleet and terrestrial infrastructure, allowing customers to use currently deployed network hardware to access the high performance connectivity. The platform's open architecture allows customers to

have control over service offerings and hardware selection, providing differentiation of service offerings.

The payload will deliver carrier-grade services to fixed and mobile network operators, and broadband for applications such as enterprise, aeronautical and maritime mobility, and government throughout the Americas. The satellite also features spot beams for mobility customers serving the heavily trafficked North Atlantic region. Companies such as Harris CapRock, Panasonic, EMC (formerly MTN), Axesat and leading national telecom operators in Latin America will be among the first to deploy services on the platform.

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

#### **Videotel, Safebridge to facilitate onboard ECDIS type-specific certification**

Videotel has joined forces with online maritime training business Safebridge GmbH, which specializes in ECDIS training, to provide shipping

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companies with the unique ability to certify their seafarers on ECDIS type-specific training while serving onboard. More than 30 ECDIS type-specific training courses will be available, which is the most comprehensive offering in the industry.

Companies using the award-winning Videotel On Demand (VOD) system will have access to this leading-edge certification route. The agreement will enable a trainee onboard to select and log onto the VOD system and access the relevant Safebridge courses. After completing online theory segments, the trainee would then proceed to practical training using the onboard ECDIS before taking their test using Safebridge's validation systems.

The list of type-specific ECDIS training courses covered in this agreement includes the full ECDIS type-specific training portfolio of Safebridge as well as further training courses for more ECDIS equipment currently in development. Maritime regulations requiring ECDIS compliance on all ship types are in a rollout phase that began in 2012 and will continue until 2018.

"Training crew on ECDIS type-specific models has been a real headache for shipping companies and ship managers over the past years. The large number of different ECDIS models and the fact that crew generally have to complete their training ashore means that the shipping industry has faced a costly logistical burden in getting crew the knowledge they legally require," said Nigel Cleave, Videotel's chief executive officer.

Videotel's training solutions are in use on more than 12,000 vessels worldwide, and include 950 new and updated titles to meet current seafarer training needs. The Videotel programs are available in a range of formats, including 500+ e-Learning courses, more than twice the number of CBTs offered by competitors. Videotel has been a leader in developing training material since 1973 when the Intergovernmental Maritime Consultative Organization (IMCO), the forerunner to the International Maritime Organization (IMO), wanted to improve the quality of training materials available to seafarers and called on the company's services.

Videotel has recorded more than 11 million training events in recent years, and its training programs have been recognized with nearly 100 awards.

Videotel's focus on maritime training materials is a vital aspect of the overall integrated maritime solution offered by KVH, which is addressing the big data needs of the maritime industry in a unique way. KVH's solution includes the mini-VSAT Broadband satellite network, which provides broadband connectivity to thousands of vessels worldwide; the TracPhone V-IP line of advanced satellite communications antenna systems; and the IP-MobileCast content delivery service, which utilizes multicasting technology to deliver entertainment and operations content without using vessels' monthly airtime data allotments. Videotel's Basic Training Package of 20 essential maritime training programs is already available via the IP-MobileCast content delivery service, and additional Videotel training programs will be added.

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

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### Viatsat-3 to deliver 1 Gbps capacity for maritime applications

ViaSat Inc. has introduced the ViaSat-3 ultra-high capacity satellite platform, which is comprised of three ViaSat-3 class satellites with state-of-the-art ground network infrastructure. Work is underway with the first two ViaSat-3 satellites, with ViaSat starting work on the satellite payloads and Boeing Satellite Systems starting on the associated satellite bus platforms, expected for integration and delivery in 2019. The first two satellites will focus on the Americas and Europe, Middle East and Africa (EMEA), respectively, with a third satellite system planned for the Asia-Pacific region, completing ViaSat's global service coverage.

The ViaSat-3 platform can provide up to 1 Gbps speeds for use in maritime, oceanic and other corporate enterprise applications such as oil and gas platforms, in addition to residential Internet, in-flight connectivity services and affordable satellite Wi-Fi connectivity to the billions of unconnected people in emerging markets.

The ViaSat-3 platform is the next big step for ViaSat to fulfill its ambition of delivering a global broadband network with enough capacity to deliver more consumer choice with an affordable, high-speed, high-quality Internet

and video streaming service. With the capability of more than 1-Tbps of network capacity per satellite, the first two satellites will deliver more than twice the total network capacity of the approximately 400 commercial communications satellites in space today combined.

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

## Voyager IP launches innovative pre-paid VSAT and IT scheme

An innovative scheme by marine broadband solutions company Voyager IP will change the way its customers—including superyachts, cruise ships, commercial vessels and offshore platforms—can keep track of their VSAT and IT support services. The company has just launched a proven points-based system where customers will be able to purchase service and support credits in advance and draw down on them as and when required.

Up until now, ship owners and management companies signed yearly VSAT and IT support service contracts that did not allow for refunds or credit if the service was not fully utilized in that time period. Voyager IP says the scheme was born out of customer feedback and is in line with similar offerings available in the onshore ICT sector.

Mark Elliott, managing director of Voyager IP, said, “At the end of each calendar month we issue a report detailing where, when and how the points were used. It will help our customers identify specific onboard hardware replacement issues and crew training needs as well as providing a monthly cost analysis. Our scheme provides extra flexibility, and customers signing up for yearly broadband services will benefit from 250 free VSAT and IT service credits which you can draw down as required.”

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

## Inmarsat provides connectivity for rowboat crossing the Atlantic

Five friends have set off on a 3,308 nmi row across the Atlantic Ocean in a bid to set a new world record and raise money for the UK children's charity, the NSPCC.

Throughout their grueling challenge, the men, known as Team Essence, will have the connectivity they require to share the adventure in real-time on social media, stay in touch with loved ones and call for help if needed—made possible by Inmarsat.

Sailing from Lagos in Portugal to Macuro, Venezuela, their chosen route is by no means the easiest, crossing vast swathes of the Atlantic Ocean. Rowing 24/7, continent to continent, in a boat that measures just 8.5 m (27.8 ft) x 1.2 m (3.9 ft), Team Essence will be aiming to cut the current world record of 52 days to 46 days.

The boat has been fitted with an Inmarsat's IsatData Pro machine to machine (M2M) communication service to track and monitor the boat's progress and send back positional data to a tracking map in real-time every 20 minutes.

The team has also been given two IsatPhone 2 satellite phones, providing a great morale boost for the men who can call home and speak to loved ones from the middle of the ocean. The phones have an emergency assistance button as well as a tracking option, which can be activated in case of an emergency.

Finally, they have a BGAN Explorer 510 terminal, which will allow Team Essence to keep supporters updated in real-time on their Facebook and Twitter pages with posts, photos and blogs of their incredible adventure.

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

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## ORCHIDS project to address infrastructure integrity

Fraunhofer UK, part of Europe's largest application-oriented research organization, has joined forces with Synaptec and the European Marine Energy Centre (EMEC) to develop an innovative solution to address cable and electrical infrastructure integrity within the marine renewable energy industry.

Funded by the UK Government's business innovation experts InnovateUK, the ORCHIDS project (Offshore Renewable energy Cable Health monitoring using Integrated Distributed Sensor systems) has brought a unique grouping of expertise together to tackle one of the key challenges in offshore renewable energy.

"Subsea cable health is a particular challenge for marine energy and offshore renewables due to the hostile environment in which they are placed and have to operate," remarked David Hytch, offshore renewables specialist at InnovateUK. "Failure of cables can also lead to costly losses of revenue and hefty repair bills."

The project is looking to enhance subsea cable monitoring capabilities by combining emerging optical sensing techniques to enable a smart cable management system that can be utilized during manufacture, transport, installation, through to end of life.

The feasibility study will include a market assessment looking at the commercial case for the technology alongside a technical review of different distributed fiber sensing techniques that can operate alongside Synaptec's unique offering.

Henry Bookey, senior researcher at Fraunhofer UK, said, "This project is the first step towards a combined smart cable system and will allow us to map out the technical and commercial challenges along the way to the first commercial deployment of this unique system. The use of optical fibers found within modern power cables as a cable condition monitor combined with innovative current and voltage sensors is an attractive prospect for offshore infrastructure monitoring."

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

## C&W Networks selects Xtera for upgrades

C&W Networks, part of Cable & Wireless Communications (CWC), the largest telecommunications service provider across the Caribbean, Central America, Mexico and United States with more than 48,000 mi of subsea fiber optic network has selected Xtera Communications, Inc., a leading provider of high-capacity, cost-effective optical transport solutions, for upgrading its submarine cable systems in the western Atlantic ocean and the Caribbean Sea to 100G. By introducing Xtera's 100G coherent solution, C&W Networks continues to offer robust services across 42 countries with superior reliability and scalability of international wholesale capacity.

C&W Networks has bolstered its subsea network capacity by upgrading several unrepeatered and repeatered segments to 100G, using Xtera's Nu-Wave Optima™ multi-purpose optical networking platform. The submarine cable systems were upgraded with new 100G channels to include the 1,570 km Gemini–Bermuda cable system, the 1,700 km Caribbean–U.S. (CBUS) cable system, the 1,700 km East West Cable (EWC) system, the 1,440 km festoon Eastern Caribbean Fiber System (ECFS), and part of the 8,700 km ARCOS-1 submarine ring.

The same optical networking platform was used over the unrepeatered and repeatered segments, enabling a unified, seamless network from an operational perspective. For the upgrade of unrepeatered segments, advanced 100G optical channel technology combined with Xtera's Wise Raman™ solution raised the capacity to multi terabits per second level even on the longest unrepeatered segments (approaching 400 km spans). This combination of technologies also enabled C&W Networks to bypass some intermediate sites when no local add/drop of 100G waves was needed, eliminating the need for back-to-back terminal equipment as found in the previous network design based on 10G optical channel technology.

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

## Nexans to provide cables for Lofotkraft



In a contract worth 4.6 million Euros, LofotKraft AS has once again selected Nexans to deliver and install 170-kV XLPE cables to upgrade the current systems in three fjords—Gimsøystraumen, Nappstraumen and Flakstadpollen—to strengthen the power supply for residents throughout Lofoten, Norway. This will include upgrading the current grid capacity from 66 kV to 132 kV.

Lofotkraft AS will upgrade the submarine cable in all three fjords to extend longevity and solve issues related to inadequate transmission capacity. Nexans Norway will supply the 170-kV XLPE cables with transition joints, end terminations and contingency repair joints.

The project begins in January 2016, with supply of the submarine cable scheduled for spring 2017 at Nexans' Halden plant in Norway.

Nexans has just celebrated the 100th anniversary of Nexans Norway, which began in 1915 as Scandinavian Cable and Gummifabrik. Throughout this time, the Group has delivered more than 1,500 submarine cable projects, which together contribute to over 50% of global transmission.

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

## TenneT opens cable storage facility at Eemshaven

On 2 February 2016, TenneT marked the official opening of a special cable storage facility in Eemshaven, The Netherlands. The facility provides 2,309 sq. m of floor space, enabling the storage of up to 4,600 tons of high-voltage electricity cables. The cables concerned measure between 10 and 24 cm in diameter, with weights ranging from 30 to 100 kg per meter. TenneT needs these massive cables for subsea connections that link offshore wind farms (OWFs) to the onshore grid, and for offshore direct-current interconnectors (DCI) like the NorNed cable between The Netherlands and Norway and the planned COBRA cable between The Netherlands and Denmark.

The storage facility includes two turntables that are used to roll up the cables. Each turntable is divided into six sections, allowing storage of 12 different cable systems at any given time to a total of 2,300 tons. The facility's location in Eemshaven is ideal for various reasons. Vessels can moor in front of the storage facility, facilitating quick and efficient loading and unloading of cables. The facility is also located



near the converter station for the NorNed cable and the planned landing point of the COBRA cable.

Previous plans for the construction of an Offshore Maintenance Centre (OMC) in the north of The Netherlands have been shelved for the time being. Such an OMC was initially envisaged as a base of operations for personnel involved in maintenance work on the transformer platforms and offshore grid connections for German and future Dutch OWFs north of the Wadden Sea. Since there are no current plans for new OWFs in this sector of the North Sea, an OMC in the north of the country is not necessary at this time. Maintenance personnel working on TenneT's offshore projects currently do not need an onshore base of operations because they will perform their work mainly on the offshore platforms or using those platforms as their base of operations.

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

#### Prysmian secures COBRAcable contract

Prysmian Group has been awarded a new contract worth around €250 million for an HVDC (High Voltage Direct Current) submarine interconnector that will link Denmark and The Netherlands, by TenneT TSO B.V. and Energinet.dk SOV, the operators of the Dutch and Danish power transmission grids, respectively.

The COBRAcable interconnector will contribute to the realization of a sustainable international energy landscape, a key aim of the European Union, who is to support the project through the EEPR (European Energy Programme for Recovery). The connection will be constructed using HVDC technology, which minimizes transmission losses over the long distances involved.

The contract awarded to Prysmian involves the turn-key supply and installation of an HVDC bipole that will operate at a voltage level of ±320 kV with a

rating of approximately 700 MW. It will run along a total route of around 325 km and will include two onshore lengths to link to the onshore converter stations, which are to be provided under separate contract by Siemens.

All cables will be produced in Arco Felice (near Naples, Italy) and Pikkala (near Helsinki, Finland), the Group's centers of technological and manufacturing excellence for submarine cables.

Prysmian is currently building on recent investments made in its Pikkala factory with a further approximately €10 million upgrade to existing production lines to significantly increase its manufacturing capacity of extruded HV submarine cables. The marine cable laying activities, which will be performed by the Group's own cable-laying vessels, the Cable Enterprise and the Giulio Verne, will also see the use of their newly

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acquired barge. Delivery of the cable system is scheduled by the 3rd Quarter of 2018.

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

### Makai upgrades MakaiPlan Pro software

Makai has released version 6.0 of MakaiPlan Pro, a popular software for planning and simulating subsea power and telecom cable installations. MakaiPlan Pro includes the tools of MakaiPlan, which is the industry standard GIS cable route engineering software. In addition, MakaiPlan Pro allows the user to perform powerful and precise 3D, dynamic simulations of a submarine cable installation. The operator can quickly simulate an entire cable lay in advance from the comfort of the office at up to 50 times faster than real-time. This is useful for developing ship installation plans, performing pre-lay and post-lay analysis, and for operator training. The operator can run advanced simulations for conducting installation feasibility studies and equipment selection. A detailed simulation aids

installers in understanding how to control cable seabed slack/tension during dynamic cable laying situations such as starts and stops, repeater deployments, sharp alter courses, and dealing with irregular seabed.

Makai provides tools for each of the three primary phases of a cable project: route planning and engineering (MakaiPlan), installation planning and simulation (MakaiPlan Pro), and real-time at-sea cable installation control (MakaiLay). Each tool has been thoroughly validated and used successfully on cable projects for over 16 years. Information flows seamlessly from one product to the next, and cable projects that were planned using MakaiPlan can be directly opened with MakaiPlan Pro, preserving the information richness of the plan (GIS layers, geo-referenced notes, etc.). After planning and simulating the installation, the entire output (including final ship plan, installation notes, and more) is passed onto MakaiLay, which is installed on the cable ship. This smooth and hassle-free transition from planning to installation minimizes the chance of errors

by totally eliminating the need to use a host of individual Excel spreadsheets, databases, and simulation tools that were not designed specifically for subsea cable lays.

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

### TE SubCom increases capacity

TE SubCom, a TE Connectivity Ltd. company, announced that it has increased capacity throughput of cable manufacturing at its wet plant factory by 50% in an effort to continue meeting customer and market demand. In addition, the company has expanded its marine fleet capability to include a sixth 3-m plow, providing 3-m burial tools across the entire construction fleet. The investments to its manufacturing and installation capabilities allow TE SubCom to continue delivering best-in-class technology and services.

SubCom achieved a 50% increase in capacity throughput through an upgrade to its existing power conductor manufacturing lines as well as the addition of new lines. This additional infrastructure will become fully operational later this

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year, allowing the company to expand on more than 610,000 km of its undersea cable installed worldwide to date. Through investments in its marine assets and the addition of another new 3-m plow, SubCom will enhance its installation capabilities, which will further ensure customers' successful burial of cable in high-risk areas.

In addition to increased manufacturing capacity and expansion of marine assets, SubCom continues to invest in product development and service offerings. In 2015, the company introduced Open Cables, a flexible business model that allows customers to select their preferred SLTE line card supplier. Today, SubCom can also offer state-of-the-art C+L band optical technology, which significantly improves the available bandwidth per fiber pair.

To meet reliability requirements for oil and gas customers, SubCom invested in a third-party qualification of the dynamic riser cable connectorized platform hang-off device (PHOD). The PHOD provides a simplified pull-in operation and can decrease vessel time at the platform. The subsea connectivity product line was also expanded with delivery of dual conductor submarine fiber cable terminated with wet-mateable ROV-accessible structures, which can be used to expand scientific communication and power networks. These investments, matched with SubCom's flexible cost structure, allows the company to better meet the needs of customers for both regional and ultra-long haul systems.

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

#### **AAE-1 selects Xtera for terrestrial segments**

The consortium behind the Asia-Africa-Europe 1 (AAE-1) submarine cable system project and Xtera communications, Inc. announced the signature of a supply contract for equipping the three terrestrial segments in the AAE-1 Network. AAE-1 submarine cable system, scheduled for completion in 2016, is one of the largest consortium cable projects currently under way, extending some 25,000 km and connecting Asia, the Middle East, East Africa and Europe. Xtera will equip the AAE-1 terrestrial segments in Egypt, Thailand, Malaysia and Singapore with its Wise Raman™ optical amplification and flex-rate channel card technologies, enabling 200G channels over long distances.

The Malaysia-Singapore terrestrial segment will directly terminate in two separate data centers in Singapore.

The AAE-1 consortium members include China Unicom, CIL, Djibouti Telecom, Etisalat, GTSL, Mobily, Omantel, Ooredoo, OTEGLOBE, PCCW Global, Pakistan Telecommunication Company Limited (PTCL), Reliance Jio, Retelit, Tele Yemen, Telecom Egypt, TOT, Viettel, VTC and VNPT. The vision shared by all AAE-1 parties is to build a seamless connection between Asia, Middle East, Africa and Europe to meet insatiable capacity needs. The AAE-1 Network is designed to offer an efficient use of capacity in both subsea and terrestrial segments with high availability and low latency to fulfill this vision.

"We are proud to be part of a cable system initiative that will provide additional empowerment for the economies of all the nations along its route. When completed before the end of this year, the AAE-1 network will connect Hong Kong (SAR of China), Vietnam, Cambodia, Malaysia, Singapore, Thailand, Myanmar, India, Pakistan, Oman, UAE, Qatar, Yemen, Djibouti, Saudi Arabia, Egypt, Greece, Italy and France," said Mr. Joseph Chan and Ms. Pan Ying, co-chairs of AAE-1 management committee. "The terrestrial routes across Thailand represent a unique network design feature and will reduce latency between Southeast Asia and India/Africa/Europe."

Xtera offers a future-proof solution based on its advanced Nu-Wave Optima™ optical networking platform combining 200G coherent technology, Wise Raman™ optical amplification solution, and fast protection switching. Each terrestrial segment is made of two physically diverse routes supporting minimum 18 Tbit/s cross-sectional capacity per fiber pair. Xtera's flex-rate channel card features integrated service protection, offering fast 50 ms protection switching and enabling 99.999% service availability.

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



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## Infinera, Telstra validate advanced coherent toolkit

Infinera and Telstra announced the successful validation of Infinera's Advanced Coherent Toolkit (ACT) for super-channels.

This new technology will cover the Telstra Endeavour subsea cable stretching 9,000 km between Sydney, Australia and Oahu, Hawaii and extract the maximum capacity from subsea and long haul terrestrial cable systems carrying super-channels—whether for new large area fibers or existing cables.

In trials on a range of next-generation super-channel coherent modulation technologies conducted late last year, two unique super-channel-based capabilities were successfully demonstrated in the trial: Nyquist subcarriers and Soft Decision Forward Error Correction (SD-FEC) gain sharing.

The trial validated the benefit of Nyquist subcarriers that have been shown in other studies to offer around a 20% increase in reach compared to single carrier transmission. In addition, the trial validated SD-FEC gain sharing in which carriers with the highest performance can be paired with carriers with

lower Optical Signal to Noise Ratio (OSNR) to improve performance.

Other capabilities demonstrated as part of this trial include a new Matrix Enhanced Phase Shift Keying (ME-PSK) modulation technique that handily surpasses Binary Phase Shift Key (BPSK) reach performance and the new, high-gain SD-FEC algorithm.

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

## RTI, Bluesky to collaborate on Pacific cables

RAM Telecom International, Inc. (RTI) announces collaboration with Bluesky Pacific Group, a subsidiary of Amper SA, to interconnect the Southeast Asia–United States (SEA-US) Cable system with Bluesky Pacific Group's Moana Cable system.

RTI and Bluesky Pacific Group intend to connect their cable investments to provide end-to-end connectivity to the U.S. West Coast, Hawaii, Guam, Samoa, American Samoa, New Zealand, and key Asian destinations. When completed, the agreement will optimize connectivity between the SEA-US and Moana Cable systems,

bringing their respective customers superior access to global content.

RTI will provide Bluesky Pacific Group with interconnection to SEA-US. Upon its anticipated completion at the end of 2016, SEA-US will link five areas and territories including Oahu, downtown Los Angeles, Piti, Davao, and Manado. The SEA-US cable is among the first transoceanic cables deploying 100 Gbps state-of-the-art ultra-long-haul optical fiber transmission technology.

Bluesky Pacific Group will provide RTI interconnection to its Moana Cable to deliver content at faster speeds to key island destinations as well as onward connectivity to New Zealand. Upon its completion, which is targeted for 2018, the Moana Cable system will link New Zealand and Hawaii, serving Samoa and American Samoa, with a second segment also linking the Cook Islands to Samoa. The Moana Cable will be the first long haul submarine cables in the Pacific Islands region relying on the latest innovative 200 Gbps optical fiber transmission technology.

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

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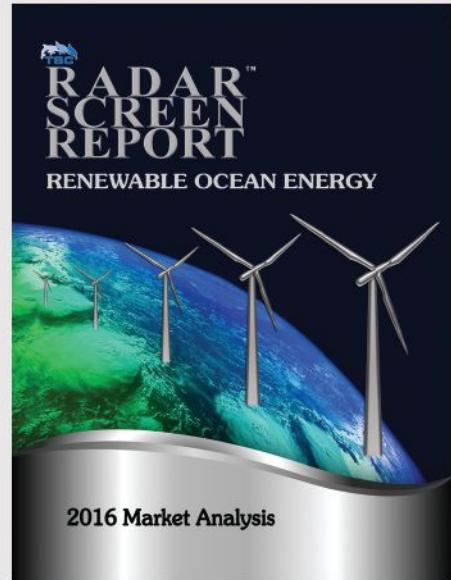
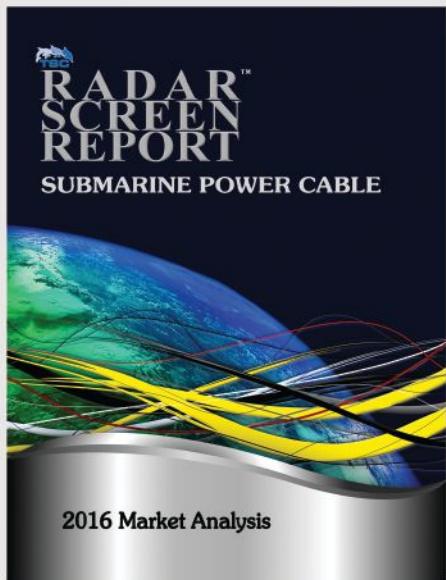
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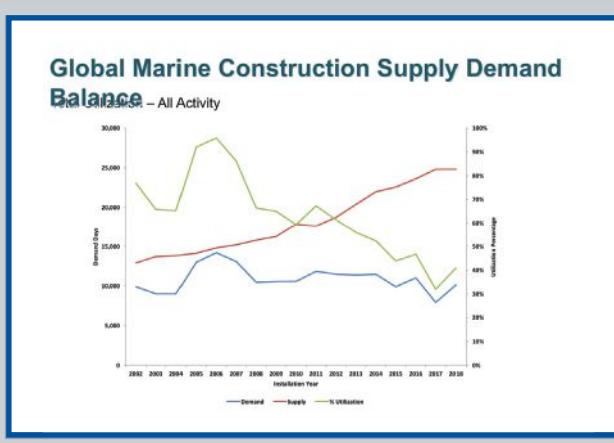
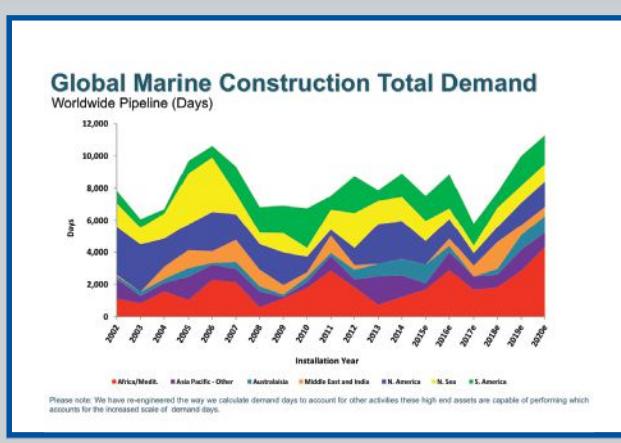
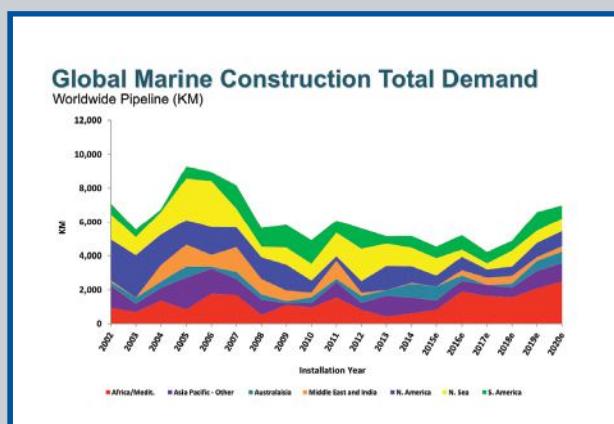
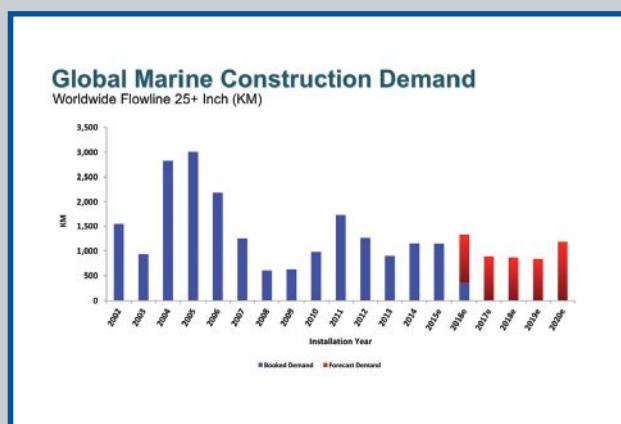
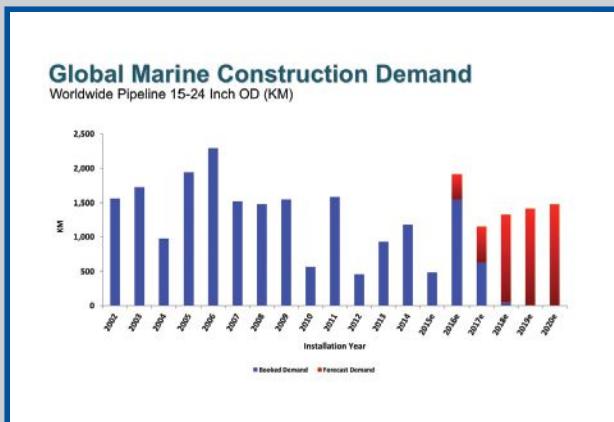
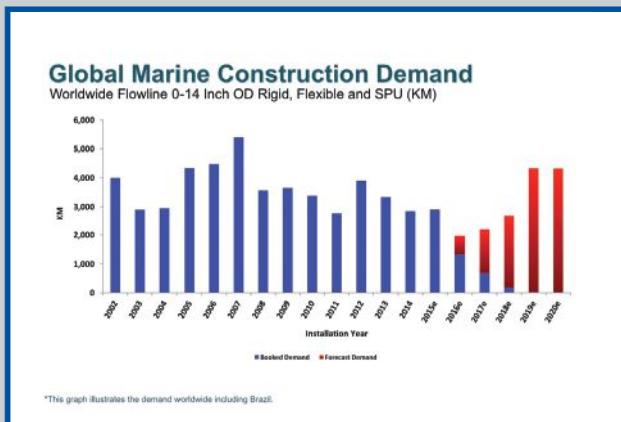


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<b>Diversified, Production Support and Equipment Companies</b>							
Baker Hughes, Inc.	BHI	39.78	39.62	0.16	0.4%	70.45	37.58
Cameron Intl. Corp.	CAM	64.36	58.24	6.12	10.5%	71.22	40.50
Drill-Quip, Inc.	DRQ	50.81	53.92	-3.11	-5.8%	81.78	48.88
Halliburton Company	HAL	29.11	30.96	-1.85	-6.0%	50.20	27.64
Tenaris SA	TS	20.85	19.95	0.90	4.5%	32.77	18.53
Newpark Resources, Inc.	NR	3.62	4.32	-0.70	-16.2%	10.85	3.46
Schlumberger Ltd.	SLB	70.31	62.61	7.70	12.3%	95.13	59.60
Superior Energy Services, Inc.	SPN	8.87	9.60	-0.73	-7.6%	26.95	8.32
Weatherford International, Inc.	WFT	6.47	6.02	0.45	7.5%	14.91	4.95
Deep Down, Inc.	DPDW	0.61	0.60	0.01	1.7%	0.89	0.37
FMC Technologies	FTI	23.12	24.40	-1.28	-5.2%	44.43	22.30
<b>Total Diversified, Production, Support and Equipment.....</b>	<b>317.91</b>	<b>310.24</b>	<b>7.67</b>	<b>2.5%</b>	<b>499.58</b>	<b>272.13</b>	
<b>Geophysical / Reservoir Management</b>							
Dawson Geophysical Company	DWSN	2.95	3.26	-0.31	-9.5%	7.00	2.90
Mitcham Industries, Inc.	MIND	2.38	2.89	-0.51	-17.6%	6.95	2.24
Compagnie Gnrale de Gophysique-Veritas	CGV	0.68	1.30	-0.62	-47.7%	7.98	0.59
<b>Total Geophysical / Reservoir Management.....</b>	<b>6.01</b>	<b>7.45</b>	<b>-1.44</b>	<b>-19.3%</b>	<b>21.93</b>	<b>5.73</b>	
<b>Offshore Drilling Companies</b>							
Atwood Oceanics, Inc.	ATW	5.63	6.14	-0.51	-8.3%	35.66	4.82
Diamond Offshore Drilling, Inc.	DO	16.92	17.11	-0.19	-1.1%	37.56	14.18
ENSCO International, Inc.	ESV	8.38	10.24	-1.86	-18.2%	31.15	7.65
Nabors Industries, Inc.	NBR	5.97	6.28	-0.31	-4.9%	16.99	4.93
Noble Drilling Corp.	NE	7.36	7.82	-0.46	-5.9%	19.62	6.66
Parker Drilling Company	PKD	1.11	1.29	-0.18	-14.0%	4.55	0.98
Rowan Companies, Inc.	RDC	11.65	12.52	-0.87	-6.9%	25.13	10.67
Transocean Offshore, Inc.	RIG	8.86	9.63	-0.77	-8.0%	21.90	8.23
<b>Total Offshore Drilling.....</b>	<b>65.88</b>	<b>71.03</b>	<b>-5.15</b>	<b>-7.3%</b>	<b>192.56</b>	<b>58.12</b>	
<b>Offshore Contractors, Services, and Support Companies</b>							
Helix Energy Solutions Group, Inc.	HLX	2.63	3.6	-0.97	-26.9%	17.73	2.60
Gulf Island Fabrication	GIFI	8.87	8.22	0.65	7.9%	17.69	7.80
McDermott International, Inc.	MDR	2.38	2.51	-0.13	-5.2%	6.00	2.20
Oceaneering International	OII	27.12	31.89	-4.77	-15.0%	59.65	25.33
Subsea 7 SA	SUBCY.PK	5.8	5.37	0.43	8.0%	12.15	4.86
Technip ADS	TKPPY.PK	11.16	10.44	0.72	6.9%	18.15	9.69
Tetra Technologies, Inc.	TTI	4.90	8.10	-3.20	-39.5%	9.44	4.62
<b>Total Offshore Contractors, Service, and Support.....</b>	<b>62.86</b>	<b>70.13</b>	<b>-7.27</b>	<b>-10.4%</b>	<b>140.81</b>	<b>57.10</b>	
<b>Offshore Transportation and Boat Companies</b>							
Seacor Holdings, Inc.	CKH	42.45	43.73	-1.28	-2.9%	78.95	41.24
Gulfmark Offshore, Inc.	GLF	3.07	2.64	0.43	16.3%	19.00	2.50
Bristow Group	BRS	12.76	19.97	-7.21	-36.1%	64.64	11.02
PHI, Inc.	PHII	15.53	17.14	-1.61	-9.4%	36.61	15.01
Tidewater, Inc.	TDW	4.67	5.09	-0.42	-8.3%	31.80	4.24
Trico Marine Services, Inc.	TRMAQ.PK	9.30	9.72	-0.42	-4.3%	14.35	9.06
Hornbeck Offshore	HOS	5.81	7.10	-1.29	-18.2%	25.22	5.58
<b>Total Offshore Transportation and Boat .....</b>	<b>93.59</b>	<b>105.39</b>	<b>-11.80</b>	<b>-11.2%</b>	<b>270.57</b>	<b>88.65</b>	

# Monthly Stock Figures & Composite Index

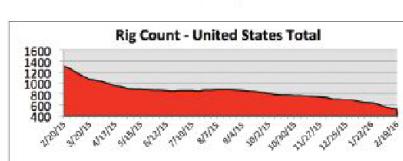
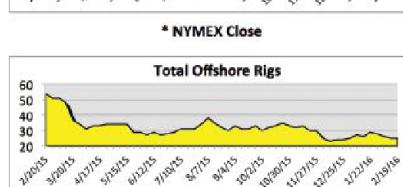
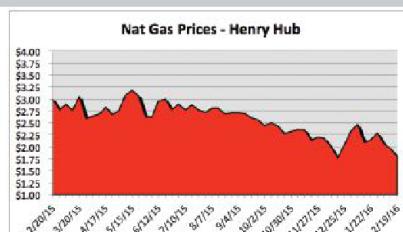
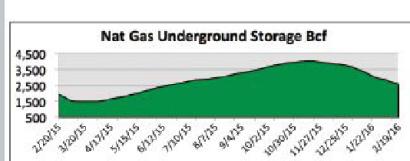
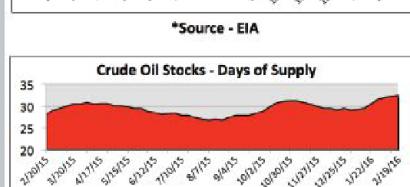
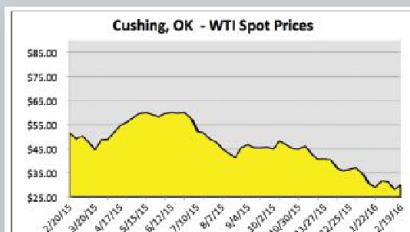
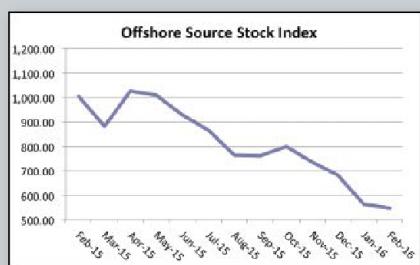
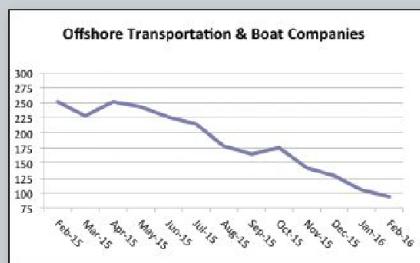
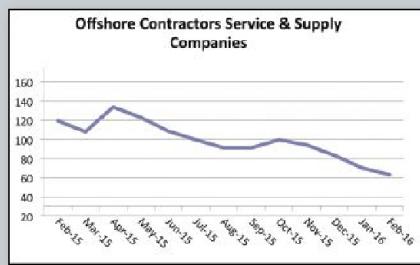
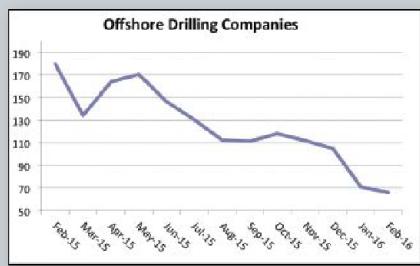
Industry	Close(Mid) February	Close(Mid) January	Change %	Change %	High 52 week	Low
Diversified, Production Support & Equipment Companies	317.91	310.24	7.67	2.5%	499.58	272.13
Total Diversified, Production, Support and Equipment	317.91	310.24	7.67	2.5%	499.58	272.13
Total Geophysical / Reservoir Management	6.01	7.45	-1.44	-19.3%	21.93	5.73
Total Offshore Drilling	65.88	71.03	-5.15	-7.3%	192.56	58.12
Total Offshore Contractors, Service and Support	62.86	70.13	-7.27	-10.4%	140.81	57.10
Total Offshore Transportation and Boat	93.59	105.39	-11.80	-11.2%	270.57	88.65
Total Offshore Source Index	546.25	564.24	-17.99	-3.2%	1,125.45	481.73

## 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.

## Oil & Gas Industry Trends

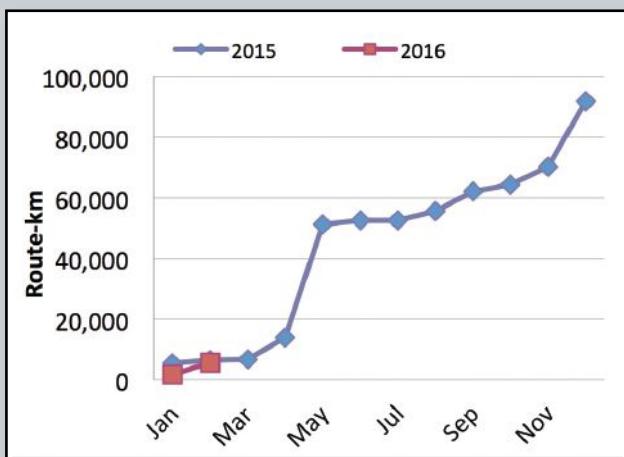
**Monitoring the Pulse of the U.S. Offshore Oil & Gas Industry**



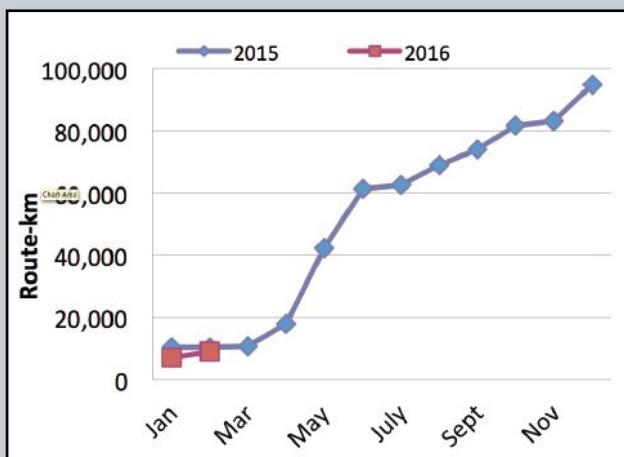
**Positive trend, at least 3 weeks**  
**Changing trend, less than 3 weeks**  
**Negative trend, at least 3 weeks**

# Subsea Telecom & Power Cable Data

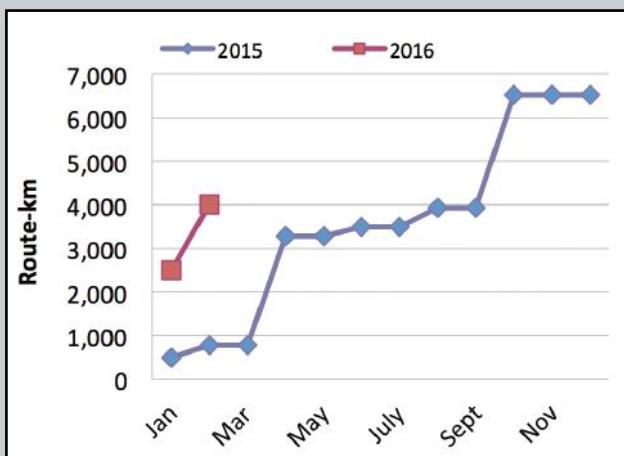
## FO Cable Awards by Month



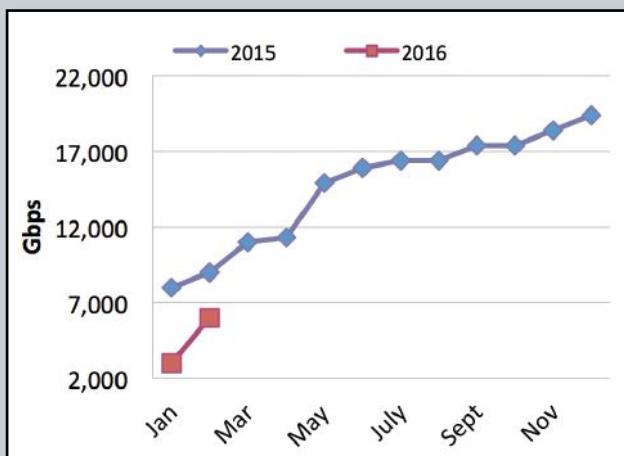
## FO Cable Announcements



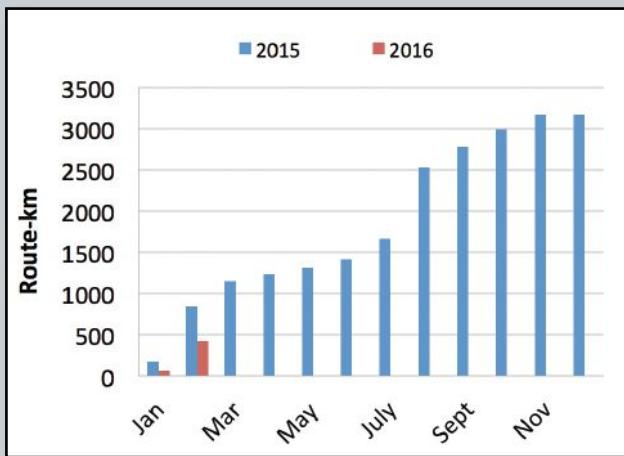
## Submarine FO Cables Entering Service in Route-km



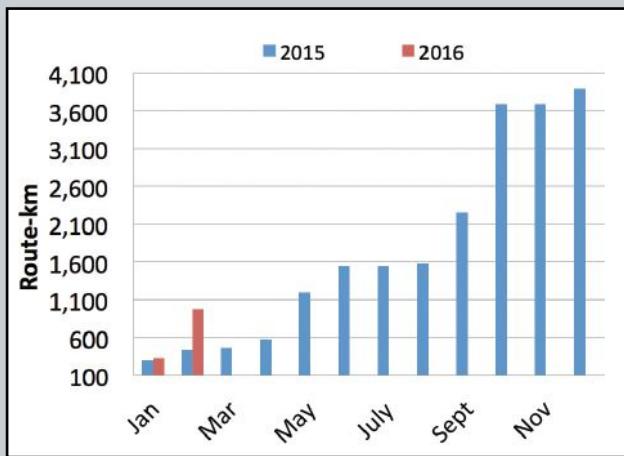
## Upgrades of Existing Cable Systems in Gbps



## Submarine Power Cable Awards in Route-km



## Submarine Power Cable Announcements in Route-km



# Gulf of Mexico Data

## Current Deepwater Activity

Operator	Area	Block	OCS Lease	Rig Name	Prospect Name	Water Depth (ft)
SHELL OFFSHORE INC.	WR	508	G17001	NOBLE JIM DAY	STONES	9,560
SHELL OFFSHORE INC.	AC	857	G20870	NOBLE DON TAYLOR	Great White	8,037
SHELL OFFSHORE INC.	AC	857	G17565	H&P 205	Great White	7,817
SHELL OFFSHORE INC.	MC	657	G08496	T.O. DEEPWATER NAUTILUS	Coulomb	7,570
EXXON MOBIL CORPORATION	WR	584	G20351	MAERSK VIKING	Julia	7,138
UNION OIL COMPANY OF CALIFORNIA	WR	677	G21245	T.O. DISCOVERER CLEAR LEADER	Saint Malo	7,038
SHELL OFFSHORE INC.	MC	566	G08831	NOBLE GLOBETROTTER	Fourier addition	7,015
MARUBENI OIL & GAS USA INC	MC	305	G19935	ENSCO 8505	Aconcagua	6,997
BP EXPLORATION & PRODUCTION INC.	GC	743	G15607	T.O. DEVELOPMENT DRILLER III	ATLANTIS(GC)	6,853
BP EXPLORATION & PRODUCTION INC.	GC	743	G15607	SEADRILL WEST AURIGA	ATLANTIS(GC)	6,814
UNION OIL COMPANY OF CALIFORNIA	WR	634	G18745	PACIFIC SHARAV	Saint Malo	6,803
UNION OIL COMPANY OF CALIFORNIA	KC	770	G25804	T.O. DISCOVERER INDIA		6,574
REPSOL E&P USA INC.	KC	686	G33341	ROWAN RENAISSANCE		6,162
BP EXPLORATION & PRODUCTION INC.	MC	778	G14657	THUNDER HORSE PDQ	Thunder Horse NORT	6,031
ANADARKO PETROLEUM CORPORATION	WR	51	G31938	DIAMOND OCEAN BLACKHAWK	Shenandoah	5,857
LLOG EXPLORATION OFFSHORE LLC	MC	427	G31498	SEADRILL SEVEN LOUISIANA	La Femme	5,768
BP EXPLORATION & PRODUCTION INC	MC	777	G09867	SEADRILL WEST VELA	Thunder Horse South	5,719
ENI US OPERATING CO INC	MC	772	G16647	ENSCO 8506	Triton (mc)	5,639
FREEPOR MCMORAN OIL & GAS LLC	MC	129	G10977	NOBLE TOM MADDEN	King South	5,330
CONOCOPHILLIPS COMPANY	AC	475	G35137	MAERSK VALIANT		5,143
COBALT INTERNATIONAL ENERGY LP	GB	958	G30876	ROWAN RELIANCE		4,846
NOBLE ENERGY INC	MC	338	G32316	ATWOOD ADVANTAGE		4,824
BP EXPLORATION & PRODUCTION INC.	MC	383	G07937	ENSCO DS-3	Kepler	4,727
ANADARKO PETROLEUM CORPORATION	GC	726	G24179	ROWAN RESOLUTE	Tonga	4,655
EXXON MOBIL CORPORATION	EB	945	G08211	* COIL TUBING UNIT (L.J. DIST)	Diana	4,642
EXXON MOBIL CORPORATION	EB	945	G08211	* WIRELINE UNIT (L.J.DIST)	Diana	4,642
HESS CORPORATION	MC	726	G24101	STENA FORTH	Tubular Bells	4,610
ANADARKO PETROLEUM CORPORATI	GC	683	G18421	DIAMOND OCEAN BLACKHORNET	CAESAR-TONGA	4,473
BP EXPLORATION & PRODUCTION INC	GC	627	G25174	SEADRILL WEST CAPRICORN		4,305
CHEVRON U.S.A. INC.	GC	640	G20082	TRANSOCEAN DEEPWATER ASGA	Tahiti 2	4,292
BHP BILLITON PETROLEUM (GOM) INC.	GC	609	G16764	T.O. DEEPWATER INVICTUS	SHENZI	4,288
ANADARKO PETROLEUM CORPORATI	EB	690	G22296	NOBLE BOB DOUGLAS	Navajo	4,202
Statoil USA E&P Inc.	MC	942	G24130	MAERSK DEVELOPER	Mirage	4,200
CHEVRON USA INC	GC	596	G16759	T.O. DISCOVERER INSPIRATION	Tahiti north	4,023
FREEPOR MCMORAN OIL & GAS LLC	GC	643	G35001	NOBLE SAM CROFT	Holstein Deep	3,885
HESS CORPORATION	GC	512	G26315	DIAMOND OCEAN BLACKLION	Stampede	3,577
SHELL OFFSHORE INC.	MC	807	G07963	OLYMPUS N88	MARS	3,037
ANADARKO PETROLEUM CORPORATI	MC	711	G14016	CAL-DIVE Q-4000	Gomez	2,951
SHELL OFFSHORE INC.	MC	807	G07963	H&P 201	MARS	2,945
SHELL OFFSHORE INC.	GB	426	G07493	* COIL TUBING UNIT (LAF #2)	Auger	2,862
SHELL OFFSHORE INC.	GB	426	G07493	* WIRELINE UNIT (LAF #6)	Auger	2,862
ENERGY RESOURCE TECHNOLOGY GO*	GC	281	G35658	NOBLE DANNY ADKINS	Boris(gc)	2,735
SHELL OFFSHORE INC.	GC	116	G05904	ATWOOD CONDOR	Popeye	2,046
STONE ENERGY CORPORATION	MC	29	G13997	ENSCO 8503	CARDONA	2,009
HESS CORPORATION	GB	216	G14224	NOBLE PAUL ROMANO	Penn state	1,481
LLOG EXPLORATION OFFSHORE LLC	MC	794	G34909	NOBLE AMOS RUNNER		1,462
STONE ENERGY CORPORATION	VK	989	G09771	H&P 100	Pompano i	1,290
ENVEN ENERGY VENTURES LLC	MC	194	G02639	NABORS S.D. XIV	Cognac	1,025
FIELDWOOD SD OFFSHORE LLC	EB	160	G02648	* WIRELINE UNIT (L.J.DIST)	Cerveza	940
WHISTLER ENERGY II LLC	GC	18	G05809	NABORS MODS 201	Boxer	760
W & T OFFSHORE INC	EW	910	G13081	H&P 203		557

Deepwater prospects with drilling and workover activity: 52

Current Deepwater Activity as of Tuesday, February 23, 2016

### Activity by Water Depth

Water Depth (m)	Active Leases	Approved Applications	Active
0 to 200	1,231	36,284	2,230
201 to 400	84	1,127	21
401 to 800	183	902	10
801 to 1,000	256	578	9
1,000 & above	2,620	2,121	30

### Rig Activity Report 19 February 2016

Location	Week of 02/19	+/-	Week Ago	+/-	Year Ago
Land	487	-27	514	-763	1250
Inland Waters	2	0	2	-4	6
Offshore	25	0	25	-29	54
U.S. Total	514	-27	541	-796	1310
Gulf of Mexico	25	0	25	-27	52
Canada	206	-16	222	-154	360
N. America	720	-43	763	-950	1670

Activity by Water Depth Information current as of Tuesday, February 23, 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

## New, small form subsea positioning transponders

Following the end of the 2015 launch of its new generation underwater positioning system, HiPAP 502, Kongsberg Maritime is introducing a new range of mini medium-frequency subsea transponders. With a smaller form factor, improved operational functionality and design, and the use of modern materials, the new cNODE MiniS family supersedes the Kongsberg Mini SSBL transponders (MST) range, which was first available in 2002.

Expanding the well-established cNODE portfolio, the cNODE MiniS 34-180 and cNODE MiniS 34-40V are the smallest transponders for use with HiPAP, cPAP and  $\mu$ PAP underwater positioning systems and are ideal for accurate ROV positioning operations. Both new cNODE MiniS transponders are depth rated to 4,000 m and offer a diverse range of applications.

cNODE MiniS 34-180 and cNODE MiniS 34-40V operate on HiPAP/HPR 400 channels with over 500 Cymbal channels. The advanced Cymbal protocol transmits more energy into the water, which together with uniqueness coding, new filtering and processing techniques, offers a number of benefits including better angular accuracy, improved range specification, higher position update and telemetry rate and longer endurance between battery charges.

Compatible with SSBL and LBL positioning configurations, other technical features of the new cNODE MiniS family that help to make it one of the most advanced range of underwater transponders available today include an internal rechargeable Li-Ion battery that can be charged from empty to 100% in under an hour and the ability to charge from an ROV's on-board 24v supply. Also included is an

advanced internal tilt sensor working up to  $\pm 90^\circ$ , which can alert operators should the transponder lose optimal positioning on the seabed.

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



## Valeport fastCTD Profiler ticks the boxes

Valeport's new fastCTD Profiler is designed to deliver high-quality CTD casts at rapid drop rates.

Created for coastal and oceanographic profiling, this new profiler is an evolution of Valeport's popular miniCTD instrument. The system incorporates Valeport's world-class technology to allow the fastCTD Profiler to deliver the highest quality profiles in a lightweight and robust package.

The fastCTD Profiler uses a conductivity cell designed for optimum flow-through; a high accuracy, fast response thermistor temperature sensor; and a 0.01% pressure sensor synchronously sampling at up to 32 Hz to attain the most accurate measurement data. Completely programmable, no data is logged until the programmed trigger depth is reached by the device.

The Valeport fastCTD Profiler is also available with an optional integral Fluorometer from Valeport's new Hyperion range and an optional Bluetooth communications module for

easy data analysis or export. Designed to operate autonomously and powered by a single D-cell battery, this instrument can also be supplied with a traditional SubConn connector for standard RS232/RS485 communication.

Kevin Edwards, Valeport sales and marketing manager commented, "Our new fastCTD Profiler offers a unique and versatile solution for the collection of casts at rapid drop rates. It is highly accurate, simple to deploy and has already received a very positive reaction. Like all our deepwater sub-sea products, the fastCTD Profiler is manufactured to the highest standards using titanium, for maximum durability, although shallow water units are also available."

The fastCTD Profiler is supplied as standard with a deployment frame and Datalog X2 operating software.

The fastCTD Profiler is available to order now.

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



## Aquatec launches new acoustic suspended sediment profiler

It is now even easier to measure suspended sediment concentration with the new AQUAscat 1000LT acoustic profiler. The latest addition to the well-established AQUAscat range combines cutting-edge technology with economic design to give the best value solution for scientists and surveyors.

The AQUAscat 1000LT observes profiles of suspended sediment concentration of up to 2.5 m using multi-frequency acoustics. Profiling allows sediment dynamics such as resuspension and entrainment to be explored, which is not possible with single point measurements. The instrument is supplied with the latest user-friendly post-processing software that allows the mean particle size and concentration to be calculated from the acoustic backscatter output.

The self-contained design and rechargeable battery make it easy to deploy and maintain. Suitable for use to 200 m, the new AQUAscat can be deployed in rivers, lakes, estuaries and coastal regions. It is ideal for academic research and commercial use, including suspended sediment research, dredge monitoring and water quality monitoring.

Managing director, Andy Smerdon, said, "Aquatec has been making suspended sediment profilers for over 20 years, and the market leading AQUAscat 1000 instruments are deployed all over the world. We are excited to release the latest instrument in this range, which makes the measurement of suspended sediment concentration simple and cost effective." Aquatec will be exhibiting the AQUAscat 1000LT at Oceanology International in March on stand J300.

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

## High-contact-density Burton™ connectors and cable assemblies

Eaton's micro wet-mate solutions incorporate rugged designs that provide 10,000 PSI open-faced pressure ratings and survive 1,000 mate and demate cycles.

These high-contact-density Burton™ connectors and cable assemblies are available in bulkhead, inline overmolded, and dummy-plug configurations:

- 3,4,5,6, and 8 contacts in 0.61 in. (15.5mm) diameter shells;
- 10 and 16 contacts in 0.98 in. (25mm) diameter shells; and
- Application-specific solution capabilities include Ethernet.

Additional features and specifications include:

- Up to 600V maximum operating voltages;
- Current ratings up to 7 amps;
- Radiused pin shoulders protect insulators from fraying;
- Bulkhead connectors are available in brass, stainless steel, aluminum, titanium, and customer-defined materials; and
- Rated for above-water mating and submerged mating in less than 3 m of water.

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



## sea WORK 2016 INTERNATIONAL

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[seawork.com](http://seawork.com)

## Precision Measurement Engineering launches new water oxygen accessory

Precision Measurement Engineering, a premiere designer and manufacturer of reliable and accurate water monitoring systems and instruments, is launching its newest product accessory, the miniWiper. The device is a portable and user-friendly accessory to complement the miniDOT Dissolved Oxygen/Temperature Logger, the industry's leading instrument that logs dissolved oxygen and temperature measurements to gauge freshwater and oceanographic research all over the world.

The miniWiper is the ideal anti-fouling device to obtain accurate water oxygen and temperature measurements over a longer period of time with no manual sensor cleanings. The device utilizes a small, durable brush to wipe the surface of the miniDOT Logger's sensor once every hour to prevent invasive organisms from growing and attaching to it and potentially hindering water oxygen readings.

"By using the miniWiper accessory



on the miniDOT Logger, users can anticipate months of uninterrupted, accurate data collection," said PME CEO Kristin Elliott. "One of the many appeals of the miniWiper is how relatively inexpensive it is compared to other wipers."

Product highlights include being able to communicate with the miniWiper to set the wipe rate, view the battery usage and set the time. Other product features include a USB data interface, user replaceable brush, user replaceable batteries and supplied software.

"Governmental agencies and research institutions have been utilizing our instruments to aid in tracking temperature and oxygen to help forecast potential El Nino storms and global warming trends," said Elliott. "We are thrilled to be a part of such important research that affects regions across the world."

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

## WFS Technologies drives down the cost of subsea flow monitor

WFS Technologies announces the launch of Seatooth PipeLogger Ultrasonic Flow (UF). Designed to deliver a step reduction in the cost of monitoring flow through subsea pipelines and jumpers, the Seatooth PipeLogger UF is set to revolutionize flow assurance.

The Seatooth PipeLogger UF incorporates an ultrasonic flow sensor and is designed to monitor flow within the pipeline without penetration of the pipe wall. Flow data is wirelessly harvested from the Seatooth PipeLogger UF by diver, ROV or AUV using Seatooth subsea radio communications systems. The system can alternatively be configured to provide real-time data through a Seatooth-enabled Subsea control module (SCM). The wireless communications range of standard Seatooth devices through seawater, the seabed, concrete blankets and the splash zone is 5 to 10 m. Wireless communications range can optionally be extended to 35 m through seawater or 150 m through the splash zone.



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The Seatooth PipeLogger UF incorporates Seatooth Endure, innovative technology designed to extend the battery life of subsea wireless systems to up to 15 years.

Systems are depth rated to 200 or 1,000 m, are compact and weigh under 5 kg in seawater. They are suitable for deployment by mini-ROV operating off a rig or small vessel or by diver. Deployment and recovery is facilitated by use of diver straps or ROV clamp. An optional protection cover is available for systems buried in the seabed, under concrete blankets or under rubble.

By reducing the typical installation cost of flow monitoring systems by over 90%, the Seatooth PipeLogger UF is another WFS product set to revolutionise subsea asset integrity monitoring and flow assurance.

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

#### **Statoil signs new agreement for AVEVA Everything3D**

AVEVA announced that it has entered a multiyear agreement with Statoil ASA for AVEVA Everything3D™ (AVEVA E3D™). The

Norwegian Energy owner operator has selected AVEVA E3D to be its strategic 3D design software platform.

Following the migration to AVEVA E3D by a number of other companies, Statoil selected it as the natural upgrade of its existing design system, AVEVA PDMS™. Statoil will benefit from improved design efficiency and AVEVA E3D's simple migration from AVEVA PDMS means there will be no disruption to existing projects. This will give Statoil and its contractors the possibility of cutting project schedules and reducing rework during both the design and construction phase.

Statoil has been a strategic user of AVEVA PDMS and AVEVA Global™ for more than 15 years and acknowledges the value this software has brought when executing field development, maintenance and modification projects as well as during the operation and revamp of its portfolio of facilities.

Moving forward, AVEVA E3D will give Statoil the possibility to meet the future demand of cost-effective project execution, utilizing its integration with high-definition laser survey capabilities, comprehensive clash detection and

improved design and drawing capabilities. As existing users of AVEVA PDMS, its compatibility with AVEVA E3D ensured that Statoil can migrate and access the 3D design for both new and existing facilities in a flexible and controlled manner.

"Statoil has selected AVEVA E3D as its 3D solution of choice for both its greenfield and brownfield complex plant design projects," said Helmut Schuller, executive vice president - sales, AVEVA. "AVEVA's unmatched design efficiency in brownfield is due to AVEVA E3D's extremely tight integration with laser scanning capabilities and its simple migration from AVEVA PDMS. The AVEVA E3D interface is very easy to use and extremely powerful so our customers are up-to-speed quickly with minimal training and no disruption to existing projects. Its ease of implementation and use gives Statoil access to AVEVA E3D's multitude of benefits without the normal risks associated with new projects and long-term operations."

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

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Hawboldt Industries is pleased to announce **David Marchetti** has joined the company in a senior sales role. Marchetti brings to Hawboldt over 27 years of experience in operations, manufacturing, engineering, project management, and aftermarket / customer service, including extensive experience with ROV systems and subsea oil and gas operations. Marchetti has held various positions with companies such as Schilling Robotics, GE Vetcro Gray, and FMC Technologies, and most recently held the position of VP of operations - subsea at Forum Energy Technologies.

EdgeTech announced that **John DeMille** has joined its team as product line sales engineer. DeMille is well known by countless police, fire, public safety dive teams and other dedicated search and recovery teams at the local and federal level throughout the country. He has provided invaluable training, service and sales support on side scan sonar systems and other



Marchetti



DeMille

important equipment for the industry. He has over 40 years in the marine industry and spent 20 years as a U.S. Navy Sea Bee Deep Sea Diver serving with the U.S. Navy underwater construction teams and then went on to work as a project superintendent installing marine transatlantic communication cables.

Global Diving & Salvage, Inc. announces the hiring of **Mike Brown** as vice president of energy services, working from Global's Houston office. In his position, Mr. Brown will focus his efforts to increase Global's position in the domestic and international energy market. He will be directly responsible for developing business opportunities and providing oversight on operations for these clients as well as oversee Global's saturation and deep diving operations throughout the company.

InterMoor, an Acteon company, has appointed **Folabi Bolatiwa** as general manager in Nigeria. Bolatiwa will be responsible for overseeing the company's continued growth in the region. Bolatiwa joined InterMoor in 2007 as an engineer and has more than 10 years of experience



Brown

in the offshore oil and gas industry, gained in engineering, operations and management roles.

ABS announces the appointment of **Bret Montaruli** to the role of vice president and chief engineer. In his new role, Montaruli will be responsible for overseeing the interpretation, application and compliance with the ABS Rules across all ABS Engineering offices worldwide.

Subsea technology company Sonardyne International Ltd. UK, has announced the appointment of **Geraint West** as its new global business manager for oceanography. Geraint joins Sonardyne with immediate effect and brings with him extensive experience gained over 32 years with the Royal Navy, Fugro, and most recently, the National Oceanography Centre.

Deep Ocean Engineering, Inc. is pleased to announce that **Raul Enrique Pena** has joined the company as its vice president of sales and marketing to drive the continued growth of Deep Ocean while expanding its presence internationally. He brings an in-depth knowledge of sales, channel management, business development and marketing from his successful career in telecom and tech, having worked in both start-up and established

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organizations. He has conducted business in Latin America, Asia and Europe in recent years.

MAR Inc. has named **John Delia** the program manager for Ohmsett – The National Oil Spill Response Research & Renewable Energy Test Facility, succeeding Bill Schmidt who retired in December 2015. Delia was most recently with BAE Systems where he served as a program manager responsible for the production and development of systems as well as the logistics for the low probability of altimeter, common data link and F-22 product lines within the Electronic Systems group.

Zupt is pleased to announce that **Simonette Lentze-Muller** has joined Zupt, LLC as the V.P. of offshore operations. Within this role, she will be responsible for the oversight of all of Zupt's offshore operations including data integrity, operational management and personnel oversight. She comes to Zupt from Heerema Marine Contractors, where she was employed as a senior specialist in engineering subsea services.

**ABS** announces the realignment of its Americas Division operations to create two new regions: Canada and Mexico, Central America and the Caribbean. This realignment strengthens localized leader-

ship to help ABS members and clients take advantage of expanding opportunities. **Joseph Rousseau** will serve as the regional vice president for Canada. **Homero Guerra** will serve as regional vice president for Mexico, Central America, and the Caribbean.

**Xylem Inc.** has acquired **Tideland Signal Corporation**, a privately owned company specializing in analytics solutions in the coastal and ocean management sectors.

**AMETEK, Inc.** announced that it has completed two acquisitions: **Brookfield Engineering**, the world's leading manufacturer of viscometers and rheometers, and **ESP/SurgeX**, a leader in energy intelligence and power protection solutions.

Aberdeen-headquartered engineering consultancy **Project Development International Ltd (PDI)** announced it is under new ownership following an acquisition by **Tattva International Holdings Pte Limited**.

**Gothia Power**, a leading Swedish power system analysis company, has been acquired by **DNV GL**.

Following the acquisition of Hydro-Lek, **Saab Seaeye** is pleased to announce that the **Hydro-Lek** business has now been transferred to Fareham and is fully

operational. The combined companies will operate under the Saab Seaeye name. The Hydro-Lek brand will remain and customers can still reach Hydro-Lek sales and operation staff who are now based at Fareham.

**EdgeTech** recently signed an agreement with **Equipment and Consulting for Hydrographic Operations (ECHO81)** to act as an exclusive 6205 MPES representative for the Americas. ECHO81, a distributor of marine survey instrumentation, offers equipment, installation, training and support services focused on hydrographic survey operations.

**SBG Systems** has appointed **Swathe Services** to be an authorized sales and support distributor for the marine hydrography market in the UK and Ireland. This includes all products within the Ellipse, Ekinox and Apogee product lines and includes the Split-Box with associated components.

Surface to seabed specialist **Seanamic Group** is expanding its global umbilicals business with a new umbilical international facility in Glasgow. Initially it will offer umbilical repair and refurbishment for operators and contractors in the lead up to full umbilical and cable manufacture.



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# CALENDAR & EVENTS

March 2016

March 6-10, 2016 <b>NACE Corrosion</b> Vancouver, BC <a href="http://www.nacecorrosion.org">www.nacecorrosion.org</a>	April 3-5, 2016 <b>Canadian Underwater Conf &amp; Expo</b> Halifax, Nova Scotia <a href="http://www.underwaterconference.ca">www.underwaterconference.ca</a>	May 2-5, 2016 <b>AUVSI - XPONENTIAL</b> New Orleans, LA <a href="http://www.xponential.org">www.xponential.org</a>
March 15-17, 2016 <b>Oceanology International</b> London, UK <a href="http://www.oceanologyinternational.com">www.oceanologyinternational.com</a>	April 5-7, 2016 <b>MCE Deepwater Development</b> Pau, France <a href="http://www.mcedd.com">www.mcedd.com</a>	May 2-5, 2016 <b>OTC</b> Houston, TX <a href="http://www.otcnet.org">www.otcnet.org</a>
March 16-18, 2016 <b>Asia Pacific Maritime</b> Singapore <a href="http://www.apmaritime.com">www.apmaritime.com</a>	April 11-13, 2016 <b>SPE HSSE-SR</b> Stavanger, Norway <a href="http://www.spe.org/events/hse/2016">www.spe.org/events/hse/2016</a>	May 16-19, 2016 <b>Canadian Hydrographic Conference</b> Halifax, Nova Scotia <a href="http://www.chc2016.ca">www.chc2016.ca</a>
March 21-23, 2016 <b>Maritime Security East</b> Norfolk, VA <a href="http://www.maritimalsecurityeast.com">www.maritimalsecurityeast.com</a>	April 18-21, 2016 <b>ONR/MTS Buoy Workshop 2016</b> Woods Hole, MA <a href="http://www.whoi.edu/buoyworkshop/2016">www.whoi.edu/buoyworkshop/2016</a>	May 25-26, 2016 <b>Deepwater Decommissioning Workshop</b> Houston, TX <a href="http://decommissioninggom.offsnetsevents.com">decommissioninggom.offsnetsevents.com</a>
March 22-24, 2016 <b>Subsea Tieback</b> San Antonio, TX <a href="http://www.subseataiebackforum.com">www.subseataiebackforum.com</a>	April 18-21, 2016 <b>SubOptic</b> Dubai, UAE <a href="http://www.suboptic2016.com">www.suboptic2016.com</a>	June 1-3, 2016 <b>UDT</b> Oslo, Norway <a href="http://www.udt-global.com">www.udt-global.com</a>
March 22-25, 2016 <b>OTC Asia</b> Kuala Lumpur, Malaysia <a href="http://www.otcasia.org">www.otcasia.org</a>	April 26-28, 2016 <b>Next Gen Marine Power &amp; Propulsion</b> Southampton, UK <a href="http://www.hybridmarine-power.com">www.hybridmarine-power.com</a>	June 12-15, 2016 <b>PORTS 2016</b> New Orleans, LA <a href="http://www.portsconference.org">www.portsconference.org</a>

72

Ocean News & Technology

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- Ocean Biogeochemistry
- Air-sea Interactions
- Ocean Data Management
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## JANUARY

**Editorial:** Underwater Navigation; Manned Submersibles  
**Distribution:** Underwater Intervention; GOM Oil Spill & Ecosystem  
**Product & Services Focus:** Multibeam & Side Scan Sonars; Research & Development Services

## FEBRUARY

**Editorial:** Oceanology & Meteorology; Decom & Abandonment  
**Distribution:** Decommissioning and Abandonment Summit; Oceanology International  
**Product & Services Focus:** Buoys & Monitoring Instrumentation; Environmental Monitoring/Testing Services

## MARCH

**Editorial:** Subsea Fiber Optic Networks; Maritime Security  
**Distribution:** Canadian Underwater Conf & Expo; SubOptic  
**Product & Services Focus:** Connectors; Cables & Umbilicals; Diver Detection Systems

## APRIL

**Editorial:** Offshore Technology; Ocean Mapping & Survey  
**Distribution:** OTC; AUVSI-Xponential; Deepwater Decommissioning Workshop  
**Product & Services Focus:** Subsea Tools & Manipulators; Batteries; Training/Safety

## MAY

**Editorial:** UW Imaging & Processing; Marine Salvage/UW Archeology  
**Special Focus Section:** Executive Profiles  
**Distribution:** UDT (Norway) PORTS; Seawork International  
**Product & Services Focus:** Magnetometers; Water Dredges & Airlifts; Diving Services

## JUNE

**Editorial:** Autonomous Unmanned Vehicles; Defense & Naval Systems;  
**Special Focus Section:** New Product Profiles  
**Distribution:** Clean Pacific; MAST  
**Product & Services Focus:** Tracking & Positioning Systems; Seismic Monitoring; Equipment Leasing/Rental Services

## JULY

**Editorial:** Ocean Engineering; Marine Construction  
**Special Focus Section:** Company History Profiles - Then and Now  
**Distribution:** OMICS  
**Product & Services Focus:** Navigation, Mapping & Signal Processing; Data Processing Services

## AUGUST

**Editorial:** Workclass ROVs; Deepwater Pipeline/Repair/Maintenance  
**Distribution:**  
**Product & Services Focus:** Cameras, Lights & Imaging Sonars; Oil Spill Clean-Up Services

## SEPTEMBER

**Editorial:** Ocean Observing Systems; Subsea Telecom; Offshore Wind Installation & Maintenance  
**Distribution:** AWEA Offshore Windpower; Oceans '16 MTS/IEEE Monterey; Teledyne Marine Technology Workshop; EWEA Annual  
**Product & Services Focus:** Water Sampling Equipment; Cable Installation Services

## OCTOBER

**Editorial:** Offshore Communications; Subsea Inspection, Monitoring, Repair and Maintenance  
**Distribution:** OilComm; Offshore Energy; Clean Gulf  
**Product & Services Focus:** Acoustic Modems, Releases & Transponders; Marine Communications; Survey & Exploration Services

## NOVEMBER

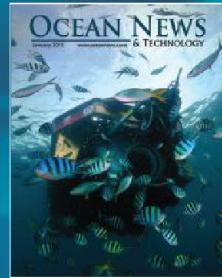
**Editorial:** Offshore Support, Supply & Emergency Vessels; Deep Sea Mining  
**Distribution:** International Workboat  
**Product & Services Focus:** Ship Protection Systems; Cranes, Winches & Control Systems; Vessel Charter/Leasing Services

## DECEMBER

**Editorial:** Light Workclass ROVs; Commercial Diving; Year in Review; UI Pre-show issue  
**Distribution:** Offshore & Deep Sea Mining  
**Product & Services Focus:** Diving Equipment & Services; Buoyancy Materials; Construction & Repair Services

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 E-mail: sales@rowetechinc.com  
 Website: www.rowetechinc.com  
 Contact: Ray Mahr



Rowe Technologies Inc. [RoweTech] specializes in the design and manufacture of underwater acoustic Doppler products and imaging systems for the oceanographic, hydrographic and hydrologic markets. Founded in 2009, Rowe Technologies is a technology-based private company with the main office located in Poway CA, USA. Rowe's ADCP/DVL electronics suite is superior to others due to a powerful compact single-unit configuration which allows simultaneous current profiling and bottom tracking.

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## [South Bay Cable Corp](#)

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E-mail: Sales@southbaycable.com  
Website: www.southbaycable.com  
Contact: Gary Brown, Sales Manager



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Website: www.ak-ind.com  
Contact: Allan Kidd



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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  
Contact: Eric Birns



**76**

Ocean News & Technology

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.

### **BIRNS Aquamate LLC**

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Fax: +1 401 753 6342  
E-mail: sales@birnsaquamate.com  
Website: 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**

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El Cajon, CA 92020 USA  
Tel: +1 619 562 7071  
Fax: +1 619 562 9706  
E-mail: seacon@seaconworldwide.com  
Website: 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**

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Fax: +1-858-565-1649  
E-mail: impulse@teledyne.com  
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### **Teledyne ODI - A Teledyne Technologies Company**

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Tel: +1 386 236 0780  
Fax: +1 386 236 0906  
Toll Free: (888) 506 2326  
E-mail: ODI\_marketing@teledyne.com  
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### **Hydro Leduc NA, Inc.**

19416 Park Row, Ste. 170  
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E-mail bogden@hydroleduc.com  
Website: www.hydroleduc.com



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March 2016

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Focal Technologies Corporation, Moog Inc.

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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.

8502 SW Kansas Ave  
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Fax: +1 772 219 3010  
Email: jbyous@oceanspecialists.com  
Website: www.oceanspecialists.com  
Contact: Jim Byous



*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 & 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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E-mail: insure@jwfisk.com  
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Fax: +1 408 954 0902  
E-mail: sales@geometrics.com  
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Website: www.csaocean.com  
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Contact : Valérie Le Pen - vlepen@nke.fr or Gouven Prud'homme - gprudhomme@nke.fr  
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Website: www.romor.ca  
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E-mail: Klein.Mail@KleinMarineSystems.com  
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E-mail: bill.new@newindustries.com  
Website: www.newindustries.com  
Contact: Bill New



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E-mail: charles@subseaamerica.com  
Website: www.subseaamerica.com  
Contact: Charles Mayea



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Tel: +1 508 563 6565  
Fax: +1 508 563 3445  
E-mail: glester@hydroid.com  
Website: 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.*

**OceanServer Technology, Inc.**

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E-mail: sales@deepocean.com  
Website: www.deepocean.com  
Contact: Bill Charbonneau



Deep Ocean Engineering, Inc. provides remotely operated and unmanned surface vehicle (ROV / USV) solutions which are used by a broad range of industry applications - security, military, nuclear and hydroelectric power plants, inshore dams and lakes, oil and gas, scientific research, fisheries, salvage, search / recovery, and pipeline inspections.

### i-Tech

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E-mail: Katarina.Tehlirian@Subsea7.com  
Website: www.interventiontechnology.com  
Contact: Katarina Tehlirian



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Tel: 713.329.4500  
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Contact: Brian Luzzi

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E-mail: sales@rovoco.com  
Website: www.rovoco.com  
Contact: Jessica McKenney



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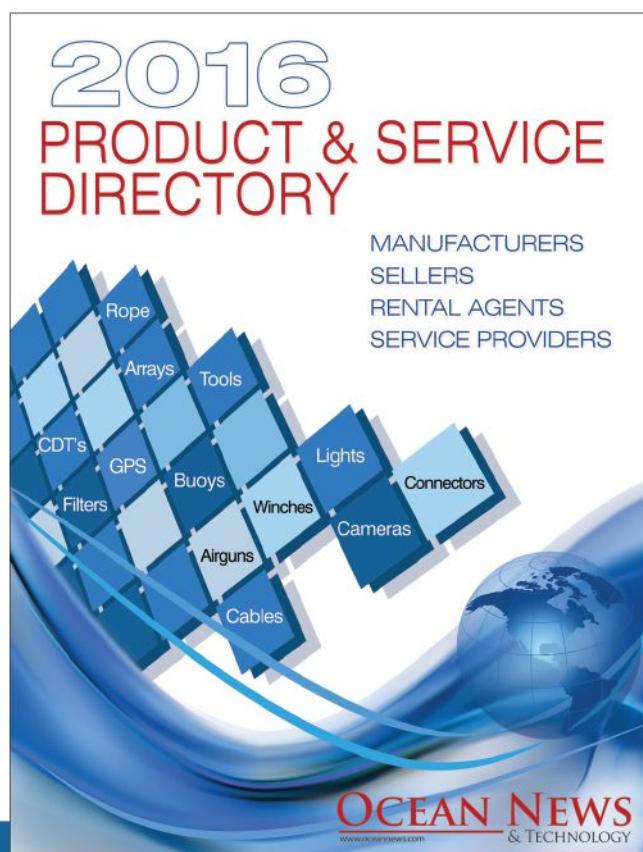
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# ADVERTISER INDEX

AFLd .....	7 .....	<a href="http://www.AFLglobal.com">www.AFLglobal.com</a>
AUVSI - Xponential 2016 .....	70 .....	<a href="http://www.xponential.org/auvsi2016/public/enter.aspx">www.xponential.org/auvsi2016/public/enter.aspx</a>
BIRNS, Inc. .....	5 .....	<a href="http://www.birns.com">www.birns.com</a>
Caldwell Marine International, LLC .....	44 .....	<a href="http://www.caldwellmarine.com">www.caldwellmarine.com</a>
Clean Pacific .....	69 .....	<a href="http://www.cleanpacific.org">www.cleanpacific.org</a>
CSA Ocean Sciences Inc. .....	4 .....	<a href="http://www.csaocean.com">www.csaocean.com</a>
CSnet International, Inc. ....	16 .....	<a href="http://www.CSnetInternational.com">www.CSnetInternational.com</a>
Deep Ocean Engineering .....	84 .....	<a href="http://www.deepocean.com">www.deepocean.com</a>
ECA Robotics .....	21 .....	<a href="http://www.eca-robotics.com">www.eca-robotics.com</a>
ECO Magazine .....	27 .....	<a href="http://www.ecomagazine.com">www.ecomagazine.com</a>
Euromaritime .....	57 .....	<a href="http://www.euromaritime.fr/en">www.euromaritime.fr/en</a>
EvoLogics GmbH .....	83 .....	<a href="http://www.evologics.de">www.evologics.de</a>
FORUM Energy Technologies, Inc. (F.E.T.) .....	9 .....	<a href="http://www.f-e-t.com">www.f-e-t.com</a>
Global Ocean Design .....	52 .....	<a href="http://www.globaloceandesign.com">www.globaloceandesign.com</a>
H&L Instruments .....	38 .....	<a href="http://www.hlinstruments.com">www.hlinstruments.com</a>
InterOcean Systems, Inc. ....	39 .....	<a href="http://www.interceansystems.com">www.interceansystems.com</a>
iXBlue SAS .....	29 .....	<a href="http://www.ixblue.com">www.ixblue.com</a>
JW Fishers Manufacturing, Inc. ....	36 .....	<a href="http://www.jwfishers.com">www.jwfishers.com</a>
LinkQuest, Inc. ....	13 .....	<a href="http://www.link-quest.com">www.link-quest.com</a>
MacArtney A/S .....	3 .....	<a href="http://macartney.com">http://macartney.com</a>
MAST .....	71 .....	<a href="https://mastconfex.com">https://mastconfex.com</a>
New Industries .....	37 .....	<a href="http://www.newindustries.com">www.newindustries.com</a>
Ocean News .....	46, 51, 56, 73, 74, 81 .....	<a href="http://www.oceannews.com">www.oceannews.com</a>
Ocean Specialists, Inc. ....	55 .....	<a href="http://www.oceanspecialists.com">www.oceanspecialists.com</a>
Oceaneering International .....	30 .....	<a href="http://www.oceaneering.com">www.oceaneering.com</a>
Okeanus Science & Technology .....	47 .....	<a href="http://www.okeanus.com">www.okeanus.com</a>
OMICS .....	72 .....	<a href="http://www.oceanographyconference.com">www.oceanographyconference.com</a>
Quest Offshore Resources, Inc. ....	58 .....	<a href="http://www.questoffshore.com">www.questoffshore.com</a>
Radar Screen Report .....	60 .....	<a href="http://www.subcableworld.com/radar-screen-report">www.subcableworld.com/radar-screen-report</a>
Saab Seaeye Ltd .....	43 .....	<a href="http://www.seaeye.com">www.seaeye.com</a>
SeaCatalog .....	59 .....	<a href="http://www.seacatalog.com">www.seacatalog.com</a>
Seacon .....	15 .....	<a href="http://www.seaconworldwide.com">www.seaconworldwide.com</a>
SeaRobotics .....	45 .....	<a href="http://www.searobotics.com">www.searobotics.com</a>
SeaWork International .....	67 .....	<a href="http://www.seawork.com">www.seawork.com</a>
Shark Marine Technologies, Inc. ....	41 .....	<a href="http://www.sharkmarine.com">www.sharkmarine.com</a>
SonarTech Co., LTD .....	45 .....	<a href="http://www.SonarBeam.co.kr / www.sonartech.com">www.SonarBeam.co.kr / www.sonartech.com</a>
South Bay Cable .....	49 .....	<a href="http://www.southbaycable.com">www.southbaycable.com</a>
Submarine Cable Newsfeed .....	60 .....	<a href="http://www.subcableworld.com">www.subcableworld.com</a>
Subsalve USA .....	53 .....	<a href="http://www.subsalve.com">www.subsalve.com</a>
SubCtech GmbH .....	53 .....	<a href="http://www.subCtech.com">www.subCtech.com</a>
Teledyne Marine .....	17 .....	<a href="http://www.teledynemarine.com">www.teledynemarine.com</a>
UDT .....	68 .....	<a href="http://www.udt-global.com">www.udt-global.com</a>
VideoRay .....	2 .....	<a href="http://www.videoray.com">www.videoray.com</a>



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- range: up to 8000 m
- accuracy: up to 0.04 degrees

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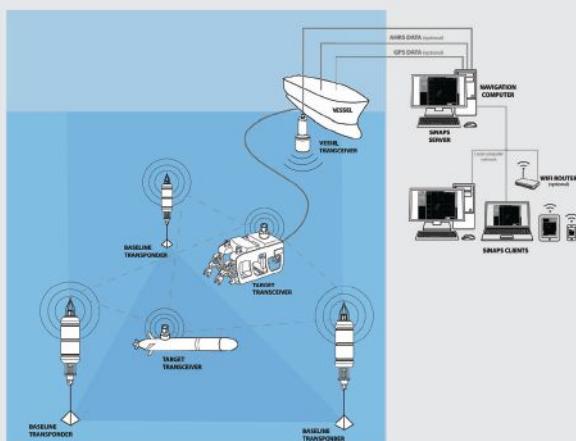
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