

# OCEAN NEWS

October 2016

**35  
YEARS**

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**& TECHNOLOGY**  
*News for the Ocean Industry*

## Protecting Maritime Assets

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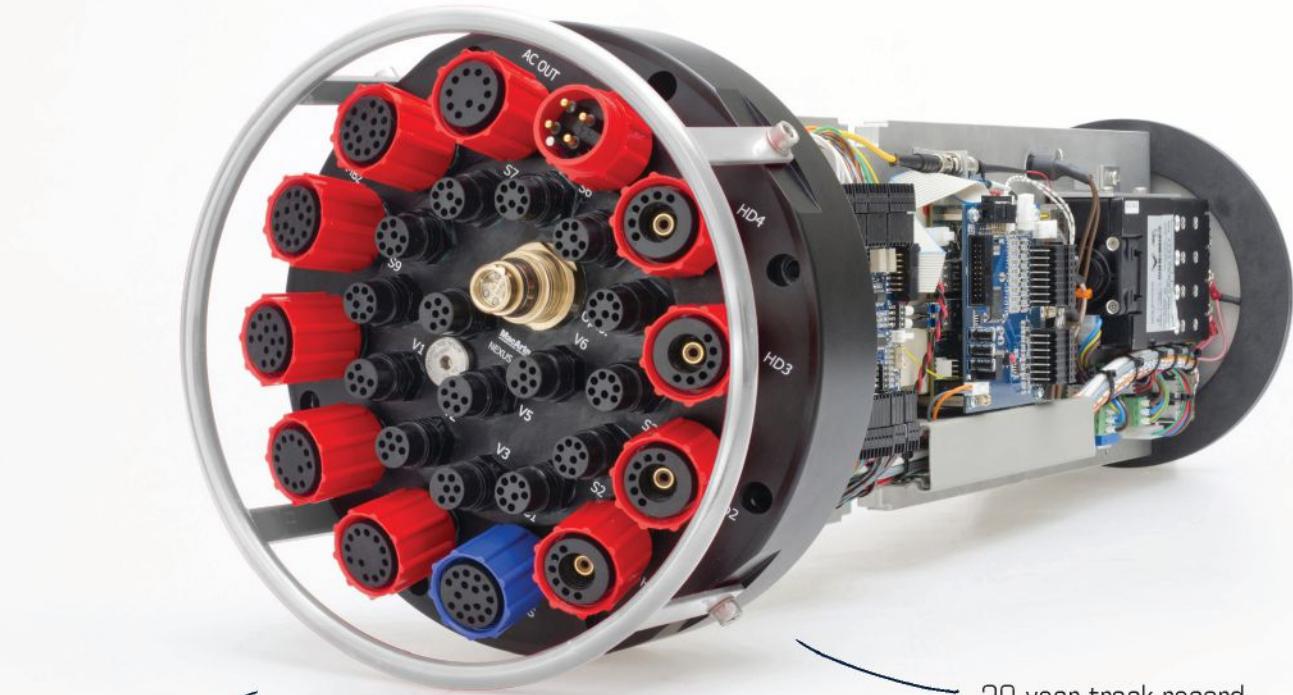
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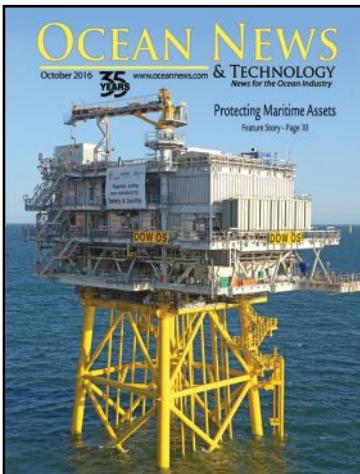
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Dudgeon Offshore Windfarm topside substation  
(Copyright: Statoil).

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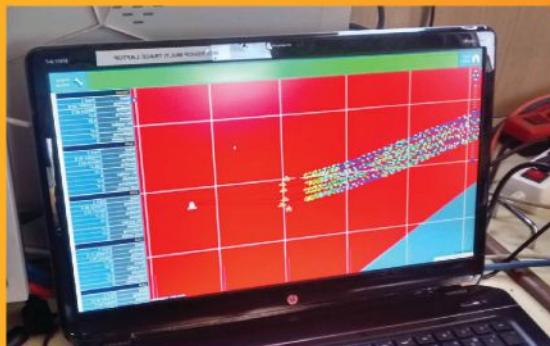


30 m Vessel towing 4 Geo-Sense 24 ch  
UHR Streamers with acoustic positioning

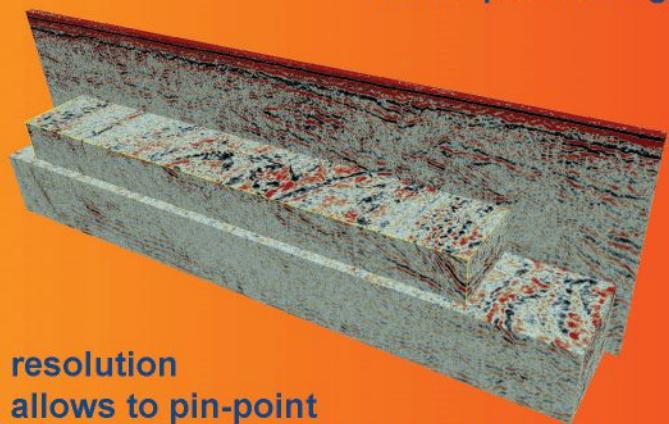


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## Submarine Cables and Corporate Responsibility

By: Eric Handa, Co-Founder and CEO of APTelecom

More and more in the 21st century, submarine cables are being seen as a way to improve conditions in developing countries by providing reliable broadband access and the social and economic opportunities that come with it. At APTelecom, however, we believe that we can do more to help than just build cables.

Any company can earn a profit. However, not everything about running a business should be for profit. There's more to life than just work, and there's more to work than just business. That's why it's essential for businesses to implement a strong Corporate Social Responsibility (CSR) program. A CSR program allows businesses to give back and do social good for a cause dedicated to its founder's personal beliefs. The charity for a CSR program should be selected on the idea of aligning with the company's overall mission. By showing its passion for something other than a bottom line, a company can use a CSR program to show its customers and employees its human side while also raising funds and awareness for a good cause.

Some "Scrooge" entrepreneurs may not like the idea of a CSR program, as they might feel like it takes away time spent on earning new business and improving company revenue. A business owner might also feel like it's difficult to maintain the overall company vision when he/she has to spend time focused on a CSR program. However, it's actually the opposite on both counts. Studies have proved that CSR programs can increase revenue, shareholder value, and employee productivity. The "Scrooges" of the world have it wrong—they are actually hurting their business and bottom line by not having a CSR program.

When we started APTelecom, we decided to make supporting charitable programs and our commitment to CSR a foundation of our company's vision. Our aim is to continue to support charities in our neighborhood. This means a continued focus on assisting programs operating in emerging markets in which we operate, such as Southeast Asia, Africa, and Latin America. We consider this a double win. We are able to support worthy causes in markets with socio-economic challenges, which ties to our core business of assisting the telecommunications industry establish new submarine cables in countries lacking access to these capabilities. While the challenges faced by each developing country in the markets in which APTelecom operates are largely determined by local cultural,

political, and economic conditions, APTelecom has found that enabling Internet access always has a profound and positive impact.

In line with this vision, APTelecom recently continued its mission by supporting underprivileged youth in several international markets. With a strong focus on doing business in emerging markets, APTelecom has a genuine desire to support charities as a way of acknowledging the support that we have received from these markets as we have grown.

In August 2016, APTelecom was honored with as Bronze Winner for the "Most Socially or Environmentally Responsible Company of the Year" category in Best in Biz Awards 2016 International based on its 2015 State of Subsea event. APTelecom's State of Subsea Bangkok event was held at the world-renowned ToT Academy in Bangkok, Thailand to help bring awareness to the location. The ToT Academy is one of the largest and most respected educational facilities for telecommunications professionals across the world, equipped with dedicated training workshop venues, classrooms, and campus amenities.

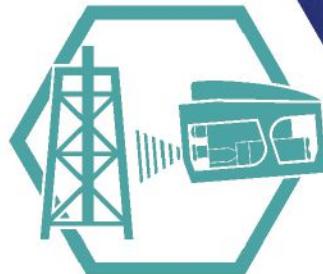
A US\$25,000 check was presented on behalf of APTelecom and State of Subsea to Friends International, whose mission is to save lives and build futures of the most marginalized children and young people across Southeast Asia. APTelecom will always continue to support charitable programs based on the CSR vision and commitment made when the company was established. State of Subsea has enriched the lives of many international charities globally.

In 2016, APTelecom's State of Subsea initiative has continued to accelerate, with more than \$100,000 in donations secured for underprivileged markets that are still struggling with access to critical ICT functions and infrastructure.

We have seen the benefits of a CSR program first-hand and have recommended that all of our customers, partners, and vendors follow suit and implement a program that is meaningful to their principal owners and values. It is part of our responsibility as business owners to lead the way on improving the way of life for those not as fortunate. With the holiday season coming up, now is a great chance to organize the foundation of CSR program and help others while also improving your bottom line, customer base, and employee morale. What's not to like?



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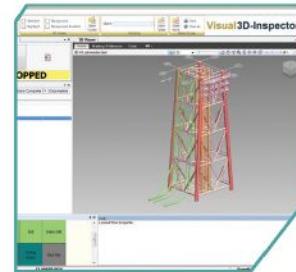
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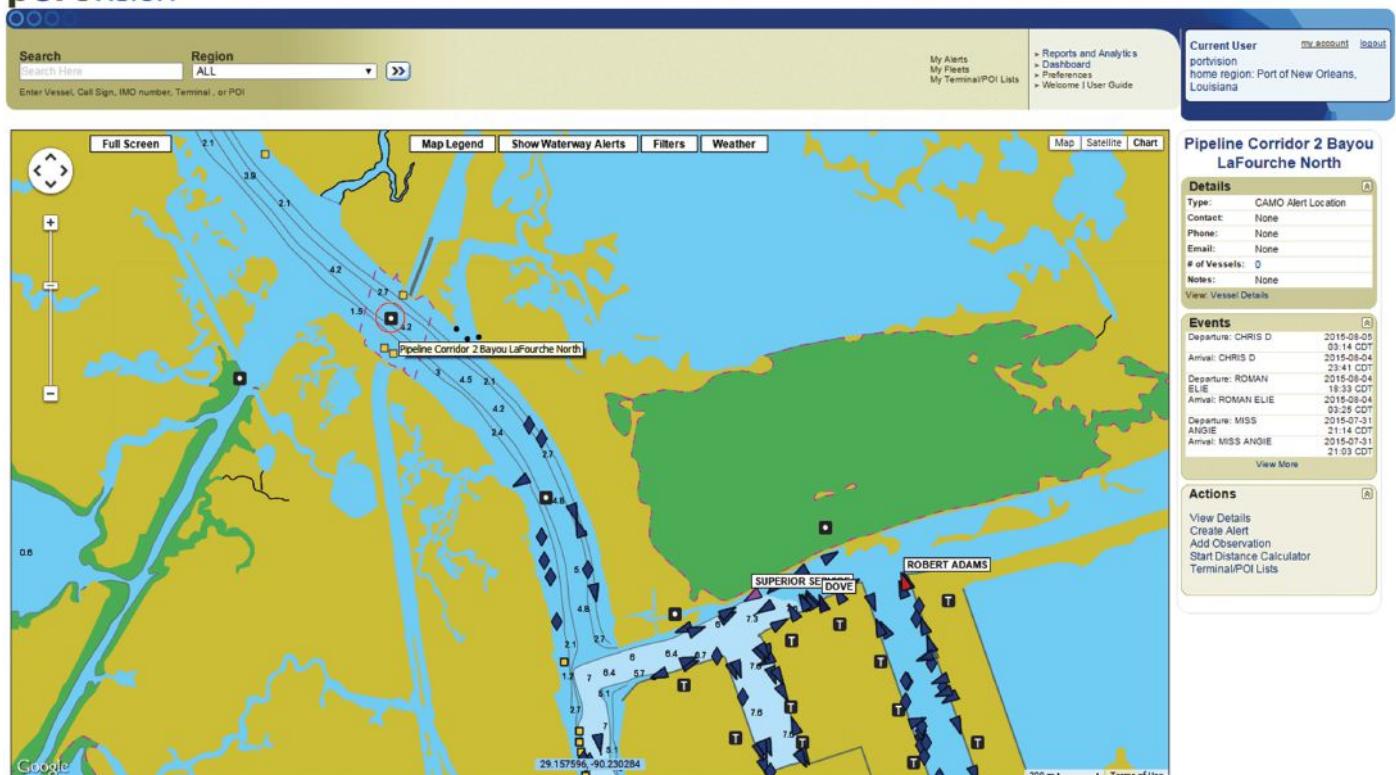
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# PROTECTING MARITIME ASSETS

*By: Jason Tieman*

Oceaneering Director of Maritime Solutions,  
Global Data Solutions (GDS)/PortVision

portvision



Pipeline corridor being monitored for vessels that could be a threat.

Safety and security are as important as operational efficiency for owners of geographically dispersed maritime assets and remote infrastructure. These organizations are increasingly much more proactive about monitoring and responding to the threat that vessels pose to assets including pipelines, offshore rigs and other fixed infrastructure above and below the water. When a vessel comes into contact with these assets, it can lead to unplanned and expensive surveys, repairs, costly litigation, and the potential of third-party claims for the economic and environmental impacts of a spill in the maritime environment.

Operators of these assets now have a new tool for threat assessment and mitigation planning, using the same Automatic Identification System (AIS) data that all major oil companies employ today to optimize their operations by better understanding vessel movements globally. These tools increase visibility to real-time vessel positions and historical commercial vessel traffic, and also include activity logging, process management, business analysis and reporting capabilities, while giving users a single operational dashboard to improve the productivity, safety and efficiency of multiple assets and/or fleets.

This technology provides operators of remote assets with the monitoring and analytical capabilities for assessing the threat of encroaching vessels, and also provides the opportunity for preemptive alerting when nearby vessel activity suggests that a strike may be imminent. In addition to leveraging the AIS signal required by most vessels, radar can also be used to assess the threat of those vessels that might not be required to carry an AIS transponder. These tools completely transform the ability for operators to make accurate, fact-based assessments of imminent threats to their infrastructure by using real-time vessel position data while also measuring historical trends in great detail to better direct the funding of surveys, maintenance and riskmitigation strategies.

When AIS is combined with radar and other data sources, it provides a more complete picture of vessels moving around marine infrastructure. As an example, many offshore oil platforms already have radars that can be combined with AIS data for enhanced web-based vessel-monitoring solutions. Radar is a particularly important data source since its use ensures that even vessels that are not transmitting AIS signals can be monitored to determine if the vessels appear to pose a threat.

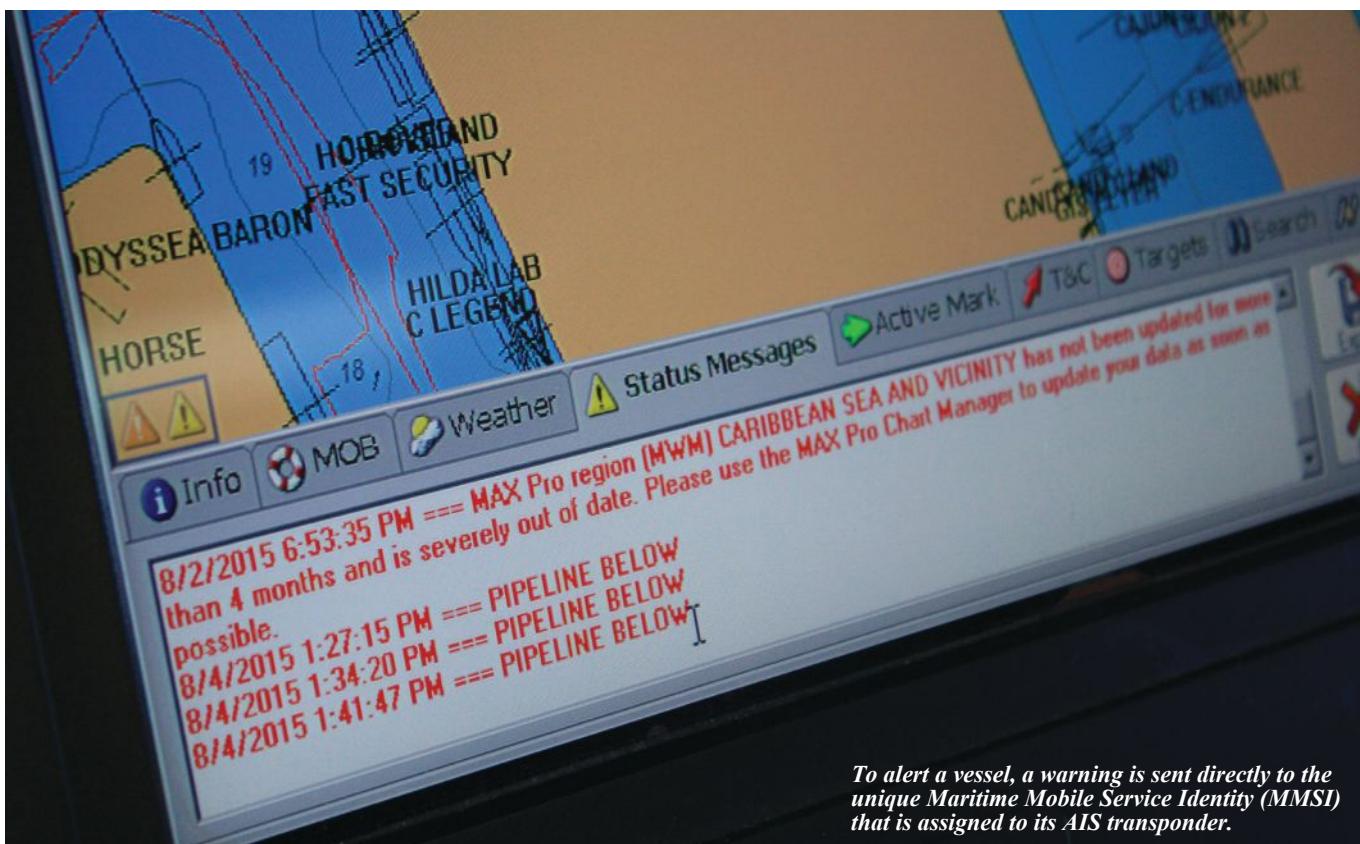
There is an additional security advantage to using radar, considering that not all vessels have AIS and that radar cannot be tampered with. There have been many cases in which operators have altered their data and falsely represented their actions or

position details, or have simply turned off their AIS transponders. The use of radar, however, ensures that these vessels are still visible, both in real time and for historical tracking purposes.

#### Redefining responsibilities for collision avoidance

According to international and inland navigation rules, every vessel bears the responsibility for preventing collisions, and must maintain an appropriate lookout by using all available means to determine if the risk of collision exists, based on prevailing circumstances and conditions. Traditionally, operators of fixed assets were only obligated to deploy passive measures to mitigate the risk of vessel interactions, but, with the growing availability and affordability of new technology, there also is the growing expectation for this technology to play a key role in proactively preventing an incident. Today's AIS-based analytical tools give infrastructure operators everything they need to actively collaborate with vessel operators on collision avoidance by continuously assessing AIS vessel position data and/or radar information. With these tools, operators can not only preempt strikes before they occur, but they can also achieve a more comprehensive vulnerability picture so they can improve their risk mitigation strategies.

The first entity to use AIS as a method to communicate safety information directly to a vessel for marine asset protection was the Coastal and Marine Operators (CAMO) group, which launched a pipeline monitoring program in August 2015 in partnership with the Greater Lafourche Port Commission in Louisiana and with Oceaneering International, Inc. The CAMO initiative uses Oceaneering PortVision AIS-based vessel-monitoring service to monitor and automatically alert vessel operators that might be slowing, stopping or anchoring inside two pipeline corridors – charted by the U.S. National Oceanic and Atmospheric Administration (NOAA) and located north and south of Port Fourchon – that pass under its main navigable channel. Their success has provided a model for broader industry deployment.



## Deploying an asset protection solution

The first step in implementing a maritime asset protection solution is to assess the asset's location to determine the type of traffic that is expected in the region, and to decide if there is value in deploying an AIS Aid to Navigation (ATON) and the ability to do so. An AIS ATON can be associated with either a real or virtual ATON, and is capable of transmitting safety messages to vessels within range. Any organization can apply for an AIS ATON for its pipeline or other fixed asset through a U.S. Coast Guard application process and a supporting Federal Communications Commission (FCC) application. Once an AIS ATON is in place, nearby vessels can then be alerted of a specific asset location. The AIS ATON can also be configured to send a safety message to the wheelhouse of the encroaching vessel to warn its captain and crew of a specific threat. This message can be designed so that it is only transmitted when an approaching vessel operates in a way that appears to threaten the asset.

Some pipeline operators are currently monitoring their entire submerged pipeline infrastructure for vessel activity, and proactively investigating threats based on triggered alerts to their pipeline monitoring team. Pipeline companies' proactive monitoring has already resulted in multiple positive communications with vessels detected near a pipeline – situations that, without this monitoring capability, might otherwise have resulted in marine casualties.

As pipeline operators employ these tools and assess traffic volumes, the way they use AIS data continues to evolve. In many cases, these operators have uncovered high-risk pipeline segments that were previously believed to have minimal or no traffic passing over them. Operators are developing risk matrices based on their pipelines' depth of cover and traffic volumes, as well as information about vessel type and draft of the passing vessels across up to five years of historical tracking data. This is greatly improving their risk assessments, enabling them to more effectively target how maintenance funds should be spent and where outreach campaigns should be focused. For instance,

operators are now even able to identify specific vessels or fleet owners for outreach and education if they appear to be consistently operating near their infrastructure.

## Advantages of centralized monitoring

While some operators already have a centralized team monitoring their assets for production and other purposes, in some cases, there is a need to develop a separate team or process to proactively monitor and respond to alerts triggered by vessels that appear to be a threat. Ideally, owners of remotely operated fixed structures should be able to establish a "virtual watch team" to assess threats for multiple remote assets or large areas of subsea infrastructure, anywhere in the world. By centralizing the processing and management of AIS and other remote data sensors to a single location, all assets and infrastructure can be monitored and assessed consistently with the same process and tools used by professionals who are experienced with vessel operations.

Centralized monitoring is particularly valuable for operators of offshore infrastructure. It offers them a number of advantages over monitoring at multiple independent locations. Following are some of the values of a team focused on these specific threats:

- The team's training in standard operating procedures can be more easily applied across multiple assets.
- The center can manage all relevant systems and communications methods to identify threats and to hail encroaching vessels, including monitoring AIS, radar and other data sensors, as well as any third-party sources of AIS, weather, news and related information as applicable per region.
- Effective processes and supporting hardware can be easily measured and assessed, resulting in all assets benefiting quickly from lessons learned and technology/hardware improvements.
- Labor costs can be reduced, as the need for multiple people in various locations is removed and a centralized monitoring team applies its focus and skills toward assessing risk for multiple assets and preventing the reliance on tasking multiple people with another collateral duty that is not their core focus.
- An optimal team comprises professional mariners who can quickly validate if a vessel's actions represent a true threat – greatly reducing the costs associated with prematurely deploying additional resources to assess the situation.
- Some operators may even outsource monitoring, thus relieving operators of the need to invest in the infrastructure and to staff a qualified team.

Today's asset protection solutions can be managed by a shore-based operations center that is staffed and equipped to implement the most effective strategy for combating threats to maritime infrastructure globally. Now, with the advent of AIS-based tools for vessel monitoring, analytics and preemptive alerting, this centralized operation could have at its disposal all the resources required to effectively monitor the safety of the organization's assets and the environments in which they operate.

## Vessel Zone Aggregate Report from Oceaneering PortVision System

Unique number of vessels per vessel zone between 12-01 and 12-31

Vessel Zone	Total Unique Vessels
526A-100_19031578_036181P-5267	888
524C-100_19031297_035242P-5243	799
523Q-100 2000957 034700-524Q-	450
BW509A-100 19040441 WLPI100-3-B	435
BW506A-100-GOM 1904044-GOM WLPI100	172
823X-1300 2001192 04073-823X-	160
823X-300 2000214 041100-813X-	160
507K-100 2000904 031521-507K-	99
<b>December Total</b>	<b>3163</b>

Assessing each pipeline segment to determine actual vessel traffic is relatively new data for pipeline companies and has significantly changed how they assess where funding is spent for risk mitigation and outreach strategies.

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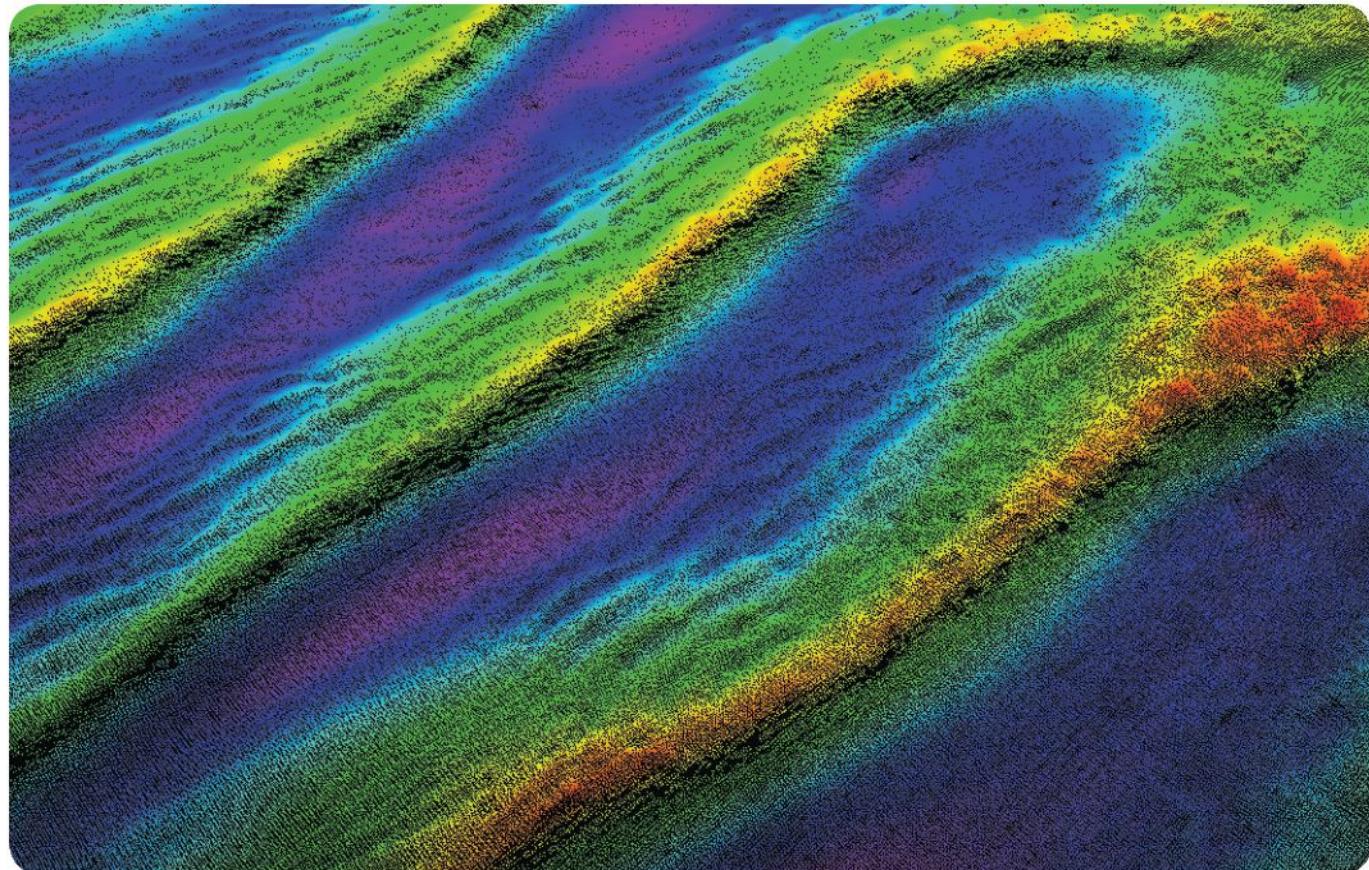
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# OCEAN INDUSTRY

## Moore Foundation supports WHOI effort to revolutionize ocean research



A Slocum glider operating underwater off Sodwana Bay, South Africa.

Photo by Sean Whelan, Woods Hole Oceanographic Institution.

The Gordon and Betty Moore Foundation announce their support for Woods Hole Oceanographic Institution (WHOI) scientists and engineers to explore a new path for ocean research focused on rapid software and hardware innovation. WHOI will explore industry partnerships, agile development practices, and novel engineering approaches over the next 18 months with the \$250,000 award.

Investigators involved in the project will explore new processes for ocean engineering using AUVs as proof of concept. WHOI engineers and researchers will incorporate knowledge and experience gained through partnerships with key organizations in the private sector.

"The technology landscape has changed dramatically in the last decade, and this award will allow us to build the next chapter of technology innovation at WHOI. By lowering the financial and technical costs of entry, we hope to bring new ideas and new capabilities to the ocean community," said Mark Abbott, president and director of WHOI and principal investigator for the project. "Developing an open platform will allow ocean scientists to explore the most pressing questions about our ocean, such as ecosystem health and resilience and the impacts of a changing climate. This will open doors to re-imagine our technology."

Moore Foundation program director Chris Mentzel said he is excited for the possible impact of this award on oceanographic research, commenting, "WHOI is already a leader in the development of high quality technologies for ocean science and their interest in embracing this new modality of innovation demonstrates a strong commitment to the future of technology-enabled research."

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

### Phoenix assists U.S. Navy in recovering VDR from sunken El Faro

Phoenix International Holdings, Inc. (Phoenix), under the operational direction of the U.S. Navy's Office of the Supervisor of Salvage and Diving (SUPSALV), successfully recovered the voyage data recorder (VDR) from the sunken cargo vessel El Faro. Working aboard USNS Apache (T-ATF 172), Phoenix operated the U.S. Navy's ROV CURV-21 during a single 13 hour dive to identify and recover the VDR from a water depth of 15,000 ft. Following the recovery, the VDR was transferred to National Transportation and Safety Board (NTSB) investigators onboard USNS Apache.

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

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### Okeanus acquires Sound Ocean Systems

Okeanus Science & Technology LLC (Okeanus) announced that it has acquired the business assets of Sound Ocean Systems, Inc. (SOSI). This business combination will allow it to offer SOSI's full catalog of equipment and engineering services to Okeanus customers and give the combined company a local presence in the Gulf of Mexico and Pacific Northwest.

Founded in 1978 in Redmond, Washington, SOSI designs and builds highly reliable and cost-effective marine winches, launch and recovery systems, towed vehicles, deck equipment, ocean mining and cable handling equipment, moored ocean observation buoy systems and a variety of engineered solutions for the ocean industry.

Okeanus is a Houma, Louisiana based rental company offering a complete catalog of oceanographic and marine scientific research and survey equipment. SOSI's product line will be integrated into the Okeanus catalog, for rent and for sale, providing customers with local service in both the Gulf of Mexico and Pacific Northwest regions.

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

### Liquid Robotics announces Maritime Robotics as new business and technology partner

Liquid Robotics®, the leader in long-duration, unmanned ocean robots, announced a new business and technology partnership with Maritime Robotics, Norway's leading system integrator of autonomous maritime systems. Joining Liquid Robotics' Open Oceans Partner Program, Maritime Robotics is now an authorized partner to sell Liquid Robotics' Wave Gliders and associated mission and integration services to customers throughout the Nordic countries of Norway, Sweden, Denmark, Finland, and Iceland. The Maritime Robotics partnership brings valuable expertise in creating and delivering high value, sustainable maritime solutions for today's applications of maritime security, fish tracking & monitoring and meteorology and oceanography. Additionally, this partnership will address the emerging commercial applications of wind farming, aquaculture and commercial flight tracking.

One of the first customers from this partnership is Flightradar24, the world's leading flight tracking service. They are currently undergoing sea trials to test ocean-based ADS-B reception with Wave Gliders.

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

## NSRI to support companies to get their technology off the ground

The National Subsea Research Initiative (NSRI) hosted its second annual Developers Day event on 15 September in a bid to further support companies to get their technology to market.

The session featured a series of presentations outlining available resources and the support organisations that can provide assistance with research and development, tax, funding and patenting.

Representatives from HGF Ltd, Johnston Carmichael, Burness Paull, Astrimar, and Simmons & Co also took to the stage to provide insight into the range of patent box schemes, R&D tax relief and collaborative industry agreements aimed at supporting the developer community get their technology off the ground. They also offered advice on how to finance a new venture and secure investor support.

## WOC ensuring industry engagement in major new Law of the Sea amendment

The 2nd Preparatory Committee Meeting (PrepCom2) got underway recently on the U.N. negotiations to expand the Convention on the Law of the Sea (UNCLOS) to include a new legally binding instrument on the conservation and sustainable use of marine life in areas beyond national jurisdiction (BBNJ).

The World Ocean Council (WOC) continues to provide ocean business community presence and input to the BBNJ process. The WOC is working to develop dialogue and inter-

action between the private sector and other stakeholders and to ensure that the BBNJ results will be practical, implementable and constructive ocean business community engagement in the conservation and sustainable use of marine life in international waters.

A full briefing on the BBNJ process and draft binding agreement to the Law of the Sea will be provided to the ocean business community at a special session of the 2016 Sustainable Ocean Summit (SOS), Rotterdam, 30 November to 2 December.

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

## National monument in Hawaii becomes world's largest marine protected area

In the middle of the Pacific Ocean lies the Papahānaumokuākea Marine National Monument. Part of the most remote island archipelago on Earth, the monument is home to more than 7,000 marine species, including coral, fish, seals, turtles, whales, and several shipwrecks, and serves as the final resting place for more than 3,000 sailors and soldiers who served during World War II.

President Obama expanded the monument by 442,781 sq. mi, bringing the total protected area to 582,578 sq. mi and making it the world's largest marine protected area. With this designation, this cultural, historical and ecologically significant marine protected area will be protected and preserved for future generations.

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

**SHARK**  
**SHARK MARINE**  
**TECHNOLOGIES INC.**

*The Barracuda is a new breed of ROV, designed to work in high current. Small, Streamlined, Extremely Powerful and loaded with Advanced Capabilities.*

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- Intelligent Flight with Shark Marine's "DiveLog Software" Provides:
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# COMPANY SPOTLIGHT

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



## TRILOGY

### Emergency medical training that meets and exceeds national standards

Trilogy HSE is a veteran-owned small business that offers emergency medical training, hyperbaric training, and medical personnel support for virtually any situation. Headquartered in Tampa, Florida, Trilogy HSE offers its training programs throughout Florida, across the United States at hosted locations, and internationally by request. Trilogy HSE is actively living its mission of enhancing public safety by delivering nationally accredited medical training programs and courses to the public safety community.

Trilogy HSE's emergency medical training programs not only meet but exceed the national standard curriculum while providing emergency responders valuable, life-saving training. Trilogy HSE provides internationally recognized and accepted certifications from the American Heart Association, National Association of Emergency Medical Technicians, National Board of Diving and Hyperbaric Medical Technology, among others. The training and medical care provided by Trilogy HSE is second to none. Trilogy provides training and certification for all levels of public safety personnel responsible for waterborne and land operations. Certification programs include Emergency Medical Responder, Remote Medical Care/Critical Care Provider, Advanced Cardiac Life Support, Pre Hospital Trauma Life Support, Tactical Combat Casualty Care, Tactical Emergency Casualty Care, Introduction to

Hyperbaric Medicine, and Dive Medical Technician Programs. Training programs are open to fire departments, law enforcement agencies, EMS systems, military, security, and civilian personnel.

The medical directors at Trilogy HSE are a combination of experienced anesthesiologist, hyperbaric medicine, and EMS medical directors. These directors provide Trilogy HSE's clients with 24/7 telemedicine support for training and onsite medical coverage. Trilogy HSE's personnel are experienced paramedics from the military, civilian EMS, and fire service that have been carefully recruited based on their education, experience, and teaching ability.



The numerous training courses offered include real-world scenarios and training, while being grounded in current theory. From basic courses to advanced training, Trilogy HSE teaches skills that will make a difference. A serious workplace injury or death changes lives forever—for families, friends, communities, and coworkers too. Occupational injuries can provoke major crises for the families and businesses in which they occur. The emergency medicine courses from Trilogy HSE can positively affect the chances of your staff getting home safely.

In addition to training, Trilogy provides 24/7 Advanced Life Support (Paramedic) and Hyperbaric Support (DMT) personnel worldwide on short notice. Trilogy HSE's emergency care protocols are progressive and up to date with industry standards. Personnel are available for onshore or offshore assignments and have the support of our on call 24/7 telemedicine department. Physician medical directors are just a phone call away and ready to provide the best telemedicine support available. Trilogy HSE medical support services include clinic/base camp operations, providing aeromedical evacuation support and coordination, staffing emergency physicians, nurses, and HSE/Paramedic/DMT personnel, and 24/7 telemedicine support. Trilogy HSE is your one-call solution for all your emergency medical staffing and training solutions.



## Fugro's new Oceanstar™ manoeuvring system enhances vessel safety

Fugro has introduced a new service to its range of satellite positioning systems. Oceanstar™ is an onboard decision support system that has been developed to improve navigational safety and reduce the operating costs of commercial vessels such as cruise ships, container ships, ferries, ro-ro vessels, bulk carriers and tankers.

The Oceanstar high performance navigation and manoeuvring system enhances navigation integrity, berthing safety and ship energy efficiency management and helps to reduce a vessel's environmental footprint. During berthing manoeuvres it provides essential information including approach speeds, rate of turn and even distances to the berth. In addition to supporting safer berthing, Oceanstar can reduce a cruise ship's berthing process by up to 30 minutes each time, allowing passengers more time ashore.

The new decision support system incorporates approved and 'Wheel Mark' certified functions such as differential GNSS (DGNSS), speed and distance measurement device (SDMD), transmitting heading device (THD) and rate of turn indicator (ROT). The system can be tailored to particular requirements and market environments to ensure a cost effective, fit-for-purpose solution.

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

## ABB's Marine Academy launches Arctic course in response to strong demand

ABB has launched a new arctic course for deck officers in response to strong demand from the ice-going vessel segment. The course has been developed in cooperation with customers and will provide deep understanding of the operational principles of diesel-electric Azipod vessels, taking into account vessel safety, environmental and economical requirements and operational efficiency and maintenance needs when operating in arctic conditions.

The course will build on the company's long history of working with ice class vessels; ABB delivered the first electric propulsion system to an icebreaker in 1939. Azipod propulsion has also gained a strong foothold in the segment and has recently expanded its reach to ice class passenger vessels.

The 5-day course is held in cooperation with Aboa Mare training center in Turku, Finland. Training consists of discussions, lessons and full mission bridge simulator exercises. Topics of the lessons vary from Azipod vessel operation and propulsion system behavior in all conditions to resource management and bridge communication. After the course, the crew will be able to fully utilize the flexibility of the propulsion system, identify potential malfunctions of the propulsion system, and cope with them without sacrificing vessel safety. The new course will complement the portfolio of 35 different courses offered by the Marine Academy.

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

## Kongsberg signs contracts for development of LNG cruise ferry simulator

Kongsberg Digital, the new KONGSBERG software and maritime simulation technology division, has signed contracts with Sweden's Chalmers University of Technology, Kalmar Maritime Academy and Linnaeus University that include development of a state-of-the-art LNG (Dual Fuel) Cruise Ferry simulator model for the K-Sim Engine simulator platform.

The new K-Sim Engine model is scheduled to be delivered in Q1 2017 in order to provide readiness for forthcoming regulations. Handling LNG fuel and other low-flashpoint fuels on ships will become part of maritime training standards in 2017, following IMO's addition of aspects of the International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code), including LNG fuel handling and bunkering, to Standards of Training, Certification and Watch keeping (STCW).

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

## Crowley takes delivery of fourth LNG-ready, product tanker—West Virginia



Crowley Maritime Corp. has taken delivery of MT West Virginia, the fourth new Jones Act product tanker built for the company by Philly Shipyards, Inc. (PSI), the sole operating subsidiary of Philly Shipyards ASA.

The West Virginia is LNG ready, meaning it can be converted for propulsion by liquefied natural gas (LNG), a feature that continues industry-leading innovations and service by Crowley's petroleum services group. West Virginia joins its sister ships, Louisiana, Ohio and Texas, which were received by Crowley in 2015 and 2016 as the first-ever tankers to receive the American Bureau of Shipping's (ABS) LNG-Ready Level 1 approval.

Like its sister ships, West Virginia is 50,000 dead-weight tons (dwt) and capable of carrying 330,000 barrels of product. The new tankers are based on a proven Hyundai Mipo Dockyards (HMD) design that incorporates numerous fuel efficiency features, flexible cargo capability and the latest regulatory requirements. The vessel is 600 ft long and is capable of carrying crude oil or refined petroleum products, as well as various chemical cargoes. Marathon Petroleum Corporation is the charterer.

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

## BMT Nigel Gee designed 24-m Ares 75 Hercules patrol boat completes sea trials

BMT Nigel Gee (BMT), a subsidiary of BMT Group, is pleased to announce successful sea trials for the first of five 24-m patrol boats, built at Ares Shipyard.

BMT has partnered with Ares to design and build 17 patrol boats from advanced composites for the Qatar Coastguard. The order comprises three different vessel sizes: five of 24 m, 10 of 34 m capable of achieving over 30 kts and two of 48-m also capable of over 30 kts.

The recently conducted sea trials for the 24-m ARES 75 HERCULES Patrol Boat have been hailed a success with the vessel achieving over 38 kts in the laden condition. The first 34-m ARES 110 HERCULES Patrol Boat has been launched with sea trials to be completed soon. By December 2016, a total of three boats are scheduled to be delivered.

BMT is responsible for the naval architecture, including hull development and class level design & engineering work on all three sizes of vessel. BMT's team of naval architects and engineers has worked closely with Ares to develop the



designs for the vessels that meet the customer's stringent performance and comfort requirements.

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

#### **US Coast Guard announces TWIC reader final rule**

The U.S. Coast Guard announced the publication of the final rule concerning Transportation Worker Identification Credential (TWIC) reader requirements.

The rule requires owners and operators of certain vessels and facilities regulated by the Coast Guard to conduct

electronic inspections of TWICs as an access control measure. The final rule also implements recordkeeping requirements and security plan amendments that will incorporate these requirements.

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

#### **MSC Shipmanagement chooses RINA software for fleet performance management**

Cyprus-based MSC Shipmanagement has chosen RINA's InfoSHIP Energy Governance (EGO) software for the performance management of its fleet.

MSC has invested in a range of retrofit solutions to reduce the energy consumption and air emissions of its fleet totalling more than 160 containerships. After trialling InfoSHIP EGO on one vessel, it is now being "rolled-out" to 81 vessels and subsequently, the entire fleet.

InfoSHIP EGO is part of the ship management software suite developed by RINA and IB Software & Consulting. InfoSHIP EGO has a number of modules that collect data onboard the ship automatically from navigation and machinery automation sys-

tems. The data can then be analysed for trim optimization, propulsion efficiency, voyage and fuel management, overall energy management and decision management. As the software can be customized to the particular operator's needs, it can easily be set-up to provide all the data needed to meet the requirements of the EU Monitoring, Reporting and Verification (MRV) scheme.

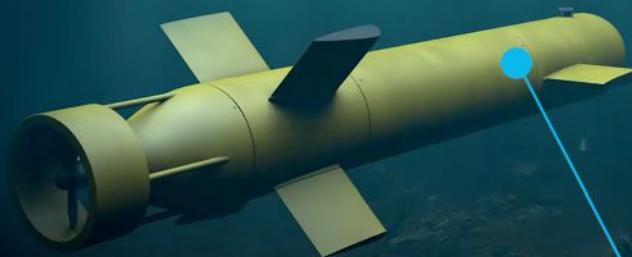
For more information, visit [www.rina.org](http://www.rina.org).

#### **World's first ballast water port solution completes tests**

Damen Green Solutions is proud to announce that the InvaSave technology has completed shipboard testing onboard the Henrike Schepers. During the shipboard tests, ballast water was taken in untreated and the efficacy of the technology was validated upon discharge. These tests have shown that the InvaSave is capable of providing an IMO-type approved backup in a port in the event of a failure in a vessel's on board treatment systems to uptake or discharge ballast water.

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

## **Now an INS for all AUV types**



**Phins C3, C5, C7**

The iXblue's Phins Compact Family has been designed to offer the AUV industry players the ability to choose an inertial navigation system adapted to their vehicle, whatever their size and mission, from accurate navigation to survey grade. Based on iXblue's unique Fiber-Optic Gyroscope Technology, Phins C3, C5 & C7 are fully scalable systems that guarantee high accuracy, unrivalled reliability and proved robustness.

**iXblue**

**Ocean observing system for aquaculture**

By: Phil Cruver, Catalina Sea Ranch, Tony White, NOMAD Engineer, Rustom Jehangir, Blue Robotics

Imagine taking the pulse of a remote area of the ocean in real time to understand trends, anticipate problems, and devise mitigation measures for immediate corrective actions. Imagine if ocean technology pioneers had a platform to rapidly prove new marine technologies in the field. Six miles off the coast of Southern California, this is a reality.

Catalina Sea Ranch LLC, the developer of the first offshore aquaculture facility in U.S. federally regulated waters, has developed a 4G LTE internet connected NOMAD buoy that enables remote, real-time monitoring of the sea surrounding their offshore aquaculture operations. This innovative Ocean Internet of Things™ platform provides access to all collected data, which is transmitted to the cloud in real time. An open hardware architecture and open-source software background makes it easy to integrate and test a wide variety of sensors and network equipment. NOAA provided the NOMAD for use in this capacity to advance offshore aquaculture in an environmentally sustainable and socially responsible manner.

Onsite testing of a NOMAD buoy began in July 2016, with wireless data collection and transmission to the internet via the Verizon cellular network. In its initial configuration, the NOMAD has sensors for ocean temperature, salinity, dissolved oxygen, system health sensors, and a camera that frequently transmits a live photo of the buoy and its surroundings.

Collaborators with this innovative venture include Dr. Kristen Davis at the University California Irvine who provided a Seabird MicroCAT sensor for initial use establishing a site baseline. An acoustic tracking sensor, provided by Dr. Chris Lowe at California State University Long Beach, identifies nearby white sharks that have been tagged with acoustic transmitters by his Shark Lab. Atmospheric data including wind direction, speed, temperature, and humidity are also being transmitted thanks to Dr. Jason Hallstrom at Florida Atlantic University, who provided a MOTE meteorological station for the NOMAD.

This monitoring capability will benefit more than just advancing aquaculture. It is also an ideal platform to test and validate emerging technologies in real-time, from environmental corrosion to the impact of equipment on marine life. The knowledge derived from this data is critical for other efforts, such as the development of marine hydrokinetic energy (MHK) sites in coastal ocean waters. MHK monitoring capabilities will allow for rapid technology transition from the lab to the sea. It would provide conditions conducive to early-stage technologies with constant monitoring and on-location connectivity for revealing any impacts. Technologies identified for real-time MHK monitoring and evaluation from the NOMAD includes oceanographic sensors, subsea vehicles and equipment, acoustic systems for communication and animal tracking, and robotics and automation systems.

Catalina Sea Ranch is working closely with another Southern California company, Blue Robotics, to test marine equipment from the NOMAD, including sensors and its new product, the BlueROV2 vehicle. "When working on new technology, testing is critical," says Rustom Jehangir, founder of Blue Robotics. According to him, the NOMAD "has already provided us with a number of opportunities to test our sensor and vehicle systems in the harsh ocean environment. We intend to have a vehicle permanently installed on the NOMAD for remote inspection work."

Catalina Sea Ranch contracted Tony White as the lead engineer to develop the hardware infrastructure and the software architecture of the NOMAD in collaboration with Blue Robotics. The software developed for the project is open-source and freely available in an effort to foster dynamic growth for this and other offshore monitoring platforms.

According to Phil Cruver, CEO of Catalina Sea Ranch: "Real time analysis of data collected will allow us to model expansion with massive amounts of data for optimizing our ranch's productivity and to minimize environmental impact. This will provide solid scientific data that will eventually lead to sound regulations for offshore aquaculture."

**Autonomous boat to monitor ocean noise**

A pioneering project to find out how increasing levels of man-made noise in the sea are affecting marine life has begun in Plymouth.

Plymouth University Marine Institute scientists are working with AutoNaut and its 5-m unique wave-propelled unmanned surface vessel (USV), which tows a Seiche Ltd passive acoustic monitoring (PAM) array.

This cutting edge technology enables the gathering of essential underwater sound data that is both high quality and cost effective.

Dr. Clare Embling and Dr. Simon Ingram, both lecturers within the School of Marine Science and Engineering and experts in marine mammal biology and bio-acoustics, are the academic leads in the project.

"Human noise in the sea is of growing environmental concern due to its potential negative impacts on marine life," Clare said. "Increasing levels of shipping and marine development raise noise levels in the sea and can make it more difficult for animals to communicate, and can displace animals from important feeding or nursing grounds and sometimes even cause physical injury."

"Yet, we know very little about the noise levels in our seas," added Simon. "The AutoNaut is a quiet autonomous platform that allows us to monitor noise levels as well as the sounds produced by marine life, such as the whistles and clicks of dolphins and porpoises over very large areas and long periods of time. This information will be invaluable for assessing how marine noise affects marine life."

Two days of initial trials of the autonomous concept were completed successfully in July, led by the companies, who both have bases in Devon. "Our new 5-m AutoNaut towed the array quite comfortably in light conditions," said Mike Poole, director of AutoNaut Ltd which manufactures the storm-proven autonomous boat. "Speed was reduced by drag, as you would expect, but steering and performance were not affected. We piloted AutoNaut remotely from our Chichester base and the AutoNaut can readily stay at sea for months while being piloted from the shore."

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

## Microplastics discovered in the deep, open ocean

A unique study by scientists at the National Oceanography Centre (NOC) will provide valuable new insights into the concentrations of microplastics in the open ocean from surface to the seabed.

Professor Richard Lampitt and Dr. Katsia Pabortsava, who lead microplastic research at NOC, said “There is considerable uncertainty about the concentration and characteristics of the many different types of microplastics and how these factors change over time and space. Our work in the vast open ocean spaces, hundreds of miles from land, is a crucial part of this assessment. The deep sea is considered one of the major sinks of microplastic debris and so we intend to focus part of our research in this area. The deep sea also has a huge diversity of marine life, yet we do not know how much plastic is in this part of the ocean or how it may enter food chains or affect marine life there.”

Preliminary findings already show microplastic presence in the top 1,000 m of the water column at the Porcupine Abyssal Plain sustained ocean observatory in the North Atlantic. NOC scientists will soon analyse samples from

3,000 m depth collected at this site for the past 20 years using sediment traps— instruments analogous to rain gauges. They will also analyse unique samples from sediment traps stationed in the central North and South Atlantic subtropical gyres, which are giant swirls in the ocean where microplastics tend to accumulate.

Between September and November, scientists from NOC will embark on a voyage from the UK to the Falkland Islands to measure microplastic concentrations and characteristics in the top 300 m of ocean, across the entire Atlantic. These findings will then be used to run ocean models to predict where large accumulations of plastics may end up and how that would impact the health of marine ecosystems and humans.

Microplastics research at NOC is currently conducted within the EU-funded Horizon 2020 AtlantOS programme, which provides the capabilities and facilities of the observing systems in the Atlantic Ocean to answer some of the fundamental questions regarding nature, significance and impact of micro-plastic pollution in the open ocean.

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

## Sealite Buoys selected for fish-aggregating devices to help fight poverty in Somalia

Sealite has supplied 25, 2.6-m Atlantic Ocean buoys to the Food and Agriculture Organization of the United Nations (FAO). The FAO has started deploying the fish-aggregating devices (FADs) to artisanal fisherman in Somalia coastal communities to help provide income, food and nutrition.

The FADs use the Sealite 2.6-m Atlantic Ocean buoy that's attached to a floating mat; marine plants rapidly grow under these mats attracting a large number of fish to the east coast waters where the devices have been strategically placed.

These FADs are anchored to the seafloor, which will provide an abundant source of high-value ocean fish species to the artisanal fisherman; without these devices the residents of these coastal fishing communities would be denied access to these fish species.

“These FADs will help achieve the FAO’s objectives of eliminating hunger, food insecurity and malnutrition,” said Chris Procter, CEO, Sealite. “It’s great to be a part of this initiative.”

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

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MONITORING  
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## Department of Interior announces lease sale offshore North Carolina

U.S. Secretary of the Interior Sally Jewell and Bureau of Ocean Energy Management (BOEM) Director Abigail Ross Hopper announced a proposed lease sale for 122,405 acres offshore North Carolina for commercial wind energy leasing.

The proposed lease is for the Kitty Hawk Wind Energy Area, which BOEM identified in consultation with members of its North Carolina Intergovernmental Renewable Energy Task Force. The task force includes membership from federal, state, tribal, and local government partners. In addition, BOEM considered information gathered through outreach with stakeholders.

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

## BOEM announces major advance in developing wind energy offshore California

BOEM announced a major step forward in supporting wind energy development in federal waters offshore California. The Department is issuing a Request for Interest in a lease area requested by Trident Winds, LLC for its proposed 765-MW floating wind energy project.

In consultation with the State of California, BOEM has determined Trident Winds LLC is qualified to hold an Outer Continental Shelf lease and now must determine whether it is appropriate to issue the company a lease on a non-competitive basis or whether a competitive process is required. The proposed project would consist of 100 floating foundations, each supporting a wind turbine generating 7 to 8 MW of energy. A single transmission cable would bring the electricity to shore. The proposed lease area, about 33 nmi northwest of Morro Bay, covers 67,963 acres of federal lands in water depths of 2,600 to 3,300 ft.

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

## Nordergründe offshore wind farm erects first turbine

Work on the site of the Nordergründe 111-MW offshore wind farm is progressing well. After the successful assembly of all 18 foundation structures, conversion of the installation ship, the MPI Enterprise, for erecting the wind turbines in the Weser estuary began at the beginning of August. The first Senvion turbine of type 6.2M126 was successfully installed on 16 August.

Funding for the project was concluded in June 2015 with the participation of the European Investment Bank and KfW IPEX. Besides wpd and John Laing, the Gothaer insurance group has also been acting as an equity provider since the end of last year.

Nordergründe is a unique project. It is the first German offshore project for which all the major work is being supplied and installed exclusively by manufacturers based in Germany and producing in the northwest region of the country. As well as Senvion (turbines), the companies involved are Ambau (foundations), BVT (transformer substation), NSW (internal cabling) and Bilfinger (installation).

The Nordergründe wind farm is being built in water up to 10 m in depth within the 12 mi zone of the German North Sea. It is located 15 km northeast of the island of Wangerooge.

For more information, visit [www.wpd.de](http://www.wpd.de).



## Siemens successfully installs offshore grid connection



Copyright: Statoil.

Siemens is supporting a sustainable future as over 410,000 British homes will be powered by renewable energy when the Dudgeon offshore wind farm is fully developed in 2017. The crucial grid connection, which enables the energy generated by the wind turbines to be transported to shore, has reached another milestone as the topside to the substation sails from Sembmarine SLP in Lowestoft to be installed on site 32 km north of Cromer off the coast of Norfolk.

The offshore 1,500-ton steel substation jacket was designed and fabricated at Sembmarine SLP in Lowestoft and is fitted with suction bucket technology—a first for any UK substation project.

The completed structure took 2 days to install in the seabed safely and on schedule in early June 2016 and achieved a hard to come by 0.01 degrees vertical position in the water. The structure is serving its purpose in the North Sea as a support mechanism for the topside.

The design and construction of the Dudgeon topside was also completed by Sembmarine SLP, including the installation of internal services on behalf of STDL, which commenced in August 2015 and all primary equipment was delivered and installed within a 6 week period from October 2015. The plant comprises two 200 MVA 132/33 kV power transformers, two 132 kV GIS (8DN8) and two boards of nine 33 kV GIS (8DA10), as well as numerous secondary equipment including LVAC, LVDC, UPS, control & protection and a back-up diesel generator.

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

## James Fisher, OMS to serve offshore renewables industry

James Fisher Marine Services (JFMS), part of James Fisher and Sons plc, has announced the signing of an exclusive cooperation agreement with Oil Management and Services GmbH (OMS).

The combined and complementary expertise of JFMS and OMS will offer significant benefits to customers in the European offshore renewables industry, with the delivery of full oil lifecycle services, including gearbox and hydraulic oil change, enhancing the safety and performance of offshore wind turbines.

OMS is one of the leading companies providing oil change services for wind turbines, demonstrating significant experience and expertise in oil management services. OMS

was set up to provide holistic solutions for the monitoring, management and treatment of lubricants. The company has also developed oil change handling equipment for both on and offshore operations, as well as high performance pumps and filtration components.

The cooperation agreement will provide a customer-focused oil management service, delivering efficiency, reliability, low maintenance costs and reduced downtime for offshore wind turbines, supporting the European offshore renewables industry cost reduction initiative to reduce the cost of megawatt per hour for offshore wind.

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

### Vattenfall to build Norfolk Vanguard offshore wind farm

Vattenfall has started development of the 1.8 GW Norfolk Vanguard offshore wind farm. The project will provide 1.3 million UK households with renewable electricity.

Norfolk Vanguard off the coast in eastern England may have up to 225 turbines and will, if realized, become Vattenfall's largest offshore wind farm by far. It will be able to produce roughly 7.8 TWh of electricity annually, which will meet the annual needs of more than 1.3 million UK households.

The development of the 1.8 GW wind farm has now started and a project team is in place managed by Ruari Lean. "We are aiming at having an irrevocable consent for the wind farm by February 2020, but we'll have to pass some major milestones along the way," he said and explains that a planning application via the Planning Inspectorate's nationally significant infrastructure projects scheme is due to be submitted in 2018.

Lean states that if all processes run as smoothly as expected and a final investment decision is taken, offshore works can start in the early 2020s. "One of the main challenges for the project team is to ensure the project's LEC (levelized electricity cost) remains lower than our competitor's projects. The development strategy hinges around low LEC. Other immediate challenges include making sure we deliver the 2016 program to set the project up for the planning application submission milestone in June 2018."

Next year Vattenfall will also commence development of nearby Norfolk Boreas with a capacity of another 1.8GW. The company is aiming at having an irrevocable consent for Boreas by 2021.

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

### Nova Scotia attracts international tidal energy players

Minas Energy has entered into a partnership with International Marine Energy Inc (IME) and Tocardo International BV, using Tocardo's tidal turbines. The new collaboration, Minas Tidal Limited Partnership (MTLP), intends to test Netherland-based Tocardo technology at the Fundy Ocean Resource Centre for Energy (FORCE) in the Minas Passage. In-water testing is anticipated in late 2017.

Minas Energy's leasehold rights to the berth site at FORCE, along with a 4 MW power purchase agreement (awarded in December 2014) will be transferred to Minas Tidal, the new Nova Scotia-based development entity.

The selected Tocardo technology consists of four, 250 KW T2 bi-directional open rotor turbine generators, which will be attaching to Tocardo's patented semi-submersible Universal Floating Platform Structure (UFS). The platforms are held in place by catenary mooring systems. Each turbine can generate up to one megawatt of power, for a combined output of four megawatts, comprising the total berth allotment.

For over a decade Tocardo has been developing and deploying its tidal turbines in rivers and ocean environments.

Minas Energy was awarded a berth at the FORCE site in 2009 by the Nova Scotia Department of Energy. Under this new arrangement, Minas Energy will continue its prominent role in establishing a new marine renewable energy industry in Nova Scotia.

For more information, visit [www.fundyforce.ca](http://www.fundyforce.ca).

### Energy Department awards funding for wave and tidal energy projects

The U.S. Energy Department announced 10 organizations selected to receive more than \$20 million in funding for new research, development, and demonstration projects that advance and monitor marine and hydrokinetic (MHK) energy systems, which generate electricity from ocean waves and tidal currents. These projects will aim to improve the performance of MHK systems and advance environmental monitoring technologies that will help protect wildlife and reduce uncertainty regarding potential environmental impacts.

The projects announced will contribute to the development of a commercially viable MHK industry and further America's progress in proving wave and tidal energy as viable sources for our nation's clean energy future.

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

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- Extensive range of accessories
- Self-sealing purge system



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

**Major MCM contract awarded to Teledyne RESON**

Teledyne RESON A/S has been awarded a double-digit million Euro contract by Lockheed Martin Global Inc. for the delivery of multiple SONAR systems for Mine Counter Measure applications for an international defense program.

The award includes delivery of the new SeaBat 7123-MkII, which is an advanced dual-use, high-resolution SONAR suitable for both commercial and military applications. Commercial applications include underwater inspection related tasks, long range detection of objects in the water column and scientific research. Military uses include use as a component in Mine Counter Measure (MCM) for detection of mine like objects. The system operates at three different frequencies to provide optimum flexibility and can be mounted on most platforms, including AUVs, ROVs and surface vessels.

"We are excited about another opportunity to deliver our unique 7123-MkII forward looking sonar into a large defense program," says Ole Søe-Pedersen, VP & general manager of Teledyne RESON, Odom and BlueView.

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

**FarSounder introduces 3D navigation systems through the U.S. Navy in support of Foreign Military Sales**

FarSounder, Inc. has been awarded a contract to provide FarSounder-1000 systems for two U.S. Navy transferred OSPREY Class Mine Hunter Coastal (MHC) Vessels. The systems were sold by FarSounder's dealer Voyager Maritime Alliance Group of Ft. Lauderdale, Florida via their customer, VSE Corporation. VSE's delivery order is under a Foreign Military Sales (FMS) contract through the Naval Sea Systems Command (NAVSEA) International Fleet Support Program.

"This contract award demonstrates the strategic benefits of deploying FarSounder's commercially developed 3D navigation and obstacle avoidance systems," said Cheryl M. Zimmerman, CEO of FarSounder. "They are advanced, cost-effective products for not only commercial vessels, but also for global defense and border control operations."

The FarSounder-1000 3D Forward Looking Sonar system offers users safe navigation by providing realtime navigation information ahead of the vessel operating at full range even in shallow water. The user is able to make fast, accurate navigation decisions with a quick view of the intuitive FarSounder display software running on the marinized bridge computer.

Voyager Maritime Alliance Group is an active FarSounder dealer with years of systems integration experience. With their global capability, their team is available to set-up and commission FarSounder's state-of-the-art systems.

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

**Northrop Grumman to demonstrate remote mine hunting capability**

Northrop Grumman Corporation will be participating in the Royal Navy's Unmanned Warrior exercise where it will demonstrate its unmanned mine hunting capability.

The unmanned mine hunting element of Unmanned Warrior will feature Northrop Grumman's AQS-24B towed mine hunting sensor operated from an Atlas Elektronik UK ARCMS Unmanned Surface Vessel (USV). The AQS-24B, which is a towed mine hunting sensor used by the U.S. Navy, features the world's only high speed synthetic aperture sonar for mine detection, localization and classification, and an optical laser line scan sensor for mine identification. The ARCMS USV is a surface craft 11 m long that will be operated via remote control while towing the AQS-24B through a simulated mine field.

Unmanned Warrior, which takes place at Ministry of Defence (MoD) exercise areas in Scotland and the Western Isles, is part of the biannual Joint Warrior exercise, and is the largest capability demonstration event of its kind. It will feature more than 40 unmanned vehicles, sensors and systems demonstrating, in a challenging environment, key military missions for the Royal Navy in a series of themed activities including mine-hunting, sea surveying, submarine simulation and fleet reconnaissance. The exercise will help inform the Royal Navy's future capability planning and demonstrate how the systems being showcased deliver maritime situational awareness.

**Bollinger delivers the USCGC Rollin Fritch**

Bollinger Shipyards has delivered the USCGC Rollin Fritch, the 19th Fast Response Cutter (FRC) to the United States Coast Guard.

Ben Bordelon, Bollinger president & CEO said, "We are very pleased to announce the delivery of the USCGC Rollin Fritch to the U.S. Coast Guard, the latest FRC built by Bollinger Shipyards and the first to be stationed in the 5th Coast Guard District at Cape May, New Jersey. This vessel represents over 30 years of continuous improvement as we have built the Coast Guard's entire patrol boat/patrol cutter fleet. We are very proud of the fact that the FRCs already in commission have seized multiple tons of narcotics, interdicted thousands of illegal aliens and saved many lives."

The 154 ft patrol craft is the 19th vessel in the Coast Guard's Sentinel-class FRC program. All previous cutters have been stationed in the 7th Coast Guard District in Florida or San Juan, Puerto Rico. The decision to homeport the Rollin Fritch in Cape May, NJ is significant because it expands the footprint of FRC operations beyond the Bahamas and the Caribbean. Eventually FRCs will be stationed in virtually every coastal state.

To build the FRC, Bollinger used a proven, in-service parent craft design based on the Damen Stan Patrol Boat 4708. It has a flank speed of 28 kts, state-of-the-art command, control, communications and computer technology, and a stern launch system for the vessel's 26 ft cutter boat.

The Coast Guard took delivery on the 23rd of August, 2016 in Key West, Florida, and is scheduled to commission the vessel in Cape May during the month of November.

Each FRC is named for an enlisted Coast Guard hero who distinguished him or herself in the line of duty. This vessel is named after Coast Guard Hero Rollin Fritch, who was posthumously awarded the Silver Star for his heroic efforts in defending the USS Callaway during Japanese kamikaze attacks in the Philippine Islands in 1945.

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

**Tidal Thames trials for UK's MAST USV**

The UK's Maritime Autonomy Surface Testbed (MAST), a USV based on the innovative Bladerunner hull shape, has undergone trials in the Tidal Thames.

MAST is being developed by Portchester-based ASV Ltd, under research funding from the Defence Science and Technology Laboratory (Dstl), providing a testbed to host a range of new technologies that allows the Ministry of Defence to test and evolve tactics for employing maritime autonomous systems.

The 32 ft MAST is one of over 40 autonomous systems taking part in Unmanned Warrior 2016 this autumn, off West Wales and northwest Scotland and the Western Isles.

In conjunction with industry and international partners, the Royal Navy has created an exciting opportunity for engineers and scientists to demonstrate state-of-the-art technology during Unmanned Warrior, the biggest event of its kind, and explore the ideas that will help shape the future of Naval Warfare for decades to come.

It is linked with the regular Joint Warrior fleet exercise and aims to test systems in an operational environment.

MAST is a unique UK designed and built craft capable of reaching high speeds on which high speed autonomy can be investigated. Various levels of autonomy include basic remote control up to autonomous navigation.

The craft is designed to operate autonomously in an unmanned mode, sensing other vessels in the immediate vicinity and avoiding them in a safe manner. The avoidance algorithms are designed to comply with internationally mandated collision regulations. When operating on a busy waterway (such as

the Thames), the craft is operated with a coxswain on board ready to take control.

It does not carry weapons, but is designed to explore autonomous capabilities and support non-lethal surveillance and reconnaissance roles.

For more information, visit [www.royalnavy.mod.uk](http://www.royalnavy.mod.uk).

### **Ingalls Shipbuilding awarded contract for a Ninth NSC**

Huntington Ingalls Industries' Ingalls Shipbuilding division received an \$88.2 million fixed-price contract from the U.S. Coast Guard to purchase long-lead materials for a ninth National Security Cutter (NSC).

The advance procurement funds will be used to purchase major items for NSC 9, such as steel, the main propulsion systems, generators, electrical switchboards and major castings.

Ingalls has delivered the first five NSCs, the flagship of the Coast Guard's cutter fleet, designed to replace the 12 Hamilton-class High-Endurance Cutters, which entered service during the 1960s. Ingalls' sixth NSC, Munro (WMSL 755), is scheduled for acceptance sea trials and delivery in the fourth quarter of 2016. The seventh

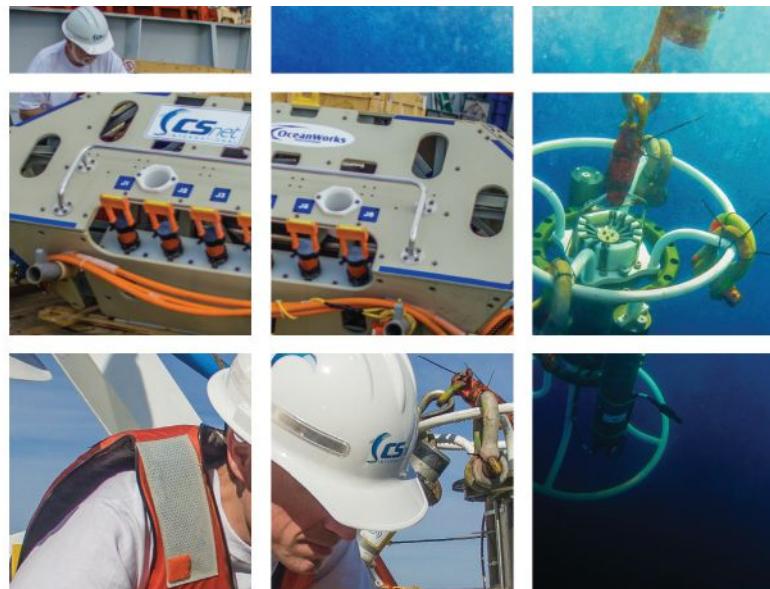


ship, Kimball (WMSL 756), is scheduled to launch in the fourth quarter, and the keel for the eighth, NSC Midgett (WMSL 757), is scheduled to be laid later this year.

NSCs are 418 ft long with a 54-ft beam and displace 4,500 tons with a full load. They have a top speed of 28 kts, a range of 12,000 mi, an endurance of 60 days and a crew of 120.

The Legend-class NSC is capable of meeting all maritime security mission needs required of the High-Endurance Cutter. The cutter includes an aft launch and recovery area for two rigid hull inflatable boats and a flight deck to accommodate a range of manned and unmanned rotary wing aircraft. It is the largest and most technologically advanced class of cutter in the U.S. Coast Guard, with robust capabilities for maritime homeland security, law

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enforcement, marine safety, environmental protection and national defense missions. This class of cutters plays an important role in enhancing the Coast Guard's operational readiness, capacity and effectiveness at a time when the demand for their services has never been greater.

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

### **BAE Systems signs Future Frigate design contract with Australian Government**

BAE Systems has signed a contract with the Commonwealth Government to further refine its design of the Type 26 Global Combat Ship (GCS) for the Royal Australian Navy under the SEA 5000 (Future Frigate) program.

BAE Systems Australia chief executive, Glynn Phillips, said, "We look forward to demonstrating the adaptability and maturity of the Global Combat Ship design to meet Australia's requirements for an anti-submarine warship frigate. The Global Combat Ship design is the most modern, adaptable and flexible of all possible options available today, and I am confident that we will be able to demonstrate that it is the best able to meet the requirements of the Royal Australian Navy."

In coming months, a team of BAE Systems' Australian engineers will be deployed to the UK to join the Company's established design team. Being embedded into one of the most advanced warship building teams in the world will allow these engineers to acquire the skills and knowledge required to effectively transfer the technology to Australia.

BAE Systems is using the latest in modern digital planning capability to refine and tailor its designs to the commonwealth of Australia's requirements. To assist this process, the Company has revealed that, a 3D visualization suite will be delivered to Australia to help improve understanding of the unique features of the ship design. This will enable conversations about design modifications the Royal Australian Navy requires and will help demonstrate how the Global Combat Ship could accommodate the required CEA Technologies' phased-array radar system.

This is part of the Australian Department of Defence's Competitive Evaluation Process for the program. The Commonwealth has also entered into similar agreements with Fincantieri and Navantia.

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

### **HII awarded design work for new LX(R)**

Huntington Ingalls Industries (HII) announced that its Ingalls Shipbuilding division has been awarded a \$13.7 million contract (with incremental funding) to perform contract design effort for the U.S. Navy's amphibious warfare ship replacement, known as LX(R).

The U.S. Navy's LX(R) amphibious warship class will replace the Harpers Ferry- and Whidbey Island-class dock landing ships and will use the same hull as the San Antonio (LPD 17) class.

Ingalls was selected to perform the majority of the contract design work for LX(R). The Department of Defense made the announcement at the same time Ingalls was awarded a contract to build the next large-deck amphibious assault warship, LHA 8.

Ingalls has delivered 10 of the LPD 17 ships to the Navy, is currently building the 11th, Portland (LPD 27), and has received more than \$258 million in advance procurement funding for the 12th, Fort Lauderdale (LPD 28).

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

### **Austal USA celebrates christening of USNS Yuma**

Austal Limited announced the christening of Expeditionary Fast Transport vessel USNS Yuma (T-EPF-8) at a ceremony held at Austal USA's Mobile, Alabama shipyard on 20 August 2016.

Ship sponsor Mrs. Janet Napolitano, former Governor of Arizona and current president of the University of California, joined distinguished guests from the U.S. Navy, state and local government, Austal USA management and employees for the christening ceremony, held beneath the hull of the ship in the final assembly bay.

USNS Yuma is the eighth of 10 Expeditionary Fast Transport vessels (EPF) that Austal USA is delivering under a contract with the U.S. Navy valued in excess of US\$1.6 billion.

EPF 8, a 103-m, shallow draft all-aluminum catamaran, is a multi-mission, non-combatant transport vessel characterized by its high volume, high speed, and flexibility. It is the fourth U.S. Navy ship to be named Yuma as a tribute to the residents of the Arizona city and their close ties with the military.

USNS Yuma will ultimately join her sister EPFs that have been delivered over the last 3 years, including USNS Spearhead (T-EPF-1), which has logged over 100,000 nautical miles at sea and is currently on her fifth deployment since she was delivered in 2012.

Three more EPF's and seven Independence variant Littoral Combat Ships (LCS) are currently under construction at Austal USA.

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

### **New test range operations center will speed U.S. naval aviation systems to the fleet**

Representatives from Naval Air Warfare Center Aircraft Division (NAWCAD), Naval Air Station (NAS) Patuxent River and construction contractor G-W Management Services officially broke ground on a new operations center for NAWCAD's Atlantic Test Ranges (ATR) on 24 August.

The project will enhance ATR's ability to support simultaneous test operations for current and future naval aviation programs, including unmanned systems and live, virtual, constructive battlespace environments.

The 17,000-sq. ft addition to the existing ATR facilities at NAS Patuxent River will include secure, multipurpose mission test cells built to support current and future flight test programs such as the MQ-25A Stingray, Next-Generation Jammer, Next-Generation Air Dominance platform(s), and the Unmanned Aircraft Common Control Station, along with system-of-systems interoperability efforts.

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

### **Newport News Shipbuilding awarded modernization contract for USS Harry S. Truman**

Huntington Ingalls Industries announced that its Newport News Shipbuilding division has received a \$52 million contract from the U.S. Navy for nuclear propulsion and complex modernization work on the aircraft carrier USS Harry S. Truman (CVN 75) as part of its planned incremental availability.

The contract covers planning, material procurement, prefabrication, manpower, support services, design integration, engineering and management support, and technical data. Work will be performed at Norfolk Naval Shipyard and is expected to be completed by September 2017.

USS Harry S. Truman (CVN 75), named after the 33rd president of the U.S., is the eighth Nimitz-class aircraft carrier. The ship was launched in September 1996 by Newport News and is homeported at Naval Station Norfolk. She displaces 103,900 tons, is 1,092 ft long and can reach speeds of greater than 30 kts.

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

## **QinetiQ to integrate unmanned air, sea and subsea vehicles under Dstl contract**

QinetiQ will provide the UK component of a multinational demonstration of unmanned and autonomous systems under a new contract with the Defence Science and Technology Laboratory (Dstl).

The demonstration, dubbed Hell Bay 4, will see a variety of unmanned underwater, surface and air vehicles working co-operatively within a number of squads, autonomously undertaking mine countermeasures missions.

QinetiQ will lead a team that includes Seabyte, Blue Bear Systems Research and ASV in the exercise, which involves participants from the U.S., Canada and Australia.

Hell Bay 4 will be delivered under the Maritime Autonomy Framework (MAF), a Dstl-led initiative and development program that has enabled the UK to participate in a number of regular multinational demonstrations and trials. Phase one of the Framework established software and architecture to test Unmanned Underwater Vehicles (UUV), with Phase Two seeing the inte-

gration of an Unmanned Surface Vehicle (USV) into a cooperative squad.

QinetiQ is contracted to deliver the third phase of the MAF, in which an Unmanned Aerial Vehicle (UAV) will be introduced into the squad to provide situational awareness and communications relay to vehicles on and under the water. It will bring together underwater vehicles operated by the Royal Navy's autonomous systems trials team, an unmanned C-Worker 5 surface vehicle provided by ASV and the Blue Bear Blackstart UAV.

The contract win is the fifth in a year for the QinetiQ Maritime Autonomy Centre (QMAC), established in 2013 to accelerate the UK's adoption of autonomous systems by facilitating their design, development, testing and evaluation.

Hell Bay 4 will take place in Scotland in October as part of Unmanned Warrior, the Royal Navy's showcase event demonstrating the potential of unmanned and autonomous systems. Unmanned Warrior involves over 40 different organizations and 50 vehicles undertaking challenging military missions in a demanding environment. QinetiQ is leading the Command

and Control component of Unmanned Warrior and playing a key role in enabling the overall program.

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

## **Huntington Ingalls completes submarine post-shakedown availability**

Huntington Ingalls Industries announced that its Newport News Shipbuilding division has completed post-shakedown availability (PSA) work on the submarine USS John Warner (SSN 785). It was the shipyard's first PSA of a Virginia-class submarine and the first accomplished without having to put the boat into a dry dock for external hull work. The submarine was redelivered to the U.S. Navy on August 31.

The PSA included combat systems and electronics upgrades, hydraulic plant acoustic improvements, and general maintenance on the submarine. One challenge of the waterborne PSA was touch-up painting on the hull. Two dive teams used a coating process that allowed the surface preparation and coating to safely take place underwater.

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

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# A Worldwide Survey of Recent Ocean Observatory Activities: 2016 Update

## Part 2 – Asia and Oceania

Contributed by the Ocean Observing Systems Committee, MTS

This eighth annual update highlights new and existing ocean observing activities around the world. Thank you to all the contributors who are helping to raise awareness of the importance of these systems.

### ASIA

#### DONET – Japan

DONET is a seafloor surveillance infrastructure of earthquake and tsunami monitoring in Japan. A development program has started in 2006 and has been completed in March 2016. Two backbone cable systems, 12 science nodes and 51 observatories were deployed on the seafloor in the program and the system is working perfectly at present as shown in Figure 1. The Japan Agency for Marine-earth Science and Technology (JAMSTEC) led the development and operation of DONET thus far; however, the operation of DONET has been transferred to the National Research Institute for Earth Science and Disaster Prevention (NIED) since April 2016. The distribution of earthquake and tsunami (pressure) data is handled by NIED through the following website: <http://www.hinet.bosai.go.jp/?LANG=en>.

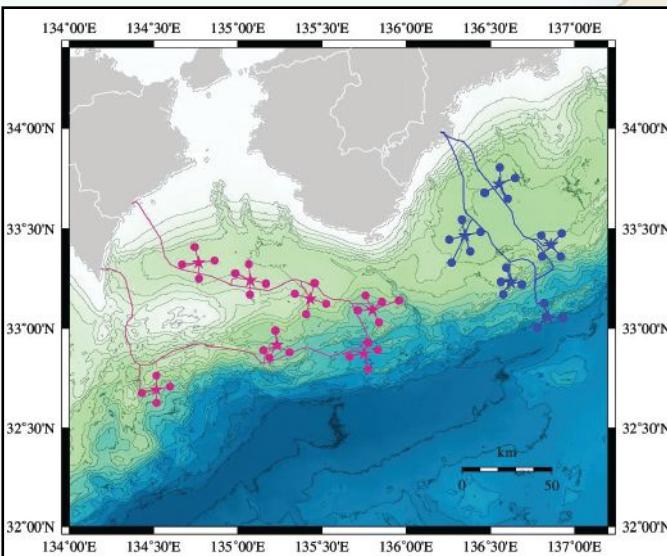


Figure 1. Present situation of DONET, depicted on February 2016.

#### Real-GEMS – Japan

A new 5-year project, Next-Generation Technology for Ocean Resource Exploration, has been launched since 2014 as a project of Cross-ministerial Strategic Innovation Promotion Program (SIP), Japan. This project is composed of three subjects including the development of a new cabled seafloor observatory system named “Real-Time Geoscientific Environmental Seafloor Monitoring System (Real-GEMS).”

Real-GEMS is a platform to allow the verification and evaluation of long-term monitoring methods for environmental impact assessment making use of state-of-the-art technologies for sub-seafloor structure monitoring, marine ecosystem monitoring, and in-situ chemical component analysis, etc.

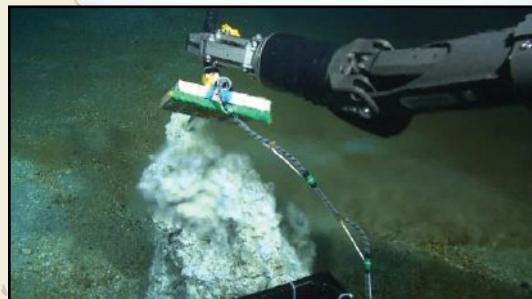


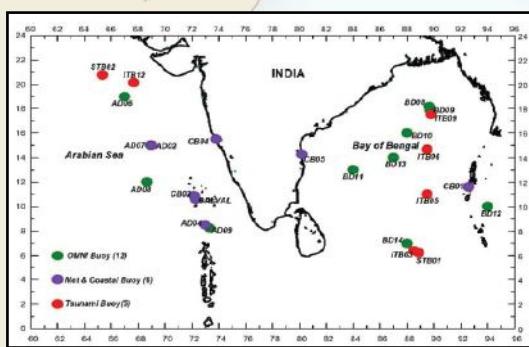
Figure 2. Temperature measurement of a chimney for selecting the installation position of observational equipment.

Thus far, the specifications of the junction box (observatory node) has been carefully determined and its performance has been partially checked using a prototype. Real-GEMS inherited the system technology from DONET; however, the power supply and data transfer capability for a single port will be reinforced significantly. The observation site is the flat-topped Omuro-dashi at the southern side of Izu-Oshima, Japan, where there is hydrothermal activity. The planned installation site of the Real-GEMS has also been surveyed using a towed vehicle and an ROV for safe installation of the cable system and observation equipment (Figure 2).

## Indian Ocean Observing Systems – India

The Ocean Observation Network project is being jointly executed by National Institute of Ocean Technology (NIOT), Chennai and Indian National Centre for Ocean Information Services (INCOIS), Hyderabad. Under the Ocean Observation Network program of the Ministry of Earth Sciences, National Institute of Ocean Technology (NIOT) established the moored buoy network in the Indian Seas. Considering the importance of continuous measurements of data of high reliability and quality, which is of scientific relevance, optimal numbers of buoys are maintained at strategic locations in the Bay of Bengal and Arabian Sea.

The components being executed by NIOT under the program of OOS are moored data buoys, (met-ocean & tsunami), technology demonstration of new observation tools, and inter-institutional R&D projects. Sustainment of the Data Buoy Network is crucial for measurement of met-ocean parameters in the Indian Seas to monitor the marine environment and improve weather and ocean forecast. Deep sea instrumented buoys have unique features of measuring subsurface parameters up to 500 m depth in addition to the standard meteorological and oceanographic parameters observed by conventional buoy systems. The Moored Buoy Network is performing successfully and providing valuable data with high data return despite many challenges faced. The Indian Tsunami Buoy network is performing very well; the data are being shared by INCOIS and the National Data Buoy Center USA. CALVAL buoy is working in Lakshadweep, Arabian Sea and providing data for satellite data validation. An indigenously developed data acquisition system incorporated in the buoy systems have seven variants and are working satisfactorily. Robofish, a unique bio-mimic technology, was tested at sea and improvements are in progress. As a part of capacity building, trainings were organized for staff from Seabird Electronics, INDO-US ASIRI-OMM project and SAIC USA. Further, students from various academic institutions also pursue their academic projects at OOS.



*Figure 3. Indian Ocean Observing Systems locations.*

### Moored Buoy Network in the Indian Ocean

OOS has undertaken 19 cruises and 4 field works, 260 days of sailing covering a distance of approximately 22,018 nmi, 1,540 man-days, for completion of 67 operations at Bay of Bengal, Arabian Sea and Arctic Ocean to maintain the moored buoy networks. Many technological challenges relevant to the long term working of components and integration have been successfully achieved. These buoy systems provide valuable data to the scientific and oceanographic community.

NIOT Data Buoys use INMARSAT's IOR (Indian Ocean Region) satellite for data transmission and TATA Communication–Pune–India as its LES. Further, NIOT has made use of INSAT satellite communication for the transmission of data from coastal buoys, wherever the buoys are under its foot print.

Datasets are obtained from different buoy variants (74 to 104 from OMNI, 34 from Met-Ocean and 25 from Tsunami buoys per transmission) three times hourly, amounting to 672 kb of data per day. The data contain information about various parameters, on different spatial and temporal scales. Mining the data for predictive analysis in the required format and tracking the history of a particular sensor are a challenge. In addition, large quantum of data are being archived and being provided on a near real-time basis to INCOIS-Hyderabad.

### Deep Sea Instrumented Buoys

State-of-the-art, next generation deep sea buoy systems are installed in 12 locations which are collecting and transmitting met, ocean and subsurface parameters in real time to shore. In addition, four coastal buoys and the CALVAL buoys are transmitting data through INSAT & GPRS telemetry. CALVAL, a buoy system to validate satellite data are being deployed and maintained successfully.

Under the Tsunami Buoy Programme, five tsunami buoy systems are being maintained by NIOT-OOS and two SAIC systems are being maintained by INCOIS. INCOIS is sharing Indian Tsunami buoy Data with NOAA-NDBC. In future five locations will have SAIC buoys to be maintained by INCOIS and two locations by NIOT buoy systems.

### Subsurface Data Analysis During ROANU Cyclone

Cyclone Roanu was the first tropical cyclone in Bay of Bengal in the year 2016. It originated from a low pressure area near south of Sri Lanka on 14 May, gradually drifted north and intensified in to a cyclonic storm on 19 May. Roanu moved nearly parallel to the east coast and made landfall near Chittagong, Bangladesh on 22 May 2016.

Five OMNI buoys and one coastal buoy deployed in the Bay of Bengal have captured the signals of the ROANU cyclone passage. Signatures of the cyclone were observed in oceanic and meteorological parameters measured by the buoys located closer to the cyclone track. The following figure shows the ROANU cyclone track and buoy locations.

Subsurface measurements of temperature and salinity recorded by the buoy BD09 ( $17^{\circ} 15' 34''\text{N}$ ,  $89^{\circ} 40' 30.78''\text{E}$ ) during the passage of cyclone Roanu reveals deepening of warm low saline surface water after 17 May, which is apparently due to increased vertical mixing driven by intense winds. The corresponding current vectors also show a remarkable change in speed and direction after 17 May.

### Indigenous OMNI Buoy System – Prakruti

It is also to be noted that the Prakruti indigenous OMNI buoy system has successfully been developed. It is the heart of the buoy system and has the facility to interface with all the buoy sensors and is able to program the data collection, process, store and transmit it in real time via satellite to data center. The comparison of data from this indigenous OMNI buoy system is in line with the imported OMNI buoy system. In fact the parameters measured are more precise in the Indigenous system when compared with the imported system.

# EDITORIAL FOCUS

## Indigenous Buoy Data Acquisition System – Hrudya

As a part of indigenous development seven variants of data loggers are working satisfactorily with data/tsunami buoy systems at various locations at Sea. The indigenous buoy data acquisition system-Hrudya collects and transmits 106 met and ocean parameters in real-time and transmits them to the mission control center. It also uses a low power processor with hybrid charge controller with facility to transmit data through Inmarsat, INSAT, GPRS and UHF telemetry.



Figure 4. Coastal buoy with INSAT and GPRS telemetry.

## Indian Tsunami Buoy System (ITBS) – ‘Sagar Bhoomi’

Development of ITBS will avoid technology dependency and will provide the capacity to upgrade, improve the tsunami buoy system in house. The development includes next generation buoy hull, low power integrated data acquisition module (LIDS) and indigenized BPR. The new buoy hull has been designed to increase the durability and field tests were conducted in the open sea successfully. The designed buoy has proved that it is stable and safe. The prototype Indian Tsunami Buoy and bottom pressure recorder (BPR) system (ITB01) – ‘Sagar Bhoomi’ was tested and deployed successfully in Bay of Bengal at depth of 3,320 m on 11 October 2015. The prototype system worked satisfactorily and was retrieved in February 2016. The data collected from the ITBS buoy are given below.



Figure 5. Prototype Sagar Bhoomi buoy system.

## Indian Arctic Mooring – IndARC

The first polar underwater Indian moored observatory ‘IndARC’ was deployed on 23 July 2014 in arctic waters. The design, development and installation of this underwater

moored observatory were successfully executed by OOS-NIOT in collaboration with NCAOR, Goa. This in-house design effort to withstand harsh polar region weather is a milestone achievement for the MoES and India. Its goal is to know how the polar waters are influenced by exchanges with the water on the shelf and in the deep sea during an entire annual seasonal cycle of water transport into the interior part of the fjord. One of the major constraints in such a study is the difficulty in reaching the location during the harsh Arctic winter and obtaining near-surface data. The IndARC observatory is an attempt to overcome this issue by collecting continuous data from depths very close to the water surface as well as at different discrete depths. The data acquired will be of vital importance to Indian climate researchers as well as to the international fraternity. In addition to providing an increased understanding of the response of the Arctic to climatic variability, the data would also provide a good handle in our understanding of the Arctic processes and their influence on the Indian monsoon system through climate modeling studies.

The IndARC-I moored observatory was deployed and recovered from the Norwegian Polar Institute’s research vessel R.V. Lance at 78°57' N / 12°01' E, about 1,100 km away from the North Pole at a water depth of 192 m. It has an array of ten state-of-the-art oceanographic sensors strategically positioned at discrete depths in the water column. Seawater temperature and salinity data were collected from discrete depths at 22, 30, 55, 80, 105 and 140 m from July 2014 to July 2015. The moored observatory was successfully retrieved on 15 July 2015. IndARC-I successfully collected continuous data for 357 days.



Figure 6. Indarc-II Mooring deployment.

# Worldwide Survey of Recent Ocean Observatory Activities

IndARC II mooring with additional sensors measuring photo-synthetic active radiation (PAR), nitrogen-based nutrient concentrations, ambient noise measures, and more than 45 additional parameters was deployed on 19 July 2015. A paper titled Indian Moored Buoy Observatory in the Arctic for Long Term *in situ* Data Collection has been accepted for publication in International Journal of Ocean and Climate sciences (IJOCS), U.K.

A team comprising Dr. R. Venkatesan, Scientist-G, Mr. M.Arul Muthiah Scientist-D, Dr. K.P. Krishnan, Scientist-D (NCAOR) and Mr. B. Kesavakumar, Scientist-C was given the National Geoscience Award - 2014 by Government of India for this IndARC programme.

## Rapid Mode Data Collection During Cyclone

The implementation of rapid mode data collection during the cyclone period in the data buoy DASs (indigenous as well as imported) is completed. This system will switch over to rapid mode data collection if the thresholds are met. Initially one system was deployed off Chennai (CB06) on a trial basis and worked satisfactorily. The first phase of four coastal buoy systems (Chennai, Agatti, Goa and Andaman) were deployed and testing of a similar algorithm for the deep ocean buoy CPU is in progress and will be implemented in the upcoming deployments for deep sea buoys.

## Design and Development of Autonomous Ocean Observation-Robotic Fish (Auqbot)

As a part of the developmental projects undertaken by OOS, the second phase development of the laboratory scale AquaBot prototype with individually controlled pectoral fins for the pitch control and caudal fin for propulsion, was manufactured and tested to check the behaviour in salt water and sea conditions. Currently, a more compliant hull with a better hydrodynamic shape, along with better maneuvering capabilities are modeled and will be manufactured soon. The new compliant system will house a versatile pitching mechanism using pectoral fins, variable buoyancy system and a moving mass mechanism to have redundancy in operation.

## INSAT Buoy Position Tracker

The deep ocean buoy system has INMARSAT communication for transmitting real time data to shore. However in case of failure in communication due to signal strength, cable damage, or a missing antenna, a secondary system to transmit the buoy position to shore is needed. This gives a confirmation of the buoy position and also makes it easier to track if it is adrift due to mooring line failure. In addition to the INSAT implementation in the coastal buoy systems for data transmission, work has been initiated to develop a buoy position tracker to meet the above requirement. This INSAT buoy position tracker will uplink the buoy position details via L-band communications. This has a salient feature of transmitting data once a day during normal conditions and transmits in shorter intervals (1 hr, 3 hr, or 6 hr) in the case of buoy drift. The INSAT Buoy position tracker was installed in TB12 buoy and BD11 and it is working satisfactorily.

## ASIRI – Air Sea Interaction Research Initiative

The air sea interaction research initiative and ocean mixing and monsoon experiment (ASIRI-OMM) is a collaborative program between Earth System Science Organization (ESSO),

India and the U.S. This program aims to improve predictive monsoon models through study of air-sea fluxes and upper ocean processes in Bay of Bengal and to focus on the effects of the Bay of Bengal Freshwater flux on Indian ocean monsoons. Persistence of shallow stratification in the North Bay of Bengal is important for monsoon air sea interaction.

Under this project, six cruises have been undertaken involving U.S. Research Vessel Roger Revelle and Indian Research Vessel Sagar Nidhi. One workshop at IISc Bangalore, one science meeting involving 22 U.S. scientists, 29 Indian scientists and young researchers was conducted by NIOT at Chennai. One Woods Hole Oceanographic Institution's (WHOI) buoy with air sea flux mooring was successfully deployed in December 2014 and one full year of data is available. The ASIRI-OMM team presented the preliminary results during the section Mixing to Monsoons: Many Scales in the Bay of Bengal at the International Symposium on Indian Ocean held at NIO, Goa in December 2015. Two posters were presented by NIOT under the same section. There was a special section for ASIRI-OMM project named "From Monsoons to Mixing: Coupled Ocean-Atmosphere Processes and Biogeochemical Response in the Indian Ocean" at AGU-OCEANS 2016 in New Orleans, USA. One paper titled Intense Convective Activity Over Northern Bay of Bengal During Late Southwest Monsoon was also presented.

A memorandum of understanding is signed with WHOI and JAMSTEC for the technical cooperation in ocean observations. Dialogues are initiated between India and Peru to conduct bilateral workshop in order to identify various collaborative agencies from both the countries. The objectives will be achieved by capacity-building on both sides through technology transfer and skill development and training. This will greatly help the interaction with international experts and take up collaborative works in ocean observation and research activities. Delegates from South Africa visited NIOT and identified various areas for collaborative initiatives.

## Design and Development of Laboratory Scale Underwater Glider

The objective of this development project is to control the buoyancy of the glider system using dual buoyancy reservoirs. The present system consists of a linear actuator mechanism for controlling the buoyancy. The proposed prototype has two reservoirs, located at the fore and aft part for buoyancy propulsion as well to attain glide angles. The indigenously developed underwater glider was tested successfully in the acoustic test facility at NIOT using the dual buoyancy propulsion.

The glider operation was checked for pitching motion and was pre-programmed using the microcontroller.



Figure 7. Glider testing using the dual buoyancy system.

# EDITORIAL FOCUS

## Student Autonomous Underwater Vehicle (SAVe) Competition

OOS organizes a competition for students pursuing engineering degrees to design an autonomous underwater vehicle. The main focus of this competition is to involve students on the new frontier areas of ocean technology and kindle their innovative thinking in this unexplored area of the ocean environment and observation. NIOT will support the winning team with technical expertise and also a sponsorship for the International competition being held annually by the AUVSI foundation in San Diego, USA.

## Training Programme on Ocean Data Collection by M/S Seabird Scientific, U.S.

As a part of capacity building, M/S Seabird scientific conducted a training programme on ocean data collection during 9-11 February 2016 at NIOT-Chennai. Sixty Participants from various institutes and organisations in India participated in this training programme.

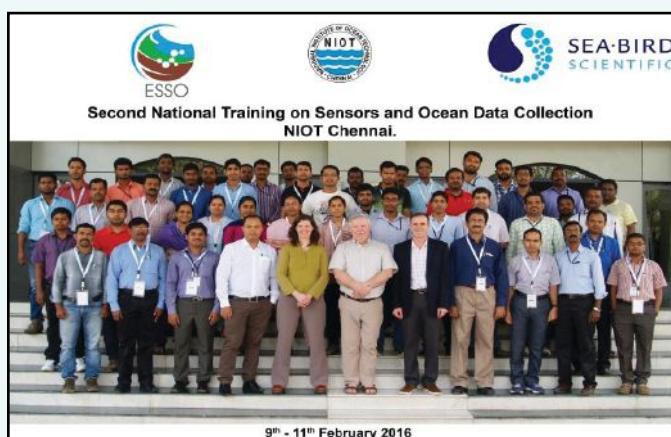


Figure 8. Workshop on Best Practices in Submersible Designs.

The Workshop on Best Practices in Submersible Designs on 21 January 2016 at NIOT was conducted on behalf of IEEE OES. 19 institutes and 46 students participated and benefited using this workshop. Various ocean engineering technical lectures were delivered by the NIOT scientific team during the workshop. Mr. Emerson Hasbrouck from WHOI delivered a lecture on subsea O-rings, cables and connectors.

## OCEANIA

### ALOHA Cabled Observatory – Hawaii

The ALOHA Cabled Observatory (ACO) is a general purpose “node” providing power, communications and timing connectivity for science use at Station ALOHA 100 km north of Oahu (Figure 1). Included are a suite of basic sensors making core measurements, some local and some sensing the water column. At 4,728 m deep, it is the deepest scientific outpost on the planet with power and Internet.

The NSF-funded project was started by Fred Duennebier, Roger Lukas, and Dave Karl in 2002. In 2007 the AT&T HAW-4 retired telecommunications cable was cut and one end moved slightly and a ‘proof module’ hydrophone

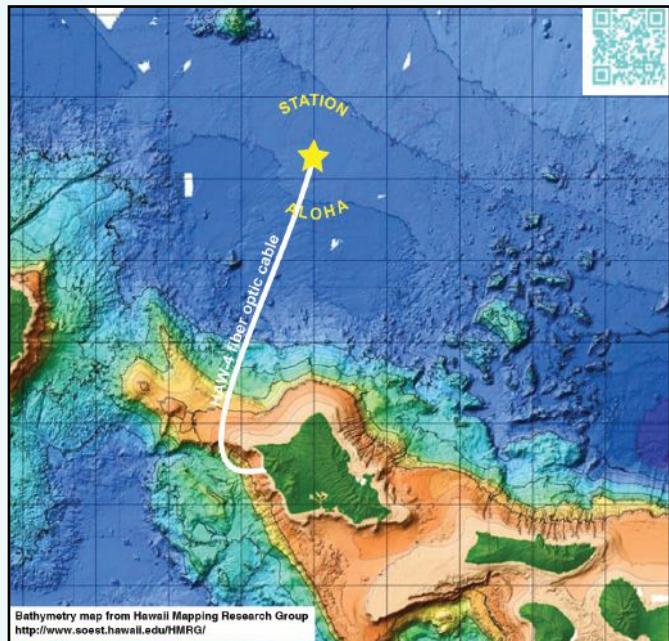


Figure 9. The ALOHA Cabled Observatory (ACO) is at Station ALOHA 100 km north of Oahu in 4,728 m water depth.

attached. In June 2011, a general purpose ‘node’ was connected and the ACO has been providing power (1,200 W), network communications (100 Mb/s) and timing (1  $\mu$ s) to the seafloor node and instruments since. This last November, another camera and lights, and a basic sensor package were added. The observatory allows the capture of extremely rare episodic events, including biological activity (e.g., fish-shrimp interaction) and circulation dynamics (sudden 20 mK temperature changes). Station ALOHA is unique in the world for the combination of long-term world-class ocean sampling, coupled with multitudes of short to long term process studies and other research.



Figure 10. The current ACO configuration. The BSPI sits off to the right about 18 m; Jason is just about to cut floats above free. A banner with contributors is by the OBS (photos by Jason).

The new UH/SOEST ROV Lu’ukai will figure prominently in the coming years. Soon it will be used to add yet more instruments and resolve some ground faults and failed lights.

For more information about the ACO see the web page <http://aco-ssds.soest.hawaii.edu/dataDisplay.php>.

# Worldwide Survey of Recent Ocean Observatory Activities

## Integrated Marine Observing System (IMOS) – Australia

Australia's Integrated Marine Observing System (IMOS) has entered its tenth year of operation and is actively planning for a second decade. The Australian Government's National Innovation and Science Agenda was released in December 2015 and delivered funding certainty for the National Collaborative Research Infrastructure (NCRIS) program that created and developed IMOS. This means that for the first time in several years IMOS is able to make multi-year plans for the future. Under an initiative called "Building world-class national research infrastructure," the Agenda makes an ongoing commitment to NCRIS and allocates \$1.5 billion over the next decade (i.e., \$150 million per annum, plus indexation).

The Australian Chief Scientist is currently leading the process to develop a National Research Infrastructure Roadmap that will guide Australian Government investment from July 2017. It is intended that the roadmap and related processes will result in allocation of multi-year funding under the National Collaborative Research Infrastructure Strategy (NCRIS).

In June this year a significant milestone was achieved with the launch of a single Australian Ocean Data Network (AODN) Portal. It brings together the strengths of the IMOS marine information infrastructure with the metadata and data holdings of many other Australian university, government and industry partners. Enabling open access to marine data is core business for IMOS. The IMOS data will continue to be discoverable alongside a wider collection of Australian marine and climate data via the new-look AODN Portal.

IMOS co-chaired the inaugural Forum for Operational Oceanography in mid-2015 with sponsorship from the Australian Government Department of Industry and Science. This event brought together marine industries, service providers, government agencies, and research providers to consider how to better utilize marine observations, modeling, and computational and information systems to enhance the social, economic, and environmental benefits of Australia's vast and valuable marine estate. There is overwhelming support for continuing the Australian Forum for Operational Oceanography, with the main goal to improving the safety and efficiency of marine industries through better decision making (for more information see <http://www.foo.org.au/>).

The extensive marine observing capability of IMOS is playing a key role in an exciting new project on marine microbes. Bioplatforms Australia, another NCRIS capability like IMOS, has instigated a pioneering investigation into the life-sustaining microbes that inhabit our oceans. The new project, led by Bioplatforms Australia, uses IMOS's marine observing infrastructure and applies its genomics network to perform DNA sequencing to generate the large-scale datasets scientists require to understand fundamental marine processes. The marine microbes project is built on the premise that a more complete understanding of marine microbial diversity and function will allow for better integration of microbial processes into predictive models. The new data will be critical for determining how environmental changes will alter the structure and function of the base of the marine food web.

The fundamental importance of subsurface ocean observations to understanding the Earth's heat and energy budget

was illustrated earlier this year in a review of the Argo array published in *Nature Climate Change*. Within the past 15 years, with the advent of the global Argo array of profiling floats, it has become possible to sample the upper 2,000 m of the ocean globally and uniformly in space and time. Building on a strategic investment made by CSIRO in the early 2000s, IMOS has provided the cornerstone for Argo Australia over the last decade. This has enabled Australian scientists to play a major role in a high profile international program, providing essential knowledge about climate variability, change and adaptation.

The power of a connected, national approach can be seen in the impressive performance of the IMOS ocean glider facility in the past year. During 2015, IMOS gliders traversed a total of almost 12,000 km to collect valuable data on temperature, salinity, currents and other variables at a range of depths in Australian waters: north, south, east and west. Glider data has been used recently to track sub-surface warming in the Great Barrier Reef, reveal the formation of dense shelf water cascades off Perth in Western Australia, and sample a Bonney Coast upwelling event in South Australia.

The first ever comprehensive report on the state of Australia's ocean, as seen through the eyes of plankton was released in December 2015. The Plankton 2015 report from CSIRO compiled data from IMOS as well as other plankton, studies and data sets from across Australia to provide a snapshot on the climate, state of global fisheries and marine ecosystem health and biodiversity. To download the full report, visit the IMOS data tools page: <http://imos.org.au/imosdatatools.html>.

Data from the IMOS East Australian Current (EAC) array of moorings provide a significant advance in our understanding of the system and begin to expose its complexity. The data from the first deployment in April 2012 to August 2013, reveal the complexity and dynamic nature of the EAC, including the offshore return flow and the episodic nature of the deep northward undercurrent. The EAC array was designed to capture the entire breadth and depth of the flow. For this reason, it was placed off Brisbane where the current is almost at full strength and still in jet form rather than as a complex eddy field found further south. Even so, there are a few days in June 2012 when a rarely occurring eddy pushes the main stream of the EAC further offshore than the 150 km extent of the array.

Finally, in 2015 IMOS launched a new video series online via the IMOS website (<http://imos.org.au/imosinmcean.html>). The series titled "IMOS in MOcean" highlights the diversity of the IMOS data collection, its use and impact.

Episodes include:

- Where do sharks go?
- How does the ocean control atmospheric CO<sub>2</sub>?
- What do changes in the Southern Ocean mean for the Antarctic ice sheet?
- How can I get ocean data?
- What is currently happening in Australia's oceans?

**For more information about this update article or to make a contribution contact: [dkocak@mtsociety.org](mailto:dkocak@mtsociety.org).**



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# OFFSHORE INDUSTRY

## Mærsk Gallant drills to record depths on Norwegian shelf



On 31 July, Maersk Gallant drilled the Solaris ultra HPHT (high-pressure, high-temperature) well to a total depth of 5,941 m TVD (True Vertical Depth), beating the record for deepest well ever drilled on the Norwegian continental shelf.

"We have broken a number of records during the Solaris operation. But this achievement is second to none. There was a lot of cheering in the driller's cabin that day," says Sadi Ozturk, assistant rig manager on Maersk Gallant.

"The Solaris exploration well is one of the most challenging wells in the North Sea. All crew members are very excited about this achievement."

In the Solaris project—together with the customer, Total E&P Norge—Maersk Drilling has taken a 15,000 psi rig and adapted the equipment and procedures in order to drill a reservoir section where predicted pore pressures are well in excess of 15,000 psi.

The demanding requirements of the customer have led to a wide variety of modifications on the rig.

Given the extreme circumstances, the rig team on Maersk Gallant has set several records during the operation, including the largest and most complicated BOP stack rig up, the biggest cement job (600 cu. m cement slurry), the heaviest casing run (1.2 million lbs), and the first time a 20K BOP has been nippled up (installed) and used to drill an ultra HPHT well.

At the moment, the crew members on Maersk Gallant are in the process of plugging and abandoning the well and expect to commence the rig move in the near future.

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

### Shell Starts production at Stones in the Gulf of Mexico

Shell announced that production has started from the Stones development in the Gulf of Mexico. Stones is expected to produce around 50,000 barrels of oil equivalent per day (boe/d) when fully ramped up at the end of 2017.

The host facility for the world's deepest offshore oil and gas project is a floating production, storage and offloading (FPSO) vessel. It is the thirteenth FPSO in Shell's global deep-water portfolio and produces through subsea infrastructure beneath 9,500 ft (2,900 m) of water. Stones underscores Shell's long-standing leadership in using FPSOs to safely and responsibly unlock energy resources from deep-water assets around the world.

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### Oil and gas industry must do business differently to meet sustainability targets, says DNV GL

Pressure is mounting on the global oil and gas industry to reduce the environmental footprint at the same time as the industry is under significant cost pressure. Since business as usual is not an option, DNV GL has launched two papers to advise the industry on how and where to make impactful changes within financial constraints.

The paper, "A cost-efficient approach to reducing environmental impact" provides a framework for the industry on how to improve environmental sustainability by identifying the most cost-efficient mitigating measures. To demonstrate how the abatement framework can work in practice, DNV GL has also carried out a case study for an offshore asset. The second paper, "CO<sub>2</sub> abatement potential for offshore upstream installations" demonstrates the results of a comprehensive case study on how CO<sub>2</sub> emissions can be reduced through the implementation of a number of cost-effective measures for offshore production on the Norwegian Continental Shelf (NCS).

Elisabeth Tørstad, CEO, DNV GL – oil & gas, says: "Cost management is a top priority for the industry right now but it's still possible to reduce our environmental footprint without breaking budgets. Cost-effective measures can be implemented across the lifecycle of assets and throughout the supply chain. Our papers will advise and support decisions in this critical area. Greater transparency by the industry on environmental risk management processes and sustainability reporting will give the sector much needed credibility and speed up sustainability improvements as a business advantage."

The framework proposed in "A cost-efficient approach to reducing environmental impact", is based on internationally recognized guidelines (IPIECA, API and IOGP) for sustainability reporting. It can also be used alongside other sustainability reporting initiatives or company specific sustainability KPIs. Aligned with UN Sustainable Development Goals for the environment, it covers a wide range of indicators, including emissions to air and discharges to sea (i.e., hydrocarbon spills, produced water, etc) for specific offshore assets. It is based on a three-step integrated approach: reporting and accounting of emissions and discharges; impact and risk assessment; and prioritizing cost-efficient environmental improvements.

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

# OFFSHORE INDUSTRY HEADLINES

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Stones, which is 100% owned and operated by Shell, is the company's second producing field from the Lower Tertiary geologic frontier in the Gulf of Mexico, following the start-up of Perdido in 2010.

The project demonstrates Shell's commitment to realizing significant cost savings through innovation. It features a more cost-effective well design, which requires fewer materials and lowers installation costs; this is expected to deliver up to \$1 billion reduction in well costs once all the producers are completed.

The FPSO is also specially designed to operate safely during storms. In the event of a severe storm or hurricane, it can disconnect and sail away from the field. Once the weather event has passed, the vessel would return and safely resume production.

Shell's global deep water business is a growth priority for the company and currently produces 600,000 boe/d. Deep-water production is expected to increase to more than 900,000 boe/d by the early 2020s from already discovered, established reservoirs. Three other Shell-operated projects are currently under construction or undergoing pre-production commissioning: Coulomb Phase 2 and Appomattox in the Gulf of Mexico and Malikai in Malaysia.

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

## RigNet awarded multi-year managed services renewal, including Software as a Service (SaaS)

RigNet, Inc., a leading global provider of technology solutions, announced that it has renewed a contract to provide remote communication services and Software as a Service

(SaaS) for a global offshore driller's entire marketable fleet. Through the multi-year contract, RigNet will deliver a VSAT managed service for the customer's fleet to optimize their operations around the world.

"We are pleased that this global offshore driller has reinforced their confidence in RigNet by extending our contract and leveraging our SaaS offerings that improve crew welfare and operational performance," said Steven Pickett, RigNet's CEO and president. "RigNet applications will enable all of our customers to experience enhanced productivity and operational efficiencies."

The end-to-end connectivity solution includes RigNet's deployment of CrewWifi, a SaaS offering, over the existing managed services. Additionally, RigNet will provide VoIP and Internet access services that are supported by RigNet's global Network Operation Centers. The solution also includes an enhancement that optimizes our customers' services to ensure the delivery of their other operational applications.

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

## Sparrows Group and SapuraKencana Petroleum to form partnership in Malaysia

Sparrows Group is set to further grow its presence in the Asian Pacific market following the formation of a partnership between Sparrows Offshore Services Pte Ltd and SapuraKencana Technology Sdn Bhd, the latter being a wholly owned subsidiary of SapuraKencana Petroleum Berhad.

The partnership will see both entities collaborating in the provision of offshore and onshore crane services including manufacturing, supply, operations, maintenance and overhaul

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of offshore and onshore cranes for the oil and gas industry in Malaysia.

Sparrows Group is currently working with a number of drilling firms in Malaysia but this new alliance will see the group's activity with operators in the country grow significantly.

Stewart Mitchell, chief executive officer at Sparrows Group, said: "SapuraKencana Petroleum is a prominent and well respected company and this partnership is right in many regards for us. It brings together two companies that have a reputation for delivering quality to the energy sector and SapuraKencana's commitment to excellence is in line with our own values."

"Our specialist capabilities will complement SapuraKencana Petroleum's diverse range of service offerings and we are confident that their knowledge and experience will support us in further establishing our presence in the country."

Vivek Arora, Senior Vice President of Business Acquisition of SapuraKencana Petroleum said: "The collaboration with Sparrows Group will expand our range of service offerings in operations and maintenance (O&M) services. We are confident that this partnership will enable sharing of knowledge and technologies in providing high quality solutions to our clients in the oil and gas industry."

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

#### Gulf of Mexico lease sale yields \$18 million in high bids on 138,240 acres in western planning area

Bureau of Ocean Energy Management (BOEM) Director Abigail Ross Hopper announced that the recent week's oil and gas Lease Sale 248 garnered \$18,067,020 in high bids for 24 tracts covering 138,240 acres in the Western Gulf of Mexico Planning Area. A total of three offshore energy companies participated in 24 bids. The sum of all bids received totaled \$18,067,020.

In this sale, BOEM offered 23.8 million acres in federal waters offshore Texas for oil and gas exploration and development.

"The Gulf of Mexico continues to be one of the most productive basins in the world and is an important part of our Nation's domestic energy portfolio," said Hopper. "Though this sale reflects today's market conditions and industry's current development strategy, the bidding confirms that there is continued interest in the deepwater areas of the Gulf."

BOEM oversees 160 million acres on the Outer Continental Shelf in the

Gulf of Mexico. Approximately 20 million acres (3,762 blocks) are leased for oil and gas development, and 4.3 million of those acres (883 blocks) are producing oil and natural gas.

The August 24 sale in New Orleans, Louisiana, was the first federal offshore oil and gas auction broadcast live on the internet, delivering pertinent bid information immediately to a much broader national and international audience. Through this approach, BOEM aims to

promote greater government efficiency and transparency. A video of the livestream broadcast will be posted to the BOEM website.

This auction is the eleventh Gulf of Mexico offshore sale and the final one for the Western Planning Area, under the Administration's Outer Continental Shelf Oil and Gas Leasing Program for 2012-2017 (Five Year Program). This sale builds on the first 10 sales in the current Five Year



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# OFFSHORE INDUSTRY HEADLINES

Program, which offered more than 60 million acres and netted nearly \$3 billion for American taxpayers.

Sale 248 included approximately 4,399 blocks, located from nine to 250 nmi offshore, in water depths ranging from 16 to more than 10,975 ft (5 to 3,340 m). As a result of offering this area for lease, BOEM estimates a range of economically recoverable hydrocarbons to be discovered and produced of 116 to 200 million barrels of oil and 538 to 938 billion cubic feet of natural gas.

The decision to hold this sale follows extensive environmental analysis, public comment and consideration of the best scientific information available. The terms of the sale include stipulations to protect biologically sensitive resources, mitigate potential adverse effects on protected species and avoid potential conflicts associated with oil and gas development in the region. The lease terms also include a range of incentives to encourage diligent development and ensure a fair return to taxpayers.

For more information, visit [www.boem.gov/Sale-248](http://www.boem.gov/Sale-248).

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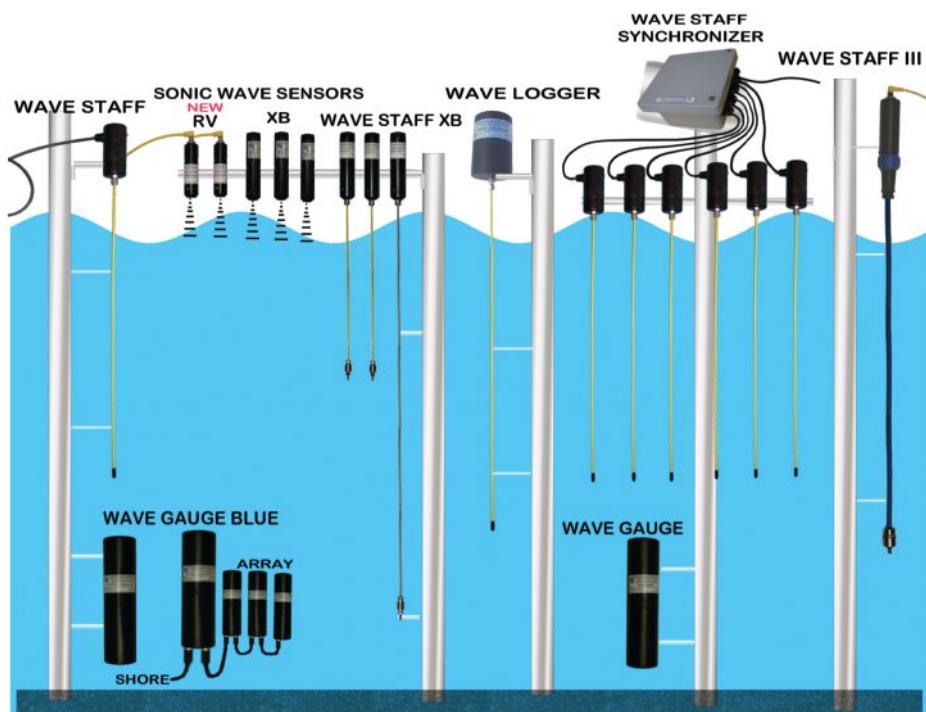
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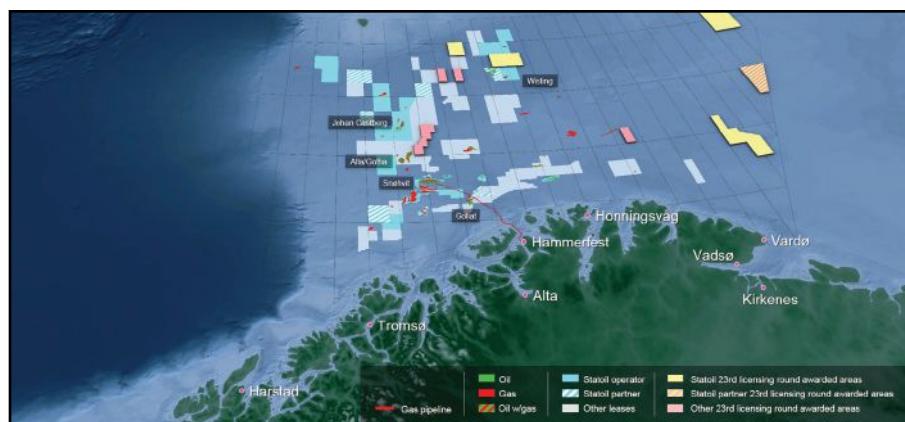
### Statoil to conduct exploration campaign in Barents Sea

Statoil aims to conduct a major exploration campaign in several parts of the Barents Sea in 2017. The company is also strengthening its position in the area through several transactions with other companies.

"We have worked systematically on developing an exploration portfolio for testing good and independent prospects in 2017 and 2018. For 2017 we see promising prospects in different parts of

the Barents Sea. For example, we want to explore the Blåmann prospect in the Goliat area, Koigen Central in PL718 on Stappen High and the Korpjell prospect in PL859 that was awarded in the 23rd licensing round," says Jez Avery, Statoil's head of exploration on the Norwegian Continental Shelf (NCS).

In addition to an exploration well in PL849 (Blåmann), awarded in the Award in Predefined Areas (APA) in January 2016, Statoil and the operator ENI have also agreed on drilling a new exploration well in PL229 (Goliat) in



2017. Statoil has already a rig on contract that is suitable for operation in the Barents Sea. The company is working on obtaining approval from partners and authorities for an exploration campaign in 2017 covering between 5 and 7 wells in the Barents Sea.

During the past months Statoil has entered or increased its share in five licences in the Norwegian part of the Barents Sea by a number of agreements with Point Resources, DEA, OMV and ConocoPhillips.

New and major discoveries are crucial to maintain the current NCS production level up to 2030 and beyond. The areas off North Norway will play a key role in reaching this ambition.

Statoil completed a comprehensive exploration campaign in the Barents Sea in 2013-2014 without any impact discoveries, but with additional volumes to Johan Castberg through the Drivis discovery. Information from the previous campaign has been used to further deepen the company's understanding of the petroleum potential of the Barents Sea.

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

## Rosneft, BP and Schlumberger sign technology agreements

Rosneft, BP and Schlumberger announced agreements for collaboration on seismic research and development. The agreements were signed at the Eastern Economic Forum (EEF) in Vladivostok, Russia, by Rosneft CEO Igor Sechin and president of BP Russia David Campbell. Schlumberger was represented by president for Russia and Central Asia Gokhan Saygi.

Under the terms of the agreements, Rosneft will join as an equal partner in BP's ongoing project with Schlumberger's seismic business, WesternGeco, to develop innovative cableless onshore seismic acquisition technology. The technology aims to revolutionize the design and acquisition of 2D and 3D seismic surveys, which in turn will improve subsurface imaging and the efficiency of exploration, appraisal and field development. The ability to deliver faster and better quality seismic data acquisition at lower cost compared to conventional seismic surveys will also bring environmental and

safety benefits in difficult to access areas and extreme climates.

The project envisages an initial 2-year period to complete the development of a seismic acquisition system. BP and Rosneft will have preferential access to this technology for an initial period, after which Schlumberger will have the exclusive rights to market the system.

Commenting on the signed documents, Igor Sechin said: "These agreements turn the page in the development of upstream technologies. By teaming up with such industry leaders as BP and Schlumberger we are bound to succeed. The fact that Rosneft, Russia's leading oil and gas company, will be involved in the development of state-of-the-art technologies is of prime importance. As a result, innovative solutions will be tailored for specific Russian settings. Given the international status of the research project, the product to be created will have a significant potential on global markets."

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

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*-Jack Fisher,  
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### D3 Consulting awarded six figure contract following successful decommissioning project

D3 Consulting, specialist decommissioning and demolition consultants has been awarded a six figure contract with a major operator, following the successful completion of a decommissioning project with another operator.

The 8-month contract started in April 2016 and involves the preparation of materials inventories for 21 platforms in the Southern North Sea, with eight associated subsea installations and pipelines. The work scope includes the quantification of assets with subsequent characterisation and classification of the waste and materials.

The contract win succeeds a successful 3 month project for a major operator that was completed in June 2016. D3 Consulting developed a waste and materials inventory as part of the planning phase for a decommissioning project in the North Sea.

Martin Bjerregaard, director of D3 Consulting, said: "The team at D3 Consulting has more than 20 years of decommissioning experience, and I'm delighted that our expertise was recognised by two major operators in the industry. Our pragmatic and streamlined approach ensures that we can support these operations with bespoke solutions to facilitate safe, regulatory compliant and cost-effective decommissioning works."

The company will utilise its unique Decommissioning Assurance through Waste kNowledge (DAWN) system—the world's only information management system for preparing materials inventories and managing waste throughout the decommissioning process. Martin continued: "As market leaders in offshore decommissioning materials inventories, we are typically engaged at the front end planning and engineering phase of decommissioning operations."

For more information, visit [d3-consulting.com](http://d3-consulting.com).

### Zenith Energy successfully completes first offshore abandonment project

An Aberdeen based well management firm has successfully completed the plug and abandonment of a platform well located offshore Italy.

Zenith Energy, which was established in 2012, provided well engineering and project management services to London-based operator, Rockhopper Exploration, successfully completing the P&A of the Ombrina Mare development well.

Utilising its experienced well engineering personnel, well delivery process and HSEQ management systems, Zenith Energy completed the project safely and within AFE, using the Atwood Beacon Jack Up MODU.

The operation involved re-entry to the existing well situated on an unmanned platform, bullheading operations, removal of completion, casing and wellhead equipment, and the setting of permanent barrier cement plugs.

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



## Ashtead supports the redevelopment of BP's Quad 204



Ashtead Technology has successfully completed a subsea integrity management project to support BP's Quad 204 redevelopment of the Schiehallion and Loyal fields, West of Shetland.

Ashtead, a leading independent provider of subsea technology and equipment, deployed its new Deflection Monitoring System (DMS), to capture critical data required to safely deploy and install two subsea manifolds at water depths of 400 m. The technology was launched to the market earlier this year.

The system monitors deflection, heading, pitch, roll, depth and other parameters of subsea structures in real time. This allows informed decisions to be made during critical operations, ensuring specified tolerances and safety requirements are taken into account.

The DMS was optimised to the exact pressures and water depths required for the scope of work at Ashtead's UKAS accredited calibration laboratory before it was launched from a vessel and lowered 400 m onto the seafloor.

The project was completed on time and allowed the subsea manifolds to be installed within 24 hours of the DMS being deployed. The entire project was controlled remotely via radio frequency and acoustic data links, removing the need for direct ROV or diver support intervention in order to gather attitude measurements.

Ashtead utilised a range of communication and positioning tools to enhance the accuracy of data collected and to ensure maximum performance of the subsea structure once in place.

This new approach to the installation and integrity management of subsea systems was developed by Ashtead Technology as part of its range of value-added services to significantly reduce risk and cost in subsea operations.

Allan Pirie, chief executive of Ashtead Technology said: "Whilst subsea structures look robust and are designed to last decades, they can be easily damaged during installation and incorrect orientation can lead to stress on flowlines and jumpers."

Quad 204 is a major UKCS redevelopment incorporating a new FPSO and upgrade of the subsea infrastructure. It will enable the potential recovery of an additional 400 million barrels of resource from the existing Schiehallion and Loyal fields and extend production through to 2035.

Ashtead Technology employs 75 people in Aberdeen, London, Houston and Singapore with agents in Abu Dhabi, Perth (Australia) and Stavanger.

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

## Maintaining integrity of SSE Hornsea Limited's gas storage facilities

SIMMONS EDECO, a leading supplier of wellhead and valve maintenance, asset integrity solutions and onshore drilling services to the global oil and gas industry, announced that UK energy supplier SSE Hornsea Limited's Gas Storage facilities has awarded the company a multi-million pound contract.

SSE plc is one of the UK's leading energy companies, involved in the generation, distribution and supply of electricity and in the extraction, storage, distribution and supply of gas.

To ensure that SSE Hornsea's Atwick and Aldbrough gas storage facilities continue to operate safely and efficiently, SIMMONS EDECO is to provide comprehensive asset integrity services. SIMMONS EDECO will not only provide and manage wellhead maintenance and valve integrity services, but wellhead panel maintenance services. In addition, SIMMONS EDECO is to supply additional third party services required by SSE to facilitate their well asset integrity maintenance schedule, as needed. To fulfil SSE's requirement to obtain this diverse range of services from one contractor, SIMMONS EDECO entered into a strategic alliance with Specialised Management Services Ltd (SMS), which specialises in wellhead panel maintenance services.

Although the contract award represents the first time that SIMMONS EDECO will have delivered wellhead, valve and asset maintenance services at Aldbrough, the company has been providing similar services elsewhere for SSE. For the past 12 years, it has contributed to the successful maintenance of the Atwick facility, helping SSE to meet customer demand for gas throughout the region. While maintenance activities have been ongoing at Atwick, SIMMONS EDECO have already commenced work on the asset integrity programme for Aldbrough.

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

## Claxton successfully completes well abandonment of Horne and Wren platform for Tullow Oil

Claxton, an Acteon company, has completed its involvement in the abandonment of two wells on the Horne and Wren platform in the Southern North Sea.

Completed within 18 days in July

2016, Claxton was responsible for the 5-1/2 in. tubing cut verification, tubing recovery, sub-mudline abrasive conductor severance, conductor cut verification and the subsequent multi-string recovery from both wells.

Rob Horton, project engineer, Claxton, said: "The multi-string severance was performed from a jack-up lift

barge (JULB) for this project, allowing significant cost savings for the client against the use of a rig."

"The Horne and Wren platform has a small 8 m x 8 m weather deck footprint, creating a space challenge which we managed to overcome. As well as using our latest evolution of the 'SABRE' abrasive cutting system, this

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project also required a full, bespoke, light weight work package. This included a hydraulic proving system and a utility crane to ensure self-sufficiency in handling our equipment."

"Proving of tubing and conductor cuts were completed with the same system, enabling us to reduce equipment,

time and money for the client. Equipment was located on the JULB with services run to the platform for the tubing recovery and multi-string severance and subsequent casing retrieval.

"We also developed a bespoke tubing laydown frame that allowed the quick and safe laydown of the severed tubing in a controlled manner."

Claxton can overcome issues in engineering bespoke designs to accommodate all platforms and environments. Rigless platform well abandonment is just one of the many services Claxton can offer to reduce the costs of decommissioning projects. Learn more about Claxton's decommissioning services.

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

### GMC makes a splash in the North Sea with connected seawater caissons

GMC Limited is proud to announce the safe and successful installation of a seawater caisson in the North Sea, 8 days ahead of schedule.

This is the first installation that has been carried out by the company in the North Sea, with a further two fabricated



caissons completed and ready to be installed later this year.

The TSA coated 30 in. OD diameter caisson was installed in nine sections using eight sets of GMC's high fatigue non-rotational caisson connectors. All connections were made up quickly and efficiently first time.

GMC's handling and installation methodology greatly reduces the installation time over convention installation methods. GMC provided sufficient handling tools to ensure continuous operations were maintained throughout, thereby eliminating delays normally associated in handling caisson operations.

A first for GMC in the UK, this project demonstrates the company's competence in providing a complete fabricated caisson with connectors, dead weight support, and guide nose cone—all fabricated and coated to the client's requirements. It also demonstrated the mobilisation of tools and competent personnel to carry out the critical "make up" operation in connecting the caisson sections together safely and efficiently in minimal time.

The GMC solution eliminates the need for offshore welding of caissons, and provides the client with a safe and efficient fabrication and installation service that delivers considerable cost savings, whilst also extending the life of ageing assets.

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

### Global Maritime completes Njord A disconnection and tow to shore

Global Maritime Consultancy & Engineering, a provider of marine warranty, dynamic positioning and engineering services to the offshore sector, has successfully led the disconnection and towing operations of the Njord A



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semi-submersible floating production platform from the Njord field. The Njord A platform arrived safely in Klosterfjorden on 23 August, where a handover to Kvaerner was achieved.

The 346 nmi journey was carried out by Global Maritime on behalf of the operator Statoil. The news follows the successful towing of the oil storage and offloading vessel Njord B by Global Maritime to Sterkoder, Kristiansund earlier this summer.

Global Maritime was responsible for the project management, engineering, design, fabrication and procurement of equipment, as well as all offshore management activities for the Njord A and Njord B mooring disconnection and tow.

Global Maritime's responsibilities included the disconnection of 12 mooring lines, the recovery of one complete mooring line (excluding the suction anchor) for onshore inspection and the towing-in of the Njord A platform to Klosterfjorden outside the Stord yard. Statoil coordinated the decommissioning activities including the disconnection of risers and the temporary plugging of wells.

Global Maritime worked closely with Statoil's Njord Future Marine Project and Operations Vessel and Rigmovet that provided the vessels and rig positioning services for the offshore operations.

David Sutton, CEO of Global Maritime Consultancy & Engineering, continued, "With a project of such complexity and with the subsea infrastructure still in tact, it was crucial that mooring disconnection activities and the towing of the platform took place with maximum precision and care. This is what Global Maritime achieved with the platform being disconnected from its moorings, departing the field, and arriving in Stord ahead of schedule. We look forward to working with Statoil on future similar projects."

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

#### **Launch of ground-breaking decommissioning tool**

Decom North Sea, the representative body for the offshore decommissioning industry, launches the ground-breaking Late Life Planning Portal.

The operational website—also known as L2P2—has been designed to support the North Sea oil and gas industry in the planning and execution of late life and decommissioning projects. Providing a single access point for knowledge sharing and cross sector learning, L2P2 reflects Decom North

Sea's overarching objective to bring the regulators, operators and supply chain together to create the co-operative environment required by the decommissioning industry.

Roger Esson, chief executive of Decom North Sea, explains the drive behind the portal: "Decommissioning is a long game, with over 40 years of

decommissioning activity yet to take place and around 90% of North Sea assets yet to be decommissioned. For that to happen as efficiently and as cost-effectively as possible in the long term, we need to make good decisions in the Late Life phase."

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



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# Decanter Solutions for Offshore Drilling

By: Nils Engelke, Public Relations & Communications Manager, Flottweg SE

Modern drilling emulsions form a closed circuit from which no solids emerge. As a result, everything that gets into the emulsion due to the drilling process must be separated out. While riddle screens and hydrocyclones separate coarse-grained particles, the decanter deals with small particles.

Natural gas and petroleum have been won from the seabed for many years. The United States had already built the first oil drilling platforms off the coast at the end of the 19th century, but building the drilling platforms far out at sea was still unimaginable for the oil pioneers. Their rigs stood in water just a few meters deep and were connected to land by a pier. Things are much different today. Operating offshore gas and oil rigs in the deep sea has become a common business. Advanced developments in drilling and conveying technology are also making it possible to pump from ever deeper water depths. For this kind of drilling, which has to take place in a closed loop system, flushing is used. Modern separation technology allows the flushing or drilling fluids to be treated as optimally as possible to guarantee the best functioning of the drilling system. Decanter centrifuges play a decisive role here.

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Drilling mud decanter centrifuges on an oil rig near Nigeria.

## Treatment of drilling fluids

Flushing has a number of different functions in drilling and therefore is given special attention. The most important are:

- Transporting the drilled rock to the surface;
- Driving, lubricating, and cooling the drill head;
- Stabilizing the drill hole;
- Thickening the drill hole so that materials such as oil, gas, or water do not penetrate it; and
- Providing information about the rock mass.

In order to accurately solve all of these tasks, the flushing fluid needs to have very specific properties and be matched to the substrate. That is why it is important that it be altered as little as possible in its composition. The flushing fluid is influenced by thermal and chemical factors and when it takes on drilling solids. Treating the flushing or drilling fluid is done to remediate the influence of the drilling solids.

## Separation of solids

Part of the drilling solids can be separated using shale shakers. Shale shakers have a mesh of up to  $25\text{ }\mu\text{m}$ . They can effectively separate approximately 10% to 30% of the drilling solids.

## Desilting systems

Hydrocyclones have been used for years to further eliminate solids from the drilling fluid. These systems can be used to treat the entire mass of drilling fluid. Centrifugal force is used to separate a concentration of solid particles up to a tiny size of  $10\text{ }\mu\text{m}$  depending on various factors (such as stone size in relation to specific weight of the particle, viscosity, etc.). The disadvantage is that a significant amount of fluid is lost with the solids.

## Decanter centrifuges

Adding a downstream decanter centrifuge can counteract the disadvantages of conventional desilting systems. The decanter separates the residual fluid from the relatively highly thickened solids in the desilting tailwater.

Where is the use of a decanter recommended?

- When maximum safety and speed are needed as well as less wear on the boring mill;
- Wherever additional costs arise from multiple uses of drilling fluid material;
- Wherever the production and remediation of mud pits present problems with surface protection and ground water protection and make significant investment necessary;
- When drilling mud pits cannot be placed near the dilling rig, resulting in transport costs for removing flushing fluids. This is particularly relevant for offshore platforms; and
- When the oil flushing form solids needs clarifying.

## Results from use

Experiences in the past months have shown that drilling mud not completely separated by shale shakers needed to be separated with Flottweg Decanters. Depending on the size and throughput of

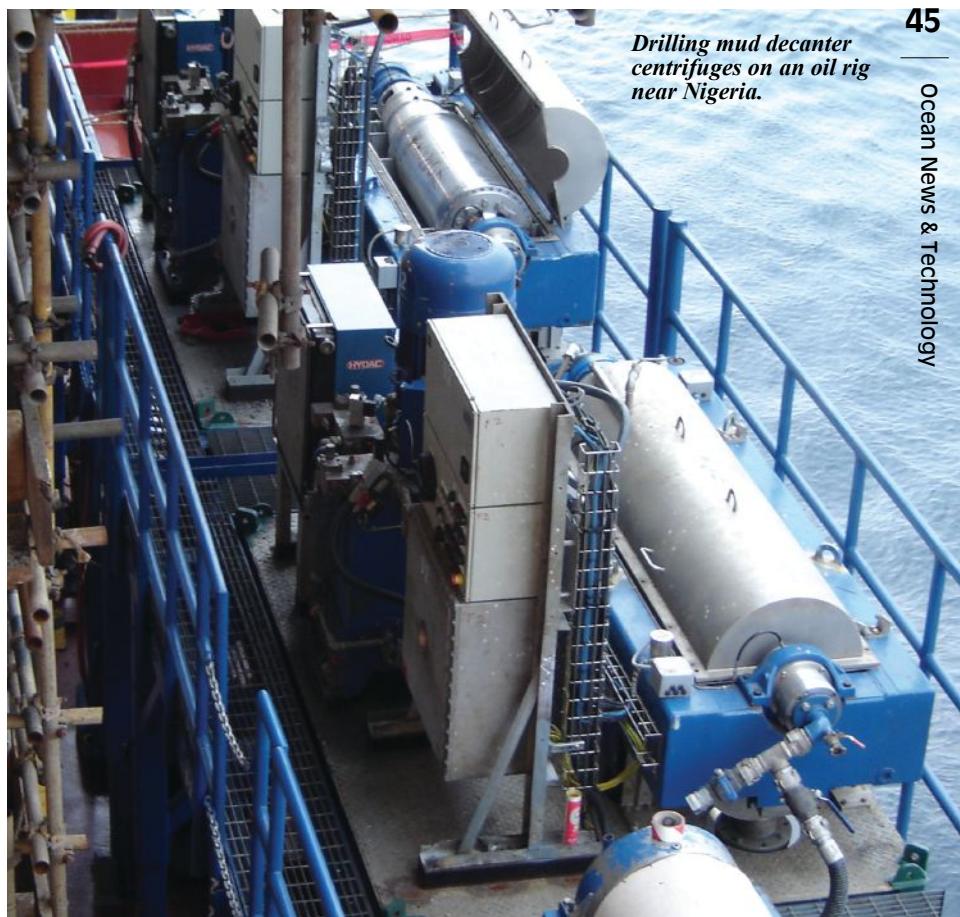
the centrifuge, a magnitude of approximately 1.5 T of drilling solids per cubic meter centrifugal cake could be separated. Overall, the volume concentration of the centrifugal cake was about 50 to 60 vol.% solids. The specific weight of the centrifugal cakes was a magnitude of about 2.0 kg/L or higher.

By using decanters at various bore holes, it was possible to partially or even completely forego having to transport the recovered flushing fluids. Only the solids in the centrifuge cake needed to be transported to the mud pit with the remaining flushing fluid.

The following numbers prove that using decanter technology in bore holes is extremely economical and cost-efficient, and the advantages are obvious. The price of polymers, various stabilizers, corrosion inhibitors, anti-foaming agents, and surfactants are a significant cost factor in drilling. Since decanter centrifuges make it possible to run the flushing fluid in a closed loop system, noticeably less flushing material is needed, which results in a significant savings potential.

In addition, less water needs to be used (exchange fluid). Plus, the process harbors even greater savings potential in terms of the disposal costs. The personnel needed for setting up the flushing and implementing the material can be employed for other important tasks.

Flottweg's top-performing decanters reflect the knowledge and experience in clarifying all types of flushing fluids from drilling. The sturdiness, ease of operation, reliability, space-saving compact design, and technical advancement all make the Flottweg Decanter prized and recognized worldwide. Flottweg Decanters are also available as platform solutions with all of the important components. This makes transportation easier and provides customers with a plug-and-play solution.



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## IMCA's Guidance on open parachute type underwater air lift bags revised

The International Marine Contractors Association (IMCA) has revised IMCA D 016 "Guidance on open parachute type underwater air lift bags". The new version is now ready for free downloading from the IMCA website at [www.imca-int.com](http://www.imca-int.com).

The guidance addresses the initial and periodic examination, testing, certification and maintenance of open parachute-type underwater air lift bags used to lift submerged objects. It also addresses the operational use of these bags and the safety precautions that should be taken during their use. The principle major revisions in this fourth revision are to those sections dealing with the use of inverter lines and hold-back rigging, and to the diagrams in the guidance document.

## MacArtney supplies specialised underwater robotics technology to Stinger, Norway

Stinger Technology AS has taken delivery of a customised Seaeye Falcon ROV to be used for offshore subsea operations under a contract awarded by Dong Energy.

The assignment includes environmental sampling and inspection inside the oil storage tank of the Siri platform. Siri is located in block 5604/20 in the northwestern part of Denmark's North Sea sector, about 220 km off the Danish coast. Production on the Siri platform first started in 1999. DONG Energy is 100% licensee of the Siri licence. The Siri platform is also host for the nearby Nini, Nini East, Cecilie and Stine fields.

The storage tank in question measures 50 x 66 m and is 17.5 m high, with a designed storage volume of 50,000 cu. m. It is split internally into 16 compartments, some of which are only accessible through a 10-in. jumper pipe.

Stinger selected the Seaeye Falcon ROV to perform as a carrier for a small VideoRay vehicle which is small enough to go into the different compartments of the tank. Therefore, they developed a TMS for the purpose of mounting it under the Falcon ROV carrying the VideoRay umbilical. The Falcon has therefore been supplied in a customised version with add-ons such as additional power and electric motor for driving the TMS. The scope of supply also includes an extensive spare parts package, FAT and a technical training course. The FAT and training were held at the facilities of MacArtney Norway in Stavanger.

Stinger is a very innovative company that really thinks out of the box when it comes to solving complex challenges, states Mats Ekström, managing director of MacArtney Norway. That is why we are so fond of doing business with this company, which challenges us on our competences and enable us to demonstrate our expertise and ingenuity mastering customer requirements for technically advanced solutions.

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



## Schmidt Ocean Institute selects Sonardyne navigation technology for new ROV



The international science community's newest ocean research platform, a deep-rated ROV called SuBastian, will be positioned and navigated using acoustic and inertial technologies supplied by Sonardyne Inc., based in Houston.

Built by the Schmidt Ocean Institute (SOI), a private non-profit operating foundation located in California, SuBastian will provide scientists from around the world with new opportunities to explore and study the ocean. Capable of diving to 4,500 m, the vehicle has been equipped with a state-of-the-art equipment package that includes a reconfigurable payload skid for deploying and recovering experiments, a 4K Ultra-High Definition camera capable of streaming live video to the surface and a comprehensive suite of scientific sampling sensors.

Following a survey of the deep ocean research experts that make up SuBastian's Science Advisory Group, the need for both accurate and multiple means of subsea navigation was identified as a priority mission requirement. The group committed that provision of the best available integrated acoustic and inertial navigation sensors underpinned the scientific value of the observations and data gathered by SuBastian.

When SuBastian enters service this summer, it will be operated from SOI's research vessel, Falkor, which has been operating with Sonardyne's Ranger 2 Ultra-Short BaseLine (USBL) acoustic positioning system since 2012. During that time, the system has provided scientists with the ability to track equipment down to abyssal depths in excess of 5,000 m.

Based on their extensive track record with Ranger 2, SOI and Sonardyne worked together to configure an integrated navigation solution for SuBastian. This resulted in the supply of a SPRINT Inertial Navigation System (INS), Syrinx 600 kHz Doppler Velocity Log (DVL) and a Wideband Mini Transponder (WMT), all of which is compatible with the Falkor's existing Ranger 2 topside hardware.

Now in its third generation, Sonardyne's SPRINT exploits the long-term precision of acoustic positioning with the continuous availability and fast update rate of inertial sensors. This combination provides robust vehicle positioning during periods of challenging acoustic conditions and helps to improve sensor data quality and vehicle control. Uniquely, SPRINT supports dual gyrocompass and INS operating modes, meaning that SuBastian's pilots and science teams will be able to rely upon its output simultaneously. Its new, lightweight titanium housing also provides valuable space and weight savings that can instead be used for scientific payload or samples.

SuBastian is also now one of the first research vehicles in the world to benefit from Sonardyne's recently introduced Syrinx DVL. DVLs are an important element of any ROV's navigation system as they enable the vehicle's velocity and distance travelled to be measured. When tightly integrated with INS, acoustic and depth observations, a true estimate of the vehicle's position can be calculated.

Syrinx differs from other DVLs in that it offers high altitude (up to 175 m) navigation capability normally only available from a 300 kHz DVL with the high precision and accuracy of a 1,200 kHz DVL. Its adaptive bottom lock has been demonstrated to provide consistency and reliability over challenging and changing seafloor topography, which together with its high update rate, will enable SuBastian to undertake complex missions in any environment.

Completing the navigation suite for SuBastian is WMT, a high-power USBL transponder built upon Sonardyne's latest 6G (sixth generation) wideband acoustic architecture that provides robust, high update rate positioning in any water depth, shallow or deep.

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

#### OceanServer delivers next gen AUV for water quality solutions with YSI integrated systems & services

OceanServer Technology, the leading manufacturer of commercial AUVs, announced the continuation of a successful 10-year partnership with the launch of the next generation EcoMapper. The i3XO EcoMapper AUV is based on the robust Iver3-580 AUV platform and takes advantage of YSI's expertise in water quality solutions. The i3XO AUV utilizes the EXO water quality system to provide users high resolu-



tion water quality data, side scan sonar imaging, downward looking current profiling, and an option for bathymetric surveying. Used by government agencies, military, universities, contractors, and private organizations, the versatility of the i3XO system delivers a wide range of simultaneous monitoring capabilities. The new compact EXO design provides new EcoMapper customers up to eight water quality parameters (via 4 sensor ports). The 100-m Iver3 based EcoMapper will

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benefit from extended bottom lock range (up to 80 m), forward looking Object Avoidance, swappable battery section along with new chirp based sonar systems. Shipments for the system have already started and additional information can be found at: <https://www.ysi.com/EcoMapper>.

All Iver3 AUV models come standard with OceanServer's VectorMap Mission Planning and Data Presentation tool, which provides geo-registered data files that can be easily exported to other software analysis tools. This unique AUV design has enabled OceanServer to carve out a very strong position in the research space for Autonomous Underwater Vehicles, sensors and behavioral studies. The VectorMap program can input NOAA ENC's or any geo-referenced charts, maps or photo images, allowing the operator to intuitively develop AUV missions using simple point-and-click navigation. The base vehicle gives university, government and commercial users an affordable base-platform for sensor development or survey applications in water quality, sub-surface security and general research.

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

## Mud Cat ROV Operating at Gardens by the Bay in Singapore

Ellicott Dredge Technologies (EDT) is pleased to announce the successful start up and installation of a state-of-the-art Mud Cat brand ROV (remote operated vehicle) at the world famous Gardens by the Bay nature park in central Singapore. ML Trading International purchased a Mud Cat Model SRD-6EHV ROV System to fulfill a contract to clean approximately 3,000 sq. m of sludge in 2 km of the Marina Gardens outlet drain tunnel which runs parallel to Marina Gardens Drive, the main access road to Gardens by the Bay.

ML Trading International selected the Mud Cat ROV due to Mud Cat's global reputation as the leading supplier of remote controlled and automated dredging systems. Other ROV suppliers were considered, but their equipment did not qualify for the project. Singapore Public Utilities Board (PUB) selected ML Trading International based on their competitive bid and chosen ROV technology. "ML Trading's custom Mud Cat ROV and compact dewatering system, co-designed by Mud Cat and AMW Systems, sets the benchmark for cost effective storm water drain cleaning in close quarters urban environments," said Ryan Horton, EDT Vice President.

The ROV is cleaning the drainage tunnel using multiple permanent ROV entry points constructed by PUB for routine maintenance of the drainage tunnel. The ROV along with ancillary equipment (hose reel, power cable reel, and 480 V generator set) are in modular forms for easy transportation and launching via truck mounted crane.

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



## DOF Subsea selects FMC Technologies' ROVs for IMR operations

FMC Technologies announces that DOF Subsea has signed a contract for two new ROVs from its Schilling Robotics business line. The HD and UHD-III ROVs will be delivered in December 2016.



These ROVs will be utilized by DOF Subsea for its Inspection, Maintenance and Repair (IMR) operations in Eastern Canada. The HD and UHD-III ROVs are known to be highly versatile for IMR and construction projects.

While designed for robust capabilities, FMC Technologies' ROV system maintenance is simple with comprehensive system diagnostics and intuitive maintenance solutions. Sub-systems are designed to be quickly maintained without any requirement for advanced technical skills or specific system knowledge.

"We've partnered with DOF Subsea for the last decade and this award, in these difficult market conditions, represents the continued strength of our relationship," said Tyler Schilling, president of FMC Technologies Schilling Robotics. "The combination of the HD and UHD-III ROVs give DOF Subsea a lot of flexibility on this project."

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

## Phoenix takes delivery of Super Mohawk II ROV

Phoenix International Holdings, Inc. (Phoenix) announces it has taken delivery of a Super Mohawk II inspection class ROV system. Capable of operating in depths of up to 3,000 m (2,000 m standard), this underwater vehicle can be supplied as free flying or with a tether management system and deployed on any vessels of opportunity.

Fitted with dual 1 atmosphere electronic pods, a SubCan control, protection and diagnostics system, and a camera pan and tilt unit, the Super Mohawk II is a robust, durable, and long proven ROV designed for high payload, with plenty of open deck space and skid mounted options. It is suitable for a wide variety of tasks including IMR, surveys, and intervention works.

Mike Kutzleb, president and CEO, stated, "This purchase underscores our commitment to investing in the growth of Phoenix and enhancing our existing business activities in the Gulf of Mexico." Added Warren Sturges, General Manager, "We look forward to integrating the Super Mohawk II into our already wide selection of service offerings for our Oil and Gas Clients."

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

## ASV Global and TerraSond mark industry first for unmanned hydrographic survey

ASV Global and TerraSond have completed a 5,172 nmi hydrographic survey in the Bering Sea, off Alaska. TerraSond used the C-Worker 5™ ASV alongside its Q105 survey ship for a duration of 36 days. The C-Worker 5™ completed 2,275 nmi of survey lines operating as a force multiplier, running parallel survey lines to the Q105. Both vessels ran multibeam sonars and simultaneously towed side scan sonars.

The C-Worker 5™ was operated using ASV Global's ASView™ control system from a control station on the Q105 vessel. ASView™ used exported survey lines from the TerraSond planning system to autonomously execute an accurate survey with minimal human intervention. Navigational safety was maintained by the C-Worker 5™ operator monitoring the ASV's colour and thermal camera feeds and AIS collision avoidance system, whilst radar overwatch was provided by the Q105.

Thomas Chance, chairman ASV Global said "The C-Worker 5™ has proven itself as a reliable, weather resistant solution to increasing survey efficiency. The ASV covered up to 130 nmi per day, doubling the coverage of the Q105 survey vessel. In addition to this, the C-Worker 5™ was able to survey shallow waters that the Q105 was not able to reach."

Thomas Newman, president, TerraSond said "I have been involved with hydrographic surveys for more than 30 years, and I can say that the production improvements due to ASV Global's unmanned force multiplier were nothing less than astounding. Using the C-Worker 5™ system alongside our survey vessel, we were able to reduce our overall time on site by more than 25 days."



This 2016 deployment was a follow on from a proof of concept operation carried out between TerraSond and ASV Global in August 2015 during which an ASV platform became the first autonomous surface vessel to update the U.S. nautical charts for NOAA.

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

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## New underwater robotics company positioned for success

A new subsea company has officially launched with the announcement of its first UK contract. An independent company focused on underwater integrity, ROVs, surveying and subsea services for both oil and gas, and renewables, Rovco has secured a contract with a UK Marine Trust.

Headquartered in Bristol, the new, privately funded organisation aims to become a leading ROV and inspection company within the next 3 years, with expertise and capacity to carry out underwater inspection projects across the globe. The company is also about to embark on its second underwater survey project in partnership with a southwest diving company.

Led by chief executive and founder, Brian Allen, Rovco will take a unique approach to technical subsea challenges by offering a high quality, cost effective solution for underwater hydrographic survey and inspection services, using high resolution state-of-the-art 4K cameras, and 360° scanning sonars.

With over 15 years' experience in the subsea industry, Brian previously managed multiple ROV systems on construction, inspection and lay vessels as a superintendent for Deepocean.

Rovco has been backed by Entrepreneurial Spark powered by Natwest, the world's largest free business accelerator programme for new and growing ventures.

The company is also a member of Subsea UK, the body which supports and represents the £9 billion British underwater industry, promoting it at home and abroad.

For more information about Rovco, visit [www.rovco.com](http://www.rovco.com).

## The immeasurable value of underwater inspections

Building upon conventional technical skills and know-how while also taking advantage of the latest technology, Hydrex offers a unique hull monitoring service to its customers. This gives shipowners total control of their ship's hull condition and consequently its performance, with only a minimum of work on their part. Underwater inspections represent a small investment and, if properly done, have the potential to save an owner a great deal of money.

Competent underwater inspections, particularly if carried out regularly can detect:

- Problems with the propeller such as bent or damaged blades (which can put undue strain on bearings), roughness due to fouling, cavitation damage or bad polishing that can reduce the propeller's efficiency.

- Anodes that have wasted away, rendering the cathodic protection system unworkable, leading to corrosion and added hull friction.

- Hull cracks or other damage that, if not rapidly arrested, can worsen and increase the cost of any subsequent repair.

- Ropes inside the stern tube assembly that may cause seal problems if neglected.

- Leaking stern tube or thruster seals that can cause an environmental problem in port and lead to costly changes to a ship's schedule if not caught quickly and repaired.

- Clogged sea chest grids (preventing proper cooling of the ship's engines), or loose or damaged grids.

- Loose or broken grids on thruster tunnels that can result in damage to thruster propellers.

- Damaged, bent, broken or detached bilge keels that again can become much worse if not caught early.

- A damaged rudder that will continue to deteriorate if not addressed rapidly, resulting in the need for much more costly repairs and representing a safety hazard in extreme cases.

Regular inspections carried out by competent divers and followed by comprehensive and accurate reports can detect any of these or other problems so that they can be corrected early and prevent more costly repairs and further damage. Because we have over 40 years of experience in both maintenance and repair services, we can carry out any required follow up repair very fast without any unnecessary loss of time. Planning in a new date is not needed as all our diver/technicians are skilled to perform the repair work as well.

If the damage found during an inspection can be anticipated, the required equipment can be mobilized in advance. Otherwise it can be transported to the location of the vessel immediately from one of our fast response centers where a large stock is available for our teams at all times.

There is another important way for underwater inspections to be used to save costs. A thorough inspection carried out a week or two before a ship is due to go to drydock can save a great deal of money in drydock. An accurate estimate of work required can lead to efficient scheduling. If thrusters are to be repaired in drydock, they can be removed prior to the ship's drydocking and can be repaired and ready for reinstallation when the ship is in drydock, rather than waiting until the docking to find out and then having to extend time in drydock in order to repair and replace the thruster.

For more information, visit [www.hydrex.be](http://www.hydrex.be).

## Bibby HydroMap completes Western Isles Connection survey operations

Seabed survey contractor Bibby HydroMap completed geophysical, geotechnical, benthic and land survey operations along the route from mainland Scotland to the Isle of Lewis, on behalf of client SHE Transmission.

Three vessels were used during the survey: 27.5-m DP1 Bibby Tethra for offshore geophysics, geotechnical sampling and benthic operations; 14-m MV Proteus for nearshore geophysics; and the 9-m RIB Cougar to ensure overlap between the inshore and land survey.

Over 1,000 line km of survey data were acquired with Bibby Tethra, using the vessel's newly installed dual head Kongsberg EM2040-4, with the towed Edgetech 4200 side scan sonar and Geometrics magnetometer positioned using the new Sonadyne Mini-Ranger 2 USBL. Shallow sub-bottom profiler data were also acquired using the vessel's hull-mounted Applied Acoustics pinger. Despite the challenging environmental conditions, geophysical operations were completed ahead of schedule yielding high quality data.

Bibby Tethra's scope of work also included conducting over 80 CPTs and vibrocores, in addition to 26 benthic drop down video and grab sampling stations.

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

## Business success for ROVOP

Independent subsea ROV service provider ROVOP has announced over \$4 million of contract wins spanning the North Sea, Gulf of Mexico, West Africa and Europe.

The company, which was visited by The Rt Hon Greg Clark MP during his first visit to Aberdeen in his role as the Secretary of State for Business, Energy and Industrial Strategy, has been awarded several new contracts across the oil and gas and offshore wind sectors.

The contracts are with several new clients across a number of sectors and include construction support, cable lay and protection, survey and inspection repair and maintenance (IRM).

CEO of ROVOP, Steven Gray, said: "I am encouraged by the contract awards and continued positive momentum in increasing both our client base and future pipeline of work. As a result of these awards, we are increasing our offshore workforce across both Aberdeen and Houston. It's clear that the market remains challenging, however, ROVOP continues to win work by focussing on saving cost for our customer."

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

## WiBotic unveils wireless power solutions to charge AUVs

After refining its robotics technology in stealth mode for almost 2 years, WiBotic announced its wireless power solutions to charge the rapidly growing ecosystem of aerial (drones), mobile (industrial) and aquatic robots. With WiBotic wireless power solutions, AUVs can stay underwater, even when charging.

A reliable alternative to mechanical battery swapping for above- or sub-sea robotic vehicles is necessary for aquatic robots to become fully autonomous. Wireless charging affords the only viable option where there are environmental limitations. WiBotic wireless power solutions deliver efficient power through water and are not limited by fluidic motion, salinity or fouling. They offer the most flexible wireless charging range, regardless of the medium by which wireless power is transferred.

Adaptable to the charging needs of any robotic application, WiBotic wireless power solutions include a wireless battery management system (BMS) and fleet-level power management software. The wireless battery management system for individual robots can significantly increase the lifetime of each battery in that robot. Additionally, the fleet-level power management software dynamically monitors how an entire fleet of robots operates and uses the data to help create a custom operational plan to optimize the life of the entire collection of batteries in that specific fleet.

WiBotic wireless power solutions are easy-to-implement and highly customizable for specific deployments. When an AUV approaches the WiBotic wireless charging platform, it automatically detects its presence and wirelessly charges the battery – just as fast, if not faster, than a standard plug-in charger. This enables the system to work fully autonomously for the lifetime of the battery. In other words, there is no longer a need for human intervention for daily maintenance, charging or battery management. Alerts are triggered if the power systems are compromised in any way.

WiBotic wireless power solutions are safe, reliable and scalable. They provide adaptive near-field wireless charging and have a higher efficiency across wider ranges than both standard inductive and other resonant systems. In addition, they have the most flexible wireless power range on the market and work in harsh weather conditions (wind, rain, snow) as well as underwater.

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

## James Fisher Subsea completes removal of UXO at German offshore wind farm

James Fisher Subsea (JF Subsea), a world leader in the location, identification and disposal of deep-sea unexploded ordnance (UXO) and part of James Fisher and Sons plc, provided critical expertise to a high priority project at Nordergrände offshore wind farm located 16 km off the North Sea coast of Germany.

Offshore wind farm development and management specialists, wpd offshore solutions (wpd), approached JF Subsea to use its innovative and safe excavation techniques to survey the precarious area and remove all unexploded munitions. The UXOs, which had been released by Central Powers and Allied forces during WWI, had delayed planned construction works and were at risk of costing the developer millions as a result.

Of the 224 targets identified, 72 were deemed to be UXOs and had to be detonated with minimal impact to sea life. JF Subsea's project manager, Max Clements, said: "Due to the project's potentially dangerous complexities—such as rough tide, heavily buried ordnance and inclement weather—the team was prepped to be ready at a moment's notice whenever a suitable weather window opened up."

"As with all UXO operations safety was of the upmost priority and from the planning stages we ensured we had project specific equipment, world-class expertise and encompassing method statements in place," Clements added.

Due to the complex and unpredictable nature of the project, JF Subsea had to work within narrow weather windows and often in shallow waters with rough tides. Target location, ROVs, detonation specialists and bespoke UXO support vessels were all used as part of a turnkey solution, ensuring the precise and efficient delivery of the project.

Two vessels were deployed for the duration on the project, with specialist divers used to locate and remove the UXOs during the day and ROVs dispatched to detect and excavate through the night. This dual-pronged approach sped up the clearance process and reduced the delay to the client's start date.

"Offshore wind turbine sites are often plagued with UXOs and are a continual problem we come up against during construction. Due to the expertise JF Subsea showed throughout the excavation process we will most likely be using their services again," said Jan Patrick Daniel, offshore project manager at wpd.

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

## Fundy Tidal Project underwater sensor platform completes successful sea trial

Efforts to understand the unique environmental conditions in the Minas Passage of the Bay of Fundy are moving forward.

After a 27-day sea trial, a team comprised of staff at the Fundy Ocean Research Center for Energy (FORCE) working in concert with crew on the Dominion Victory have successfully recovered an underwater monitoring platform, known as FAST-1.

"To explore the energy potential in the Bay of Fundy responsibly, we have to understand it," said FORCE general manager Tony Wright. "We're building a series of subsea instrument platforms that will give us a clearer picture of what's happening at the FORCE test site."

The platform was retrieved in mid-July, and analysis of sensor data is now underway. Reliable site data is critical to all aspects of in-stream tidal energy development, including both turbine design and understanding any effects on the marine ecosystem.

The Fundy Advanced Sensor Technology (FAST) program encompasses three separate underwater platforms, onshore radar, meteorological instruments, and a tide gauge. Headlining the program is FAST-1. At 4.5-tonnes and 4-m in length, this platform is designed for frequent deployment and recovery to enable instrument testing and monitoring.

The platform's current sensor array includes:

- Acoustic Doppler current profilers (ADCP) and the Vectron (measuring current speed and turbulence);
- Acoustic zooplankton and fish profiler (assessing zooplankton and fish density and depth distribution);
- Water quality sensors (measuring water conductivity, temperature, and salinity);
- Optical sensor (measuring sedimentation size, distribution and volume concentration using laser diffraction);
- Tide, turbidity, and current sensors; and
- Orientation sensor (measuring pitch, roll and heading—crucial to platform placement and the analysis of all other instruments).

These include the Aanderaa SeaGuard Platform, the Sequoia LISST, ASL acoustic profiler, Nortek Signature 500, and the TRDI Sentinel V s100.

The FAST program is in addition to FORCE's regulated environmental effects monitoring programs, which in 2016 focus on fish, lobster, marine mammals, seabirds, and marine noise.

For more information, visit [www.fundyforce.ca](http://www.fundyforce.ca).

# MARITIME COMMUNICATIONS

Satellite • Wireless Technology • Contracts

## Nakilat upgrades communications with advanced services with EMC

Nakilat, the shipping arm of Qatar's liquefied natural gas sector, has entered into a contract with Global Eagle Entertainment Inc.'s Emerging Markets Communications (EMC) service line to provide marine VSAT services for vessels in its fleet of liquefied natural gas (LNG) and liquefied petroleum gas (LPG) carriers.

Under the contract, Global Eagle Entertainment's EMC is supplying global Ku-band VSAT connectivity and content to enable a range of internet, data and voice services for the vessels and crew. The installations were completed recently on eight Nakilat vessels, which will ensure continuous connectivity for their ships sailing global routes. The onboard satellite communication suite includes a high-quality voice-over-IP system for the corporate network, lowering the costs of voice calls over the satellites. The crew welfare system provides always-on internet connectivity to communicate with family and friends at home.

Nakilat administration director Rashid Hamad Al-Marri said, "We are delighted to sign this agreement with EMC, which will significantly contribute to the development of the communication systems' infrastructure and facilitate Nakilat's maritime operations. As an owner of one of the largest LNG fleets in the world, staying connected while at sea is essential for Nakilat's global operations. By utilizing EMC's VSAT technology, we are able to ensure real-time information is accessible and that our personnel can stay in touch with their families during the vessel's voyage while at the same time, realize cost savings for the company."

"Nakilat's modern LNG and LPG carriers are highly sophisticated specialized ships, requiring the highest levels of dependable connectivity for ships' business and crew welfare," said Gilles Gilleson, president of EMC's commercial shipping business unit. "Our seamless global coverage and network infrastructure, coupled with our suite of patented technologies, provides an unmatched value proposition enabling customers like Nakilat to bring the benefits of modern voice, Internet and high-speed data to their ships at sea."

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

## Iridium leads maritime market

Iridium Communications Inc. announced that over the last 12 months, ending June 30, 2016, the company shipped over 2,200 Iridium Pilot® units, concluding with one of the best quarters in company history. Iridium Pilot, which is powered by Iridium OpenPort®, Iridium's current global broadband service, is one of the fastest growing maritime products in the Mobile Satellite Service (MSS) industry today. Over the same 12-month period, Iridium OpenPort subscriber base increased by 9% across the company's vast partner network and customer base.

Iridium's maritime line of business focuses on value, offering Iridium Pilot packages that deliver reliable satellite communications via the Iridium network, at prices that are flexible for shipping companies and vessels of all sizes. The network, which is a constellation located in low Earth orbit (LEO), is the only truly global satellite constellation, providing robust and reliable satellite connectivity anywhere on the planet, making it an ideal provider for mariners, especially those traveling in remote waters.

The Iridium Pilot terminal can be used as a primary means of communication on ships or as a VSAT backup solution. The device has a small, rugged design and omnidirectional L-band antenna, ensuring that it can perform in rough maritime environments, without taking up too much space on any ship. The Iridium team has prepared for the upcoming launch of Iridium NEXT, the company's next-generation satellite constellation, by ensuring that all Iridium Pilot terminals are forward compatible, meaning that existing equipment will work across both networks.

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

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Ocean News & Technology

## Eutelsat, MCN sign strategic cooperation agreement



Beijing Marine Communication & Navigation Company (MCN), the commercial entity of China Transport Telecommunications & Information Center (CTTIC), and Eutelsat Communications met in Paris to sign a strategic cooperation agreement that sets the stage for addressing fast-growing global aviation, maritime and land mobile broadband markets.

This agreement will leverage Eutelsat's satellite resources and MCN's ground infrastructure to enhance mobile broadband services for Chinese companies and international customers across the globe. It will also support the People's Republic of China's "One Belt One Road" initiative that focuses on connectivity and cooperation in Eurasia.

With its global satellite infrastructure and international teleport network, Eutelsat is well-positioned to partner with MCN to serve mobile broadband markets. The partnership also enables Eutelsat and MCN to work together to promote satellite technology applications research and development and to integrate innovative technologies developed by both companies into commercial satellite communication services.

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

## Teekay chooses NSSLGlobal for enhanced VSAT capability across its fleet

Teekay, one of the world's largest marine energy transportation, storage and production companies, has signed a new \$4-million VSAT upgrade and contract extension with leading global satellite communications provider NSSLGlobal.

The new contract enhancement will not only double the bandwidth speeds for both the onboard crew and operational network, but will also provide additional technical managed services to allow Teekay to be able to quickly and confidently roll out new fleet-wide applications. The upgrade will be rolled out in the next few months across Teekay's fleet of conventional tankers and LNG Carriers, totaling 125 vessels.

From the outset of its long-standing relationship with Teekay, NSSLGlobal has serviced Teekay vessels on a worldwide basis. Over the last few years NSSLGlobal has been growing its sales and service offices in order to be able to support customers such as Teekay in Maritime Hubs globally.

NSSLGlobal's VSAT IP@SEA service is a maritime broadband VSAT (DVBS2-RCS2) service for commercial vessels, which combines an extensive Ku- and C-Band coverage with some of the fastest speeds in the industry. Being an independent VSAT operator ensures that NSSLGlobal can offer flexible and tailored solutions around its customers. The



service comprises six global teleport supporting 24 satellite beams and two Network Operation Centers to achieve “always-on” connectivity.

NSSLGlobal's experience, technical knowledge with a true 24/7 technical support service and an in-country service engineering capability means it can provide a “one-stop shop” for any company looking for the best service in the industry.

Along with this wholly owned VSAT network NSSLGlobal also brings together best-in-class satellite solutions from key market providers such as Inmarsat, Thuraya and Iridium, to offer options across C-, L-, Ka- and Ku-Band networks.

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

### New system will monitor motion and impact of offshore vessels

UK Electronic Solutions (part of NSSLGlobal Group) announced Oceanic Dynamics, a new self-contained motion and impact monitoring system suited to offshore vessels. Created by UK Electronic Solutions, Oceanic Dynamics protects the longevity of offshore assets by monitoring and reporting vessel impact on structures, passenger comfort and safety and engine performance and reliability.

Offshore structures have highly stringent requirements when it comes to the total impact force allowed from docking vessels. Vessels are generally obliged to remain within pre-specified ranges of impact force and to operate only within certain environmental conditions (or else run the risk of voiding their Service Level Agreements). It is highly advantageous for companies operating vessels to be able to closely monitor impacts that occur while docking and offloading in order to justify their performance. Oceanic Dynamics uses a highly accurate Microelectromechanical System (MEMS) based orientation sensor to monitor motion and impact of the vessel as it docks, enabling vessel operators to keep in line with such regulations.

While impact monitoring was the starting point and primary function of the system, Oceanic Dynamics is also able to monitor fuel efficiency, engine data, and route information as well as the vessel's dynamic stability within the water. These extra functions offer transfer vessel operators the potential to justify the cost efficiencies and eco credentials of their service. Oceanic Dynamics also employs a HD CCTV bullet camera to record footage from the deck of the vessel at all times. The video footage helps clarify events on board at any given time and provides further visibility of the moment the vessel docks.

Oceanic Dynamics delivers a weekly comprehensive report of how the vessel, crew and environment are impacting vessel performance. This report can be tailored in-line with the specific content, complexity and frequency required by the vessel operator. All information is stored locally within the unit until the vessel is within GSM or Wi-Fi range and can then be seamlessly downloaded to shore. Should there be a requirement for data to be transferred to shore more immediately the unit is also capable of seamlessly integrating with any onboard satcom system.

The Oceanic Dynamics box is also highly compact, and is contained inside a single briefcase. This is designed to create minimal physical impact and to ensure that the system can be moved easily between vessels.

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

### New report confirms KVH's continuing leadership in maritime VSAT market

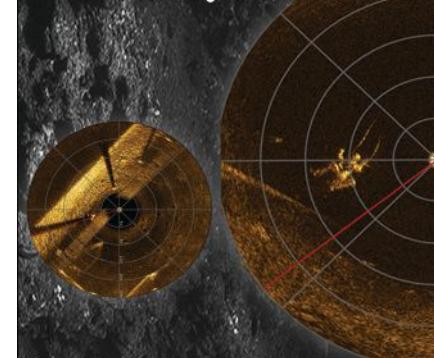
The mini-VSAT Broadband<sup>sm</sup> service of KVH Industries, Inc. has been cited as the market share leader in maritime VSAT units in service, in a newly published report. “Maritime SATCOM Markets, 4th Edition,” by Northern Sky Research (NSR), a leading maritime industry analyst firm, reports that KVH’s mini-VSAT Broadband customers account for 29% of the vessels using Ku-band services, which is more than double the 14% share of the nearest competitor, as of the end of 2015. KVH’s mini-VSAT Broadband customers also account for 21% of the vessels using combined C/Ku-band services, with the nearest competitor at 15% share.

KVH launched mini-VSAT Broadband in 2007 and has steadily grown the service to a dominant position in the maritime VSAT market. The company recently shipped its 6,000th VSAT system, as reliance on fast and reliable satellite broadband connectivity

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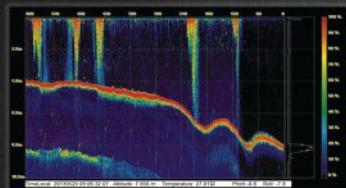
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has spread throughout the maritime industry. In 2012, the mini-VSAT Broadband service first became the maritime VSAT market share leader according to leading market research reports and has since that time reconfirmed that position in subsequent report updates.

With its analysis of quantitative and qualitative factors, the report presents a complete picture of the maritime market, including trends, issues, and the latest SATCOM developments. "As connectivity becomes a must-have in the commercial maritime industry, we expect a steady rise in VSAT-connected vessels by 2025," said Brad Grady, NSR senior analyst, who co-authored the report with NSR analyst Dallas Kasaboski. "For both operations and crew welfare, maritime operators are likely to become more and more reliant on broadband for their vessels."

The NSR analysts also described an emerging trend toward maritime VSAT service providers developing value-added services and a range of web applications to meet the increasingly complex systems and demands of com-

mercial vessels. The range of web applications likely to be in demand by maritime markets, according to the report, includes apps for streaming media, e-Learning, network configuration, crew calling, and weather.

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

## Globecomm integrates business units to serve 'new era' in maritime communications

Globecomm is integrating its Telaurus and Globecomm South Africa business units to enhance service provision to ship owners.

Globecomm South Africa is an Inmarsat Distribution Partner and L-Band specialist supporting service providers and resellers, while Telaurus has been one of the maritime industry's leading communications solutions providers for many years.

Both companies will operate under the Globecomm Maritime brand, providing VSAT, L-Band and cellular communications to a fleet of over 4,000 vessels. The integration of the two units will make more resources available in a

streamlined service offering, with faster response to client requirements. Enhanced support will operate around the clock from more regional locations.

The current leaders of the two organizations will continue to lead the combined organization, with Malcolm McMaster serving as president of Globecomm Maritime and Dickon Webb serving as general manager.

In addition to provisioning L-Band and VSAT connectivity, Globecomm Maritime delivers value-added services in the form of Nimbus and Cirrus, a cloud-based management platform for narrowband and broadband communications. Also available is a range of data and voice connectivity solutions, including BYOD support via the Globecomm App and AccessGSM, as well as high quality pre- and post-paid VOIP services that can be used on a range of devices.

Further tools include Aegis, a network-based unified threat management, usage reporting and firewalling tool and MWC, a network-based crew calling platform. These formerly separate services will be integrated into a single

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offering to better serve the needs of vessel operators.

Earlier this year, Globecomm unveiled Globecomm VSAT, powered by iDirect, a high-capacity multi-band communications solution designed to deliver “industrial strength” connectivity to fixed and mobile assets on a global basis.

The service provides a broad range of high-throughput applications over a robust, flexible and scalable network designed specifically to deliver shared services and private networks to customers in maritime and energy markets.

Globecomm’s industry leading coverage has recently been expanded to provide Ku-Band coverage in the South Atlantic to serve merchant shipping, Ku-Band coverage in the Barents Sea for fishing and offshore customers and regional C-Band services covering Asia-Pacific and the Middle East to meet expanded offshore industry demand.

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

## Marlink doubles throughput speeds with new data allowance packages

Marlink has doubled the burst speed on its Sealink VSAT services, enabling up to 3 Mbps for users on its data allowance packages, enabling faster Internet access and a smoother web browsing experience. New 40, 60 and 80 GB data allowances have been introduced in parallel to the burst speed increase, enabling users with high bandwidth requirements to extend their smart shipping and crew welfare strategies with the world’s largest, most reliable maritime VSAT network.

Combined with the potential for faster Internet access, the new Sealink allowances enable significantly more capacity for smarter operational efficiency and enhance crew data communications while providing access to social media and web browsing. Providing a reliable, global and always-on link for business connectivity, Sealink Allowances combine up to four voice lines with eight data allowance plans now available from 1 GB up to 80 GB per month.

The new Sealink data plans provide for predictable investments in crew communication facilities, helping to improve recruitment and retention, in addition to supporting on board morale, safety and efficiency. The data allowances will also strengthen business administration including email, electronic document handling and Machine to Machine (M2M) applications.

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

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# SUBSEA CABLES

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## Partnership with humanity: Future SMART subsea cable systems

Humanity faces environmental threats, both immediate and long-term, that require access to the deep ocean. Tsunamis have the potential to threaten many of the world's coastal communities within minutes or hours of a large seismic event. Reliable, robust tsunami-warning systems will save lives and property. Our ocean and climate are experiencing global changes that will affect us and our descendants. Without access to the seafloor for fundamental oceanographic measurements, we cannot quantify and respond to the dilemma facing humanity.

The global infrastructure of submarine telecommunication cables is the backbone of the world's connectedness for business, finance, social media, entertainment, political expression, and science. Internationally, these cables are the bottom, physical layer of the Internet. The dependability of this infrastructure is so important that whole national economies are affected when problems arise.

A partnership with humanity—society, science, the telecommunication private sector, and governments—can bring forth submarine telecommunication cables that are environmentally aware. We look to a future where SMART cables serve a dual purpose, both as communications infrastructure and a scientific backbone for monitoring tsunamis, earthquakes and the world's ocean climate and circulation.

A relatively straightforward complement of instrumentation—accelerometers, high resolution pressure gauges, thermometers—will answer many of the basic science and societal needs as well as provide for the monitoring of the physical state-of-health of the cable system itself. Technological advances have made it possible to integrate basic sensors with repeaters on submarine telecommunication cables at intervals of about 50 to 70 km, at a small fraction of the total cost of a new cable system deployment.

The ITU/WMO/UNESCO-IOC Joint Task Force strongly endorses the concept of embedding critical climate-relevant, tsunami-warning and cable-hazard sensors in transoceanic communications cables. We call upon the private sector, governments, scientists, philanthropic foundations and the Internet-using public to recognize this extraordinary need and opportunity, and to take concerted action to make this system a reality for humanity.

Whether in the shallow ocean, in orbit around Earth, on land, or from the air, governments have traditionally installed and maintained our global infrastructure for monitoring Earth. However, the access to the seafloor and deepest ocean is literally owned by the telecommunication private sector. Therefore, unique new partnerships and collaborations must be established to enable this SMART cable vision. No ocean aware telecommunication system is in place today. Yet, cable systems in use today will be upgraded and replaced, and new systems installed over their 25 year lifetime. The time is ripe to begin a future with SMART systems.

This Joint Task Force of three UN agencies—the International Telecommunication Union (ITU), the World Meteorological Organization (WMO), and the Intergovernmental Oceanographic Commission of UNESCO (UNESCO-IOC)—has undertaken this task on behalf of humanity to deal with the daily threat of tsunami and earthquake disaster and the prospect of global climate change. Each new cable system that is environmentally unaware is a missed opportunity, lost for decades.

How can an individual, a corporation, philanthropic foundation, or government engage with this effort? Most effective would be private sector engagement with governments of coastal nations to directly address financial arrangements, legal issues, and the permitting process. Highly placed individuals and foundations can make a significant contribution of funding and time for non-recurring engineering costs. Internet companies newly investing in submarine cables can differentiate themselves by creating a new paradigm—taking the environmentally conscious high ground by building SMART cables.

Twenty-five years from now, when effects of global change become increasingly evident, we will either have deep ocean data from SMART cables to corroborate our global models, or there will be a fundamental gap in our knowledge.

For more information, visit [www.itu.int/en/ITU-T/climate-change/task-force-sc/Pages/default.aspx](http://www.itu.int/en/ITU-T/climate-change/task-force-sc/Pages/default.aspx).

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## TE SubCom completes third upgrade to SJC



TE SubCom, a TE Connectivity Ltd. company, announced the on-schedule completion of its third network upgrade to the South-East Asia Japan Cable (SJC) System.

The upgrade of the system, which connects Brunei, mainland China, Hong Kong, Japan, Singapore and the Philippines, increases system capacity by 6.3 Tb/s using TE SubCom's latest 100 Gb/s coherent transmission technology (C100U+). The third upgrade of the 8,986 km system is in service and meets the growing capacity needs for businesses and communications across the Asia-Pacific region.

The SJC consortium is composed of Brunei International Gateway Sendirian Berhad (BIG), China Mobile International Ltd. (CMI), China Telecommunications Corporation (China Telecom), China Telecom Global Limited (CTG), Donghua Telecom Co. Ltd (DHT) (a subsidiary of Chunghwa Telecom, Co., Ltd.), Globe Telecom, Inc., Google, KDDI Corporation, Singapore Telecommunications Limited (Singtel), PT Telekomunikasi Indonesia International (Telin a subsidiary of PT Telekomunikasi Indonesia, Tbk), and TOT Public Co., Ltd.

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

## Hawaiki signs partnership for Hawaii landing

Hawaiki Submarine Cable LP, the New Zealand owner and developer of Hawaiki submarine cable system, has selected DRFortress as its landing and operating partner in Hawaii. As part of its system architecture, Hawaiki will land its proposed 14,000 km trans-Pacific cable from Australia and New Zealand to the U.S. West coast in Oahu, Hawaii.

Following the coming into force of the supply contract in March and the start of the marine survey in August, Hawaiki has achieved another key milestone of the system deployment by securing its Hawaii operations through a Landing Party Agreement with DRFortress.

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

## Lower Churchill cable progressing

After just over a month of cable installation, on August 13, 2016, the Lower Churchill Project's Marine Crossings Team successfully joined the first of three submarine cables installed on the seafloor in the Strait of Belle Isle, connecting Labrador to the island for the first time.

Since cable installation began in July, three cables have been laid on the seafloor between Forteau, Labrador and Shoal Cove on the Northern Peninsula. Each cable is first laid in two pieces that are pulled through conduits on each side of

the Strait by a cable installation vessel operated by Nexans. The pieces are then intricately joined together on the vessel and permanently laid on the seafloor.

The marine cable crossing is a critical component of the Muskrat Falls Project, connecting the Labrador and island portions of the 1,100 km transmission line that will carry electricity from Muskrat Falls to the Avalon Peninsula.

Construction on the marine cable crossing has progressed on schedule since work began in 2013, when the sites in Forteau and Shoal Cove were first cleared and prepared for development. Horizontal directional drilling (HDD) was then carried out on both sides of the Strait to create boreholes from the shore to the seafloor. That work was completed in mid-2014. In 2015, land cables were installed as part of the system that connects the submarine cables to the overhead transmission line from Muskrat Falls to Soldiers Pond.

Cable installation activities will continue in the Strait of Belle Isle over the next several months. The remaining two cables will be joined together, and a protective rock berm will be installed on top of all of the cables by a separate vessel. This activity is expected to begin by early September and take approximately 2 months to complete. All work associated with the marine cable crossing component of the Muskrat Falls Project is expected to be complete on schedule this fall.

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

#### **VBMS reports progress on offshore wind projects**

VBMS completed its cable installation work for one offshore wind project, while announcing contracts for two others.

The company has completed its scope for Vattenfall's Sandbank Offshore Wind Farm. A total of 76 inter-array cables were installed and post-lay buried within a limited time frame of approximately 2.5 months.

VBMS deployed their multipurpose vessels Ndurance and Ndeavor in order to simultaneously perform cable installation and placement of messenger wires, cable burial, cable connection, and cable testing works. For this project, VBMS successfully launched its in-house post-lay burial ROV 107-1100.

The Sandbank Offshore Wind Farm is situated in the German Bight, next to the DanTysk Offshore Windfarm. The 72 wind turbines will generate a total capacity of 288 MW.

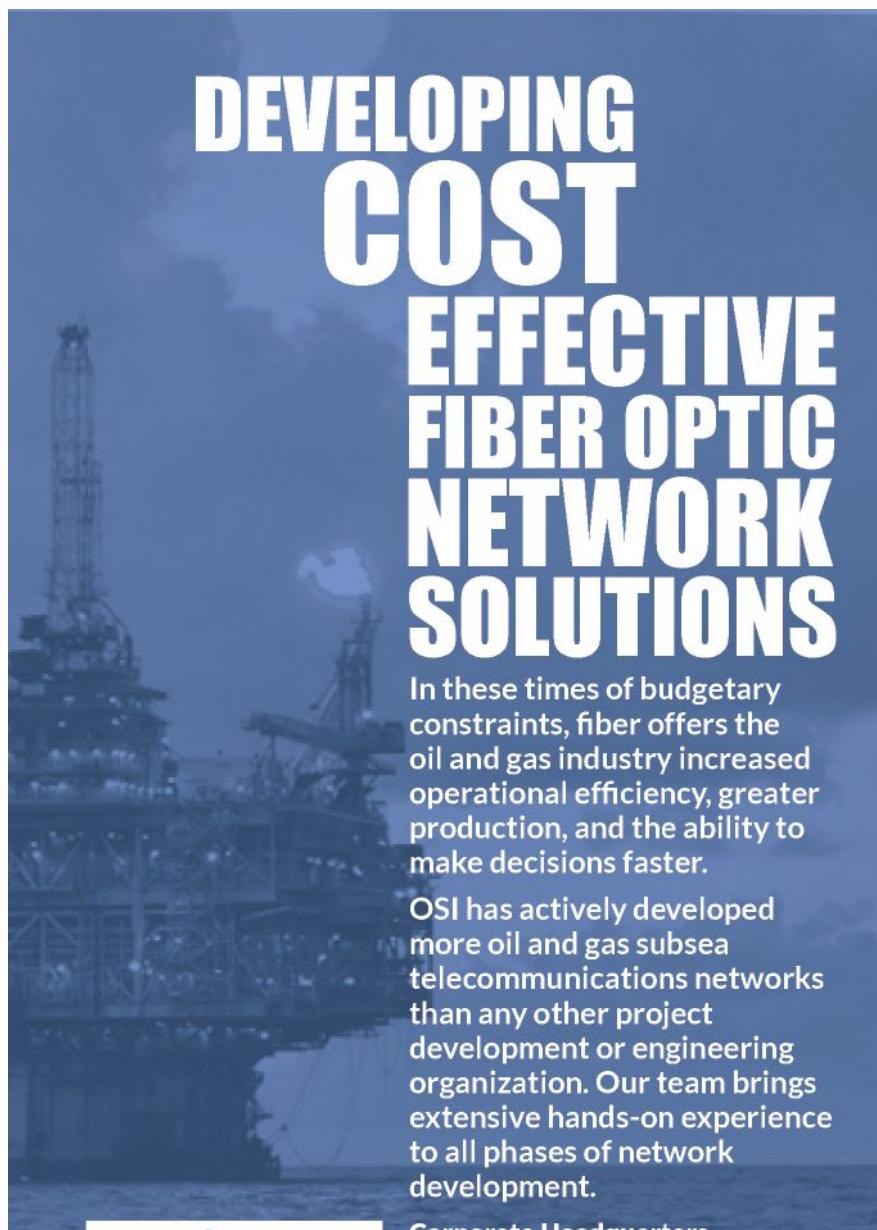
VBMS has been awarded a contract with Vattenfall Vindkraft A/S for the

installation of 33 kV inter-array cables for the Horns Rev3 offshore wind farm.

The farm, located in the eastern North Sea off the coast of Esbjerg, Denmark has a planned capacity of 400 MW and will produce the equivalent of the electricity consumption of 450,000 households by 2020. The works for VBMS are scheduled to be executed mid-2018 and will consist of supply, installation, CPS, post-lay burial, termination and testing of the inter-array cables.

VBMS also was awarded a contract by EDF Energy Renewables to provide the subsea connection between the offshore turbines and the onshore grid for the Blyth offshore wind farm. This will be the first project to use the new 66kV cable technology. The standard voltage for array cables until now has been 33kV, but with turbines growing in size, a higher specification cable has proven more cost-efficient.

EDF Energy Renewables is to install



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## SUBSEA CABLES

new turbine, foundation and cable technology in realistic offshore conditions before using the technology on a wider scale. The scope of work for VBMS includes the supply and installation of a total of approximately 14 km of export and inter-array cable, the landfall pull ashore, and testing, terminations and commissioning services. VBMS will be using one or more of its cable-laying vessels and burial tools and has contracted Nexans as the supplier for the 66 kV cables. Work is scheduled to commence in 2017.

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

### Clinton Marine wins cable tracking contract

Clinton Marine has been awarded a large-scale cable tracking project between Sweden and Denmark. Svenska kraftnät owns and operates the cables between Lindome located south of Gothenburg (Sweden) and Lässö (Denmark) of the HVDC link Konti-Skan.



The link consists of two separate cable systems (Konti-Skan 1 and Konti-Skan 2). Konti-Skan is a bipolar HVDC scheme. Pole 1 (Konti-Skan 1) was originally built in 1965 using mercury arc valves and was able to transmit up to 250 MW of power with an operating voltage of 250 kV. The original mercury arc scheme was taken out of operation and disconnected on 15 August 2006, being replaced by new equipment using thyristors with a power rating of 350 MW. Pole 2, the 1988-built Konti-Skan 2, was built with thyristors from the outset and can transmit 300 MW with a voltage of 285 kV.

The survey includes cable tracking, ROV video, multi-beam, and sidescan sonar on the link. The water depth is ranging between 0 to 80 m and has been conducted with our two survey vessels MV Lode and MV Stenkoll.

For more information, visit [www.clinton.se](http://www.clinton.se).

### Report highlights impact of cable on local economy

A report that was published on Scottish Hydro Electric Transmission's (SHE Transmission's) £1.1 billion Caithness-Moray project shows that almost two thirds of the total expenditure (£643.5 million) will be spent with UK-based suppliers and contractors.

One of SHE Transmission's commitments in delivering projects of this scale is to go further to ensure that communities in the local areas where it is working are able to share in and benefit directly from its investment.

To provide a measure of success in terms of employment on site throughout its supply chain, a snapshot was taken of employees working on the project sites at 31 March 2016 and found that a total of 144 were long-term residents of

## SUBSEA CABLES

Caithness and Sutherland while 73 were long-term residents in Moray.

To date, contracts with a value in excess of £47 million have been awarded through O4B in conjunction with key large contractors involved in the Caithness-Moray work such as Balfour Beatty, BAM Nutall and ABB.

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

### SeaPlanner to address offshore wind cable problems

Cable failures contribute to 77% of the financial losses of global offshore wind projects. This is evidenced by data reported by leading underwriter for renewable energy, Gcube. According to the report, insurance claims in 2015 exceeded €60 million in relation to incidents surrounding the installation and operation of high-voltage subsea cables—25% higher than in 2014. The financial implications of this concerning statistic can be significantly reduced with improved quality control during cable laying, as well as continuous monitoring and the implementation of reliable data collection and analysis platforms.

As the industry comes under increasing pressure to drive down costs, it is important for companies to address the issues that, according to the report by GCube, cause 100 days or more of unscheduled project delays and create substantial cost overruns.

SeaRoc Group recognizes that essential to achieving this is effective risk mitigation and has subsequently invested heavily in its marine management and monitoring system, SeaPlanner, which is designed to support offshore wind farm construction and O&M projects.

SeaPlanner integrates live data feeds from a variety of sources for a complete real-time view of site operations. Project data made available by SeaPlanner allows project teams to take proactive action to prevent incidents and potentially costly damages.

Recurring issues cause particular concern for the industry. SeaPlanner records data throughout the lifetime of a project including maintaining a log of all vessel and personnel movements across the site. Having access to this data allows for lessons to be learnt, improvement of processes and introduction of project standardization. Having a competent monitoring system in place also helps to secure funding and investment by being able to present, with evidence, progress on the project and demonstrate that risks are being effectively managed.

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

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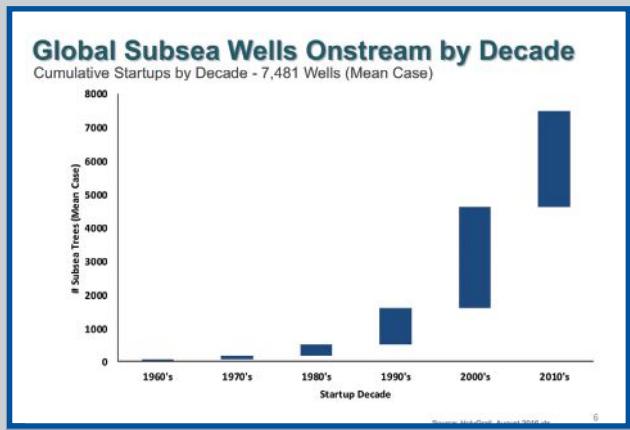
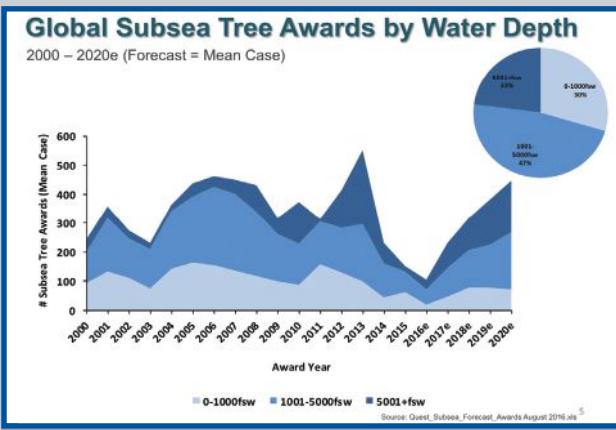
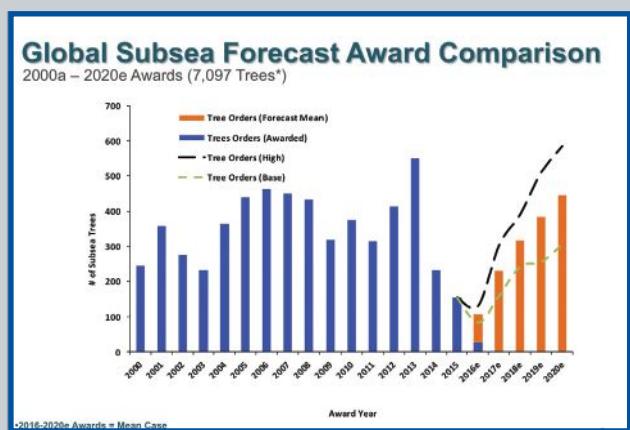
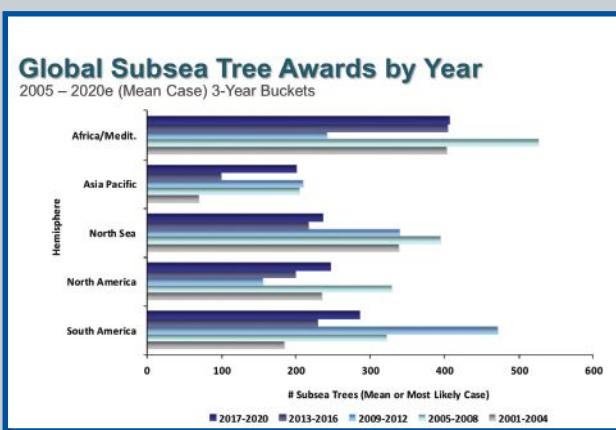
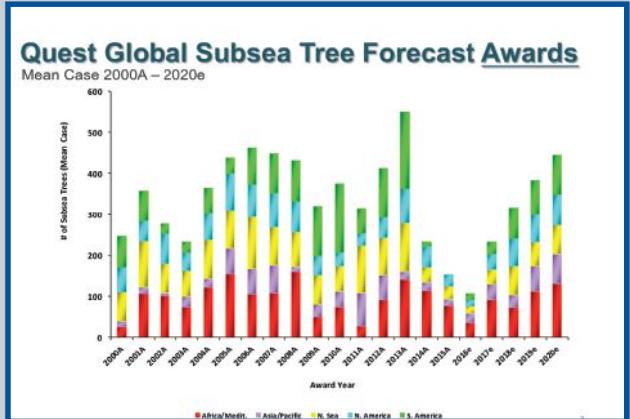
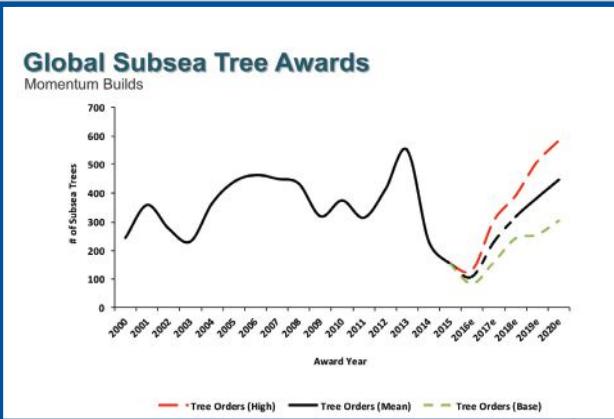
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# OFFSHORE STATS & DATA

## Quest Offshore Activity Report

October 2016

Ocean News & Technology



FOR MORE DETAILED INFORMATION

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# Gulf of Mexico Data

## Current Deepwater Activity

Operator	Area	Block	OCS Lease	Rig Name	Prospect Name	Water Depth (f)
SHELL OFFSHORE INC.	WR	508	G17001	T.O. DEEPWATER THALASSA	STONES	9,552
SHELL OFFSHORE INC.	AC	857	G17565	H&P 205	Great White	7,812
SHELL OFFSHORE INC.	MC	392	G26253	T.O. DEEPWATER PROTEUS	APPOMATTOX	7,220
CHEVRON USA INC	WR	758	G17015	T.O. DISCOVERER CLEAR LEADER	Jack	6,968
BP EXPLORATION & PRODUCTION INC	MC	822	G14658	T.O. DEVELOPMENT DRILLER III	Thunder Horse South	6,267
LLOG EXPLORATION OFFSHORE LLC	MC	427	G31498	SEADRILL SEVEN LOUISIANA	La Femme	5,782
BP EXPLORATION & PRODUCTION INC	MC	776	G09866	SEADRILL WEST VELA	Thunder Horse North	5,636
ENI US OPERATING CO INC	MC	773	G16647	*COIL TUBING UNIT (N.O. DIST)	Devil's tower	5,610
BP EXPLORATION & PRODUCTION INC	MC	777	G09867	HELIX QS000	Thunder Horse South	5,610
ENI US OPERATING CO INC	MC	773	G16647	NABORS POOL 140	Devil's tower	5,610
ANADARKO PETROLEUM CORPORATION	GC	859	G24194	*WIRELINE UNIT (HOUma DIST)	HEIDELBERG	5,355
ANADARKO PETROLEUM CORPORATION	GC	859	G24194	NOBLE BOB DOUGLAS	HEIDELBERG	5,355
HESS CORPORATION	MC	726	G24101	STENA FORTH	Tubular Bells	4,611
COBALT INTERNATIONAL ENERGY LP	GB	959	G30876	ROWAN RELIANCE	North Platte	4,570
BP EXPLORATION & PRODUCTION INC	GC	782	G15610	MAD DOG SPAR RIG	Mad Dog Phase 2	4,428
CHEVRON USA INC	GC	640	G20082	T.O. DISCOVERER INSPIRATION	Tahiti 2	4,292
CHEVRON USA INC	GC	640	G20082	T.O. DEEPWATER ASGARD	Tahiti 2	4,251
CHEVRON USA INC	GB	998	G31688	PACIFIC SANTA ANA		4,235
ANADARKO PETROLEUM CORPORATION	GC	563	G34992	DIAMOND OCEAN BLACKHAWK	Timon	4,200
ANADARKO PETROLEUM CORPORATION	GC	562	G11075	DIAMOND OCEAN BLACKHORNET	K-2	3,926
HESS CORPORATION	GC	512	G26315	DIAMOND OCEAN BLACKLION	Stampede	3,531
SHELL OFFSHORE INC.	MC	762	G07957	ATWOOD CONDOR	Deimos	3,144
SHELL OFFSHORE INC.	MC	807	G07957	OLYMPUS N88	MARS	3,039
CHEVRON USA INC	GC	205	G05911	*WIRELINE UNIT (HOUma DIST)	Genesis	2,590
CHEVRON USA INC	VK	786	G10944	NABORS 87	Petronius Compliant	1,754
HESS CORPORATION	GB	200	G17307	CAL-DIVE Q-4000	Northwestern	1,736
ENVEN ENERGY VENTURES LLC	EW	1003	G13091	*WIRELINE UNIT (N.O.DIST)	Prince	1,490
HESS CORPORATION	GB	215	G09216	NOBLE PAUL ROMANO	Conger	1,450
WALTER OIL & GAS CORPORATION	EW	834	G33140	H&P 203	Hummingbird	1,186
HESS CORPORATION	GB	215	G09216	NOBLE PAUL ROMANO	Conger	1,450
WALTER OIL & GAS CORPORATION	EW	834	G33140	H&P 203	Hummingbird	1,186
W & T ENERGY VI LLC	VK	823	G10942	*HYDRAULIC WORKOVER UNIT (N	Virgo	1,132
ENVEN ENERGY VENTURES LLC	MC	194	G02643	*LIFT BOAT (NEW ORLEANS DIST)	Cognac	1,024
FIELDWOOD SD OFFSHORE LLC	EB	160	G02648	*NONE RIG PA OPERATION (LJ)	Cerveza	940
FIELDWOOD SD OFFSHORE LLC	EB	159	G02646	*WIRELINE UNIT (L.J.DIST)	Ligera	924
FIELDWOOD SD OFFSHORE LLC	EB	159	G02645	*WIRELINE UNIT (L.J.DIST)	Ligera	924
WALTER OIL & GAS CORPORATION	VK	986	G14618	*NON RIG PA OPERATION	VK986	893
EXXON MOBIL CORPORATION	SM	6636	P00188	*WIRELINE (GENERIC)		842
CHEVRON USA INC	GB	189	G06358	*WIRELINE UNIT (L.C.DIST)	Tick	718
FIELDWOOD SD OFFSHORE LLC	EB	110	G02650	*NONE RIG PA OPERATION (LJ)	Tequila	660
FIELDWOOD SD OFFSHORE LLC	EB	110	G02650	*WIRELINE UNIT (L.J.DIST)	Tequila	660
SOJITZ ENERGY VENTURE INC	GB	142	G21381	*COIL TUBING UNIT (L.J. DIST)	Matia	543
SOJITZ ENERGY VENTURE INC	GB	142	G21381	*WIRELINE UNIT (L.J.DIST)	Matia	543

Deepwater prospects with drilling and workover activity: 41

October 2016

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Ocean News & Technology

Current Deepwater Activity as of Tuesday, September 13, 2016

### Activity by Water Depth

Water Depth (m)	Active Leases	Approved Applications	Active
0 to 200	1,090	36,344	2,156
201 to 400	72	1,135	20
401 to 800	144	904	10
801 to 1000	203	580	9
1000 and Above	2,203	2,168	30

### Rig Activity Report 12 August 2016

Location	Week of 09/09	Week +/-	Week Ago	Year +/-	Year Ago
Land	485	3	482	-328	813
Inland Waters	5	0	5	1	4
Offshore	18	8	10	-13	31
U. S. Total	508	11	497	-340	848
Gulf Of Mexico	18	8	10	-11	29
Canada	134	-3	137	-51	185
North America	642	8	634	391	1033

Activity by Water Depth Information current as of Monday, September 12, 2016.

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

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

# Monthly Stock Figures & Composite Index

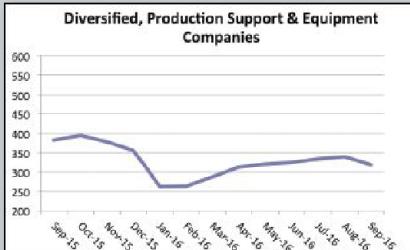
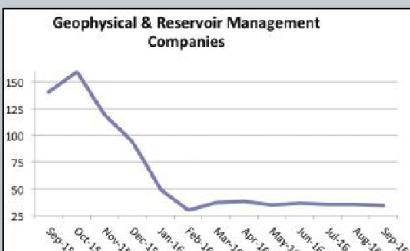
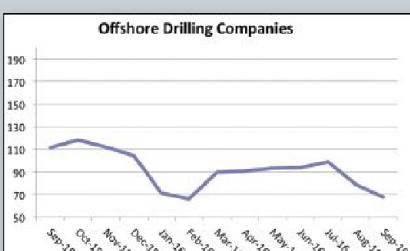
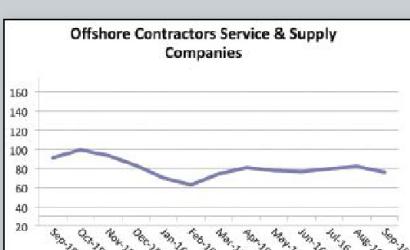
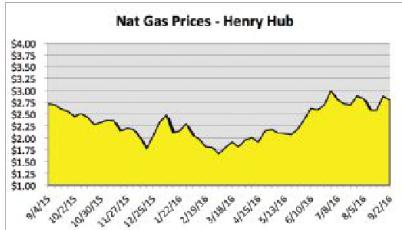
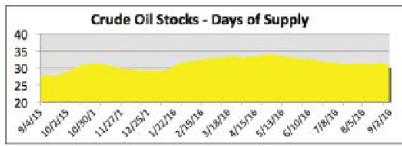
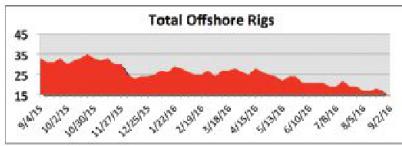
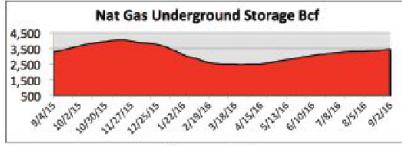
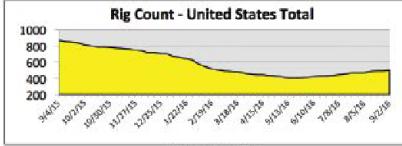
Industry Company Name	Symbol	Close (Mid) September	Close (Mid) August	Change	Change %	High 52 week	Low
<b>Diversified, Production Support and Equipment Companies</b>							
Baker Hughes, Inc.	BHI	48.42	50.77	-2.35	-4.6%	58.23	37.58
Forum Energy Technologies, Inc.	FET	17.26	17.78	-0.52	-2.9%	19.32	8.47
Drill-Quip, Inc.	DRQ	52.40	56.98	-4.58	-8.0%	68.69	48.88
Halliburton Company	HAL	41.26	44.83	-3.57	-8.0%	46.90	27.64
Tenaris SA	TS	26.09	28.98	-2.89	-10.0%	29.89	18.53
Newpark Resources, Inc.	NR	6.71	7.23	-0.52	-7.2%	7.72	3.35
Schlumberger Ltd.	SLB	76.37	81.51	-5.14	-6.3%	83.97	59.60
Superior Energy Services, Inc.	SPN	15.14	17.42	-2.28	-13.1%	19.83	8.25
Weatherford International, Inc.	WFT	5.92	5.84	0.08	1.4%	11.49	4.71
Deep Down, Inc.	DPDW	0.98	0.83	0.15	18.1%	0.98	0.83
FMC Technologies	FTI	27.61	27.25	0.36	1.3%	28.92	27.41
<b>Total Diversified, Production, Support and Equipment.....</b>	<b>318.16</b>	<b>339.42</b>	<b>-21.26</b>	<b>-6.3%</b>	<b>375.94</b>	<b>245.25</b>	
<b>Geophysical / Reservoir Management</b>							
Dawson Geophysical Company	DWSN	6.73	7.56	-0.83	-11.0%	8.87	2.90
Mitcham Industries, Inc.	MIND	3.19	2.95	0.24	8.1%	5.00	2.24
Compagnie Gnrale de Gophysique-Veritas	CGV	24.43	24.98	-0.55	-2.2%	26.88	23.99
<b>Total Geophysical / Reservoir Management.....</b>	<b>34.35</b>	<b>35.49</b>	<b>-1.14</b>	<b>-3.2%</b>	<b>40.75</b>	<b>29.13</b>	
<b>Offshore Drilling Companies</b>							
Atwood Oceanics, Inc.	ATW	6.91	8.88	-1.97	-22.2%	19.65	4.82
Diamond Offshore Drilling, Inc.	DO	14.80	19.32	-4.52	-23.4%	26.72	14.18
ENSCO International, Inc.	ESV	6.89	8.59	-1.70	-19.8%	18.93	6.67
Nabors Industries, Inc.	NBR	9.24	10.03	-0.79	-7.9%	12.33	4.93
Noble Drilling Corp.	NE	5.63	6.34	-0.71	-11.2%	14.64	5.30
Parker Drilling Company	PKD	2.20	2.18	0.02	0.9%	3.64	0.98
Rowan Companies, Inc.	RDC	12.59	13.63	-1.04	-7.6%	21.83	10.67
Transocean Offshore, Inc.	RIG	9.12	9.95	-0.83	-8.3%	17.19	7.67
<b>Total Offshore Drilling.....</b>	<b>67.38</b>	<b>78.92</b>	<b>-11.54</b>	<b>-14.6%</b>	<b>134.93</b>	<b>55.22</b>	
<b>Offshore Contractors, Services, and Support Companies</b>							
Helix Energy Solutions Group, Inc.	HLX	6.8	7.96	-1.16	-14.6%	9.07	2.60
Gulf Island Fabrication	GIFI	8.72	9.21	-0.49	-5.3%	13.25	6.34
McDermott International, Inc.	MDR	4.82	5.06	-0.24	-4.7%	6.00	2.20
Oceaneering International	OII	25.38	28.32	-2.94	-10.4%	48.11	25.10
Subsea 7 SA	SUBCY.PK	10.24	11.25	-1.01	-9.0%	11.60	4.86
Technip ADS	TKPPY.PK	14.28	14.13	0.15	1.1%	15.35	9.69
Tetra Technologies, Inc.	TTI	5.75	6.22	-0.47	-7.6%	9.44	4.62
<b>Total Offshore Contractors, Service, and Support.....</b>	<b>75.99</b>	<b>82.15</b>	<b>-6.16</b>	<b>-7.5%</b>	<b>112.82</b>	<b>55.41</b>	
<b>Offshore Transportation and Boat Companies</b>							
Seacor Holdings, Inc.	CKH	56.88	55.37	1.51	2.7%	67.60	41.24
Gulfmark Offshore, Inc.	GLF	1.90	2.62	-0.72	-27.5%	8.92	1.84
Bristow Group	BRS	11.09	11.91	-0.82	-6.9%	12.93	10.43
PHI, Inc.	PHII	17.60	18.52	-0.92	-5.0%	29.00	13.05
Tidewater, Inc.	TDW	3.23	4.87	-1.64	-33.7%	18.10	3.05
Swire Pacific	SWRAY	11.01	12.04	-1.03	-8.6%	12.13	9.06
Hornbeck Offshore	HOS	5.25	5.50	-0.25	-4.5%	17.81	4.92
<b>Total Offshore Transportation and Boat .....</b>	<b>106.96</b>	<b>110.83</b>	<b>-3.87</b>	<b>-3.5%</b>	<b>166.49</b>	<b>83.59</b>	

October 2016

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Ocean News &amp; Technology

# Monthly Stock Figures & Composite Index

Industry	Close (Mid) September	Close (Mid) August	Change %	Change	High 52 week	Low
<b>Total Diversified, Production, Support and Equipment</b>	318.16	339.42	-21.26	-6.3%	375.94	245.25
						
<b>Total Geophysical / Reservoir Management</b>	34.35	35.49	-1.14	-3.2%	40.75	29.13
						
<b>Total Offshore Drilling</b>	67.38	78.92	-11.54	-14.6%	134.93	55.22
						
<b>Total Offshore Contractors, Service and Support</b>	75.99	82.15	-6.16	-7.5%	112.82	55.41
						
<b>Total Offshore Transportation and Boat</b>	106.96	110.83	-3.87	-3.5%	166.49	83.59
						
<b>Total Offshore Source Index</b>	602.84	646.81	-43.97	-6.8%	830.93	468.60
<b>DISCLAIMER</b>						
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.						
<h2 style="color: #336699;">Oil &amp; Gas Industry Trends</h2> <p style="color: #FF0000; font-style: italic;">Monitoring the Pulse of the U.S. Offshore Oil &amp; Gas Industry</p>						
 <p><b>Cushing, OK - WTI Spot Prices</b></p> <p>*Source - EIA</p>						
 <p><b>Nat Gas Prices - Henry Hub</b></p> <p>* NYMEX Close</p>						
 <p><b>Crude Oil Stocks - Days of Supply</b></p> <p>*Source - EIA</p>						
 <p><b>Total Offshore Rigs</b></p> <p>*Baker Hughes</p>						
 <p><b>Nat Gas Underground Storage Bcf</b></p> <p>*Source - EIA</p>						
 <p><b>Rig Count - United States Total</b></p> <p>*Baker Hughes</p>						
 <ul style="list-style-type: none"> <li><span style="background-color: green; display: inline-block; width: 15px; height: 15px;"></span> Positive trend, at least 3 weeks</li> <li><span style="background-color: yellow; display: inline-block; width: 15px; height: 15px;"></span> Changing trend, less than 3 weeks</li> <li><span style="background-color: red; display: inline-block; width: 15px; height: 15px;"></span> Negative trend, at least 3 weeks</li> </ul>						

## Datawell Wave Buoy supports NASA's Wallops Island beach stability study

A new Datawell Directional Waverider (Mk III) wave buoy has been deployed 9 mi offshore Wallops Island, Virginia. The buoy was funded by NASA's Goddard Space Flight Center for stability studies of an engineered beach. The beach was built by the U.S. Army Corps of Engineers Norfolk District in 2012 to protect NASA's Wallops Island Launch facilities. It was partially renourished in 2014 to restore its protective capabilities following extra-tropical storm Sandy.

The Waverider incorporates some of Datawell's novel engineering in their well-proven standard buoy. Solar panels power the buoy by day and charge super-capacitors for power at night. During extended cloudy periods, an intelligent regulator draws sequentially from three high-capacity battery banks. For this deployment the solar panels reduce battery usage and provide an extended deployment life. At some locations the solar panels suffice and the batteries are not used at all. The buoy hull is composed of Cunifer-10, a copper/nickel/iron alloy that is a natural biocide and requires no anti-foulant coating. Full spectral data are transmitted via Iridium satellite telemetry every half hour. The buoy is purpose-built for wave observations and makes no concessions for additional sensors (such as a met tower), so the wave observations are of the highest quality and well suited for this research.

The buoy was procured by Geodynamics and was deployed and is maintained by the U.S. Army Corps of



*Credit: Pat Dickhut at the USACE Field Research Facility, Duck, North Carolina.*

Engineers Field Research Facility. Data management is provided by the Scripps Coastal Data Information Program. Real-time data are available from several sources including <http://frf.usace.army.mil>, [cdip.ucsd.edu](http://cdip.ucsd.edu), or [ndbc.noaa.gov](http://ndbc.noaa.gov).

For more information, visit [www.datawell.nl](http://www.datawell.nl).

## Subsea laser scanners

Capturing subsea inspection data within 0.1 mm accuracy at depths up to 4,000 m is now possible with Newton Labs' underwater laser scanners designed for deep sea inspection. Newton, the world's largest manufacturer of underwater laser scanners, will take orders on the new products immediately.

Underwater laser scanning captures sub millimeter measurements beyond the capabilities of ultrasound. Newton's new models, the M1500UW, M3200UW and M4000UW, operate at depths of 1,500, 3,200, and 4,000 m. Laser scan data is easily converted to CAD modeling for the most accurate measurement and structural analysis available on the IRM market.

Newton's underwater laser scanners offer a variety of deployment options including standard ROV integration. A live camera view and selective region of interest allows for precision targeting, saving operators valuable deployment time. The average scan time is between 30-90 seconds and can be adjusted based on user controlled settings.

Newton's comprehensive product line now covers nearly all underwater measurement applications. In addition, Newton leverages this technology into a variety of application specific robotic solutions.

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

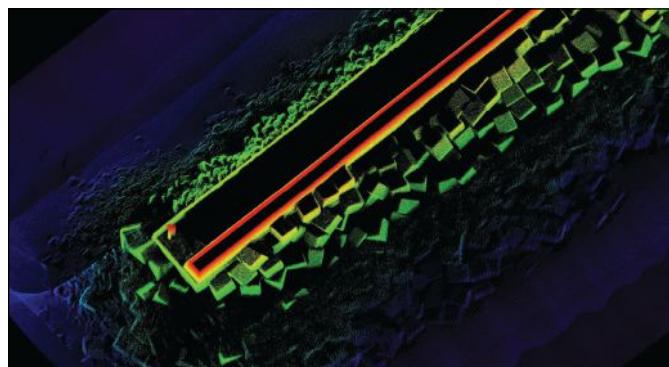


## NORBIT announces release 10.0

NORBIT Subsea is proud to announce Release 10.0. This updated firmware/software package increases the performance of the WBMS family of systems with the industry's highest resolution side-scan snippets (which take full benefit of the cylindrical array and the 80kHz FM bandwidth), roll stabilization over 160° swath (Applanix interfaced), flexible water column display / output and enhancements to the intuitive user interface.

NORBIT Release 10.0 also includes mechanical updates—the tightly integrated iWBMSx now connects sonar, IMU and sound probe with only a single wet cable to small topside unit leaving space for auxiliary sensors to be integrated, this includes the iLiDAR, forward looker or second WBMS.

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



## Ashtead boosts rental fleet with cost-effective subsea navigation technology

Ashtead Technology, a global leader in marine technology and subsea services, has expanded its equipment rental pool following a significant investment in a state-of-the-art subsea navigation system that has been proven to deliver faster, more accurate results in the toughest environments.

The iXblue RAMSES is an acoustic synthetic baseline positioning tool with self-contained computing, for simple, efficient, real-time underwater navigation. Coupled with iXBlue inertial navigation system (INS), it delivers extreme precision in even the world's most challenging seas.

It can be used to track the position of subsea structures without the need for multiple transponders or umbilicals, enabling immediate and simplified mobilisation. Traditionally, achieving subsea accuracy required the deployment and calibration of subsurface equipment—an often lengthy and very costly process.

With the iXblue RAMSES system, an ROV can place a single beacon on the seafloor and achieve positioning precision, allowing for improved operational flexibility, significant cost savings, improved operational efficiency and higher levels of acoustic accuracy.

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



## Global Ocean Design wins patent for pressure activated switch

Global Ocean Design has won a second patent; this time for a pressure activated switch. The switch triggers at a depth of 2-3 atm yet can survive overpressure to 1,100-atm. The super-strong Ti-6-4 switch body is also corrosion



proof. It comes in several versions: for glass spheres (G-120), end caps (G-121), or in-line applications (G-117). All switches have the initial option of "OFF" at surface, "ON" at depth or "ON" at surface, "OFF" at depth.

The G-120 comes with a standard Titanium Grade 5 (Ti 6-4) body for use in glass spheres or the in-line version, but the G-121 can be made of other materials to match a specific endcap material to avoid galvanic corrosion. Each switch is individually serialized and tested to their design limit. The G-120 and G-121 are rated to 18,000 psi.

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

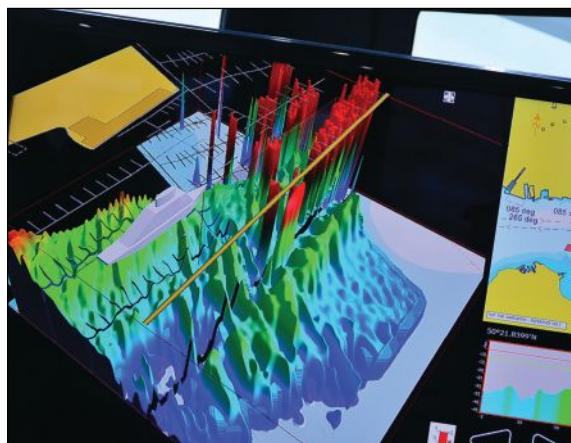
## Sonardyne delivers collision avoidance sonar to MARSS Group for new private vessel

Maritime security company, Sonardyne International Ltd., UK, has announced that it has supplied forward-looking sonar technology to MARSS Group of Monaco for a 120 m-plus private vessel that was recently delivered to its new owner in Europe.

The NOAS (Navigation and Obstacle Avoidance Sonar) system was specified for the unnamed vessel to allow it to explore remote, poorly charted places with the assurance that potentially hazardous underwater obstacles can be identified and avoided. The contract also included the supply of Sonardyne's market-leading diver detection sonar, Sentinel. This complements the NOAS installation to enable the detection of underwater intruders approaching the vessel when stationary.

Integrated into the vessel's MARSS Group NiDAR command and control system (C2), NOAS images the water column over a wide field of view to offer long range detection and mapping of the seabed, delivering reliable early warning of collision and grounding hazards. When shallow water or an obstruction is detected, NOAS automatically alerts the crew to the danger so that they can take avoiding action.

NOAS has multiple imaging modes to suit both open water cruising and shallow water, close-in manoeuvring. In 2D mode, the system aids navigation by continuously monitoring 180° in front of the vessel for underwater objects up to 1.5 km away. When sailing close to shore and approaching harbours, NOAS' 3D mode creates a highly detailed image of the seabed directly ahead of the vessel, displaying water depth and terrain information on an interactive 3D moving map. Uniquely, NOAS stores the sonar imagery for the



terrain it has recently passed over, enabling users to instantly explore alternative routes without the need for re-scanning should a sudden change in course be required.

The compact design of the NOAS sonar assembly enables it to be fully enclosed within the bulbous bow of a vessel with nothing protruding external of the hull to affect hydrodynamic performance. This makes the system particularly suitable for retro-fitting into existing vessels and unlike similar forward-look sonars, NOAS can be serviced and maintained without the need for dry docking.

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

## New Ocean Signal E101V float-free EPIRB with VDR memory capsule

The new Ocean Signal E101V float-free EPIRB with integrated voyage data recorder (VDR) memory capsule is designed according to the latest VDR performance standards as a leading



solution for commercial vessels of 3000+ gross tonnage.

Developed in collaboration with VDR specialist AMI Marine, the E101V is Cospas Sarsat and MED certified and approved to IEC61097-2 as a float-free EPIRB with built-in memory capsule.

Enabling ship owners and operators to meet new mandates for VDRs as defined by IMO Resolution MSC.333(90), the Ocean Signal device can be easily integrated with a vessel's VDR, a vital on-board system that helps to identify the cause of any accident, evaluate decision making on-board at the time of an incident, improve safety and also assist in accident avoidance, training and other areas of maintenance, monitoring and analysis.

The E101V features a dedicated float-free housing with improved hydrostatic release unit and automatic disconnection of the interface cable on release before 4 m depth, ensuring the stored data can be easily and quickly retrieved in the event of an accident or incident.

With 406 MHz Cospas Sarsat satellite alerting and 121.5 MHz homing, the Ocean Signal device features an integral 66-channel GPS receiver, rather than the 22-channel GPS featured in other products, which ensures fast and accurate positioning as the device is able to acquire the position from a cold start by seeking all the satellites simultaneously to determine which are in view.

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

## CTG algae monitoring system for United Utilities

United Utilities has chosen the Chelsea Technologies Group (CTG) ALGAE-Wader Pro and ALGAE-Station Pro systems to assist them in real time assessment of algae levels in their water sources feeding into a number of their Water Treatment Works.

The CTG algae monitoring systems



were chosen after an extended trial period which successfully demonstrated the use of the TriLux fluorometer, from that these systems are based, in detecting chl-a, Phycocyanin and Phycoerythrin levels.

The CTG ALGAE-Wader Pro is a portable system that includes the Hawk handheld display and logger. The Hawk provides simple and robust interaction with the field operator, displays all data in either numerical or graphical form, provides RAG thresholds and logs all data with both time and position stamps.

The CTG ALGAE-Station Pro is a robust wall-mounted system that includes the Watchkeeper display and logger. The Watchkeeper displays and logs all data, provides Alarm thresholds and outputs 4 to 20 mA for connection to SCADA type networks.

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

## PREVCO pressure testing

PREVCO USA currently has three pressure testing chambers where in-house testing and pressure testing for outside clients is being conducted. The smaller of the three chambers can test underwater housings up to 10,000 psi and can accommodate vessels with maximum diameters of 8.5 in. by 30 in. in length. The medium sized chamber will accommodate housings up to 17 in. diameter and 8 ft in length, with a maximum pressure of 2,675 psi. The new larger chamber has an ID of 24 in. and length of 120 in. and can pressure test up to 15,000 psi. The PREVCO standard test is for two 10-minute holds and one 1-hour hold. Depending on size, it is possible to test several items together in a batch.

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

## TRIAxYS Wave Buoy now available with AIS aid to navigation

AXYS Technologies (AXYS) is pleased to announce the addition of AIS vessel tracking to our signature wave buoy series, TRIAXYS. The SRT Chronos Aid to Navigation (AtoN) AIS is an IALA and IEC compliant device that broadcasts buoy position and weather information to local vessel traffic.

This new feature both protects the buoy from collision by notifying vessels of its whereabouts and can also act as an additional telemetry method, providing data within radio range.

"This is the first time that a wave buoy has been equipped with AIS and confirms our strategy of continuous improvement for the TRIAXYS family



of buoys," says Graham Howe, AXYS director of sales. "We are excited to bring this development to the market as this will not only give our clients greater protection against vessel damage but also give them another telemetry option."

The TRIAXYS AIS implementation supports both message 21 data, which displays buoy information and position data on the AIS channel of passing vessels, and message 8 data transmission.

The TRIAXYS Buoy is a precision instrument incorporating advanced technologies that make it an easy to use and reliable buoy for accurate measurement of directional waves and ocean currents in real time. Economical and rugged, the TRIAXYS Buoy can withstand the rigours associated with deployment and recovery operations. The TRIAXYS is the only 1 m wave buoy on the market that can support an industry standard ADCP for water column current speed and direction profiling.

AIS is available on all TRIAXYS family buoys from 1 September 2016.

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

## Seateronics continue to invest in industry leading technology with iXblue RAMSES System

Seateronics, an Acteon company and leaders in the rental and sale of marine electronic equipment, has announced its investment in iXblue's RAMSES system to increase its client's objectives of operational efficiency. iXblue are leading global provider of innovative navigation, positioning and imaging solutions.

Seateronics continues to develop its business through the provision and development of leading technology, providing its clients with increased efficiencies through forward thinking solutions.

Seateronics has taken delivery of the systems and is fully proficient and ready to assist its clients around the world with immediate and simple mobilisations.

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

## Hydroid announces software updates for REMUS vehicle and REMUS vehicle interface program

Hydroid, Inc., a subsidiary of Kongsberg Maritime and a leading manufacturer of marine robotic systems announced version 7.4.0 software updates for its REMUS AUV and REMUS vehicle interface program (VIP), an intuitive graphical interface that allows REMUS users to view the vehicle's status, program missions and download the data, all from one easy-to-use program.

Hydroid's 7.4.0 software updates include those listed below.

### REMUS Vehicle

- Added Support for the Line Capture Line Recovery (LCLR) Module: This allows for increased operational flexibility for autonomous launch and recovery.
- Added Support for the BlueView MB1350 Multibeam Profiler Sonar: The Blueview Multibeam sensor is now used in conjunction with a sidescan sonar to fill the sidescan nadir.
- Improved Navigation with the Kearfott INS: The Kearfott INS has been updated with the sound speed calculated by REMUS, which allows it to perform well in low or near zero salinity environments.
- RECON Interface (Version 1.26): RECON now supports USBL range bearing measurements. A new command has been added to the RECON interface to provide the range and bearing to the transponder. This will enable customer applications to gain access to the DUSBL data to perform homing and docking maneuvers.
- Added support for the Rockwell Collins Polaris GPS: Changing between the GB-GRAM and Polaris GPS receivers is now supported with the REMUS configuration file.

### REMUS VIP

- Improved Licensing: The Hydroid VIP now uses an encrypted license file for defining the licensed options with the VIP.
- Automatic Identification System: The Automatic Identification System (AIS) is a tracking system used on ships for identifying and locating vessels by electronically exchanging data. The VIP will now show ship traffic and current positions on the navigation page.
- Added VIPRE interface: The added VIPRE interface is a TCP/IP server running within the VIP that provides real-time status to the vehicle connected via the Ethernet or Wi-Fi. The interface supports mission uploads and downloads, vehicle status and acoustic modem messages for up to four vehicles.

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

## ASL Environmental Sciences has been leasing MetOcean instruments for 30 years

Back in the 80s, ASL Environmental Sciences were leasing equipment such as the Neil Brown ACM2 acoustic current meter and the Aanderaa RCM4 rotor and vane current meter. This was before Doppler profilers were introduced by RDI. The RCM4's and first CTD, an AML STD12+, recorded to tape. Yes, hard for you young ones to believe.

The lease pool currently contains over 50 TRDI ADCPs (75 through 1,200 kHz, including StreamPro, RiverRay and Sentinel-V), about 100 water quality loggers and profilers (RBR and Seabirds, profilers and loggers, some with turbidity, dissolved oxygen, and chlorophyll), over 70 EdgeTech acoustic releases (PORTs, CARTs) and deck boxes, a dozen wave and tide pressure gauges, various acoustic pingers and transponders, almost 20 Ice and zooplankton-fish profilers, various Iridium and ARGOS satellite beacons and RF/flashers, flotation and mooring cages and bottom frames, and Niskin bottles and grab samplers.

Clients are worldwide and include oil & gas, engineering firms, mining, renewable energy, consultants, and government agencies.

An extensive lease pool of oceanographic equipment is available. We are proud of our ongoing commitment to quality field performance, prompt delivery, and dedicated oceanographers on staff. We can help with program planning, field services and data analysis.

For more information, visit [www.aslenv.com/lease.html](http://www.aslenv.com/lease.html).



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### Polymer Corporation advances plastic parts production for marine applications

Polymer Corporation, based in Rockland, Massachusetts, long has been a leading manufacturer of high-performance, difficult-to-produce plastic parts and assemblies for surface, underwater and deep sea use. Its parts are tough, lightweight, don't corrode or rust, and meet a wide variety of mission-specific performance requirements.

Polymer has extensive knowledge of materials for marine use and continues to extend its repertoire of custom-formulated, application-tailored materials. It can machine precision parts quickly in any of these materials. Furthermore, its pioneering liquid resin casting process is ideal for many marine applications—thick walls for extreme depth pressures, no-leak windows and sensor zones, design freedom to reduce potential leak paths, low-cost tooling and fast time to first article. Polymer often encapsulates delicate electronics, GPS modules, antennae and other critical components.



Polymer now is leading the way in the use of additive manufacturing, or 3D printing, to advance production possibilities for fully functional plastic parts. No tooling, no long wait, tough parts that perform. It recently produced the propeller shown for an underwater defense propulsion application, going from an engineering part design file to a finished, vehicle-ready part in an hour. The future imagined and delivered!

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

### STR acquires cable counter technology from Remontec

Great Yarmouth-based Subsea Technology & Rentals Ltd (STR), global specialists in the design, production

and rental of advanced subsea technology for the offshore industry, have acquired the product rights to Remontec's cable counter technology.

Under the terms of the agreement, STR now own the design and copyright covering all Remontec's T-Count Cable Counter range and have commenced a manufacturing and product development programme to ensure continued availability.

The robust wireless cable counter blocks are already used by STR's customers for various oceanographic applications and will continue to complement their expanding portfolio of specialist technology.

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



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## Underwater video aids aquaculture and marine researchers

Many aquaculture farms are discovering an underwater video system is a must-have tool for their operations. The camera transmits live video to the surface for viewing and recording, allowing the aqua farmer to check the health of the finfish or shellfish, as well as the condition of the tanks, cages, or area where they are being cultivated. Operators can instantly see how the population is fairing, if nets need repairing, if predators have entered, the condition of ropes and anchors, the amount of waste material present and other important environmental factors. This allows the farmer to make quick decisions to keep his stock healthy, intact, and profitable.

One company employing this technology is Grieg Seafarms in Newfoundland, Canada. The company recently received approval from the provincial government to begin construction of what will be the largest and most modern salmon hatchery in the world. Grieg will construct a number of sea cages in Placentia Bay where fish

will mature until ready for harvest. One of first tools the company acquired to assist in this project is JW Fishers DV-2 drop video system, which has a high resolution color camera mounted in rugged, corrosion-proof housing equipped with two high intensity LED lights. The camera is lowered from a topside vessel or platform and continuously transmits live video to the surface for viewing and recording. The subsea picture can be displayed on a TV, video monitor, computer, or Fishers VRM-1, which has a built-in ultra-bright LCD monitor and digital video recorder. The system will allow company officials to oversee the underwater construction process and prove instrumental when the aquafarm goes into full operation.

Another Canadian company involved in aquaculture is SIMCorp with offices in New Brunswick, Nova Scotia, and Newfoundland. The company employs teams of professional marine biologists and technicians who are fully equipped to work on all stages on production. One of the tools the teams employ is Fishers drop video system. SIMCorp

biologist Janelle Arsenault routinely works with the drop system and reports, "It produces a great picture of subsea environment and helps make our job a little easier."

Aquaculture farmers are not the only ones getting help from these underwater cameras. CH2M, a multi-billion dollar company with offices around the world, offers a diverse range of environmental, engineering, management, and consulting services. On a recent project in Puerto Rico, a team of CH2M divers assisted government regulators by collecting sediment samples from the ocean bottom and sending live video of the procedure to observers on the topside support vessel. The camera system the team acquired for this job was Fishers DHC-2 diver-held video system with 300 ft of umbilical and a VRM-1 recorder and monitor. CH2M biologist and AAUS scientific dive safety officer Lora Pride reported, "We are very pleased with the equipment purchased from Fishers. The video quality is great and the camera and monitor are easy to operate."

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



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Klein Marine Systems, Inc. announced that **Joe Kane** has joined Klein as director of operations and manufacturing. Kane brings a broad range of manufacturing leadership experience to Klein, having been highly effective with revenue growth, cost reductions and quality improvements within various roles of leading electronic manufacturers. He will be responsible for supply chain management, manufacturing and customer service for Klein's side scan sonar, bathymetry products and maritime security and surveillance systems.

Anadarko Petroleum Corporation announced that **Darrell Hollek**, formerly executive vice president, U.S. onshore exploration and production, has been named executive vice president, operations with responsibility for the company's U.S. onshore exploration, production and midstream activities, along with its Gulf of Mexico and international operations. The company also announced **Ernie Leyendecker**, formerly sr. vice president, international exploration, has been named executive vice president, international and deepwater exploration.

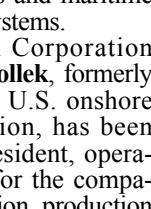


Kane

Phoenix International Holdings, Inc. is pleased to announce that **James (Jim) Donnelly** has joined the company to further develop business opportunities and strengthen our worldwide presence with clients for our growing commercial oil and gas division. He comes with a wealth of experience within the industry, beginning over 40 years ago as a diver tender to his current tenure as an accomplished technical sales representative with strengths in regional market development, account management and a proven track record of facilitating long term business relationships.

Decom North Sea has appointed **Nigel Lees** as the new chairman of the board. As vice president responsible for decommissioning at Wood Group, Lees has amassed considerable experience in decommissioning, as well as an extensive industry network, and has been an active member on the Decom North Sea board of directors for the past 5 years.

EdgeTech recently promoted **Dylan Lynch** to the role of customer service manager. Lynch has worked with



Lees

EdgeTech for over 7 years, holds an Ocean Engineering degree, and is extremely knowledgeable on all of the EdgeTech products. EdgeTech is also happy to announce that **Adam Lipper** has recently joined the company as a customer service engineer. Lipper has over 10 years in the industry with countless off-shore trips helping customers with acoustic communication and related underwater equipment.

Crowley Maritime Corporation announced that veteran company executive **Eric Evans** has been promoted to vice president of strategy, a newly created position that will focus on facilitating long-term growth through external business partnerships, including mergers and acquisitions.

The **Harris Pye Engineering Group** has formed a new dedicated global boiler division, with **Jan Bloksgaard** appointed managing director, to optimise their existing knowledge and understanding of all types of marine boilers. The group, which has marine boiler repair experience dating over nearly 40 years, is located in 16 countries with boiler workshops in Bahrain, Brazil, China, Dubai, Saudi Arabia, Singapore and the UK.



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**Quest Offshore Resources, Inc.** announces the sale of its data and subscriptions business to **Verisk Analytics, Inc.**, a leading data analytics provider. The data and subscriptions business will become part of Wood Mackenzie, a Verisk Analytics business, and will complement Wood Mackenzie's existing upstream analysis expertise.

**Viper Subsea Technology Ltd**, the Portishead and Aberdeen-based subsea engineering company is pleased to announce that it has acquired a 33% equity stake in U.S.-based **LiveWire Innovation Inc.**—the recognised leader in spread-spectrum time domain reflectometry or "SSTDR".

**Kongsberg Maritime** and **Schneider Electric** have signed a global partnership agreement to further the development and delivery of KONGSBERG K-Power switchboards and related systems for offshore and maritime markets.

**James Fisher and Sons plc** announces the acquisition of **Hughes Sub Surface Engineering Ltd**, a specialist diving, subsea and marine project company. The acquisition further enhances James Fisher's existing subsea activities and, through the combination of complementary capabilities, creates a

comprehensive portfolio of services focused in the oil and gas, marine renewables, power generation and marine civil engineering sectors.

**Applanix**, a Trimble Company, and **TES Survey Equipment Services LLC** announced they are partnering to provide products, support, and service to marine clients in the Middle East. By working closely with TES, Applanix gains knowledgeable and experienced representation in the Middle East and TES further expands its solutions portfolio with the addition of Applanix' POS MV and POSPac MMS GNSS-aided inertial navigation products for the commercial market.

**Caterpillar Marine** is establishing a new marine center in Singapore in the facility previously occupied by Caterpillar Remanufacturing, at 5 Tukang Innovation Grove. The new center will bring together in one location almost 200 people employed by Caterpillar Marine in Singapore.

**Mariscope** is proud to announce that the company moved to a new facility in the town of Gettorf (near to Kiel), Germany. Mariscope Meerestechnik has competed 22 years of ROV and marine technology manufacturing and is one of the few companies in this area that is still

owned by its original founder, Christian Haag. Mariscope specialized in customized designs, special developments and prototypes. ROVs are manufactured in stainless steel materials, frames are hand welded and the units are known for their extreme robustness.

**Subsea Technology & Rentals Ltd** has received accreditation to supply third party calibration services on Valeport hydrographic and oceanographic instruments. Calibration services are the latest offering from STR to provide customers access to local and efficient asset management services.

**RJE International**, a market leader of mission critical products for underwater navigation and aquatic safety applications is celebrating 25 years in business. RJE International has built a reputation as a renowned manufacturer of quality and high-tech underwater products including diver navigation, diver sonar and underwater relocation products. RJE is a leader in providing its mission critical products to the special operations community as well as other governmental and commercial customers worldwide.

The **Business Network for Offshore Wind** announced the opening of its Woodbridge, New Jersey office.

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**72**

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**2** Describe your job function (circle 1):

- |                          |                          |
|--------------------------|--------------------------|
| 1. Management/ Executive | 4. Technician/ Operator  |
| 2. Educator              | 5. Buyer/ Sales          |
| 3. Engineer / Scientist  | 6. Other (specify) _____ |

**3** Describe your organization (circle 1):

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- B. Offshore Oil and Gas/ Mining
- C. Ocean Renewables
- D. Education
- E. Government, Military
- F. Government, Civilian
- G. Marine Science/ Environmental/ Fisheries (Science; Environmental; Fishing and Aquaculture; Survey; Observation; Exploration)
- H. Maritime Communications and Computing (Communications Products and Services; Computer Services/ Software; Subsea Telecom; Cables and Connectors)
- I. Instrumentation/ Equipment/ Components (Equipment Manufacturer/ Rentals; Ocean/ Science Instrumentation; Marine Hardware; Deck Equipment)
- J. Other (specify) \_\_\_\_\_

**4** Signature \_\_\_\_\_ Date \_\_\_\_\_

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October 17-19, 2016  
**Submarine Networks World**  
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[www.terrapinn.com](http://www.terrapinn.com)

October 19-20, 2016  
**Offshore Well Intervention GoM**  
Houston, TX  
[www.interventiongom.offsnetevents.com](http://www.interventiongom.offsnetevents.com)

October 24-26, 2016  
**OTC Arctic Technology Conference**  
St. Johns, Newfoundland, Canada  
[www.arctictechnologyconference.org](http://www.arctictechnologyconference.org)

October 25-26, 2016  
**AWEA Offshore Windpower**  
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[www.awea.org](http://www.awea.org)

October 25-26, 2016  
**Offshore Energy '16**  
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[www.offshore-energy.biz](http://www.offshore-energy.biz)

November 1-3, 2016  
**Clean Gulf**  
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[www.cleangulf.org](http://www.cleangulf.org)

November 6-9, 2016  
**IEEE AUV 2016**  
Tokyo, Japan  
[www.auv2016.org](http://www.auv2016.org)

November 28-29, 2016  
**Offshore & Deep Sea Mining**  
London, England  
[www.ibcenergy.com](http://www.ibcenergy.com)

November 30 - December 2, 2016  
**International Workboat Show**  
New Orleans, LA  
[www.workboatshow.com](http://www.workboatshow.com)

November 30 - December 2, 2016  
**WOC Sustainable Ocean Summit**  
Rotterdam, The Netherlands  
[www.ilago.ovh/sustainableoceansummit/](http://www.ilago.ovh/sustainableoceansummit/)

December 12-16, 2016  
**AGU Fall Meeting**  
San Francisco, CA  
<https://fallmeeting.agu.org/2016>

January 17-18, 2017  
**UDT Asia**  
Singapore  
<http://www.udt-asia.com>

January 31 - February 2, 2017  
**Euromaritime**  
Paris, France  
[www.euromaritime.fr](http://www.euromaritime.fr)

February 6-9, 2017  
**GoM Oil Spill & Ecosystem**  
New Orleans, LA  
<http://tinyurl.com/GoM-Oil-Spill-Ecosystem>

February 14-16, 2017  
**OI North America**  
San Diego, CA  
[www.oceanologyinternationalnorthamerica.com](http://www.oceanologyinternationalnorthamerica.com)

February 21-23, 2017  
**Underwater Intervention**  
New Orleans, LA  
[www.underwaterintervention.com](http://www.underwaterintervention.com)

## 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; AUVS!-Xponential; Deepwater Decommissioning Workshop  
 Canadian Hydrographic Conference  
**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) 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:**  
**Product & Services Focus:** Navigation, Mapping & Signal Processing; Data Processing Services

## AUGUST

**Editorial:** Workclass ROVs; Deepwater Pipeline/Repair/Maintenance  
**Distribution:** TBD  
**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; Int'l Offshore Wind Forum  
**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; Euronaval; Offshore Well Intervention GoM  
**Product & Services Focus:** Acoustic Modems, Releases & Transponders; Marine Communications; Survey & Exploration Services

## NOVEMBER

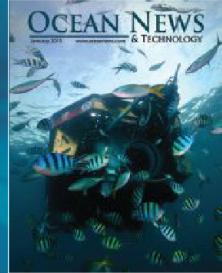
**Editorial:** Offshore Support, Supply & Emergency Vessels; Deep Sea Mining  
**Distribution:** International Workboat, Offshore & Deep Sea Mining  
**Product & Services Focus:** Ship Protection Systems; Cranes, Winches & Control Systems; Vessel Charter/Leasing Services

## DECEMBER

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

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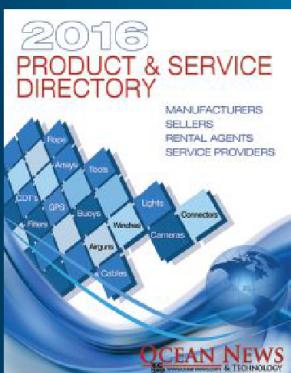
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*Nortek excels in the development and manufacture of acoustic Doppler instrumentation. Doppler Velocity Logs (DVL) are used for subsea navigation. Acoustic Doppler Current Profilers (ADCP) are used to understand physical processes in the ocean, rivers,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

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 Tel: 858 842 3020  
 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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E-mail: sales@falmat.com  
Website: www.falmat.com  
Contact: Shawn Amirehsani



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### South Bay Cable Corp

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Phone: (951) 659-2183  
Fax: (951) 659-3958  
E-mail: Sales@southbaycable.com  
Website: www.southbaycable.com  
Contact: Gary Brown, Sales Manager



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

## CONNECTORS

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



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

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Fax: +1 805 487 0427  
USA: +1 888 BIRNS 88 (+1 888 247 6788)  
E-mail: service@birns.com  
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Contact: Eric Birns



BIRNS, Inc. has been serving the subsea industry since 1954, and is an ISO 9001:2008 certified global leader in the design and manufacturing of high performance connectors, custom cable assemblies and lighting systems. With a NAVSEA PRO-020 certified molding facility, the company leads the industry with sophisticated connector lines, including exceptional electrical, electromechanical, coaxial, electro-coax, optical, electro-optical and electro-opto-mechanical hybrid options. BIRNS provides the industry's highest volume of cost-effective hydrostatic and helium pressure testing, and has a wide range of ABS Product Design Assessment (PDA) certified fiber optic and electrical penetrators. BIRNS also delivers brilliant LED and tungsten-halogen marine, chamber, security and commercial diving lights trusted in the world's most extreme environments.

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

## DESIGN AND ENGINEERING

### Hydro Leduc NA, Inc.

19416 Park Row, Ste. 170  
Houston, TX 77084  
Tel: 281-679-9654  
E-mail bogden@hydroleduc.com  
Website: [www.hydroleduc.com](http://www.hydroleduc.com)



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Hyperbaric Medicine Division  
400 N Ashley Drive, Suite 2600  
Tampa, FL 33602  
US (813)567-1099  
UK 011-44-20-3372-4531  
Email hbo@trilogyhse.com  
Website www.trilogyhse.com



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**Okeanus Science & Technology, LLC**

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Houma, LA 70363  
Tel: 985-346-4666  
Fax: 985-346-8444  
E-mail: Bleblanc@okeanus.com  
Website: www.okeanus.com  
Contact: Benton LeBlanc



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

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



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

**Ocean Specialists Inc.**

8502 SW Kansas Ave  
Stuart, FL 34997  
Tel: +1 772 219 3033  
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 and Gas, Telecommunications and Ocean Observing, recognize the value of fiber optic networks to their field and services solutions, and look to OSI to deliver the skills and experience that developing these networks require.*

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

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



KONGSBERG

*Kongsberg Seatex is a leading international marine electronics manufacturer specializing in the development and production of precision positioning and motion sensing systems. Our commitment is to provide quality products and solutions for safe navigation and operations at sea in the commercial offshore, maritime, hydrographics and defence industries.*

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



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E-mail: insure@jwfisk.com  
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Fax: +1 201 825 1962  
E-mail: atl@atlinc.com  
Website: www.atlinc.com  
Contact: David Dack



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 E-mail: sales@bartington.com  
 Website: www.bartington.com



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**Geometrics, Inc.**  
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 San Jose, CA 95131  
 Tel: +1 408 954 0522  
 Fax: +1 408 954 0902  
 E-mail: sales@geometrics.com  
 Website: www.geometrics.com  
 Contact: Bart Hoekstra



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 Tel: +1 772 219 3000  
 Fax: +1 772 219 3010  
 E-mail: gstevens@conshelf.com  
 Website: www.csaocean.com  
 Contact: Gordon Stevens



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

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 Tel: +47 73 54 55 00  
 Fax: +47 73 51 50 20  
 E-mail: km.seatex@kongsberg.com  
 Website: www.km.kongsberg.com/seatex  
 Contact: Finn Otto Sanne at finn.otto.sanne@kongsberg.com



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 Fax: +49 (0) 30 4679 862-01  
 E-mail: sales@evologics.de  
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## NETWORK AND DATA COMS

**Kongsberg Seatex AS**  
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 E-mail: km.seatex@kongsberg.com  
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 Contact: Finn Otto Sanne at finn.otto.sanne@kongsberg.com



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E-mail: info.instrumentation@nke.fr  
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Contact: Valérie Le Pen - vlepen@nke.fr or Gouven Prud'homme - gprudhomme@nke.fr
- Provor and Arvor profiling subsurface floats (ARGO project): CTD, dissolved oxygen, BGC, deep; Argos and Iridium transmission.
- Drifting surface buoys with temperature and GPS receiver for Surface velocity project.  
Contact: Nathalie Le Bris - nlebris@nke.fr

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E-mail: Sales@romor.ca  
Website: www.romor.ca  
Contact: Darrin Verge, President & CEO



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**Sea-Bird Scientific**  
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E-mail: info@sea-birdscientific.com  
Website: www.sea-birdscientific.com  
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Fax: +354 533 6069  
E-mail: baldur@star-oddi.com  
Website: www.star-oddi.com  
Contact: Baldur Sigurgeirsson

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Fax: +44 (0)8713 140910  
Email: info@oceanwise.eu  
Website: www.oceanwise.eu  
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Fax: +1 603 893 8807  
E-mail: Klein.Mail@KleinMarineSystems.com  
Web: www.KleinMarineSystems.com  
Contact: Deborah Durgin, Supervisor, Marketing & Sales



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

**Marine Sonic Technology**

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Yorktown VA 23692-1309  
Toll Free: +1 800 447 4804  
E-mail: Regan.Lipinski@na-atlas.com  
Website: [www.marinesonic.com](http://www.marinesonic.com)



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Laksevag, Norway  
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E-mail: info@savias.no  
Website: [www.savias.no](http://www.savias.no)  
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## SUBSEA FABRICATION

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14418 Brumbeelow Rd.  
Needville, Texas 77461  
Tel: (713) 818-6150  
Email: [tdavis@hydraoc.com](mailto:tdavis@hydraoc.com)  
Website: [www.hydraoc.com](http://www.hydraoc.com)  
Contact: Trevor Davis



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

### New Industries

6032 Railroad Avenue  
Morgan City, LA 70380  
Tel: +1 985 385 6789  
E-mail: [bill.new@newindustries.com](mailto:bill.new@newindustries.com)  
Website: [www.newindustries.com](http://www.newindustries.com)  
Contact: Bill New



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80

### Subsea Americas

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



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

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a subsidiary of Kongsberg Maritime  
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Fax: +1 508 563 3445  
E-mail: [glester@hydroid.com](mailto:glester@hydroid.com)  
Website: [www.hydroid.com](http://www.hydroid.com)  
Contact: Graham Lester



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

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Fall River, MA 02723 USA  
Tel: +1 508 678 0550  
Fax: +1 508 678 0552  
E-mail: [sales@ocean-server.com](mailto:sales@ocean-server.com)  
Website: [www.iver-auv.com](http://www.iver-auv.com)  
Contact: Jim Kirk



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

## UNDERWATER VEHICLES/ROVs

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11911 FM 529  
Houston, TX 77084  
Tel: 713.329.4500  
E-mail: [info@oceaneering.com](mailto:info@oceaneering.com)  
Website: [www.oceaneering.com](http://www.oceaneering.com)  
Contact: Bill Mallin



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

### Outland Technology

38190 Commercial Ct.  
Slidell, LA 70458 USA  
Tel: 985-847-1104  
Fax: 985-847-1106  
E-mail: [jeff@outlandtech.com](mailto:jeff@outlandtech.com)  
Website: [www.outlandtech.com](http://www.outlandtech.com)  
Contact: Jeff Mayfield



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Canary Islands & Barcelona, Spain  
Tel: +34 616 604 778 / +34 928 91 48 13  
Fax: +34 928 91 48 13  
E-mail: [info@qstar.es](mailto:info@qstar.es)  
Websites: [www.qstar.es](http://www.qstar.es) & [www.rovs.eu](http://www.rovs.eu)



*QSTAR was established to offer services for industries that require effective solutions for Subsea projects through the use of our ROV fleet and high Qualified personnel. Our World leading ROV Training Division offers High Quality Training for ROV PILOT TECHNICIANS as a World-Wide ROV Training Establishment Member of the IMCA.*

### Teledyne SeaBotix

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



*Teledyne SeaBotix is a world leading manufacturer of capable underwater MiniROVs that perform a multitude of tasks including maritime security, search and recovery, hull and pipeline inspection, hazardous environment intervention, aquaculture, sensor deployment and oceanographic research. The Little Benthic Vehicle systems have become the benchmark in compact ROVs around the world. and ROV equipment for over 30 years. We recognize that no two jobs are the same and specialize in products that are customizable for your specific applications.*

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Fax: +1 610 458 3010  
E-mail: [sales@videoray.com](mailto:sales@videoray.com)  
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Fax: +1 281 858 6363  
E-mail: [sales@rovoco.com](mailto:sales@rovoco.com)  
Website: [www.rovoco.com](http://www.rovoco.com)  
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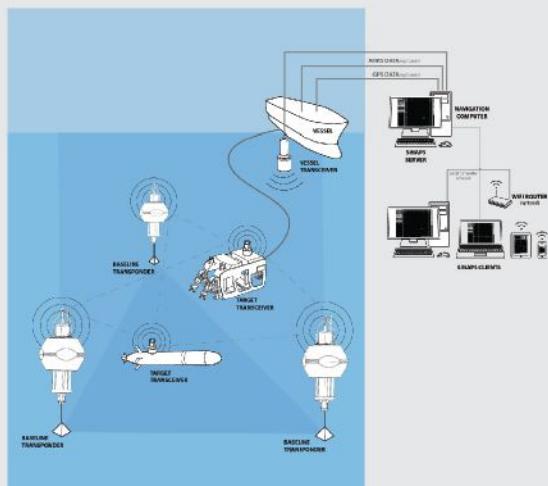
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