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CAPACITY FOR MARINE  
APPLICATIONS**

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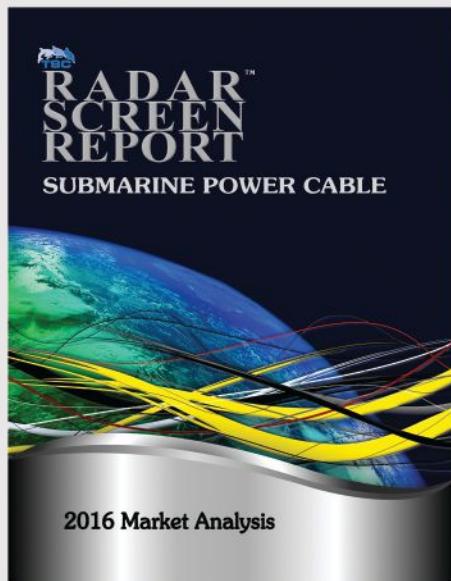
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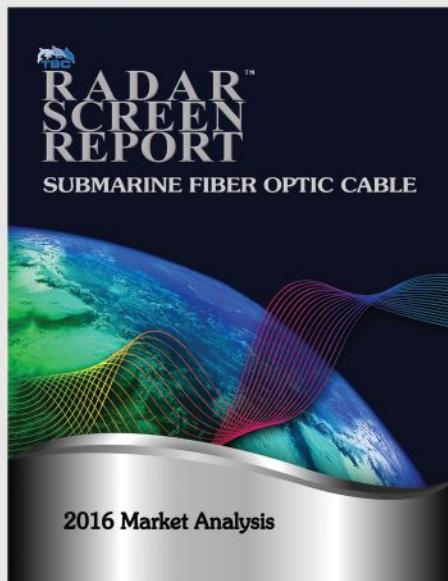
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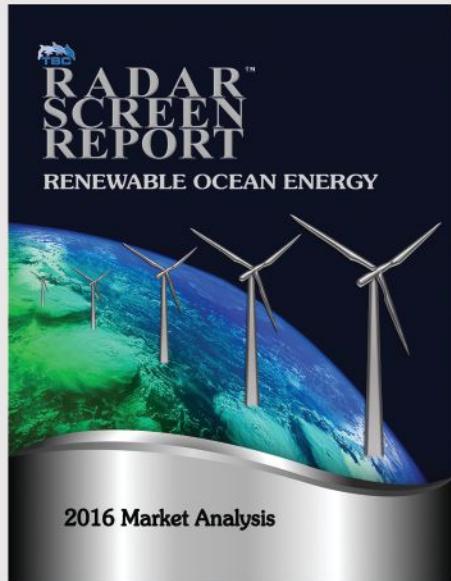
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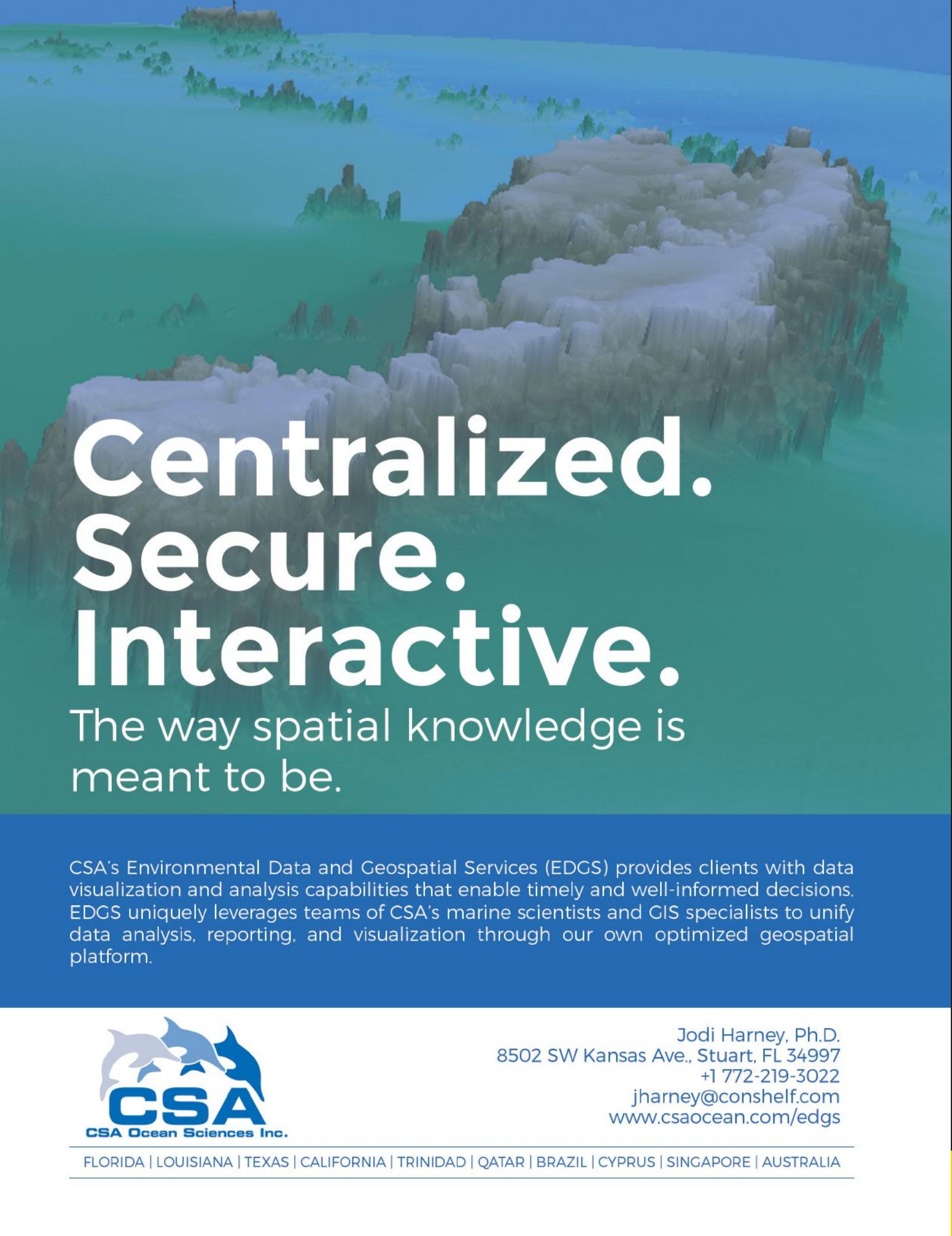


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Sheringham Shoal Wind Farm, UK.  
Photo credit: Alan O'Neill - Statoil ASA.

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# EDITORIAL



By John Manock

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## Cable Laying for First U.S. Offshore Wind Farm is Underway

Although I have been in the submarine cable business for a long time, there have been few occasions that have allowed me to follow a project closely through its development from beginning to end. Recently, however, I have had just such an opportunity thanks to the offshore wind industry, which has finally come to the United States.

The building of the first offshore wind farm in American waters, the Block Island Wind Farm by Deepwater Wind, is taking place almost literally in my backyard. I have been able to follow the plans for the wind farm over its years of development. I have watched the turbine foundations towed out to sea. And now I am getting a first-hand look at the building of the cables that will transmit the power generated by the wind farm to the grid. I find the entire process fascinating—from the challenge of finding a place to land the cable on the mainland to cable installation efforts.

Earlier this year, I was invited by National Grid to view the transfer of the cable to the cable-laying barge (CLB) that is conducting the actual installation. To my surprise, I was able to walk right up to the ship (though not on-board) for a close look at the process, which involved unloading the cable from the delivery freighter to the CLB, referred to as Big Max. The cable itself was manufactured in South Korea by LS Cable, which won the international tender process.

Submarine power cables are huge; many times larger than the submarine fiber optic cables with which I am more familiar. The 20-mi long length of cable weighed in at approximately five million pounds!

The transfer of a submarine cable was an impressive sight, with the cable being unspooled from the freighter and spooled onto Big Max, which had been fitted in Florida with a tower for the cable feeding operation. The cable was fed from the freighter to the stern of the barge, then fed up the tower vertically. From there, the loading arm, which rotates continuously at the top of the tower, fed the cable down into the cable bay where it was re-spoiled.

Workers inside the bay wedged the cable into place using high-tech tools specially made for the job—a couple of pieces of wood held together with duct tape. I couldn't resist making a comment to the assembled group about how you know it's a high-tech operation when you see pieces of wood taped together. Fortunately, they thought I was funny.

I was only at the dock only a short time, but the process continued 24-hours a day for several days until the 20 mi of cable were spooled onto Big Max.

Although some might say that watching a submarine cable being transferred between two vessels is about as exciting as watching grass grow, others might say that it's not even as exciting as that. I, however, believe that it is almost a spellbinding operation. The apparent simplicity of the task masks something very difficult, something that requires careful planning and preparation. The cable is heavy and dangerous. There was one instance, years ago, where a freighter capsized during a similar transfer because the cable had been stored improperly on the freighter. Just getting the cable to go where it needs to go is not easy. Understanding the planning and forethought that was required to plan such an undertaking makes the seemingly boring operation becomes fascinating.

By the time you read this, the cable installation should be complete, if the weather cooperated. The installation of the Block Island Wind Farm cables is historic, signalling the start of a new phase in the development of renewable energy in the United States. The wind farm itself should begin generating electricity later this year.

The cable installation work is also significant as it required the creation of a new supply chain, bringing in offshore wind farm experience from overseas while simultaneously taking advantage of U.S. expertise in submarine cable works gained from other industries, such as offshore oil and gas.

There are big plans for offshore wind in U.S. waters. It is still far from sure if these plans will reach fruition—but if they do, it will involve an offshore construction program on a huge scale, with many more cable projects to come. Perhaps, if I'm lucky, I will continue to be able to peek into process of planning and building offshore wind farm cable projects.

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# OE101: Quantifying Battery Capacity for Marine Applications

*By: Kevin Hardy, Global Ocean Design,  
Ron Lugo, Battery Concepts*

## Introduction

Batteries permit the untethered operation of instrumentation and vehicles. Duration is a matter of capacity and discharge rate. Several factors will affect the deliverable energy of a battery, which may result in less than the catalog rated capacity, such as a high discharge rate. This primer will discuss multiple means to determine the actual energy available, using the more common chemistries applied to oceanographic research as examples. This is a large subject to cover in a few pages, and readers are urged to follow their curiosity into this hugely fascinating field.

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## Battery basics

A cell generates electrical power through the application of the different electrode potentials of two galvanically active materials in a conducting electrolyte. The galvanic difference between the cell anode and cathode is called the potential and measured in volts. A battery is made from a number of cells in a series. The capacity of a battery is its ability to discharge current for a period of time, measured in amp-hours. A battery's energy, measured in watt-hours, is its capacity times its average potential. A battery pack is the assembly of batteries either in a series, to increase voltage, in parallel, to increase current capacity, or both.

There are two broad classes of batteries, primary and secondary. Primary cells can be used once, as the chemical process that produces the current is irreversible. Examples include alkaline and lithium cells. Secondary cells can be recharged by application of reverse current from a charger. The interior anode and cathode plates are rebuilt in the process. The regeneration process is not perfect, and some material is lost in each discharge-recharge cycle. This limits the number of times the battery may be recharged, known as cycle life.

## Factors Effecting Capacity

Batteries are based on chemistry. The chemical reaction rates of liquids and solids are largely driven by temperature. The vast majority of reactions depend on thermal activation, so the fraction of the molecules that possess enough kinetic energy to react at a given temperature will determine the capacity of the cell. The colder temperatures of the deep sea will lower the

capacity of most stored energy systems. Changing the pressure on a reaction that involves only solids or liquids has no effect on the rate.

Batteries are assigned a capacity rating based on a moderate Discharge Rate. If the actual rate exceeds that moderate discharge rate, the battery will be depleted faster, and not provide the assigned rated capacity. Operating a battery at its maximum current rating, say a 5Ah battery at 5A for 1 hour, would be destructive to the battery.

Many batteries have a self-discharge rate, which means that even on the shelf under no load, the cell's reactants will slowly combine and reduce the amount of energy available. Rechargeable batteries may be put on trickle chargers to prevent this, as on a cabled-to-shore node, but untethered vehicle designers have to consider this.

Some battery chemistries, principally Nickel-Cadmium (NiCd) and Nickel Metal Hydride (NiMH), have recharge memory effects. The condition describes the way these batteries gradually lose their maximum energy capacity if they are repeatedly recharged after being only partially discharged. The battery appears to "remember" the smaller capacity.

Physical Modifications to a battery, including means to pressure compensate the cells, may affect battery capacity.





**Figure 1: Launching the Woods Hole Oceanographic Institution's SeaBED AUV draws a crowd of interested penguins. Several factors, including temperature and discharge rate, can affect battery capacity. Courtesy H Singh, Northeastern University (c) Woods Hole Oceanographic Institution**

### Common Batteries in Marine Applications

Certain chemistries have found wide use in the marine field for their availability, energy density, ease of handling, or cost. These include primary cells such as alkaline and lithium, and secondary cells including Nickel Metal Hydride, Nickel-Cadmium, Lead-acid, and recently lithium ion and lithium polymer. Each have advantages and disadvantages, and choosing one generally involves some measure of trade-off.

*Alkaline (alkaline-manganese dioxide):* These primary cells are available in the widest number of standard sizes, and are commonly available around the world. This is handy if you are in a remote port and need to cobble together a spare battery pack. Numerous domestic manufacturers can assemble the cells into battery packs for you. Spot welding stainless steel tabs to the ends of the cells provides a ready way to join the cells into battery packs, and provides for a solder tab to attach a wire and connector. Because of the sealed metal cylinders, these cannot be pressure compensated. As the temperature drops to 0°C, these cells lose on the order of 1/3 of their capacity. As current drain increases, the temperature impact becomes more dramatic (ref: Duracell). Tip: Don't rely on spring-loaded battery holders for critical applications. Spot welding or soldering is a sure thing.



*Lithium-iron (Li/Fe):* These primary cells work as a replacement for alkaline batteries with a 1.5 V nominal voltage. Energizer Ultimate Lithium brand AA, AAA cells and 9v batteries employ this chemistry. These have 2.5 times higher capacity during high current discharge cycles than alkaline batteries, better storage life due to lower self-discharge, and more capacity at lower temperatures. The temperature effects on capacity only begin to show degradation after the cells pass below 0°C. (ref: Energizer)

*Lithium (Lithium-thionyl chloride, Li-SOCl<sub>2</sub>):* These primary cells have the highest energy density of all common cells, and the ability to deliver large amounts of current in a very short period of time. As a consequence of earlier misfortune, each cell is built with an internal fuse to protect it from being shorted and discharging rapidly with its attendant problems of outgassing and possible explosion. The metallic lithium, contained inside a thin stainless steel cylinder, is also extremely reactive with water. If the pressure case holding the cells leaks at depth, the cell will crush, and lithium metal will be exposed to seawater. The subsequent violent reaction will likely blow the endcaps off the pressure case at depth, even if a Pressure Relief Valve (PRV) is employed. If the housing is on a mooring, it may be

# FEATURE STORY

recoverable. By the time it gets on deck the reactive lithium will have been fully consumed and no longer pose any danger, though the smell of sulphur will be obvious.

**Nickel Metal Hydride (NiMH):** are replacing NiCds in many applications. They self-discharge in 2-3 months, and do display some memory effects. They can suffer longevity issues with deep discharge. NiMH are themselves being superseded by Li-ion and LiPO batteries.

**Lithium-ion:** These secondary cells are not subject to memory effect, capable of moderately deep discharge, and much safer than primary lithium cells. They do require built-in protection against both excessive discharging and overcharging. Special charging stations isolate and charge individual cells to provide a balanced charge on all cells in the battery. They have a relatively low self-discharge rate, about 6% per month. They are used in applications requiring lightweight and high power drains such as drones and power tools. Li-Ion batteries use a flammable solvent-based organic liquid as the electrolyte. This electrolyte is responsible for the lithium ion exchange between the anode and cathode plates. Li-Ion batteries are usually encased in a hard metal can to keep the electrodes wound tightly against the separator sheet, adding some weight and limiting the number of shapes and sizes.

**Lithium Polymer (LiPO):** a lower cost version of the Lithium-ion battery. It cannot deliver the high current bursts of the Li-Ion. A LiPo battery doesn't use a liquid electrolyte as does the Li-Ion, but a dry, thin electrolyte polymer separator sheet that allows for the lithium ion exchange, hence the name "Lithium Polymer". This separator is laminated between the anode and cathode plates in a construction sometimes called a "jellyroll". This method allows for a very thin and wide range of shapes and sizes of cells. Li-ion batteries are considered safe for the trashcan and landfills once fully discharged, which manufacturers suggest may be done by dropping the old pack into a bucket of saltwater. There is lots of information available on the web from manufacturers, plus serious amateurs and RC clubs, such as RCHelicopterFun.com.



Figure 2: LiPO pouch cells have been shown to operate in ambient pressures to 20,000psi. Their solid-state protective circuitry must likewise be pressure tolerant.

Of special interest for marine applications, LiPO batteries are offered in a "pouch" design, with a soft, flat body. The absence of a hard case gives pouch cells the highest energy density of any battery available. They still require some means of general structural support. The pouch is vacuum-sealed, with all voids filled by a gelled electrolyte. Thus, there are no implodable spaces. Pouch LiPos have tolerated 20,000 psi immersed in mineral oil inside a Ziplock™ bag, and shown no degradation. The advantage to designers is two-fold: 1) battery packs carried on the outside of a pressure housing only subtract their water weight from the overall buoyancy, while carried inside, they subtract their air weight; and 2) it is easier to exchange batteries on a small vehicle by unplugging the used battery packs and plugging in the replacement charged ones. This benefit comes at the expense of additional underwater connectors.

**Lead-Acid:** The venerable lead-acid battery comes in three variants: 1) wet-cell or flooded, 2) Absorbent Glass Mat (AGM), and 3) gel electrolyte cells, the latter two considered valve regulated lead acid (VRLA), maintenance free designs. Lead-acids are temperature dependent, and their capacity may fall to as low as 60% of rated capacity as they approach 0°C depending on current drain.

Lead-acid wet-cells must remain upright or the electrolyte, a 35% sulphuric acid and 65% water solution, will spill. They can be exposed to high ambient pressure, and maybe mounted outside the hull. If exposed to seawater, they must be pressure-compensated. Any compensation fluid must consider specific gravity, miscibility, and surface tension with respect to the electrolyte.

If sealed with a rubber diaphragm, the battery must be vented to eliminate gases formed during charging. (Myers, 1968) An innovative alternative to pressure compensation was invented by Frank Snodgrass, Scripps Institution of Oceanography, in 1968. His wet-cell automotive batteries were open to the sea at the top, filed to the cat eye fill indicator with electrolyte. A PVC riser tube was placed over each cell and filled with an immiscible partition fluid heavier than seawater ( $\text{sg}=1.025$ ) and lighter than the battery electrolyte ( $\text{sg } 1.265$ ). The original cell vent cap was screwed into the top of the riser pipe to vent the gases associated with charging. Wires were soldered to the lead posts. The lead-acid battery was intended as an expendable ballast weight. Hence, the modified battery assembly was contained in a low-cost plywood box potted with hot tar. A pressure-compensated pull-apart connector allowed the simple disconnect of the electrical leads as the vehicle released its ballast frame. (See Figure 3).

Absorbed Glass Mat (AGM) lead-acid batteries are constructed differently than the wet-cell battery. AGMs are considered a "Recombinant Gas Absorbed Electrolyte" battery. Loss of charge due to self-discharge is 3 to 10 times better than gel cell sealed lead-acid, and 5 to 50 times better than wet-cell lead-acid batteries. In AGM batteries, also called starved electrolyte batteries, there is a thin, ultra-fine fiberglass mat sandwiched between the plates of each cell that is saturated with battery acid to about 95% of what it can hold. This glass mat absorbs and immobilizes the acid while still keeping the acid available to the plates. The mat is slightly compressed between the plates when assembled in a frame. Because the plates and mats are packed fairly tight, they are virtually immune to vibration. The remain-

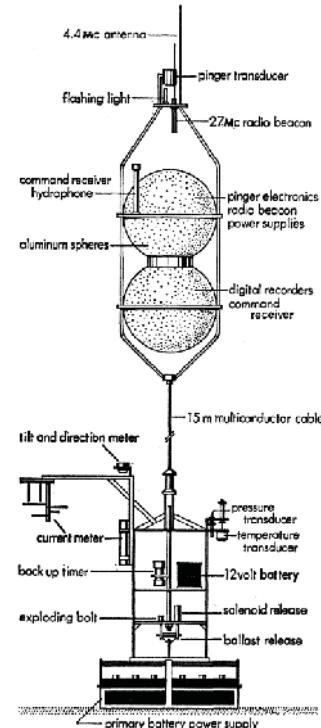


Figure 3. The Munk-Snodgrass deep sea instrument capsule with expendable ballast frame and lead-acid batteries, 1968 (Science, Vol 162, #3849, Oct 4, 1968).

ing volume around the plates is air-filled, so that even if the battery is broken, no electrolyte will be spilled. It also makes the AGM battery lighter. Since the glass mat restrains the electrolyte, the AGM may be used in any orientation. Should an AGM battery be adapted to a pressure-compensated battery system, however, great thought must be given to the introduction of a fluid other than electrolyte into the interior of the cells. Should the compensating fluid with its dielectric properties wick into the glass mat, at worst displacing the electrolyte, a reduction in capacity will follow as areas of the plates become isolated or contaminated. A capacity test would be wise to validate the design and resultant performance.

Gel cell Sealed Lead-Acid (SLA) batteries substitute a gel-type electrolyte for the liquid in basically a wet-cell lead acid battery. This permits it to be used in any position. They are operated at a lower potential to prevent gas generation, meaning they are never fully charged, resulting in the lowest energy density of all secondary batteries. They have low self-discharge rates, and no memory effects. They cannot be fast charged. Gel cells are still being sold, but getting harder to find as the AGMs are surpassing them in performance.

### Quantifying Battery Capacity

There two means of determining battery capacity, one by estimate, and the other by measurement. The first method relies on the use of battery cell manufacturer spec sheets, an understanding of the environment the batteries will be used in, and the expected battery performance characteristics. Data sheets are available on-line from all manufacturers, such as Duracell, Energizer, and Panasonic.



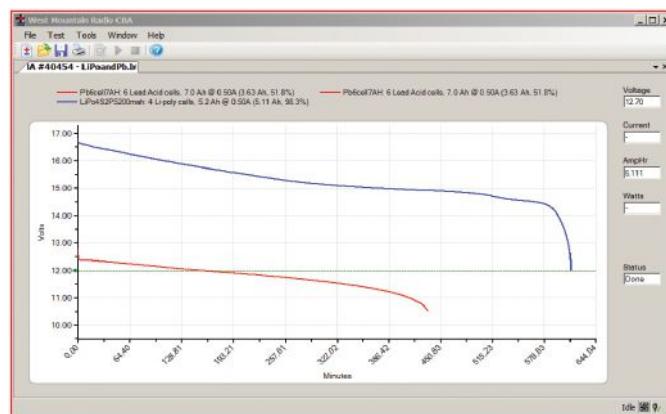
**Figure 4:** The rugged West Mountain Radio Computerized Battery Analyzer (CBA IV) attaches to a laptop by a USB cable, and to a battery by Powerpole® Connectors.

The second means is to measure the battery performance directly. This is best done by use of a computer controlled battery analyzer, such as the Computerized Battery Analyzer (CBA IV), from West Mountain Radio. Originally intended for ham operators running sets in the wild on Field Day, the CBA IV can test virtually any type or size of battery, any chemistry or number of cells, up to 55 volts. The CBA IV is capable of tests up to 100 watts continuous, or 150 watts for short periods of time. With an optional amplifier, tests can be done to 500 watts. Additionally, up to four amplifiers can be used at once for a total test power of 2000 watts. The basic model is about \$160, while the commercial Pro version is just \$40 more.

The CBA tests the total amount of energy stored in a battery (capacity in amp-hours), graphically displays and charts the voltage versus time using a constant current load. Graphs may be dis-

played, saved and printed. The axis parameters can be changed at anytime. Multiple test graphs of the same battery, or multiple batteries, may be compared or overlaid. The battery test data can be printed on any printer. Test result labels can be printed to put directly on the tested batteries. An optional external temperature probe provides automatic over-temperature test cutoff.

The intuitive software supplied with the CBA is designed to protect both the CBA and the batteries being tested, providing automatic sensing of the battery cell count, a safety check of the test rate, and recommending a minimum safe discharge voltage. Capacity discharge tests may be viewed in Amp Hours or Watt Hours. A lab calibrate current adjustment improves the accuracy for testing at very low discharge rates, or for critical applications. The Charge Monitor Test charts and records the voltage rise during recharging, so you can see the performance of the battery under those conditions.



**Figure 5:** LiPo & Lead-acid battery testing showing minutes of use at 500ma average current. (Courtesy West Mountain Radio).

Primary cells may be tested and used to predict performance of a larger battery pack. Once discharged, however, they are done, so be wise about the number you batch test.

Secondary cells or batteries may be tested then recharged. The CBA IV is also capable of a Power Profile test, useful for power supply testing or solar cell analysis. The resulting graph displays Voltage vs. Amps or Watts. This will be useful for designers working with solar recharging systems on buoys and unmanned surface vehicles (USV).

### Conclusion

Battery testing may be done for manufacturer quality assurance or end-user battery characterization before specifying a battery for critical use. Testing to qualify a particular battery system for a project must replicate the expected conditions of use. Battery technology is a field that continues to improve. Many technical books and reference guidelines have been published on the subject. Certain chemistries, like mercury and cadmium, are disappearing due to environmental hazards, while others, such as rechargeable Lithium polymers, are showing great promise for increased stability, energy density and low cost. Transportation issues for some battery chemistries may also affect the choice of the ideal battery.

### References:

*Handbook of Ocean and Underwater Engineering* (Myers, Holm, McAllister); UC Davis Chem Wiki <http://chemwiki.ucdavis.edu/>; *Battery University* <http://batteryuniversity.com/learn/>; *Practical Electronics for Inventors* (Scherz, Monk); *Battery Stuff* [www.batterystuff.com](http://www.batterystuff.com); *Duracell, Energizer, Panasonic*

A circular graphic featuring a world map silhouette against a blue sky with white clouds and a bright sun. In the foreground, a sea turtle swims towards the viewer. Overlaid on the center of the map is the text "REACHING 19,000 GLOBAL PROFESSIONALS" in large, bold, green capital letters.

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# OCEAN INDUSTRY

## Downed WWII aircraft located in Pacific islands



An American aircraft, a TBM-1C Avenger, missing since July 1944 was recently located in the waters surrounding the Pacific Island nation of Palau by Project RECOVER.  
Photo credit: Eric Terrill (Scripps) and Mark Moline (UD).

An American aircraft, a TBM-1C Avenger, missing since July 1944 was recently located in the waters surrounding the Pacific Island nation of Palau by Project RECOVER—a collaborative effort to combine the most advanced oceanographic technology with advanced archival research methods to locate aircraft and associated Americans missing in action (MIA) since World War II.

Scattered among the lagoon waters and coral reefs surrounding Palau's island chain and concealed within its dense mangrove forests are several dozen U.S. aircraft and the remains of as many as 80 U.S. airmen. This U.S. Navy TBM-1C adds to the growing list of wrecks discovered by Project RECOVER.

"The importance of our mission is reinforced with each new discovery of a missing aircraft," said Eric Terrill, an oceanographer from Scripps Institution of Oceanography at the University of California San Diego, one of Project RECOVER's three founding entities. "But this is more than reconnecting with history; it's about locating the missing to enable the U.S. government to bring them home for a proper burial. With potential recovery sites around the world, Project RECOVER and its team of researchers and volunteers are expanding to intensify its searches using modern science and technology."

The most recent find was made possible by a substantial financial commitment from Dan Friedkin, founder and chairman of Air Force Heritage Flight Foundation and chairman of Gulf States Toyota and The Friedkin Group. As a member of the Project RECOVER team, Friedkin's continued support is helping sustain ongoing missions, while enabling the organization to innovate its technology and expand its search and discovery efforts to focus areas around the world.

"This recovery is another step closer towards Project RECOVER's goal of finding the final underwater resting places of all Americans missing in action since World War II," said Friedkin, one of nine civilian Heritage Flight pilots qualified to fly in formation with U.S. Air Force single-ship demonstration teams. "As someone who gained a passion for flying and admiration for our country's brave service members as a child, I will continue to support the efforts of Project

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### May cover image clarification

ON&T would like to clarify that the cover image featured in the May 2016 issue was from Sonardyne who used 2G Robotics' underwater laser scanning technology to dynamically scan and map the seabed in Monterey Bay, California. This high-resolution deepwater mapping of Sur Ridge was performed using 2G Robotics' ULS-500 underwater laser scanner mounted to an ROV.

### Teledyne Marine announces photo/data contest

Teledyne Marine, a consortium of 23 Teledyne brands serving the marine technology industry, has announced the creation of a customer field photo / data contest. All Teledyne Marine customers and product users are invited to submit their relevant field photos, videos, and/or data via Teledyne Marine's online repository. The winning selections will be determined based on popular vote. Readers are encouraged to submit their photos / videos and/or cast their vote(s) for their favorite images. Submissions and voting opportunities can be found at: <http://competition.teledynemarine.com/>.

The winner of each of the four contest categories will receive a Go Pro Hero4 Silver Edition Camera or a gift certificate for camera equipment at a value of \$400.

### Fishers offers money for photos and videos

JW Fishers is inviting customers in commercial diving, law enforcement, military, marine archaeology, and recreational diving to submit photos and videos of their underwater search equipment. A \$250 gift certificate will be given for each video interesting enough to post on our website and a \$100 gift certificate for each good photo.

Videos should be edited and 3 to 5 minutes in length. Underwater footage shot from any of Fishers ROVs or other video systems is desirable as well as videos showing the equipment being deployed. Videos of the boat-towed detectors as well as the pipe and cable trackers are also eligible.

Photos can be a posed shot of your dive team with JWF equipment or a picture showing the equipment in use. Photos of sonar images produced by Fishers sub bottom profilers, scanning sonars, or side-scan sonars will be given special consideration. Photos must be 300 dpi and at least 1 MB in size.

Email photos to [info@jwfishers.com](mailto:info@jwfishers.com). Videos can be put on thumb drive and mailed to JW Fishers Mfg., 1953 County Street, East Taunton, MA 02718.

RECOVER and their partner organizations. Every family member impacted by the loss of a service member deserves this type of closure."

Upon locating this TBM-1C Avenger and other U.S. aircraft, Project RECOVER provides detailed information about discovered wrecks and possible links to airmen listed as missing in action to the Department of Defense's Defense POW/MIA Accounting Agency (DPAA). DPAA is tasked with recovery and repatriation efforts, including notification of the families of these MIAs.

Financial gifts to this cause are shared among Project RECOVER's three founding entities—the University of Delaware, Scripps Oceanography, and the BentProp Project (a non-profit organization). Funds are being used in development of technology, data processing and analysis, and field efforts that lead to discoveries of World War II wreckage and their associated MIAs. All three member organizations recently signed memorandums of understanding with DPAA to formalize their public-private partnership with the U.S. government for conducting MIA-related searches.

For more information, visit [www.udel.edu/udaily/2016/may/project-recover-052516/](http://www.udel.edu/udaily/2016/may/project-recover-052516/).

## Shipwrecks beamed ashore

Live images of significant historical shipwrecks were filmed by a Saab Seaeye Falcon ROV and beamed directly to educational and public audiences ashore in a live telepresence-enabled exploration project.

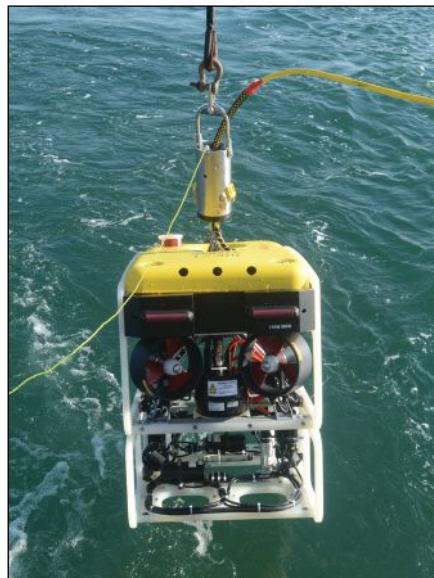
The University of Rhode Island's research vessel, Endeavor, is exploring the remains of two shipwrecks located off the coast of Rhode Island—the smallest state in America. They include the German U-Boat U-853, sunk at the very end of WWII.

Also aboard Endeavor, a scientific team is conducting an acoustic tracking experiment for tracking fish using newly developed technology.

Schools, colleges and the general public were able to view live programs over the Internet—broadcast in high bandwidth—using the ship-to-shore satellite telepresence system and the video streaming facilities at the Inner Space Center.

TV channel, Rhode Island PBS also simulcasted the live webcasts.

Named Deep Reef by the exploration team, their Saab Seaeye Falcon is equipped with the most advanced filming equipment including Hollywood-grade camera technology used in



movies like Avatar, and low-light cameras that can see in the dark, along with single-mode fiber optics and a gigabyte Ethernet for the fastest, highest grade images possible.

Prior to the Falcon's exploration, a side-scan sonar system surveyed the shipwreck sites to aid in constructing a dive plan for navigating the ROV safely around each wreck.

In addition to exploring shipwrecks, Dr. David Gruber, associate professor of biology at City University New York, used the Falcon to image the seabed sedimentary geological formations and the marine biological habitat associated with the wreck sites and surrounding region.

The scientific team also conducted an acoustic tracking experiment with newly developed technology that includes a miniature archival tag for long-range fish tracking.

The small and easily manhandled Falcon, the most popular ROV of its class in the world, has five powerful thrusters for extreme maneuverability and for mastering strong currents while filming and on tasks, together with an intelligent distributed control system that makes it easy to add and change systems, along with an ability to handle highly sophisticated technology.

Dr. Dwight Coleman, director at the Inner Space Centre and a marine research scientist, spearheaded the exploration team of scientists, engineers, archaeologists, students, teachers, and video producers from the University of Rhode Island, along with contributors from the Ocean Exploration Trust and the U.S. Coast Guard Academy.

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

## Coast Guard, Navy complete joint fisheries patrol in Oceania, promote regional stability

The Coast Guard and Navy recently completed a 40-day joint mission in the Central and South Pacific under the Oceania Maritime Security Initiative to combat transnational crimes, enforce fisheries laws and enhance regional security.

A Coast Guard law enforcement detachment from Pacific Tactical Law Enforcement Team Detachment 108 embarked USS Spruance (DDG 111) and conducted 20 fisheries enforcement boardings with the assistance of the Navy's Visit, Board, Search and Seizure team and enforcement shipriders from the Federated States of Micronesia and Palau.

"OMSI demonstrates the ability to partner with not only military agencies, but local agencies," said Cmdr. Manuel Hernandez, commanding officer, Spruance. "The ability to leverage the unique capacity and capabilities of the U.S. Navy, the U.S. Coast Guard and their experience in law enforcement, USDAO, Foreign Fisheries Agency, and our partner nations in the area in support of the security and stability, and therefore the prosperity of the Asia-Pacific region is incredible."

Ten of the boardings were conducted on the high seas under the Western and Central Pacific Fisheries Commission guidelines, with one potential violation for tampering with a vessel monitoring system found. The other 10 were conducted in the Federated States of Micronesia and Palau exclusive economic zones, with three violations of improper logging of catch and one violation for lack of a bait fishing permit found.

## Delmar Systems acquires InterOcean Systems

Delmar Systems, Inc., a worldwide supplier of offshore mooring and subsea services, announces an expansion of products and services with the acquisition of privately owned InterOcean Systems, Inc. InterOcean will be operated as an affiliated entity of Delmar.

Since 1946, InterOcean Systems is the leader in the design and manufacture of high quality oceanographic and environmental equipment and systems, including its proprietary Rig Anchor Release (RAR), acoustic technology and releases, METOC buoys, current meters, transponders, transducers, hydrophones, subsea winches, and other specialized equipment including its proprietary remote oil spill detection system—Slick Sleuth™.

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

## Innovating Marine Measurement Instrumentation

With their leading edge technology, lifetime product care approach and strong commitment to putting the customer first, Valeport, one of the foremost manufacturers of oceanographic and hydrographic instrumentation for over 46 years, continues to provide a diverse, innovative and reliable global offering to the subsea sector.

From its state of the art facilities in the historic town of Totnes, Devon, in the South-West of the UK, Valeport designs, manufactures and supports its range of oceanographic and hydrographic monitoring instrumentation.

Valeport's ethos is to keep as much of the business in house as possible. So from their single site Valeport handles all development, manufacturing and after sales support. Their on-site facilities include a CNC machine shop, anti-static assembly areas and twin calibration laboratories. Also located at the site are all service staff, R&D engineers, sales and marketing and back-office functions.



Valeport, an independent family owned business, has supplied to the subsea sector since it was established in 1969 and has a worldwide customer base that includes: environmental, defence, oil and gas, renewable energy, construction, dredging and civil engineering sectors. Valeport works with a global network of agents to ensure a responsive and efficient worldwide service.

Valeport products benefit from an industry-leading three-year warranty. All deep water subsea products are manufactured to the highest standards using titanium for maximum durability.

The dedicated service facility and modern calibration laboratories at Valeport provide a responsive repair and calibration service to their global customer base and Valeport offers a unique 12-month warranty on all their serviced products.

### Latest additions to Valeport's Profiling Instrument range

The revolutionary SWiFT SVP - Designed from the outset with the intention of a seamless workflow, the

SWiFT profiler provides survey grade sensor technology coupled with the convenience of Bluetooth connectivity and rechargeable batteries. An integral GPS module, to geo-locate each profile, completes the package. Data can be easily and quickly downloaded and reviewed wirelessly, via Bluetooth, using the SWiFT App on iOS devices and instantly shared through email and cloud services. Using the provided USB cable, Valeport's DataLog x2 software package provides further tools including translation to common SVP formats.

In addition to the directly measured SV, Temperature and Pressure, SWiFT calculates Salinity and Density using a proprietary Valeport algorithm developed from extensive laboratory and fieldwork. This algorithm gives an accuracy of 0.05 PSU for salinity and 0.05 g/m<sup>3</sup> for density.



FastCTD Profiler packs a punch - An evolution of the miniCTD, the fastCTD Profiler is designed to deliver the highest quality CTD casts at fast drop rates. Available with a new battery to enhance performance when fitted with an integral Fluorometer. This small, robust package is the only CTD offering an integrated Fluorometer option and high quality data profiles. Highly accurate, incorporating Valeport's world-class technology the fastCTD is simple to deploy.

### The future

Valeport continues to invest significantly in R&D to lead the way in supporting hydrographic surveying and to maintain Valeport's reputation as a strong, trusted brand that insists on putting the customer first.

See Valeport at exhibitions including: Hydro 2016, OI China and OSEA 2016.

Contact : Kevin Edwards, Valeport sales and marketing manager T.+44 (0) 1803 869292 E.sales@valeport.co.uk or visit [www.valeport.co.uk](http://www.valeport.co.uk)

## ABS Nautical Systems enables next-generation vessel performance

ABS has unveiled ABS Nautical Systems Vessel Performance—a comprehensive software solution developed in response to continued demand for tools that improve vessel efficiency, reduce costs and facilitate emissions reporting and compliance.

The NS Vessel Performance tool is designed to improve efficiency and control costs through the application of a ship-specific performance model and tracking of key performance indicators (KPIs), while also supporting environmental compliance and reporting, including the European Union's Monitoring, Reporting and Verification (MRV) regulation for CO<sub>2</sub> emissions.

NS Vessel Performance leverages a ship-specific performance model based on vessel design characteristics. The model delivers performance predictions using sea trial data and other relevant information to establish performance baselines. Combining model output with the visualization and analysis of vessel operations data improves decision-making.

Based on the performance model and analyses of regularly captured data, KPIs are established within the tool to enable decision support ashore and on board the vessel. This results in operational profiles for fleet-wide comparison of operational efficiency, maintenance strategies and conformance to charter party requirements. Consumption and emissions calculations enable compliance to environmental regulations, including MRV, and contribute to an active Ship Energy Efficiency Management Plan.

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

## Trelleborg trains U.S. Coast Guard on safe transportation of liquefied gas

Trelleborg's marine systems operation has again supported the U.S. Coast Guard by delivering a third training session in ensuring the safe, secure and clean transportation and use of liquefied gas in U.S. waters. As liquefied gases become a major commodity across the U.S., there is a critical need for the coast guard community to understand the systems used on board liquefied gas ships and how these work with onshore facilities.

This training was led by Andrew Stafford, technical director for our SeaTechnik product area, and focused on key safety issues such as emergency shutdown procedures and safety links for both large and small-scale fueling applications. As well as familiarizing the U.S. prevention community with the systems used on board liquefied gas ships and how these work with facilities ashore, the session also involved discussion on response and planning.

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

## Fuel savings convince "K" Line to expand use of ClassNK CMAX LC-A

"K" Line Ship Management (Singapore) Pte Ltd has selected ClassNK Consulting Service's machinery condition monitoring and automatic diagnostic system ClassNK CMAXS LC-A for use on one of its container vessels, marking the first commercial application of the software.

"K" Line Ship Management (Singapore) Pte Ltd selected ClassNK CMAXS LC-A after a successful trial installation in 2014 delivered proven fuel and lubricating oil savings of 200 tons/year. The trial was carried out as part of a joint research project in collaboration with ClassNK and Diesel United Ltd.

ClassNK CMAXS LC-A uses innovative diagnosis algorithms to analyze multiple sensor data in the engine room and detect any early signs of machinery damage. The solution automatically shows the condition of a wide variety of machinery in real-time, provides the relevant instructions and procedure manuals, and proposes the optimum setting value for main engine optimum operation based on the result of the automatic condition diagnosis - all without the need for remote shoreside support.

For more information, visit [www.classnk.or.jp](http://www.classnk.or.jp).

## Wärtsilä powers the world's largest cruise ship



Royal Caribbean International's Harmony of the Seas, featuring Wärtsilä engines, propulsion equipment, exhaust scrubber systems, Wärtsilä NACOS Platinum navigation and dynamic positioning systems, as well as Wärtsilä CCTV systems and various electrical and automation solutions, is now in commercial operation. The Harmony of the Seas has also been included in a service agreement between Wärtsilä and Royal Caribbean covering technical management and monitoring under Wärtsilä Genius services. The ship was delivered from the yard on 12 May. With a length of 362 m in the ship, which was built at the STX France shipyard in the French port of Saint-Nazaire, is the world's largest cruise vessel.



Wärtsilä has also provided the engines and thrusters to the vessel's sister ships, the Oasis of the Seas and the Allure of the Seas, thus emphasizing the trust and cooperation that exists between Wärtsilä and Royal Caribbean International.

The Harmony of the Seas is powered by four 12-cylinder Wärtsilä 46F engines and two 16-cylinder Wärtsilä 46F engines, featuring best-in-class fuel economy, and outstanding power-to-weight and power-to-space ratios. For effective maneuvering, the ship has four Wärtsilä CT3500 transverse thrusters.

The two Wärtsilä hybrid scrubber systems represent the world's biggest marine exhaust scrubber installation so far. They feature the latest in exhaust cleaning technology thus minimizing sulphur oxide (SOx) emissions and allowing the vessel to comply with emission control regulations around the world. Wärtsilä hybrid scrubber system solutions have the flexibility to operate in both open and closed loop using seawater to remove SOx from the exhaust.

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

## Seacat Services secures Burbo Bank charter deal

Leading offshore wind project developer, DONG Energy, has awarded class-leading offshore energy support vessel operator, Seacat Services, with the supply contract for all crew transfer services at its 258 MW Burbo Bank Extension project under development in the Irish Sea.

The four-vessel charter contract, with durations of 3 to 11 months, is the second such agreement signed between Seacat Services and DONG Energy in 2016, following the confirma-

tion of a four-workboat construction support deal for the Race Bank Offshore Wind Farm in April.

With a handful of remaining 'Round 2.5' extension projects due for installation in UK waters in 2016 ahead of the upcoming Round 3 construction phase, this latest supply agreement is a further vote of confidence in the ability of domestic vessel operators to deliver the high standards of support required to keep increasingly complex projects on track.

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

### ABB Turbocharging previews first dedicated marine auxiliary product

ABB Turbocharging presented at the CIMAC Congress 2016 its first dedicated turbocharger, for marine auxiliary engine applications, in a development cooperation with IHI Corporation. Designed for ease of operation and service, it supports a condition-based maintenance concept.

The innovative Marine Auxiliary Power (MXP) turbocharger is a key part of the company's strategy to focus on increased value for engine builders and



operators in the large engine industry through segment- and application-specific turbocharging offerings.

MXP has been designed for auxiliary engines with power output up to 2 MW, operating under HFO conditions. In this dedicated product, the complexity of parts required in turbochargers with broader usage has been simplified for the specific operational requirements of this market. These include ease of maintenance by the crew, based on condition, as well as optimized load response behavior and improved efficiency at part load, which both contribute to fuel savings.

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

### DNV GL wins framework agreement from National Grid

DNV GL has been awarded a framework agreement for the provision of design and engineering technical services to the Grain LNG terminal.

The scope of the 3-year framework agreement covers feasibility studies, conceptual design studies, specialist engineering and risk management services up to and including front-end engineering and design (FEED).

Grain LNG is integral to the UK energy infrastructure and security of supply. It is the largest terminal in Europe and eighth largest in the world by tank capacity with a site that spans over 600 acres in total.

Liquefied natural gas is developed by chilling gas to -161°C so that it occupies 600 times less space than in its gaseous form. It is easily stored in large volumes assisting in security of supply, in times of great need such as winter cold spells. Over time, as indigenous supplies from the UK Continental Shelf diminish, LNG could make up a significant percentage of the UK's gas supply and demand requirement.

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

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Ocean News & Technology



Jack Fisher,  
Founder

## "See under the ocean floor with Fishers Sub Bottom Profiler"



Topside  
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**Sub Bottom  
Profiler**

**Only \$18,995**

**Towed or Pole  
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**Sub Bottom Profiler**

Fishers Sub Bottom Profiler is used to identify the thickness of the different strata layers below the ocean floor. It will also show any density disturbance within a strata layer thus indicating "hidden objects" beneath the surface. Fishers' Sub Bottom Profiler is boat towable or pole mountable for shallow water use.



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Signal Injector

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**Hand Held  
Metal Detector**

**\$2,395**



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**High frequency radar data quality control manual released**

The U.S. Integrated Ocean Observing System (IOOS®) Quality-Control/Quality Assurance of Real-Time Oceanographic Data (QARTOD) project has released its latest manual providing guidance for the quality control of high-frequency (HF) radar surface currents data. Subject-matter experts from universities, oceanographic research institutions, HF radar manufacturers, and the National Oceanic and Atmospheric Administration (NOAA) developed the manual. Reviewers from the U.S., Australia, Germany, and Canada provided additional content and valuable suggestions during the review process. The manual describes 17 different tests that can be conducted in real time to help data providers (operators) assess the quality of their data. Each test includes instructions that a computer programmer needs to develop code that is used within an automated software program to flag data that do not meet specified criteria.

Three major HF radar systems are used around the world: the CODAR Ocean Systems SeaSonde®, the Wellen Radar (WERA) system, and the Least-Expensive Radar (LERA) system. The manual addresses QC of data from all three manufacturers and makes distinctions about which tests work for specific systems. The CODAR SeaSonde is the most widely used HF radar system, with several hundred operational systems worldwide. Its founders were the first to establish the HF surface-wave radar field over 50 years ago. The WERA system, originally developed at the University of Hamburg in 1996 and now manufactured by HELZEL Messtechnik (HZM) GmbH, has about 100 systems operating internationally, with 10 of them located in the U.S. The LERA system, recently developed at the University of Hawaii Radio Oceanography Laboratory, has about nine systems operating with in the U.S.

For more information about U.S. IOOS QARTOD, please visit <https://ioos.noaa.gov/project/qartod/>.

**How to tell if your seaweed looks weird**

A new online course released by the Scottish Association for Marine Science (SAMS UHI), in partnership with The Open University in Scotland, makes cutting edge research on seaweed cultivation freely available for the first time to learners, industry and academics alike.

Seaweed has often been hailed as a solution to a number of global issues, whether it is the next 'superfood' or the answer to food and fuel shortages. Now the budding UK seaweed cultivation industry has been boosted by the production of a new free openly licensed online course with The Open University.

*My Seaweed Looks Weird* has been devised by scientists at SAMS UHI and developed in partnership with Opening Educational Practices in Scotland (OEPS) hosted at The Open University in Scotland.

The course is aimed at students with a scientific background and employees within the industry. It aims to build their knowledge and understanding of seaweed parasitology, enhancing employability and skills within the industry and leading to badged recognition for learners.

The content is based on a Natural Environment Research Council-funded project, GlobalSeaweed, which aims to establish a worldwide network of partners tackling emerging issues in seaweed cultivation, such as pests, invasive species and pathogens.

Project leader Dr. Claire Gachon is excited about opening her research to the wider population. She said: "Seaweed has promised a lot but, as in any new industry, there are pros and cons to consider. We need a clear picture of where the industry is going and how we can make it sustainable."

"Running this course through the Open University will allow the GlobalSeaweed project to communicate with lots of audiences and will help us achieve our goal of creating a network of seaweed industry partners."

The UK has a tradition of seaweed harvesting; it has been part of the country's diet for around 4,000 years and was traditionally used as a cheap fertilizer. Today, countries like China harvest seaweed on a huge scale as part of a multi-billion dollar industry globally.

**Hydrothermal vents, methane seeps play enormous role in marine life, global climate**

The hydrothermal vents and methane seeps on the ocean floor that were once thought to be geologic and biological oddities are now emerging as a major force in ocean ecosystems, marine life and global climate.

However, even as researchers learn more about their role in sustaining a healthy Earth, these habitats are being threatened by a wide range of human activities, including deep-sea mining, bottom trawling and energy harvesting, scientists say in a report published in *Frontiers in Marine Science*.

Researchers from Oregon State University first discovered these strange, isolated worlds on the ocean bottom 40 years ago. These habitats surprised the scientific world with reports of hot oozing gases, sulfide chimneys, bizarre tube worms and giant crabs and mussels—life forms that were later found to eat methane and toxic sulfide.

"It was immediately apparent that these hydrothermal vents were incredibly cool," said Andrew Thurber, an assistant professor in the OSU College of Earth, Ocean and Atmospheric Sciences, and co-author on the new report.

"Since then, we've learned that these vents and seeps are much more than just some weird fauna, unique biology and strange little ecosystems. Rather than being an anomaly, they are prevalent around the world, both in the deep ocean and shallower areas. They provide an estimated 13% of the energy entering the deep sea, make a wide range of marine life possible, and are major players in global climate."

As fountains of marine life, the vents pour out gases and minerals, including sulfide, methane, hydrogen and iron—one of the limiting nutrients in the growth of plankton in large areas of the ocean. In an even more important role, the life forms in these vents and seeps consume 90% of the released methane and keep it from entering the atmosphere, where as a greenhouse gas it's 25 times more potent than carbon dioxide.

In reviewing the status of these marine geological structures and the life that lives around them, a group of researchers from 14 international universities and organizations have outlined what's been learned in the past four decades and what forces threaten these ecosystems today. The synthesis was supported by the J.M. Kaplan fund.

These vents and seeps and the marine life that lives there create rocks and habitat, which in some settings can last tens of thousands of years. They release heat and energy and form biological hot spots of diversity. They host extensive mussel and clam beds, mounds of shrimp and crab, create some

prime fishing habitat and literally fertilize the ocean as zooplankton biomass and abundance increases. While the fluid flows from only a small section of the seafloor, the impact on the ocean is global.

These systems, however, have already been damaged by human exploitation, and others are being targeted, the scientists said. Efforts are beginning to mine them for copper, zinc, lead, gold and silver. Bottom trawling is a special concern, causing physical disturbance that could interfere with seeps, affect habitat and damage other biologic linkages.

Contributors to this report included researchers from the Scripps Institution of Oceanography, Florida State University, the National Institute of Water and Atmospheric Research in New Zealand, University of the Azores, Temple University, Universidade de Aveiro, the U.S. Geological Survey, University of the West Indies, Dalhousie University, University of Victoria, Duke University, Ghent University, and the University of Hawaii at Manoa.

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

### **Biggest ever assessment of Atlantic deep-sea ecosystems gets underway**

The European Commission's Horizon 2020 funding program is supporting the largest and most ambitious assessment of deep-sea Atlantic ecosystems ever undertaken through the €9 million ATLAS (A trans-Atlantic assessment and deep-sea ecosystem-based spatial management plan for Europe) project, which kicked off on 13–15 June 2016 in Edinburgh, Scotland.

The launch of ATLAS marks the beginning of an exciting series of expeditions involving at least 25 research cruises and hundreds of scientists from 10 European countries, the U.S. and Canada, working collaboratively to explore the depths of the Atlantic Ocean over the next 4 years.

ATLAS project coordinator Professor J. Murray Roberts, from Heriot-Watt University, said: "The north Atlantic was the birthplace of deep-sea biology and the cradle of oceanography. It's the place we should know best, but it's only over the last 20 years that we've uncovered just how varied and vulnerable the Atlantic's deep-sea habitats really are."

ATLAS will strive to improve our understanding of the complexity of deep-sea ecosystems and to predict future shifts and vulnerabilities of these ecosys-



tems and their associated species, including those that are new to science. To do this requires a multi-disciplinary team of scientists and an integrated approach to tackling the problem. Alongside traditional approaches, ATLAS scientists will explore modern molecular techniques, such as environmental DNA (eDNA) sequencing, to search water and sediment samples for known and undiscovered deep-sea species.

As well as carrying out pioneering research and discovery, a major goal of ATLAS is to develop a scientific knowledge base that can inform the development of appropriate international policies to ensure deep-sea Atlantic resources are managed effectively. This will contribute to the European Commission's long-term "Blue Growth" strategy to support sustainable growth in the marine and maritime sectors as a whole. Seas and oceans are drivers for the European economy and have great potential for innovation and growth. The "blue" economy represents roughly 5.4 million jobs and generates a gross added value of almost €500 billion a year for Europe.

ATLAS also intends to carry out outreach activities to raise awareness of the importance and vulnerability of the Atlantic ecosystem and the impact humans are having on the ocean environment. This will contribute to a major international effort for "Ocean Literacy" to make all European citizens aware of the importance of the oceans on everyday life on Earth and what actions they can take to help protect them. Activities will include the development of deep-sea education material, a traveling road show and a new interactive exhibition on the ocean at Dynamic Earth, a science center in Edinburgh that receives over 220,000 visitors per year.

For more information, visit [www.eu-atlas.org](http://www.eu-atlas.org).

### **Kongsberg AUVs and hydrographic technology for new research vessel**

Kongsberg Maritime has been chosen to deliver an integrated subsea technology systems package including two Hugin AUVs for a new Peruvian Navy hydro-

graphic and oceanographic research vessel. The 97-m 'BAP Carrasco' is built at Construcciones Navales P. Freire shipyard in Vigo, Spain.

The advanced new research ship will have Polar capability and be classified with PC7 notation to perform research in Peruvian waters in order to fulfill Peru's commitment under the Antarctic Treaty. The Kongsberg technology on board will form the platform for the Peruvian Navy to perform missions within hydrography, oceanology, geology, biology and geophysics.

Following the launch of BAP Carrasco in Vigo, Kongsberg will fulfil the equipment delivery in collaboration with Robinson Marine Electronics in Callao, Peru and Simrad Spain SI. The full scope of supply includes:

- Hydrography: Kongsberg EM122 1° x1° deepwater multibeam echo sounder, Kongsberg EA600 12,38 & 200 kHz single beam echo sounder.
- Geophysics: Kongsberg SBP 120 3° Sub-bottom Profiler
- Biology: Simrad EK80 18, 38, 70, 120 & 200 kHz scientific single beam multi-frequency echo sounder
- Enhanced medium water operations: 2 x Kongsberg Hugin AUV with hydrographic, geology and geophysics configuration for high resolution survey depth rated to 3,000 meters, Kongsberg HiPAP.

All Kongsberg technology on BAP Carrasco will be fully integrated to ensure the highest level of performance. The delivery reflects Kongsberg Maritime's 'Integrated Systems for Research Vessels' approach, which has proven successful on many of the world's most advanced scientific ships in recent years.

To ensure optimal performance in all conditions, Kongsberg will manage the proper installation of the acoustic transducers for ice water operations and the integration of various sub-systems including the K-Sync synchronisation unit, an advanced position, heading and motion reference system and the MDM500 marine data management system.

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

### **Fukushima radioactivity diluted in the Pacific makes tracing ocean currents possible**

Very little is known about ocean currents and generally about dynamics in the oceans. But radioactivity released into the Pacific by the Fukushima nuclear accident, which was quickly diluted to harmless levels, has allowed

scientists to trace the ocean's currents.

The JRC's expertise in nuclear measurements was instrumental in detecting and quantifying the radioactivity of sea-water samples. The study was carried out with a team of researchers from two Japanese Universities, following a campaign of sampling and measuring anthropogenic radionuclides in the North Pacific. It allowed natural processes using radionuclides as tracers to be studied.

The most important oceanographic conclusion from the study is that most of the surface water transported to the east towards the U.S. is submerged to a depth of 400 m near to the International Date Line and then turns towards southwest. This movement of the currents was not known prior to this study and will have an impact on computer models calculating global warming.

The accident in the Fukushima Dai-ichi nuclear power plant in March 2011 led to the release of huge amounts of radioactivity into the Pacific Ocean. During 2011 and 2012, Japanese scientists collected some 800 water samples and about 80 samples of plankton and suspended particles. In collaboration with the JRC, the samples were analyzed, revealing very low levels of radioactivity. To measure such low radiation, the samples were placed deep (225 m) underground to avoid interference from cosmic rays in the sensitive instruments.

Three radionuclides from Fukushima were detected in the samples from the Pacific: Caesium-134 (134Cs, half-life: 2.1 years), Caesium-137 (137Cs, half-life: 30 years) and the Silver isotope 110mAg (half-life 0.68 years). The zooplankton contained higher amounts of radiocaesium than particulate matter as it consumes organic matter and thereby accumulates caesium. The study of plankton is useful to understand the uptake in the food chain and estimate impact on biosystems of future releases. The measurements of the plankton showed that in all sampling locations the level of radiocaesium was in the order of 30 mBq/g (May/June 2011) while only those samples collected up to 70 km from Fukushima (near to the epicentre of the earthquake) had measurable amounts of 110 mAg.

For more information, visit [ec.europa.eu](http://ec.europa.eu).

### Fishing prohibitions produce more sharks along with problems for fishing communities

Scientists working for Murdoch University, the Wildlife Conservation

Society, The Nature Conservancy, and other groups have good news about fishing closures established in Indonesia's shark sanctuary: It's good for sharks and other fish, all of which are more abundant within zones with fishing restrictions.

The bad news: People who rely on shark fishing for their livelihoods have few other options but to fish in unprotected areas when fishing closures are put in place. Fishers go as far as sometimes making ends meet with illegal practices. The study examines both the effects of fishing restrictions on sharks and the impacts of those changes on local community members who fish for a living.



*Credit: Steve Lindfield.*

The study, titled "Higher Abundance of Marine Predators and Changes in Fishers' Behavior Following Spatial Protection within the World's Biggest Shark Fishery," appears in a recent edition of *Frontiers in Marine Science*. The authors of the study are Vanessa Jaiteh of Murdoch University; Steve Lindfield of the Coral Reef Research Foundation; Sangeeta Mangubhai of The Nature Conservancy and the Wildlife Conservation Society; Carol Warren of Murdoch University; Ben Fitzpatrick of Oceanwise Australia; and Neil Loneragan of Murdoch University.

The study on the relationship between shark conservation efforts and the behavioral changes in people after fishing closures are implemented is an important one for Indonesia, which is both a center of enormous marine diversity and the largest contributor to the international trade in shark fins.

"Sharks are apex predators that play a huge role in maintaining ecological balance in the region's marine ecosystems," said Dr. Sangeeta Mangubhai of the Wildlife Conservation Society and the Nature Conservancy, one of the co-authors on the study. "Protecting shark populations from overfishing is not merely a matter of establishing marine protected areas. Such measures also require considerations of increased fishing effort in

unprotected areas and how to provide more livelihood opportunities for people who depend on marine resources."

### Fishermen, scientists collaborate to collect climate data

Fishermen plying the waters off the southern New England coast have noticed significant changes in recent years. Though generations of commercial fishermen have made their livings on these highly productive waters, now, they say, they are experiencing the impacts of climate change.

"The water is warming up, and we see different species around than we used to," says Kevin Jones, captain of the F/V Heather Lynn, which operates out of Point Judith, Rhode Island.

To help understand the ongoing changes in their slice of the ocean, Jones and other fishermen in the region are now part of a fleet gathering much-needed climate data for scientists through a partnership with the Commercial Fisheries Research Foundation (CFRF) and Woods Hole Oceanographic Institution (WHOI).

"There has been a lack of consistent measurements in this region, particularly across the continental shelf south of Rhode Island," says Glen Gawarkiewicz, a physical oceanographer at WHOI and principal investigator on the project. "In order to understand the changes in ocean conditions and how those changes impact ecosystems and the people who depend on them, we need to collect more data, more often."

The Shelf Research Fleet Project began in 2014 with that goal in mind. The fleet is made up of commercial fishing vessels that are fishing in or transiting through the study area throughout the year.

"We're utilizing fishermen's time on the water and their knowledge of the ocean environment to develop an understanding of this highly dynamic area," says Anna Malek Mercer, research fleet director and CFRF executive director. "[The partnership is] unique both in terms of approach and in the data that's coming out."

As part of the project, Malek Mercer and others from CFRF trained captains and crew members in how to take weekly measurements using a CTD. The data from the CTD is available in real-time to view onboard the fishing vessel using an iPad tablet. Along with the CTD data, the fishermen can also include notes on the tide, weather conditions, and fish species observed in the area. The data are then sent to researchers

and posted on a website that is accessible to the public.

Members of the fishing research fleet participate in workshops with WHOI scientists where they share their observations about fish movements in the study area, discuss the data collected, and help researchers interpret results.

Since data collection started in November 2014, results from more than 160 CTD casts have been logged. Scientists use the CTD data to assess the frequency, timing, and extent of intrusions of warm, salty water along the slope and Gulf Stream waters onto the continental shelf. Long-term, the data will help scientists better understand how changes in large-scale forcing—including the position of the Jet Stream—affects annual temperature and salinity extremes, and cross-shelf exchange processes during periods of rapid change.

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

### **NOAA, USGS, partners predict an average ‘dead zone’ for GoM**

Scientists forecast that this year’s Gulf of Mexico dead zone—an area of low to no oxygen that can kill fish and marine life—will be approximately 5,898 sq. mi or about the size of Connecticut, the same range as it has averaged over the last several years.

The dead zone in the Gulf of Mexico affects nationally important commercial and recreational fisheries. Hypoxic zones or “dead zones” are caused by high levels of nutrients, primarily from activities such as industrialized agriculture and inadequate wastewater treatment.

The NOAA-sponsored Gulf of Mexico hypoxia forecast is improving due to advancements of individual models and an increase in the number of models used for the forecast. Forecasts based on multiple models are called ensemble forecasts and are commonly used in hurricane and other weather forecasts.

This year marks the second year that a four-model forecast has been used. The four individual model predictions ranged from 5,204 to 6,823 sq. mi, and had a collective predictive interval of 3,200 to 8,597 sq. mi. The forecast assumes typical weather conditions, and the actual dead zone could be disrupted by hurricanes or tropical storms. Data from these four models are used to determine and meet the nutrient reduction targets set by the interagency Mississippi River/Gulf of Mexico Watershed Nutrient Task Force.

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

### **Underwater ‘lost city’ found to be geological formation**

Ancient underwater remains of a long lost Greek city were in fact created by a naturally occurring phenomenon—according to joint research from the University of East Anglia (UEA) and the University of Athens (UoA).

When underwater divers discovered what looked like paved floors, courtyards and colonnades, they thought they had found the ruins of a long-forgotten civilization that perished when tidal waves hit the shores of the Greek holiday island Zakynthos.

But new research published recently reveals that the site was created by a natural geological phenomenon that took place in the Pliocene era—up to five million years ago.

Lead author Prof Julian Andrews, from UEA’s School of Environmental Sciences, said: “The site was discovered by snorkelers and first thought to be an ancient city port, lost to the sea. There were what superficially looked like circular column bases, and paved floors. But mysteriously no other signs of life, such as pottery.”

The bizarre discovery, found close to Alikanas Bay, was carefully examined *in situ* by the Ephorate of Underwater Antiquities of Greece.

Archaeologist Magda Athanasoula and diver Petros Tsampourakis studied the site, together with Professor Michael Stamatakis from the Department of Geology and Geoenvironment at the UoA. After the preliminary mineralogical and chemical analyses, a scientific research team was formed.

The research team went on to investigate in detail the mineral content and texture of the underwater formation in minute detail, using microscopy, X-ray and stable isotope techniques.

Professor Andrews said: “We investigated the site, which is between 2 to 5 m under water, and found that it is actually a natural geologically occurring phenomenon. The disk and doughnut morphology, which looked a bit like circular column bases, is typical of mineralization at hydrocarbon seeps—seen both in modern seafloor and palaeo settings. We found that the linear distribution of these doughnut shaped concretions is likely the result



of a sub-surface fault which has not fully ruptured the surface of the sea bed. The fault allowed gases, particularly methane, to escape from depth. Microbes in the sediment use the carbon in methane as fuel. Microbe-driven oxidation of the methane then changes the chemistry of the sediment forming a kind of natural cement, known to geologists as concretion. This kind of phenomenon is quite rare in shallow waters. Most similar discoveries tend to be many hundreds and often thousands of meters deep underwater.”

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

### **NOAA announces proposals to expand Flower Garden Banks National Marine Sanctuary**

Building on more than 30 years of scientific studies, including numerous reports released in the last decade and in the aftermath of the 2010 Deepwater Horizon oil spill disaster, NOAA announced a proposal to expand Flower Garden Banks National Marine Sanctuary to protect additional critical Gulf of Mexico habitat.

The plan lays out five expansion scenarios, ranging from no expansion of the 56-sq. mi sanctuary to one bringing it to a total of 935 sq. mi. In NOAA’s preferred scenario, the sanctuary would expand to 383 sq. mi to include 15 reefs and banks that provide habitat for recreationally and commercially important fish, as well as a home to 15 threatened or endangered species of whales, sea turtles, and corals.

“These habitats are the engines of sustainability for much of the Gulf of Mexico and are critical to fish such as red snapper, mackerel, grouper and wahoo, as well as other protected species,” said John Armor, acting director, NOAA’s Office of National Marine Sanctuaries. “The proposed expansion also advances NOAA’s mission to conserve and manage coastal and marine ecosystems and resources that help sustain local communities and America’s economy.”

The public is invited to comment on the agency’s proposal through August 19. Those comments will be used to develop a final environmental impact statement, which will then be available for public review. After reviewing the comments from the public, NOAA would then make a decision on the proposed expansion.

A description of the expansion scenarios, including boundaries and resources the areas contain, can be found at <http://flowergarden.noaa.gov/management/expansiondeis.html>.

**BRTP tidal power platform to be fabricated by Aecon**

Black Rock Tidal Power Inc. (BRTP) has awarded the contract to fabricate its TRITON S40 tidal power platform to Aecon Atlantic Industrial Inc., a wholly owned subsidiary of Aecon Group Inc. This will be the first full-scale fabrication of this technology in the world. The instream tidal device will be installed in the Bay of Fundy in 2017.

BRTP's tidal-current energy technology uses forty SIT 250 turbines mounted on the TRITON, summing up to 2.5 MW overall capacity. Because the TRITON can be easily brought to the surface it allows for easy maintenance access. The use of multiple small turbines together with TRITON's maintenance approach reduces both capital and maintenance costs.

BRTP is one of only five companies from around the world awarded a demonstration site at FORCE, Canada's leading research center for instream tidal energy located in the Bay of Fundy.

Unlike wind power, instream tidal power is a predictable source of renewable energy because of the regularity of the tides. This means that tidal energy can be used on a commercial scale to produce renewable electricity and reduce greenhouse gas emissions.

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

**Protean tests Wave Energy Converter**

Protean Wave Energy Ltd has completed the first phase of Stage One of deployment of the demonstration wave energy farm at the Port of Bunbury, Western Australia, which consisted of deploying a pilot Wave Energy Convertor (WEC).

The performance of the pilot WEC is currently being assessed, ahead of deployment of additional WECs. Two additional WECs have been fabricated and are fitted with GPS tracking and remote sensor equipment to collect performance data. Performance and environmental data will be evaluated for a pre-feasibility assessment targeting the deployment of the company's first commercial pilot wave farm.

Protean Wave Energy intends to sequentially deploy the two additional WECs following completion of final testing of their data collection equipment and evaluation of the performance of the pilot WEC.

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

**DONG Energy awards ABS Group certification contract**

ABS Group Ltd., a subsidiary of ABS Group of Companies, Inc., a leading provider of project certification and quality assurance services for offshore wind assets, has received a contract to provide project certification services from DONG Energy Wind Power A/S for the planned Hornsea Offshore Wind Farm Project One in the UK.

DONG Energy is developing the Hornsea Offshore Wind Farm Project One, which is expected to be fully commissioned and in operation by 2020. With a capacity of 1,200 MW, Hornsea will be the world's first offshore wind farm to exceed 1,000 MW in capacity. The wind farm project development is located 120 km off the Yorkshire coast and covers approximately 407 sq. km.

ABS Group's certification scope will cover Quality Assurance/Quality Control document review and manufacturing inspection of three offshore substations (OSS) and one reactive compensation substation (RCS), including the topsides and foundations. Inspections will be carried out in several European countries.

Torsten Muuss, director of renewable energy for ABS Group, said, "Due to the long distance from shore, an RCS—in addition to the OSS—will be needed approximately halfway along the cable route to compensate the reactive losses in the export cable. These three OSS and one RCS will be manufactured in a very short time of about 2 years, and ABS Group will support DONG Energy to meet this timeline and the quality standards and requirements by mobilizing, in total, about 30 inspectors and engineers in five European countries."

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

**Scotrenewables launches world's largest tidal turbine**

Scotrenewables Tidal Power has launched its 2-MW SR2000, the world's largest energy-generating tidal turbine. The company, which is at the forefront of the floating tidal technology sector, launched the 550-ton machine at Harland & Wolff Heavy Industries Ltd in Belfast on Thursday 12 May. This is the first commercial-scale machine the company has built. The turbine will undergo preliminary tow trials in Belfast Lough before being towed to the European Marine Energy Centre (EMEC) in Orkney to commence a grid connected test program.

The SR2000 is the culmination of more than 12 years of a detailed and incremental engineering R&D program, with the project being supported by £1.25m funding under the Scottish Government's WATERS2 initiative. The turbine design follows Scotrenewables' floating generating platform philosophy, which the company expects will deliver a step-change cost and risk reduction to the commercial tidal energy sector.

The company's progress has been underpinned by long-standing support and investment of more than £25 million from main investors: ABB, (Scottish Government's) Renewable Energy Investment Fund, DP Energy, Fred. Olsen Group and Total New Energies.

Steel fabrication of the machine was carried out by fabricators in Scotland, Northern Ireland, and England with assembly and commissioning of the SR2000 taking place at Harland & Wolff shipyard over the past 12 months, drawing on H&W's 150 years of marine manufacturing experience to deliver this next generation technology.

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

**Denmark and the U.S. agree to strengthen cooperation on offshore wind**

At the Embassy of Denmark in Washington, D.C., Danish Ambassador Lars Gert Lose and BOEM director Abigail Ross Hopper signed a Memorandum of Understanding (MOU) to recognize their countries' common interests in developing offshore wind as a clean and sustainable energy source.

"This is a historic event for our respective countries as we work together to share knowledge, experiences, data and best practices relevant to offshore wind energy development," said Director Hopper. "This MOU represents an exciting milestone toward achieving a clean energy future."

"This agreement is a testimony to the strong Transatlantic ties between Denmark and the U.S." Ambassador Lose said.

"Denmark has been using offshore wind power as an energy resource for 25 years and I am delighted that we—by sharing our knowledge and experience—can help promote renewable energy in the world's largest economy."

The following topics have been identified as high priority areas for cooperation under this MOU:

- Promoting information sharing, best practices, and policy initiatives to support development and regulation of offshore wind energy resources.
- Working to identify and discuss challenges associated with financing and risk management for offshore wind energy facilities.
- Identifying opportunities for the sharing of best practices, regulatory approaches, and scientific models with regard to protection of the environment, including, but not limited to, the effects of offshore wind energy facilities on marine mammals, migratory birds, and cultural resources.
- Facilitating technical knowledge transfer related to electrical interconnection and grid integration of electricity generated from offshore wind energy facilities.

Knowledge sharing on a wide range of offshore wind energy issues, including supply chain, offtake, grid integration/interconnection, system planning to optimize offshore wind energy deployment, data on the benefits of offshore wind energy, and strategies for achieving cost reductions.

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

#### **China COSCO Shipping, DEME team up to develop offshore wind in China**

The Belgian dredging, environmental and marine engineering group, DEME, and China COSCO Shipping—the largest shipping company in the world—have formed a joint venture to develop offshore wind energy in China. The cooperation is in line with the Chinese climate vision and its aim to develop renewable energy, both of which were recently incorporated in the 13th Five-Year Plan (2016-2020) for social and economic development. The Chinese government wishes to increase the installed capacity of offshore wind energy significantly by 2020.

DEME and China COSCO Shipping

are both market leaders in their sectors and have found one another in the COSCOCS - DEME joint venture active in offshore wind energy in China. As the largest shipping company in the world, China COSCO Shipping wishes to enter this new market segment and has found a partner in DEME's subsidiary GeoSea, with its extensive experience in developing, building and maintaining offshore wind farms.

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

#### **World's largest floating wind farm moves to next stage**

A floating wind farm to be located off Scotland's east coast at Buchan Deep, some 25 km from Peterhead, is one step closer to becoming reality following The Crown Estate granting a lease to Statoil that will enable construction to commence.

The project, set to be the world's largest floating wind farm, consists of five 6-MW turbines that will be deployed in deeper water than any previous offshore wind turbines around the coast of the UK.

The Crown Estate manages leasing

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of the seabed. The business's team uses in-depth knowledge of the offshore renewables sector, covering planning and consenting, finance and commercial, environmental and legal issues, to actively manage the seabed to ensure it is sustainably developed and enjoyed to deliver best value over the long-term.

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

### Last wind turbine completed at the Gode Wind

DONG Energy has installed the last wind turbine at the offshore wind project Gode Wind. This means that installation of all 97 turbines of the offshore wind farms Gode Wind 1 and Gode Wind 2 has been completed. With a total capacity of 582 MW, the two wind farms will deliver enough green power to cover the consumption of 600,000 German households. This summer the two wind farms will go into operation.

Trine Borum Bojsen, managing director of DONG Energy in Germany and responsible for offshore wind in the country, said, "Gode Wind 1 and 2 are our second and third projects in Germany. Borkum Riffgrund 1, our first German wind farm, was inaugurated last year. I'm pleased that we can once again contribute to the German energy transformation. The construction of such large projects brings along economies of scale, contributing to the reduction of the cost of offshore wind."

The construction of Gode Wind 1 and 2 took just over 1 year. In April last year, the construction activity started approximately 45 km off the coast. In August, the offshore team began the installation of the 6.0 MW wind turbines. Despite the challenging weather conditions during winter time, DONG Energy completed the installation on schedule.

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



### Gibraltar wave energy project formally opened

Wave energy developer Eco Wave Power Ltd announced that Eco Wave Power's Energy Project was formally opened by the Chief Minister, Hon. Fabian R Picardo and by the Minister of Health, Environment and Climate Change, Hon. Dr. John Cortes, and is now exporting electricity into Gibraltar's power grid.



The Gibraltarian Project was officially "switched-on" by the Chief Minister of Gibraltar, Hon. Fabian R Picardo and by the Minister of Health, Environment and Climate Change, Hon. Dr. John Cortes. Gibraltar Electric Authority (Gibraltar's National Electric Company) is the purchaser of the entire project's power.

The project is the first grid connected Eco Wave Power plant and the only wave power plant anywhere in Europe, operating multiple wave units, under Commercial PPA terms.

This is the first array of wave power generators to be connected to an electricity grid in Gibraltar and in Europe. The innovative Eco Wave Power floaters move up and down with the movement of the waves, and create pressure which is driving a hydro motor and a generator. The technology also provides smart automation system that controls the power station's storm-protection mechanism and the stable transmission of clean electricity to the grid.

Eco Wave Power's technology has been under development since 2011, and since then the company tested its technology in Ukraine and installed a pilot plant in Jaffa Port. Moreover, the company received Pioneering Technology status from the Chief

Scientist of the Energy Ministry in Israel Dr. Bracha Halaf, won numerous innovation awards by Frost & Sullivan, Energy Globe Award, Erasmus University and others. In addition, EWP invested significant efforts to finalize an impressive projects pipe line of 111-MW worldwide, and establishing three subsidiaries in Gibraltar, China and Mexico, with additional ones to be established shortly.

The expansion of Eco Wave Power's power plant from 100 KW to 1 MW to 5 MW is currently in the design phase and will feature the largest Eco Wave Power units yet with a targeted capacity of some 10 times of the current generation.

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

### DONG Energy completes acquisition of New Jersey wind development rights

DONG Energy announced that the company has taken over RES Americas Developments Inc.'s (RES) more than 1,000 MW development project rights off the coast of New Jersey.

The New Jersey lease area, which was acquired by RES during the offshore wind auction held by BOEM on 9 November 2015, was legally taken over by DONG Energy on 11 May 2016. RES Americas will continue to support the development of the lease area as agreed with DONG Energy.

The New Jersey lease area, which the company has named Ocean Wind, has a total size of 160,480 acres and is located approximately 10 nmi offshore and has the potential to accommodate more than 1,000 MW of offshore wind, which could power 500,000 New Jersey homes.

The New Jersey lease is the second U.S. lease area for DONG Energy. The acquisition of the company's first U.S. lease area was approved by BOEM in June 2015 along the coast of Massachusetts.

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

### **BEI announces offshore wind engineering contracts**

Beothuk Energy Inc. (BEI) has awarded contracts for its St. George's Bay (western Newfoundland and Labrador (NL), Canada) offshore wind energy project through its engineering firm, Maderra Engineering, to DNV GL and Fugro GeoSurveys. The St. George's Bay project is planned to have a capacity of 180 MW and has the potential for immense socioeconomic benefits on the west coast of NL, similar to the impact made by the offshore oil industry on the east coast of the province.

The work program includes geological and bathymetric compilation, constraints analysis, wind resource and energy assessment, and Levelized Cost of Energy (LCOE) cost modeling. The consultants and BEI have access to established data sets and 67 years of wind data for analysis and will be assessing an extensive collection of seismic, hydrographic, and bathymetric data.

DNV GL has been awarded a contract to provide the constraints analysis, wind resource and energy assessment, LCOE modeling and a preliminary wind farm layout. DNV GL's long history and extensive experience in the offshore sector lead to an incomparable quality of its offered services.

Fugro GeoSurveys has been contracted to provide bathymetric/geologic compilation, hydrographic data reprocessing, assessment of stability and seismicity, GIS analyses of seabed morphology, and routing options. Fugro GeoSurveys is a division of Fugro Canada Corp., with offices in St John's, NL, Canada. Fugro GeoSurveys is a professional service company that specializes in seafloor mapping, geotechnical, geological/seismic surveys, integrated navigation/positioning and industrial surveys on land, in the air, or in the oceans.

Maderra Engineering will provide Owner's Engineering services including planning, technical documentation review and integration, and interface management. Located in St. John's, NL, Maderra Engineering Inc. focuses on the delivery of engineering, project management and personnel services to the ener-

gy, industrial and commercial sectors.

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

### **First offshore wind platform-to-platform cable connection using a bridge**

For the first time, two sister platforms in an offshore wind farm will be connected by means of a bridge system with the aid of a new, flexible high-voltage cable with a conductor cross section of 800 sq. mm. This increases the guaranteed energy feed-in for the wind farm operator.

Pfisterer has received a major contract for this pilot project within the framework of the connection of the DolWin3 converter station. The electrical connector manufacturer already possesses the pre-qualification for the Feltoflex connecting cable with a conductor cross section of 800 sq. mm. The onshore work to equip the converter station with medium-voltage cable systems has already started, and completion of the HVDC offshore connection is planned by 2017.

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

### **Adwen's AD 5-135 obtains Type Certification**

Adwen's AD 5-135 turbine has obtained the first Type Certificate based on the Guideline for the Certification of Offshore Wind Turbines, Edition 2012, issued by DNV GL. This new guideline updates the previous version from 2005 to fully comply with GL's Guideline for Onshore Wind Turbines, edition 2010, and to cover IEC 61400, parts 1 and 3.

The new guideline contains a type certification process especially developed for offshore wind turbines. It takes into account the important increase on the average size of turbines experienced from 2005 as well as the use of advanced, intelligent control systems to mitigate loads. Furthermore, the machinery and electrical design requirements are improved to the latest state of the art.

The AD 5-135 is an evolution of the AD 5-116 of which Adwen has installed 630 MW, was first certified in March of 2015 according to this guideline and has been updated to cope with the specific configuration required for Wikinger offshore wind farm, Iberdrola's 350 MW project in the Baltic Sea. Among the new features figure the 25-year operating lifetime and the Grid Loss System—a new smart system that allows energy production for self-consumption in case of temporary loss of grid connection.

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

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**Lehnhardt relieves Baumann as SUPSALV director**

Capt. Keith Lehnhardt relieved Capt. Gregg Baumann as the director of Ocean Engineering, Supervisor of Salvage and Diving (SUPSALV).

Lehnhardt reports to SUPSALV after serving as program executive officer, maritime in the special operations force acquisition, technology and logistics directorate at the U.S. Special Operations Command. His previous tours include commanding officer, Navy experimental diving unit, officer in charge, diving systems detachment, deep submergence unit, and a tour at Portsmouth Naval Shipyard conducting submarine repairs.

Baumann, who served as SUPSALV director since October 2014, retired from the Navy after 30 years of service.

The Office of the Director of Ocean Engineering, Supervisor of Salvage directs development and maintenance of the Navy's salvage, underwater ship husbandry, diving, and certification program for the U.S. Navy.

**exactEarth announces contract to provide French Navy with satellite AIS data**

exactEarth Ltd. announces that it has been selected by Telespazio France to supply Satellite AIS services to the French Navy as part of the recently announced 4-year Trimaran 2 project won by a consortium of Airbus Defense and Space and Telespazio France.

Under terms of the contract, exactEarth will provide a Satellite AIS data feed of the French economic exclusion zone, which encompasses 11 million sq. km, to Telespazio France who will provide a viewing capability to several users in the French Navy.

**thyssenkrupp Marine Systems awarded service order in Peru**

thyssenkrupp Marine Systems has received a service order worth around €40 million from the Peruvian naval shipyard SIMA. A key component of the order is the provision of consulting during the planning and realization of extensive modernization work on four HDW 209/1200 class submarines over a period of 7 years. Among other things, thyssenkrupp Marine Systems will perform engineering and technical services such as cutting and welding on the submarines and will make specialists available to provide local support.

The four submarines—named Angamos, Antofagasta, Pisagua and Chipana—were built in the early 1980s at the thyssenkrupp Marine Systems shipyard (at that time HDW – Howaldtswerke-Deutsche Werft GmbH) in Kiel and have been used by the Peruvian navy ever since, forming the backbone of the Peruvian submarine fleet.

**U.S. Coast Guard, Malaysia strengthen partnership to improve port security**

A U.S. Coast Guard International Port Security team completed a bilateral engagement with Malaysian officials.

This engagement involved sharing best practices and visiting with the Ministry of Infrastructure Marine and Ports Division to observe the implementation of the International Ship and Port Facility Security Code at multiple port facilities: Northport, Port Klang and two port facilities in Penang; Swettenham Cruise Terminal and North Butterworth Container Terminal.

"The Coast Guard appreciates Malaysia's invitation and their strong commitment to securing the global supply chain," said Lt. Cmdr. Kevin Beaudoin, ISPS program liaison officer, U.S. Coast Guard Activities Far East Division.

Members from the Coast Guard delegation also provided a half-day seminar on conducting internal security audits. In attendance were approximately 20 port security professionals made up of the Marine Department, Port facility Security Officers, Malaysia Maritime Enforcement Agency and the Klang Port Authority.

In 2003, the U.S. Coast Guard developed the International Port Security Program to reinforce the implementation of the ISPS Code. Malaysia became signatory to the ISPS Code in 2004. The ISPS Program seeks to reduce risk to U.S. maritime interests, including U.S. ports and ships, and to facilitate secure maritime trade globally.

**Austal USA celebrates christening of LCS 14**

Austal officials joined ship sponsor U.S. Senator Jeanne Shaheen and many distinguished guests in celebrating the christening of the nation's 14th littoral combat ship (LCS), the future USS Manchester, at Austal USA on 7 May 2016.

Manchester (LCS 14) is the fifth LCS in Austal's 11-ship, contract worth over \$3.5 billion. With its shallow draft of 14 ft, the Austal-built Independence-variant LCS is an advanced high-speed and agile 419-ft aluminum trimaran combat ship that combines superior seakeeping, endurance and speed with the volume and payload capacity needed to support emerging missions.

The future USS Manchester is scheduled for delivery in 2017. She has a maximum speed of more than 40 kts, a voluminous 28,000 sq. ft mission bay, and a flight deck capable of simultaneously holding two H-60 helicopters.

Austal's LCS program is in full swing with three ships delivered and seven ships under construction at this time. Montgomery (LCS 8) conducted acceptance trials late last week. Gabrielle Giffords (LCS 10) and Omaha (LCS 12) are preparing for trials. Final assembly is well underway on Tulsa (LCS 16) and modules for Charleston (LCS 18) and Cincinnati (LCS 20) are under construction in Austal's Module Manufacturing Facility.

The company has also been contracted by the U.S. Navy to build 10 Expeditionary Fast Transports (EPF). Of the 10 ships included in the \$1.6 billion block-buy contract, 6 have been delivered.

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

**Saab receives order for new lightweight torpedo**

Saab has received an order from the Swedish Defence Material Administration (FMV) for the development and production of a new lightweight torpedo system. The total order value amounts to approximately SEK1.53 billion and deliveries will take place during the period 2016-2024.

The order comes under the terms of the Letter of Intent (LoI) between Saab and FMV that was announced on June 9, 2014. The LoI supports the Swedish Armed Forces' underwater capabilities for the period 2015-2024. This order connects to the previous orders from FMV announced in July 2014 and February 2015 for new lightweight torpedo.

Saab has over the years established a unique experience and expertise in developing underwater systems for shallow waters and the types of environments that exists in the Baltic

Sea, including adapted propulsion, communications and target seekers.

Saab is a long-standing supplier to FMV and has provided underwater solutions for weapon systems, sensors, autonomous and remotely operated underwater vehicles and mine hunting.

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

#### **Waterside research facility upgrades and expands Sonardyne Sentinel IDS security system**

Six years after it was commissioned, the underwater security system protecting an undisclosed waterside facility in the Middle East is to be expanded and upgraded to offer enhanced levels of intruder protection.

The announcement was made by UK-based maritime security company, Sonardyne International Ltd UK, following the award of a contract to service the Sentinel Intruder Detection Sonar (IDS) system that helps safeguard the high profile facility from unauthorized access from the sea. The scope of work includes the supply of extra sonar sensors to monitor an additional stretch of coastline and

updating the existing in-water sonars to the latest design specification.

While security measures such as CCTV, radar, access control and motion sensors are proven, cost-effective options for protecting inland locations, sites located close to water remain vulnerable to unauthorized intrusion from the water, and in particular, from below the surface.

Helping to close this surveillance gap is Sentinel IDS, widely recognized as the security industry's most extensively deployed sonar. It meets the requirements of private, commercial, government and naval end users by reliably detecting, tracking and classifying divers and small underwater vehicles approaching a protected asset, alerting security personnel to the potential threat. Whether it is protecting a critical infrastructure facility, offshore platform, sea port or superyacht at anchor, Sentinel's autonomous monitoring capabilities, long-range detection and proven low false alarm rates provide a rapidly deployable, 360° underwater security solution for any marine asset.

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

#### **U.S. Navy conducts counter-ISIL sorties from Mediterranean**

The U.S. Navy's Harry S. Truman Carrier Strike Group conducted combat sorties from the Eastern Mediterranean Sea on 3 June, in support of Operation Inherent Resolve over Syria and Iraq.

The Carrier Strike Group transited the Suez Canal 2 June and flew multiple combat sorties 3 June in an effort to degrade ISIL resources and leadership.

The strike group consists of USS Harry S. Truman (CVN 75); the embarked Carrier Air Wing (CVW) 7; Commander, Carrier Strike Group 8; USS Anzio (CG 68); Destroyer Squadron (DESRON) 28; USS Bulkeley (DDG 84); USS Gonzalez (DDG 66); and USS Gravely (DDG 107).

The strike group brings multi-mission capable platforms to the U.S. European Command (EUCOM) area of responsibility and the U.S. 6th Fleet area of operations with strike, ballistic missile defense, intelligence, surveillance and reconnaissance capabilities. These resources further serve to support European Allies and partners, deter potential threats and to conduct combat operations in support of the counter-ISIL mission.

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After conducting operations in the 5th Fleet area of operations, the strike group's deployment has been extended to support dismantling and rolling back terrorist networks from the 6th Fleet area of operations before it will return home to Norfolk.

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

### **U.S. Navy accepts delivery of USS John P. Murtha**

The U.S. Navy accepted delivery of the future John P. Murtha (LPD 26) during a ceremony at the Huntington Ingalls Industries (HII) shipyard on May 13. The delivery of John P. Murtha serves as the official transfer of the ship from the shipbuilder to the Navy and is a major milestone in the ship's transition to operational status.

Following crew move aboard and certification, the ship will transit to Philadelphia for commissioning, planned for fall 2016. Upon commissioning, the ship will transit to her homeport of San Diego.



The principal mission of LPD 17 class amphibious transport dock ships is to transport and deploy the necessary combat and support elements of Marine Expeditionary Units and Brigades. The ship will carry 699 troops—with a surge capacity to 800—and have the capability to transport and debark air cushion or conventional landing craft and amphibious vehicles, augmented by helicopters or vertical takeoff and landing aircraft (MV-22). These ships will support amphibious assault, special operations and expeditionary warfare missions through the first half of the 21st century.

HII is currently in production on the future USS Portland (LPD 27) and was awarded a contract in December 2015 for long lead time material to support detail design and construction of the future LPD 28.

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

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

### **HII awarded advance planning contract for CVN 80**

Huntington Ingalls Industries was awarded a \$152 million contract for advance planning for the construction of the aircraft carrier Enterprise (CVN 80). The third aircraft carrier in the Gerald R. Ford class was named in honor of the U.S. Navy's first nuclear-powered aircraft carrier, USS Enterprise (CVN 65).

The work, which includes engineering, design, planning and procurement of long-lead-time material, will be performed at the company's Newport News Shipbuilding division through March 2018.

Construction on Enterprise is slated to begin in 2018 with

delivery to the Navy in 2027. The new Enterprise will eventually replace the USS Dwight D. Eisenhower (CVN 69) when the aircraft carrier enters the fleet.

Shipbuilders have captured thousands of lessons learned in the process of building Gerald R. Ford, most of which are being implemented as cost-saving initiatives in building the second ship in the class, John F. Kennedy (CVN 79). These initiatives will continue on Enterprise, and HII will work with the Navy to identify additional cost-saving initiatives for future Ford-class carrier construction.

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

### **Newport News Shipbuilding celebrates keel-laying of SSN 791**

Dr. Jill Biden, the Second Lady of the United States and sponsor of the Virginia-class submarine Delaware (SSN 791), visited Huntington Ingalls Industries' Newport News Shipbuilding division for the submarine's keel-laying ceremony, during which she declared the keel "truly and fairly laid." The keel laying signifies the ceremonial start of construction for the newest U.S. Navy vessel named for "The First State."

More than 4,000 shipbuilders support the construction of Delaware. The submarine will be the newest Navy vessel named for the country's first state, following the dreadnought battleship USS Delaware (BB 28) that was delivered by Newport News in 1910.

Delaware is the final ship of the Block III submarines built under a unique teaming agreement between Newport News and General Dynamics Electric Boat.

Construction on Delaware began in September 2013. The submarine is about 56% complete and is on track for delivery in 2018.

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

### **Ingalls Shipbuilding begins fabrication of DDG 121**

Huntington Ingalls Industries' Ingalls Shipbuilding division recently marked the start of fabrication for the Arleigh Burke-class (DDG 51) destroyer Frank E. Petersen Jr. (DDG 121) for the U.S. Navy. The start of fabrication signifies that 100 tons of steel have been cut.

DDG 121 is the third of five DDG 51 destroyers the company was awarded in June 2013. The five-ship contract, part of a multi-year procurement in the DDG 51 program, allows Ingalls to build ships more efficiently by buying bulk material and moving the skilled workforce from ship to ship.

The guided missile destroyer honors Frank Emmanuel Petersen Jr., who was the first African-American aviator and general officer in the United States Marine Corps. After entering the Naval Aviation Cadet Program in 1950, Petersen would go on to fly more than 350 combat missions throughout the Korean and Vietnam wars.

The highly capable, multi-mission ship can conduct a variety of operations, from peacetime presence and crisis management to sea control and power projection, all in support of the United States' military strategy. Arleigh Burke-class destroyers are capable of simultaneously fighting air, surface and subsurface battles. The ship contains myriad offensive and defensive weapons designed to support maritime defense needs well into the 21st century.

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

### **RN's holds conference on unmanned systems**

The Royal Navy has hosted more than 40 organizations responsible for the latest in unmanned maritime systems. The main planning conference for October's Unmanned Warrior saw representatives from defense, industry and academia dis-

cuss how to deliver the largest unmanned systems event of its kind.

Fleet Robotics Officer Commander Peter Pipkin said, "We have made great progress; Unmanned Warrior is well set and it is going to blaze a path for others to follow."

The demonstration of unmanned systems overlaid onto the twice-yearly multinational Joint Warrior exercise staged off western Scotland will set a more challenging environment for the participants and allow the Royal Navy to see first-hand how some of the systems and sensors could integrate into current and future operations.

The growing scale of Unmanned Warrior is a clear demonstration of the Royal Navy's ambition to lead and win through technological innovation. Unmanned Warrior will see more than 50 vehicles, sensors and systems operating in a number of themed activities in the MOD exercise areas based around Scotland.

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

### Royal Navy heads multi-nation task force in drugs bust

A Royal Navy-led operation seized over a ton of heroin being transported across the Indian Ocean to East Africa.

Operation Shirikisho, which means Unity in Swahili, was an operation planned and executed by the UK-led Combined Task Force (CTF) 150. It involved a UK command team in Bahrain, and out at sea, an Australian frigate, a French ship and French Maritime Patrol and Reconnaissance Aircraft (MPRA). Their task was to detect and intercept vessels trafficking drugs.

HMAS Darwin's boarding team approached and boarded a 20-m fishing dhow and discovered evidence that she was carrying an illicit cargo of heroin. Conducting a rigorous search over 8.5 hours, she uncovered 380 kg of heroin, packed in bags.

Then, 12 hours later, her team boarded another suspect dhow. Several hours of searching followed and 512 kg of drugs was found. A third suspect dhow was boarded and another 60 kg discovered, taking the total to 952 kg of heroin.

The French Navy, which had played a crucial role by providing air surveillance for the operation, also had success at sea.

French Ship (FS) Nivose, which had been patrolling off the coast of East Africa alongside her Australian opposite number, sent a boarding team to search a dhow, finding 130 kg of heroin.

The airborne surveillance was provided by a French Falcon 50, which was supporting Operation Shirikisho throughout May.

CTF 150 is part of Combined Maritime Forces (CMF), a multi-national naval partnership, which is designed to promote security, stability, and prosperity in the Indian Ocean, Red Sea, and the Gulf region, an area comprising 3.2 million sq. mi.

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

### Second Singaporean LMV launched

Singapore Technologies Marine Ltd (ST Marine), the marine arm of Singapore Technologies Engineering Ltd (ST Engineering), held the launching ceremony in April for the second littoral mission vessel (LMV), Sovereignty, designed and built for the Republic of Singapore Navy (RSN).

The launch of Sovereignty, the second LMV in a series of eight vessels, marks another significant milestone for the LMV program. Smarter, faster and sharper, the LMVs are highly capable warships designed and equipped with advanced combat capabilities and technologies to further strengthen the RSN's ability in the seaward defense of

Singapore and protecting our sea lines of communication.

The integrated command center, where the bridge, combat information center and machinery control room are co-located, integrates and synergizes the management of navigation, engineering, and combat functions to achieve greater operational effectiveness and efficiency during maritime security operations. Adopting the concept of "mission modularity," these vessels are versatile and can leverage a range of mission modules that can be reconfigured to respond to different circumstances and roles, ranging from maritime security and mine clearing, to humanitarian assistance and disaster relief operations.

Measuring 80 m in length and beam at 12 m with displacement of 1,250 tons, the LMVs are 2.5 times larger than the current Fearless-class patrol vessels (PVs) and possess better sea-keeping capabilities to operate in higher sea state conditions.

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

### USS Bataan trains with new Mark VI patrol boats

Coastal Riverine Squadron Four (CRS-4) conducted well deck operations with the Mark VI patrol boat for the first time aboard amphibious assault ship USS Bataan (LHD 5) on 15 May. Two Mark VI boats demonstrated their capabilities by mooring and launching multiple times from the well deck of Bataan, accomplishing a major milestone for the craft.

The first operational Mark VI arrived in Bahrain as part of U.S. 5th Fleet. Once deployed, CRS-4 will utilize the Mark VI to conduct maritime security missions throughout the Arabian Gulf.

The Mark VI is an 85-ft patrol craft fitted with a Mark 38 25 mm gun on the bow and an ability to reach speeds in excess of 35 kts. The craft will provide the Navy the continued ability to patrol waterways for the purpose of protecting coalition forces and vital infrastructure.

The boats are versatile enough to fit inside the well deck; thus, they can be transported to any location in a short period of time. The crafts are also provided with kickstands to help deck department when conducting boat operations.

The Coastal Riverine Force (CRF) operates in harbors, rivers, bays across the littorals and ashore. The primary mission of CRF is to conduct maritime security operations across all phases of military operations by defending high value assets, critical maritime infrastructure, ports and harbors both inland and on coastal waterways against enemies and when commanded conduct offensive combat operations.

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



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## Sustainable and Resilient Solutions for Coastal Engineering, Applied Ecology and Oceanography Since 1986

The Woods Hole Group ([www.woodsholegroup.com](http://www.woodsholegroup.com)) celebrates 30 years. Originally founded in 1986 as Aubrey Consulting, the company diversified services to address environmental problems worldwide, focusing on engineering and environmental challenges in the deep ocean, the coastal zone, and wetland and terrestrial environments. More than one-third of the staff members have been with the company for 10+ years, a testament to corporate sustainability.

Headquarters remain in Falmouth, Massachusetts, with expansion to client-centered offices in Delaware, Florida and Texas as well as with partners in 20 countries. Building on early coastal roots, expertise includes:

- Real-time metocean systems design, installation, operation, and maintenance;
- Physical oceanography;
- Turnkey coastal engineering design;
- Numerical modeling on high-performance cluster;
- Climate change vulnerability assessments and sustainability;
- Living shorelines/wetland restoration; and
- Ecological risk assessments/remediation planning.

Energy exploration and development is a key focus, including traditional offshore oil and gas and renewable power sources. With energy production in deeper water, Woods Hole Group applies new technologies that provide real-time environmental data to customers' desktops. Offshore work expands a cornerstone of its business, supporting port and harbor monitoring systems (NOAA PORTS®). Another future growth area supports coastal communities, businesses, and transportation authorities in a changing climate facing ongoing sea level rise. New infrastructure requires design criteria and risk profiles for 50+ years, with more frequent and severe coastal flooding. The growing Applied Ecology & Sustainability team unites the Coastal and Oceanographic teams, encouraging resilient designs.

With 2,000+ projects completed, the company has proven sustainable project solutions. An original focus remains today—applying the latest technologies and scientific methods to solve real-world problems. This goal produces project designs that outperform expectations and increase clients' value. Experience proves economic development can be harmonious with the environment. Woods Hole Group recorded one of its best years in 2015 and embraces new challenges and growth opportunities.



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# OFFSHORE INDUSTRY

## BP starts up major project at its largest Gulf of Mexico platform



BP has started up a major water injection project at its Thunder Horse platform, extending the production life of one of the biggest deepwater fields in the U.S. Gulf of Mexico.

The project, which reflects BP's strategy of continued investment in its existing deepwater Gulf of Mexico production hubs, will boost recovery of oil and natural gas from one of the Thunder Horse field's three main reservoirs.

Over the past 3 years, BP refurbished the platform's existing topsides and subsea equipment while also drilling two water-injection wells at the site. From those wells, water will be injected into the reservoir to increase pressure and enhance production. The improvements are expected to allow the Thunder Horse facility to recover an additional 65 mboe over time.

The project is the second of five major upstream projects BP expects to bring online in 2016. It is part of BP's plan to add approximately 800,000 barrels of oil equivalent per day of new production globally from projects starting up between 2015 and 2020.

"This project will help BP sustain high levels of oil production in the deepwater Gulf of Mexico for years to come," said Richard Morrison, regional president of BP's Gulf of Mexico business. "And it's another example of BP taking advantage of targeted and cost-effective opportunities within our existing portfolio."

The Thunder Horse platform, which sits in more than 6,000 ft of water and began production in June 2008, has the capacity to handle 250,000 barrels of oil and 200 million cubic feet per day of natural gas. The facility continued to operate while work on the water injection project was underway.

In the deepwater Gulf of Mexico, BP operates four large production platforms—Thunder Horse, Atlantis, Mad Dog and Na Kika—and holds interests in four non-operated hubs—Mars, Mars B, Ursa and Great White.

BP has two other major projects underway in the deepwater Gulf of Mexico. The Thunder Horse South Expansion project will add a new subsea drill center roughly 2 mi from the Thunder Horse platform. In addition, BP continues to design the Mad Dog Phase 2 project, which will develop resources in the central area of the Mad Dog field through a subsea development tied back to a new floating production hub consisting of up to 24 wells from four drill centers.

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

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### Subsea Industry urges government to support the UK's £9billion sector in the face of lower oil prices

Industry body, Subsea UK, led a delegation of high profile subsea leaders from companies across the country's supply chain to Westminster on 15 June to outline what is required of Government to help the industry in the lower, for longer oil price environment.

According to Oil & Gas UK, around 120,000 oil and gas will have been lost by the end of 2016, since the oil price collapse. Subsea UK reckons that, of those, around 5,000 are in the subsea sector. The organization's recent "snapshot" survey revealed that 90% of subsea companies had seen a fall in revenues, with 28% seeing a drop in sales of between 30% to 40% and a further 28% losing half or more.

The UK's subsea sector leads the way around the world with about a 43% of the global market and subsea firms are continuing to explore new markets overseas for their products and services.

The findings from Subsea UK's survey revealed that over 80% of respondents were hoping to drive growth by increasing overseas sales in Asia, the Middle East, North America and Africa. Other countries of interest were Australia, China, Brazil and Norway.

### BSEE Announces Investigation Panel for Oil Release in the GoM

The Bureau of Safety and Environmental Enforcement is continuing its investigation of the oil release from Shell Offshore Inc.'s Glider Field on 12 May. The Glider Field, located approximately 97 mi south of Port Fourchon, Louisiana, includes subsea wells and the field's production flows to the Brutus Platform.

BSEE Gulf of Mexico regional director Lars Herbst formally established an investigative panel 16 May. The seven-member panel is comprised of BSEE engineers, inspectors, and investigators. The panel will conduct a thorough investigation of the incident in order to identify the causes and any contributing issues that led to the release. The panel will make recommendations in its final report on how to strengthen existing safety and environmental management systems and identify any reforms to existing regulations that may be needed. The focus of these recommendations is to prevent a similar incident from occurring.

BSEE approved Shell's plan for recovery of the damaged flowline segment. A BSEE inspector is on board the recovery vessel to observe the recovery operations. All repair plans for the subsea flow lines and production systems will be submitted to BSEE for review.

# OFFSHORE INDUSTRY HEADLINES

Research & Development • Environmental Assessment • Discovery

## BSEE and BOEM publish joint environmental assessment on use of well stimulation treatments in Federal waters off California

The Bureau of Safety and Environmental Enforcement (BSEE) and Bureau of Ocean Energy Management (BOEM) have completed a comprehensive environmental analysis evaluating the potential impacts from the use of well stimulation treatments on the 23 oil and gas platforms currently in operation on the Outer Continental Shelf offshore California.

Based on the analysis in this joint Programmatic Environmental Assessment (EA), BSEE and BOEM issued a Finding of No Significant Impact (FONSI) from the use of specific well stimulation treatments in oil and gas activities on the Pacific Outer Continental Shelf (OCS).

"Drawing on the best available science, the EA provides information and analysis on the use of well stimulation treatments in federal waters offshore California. The comprehensive analysis shows that these practices, conducted according to permit requirements, have minimal impact," said BOEM director Abigail Ross Hopper. "As always, coordination with other key agencies, and input from the public and non-governmental organizations, were vitally important as we developed this assessment."

The programmatic EA evaluated several categories of treatments, including hydraulic fracturing, a range of alternatives, and all environmental resources that could potentially be impacted. The analysis indicated no significant environmental impacts associated with any of the alternatives considered. The EA provides valuable information that BSEE's Pacific Region will consider in future processing of permits involving Well Stimulation Treatments.

To view the EA and the FONSI, visit <http://pocswellstim.evs.anl.gov>.

## Seven new DNV GL collaborative projects in North America

In a concerted drive to find smart solutions to safely reduce complexities and cost in the North American oil and gas industry, DNV GL is leading seven new joint industry projects (JIPs) from the region in 2016. The initiatives will support overall efficiency efforts in the pipelines, wells and subsea, umbilicals, risers, and flowlines (SURF) sectors.

Key focus areas for DNV GL in 2016 will be centered around solving challenges around standardization, operations (OPEX services), safety, environment, regulations and performance.

DNV GL is inviting industry players to take part in the following JIPs:

- Extended application of corrosion resistant alloys;
- Guidance for qualifying materials in compliance with API 17TR8 HPHT design guidelines for subsea equipment;
- Increased consistency for sour service testing and assessment;
- Sour HPHT fatigue testing for clad subsea components;
- Prediction of internal flow induced vibration of complex subsea pipework;
- Jumper VIV instrumentation and field measurements - expanding ongoing JIP; and
- Safe assessment of embedded flaws in sour pipelines.

According to a recent research report published by DNV GL, one-third of North American respondents are concerned that they do not have a strategy in place to maintain innovation in a declined market. However, 31% see greater involvement in JIPs as a priority over the next 12 months, while 4 in ten want to increase collaboration with other industry players (40%).

The report also found that 6 out of 10 (60%) respondents agreed that operators will increasingly push to standardize their approach globally- up from 42% in 2015. Only 9% expect an increase in spending in R&D and innovation, a figure that has been cut by more than half in two years, from 20% in 2014.

In total, 43 DNV GL-led JIPs have been initiated globally this year, in addition to the launch of a new Step Change innovation program to help customers leverage opportunities from digitalization.

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

## North Sea infrastructure deals in the pipeline, says Deloitte

The North Sea will see a rise in infrastructure deals this year, with private equity funds playing an increasing role in midstream assets, according to business advisory firm Deloitte.

Against the backdrop of a low oil price, more oil and gas companies are looking to rationalize their portfolios and divest non-core assets in the UK Continental Shelf (UKCS), the firm said—with private equity and specialist infrastructure funds likely purchasers.

Deloitte's latest European Infrastructure Investors survey found that pipelines, in particular, have provided a solid and steady return over the last 5 years. The asset class was highlighted by investors as performing well compared with other infrastructure, including fuel storage, ports and renewables; the internal rate of return on

pipelines reached 14% in the period 2013-2016.

Deloitte's report also found that pipelines will remain a strong focus for infrastructure investors in the future, along with gas and fuel storage.

Shaun Reynolds, director, transaction services, at Deloitte, said: "Historically, big oil and gas operators developed and owned what they needed, transporting their major discoveries through proprietary pipelines and refining it in their own processing plants. That's largely remained the case, until the last 2 or 3 years.

"The ownership model has evolved, driven by the maturity of the basin and the low oil price. Established players are divesting to shore up their balance sheets, and infrastructure is comparatively less complex to value and sell, with a ready market at the right price.

"Private equity firms and specialist energy infrastructure funds are likely buyers—specifically those with a solid grasp of the UKCS. They'll look to take a number of assets under management, create a portfolio, maximize their potential and then look to divest; most likely to a pension fund aiming for steady returns from a stable asset."

In 2015, BP sold its stake in the Central Area Transmission System (CATS) to Antin Infrastructure Partners in a £324 million deal. Antin had bought BG Group out of its stake the previous year, giving it near-complete ownership of the asset.

The third-party ownership model has been employed successfully in the U.S. shale gas market for years, while oil and gas infrastructure in The Netherlands and Norway is commonly owned by private equity or pension funds.

Shaun added that the changing asset stewardship of North Sea infrastructure could be a positive development for the industry, with 20 billion barrels still recoverable in the basin.

Shaun commented: "It's a positive step for the UKCS. Private equity will provide focussed management of the assets and ensure they are being used to their utmost potential. That can only be a good thing, particularly from a longevity perspective as we seek to make the most of the North Sea."

"Whatever the case, there's a strong appetite from investors for North Sea infrastructure—but only at the right price. As the oil price continues to take its toll and pressure mounts on balance sheets, more operators will have to look at rationalization and infrastructure tends to be a logical sale. Deals are brewing in the UKCS—and we'll see more on the infrastructure front in the short- to medium-term."

## **Det Norske Oljeselskap and BP Norge merge, creating a leading independent E&P company**

Det norske oljeselskap ASA (Det norske) has entered into an agreement with BP p.l.c. (BP) to merge with BP Norge AS (BP Norge) through a share purchase transaction to create the leading independent offshore E&P company. The transaction will significantly strengthen the combined company's operations, cost efficiency and growth potential, enabling the company to initiate dividend payment. The company will be named Aker BP ASA (Aker BP) and will be headquartered at Fornebuporten, Norway, with Aker ASA (Aker) and BP as main industrial shareholders.

"We are proud to announce this merger to create Aker BP, the leading independent offshore E&P company. Aker BP will leverage on Det norske's efficient operations, BP's international oil company capabilities and Aker's 175 years of industrial experience. Together, we are establishing a strong platform for creating value for our shareholders through our unique industrial capabilities, a world-class asset base and financial robustness. We look forward to taking advantage of the attractive growth potential on the Norwegian Continental Shelf through this industrial partnership with BP and to deliver on Aker BP's dividend story," says Øyvind Eriksen, chairman of the board of directors in Det norske.

Aker BP will be jointly owned by Aker ASA (40%), BP (30%) and other Det norske shareholders (30%). As part of the transaction, Det norske will issue 135.1 million shares based on NOK 80 per share to BP as compensation for all shares in BP Norge, including assets, a tax loss carry forward of USD 267 million (nominal after-tax value) and a net cash position of USD 178 million. In parallel, Aker will acquire 33.8 million shares from BP at the same share price to achieve the agreed-upon ownership structure.

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

## **Aker Solutions on track to reach improvement goals**

Aker Solutions is making good progress in reaching a goal of boosting cost efficiency in all areas of the company by at least 30% as part of a broader effort to strengthen its competitiveness amid current market challenges.

A quarter of the targeted improvement will be achieved this year, helping to achieve potential annualized cost savings of at least NOK 9 billion by the end of 2017, based on the 2015 cost

base and work volumes. The improvements are expected to speed up next year as longer-term processes take hold.

Aker Solutions over the past 2 years formed alliances with peers including Baker Hughes, ABB, MAN Diesel & Turbo and Saipem. They span the entire subsea value chain from the reservoir to the seabed and up to the topside. These are partnerships with leaders in their fields whose competence and technology complement Aker Solutions' subsea capabilities.

The company announced a contract valued at more than NOK 1 billion to deliver its longest-ever umbilicals system at the Zohr gas field offshore Egypt. Later, it announced a three-year contract extension from Total to provide maintenance and operations services at the Elgin and Franklin fields in the UK North Sea. This work is valued at more than NOK 400 million.

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



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### GE to provide maintenance services on Gazflot's semi sub drilling vessels

GE's Marine Solutions was recently awarded a service contract by CIMC Raffles to provide the first dry-dock services on two of Gazflot's semi sub drilling vessels—Northern Lights and Polar Star. During the dry-docking, GE's Marine Solutions will thoroughly test its scope of supply and replace and upgrade parts where necessary.

With years of experience in carrying out similar activities, historical data from these vessels and an understanding of how systems interact with each other, GE's Marine Solutions is ideally placed as a one-stop solution to carry out the dry-docking of these vessels. This dry-docking will enable Gazflot to continue operating its vessels at optimum levels.

The two vessels were equipped with GE technologies including dynamic positioning, automation, drilling drives, MV 7000 propulsion drives, power management system, vessel management system and thruster assisted mooring System. These technologies have been reliably at work on Gazflot's ice class vessels, which are capable of drilling up to 10,000 ft in the adverse conditions in Northern Russia. Through the current contract, GE's team of on-site engineers will ensure the longevity of installed systems while working with the yard to supervise the dry-docking activities.

After the dry-docking, GE will continue to provide remote technical support for the Northern Lights and Polar Star semi sub drilling vessels.

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

### MSI successfully complete first year of measurements for McDermott Australia in the INPEX "ICHTHYS" field

Metocean Services International (MSI) has recently completed the first annual service of McDermott Australia Pty Ltd's (MAPL) AXYS WatchMate™ current and wave buoy. The buoy was sold to MAPL in 2014 accompanied by an installation and service contract for an initial 3 years.

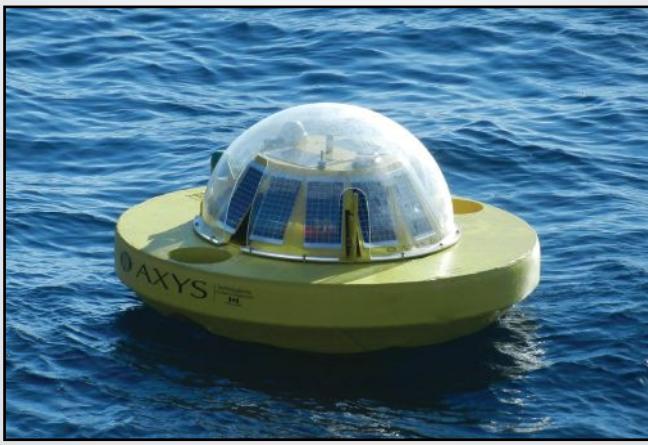
The buoy is installed in 270 m of water in the ICHTHYS field. The INPEX operated ICHTHYS LNG Project in the Browse Basin offshore Western Australia is ranked amongst the most significant oil and gas projects in the world. In field, construction is well underway with the first production targeted at third quarter 2017.

Real-time meteorological, current and directional spectral wave data is telemetered back to MSI via Inmarsat satellite and posted onto a client-specific website. Data is also posted to an FTP site to allow MAPL personnel to use it to support the ongoing infield construction where accurate, reliable and timely data is essential to ensure safe operations.

The WatchMate™ was specifically proposed to MAPL at the tendering stage due to the extreme local metocean conditions at site where a standard wave buoy was unlikely to survive. The WatchMate's™ additional flotation combined with a site-specific mooring designed by AXYS make it an ideal solution for these trying conditions proved by the exceptional data return provided over the last 12 months.

The project is expected to last 3 years before the buoy is recovered by MAPL following completion of their offshore work.

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



## Pharos Offshore strikes a 12-month deal for the former Skandi Inspector



Pharos Offshore Group is in the process of mobilizing the newly named DP2 Deepsea Worker with a Work Class ROV, an Observation Class ROV and a subsea excavation spread, ready for 2016/2017 operations.

Aleron Subsea will be Pharos Offshore's ROV partner during the period, providing a comprehensive vehicle support package, while Pharos operates the equipment.

Among the equipment to become available on the vessel will be a full pre-lay grapple run spread, boulder clearance spread and cable recovery spread.

The company entered discussions with the vessel owners in early February for the vessel, which has become available after her 5-yearly inspection. The vessel, with a clear deck space of 540 sq. m and 50 ton construction crane, will be mobilized in Bergen and re-birthed in the Port of Blyth alongside Pharos Offshore's quayside storage facility.

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

### BP announces latest gas discovery in Egypt's East Mediterranean

BP Egypt announced another important gas discovery in the Baltim South Development Lease in the East Nile Delta.

The Baltim SW-1 exploration well, drilled in water depth of 25 m by operator IEOC (Eni), reached a total depth of 3,750 m depth and penetrated approximately 62 m of net gas pay in high-quality Messinian sandstones. The discovery, which is located 12 km from shoreline, is a new accumulation along the same trend of the Nooros field discovered in July 2015 and currently producing 65,000 boed. Further appraisal activities will be required to underpin the full resource potential of the discovery.

Hesham Mekawi, regional president of BP North Africa, commented: "We are pleased with the results of the Baltim SW-1 well as it is the third discovery along the Nooros trend and confirms the great potential of the Messinian play and its significant upside in the area. Our plan is to utilize existing infrastructure which will accelerate the development of the discovery and expedite early production start-up. This announcement is another example of BP's commitment to unlock resources in order to bring critical gas production to Egypt."

BP holds a 50% stake in the Baltim South Development lease, and Eni, through its subsidiary IEOC, holds 50%. The well was drilled by Petrobel, a joint venture between IEOC and the state partner Egyptian General Petroleum Corporation (EGPC).

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

## Saipem upgrades to Sonardyne autonomous monitoring transponder technology

International oil and gas turnkey contractor, Saipem, has extended the capability of its Sonardyne sixth generation (6G) acoustic positioning transponders, adding functionality that makes the equipment now suitable for a wide range of subsea autonomous monitoring tasks.

The work to convert the Compatt 6 instruments into Autonomous Monitoring Transponders (AMTs) was undertaken by engineers based at Sonardyne's Brazilian headquarters in Rio das Ostras as part of a wider scope of work to inspect, service and re-calibrate Saipem's inventory of Long BaseLine (LBL) acoustic technology located in the region.

Sonardyne's AMT enables users to conduct long endurance, remote monitoring surveys without the need for a surface vessel and ROV to be present throughout the project. Applications for it range from a single instrument deployed to measure tidal variation, to a large, field-wide network capable of detecting subtle trends in structure movement, pipeline creep and seabed settlement.

The autonomous functionality built into every AMT enables it to operate for several years without operator intervention. Measurements from its suite of onboard sensors are logged in the unit's memory and can be recovered at any time by an AUV, ROV or vessel-of-opportunity using high-speed wireless communications.

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

## Diamond Offshore and Trelleborg in agreement to manufacture new helical riser buoyancy design

Diamond Offshore Drilling, Inc. and Trelleborg's Offshore operation have announced a Joint Development Agreement to develop, manufacture and market Helical Buoyancy™ riser technology developed by Diamond Offshore. This innovative, patented



*Ocean BlackRhino Photo courtesy:  
Diamond Offshore.*

riser buoyancy design reduces riser drag and mitigates Vortex-Induced Vibration in offshore applications and enables improved operational efficiency.

This solution is an alternative to adding fairings or strakes to the drilling riser and can reduce deployment time and operating expense. The Helical Buoyancy design also improves safety in challenging environments by eliminating the need for personnel to work below the

drill floor to attach a separate apparatus.

The helical design is the result of several years of development by Diamond Offshore utilizing computational fluid dynamics and high Reynolds number wind tunnel testing. Diamond Offshore will work with Trelleborg on further application engineering, data acquisition, testing and development of Helical Buoyancy applications across the offshore drilling market.

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In conjunction with this agreement, Diamond Offshore has ordered Helical Buoyancy from Trelleborg for drilling risers on the Ocean BlackRhino and Ocean BlackLion, two of Diamond Offshore's sixth-generation drillships currently under contract in a high-current area in the Gulf of Mexico.

"Development of this new technology for riser buoyancy is even more important as drilling moves into deeper waters," said Ron Woll, senior vice president and chief commercial officer of Diamond Offshore. "We continually look for ways to improve the economics of offshore drilling for our customers, and this new buoyancy design will enhance drilling efficiencies in high-current environments."

"This technology advancement is the result of Diamond Offshore's engineering expertise and thought leadership and should benefit the broad offshore drilling industry as it gets adopted," said Woll.

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

#### **Mermaid charters-in dive support vessel Mermaid Nusantara**

Mermaid Maritime Public Company Limited has announced that its Indonesian business unit PT Seascape Surveys Indonesia (Seascape) has entered into a one year charter-in contract with PT Nusa Perkasa Permai for a DP2 dive support vessel (DSV), the Mermaid Nusantara. The vessel is expected to be delivered to Seascape in August 2016.

Formerly Windermere and renamed as Mermaid Nusantara, the vessel comes with a 15-man built-in saturation diving system and air diving system, 120 beds and a 50-



*Mermaid Nusantara.*

ton crane. The vessel will undertake inspection, repair, and maintenance contracts as well as performing saturation diving for construction support, ongoing field maintenance and call out repair.

Mermaid had previously chartered-in this vessel and deployed the vessel to support its various subsea projects in 2015. The re-chartering of this vessel comes at the back of anticipated continuing demand for subsea services in both Indonesia and the rest of the SouthEast Asian region. This latest charter also comes with a 1-year extension option which, if exercised, would extend the charter through to July 2018.

This charter-in of the Mermaid Nusantara is an opportunity for Mermaid to continually secure a dedicated DSV for the South East Asian market and also to materially increase the

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revenue and profit of Mermaid in the Eastern Hemisphere. Being Indonesian flagged, the vessel will be in prime position to secure any potential work in Indonesia.

Mermaid has already secured subsea contracts worth circa USD 10 million that will utilize this vessel for a scheduled duration of approximately 70 days and is actively bidding for more work utilizing the vessel in the SouthEast Asian region.

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

#### **Fugro enables safer drilling for BP in area of strong currents**

Fugro has provided a spectrum of services to BP Trinidad and Tobago LLC (bpTT) to allow safe drilling and completion of five subsea wells in an area of strong currents. The services include wellhead motion (fatigue) monitoring, metocean measurements and positioning services.

The positioning activities were carried out onboard the drilling vessel as well as on the three supporting anchor handling tugs (one tug had subsea acoustic ROV positioning). Fugro provided bpTT with dimensional control survey services, DGNSS verification, gyrocompass calibration and offset measurements, navigation at the well locations, and final positioning of the drilling vessel within the required tolerance of 3 m. This position accuracy was required because the five wells were being drilled in a cluster (with separation ranging between 16 and 30 m) and because of the need to accommodate subsea Xmas trees. Survey support was provided for anchor handling and ROV operations as well as for subsea asset positioning.

To enable the monitoring of subsea equipment integrity during operations, Fugro supplied its Wellhead and Riser Instrumentation Service (WARIS), which included monitoring at two subsea locations—on the BOP stack and on the riser, immediately above the lower flex joint. Data were relayed to the vessel by hydroacoustic modems and then transferred to secure onshore storage before being processed and made available to staff both offshore and onshore. The motion measurements gave bpTT real-time tracking of wellhead fatigue as well as determination of foundation stiffness and the BOP stack resonant frequency. Midway through the program the recorded real-time data were utilized to update theoretical fatigue transforms and improve the fatigue life of wellhead components.

Strong currents at the well location needed to be understood for operational planning, as well as further analysis of subsea equipment motions. Fugro installed an Acoustic Doppler Current Profiler (ADCP) on the seabed for metocean measurements. Current measurements were relayed to the vessel in real time using the same hydroacoustic equipment as with the WARIS.

bpTT drilling engineer, Anil

Saisbhan said, "The additional non-traditional services from Fugro with the WARIS and real-time ADCP measurements have enabled us to realize more fatigue life of wellhead components than was theoretically suggested, as well as to mitigate against operational risk with high currents which occur sporadically in the area."

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

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## **Statoil completes efficient exploration drilling campaign offshore Newfoundland**

Statoil, along with its partners, has finalized a 19-month exploration drilling program offshore Newfoundland. The purpose of the drilling program was to increase the robustness of the Bay du Nord project and to test new areas of the Flemish Pass Basin.

Nine wells were drilled safely and efficiently by the Seadrill West Hercules in the Flemish Pass Basin, located approximately 500 km east of St. John's, Newfoundland and Labrador. The results have improved Statoil's understanding of the frontier Flemish Pass Basin.

The drilling program included four exploration wells in close vicinity of the 2013 Bay du Nord discovery as well as three appraisal wells on the discovery. In addition, two exploration wells were drilled in areas outside the Bay du Nord discovery. The program was conducted in a harsh offshore environment; however, with strong operational and HSE performance, it set several records on drilling speed during the campaign.

The drilling program has resulted in two discoveries of oil at the Bay de Verde and Baccalieu prospects in the Bay du Nord area, both of which add to the resource base for a potential development at the Bay du Nord discovery.

The appraisal and near-field exploration of the Bay du Nord discovery has reduced key reservoir uncertainties and confirmed that the volumes are within the original volume range of the 300 to 600 million barrels of recoverable oil initially estimated by Statoil in 2013, but potentially towards the lower end of the range.

"We are encouraged by the discoveries in the Bay de Verde and Baccalieu wells and the results of the appraisal wells," said Erling Vågnes, senior vice president, Statoil



*Seadrill West Hercules.*

Exploration, Northern Hemisphere. "Based on the improved understanding of the Flemish Pass Basin petroleum system, we are maturing further prospects that may add volumes to Bay du Nord."

"The Flemish Pass Basin offshore Newfoundland is a frontier area, where only 17 wells have been drilled in the entire basin—in an area that is 30,000 sq. km," said Vågnes. "This drilling campaign has been critical both to maturing the Bay du Nord discovery as well as evolving our knowledge of the greater basin and Newfoundland offshore—which remains a core exploration area for Statoil."

The drilling program began in November 2014 and was extended by 1 month to incorporate the drilling of Baccalieu, a well on a license awarded by the C-NLOPB in the 2015 land sale, which Statoil was able to progress from access to well-completion in 4 months.

Statoil's assessment of the commercial potential of the Bay du Nord discovery is ongoing. "The recent drilling program has been critical to Statoil's continued assessment of Bay du Nord, and work is underway to evaluate the results related to proceeding with a potential Statoil-operated development in the Flemish Pass Basin," said Paul Fulton, president, Statoil Canada.

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

## **Oil and gas discovery at the Brasse exploration well and Njord facility update**

Faroe Petroleum, the independent oil and gas company focusing principally on exploration, appraisal, development and production opportunities in Norway and the UK, is pleased to announce an oil and gas discovery in the Faroe-operated Brasse exploration well in licence PL740 in the Norwegian North Sea (Faroe 50%).

The Brasse well (31/7-1) has been drilled to a total depth of 2,780 m. The well encountered approximately 18 m of gross gas-bearing and approximately 21 m of gross oil-bearing Jurassic reservoir, which is believed to be analogous to the effective reservoir at the Brage producing oil field (Faroe 14.3%), located approximately 13 km to the north of Brasse. Preliminary results based on extensive coring, wireline logs and pressure data show that the well has encountered oil and gas in reservoir sandstones of good quality. The presence of oil and gas has been confirmed subsequently by fluid sampling.

The partnership has now decided to drill a sidetrack to help confirm both the reservoir distribution and hydrocarbon contacts. A further announcement will be made at the completion of drilling activities. The co-venturer in the PL740 licence is Point Resources AS (50%).

In line with previous guidance, production from the Njord and Hyme fields (Faroe 7.5%) has been suspended, and the Njord A platform will be towed to shore for refurbishment and modification.

Graham Stewart, CEO of Faroe Petroleum, commented, "We are very pleased to announce the oil and gas discovery at the Brasse prospect and await the results of the sidetrack. This discovery in one of our core areas builds on Faroe's already significant position in the Norwegian North Sea via a low cost exploration well. If the Brasse drilling results prove a commercial discovery, it could be tied-back to the Brage production facilities or alternatively to other nearby installations. Once there is further information in relation to results from the sidetrack well, we will update the market."

For more information, visit [www.fp.fo](http://www.fp.fo).

## ACE Winches awarded second contract in Newfoundland for Hebron project

ACE Winches, leading global deck machinery specialists, has been awarded a six-figure contract with an operator to support connecting the Hebron gravity-based structure (GBS) and topsides.

The project will see ACE Winches supply hydraulic drum winch packages for the deep-water Hebron oil field located off the coast of Newfoundland and Labrador in Canada, working at depths of 95 m. The contract will include all winches, ancillary equipment and skilled personnel for the project.

ACE Winches will provide ACE 40 tonne WLL hydraulic drum winches, two ACE 12.5 tonne WLL hydraulic drum winches, a dedicated diesel hydraulic power unit for each winch and running line monitors to provide line and load monitoring.

The contract marks further work on the Hebron project for the company; in 2014 the company supplied a range of winches for use in the dry dock to tension the installation as it transitioned from dry dock into open water. The winches were then used to keep the GBS in position during the maneuver process.

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

## PGS Ramform Tethys breaks world towing record

The Ramform Tethys is currently working on her maiden project, a multi-client survey over the Aasta Hansteen area of the Norwegian Sea, with a configuration of 16 streamers, each 8.1 km long, with streamer separation of 75 m.

On Aasta Hansteen, Ramform Tethys is recording high-density 3D broadband seismic data from the largest amount of streamer ever towed behind a single vessel. The total spread tots up to 129.6 km of GeoStreamer® equipment.

The Ramform Tethys thereby exceeds the previous industry record, which was set by sister ship the Ramform Titan, in December 2015, for towing around 127 km of GeoStreamer during the first ever 18-streamer deployment in the Bay of Bengal. She, in turn, took the lead from Ramform Sovereign.

Per Arild Reksnes, EVP operations commented: "I continue to be impressed by the ability of PGS crews to utilize the Titan-class vessels, as demonstrated by Ramform Tethys and her crew on Aasta Hansteen. The performance we see from competent crews and remarkable vessels is a great asset in a challenging market."

Ramform Tethys commenced acquisition in June of a new 4,400 sq. km 3D GeoStreamer survey over the Aasta Hansteen area of the Norwegian Sea. This survey is due to be completed in August 2016, with fast track data available 4 months after the final shot.

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



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## MCA publishes revision to safe & efficient ROV ops guidance

Technical developments and operational experience are fundamental to the latest revision of the International Marine Contractors Association's (IMCA) Guidance for the Safe and Efficient Operation of Remotely Operated Vehicles' (IMCA R 004 Rev 4).

"The guidance provides a pertinent reference document for the safe and efficient offshore operations of remotely operated vehicles (ROVs) and of ROV support systems and is designed for use by both contractors and clients," explains IMCA's technical director, Richard Benzie. "Adoption of, and adherence to, the guidance will contribute to a safe and efficient industry that operates to common standards."

"Our document is not intended to replace experience and competence to successfully conduct ROV operations. It should be the duty of individual contractors to satisfy themselves that all ROV operations are conducted safely and efficiently."

"While it is recognized that safety must never be compromised, recommendations are made for areas where the balance between commercial considerations and safety implications is complex. In particular, clients and contractors need to recognise and accept the importance of providing sufficient qualified personnel to conduct safe operations at all times. This includes periods of routine preventative maintenance, breakdown or repairs when personnel may be exposed to the dangers of high-voltage, high-pressure hydraulic systems, rotating machinery and other potential hazards."

With sections on ROV Classification; ROV Tasks; ROV Tools; Environmental Considerations; ROV Operations; Equipment, Certification and Maintenance; Personnel; Responsibilities; and a useful glossary of terms and abbreviations, Guidance for the Safe and Efficient Operation of Remotely Operated Vehicles contains guidelines and recommendations that, when combined with manufacturers' instructions and companies' operational procedures/processes, allow for the maintenance of a high level of safety and efficiency across the sector.

The guidance is intended to apply internationally, but it is recognized that some countries will have regulations that require different standards or practices to be followed. Where local or national regulations are more stringent than those in IMCA R 004, they will always take precedence over the IMCA guidance.

To download the document free of charge, visit [www.imca-int.com/media/72417/imcar004.pdf](http://www.imca-int.com/media/72417/imcar004.pdf).

## N-Sea Offshore–DOF Subsea cooperation agreement announced

Subsea IMR provider, N-Sea, and subsea projects and engineering provider, DOF Subsea, have entered into a 2-year cooperation agreement to provide an Integrated Saturation (SAT) Dive Service.

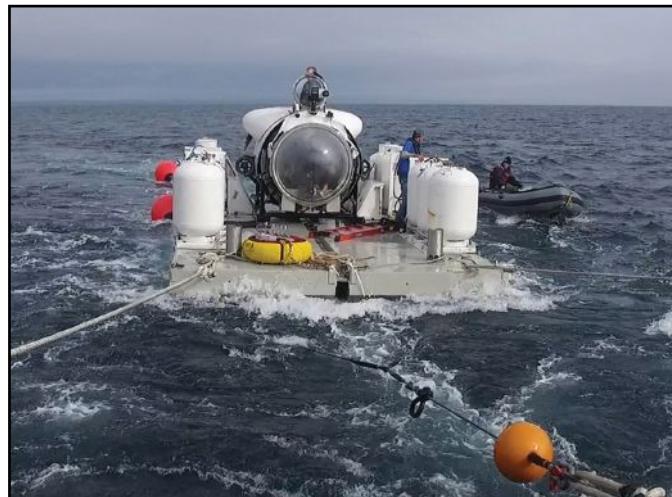
The cooperation agreement reflects both companies' strategic decision to increase their overall service offering through saturation diving across Europe, Africa, and Mediterranean.

The principles of the agreement are set out with DOF Subsea providing the dive support vessel, Skandi Achiever, while N-Sea will provide saturation diving resources. Project management, engineering and diving manual/procedures will be provided through an integrated team.

N-Sea chief operating officer Roddy James said: "This cooperation agreement with DOF Subsea reinforces N-Sea's key objective to fully appreciate our clients' requirements and provide them with the safe, sound and swift service they have come to expect. The MOU allows both N-Sea and DOF Subsea to offer an integrated and highly efficient SAT diving service to our client—something we regard as particularly important in the context of current market conditions."

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

## OceanGate begins long-term study of legendary Andrea Doria shipwreck



Cyclops 1 aboard Ms. Lars Mobile Subsea Launch and Recovery System under tow behind the support vessel Warren Jr.

Using its state-of-the-art manned submersible, OceanGate for the first time ever captured detailed closeup sonar images of the legendary Andrea Doria shipwreck. OceanGate did the mapping with a team of explorers conducting the first manned submersible operation to the wreck since 1995.

"Five times more people have been to the top of Mt. Everest than have seen the Andrea Doria wreck site, so this expedition was a rare opportunity for our crew—all while expanding our knowledge of the ocean," said Stockton Rush, OceanGate's CEO. "Using our five-person Cyclops 1 submersible, we were able to view the Andrea Doria area for nearly 4 hours, which is more than 10 times longer than scuba divers can."

Rush said foggy conditions and rough seas prevented the team from conducting as many dives as they had hoped, but the team was still able to do 17 scans of the bow. "Given the conditions, we got as much time on the wreck as we could," Rush said. "We have great respect for harsh ocean conditions and for the history of this infamous wreck, so ensuring the safety of our crew is always our top priority. We've always planned to revisit the Andrea Doria regularly to continue an ongoing mapping process, and what we captured will certainly serve as a benchmark for what we capture on future expeditions."

This summer marks the 60th anniversary of the sinking of the Andrea Doria, the Italian passenger liner that sank in 1956 about 50 mi. from Nantucket. The 697 ft-long wreck, often referred to as the "Mt. Everest of scuba diving" due to its location and 240-ft depth, tests the limits of scuba diving on compressed air.

Several hundred dives have taken place at the site over the past 60 years, but identifiable landmarks have decayed over time, making it more difficult for scuba divers to safely navigate the wreck during their 20-minute dives. Since the ship sank, 16 divers have died on scuba trips to the wreck.

OceanGate's 2016 expedition began a survey of the exterior of the wreck to capture detailed multi-beam sonar images. The expedition included three dives in the manned submersible to begin mapping the wreck and debris field. The goal is to digitally assemble the sonar scans into a virtual model to help illustrate the full scope of the wreck and document its current condition.

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

## DeepFlight submarines being certified by Lloyds Register

DeepFlight announced that the company has entered into a working relationship with Lloyd's Register (LR) to certify DeepFlight personal submarines in accordance with LR's Rules for the Construction and Classification of Submersibles and Diving Systems. Certification is one of the many initiatives the company has undertaken in preparing to offer the unique experience of underwater flight to resort guests.

DeepFlight has completely redesigned the concept of a personal submarine through its innovative use of composite materials and by applying the principles and dynamics of flight underwater. The use of composites has allowed the company to build submarines that are lighter weight than all conventional submarines, enabling easy beach and shore launches that are necessary for resort operations. The flight characteristics ensure that DeepFlight submarines offer greater speed, longer range and unprecedented maneuverability, making a DeepFlight resort dive a



thrilling and unique experience. Additionally, all DeepFlight craft are permanently positively buoyant, offering the unique safety advantage of automatic return to surface.

DeepFlight submarines will be the first composite-hulled personal submarines to undergo certification. In addition to working with Lloyd's Register, DeepFlight has also engaged with the U.S. Coast Guard. Both organizations provide expert third-party validation on the innovation and safety of DeepFlight craft.

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

## Sonardyne performs 3D mobile mapping of seabed using 2G Robotics' underwater laser technology

Subsea technology company Sonardyne International Ltd recently used 2G Robotics' underwater laser scanning equipment to dynamically map the seabed in Monterey Bay, California. This high-resolution deepwater mapping of Sur Ridge was performed using 2G Robotics' ULS-500 underwater laser scanner mounted to an ROV.

For the survey, the ROV was equipped and navigated using Sonardyne's inertial navigation sensor, SPRINT, interfaced with a Syrinx 600 kHz DVL, ROVNav 6 LBL transceiver and a precision pressure sensor. EIVA's hydrographic survey and navigation software was integrated with the ULS-500 using EIVA's dedicated driver for 2G Robotics' systems to facilitate data capturing and post-processing.

Sonardyne noted that laser mobile mapping is dramatically faster than static scanning, enabling wide areas to be covered quickly and efficiently while



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capturing extremely high resolution 3D models of the seabed.

2G Robotics founder and CEO, Jason Gillham noted: “We have been performing subsea vehicle integrations and providing dynamic scanning support since 2012. We have completed numerous AUV, survey class ROV, and work class ROV installations on customer-owned vehicles worldwide. Our ULS-500 system has been specifically developed for dynamic scanning with a focus on high sample rates, timing synchronization, and continuous data acquisition for faster, more efficient inspections.”

Underwater laser scanning is an emerging technology that continues to provide accuracy, precision, and cost efficiency improvements for subsea surveys and inspections. 2G Robotics’ underwater laser scanners generate true-scale, high-resolution 3D models in real-time of underwater structures, organisms, and environments. The high point density of 2G Robotics’ data effectively resolves fine-scale dimensional features that acoustic and photographic methods fail to capture, allowing for a more detailed understanding and measure of structural and environmental complexity.

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

### Aquabotix introduces new mini inspection class ROV—Endura

Aquabotix, a marine technology company delivering the accessibility of today’s electronics products to the complex world of underwater ROVs, announces the immediate availability of the Endura. The Endura has been engineered for dependability and functionality across a wide range of underwater applications. It surpasses other mini ROVs in thrust, dependability and software performance.

Endura is easy to use—it is ready for the water in 3 minutes and basic driver competency is developed in about 3 hours, with professional proficiency achieved in 3 days. Endura is intelligent



—a full computer is built inside the vehicle and auto controls are available in the software. Endura is high performance—with hydrodynamic design for ultimate control in the water and powered by high torque motors for up to 5 knots of thrust. The Endura configuration includes:

- Five precision high torque motors;
- Sensor package, including depth, temperature, digital compass and leak detector;
- 1080p true HD quality camera with tilt;
- 60 m of neutrally buoyant tether extensions available;
- Depth rated to 100 m—(also available with 300 m depth rating);
- 6 lbs of payload capacity for customer specific applications; and
- High intensity LED lighting (4400 Lumens).

Endura operates on lithium battery technology with a standard operational run time of 4 hours. Available as an option, AC power can be used for continuous operation. Other options include:

- Sonar: side-scan, scanning or multibeam;
- GPS, DVL, USBL, Wi-Fi, blue-tooth, satellite communications;
- Environmental sensors;
- Fish plow, laser scaler, manipulator arm; and
- 360° rotating / 180° tilt camera

Endura pricing starts at \$17,000 and is currently available for order from Aquabotix.

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

### Caley supplies SAT dive bell handling systems

Caley Ocean Systems, part of the Seanamic Group, is supplying a portable saturation dive bell handling system to submarine rescue and specialist subsea operations company, JFD (a part of James Fisher & Sons). Caley has designed the dive bell handling system to meet exacting width requirements, at just 3 bm it will be one of the most ultra-compact, fully road transportable, dive bell handling systems ever made.

The dive bell handling system is designed for over-the-side and moon pool deployment of the bell. Its modular construction, together with small footprint, enable the bell handling system to be deployed on a number of vessels of opportunity. Type approved by Lloyd’s Register, the handling system’s variable



speed electric winch enables precise control and positioning of the bell and its guide wire and clump weight. The dive bell will interface with a JFD decompression chamber.

“A typical road transportable dive bell handling is around 5 m; by reducing the width by 40% to 3 m, we’re able to greatly increase the ease with which the handling system can be transported to even the most remote location,” says Gregor McPherson, sales director, Caley Ocean Systems.

JFD is one of the world’s largest subsea operations and engineering companies providing complete diving and underwater systems to the commercial and defence industries.

In addition, Caley is supplying Singapore-based, diving and subsea equipment company Flash Tekk Engineering with saturation dive bell handling systems for its client Ultra Deep Solutions’ vessels Deep Installer and Van Gogh DSCVs.

The Caley dive bell handling systems are designed for deployment and recovery of a 24-man DNV classed twin bell saturation dive system for the Ultra Deep Installer, and a DNV classed 18-man bell saturation dive system for the Van Gogh, for operations to 300 m water depth. On each dive support vessel, the bell is deployed via a moonpool using the Caley bell handling system featuring two clump weight guide wire winches and main bell cable winch. The systems are fully DNV-classed approved.

The new build ‘Ultra Deep Installer’ dive support and construction vessel, commissioned by Ultra Deep Solutions and constructed by China Merchants Industry Holdings, Schenzen is due for delivery to UDS in Singapore around Q2-18. The DP2 DSCV Van Gogh is a state of art DP2 Multipurpose Diving Support Vessel / SPS Code 2008.

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

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- as well as corresponding manufacturer contact listings.

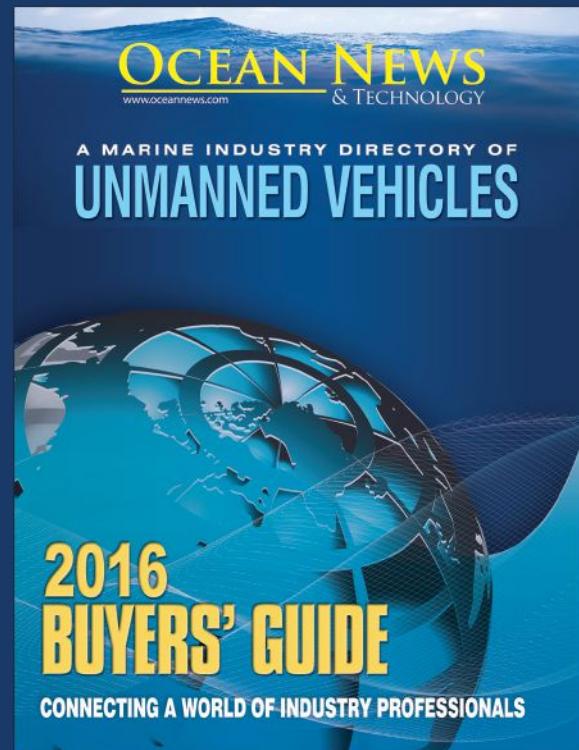
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## 3D scanning sonar data collection from a moving ROV

Teledyne BlueView's collaboration with Teledyne PDS to develop MotionScan, a 3D scanning sonar solution to collect 3D scanning data while correcting for motion and position changes, has been integrated onto a lightweight ROV specifically designed to deploy the 3D scanning sonar to strategic scan locations.

The ROV, developed by Teledyne Benthos, is instrumented with a heading pitch and roll sensor to correct the data for attitude changes from the ROV while holding position.

The owner of the ROV, IDEA, and Teledyne BlueView's local Japanese distributor, Hydro Systems Development, Inc. are integrating underwater positioning systems, inertial navigation systems, and USBL to assist with position change corrections of the vehicle.

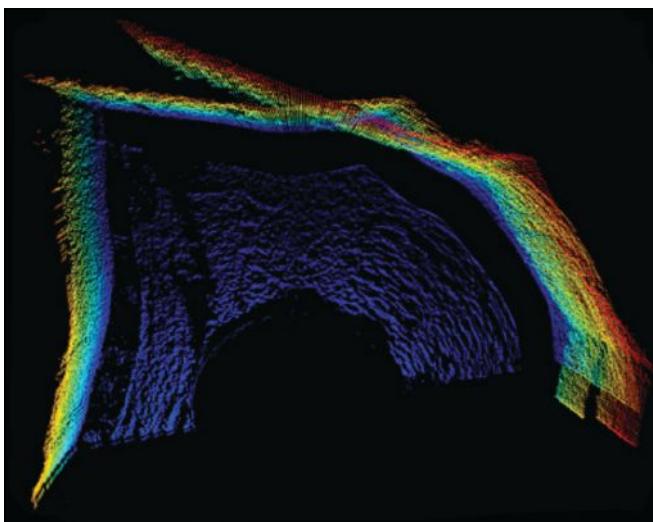
"The ROV with integrated MotionScan 3D scanning sonar provides a highly versatile tool that collects high-resolution 3D point clouds of areas that were previously inaccessible with traditional means to collect 3D point cloud data," says

Mr. Soutaro Takashima with IDEA. "The improved deliverables and modularity of the 3D scanning sonar provides a highly valuable asset to our company, and this is why we invested in the ROV, 3D scanning sonar and surface vessel deployment equipment."

The MotionScan 3D scanning sonar deployed on an ROV allows operators to collect 3D point clouds of structures from the seabed to the surface with one tool. The ROV can hold position to conduct scans or traverse with the sonar angled at the area of interest while the ROV is moving by a structure to collect 3D profile data.

ROVs operating in areas with low visibility can see the benefits of the 3D scanning sonar with a 3D point cloud of the work site that can be manipulated to take measurements, volume calculations and provide detailed information on the areas of interest. These deliverables can greatly increase the capability of any ROV system for many markets to increase the decision making capabilities on site.

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



3D point cloud uncorrected.



3D point cloud corrected.

## Research ready, Heriot-Watt University's Seaeye Falcon gets smart with SeeByte's CoPilot

SeeByte, the global leader in creating smart software for unmanned maritime systems, are pleased to announce that Heriot-Watt University has successfully integrated CoPilot with their Seaeye Falcon 1256, an observation-class ROV.

With assistance from Heriot-Watt University's Ocean Systems Laboratory personnel, the SeeByte team integrated and tuned the system to operate with a Teledyne RDI Workhorse Navigator 600 KHz DVL. The work was conducted over a 2-day period including testing in Heriot-Watt University's wave tank. This configuration can be used with other Seaeye Falcon systems.

Professor Yvan Petillot, head of research at the Sensors, Signals, and Systems Institute, commented: "SeeByte's CoPilot provides us a real-time input to their navigation and waypoint engine. This means we can deploy electric manipulators and develop coupled control algorithms as well as adaptive control routines. This is a fantastic resource for our Ph.D. students. It will also add value to our colleagues across the road on the life sciences school, helping them conduct repetitive geo-located surveys."

CoPilot is the world's most advanced, easy-to-use, plug-

and play software that makes piloting any ROV a much simpler task. CoPilot permits pilot controlled auto-transit and stop-and-hover, while providing automated sonar tracking and movement relative to a target. CoPilot is easily retrofitted to any ROV system, but is also available from the factory with VideoRay, Seatronics and SMD.

## ROVOP wins £3M Mexico and Asia deals

Independent ROV provider ROVOP has been awarded £3 million worth of new contracts, which sees the company expanding into two new territories.

For the first time, ROVOP will complete projects in Southeast Asia and Mexico, signalling success for both its Aberdeen and Houston bases.

Chief executive, Steven Gray, said: "The market remains challenging but our ability to save operating costs for our customers, while using the best equipment and personnel on the market, means we continue to enjoy regular contract wins. These awards further encourage the successful establishment of our Houston office last year and build on the completion of several workscopes in the U.S. Gulf of Mexico and Central and South America over the past 3 years."

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

## UNDERWATER INTERVENTION

### SeaRobotics delivers bathymetric USV to China

SeaRobotics Corporation (SeaRobotics) announced the delivery of two USV 4.0, bathymetric, autonomous 4-meter unmanned surface vehicles (USVs) to the Chinese market. The systems were sold and delivered through LinkOcean Technologies Ltd., SeaRobotics' exclusive representative in China. The units will be used by two prestigious oceanographic institutions, The First Institute of Oceanography in Qingdao, and The Second Institute of Oceanography in Hangzhou to perform bathymetric surveys.

These recent orders leverage SeaRobotics extensive expertise and history delivering USVs for high precision bathymetry, water quality analysis, and hydrographic survey, as well as mine countermeasures, surveillance, targeting, and many other applications. The vehicles were delivered with fully integrated R2Sonic multi-beam echo-sounders, motion reference units, GPS systems, and sound velocity probes, with software from HYPACK to provide a complete autonomous unmanned, high-precision, bathymetric survey system.



"The USVs will be used in estuaries and in the coastal zone for bathymetric survey. Dr. Ju Jun from The First Institute of Oceanography and Dr. Lai Xianghua at the Second Institute of Oceanography have declared they are very pleased with the performance of the systems," stated Shuren Qin, president of Link Ocean Technologies.

"We couldn't be happier with the performance of the systems as well as the support we have received from Shuren and his team at LinkOcean Technologies who helped develop the initial specification and supported us during the delivery, training and early operational phases of these systems," stated Don Darling, president of SeaRobotics.

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

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# MARITIME COMMUNICATIONS

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## Global Eagle Entertainment agrees to acquire EMC

Global Eagle Entertainment Inc. (GEE) has signed a definitive agreement to acquire Emerging Markets Communications (EMC). The combined company will become a leading provider of global satellite-based communications and media content serving the rapidly growing aviation and maritime markets and select land-based markets.

Under the agreement, GEE will pay \$550 million for EMC. EMC shareholders will receive \$30 million in cash and 6.6 million shares of GEE stock at closing and another \$25 million in 2017, which may be paid in cash or stock at GEE's election. As a result of this transaction, ABRY Partners, an experienced communications-focused private equity investment firm and the majority owner of EMC, will acquire an equity position in GEE as well as the right to nominate a member to GEE's board of directors. Dave Davis, chief executive officer of GEE, will be CEO of the combined company and Abel Avellan, Founder and Chief Executive Officer of EMC, is expected to serve as GEE's president and chief strategy officer.

The combined company is expected to benefit from an expanded addressable market and growth opportunities; unparalleled global infrastructure to support customer needs; a diversified and balanced revenue mix; and significant network and operational efficiencies.

EMC is projected to reach \$190 to 200 million in 2016 revenue and \$55 to 65 million in Adjusted EBITDA in 2016. GEE projects annual synergies of at least \$40 million resulting from removing overlap in existing network infrastructure, reduced bandwidth costs, lower development expenses and integrating internal operations. GEE expects to achieve annual synergies of approximately \$15 million in 2017 and reach \$40 million run-rate by 2019. Costs to achieve the synergies are expected to range from \$4 to \$5 million over the next 18 to 24 months.

Following the acquisition of EMC, GEE's global satellite-based connectivity platform will service more than 700 planes, 1,600 vessels, 100,000 cruise ship cabins, and several thousand land-based sites, creating a leading provider of connectivity and media content to better serve customers in rapidly growing mobility markets. Both companies have a well-established track record of driving growth through new customer acquisitions and very high contract renewal rates. In addition, GEE and EMC have jointly provided media content to the maritime market for a number of years.

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

## Apax Partners completes the acquisition of Marlink

Funds managed by Apax Partners completed the acquisition of Marlink, Airbus Group's Commercial Satellite Communication business.

Marlink's maritime and land commercial satcom business is present in 14 countries across Europe, Asia, Middle East and Americas, and has a distribution network of approximately 400 resellers worldwide. The company serves all maritime sectors in the world and thousands of users operating in challenging environments in the mining, energy and humanitarian sectors that need highly reliable satcom mobile and fixed connectivity services.

The government satcom business is not part of this transaction and remains part of Airbus Defence & Space's core activities.

The objective is to offer an ever-growing range of broadband satcom solutions to clients worldwide, providing tailored products and services that will help them digitalize their own operations on land and at sea. To achieve this objective, Erik Ceuppens, CEO of Marlink, can count on the support of the Apax Partners team, led by Bertrand Pivin, Partner.

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

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## Norwegian Cruise Line Holdings enters agreement with EMC



EMC has entered a long-term strategic agreement with Norwegian Cruise Line Holdings to deliver a faster Internet experience and premium entertainment over satellite to meet the rising expectations of cruise passengers, with demands for home-like performance and content. EMC's recent innovations put satellite connectivity on par with meeting these skyrocketing needs, enabling Norwegian Cruise Line Holdings brands to provide an exceptional quality of experience for their guests.

Following the 2015 MTN acquisition, EMC has fully integrated its innovation of highly valued patents, maritime experience and unparalleled network coverage to provide the highest quality of experience and satisfaction to passengers.

"With the addition of new hardware, combined with the significant increase in satellite bandwidth, shoreside connectivity and EMC's SpeedNet, we have moved beyond the decades-old problem of slow data speeds from satellite to deliver a much more efficient and faster Internet experience for our guests," said Ross Henderson, vice president, onboard revenue, at Norwegian Cruise Line Holdings. "Our guests can consume content, post to social media and stay in touch with family and friends on the ships' network, just as they are used to on land," Henderson continued.

All brands in Norwegian Cruise Line Holdings' portfolio will have immediate access to EMC's innovation, which brings the highest standards of Web, entertainment and multi-media experiences.

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

## Fleet One Global brings flexibility and choice to the maritime industry

Inmarsat launched Fleet One Global—a simple, cost-effective service designed to offer basic voice and data connectivity to the maritime market. Fleet One Global is part of the Fleet One range of satcom services developed for flexibility, reliability and simplicity aimed at customers with low data needs looking for basic functionality, greater cost and usage control with the reassurance of a trusted global commercial satellite network.

The plug-and-play service delivers 100 kbps voice and data at one global rate, eliminating the need for ship owners to use a patchwork of different providers. Fleet One Global achieves 99.9% uptime worldwide, ensuring that ships are never out of range for voice calls, business emails, text-based

crew emailing, electronic chart synching, updated vessel routing, weather forecasting and planned maintenance information wherever ships operate.

"Fleet One Global offers voice, data services and uninterrupted access to the internet, all based on user need and at performance levels that are consistent across all regions," said Shane Rossbacher, vice president of product management, Inmarsat Maritime. "It brings a unified offer and cost transparency to sections of the shipping market, including deep sea fishing, river-sea ships, offshore support vessels, coasters and ferries that have been at the mercy of hidden roaming and usage costs."

Traditionally, satellite communications have not been considered a cost-effective option for vessels with low data needs. Owners have not wanted to be tied to subscription costs for a service they might only need seasonally or for occasional voyages or only when they sail out of VHF or GSM coverage. With cost efficiency and subscription flexibility designed to offer value for money to telecoms-savvy and entry-level users alike, the Fleet One Global service includes pre- and post-paid options and monthly reviews for

upgrade/downgrade. Commitment periods are negotiable, while the service can even be deactivated at no extra cost – perfect for seasonal usage requirements.

Available via the Inmarsat L-band satellite network, Fleet One Global offers voice calls, IP rates of up to 100 kbps and standard 160 character SMS email messaging for crew. No specialist skills are needed to install the low-cost and compact antenna and below-deck units from manufacturing partners, each of which weighs no more than 2.8 kg.

The Fleet One Global service will be offered alongside the Fleet One Coastal service that will continue to be offered and is aimed at the regional and low-end fishing market.

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

### RigNet brings Global Xpress to the energy market

RigNet, Inc. announced its launch of Global Xpress (GX) services based on Inmarsat's globally available, Ka-band, high-throughput satellite (HTS) network.

In 2013, RigNet was selected as Inmarsat's preferred partner to launch Global Xpress into the oil and gas industry. Global Xpress is the first Ka-

Band satellite network from a single operator to deliver a global footprint that supports increased data rates and global mobility at affordable price points. Whether onshore or offshore, the network architecture allows the use of small footprint antennas that save deck space at a remote location. The GX design simplifies the remote installation process and decreases the time for deployment, while providing consistency in the hardware for ease of sparing and maintenance.

This unique service allows companies to utilize a single satellite platform with global standards across their geographically dispersed organizations. GX delivers a reliable high-speed, seamless connection that gives a better end-user experience than those found in traditional satellite services to the oil and gas industry. The network's high-throughput and "comms on the move" (COTM) capability makes it a perfect fit for essential applications and crew welfare communications in the oil and gas industry. Whether your application is in drilling, production, energy maritime, or support services, GX has a solution that improves the efficiency of your operations. The service can also boost crew

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morale through high-speed crew internet, video conferencing and onboard Wi-Fi solutions.

Greg Ewert, president of enterprise at Inmarsat said, "We're looking forward to introducing Global Xpress to organizations across the oil and gas industry. The digital oilfield is evolving into an intelligent and data-driven space where technology solutions can save businesses both money and time like never before. Cost pressure within the industry due to low oil prices mean the efficiencies which Global Xpress provides are more important than ever."

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

## Intellian antennas showcased at CommunicAsia 2016

Intellian Technologies presented its breakthrough 1-m and 60-cm GX antennas at CommunicAsia 2016, both purpose-designed for a new age in broadband-enabled maritime communications. Intellian already has the largest number of multiband GX convertible antennas in operation and is the first company to offer the maritime market auto-switching between Ku-band and C-band, delivering robust and reliable high-throughput broadband coverage anywhere at sea.

Intellian's latest antennas are the critical link to Fleet Xpress, the broadband satcoms service from Inmarsat that brings high-speed data transfer between ship and shore to commercial shipping and offshore subscribers. Fleet Xpress is provided through Inmarsat's GX satellite constellation.

Intellian's GX range is available from stock worldwide for rapid deployment. Antennas come in specially pre-packed systems, delivered to the quay, which can be installed and online in just a few hours.

The company will also be displaying its recently launched Intellian rack mount FleetBroadband product, FB500R, which saves space and has been designed for fast installation and commissioning.

CommunicAsia also offered Intellian the opportunity to highlight its partnership with Kymeta Corporation to commercialize the next generation of Ku-band VSAT terminals for the maritime sector. Drawing on metamaterial technology, new generation terminals will be built by Intellian and integrate Kymeta's thin, flat, lightweight, electronically beam-steered mTenna satellite antennas, making VSAT technology easy to adopt across all segments.

Intellian also offers the only military-grade maritime GX terminal, the GX100PM, designed for navy, coast



guard and maritime security company communications.

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

## Marlink awarded contract to serve major shipping company

Marlink has been contracted to implement the KeepUp@Sea IT operational platform from Norwegian maritime IT&C experts Palantir on 110 vessels of one of the world's largest shipping companies, CMA CGM. CMA CGM's 200 maritime services call at more than 420 ports, covering all five continents. CMA CGM has grown continuously and has been constantly innovating to offer its clients new sea, land and logistics solutions.

The contract is part of the recent renewal of CMA CGM's Sealink connectivity services. KeepUp@Sea will be used to standardize, simplify and automate vessel IT management, dramatically improving the efficiency and security of CMA CGM's IT operations.

KeepUp@Sea monitors all hardware and software on board a vessel and throughout a fleet, allowing IT staff on shore to detect and address issues remotely and proactively. It enables IT network changes and maintenance such as software updates from shore, ensuring more stability of computers and equipment on board vessels.

Through continuous network monitoring, pro-active maintenance and remote intervention, KeepUp@Sea over Marlink's Sealink connectivity services removes the need to have any IT expertise on board and significantly reduces the time and cost of vessel and fleet IT management. The system allows masters and officers to focus more on operations and, because it requires less physical intervention by IT staff being sent to fix issues on board, the cost of travel and its environmental impact can be reduced.

Integrated with Marlink's multi-band Sealink connectivity services to ensure high availability globally, Palantir IT solutions enable shipowners

and operators to significantly improve fleet efficiency while reducing maintenance costs. By handing real-time network management to IT experts on shore, CMA CGM can be more confident in the security of its maritime and land based networks. The solution features a unique dashboard display concept, which forms the interface to a powerful, scalable and flexible solution to optimize IT operations.

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

## SpeedCast adds South Atlantic beam on Telstar 12 VANTAGE Satellite

Telesat announced new service contracts with SpeedCast International Limited. The contracts are the latest example of an industry leader, SpeedCast, choosing Telesat's services as offering the best combination of coverage, performance and value to support the growing demand for mobile broadband.

Telesat's innovative Ku-band coverage over the North Atlantic Ocean Region on Telstar 14R and Telstar 11N has driven the growth of mobile broadband. Telesat's new Telstar 12 VANTAGE satellite adds HTS capacity over the North Sea, the Mediterranean and the Caribbean. Telstar 12 VANTAGE also has a South Atlantic Ku-band beam that SpeedCast is now using to serve vessels operating in remote and harsh environments off South America's east coast and between South America and Africa.

SpeedCast is not only expanding its use of Telesat space segment but also expanding its presence in Telesat's state-of-the-art teleport in Mount Jackson, Virginia. SpeedCast's new infrastructure at Mount Jackson gives them greater control over their global capacity and enables SpeedCast to seamlessly access the South Atlantic beam of Telstar 12 VANTAGE.

"SpeedCast and Telesat have been working together for more than 10 years to build the global market for mobile and fixed broadband and we are excited to expand our ties to Telesat once again with new capacity on the Telstar 12 VANTAGE HTS satellite," said Mr. Moti Shulman, vice president technology & network planning, of SpeedCast. "Telesat's innovative South Atlantic spot beam and Europe beam enable us to effectively manage our capacity and provide better service quality and coverage to our clients. We are pleased to add multiple beams of Telstar 12 VANTAGE to our global coverage and join hands with Telesat to grow in the mobility market."

"When a longstanding customer and industry leader like SpeedCast decides

to expand their business with Telesat, it really serves to validate our business approach," said Tom Eaton, vice president, international sales, for Telesat. "SpeedCast has the resources and expertise to compare any number of satellite options. Their decision to choose Telstar 12 VANTAGE and increase their presence at our Mount Jackson teleport is a tribute to the performance and value offered by Telesat. We look forward to continuing to meet SpeedCast's growing requirements in mobility markets around the world."

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

### **OOCL renews fleet-wide Videotel On Demand training contract**

Videotel, a leading producer and distributor of training videos, 3D animation, and e-Learning courses to the maritime market and part of KVH Industries, Inc., has renewed its contract with Orient Overseas Container Line (OOCL) to supply the full Videotel On Demand (VOD) and software solutions service.

VOD delivers high-quality, award-winning training materials, available as an onboard and online e-Learning library, with accompanying recording and reporting software, making it easy for crew members to select specific training courses to learn new skills and develop their careers.

"We take the safety of our people very seriously indeed and, with the VOD service, each seafarer's training programs can be monitored to ensure we have competent crew onboard, minimizing the risk of incidents," says Den Fok, fleet personnel manager of OOCL. "We view training as a crucial investment to help with crew retention and encourage career advancement."

OOCL will take delivery of an additional six 21,000 TEU new builds in the second half of 2017, making it one of the largest global container transportation, logistics, and terminal companies.

The entire OOCL fleet, including the aforementioned new builds, will be supplied with Videotel's VOD G2 units, which utilize cloud-based technology and provide access to a comprehensive training library of more than 950 titles.

Videotel's maritime training programs are a vital aspect of the overall integrated maritime solution offered by KVH, which is addressing the operational optimization needs of the maritime industry in a unique way. KVH's solution includes the mini-VSAT Broadband satellite network, which provides broadband connectivity to thousands of vessels worldwide; the TracPhone V-IP line of advanced satel-

lite communications antenna systems; the IP-MobileCast content delivery service, which utilizes multicasting technology to deliver news, entertainment, and operations content without using vessels' monthly airtime data allotments; and the KVH OneCare comprehensive global support program.

Taken together, the company refers to the complete solution under the Power of One banner. Videotel's Basic Training Package of 20 essential maritime training programs is already available via the IP-MobileCast content delivery service, and additional Videotel training programs will be added in the future.

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

### **OBP Maritime Communications Initiative opens center in Somaliland**

Oceans Beyond Piracy (OBP), United Nations Office of Drugs and Crime (UNODC), EUCAP Nestor and the Somaliland Coast Guard announced the opening of the Berbera Maritime Operations Center. The center, operated by the Somaliland Coast Guard and part of the OBP Maritime Communications Initiative, will create maritime situational awareness and improve the safety of Somaliland waters for local maritime traffic. The center is also expected to assist in combatting illegal fishing, piracy and other maritime crimes.

The opening of the center, primarily funded by the Taipei Representative Office in the European Union and Belgium, was marked by a ceremony attended by officials from OBP, Somaliland, the United Nations, and the European Union. To improve communication and visibility with traffic in Somali waters, the new center features updated equipment and systems including VHF and HF radios and the Internet-based SEAVISION maritime situational awareness system. The center is solar powered to maximize operating efficiency and reduce costs. Internet was provided by the Somaliland government to enable these capabilities and ensure the long-term sustainability of the center.

According to the ROC Representative to the EU and Belgium, Tung Kyo-yu, "The centers will collaborate with international naval forces and local authorities to increase the safety of seafarers operating in the region."

EUCAP Nestor and OBP carried out initial training for the operations staff on board the EUNAVFOR vessel, FGS ERFURT. The staff was trained in maritime communications procedures and the basics of maritime situational awareness and information sharing. It is expected that a long-term partnership

for coordinated training will continue to provide needed training and mentoring for the center.

Work on the next Somali center is expected to begin this fall.

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

### **Thor 7 Ka-band service ready for commercial operation**

Telenor Satellite announced the commercial readiness of its THOR 7 Ka-band mobility service. The Ka-band payload offers regional coverage with a favorable look angle over the main European shipping lanes and utilizes high-powered spot beams, providing unprecedented performance for maritime applications.

Since the commercial handover of the THOR 7 satellite in June 2015, Telenor Satellite has been carrying out a Ka-band testing program prior to its commercial launch. The final testing phase involved more than 15 customers running sea trials on approximately 30 vessels, with up to 50 remote terminals testing the service across THOR 7's footprint. Thanks to the valuable contributions of our pilot customers involved in the final testing phase, we can now launch our mobility Ka-band service with confidence.

Telenor Satellite's THOR 7 HTS Ka-band service offer 6 to 9 Gbps throughput with up to 25 simultaneously active spot beams. Supported by the iDirect next-generation iDirect VelocityTM platform, Telenor Satellite is able to offer automatic and seamless spot-beam handover, assuring continuous connectivity across the entire satellite footprint.

Telenor Satellite's investment in THOR 7 has provided the additional European growth capacity needed to expand its overall business and extend its services capability within the mobility VSAT market.

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



## VBMS wins wind farm contracts

VBMS has been awarded contracts by DONG Energy and E.ON for cable installation services on offshore wind farm projects in the United Kingdom and Germany.

Under the contract with DONG Energy, VBMS will be responsible for the installation of 87 inter-array cables for the Walney Extension offshore wind farm. The total scope of work for VBMS will consist of route engineering, a pre-lay grapple run, cable transport, cable installation and trenching. The project will be executed by VBMS' in-house owned and operated cable-laying vessels and trenching tools.

The Walney Extension will have a maximum capacity of 660 MW and is located approximately 19 km off the west coast of England, next to the 367.2 MW Walney 1 & 2 offshore wind farms, for which VBMS installed the export and inter-array cables between 2009 and 2011.

For the contract awarded by E.ON, VMS will conduct the installation of 65 inter array cables for the Arkona offshore wind farm, located in German waters in the Baltic Sea, about 35 km northeast of Rügen Island.

The total scope of work for VBMS will consist of route engineering, surveying, a pre-lay grapple run, trenching, termination and testing of the 65 cables. The cabling project is set to start in 2018, following survey activities that are scheduled for this year.

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

## Tekmar, JDR to collaboration on offshore wind

JDR Cables and Tekmar Energy have signed an Agreement to work together collaboratively on technology and value engineering projects to support the industry drive for cost, risk and lead time reduction.

The agreement cements an already close working relationship developed over recent years while executing multiple offshore wind farm projects from their United Kingdom manufacturing sites. JDR's and Tekmar's products have been combined on projects such as Wind MW's Meerwind in Germany, DONG Energy's next offshore construction, Race Bank development, and most recently E.On's Rampion Project, the UK's first round three project.

JDR COO Richard Turner said, "At JDR, we view our supply chain partners as an extension of our own business. This agreement with Tekmar allows us to work differently, beyond the barriers of a traditional transactional supplier relationship. It will allow us to develop synergies which will better serve the needs of our end users."

For more information, visit [www.jdrglobal.com](http://www.jdrglobal.com) and [www.tekmar.co.uk](http://www.tekmar.co.uk).

## Amazon Web Services buys Hawaiki capacity

Hawaiki announced that Amazon Web Services (AWS), a leading cloud services provider, has purchased capacity in the Hawaiki Submarine Cable to speed performance and reduce latency for their cloud customers operating between Australia/New Zealand and the U.S.

The Hawaiki Submarine Cable, due to go live in June 2018, will be the fastest and largest link between the U.S. and Australia and New Zealand, offering more than 30 Tbps capacity, which is considerably larger than the network capacity available today. As a carrier-neutral cable system, Hawaiki will usher in a new era of international connectivity benefitting businesses and consumers across the Pacific region. It will complement Amazon Web Services' global infrastructure, which comprises 33 Availability Zones across 12 geographic regions worldwide, (including one in Sydney), with another 5 AWS Regions (and 11 Availability Zones) in Canada, China, India, Ohio, and the United Kingdom expected to come online throughout the next year.

AWS Australia and New Zealand managing director, Paul Migliorini, said, "Our customers in Australia and New Zealand will benefit significantly from the arrival of the Hawaiki submarine cable. The role of the network, as well as the many AWS Regions around the world, is especially important for our customers looking to run global businesses and become more agile."

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

## DeepOcean prepares trencher for 2016 renewables work



DeepOcean 1 UK Ltd., a subsidiary of DeepOcean Group Holding BV, announced that the company has placed a contract with subsea equipment manufacturer SMD to deliver a mechanical cutting boom and associated cable handling system for its tracked trenching vehicle the T3200. The cutting boom will be twice as powerful and deliver double the torque of any other comparable subsea trenching asset in the industry, enabling unrivalled power cable trenching capability in hard ground regions.

The T3200 is the world's most powerful subsea trenching vehicle, offering 3200 horse power of effective trenching power, and is currently equipped with an interchangeable jet trenching cassette that delivers unrivalled jetting power in softer ground. SMD is part of DeepOcean's high-value supply chain in the UK and will deliver an ultra-high torque, boom-cutting cassette for simultaneous mechanical and jet trenching, thus enabling the protection of bundled and un-bundled power cables in rock and other hard ground areas that cannot be trenched with less capable machines.

DeepOcean believes that the T3200 will be a game changer for the offshore power cable industry and will set a new standard for cable burial. In addition to the vehicle's ability to protect product to 3 m in challenging seabed conditions, the asset incorporates health usage and monitoring system (HUMS) for real-time analysis of work rate and asset condition. This will increase reliability and sustain subsea operations. DeepOcean will be using the T3200 for the burial of export cables on a UK-based windfarm in 2016 followed by the Nemo Link® interconnector project in 2017 and 2018.

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

## Microsoft, Facebook to build transatlantic cable

Microsoft and Facebook announced an agreement to build a new, state-of-the-art subsea cable across the Atlantic. The new "MAREA" cable will help meet the growing customer demand for high speed, reliable connections for cloud and online services for Microsoft, Facebook and their customers. The parties have cleared conditions to go Contract-In-Force (CIF) with their plans, and construction of the cable will commence in August 2016 with completion expected in October 2017.

Microsoft and Facebook are collaborating on this system to accelerate the development of the next-generation of Internet infrastructure and support the explosion of data consumption and rapid growth of their respective cloud and online services. MAREA will be the highest-capacity subsea cable to ever cross the Atlantic—eight fiber pairs and an initial estimated design capacity of 160 Tbps. The new 6,600 km

submarine cable system, to be operated and managed by Telxius, Telefónica's new telecommunications infrastructure company, will also be the first to connect the Mid-Atlantic United States to southern Europe, from the data hub of Northern Virginia to Bilbao, Spain, and then to network hubs in Europe, Africa, the Middle East and Asia. This route is south of other transatlantic cable systems, thereby helping ensure more resilient and reliable connections for customers in the United States, Europe, and beyond.

Microsoft and Facebook designed MAREA to be interoperable with a variety of networking equipment. This new "open" design brings significant benefits for customers: lower costs and easier equipment upgrades, which leads to faster growth in bandwidth rates since the system can evolve at the pace of optical technology innovation.

Microsoft and Facebook are working with Telxius to build upon Telefónica's longstanding experience in subsea cables on this innovative new system. Telxius will serve as the operator of the system and sell capacity as part of their wholesale infrastructure business.

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

#### **Green light for construction of COBRA cable**

TenneT and Energinet.dk have received all of the necessary Dutch government permits to begin construction of COBRA, the submarine direct current (DC) cable connecting the Dutch and Danish power grids.

The cable, with a capacity of approximately 700 MW, is about 325 km long and runs from Eemshaven (Netherlands) through Germany to Endrup (Denmark). The connection is designed as a high-voltage DC cable (HVDC), as this technology experiences little loss in power transmission over long distances. Three converter stations on land, and one in the Netherlands and two in Denmark, will connect the cable to the existing networks.

For the construction of COBRA, various permits are required in both the Netherlands and Denmark, as well as in Germany, as a section will be constructed on German seabed. The cable will cross protected areas such as the Wadden Sea, and mining areas, and will be in the vicinity of other cables and offshore wind farms. With the permits in hand, TenneT and Energinet.dk can now focus their full attention on the preparations for the construction of the cable.

COBRA will deliver benefits to both countries. It will allow The Netherlands

to import more renewable energy, especially wind energy from Denmark. It also will provide Denmark with a greater level of energy security. Further, the cable connection is designed such that it is possible at a later stage to connect to offshore wind farms. This allows COBRA to contribute to the European Union's goal of a sustainable international energy landscape.

The COBRA cable is not the first

subsea electricity connection for TenneT. In 2008, TenneT realized the NorNed cable between The Netherlands and Norway (capacity: 700 MW, length: 580 km) and in 2011 the BritNed cable between The Netherlands and the United Kingdom (capacity: 1,000 MW, length: 260 km). Besides COBRA, TenneT is currently working on the construction of Nord Link. This submarine cable will connect Germany and



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Norway will have a capacity of 1,400 MW and will be completed in 2020.

Energinet.dk already has submarine cables to Norway, Sweden and Germany. A new cable between Denmark and Germany is planned for 2020. Energinet.dk and the British grid operator National Grid are currently investigating the possibility of a cable between Denmark and Britain.

TenneT and Energinet.dk will start preparatory work for COBRA at the end of summer. In the autumn, they will start with the construction of the cable. The connection will be put into operation in 2019.

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

## ABB, Aker join to propel and power subsea production

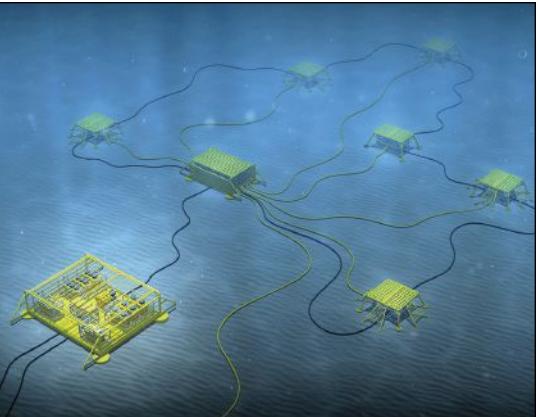
ABB and Aker Solutions announced an agreement to build on their combined strengths in subsea, power and automation technologies to develop solutions that will improve oil and gas production for the global energy industry.

The cooperation will integrate ABB's leading technologies in subsea power and automation and Aker Solutions' pioneering subsea capabilities to bring customers more effective, reliable and flexible oil and gas production solutions. It will enhance how production equipment on the seafloor is powered and controlled by applications on shore or platforms, lowering costs and enabling economically viable production at fields far from existing infrastructure.

The cooperation is an outcome of several years of joint work that includes landmark developments such as the 2015 delivery of the world's first subsea compression system for the Statoil-operated Åsgard field offshore Norway. Initial focus areas will include developing better subsea compression systems at lower costs and in less time.

The collaboration will target opportunities globally, building on the companies' presence in oil and gas markets worldwide. It will be headquartered in Oslo, Norway.

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



## Aqua Comms signs investment agreement

Aqua Comms Limited has entered into an agreement with global private equity firm Cartesian Capital Group, for up to \$75 million in equity capital to support global growth initiatives. The financing agreement immediately provides \$50 million that Aqua Comms will use to further accelerate customer growth on its existing networks. In addition, Cartesian has committed to fund an additional \$25 million of equity capital to be used to opportunistically accelerate expansion, including potential new routes.

Aqua Comms currently operates a number of subsea fiber-optic networks. Recently completed and declared ready for service, America Europe Connect (AEConnect) is the newest Atlantic subsea cable system powering a direct, diverse route from existing transatlantic systems to support metro networks and data center interconnectivity (DCI) to all of the major data centers in Dublin, London, and New York. The 6,300-km network allows businesses to scale against increased future capacity requirements and is also the most secure cable system in existence, being the first to achieve Ciena's FIPS 140-2 Level 3 encryption certification.

In addition, Aqua Comms also owns and operates CeltixConnect, a subsea fiber-optic network connecting Ireland to the UK across the Irish Sea.

Cartesian joins Aqua Ventures International (Aquavint), Aqua Comms' founding shareholder. Peter Yu, managing partner and founder of Cartesian, will be appointed to Aqua Comms' board of directors.

Moelis & Company LLC acted as financial advisor and exclusive placement agent to Aqua Comms on the transaction. Kirkland & Ellis International LLP and Phillip Lee acted as the legal advisors to Aqua Comms on the transaction. Leman acted as legal advisor to Cartesian on the transaction.

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

## Sparkle given NA, NOC responsibilities for SEA-ME-WE 5

Sparkle, the international services arm of Telecom Italia Group, has been awarded by the SEA-ME-WE 5 consortium of both Network Administrator (NA) and Network Operation Center (NOC) responsibilities for the new cable system.

The two responsibilities have been assigned to Sparkle as outcome of a tender process participated by several consortium members, and the result represents an important recognition of

Sparkle's affirmed competence and knowhow in managing and operating submarine cable systems.

Both activities will be performed in Sparkle's Core Landing Station in Catania, which is also a main landing point in Europe for SEA-ME-WE 5 as well as for other major international cable systems.

With a design capacity set at 24 Tbps on 3 fiber pairs deployed by a consortium of 19 carriers including Sparkle, the new cable system is due to come into service by the end of this year and will provide lowest latency connectivity through 16 countries—Singapore, Malaysia, Indonesia, Myanmar, Bangladesh, Sri Lanka, Pakistan, Oman, UAE, Yemen, Djibouti, Saudi Arabia, Egypt, Turkey, France and Italy—offering an additional network layer of diversity and resilience for the heavily loaded Asia to Europe route.

Sparkle's connectivity solutions out of Sicily will be available to SEA-ME-WE 5 through Sparkle's Next Generation Data Center and open ecosystem located in Palermo, Sicily Hub—a rich service marketplace interconnected with all international cables landing in Sicily, where customers can also peer directly with content providers or publicly through DE-CIX.

SEA-ME-WE 5 is the first cable in the Europe-to-Asia route to provide advanced connectivity solutions on a POP-to-POP basis from open telehouses in Europe—such as Sparkle Sicily Hub—as well as in Singapore, in a decisive effort to effectively address today's demand for IP and capacity services, while facilitating network interconnection and improving performance.

With its participation in the SEA-ME-WE 5 consortium, Sparkle has secured its leadership in the fast growing Asia to Middle East and Europe route, enhancing its proposition with a diversified and low latency route to and from Asia. And with the recent opening of Sicily Hub in Palermo, Sparkle is further strengthening its role as leading European hub in the Mediterranean.

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

## Finland to explore cable in the North-East Passage

Finland's Minister of Transport and Communications Anne Berner has appointed former Prime Minister Paavo Lipponen and former managing director of FiCom Reijo Svento to explore the prerequisites for international cooperation in launching the cable-laying project in the North-East Passage.

Commissioned by the Ministry of Transport and Communications and

supported by the Foreign Ministry's expertise and networks, the experts will clarify the extent to which the countries with an interest in the NorthEast Passage cable project are committed to the matter. The project would involve construction of a new high-capacity optical fiber cable via the NorthEast Passage between Asia and Europe.

The submarine cable connection would be the fastest physical telecommunications route from Asia to Northern and Central Europe, according to a statement by Finland's Ministry of Transport and Communications. The NorthEast Passage a shipping route between Europe and Asia along Russia's northern coastline. The cable would bring not only speed but also respond to the rapidly increasing capacity needs.

The realization of this extensive and multinational cable project would require international commitments from at least Russia, China, Japan, South Korea, Norway, certain EU countries and the United States. In addition, the European Union could have a significant role in this international cable project both as a beneficiary and provider of funding.

The expert's term will last from 2 May until 31 October 2016. An interim report must be submitted in August.

For more information, visit [www.lvm.fi](http://www.lvm.fi).

#### Naming ceremony for the Maersk Connector held

DeepOcean 1 UK Ltd., a subsidiary of DeepOcean Group Holding BV (DeepOcean), announced that a naming ceremony was held for the Maersk Connector in corporation with Maersk Supply Service on 3 May 2016 in Newcastle, UK.

DeepOcean was joined by over 90 guests from the offshore renewable and power transmission industry to witness Haydee Noemi Castillo Diaz de Boyde, the wife of DeepOcean's commercial director Mr. Pierre Boyde, successfully naming the vessel and wishing her and her crew a safe and prosperous onward journey.

The Maersk Connector was built by Damen to a bespoke DeepOcean specification, on schedule and budget. She was delivered in cooperation with vessel owner Maersk Supply Service and is on long term charter to DeepOcean. Maersk Supply Service's chief operat-



ing officer Soren Karas commented "The name giving ceremony celebrates a very successful collaboration between DeepOcean and Maersk Supply Service. We look forward to working with DeepOcean to demonstrate this vessel's unique capabilities".

The ceremony was held at A&P Tyne in Newcastle where work to install the dual concentric 7000 tonne split capacity basket carousel, loading arms and associated cable handling equipment is nearing completion.

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



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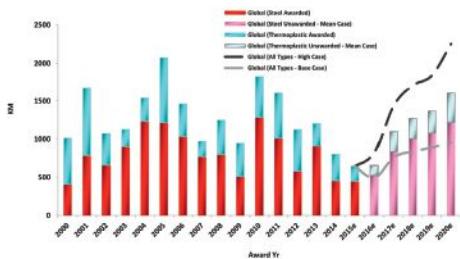
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# OFFSHORE STATS & DATA

## Quest Offshore Activity Report

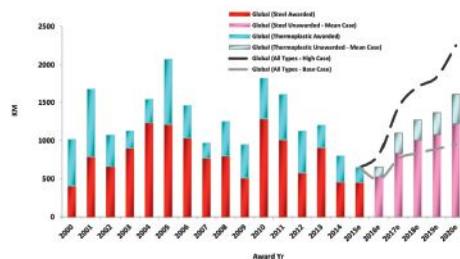
### SPU KM Activity Trends

Mean Case



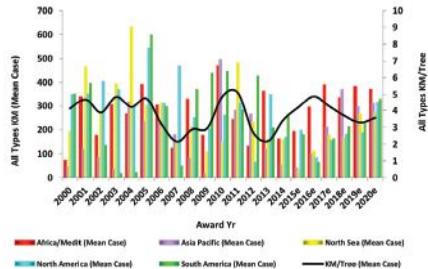
### Global SPU Demand Steel vs. Thermoplastic

Base, Mean & High Case SPU Awards Forecast



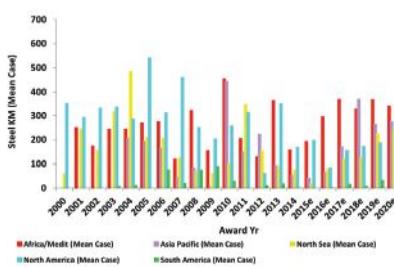
### Worldwide SPU Demand All Types

Mean Case



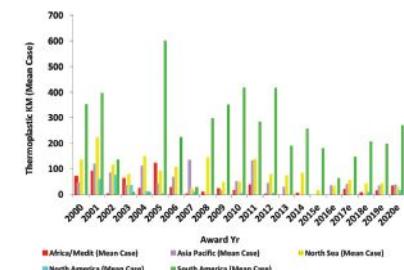
### Worldwide Steel SPU Demand

Mean Case



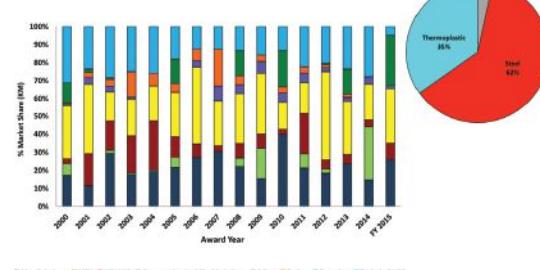
### Worldwide Thermoplastic SPU Demand

Mean Case



### Global SPU Manufacturer Market Share

2000 – 2015 SPU • 21,057 KM • \$9,929 MM

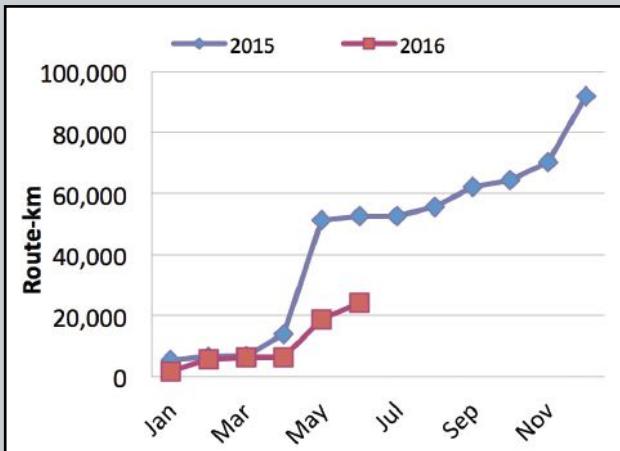


#### FOR MORE DETAILED INFORMATION

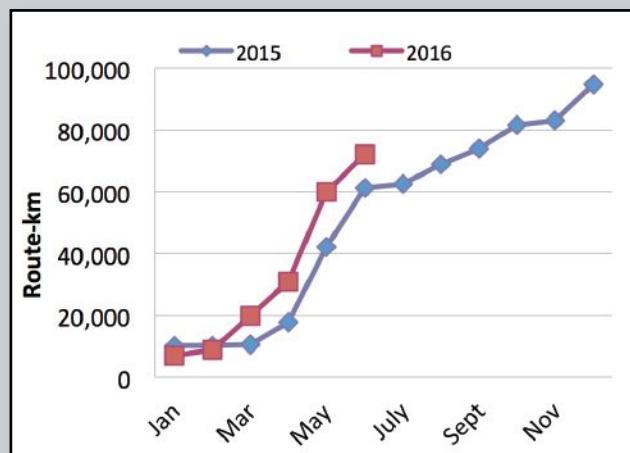
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# Subsea Telecom & Power Cable Data

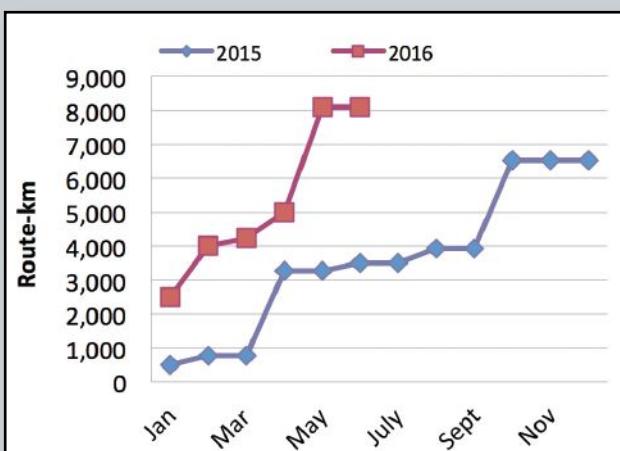
**FO Cable Awards by Month**



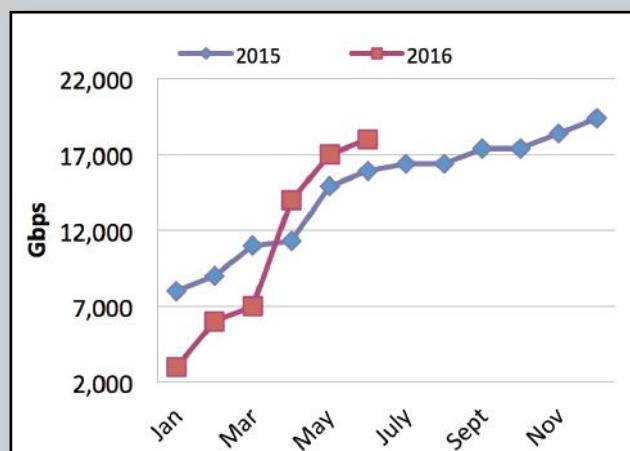
**FO Cable Announcements**



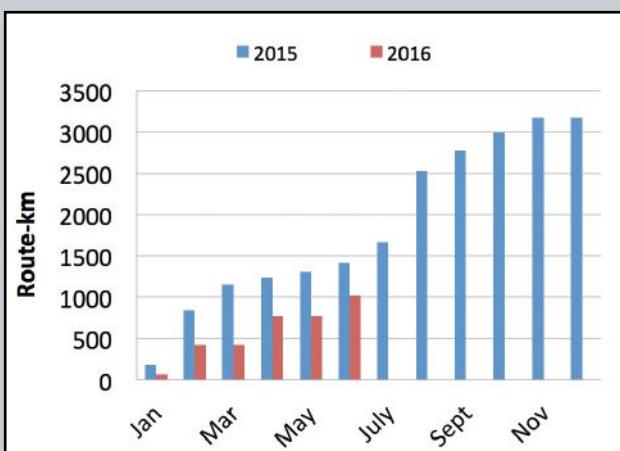
**Submarine FO Cables Entering Service in Route-km**



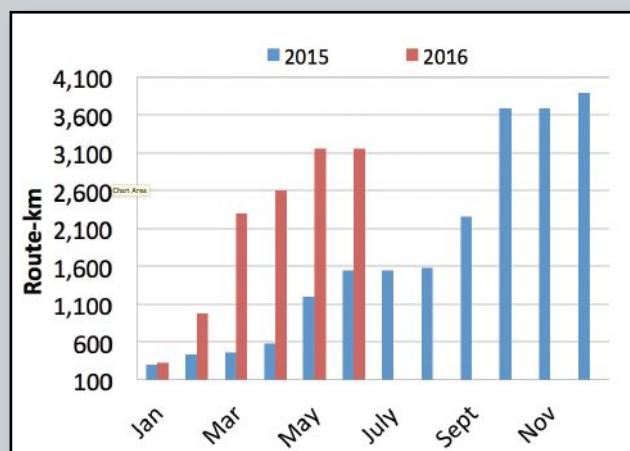
**Upgrades of Existing Cable Systems in Gbps**



**Submarine Power Cable Awards in Route-km**



**Submarine Power Cable Announcements in Route-km**



# Monthly Stock Figures & Composite Index

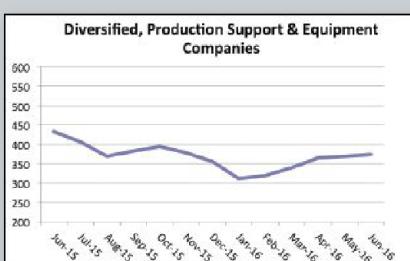
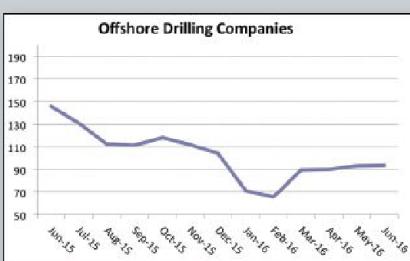
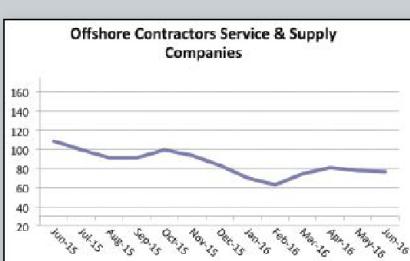
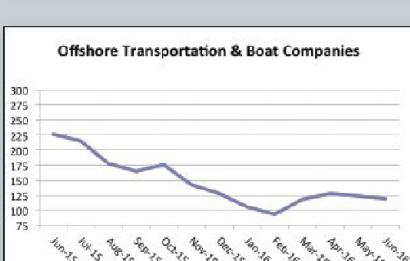
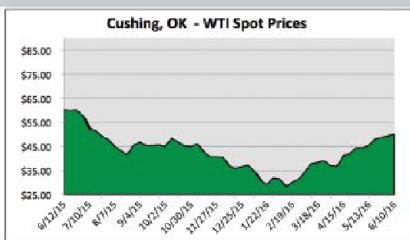
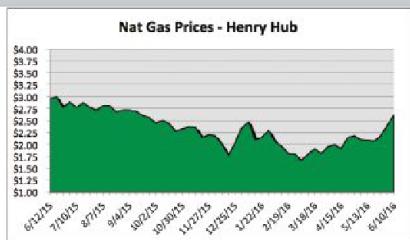
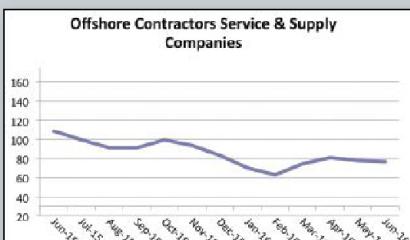
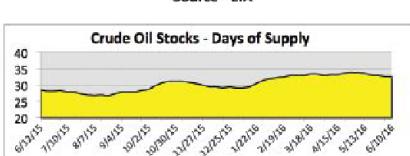
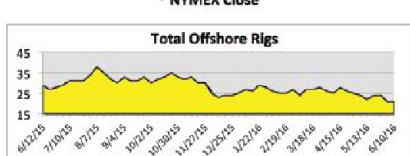
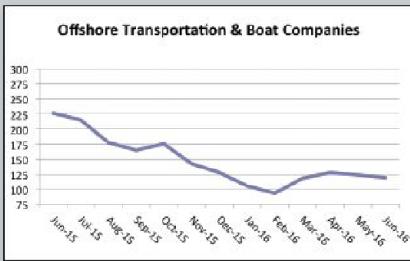
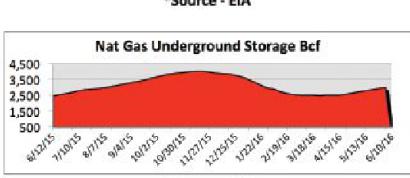
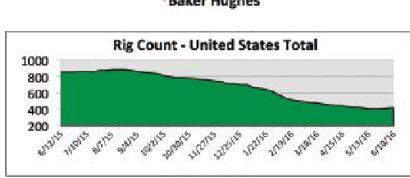
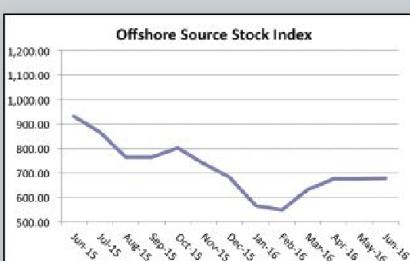
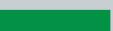
Industry Company Name	Symbol	Close(Mid) June	Close(Mid) May	Change	Change %	High 52 week	Low
<b>Diversified, Production Support and Equipment Companies</b>							
Baker Hughes, Inc.	BHI	45.28	46.19	-0.91	-2.0%	64.52	37.58
Cameron Intl. Corp.	CAM	66.01	66.01	0.00	0.0%	71.22	40.50
Drill-Quip, Inc.	DRQ	59.19	59.62	-0.43	-0.7%	77.35	48.88
Halliburton Company	HAL	42.79	40.40	2.39	5.9%	46.69	27.64
Tenaris SA	TS	27.24	26.23	1.01	3.9%	29.69	18.53
Newpark Resources, Inc.	NR	5.32	4.72	0.60	12.7%	8.62	3.35
Schlumberger Ltd.	SLB	75.84	74.04	1.80	2.4%	90.55	59.60
Superior Energy Services, Inc.	SPN	17.93	16.00	1.93	12.1%	22.43	8.25
Weatherford International, Inc.	WFT	6.06	5.83	0.23	3.9%	13.98	4.71
Deep Down, Inc.	DPDW	0.96	0.90	0.06	6.7%	1.03	0.37
FMC Technologies	FTI	26.11	28.89	-2.78	-9.6%	42.92	22.30
<b>Total Diversified, Production, Support and Equipment.....</b>		<b>372.73</b>	<b>368.83</b>	<b>3.90</b>	<b>1.1%</b>	<b>469.00</b>	<b>271.71</b>
<b>Geophysical / Reservoir Management</b>							
Dawson Geophysical Company	DWSN	7.36	5.80	1.56	26.9%	8.42	2.90
Mitcham Industries, Inc.	MIND	4.02	3.59	0.43	12.0%	5.00	2.24
Compagnie Gnrale de Gophysique-Veritas	CGV	0.72	0.80	-0.08	-10.0%	6.58	0.59
<b>Total Geophysical / Reservoir Management.....</b>		<b>12.10</b>	<b>10.19</b>	<b>1.91</b>	<b>18.7%</b>	<b>20.00</b>	<b>5.73</b>
<b>Offshore Drilling Companies</b>							
Atwood Oceanics, Inc.	ATW	10.96	11.68	-0.72	-6.2%	29.02	4.82
Diamond Offshore Drilling, Inc.	DO	23.89	24.04	-0.15	-0.6%	28.43	14.18
ENSCO International, Inc.	ESV	9.98	10.79	-0.81	-7.5%	23.64	7.25
Nabors Industries, Inc.	NBR	9.97	8.42	1.55	18.4%	14.76	4.93
Noble Drilling Corp.	NE	8.84	9.13	-0.29	-3.2%	16.40	6.66
Parker Drilling Company	PKD	2.30	2.42	-0.12	-5.0%	3.64	0.98
Rowan Companies, Inc.	RDC	17.19	17.18	0.01	0.1%	21.83	10.67
Transocean Offshore, Inc.	RIG	10.35	9.65	0.70	7.3%	17.58	7.67
<b>Total Offshore Drilling.....</b>		<b>93.48</b>	<b>93.31</b>	<b>0.17</b>	<b>0.2%</b>	<b>155.30</b>	<b>57.16</b>
<b>Offshore Contractors, Services, and Support Companies</b>							
Helix Energy Solutions Group, Inc.	HLX	6.98	7.22	-0.24	-3.3%	14.61	2.60
Gulf Island Fabrication	GIFI	6.75	6.71	0.04	0.6%	13.64	6.34
McDermott International, Inc.	MDR	4.51	4.6	-0.09	-2.0%	6.00	2.20
Oceaneering International	OII	31.33	32.39	-1.06	-3.3%	49.32	25.33
Subsea 7 SA	SUBCY.PK	8.77	8.8	-0.03	-0.3%	10.33	4.86
Technip ADS	TKPPY.PK	12.72	13.04	-0.32	-2.5%	16.55	9.69
Tetra Technologies, Inc.	TTI	5.49	5.24	0.25	4.8%	9.44	4.62
<b>Total Offshore Contractors, Service, and Support.....</b>		<b>76.55</b>	<b>78.00</b>	<b>-1.45</b>	<b>-1.9%</b>	<b>119.89</b>	<b>55.64</b>
<b>Offshore Transportation and Boat Companies</b>							
Seacor Holdings, Inc.	CKH	58.51	56.11	2.40	4.3%	73.31	41.24
Gulfmark Offshore, Inc.	GLF	3.56	4.88	-1.32	-27.0%	12.85	2.50
Bristow Group	BRS	14.08	15.36	-1.28	-8.3%	55.88	10.81
PHI, Inc.	PHII	19.10	19.09	0.01	0.1%	34.00	13.05
Tidewater, Inc.	TDW	4.57	7.46	-2.89	-38.7%	24.16	3.79
Trico Marine Services, Inc.	TRMAQ.PK	11.05	10.64	0.41	3.9%	13.08	9.06
Hornbeck Offshore	HOS	8.54	10.07	-1.53	-15.2%	21.79	5.58
<b>Total Offshore Transportation and Boat .....</b>		<b>119.41</b>	<b>123.61</b>	<b>-4.20</b>	<b>-3.4%</b>	<b>235.07</b>	<b>86.03</b>

July 2016

Ocean News &amp; Technology

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# Monthly Stock Figures & Composite Index

Industry	Close(Mid) June	Close(Mid) May	Change %	Change	High 52 week	Low
<b>Total Diversified, Production, Support and Equipment Companies</b>	372.73	368.83	3.90	1.1%	469.00	271.71
						
<b>Total Geophysical / Reservoir Management</b>	12.10	10.19	1.91	18.7%	20.00	5.73
						
<b>Total Offshore Drilling</b>	93.48	93.31	0.17	0.2%	155.30	57.16
						
<b>Total Offshore Contractors, Service and Support</b>	76.55	78.00	-1.45	-1.9%	119.89	55.64
						
<b>Total Offshore Transportation and Boat</b>	119.41	123.61	-4.20	-3.4%	235.07	86.03
						
<b>Total Offshore Source Index</b>	674.27	673.94	0.33	0.0%	999.26	476.27
<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.						
<b>Oil &amp; Gas Industry Trends</b>						
<i>Monitoring the Pulse of the U.S. Offshore Oil &amp; Gas Industry</i>						
<b>Offshore Drilling Companies</b>		<b>Cushing, OK - WTI Spot Prices</b>		<b>Nat Gas Prices - Henry Hub</b>		
						
<b>Offshore Contractors Service &amp; Supply Companies</b>		<b>Crude Oil Stocks - Days of Supply</b>		<b>Total Offshore Rigs</b>		
						
<b>Offshore Transportation &amp; Boat Companies</b>		<b>Nat Gas Underground Storage Bcf</b>		<b>Rig Count - United States Total</b>		
						
<b>Offshore Source Stock Index</b>		<b>*Source - EIA</b>		<b>* NYMEX Close</b>		<b>* Baker Hughes</b>
 Positive trend, at least 3 weeks  Changing trend, less than 3 weeks  Negative trend, at least 3 weeks						

## New and exciting measurement possibilities with long-awaited 250 kHz profiler

Nortek is pleased to announce that the long-awaited mid-range profiler Signature250 is now in production.

It has an optional center beam for the patented SUV wave measurement mode—which means it can be deployed on sub-surface buoys at depths as great as 150 m.

The Signature family now includes instruments covering ranges from <1 m to >1,000 m (frequencies of 1,000, 500, 250 and 55/75 kHz). The Signature series now covers most needs and requirements in terms of range and application.

With a specified current profiling range of 200 m, the new Signature250 opens up new and exciting measurement possibilities. Additionally, with the optional 5th beam, it has the capability of measuring ice thickness, ice drift and directional waves from an installation depth of up to 150 m. All of this is possible with the same energy-saving technology as the rest of the Signature series products.

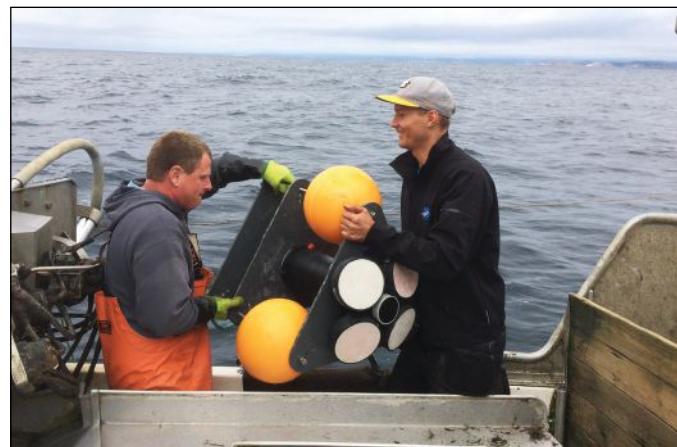
Its features were carefully developed around the needs of scientists and engineers working both within academia and the offshore industry.

One possible application is accurate measurements from subsurface buoy mounts. Here, changes in buoy position is managed by special measurement modes for both ice and waves. The optional 5th beam (Acoustic Surface Tracking [AST]) is optimized by depth so that buoy draw-down is not

an issue and directional wave measurements are unaffected by buoy rotation. This is possible thanks to Nortek's patented SUV measurement mode (US Patent 7,352,651).

Nortek has built a rugged, robust system optimized for operational users while also offering innovation in data investigation capabilities and accuracy to scientific researchers.

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



## SBE 39plus-IM temperature, optional pressure recorder

The SBE 39plus-IM is a high-accuracy, fast-sampling temperature with optional pressure recorder with integrated Inductive Modem (IM) interface, internal batteries, and memory. The 39plus-IM is designed for long-duration deployments on moorings.

Data is recorded in memory and can be transmitted when polled through Inductive Modem telemetry. Measured data are output in engineering units.

Memory capacity exceeds 9.5 million samples without pressure, or 5.5 million samples with pressure. Battery endurance varies, depending on the sampling scheme, but the 39plus-IM is usually limited by its memory capacity. Sampling every 7 seconds (without pressure) or 12 seconds (with pressure), the 39plus-IM can be deployed for 2 years.

The SBE 39plus-IM features:

- Moored temperature, pressure (optional), and time, at user-programmable 5-sec to 6-hour intervals.
- Inductive Modem (IM) interface.
- Internal memory and battery pack; internal USB interface for fast upload.
- 600 m plastic or 10,500 m titanium housing.
- Rigorous 11-point temperature calibration of each sensor.
- Seasoft©V2 Windows software package (setup, data upload, and data processing).
- Next generation SBE 39-IM: faster sampling, more power and memory, same diameter housing, compatible output (39plus-IM to 39-IM comparison).
- 5-year limited warranty.

The Inductive Modem (IM) system provides reliable, low-cost, real-time data transmission for up to 100 IM-enabled

instruments using plastic-coated wire rope (typically 3x19 galvanized steel) as both transmission line and mooring tension member. IM instruments clamp anywhere along the mooring, which is easily reconfigured by sliding and reclamping instruments on the cable. In a typical mooring, an Inductive Modem Module (IMM) in the buoy communicates with IM instruments and interfaces to a computer/data logger (not supplied by Sea-Bird) via RS-232. The data logger is programmed to poll each IM instrument for data and sends the data to a satellite link, cell phone, etc.

The aged and pressure-protected thermistor has a long history of exceptional accuracy and stability. It is available in two configurations: embedded in titanium endcap (25-sec time constant) for rugged conditions or external thermistor in pressure-protected sheath (0.5-sec time constant) for fast sampling.

An optional strain-gauge pressure sensor with temperature compensation is available in eight ranges (maximum depth 7,000 m).

The unit comes in either a plastic (600 m) or titanium (10,500 m) housing. A wire guide and mounting clamp is available in one of nine sizes, and a net fender/fairing with conical ends shaped to shed fishing lines and nets is optional.

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



## MacArtney supplies winch for deep-sea search

Two years ago, a Boeing 777-200ER disappeared over the sea between Malaysia and Vietnam. Two hundred thirty nine passengers and crew vanished on the flight from Kuala Lumpur to Beijing. The plane's transponder stopped transmitting and the passenger jet seemingly disappeared without a trace. Following an intensive search involving planes and ships from 14 countries and a session of careful flight data analysis, it was determined that the plane had diverted south. Since then, resources have been focused on a swathe of the Indian Ocean, about 2,000 km west of Australia—the so-called Seventh Arc.

In 2015, top-ranking government officials from both Australia and China had a meeting and discussed about the search for Malaysia Airlines flight MH370. China offered to help searching for Malaysia Airlines flight MH370 by deploying a search and rescue vessel to search for the missing plane.

MacArtney won the tender to supply a MERMAC R40 winch for a Benthos deep tow sonar system. The winch is to be installed on board the search and rescue vessel Nan Hai Jiu 102 and the search for flight MH370 is going to be reinitiated in summer 2016 by an Australian-based search team.

The MacArtney MERMAC R electrically driven winch in question is a robust and advanced vehicle handling system that safely controls the launch, operation and recovery of ROVs and towed vehicle systems.



Featuring high power and speed, minimal maintenance requirements, a rugged and compact design, active heave compensation and a unique remote diagnostics tool, the MERMAC R series represents cutting-edge winch solutions. The winches are available in standard and custom configurations.

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

## A sound choice for ROVs: Tritech's Gemini and SeeByte's CoPilot

SeeByte, the global leader in creating smart software for unmanned maritime systems and Tritech International Limited [Tritech], a Moog Inc. company, a high-technology business dedicated to providing the most reliable imaging and ancillary equipment for use in underwater applications have successfully integrated the Gemini sonar onto SeeByte's CoPilot software. The system was demonstrated on Heriot-Watt University's Seaway Falcon 1256 ROV in the university's wave tank facilities.

CoPilot provides ROV pilots with a simple point-and-click tool to fly the ROV. It is already integrated to Heriot-Watt's



Falcon ROV and can also be used to pilot other ROV systems. By integrating the Gemini, the ROV pilot can simply point on the sonar data and the ROV will automatically move to the required coordinates.

Scott McLay, sales director at Tritech, commented: "It was great to see the system in action; CoPilot is a very intuitive software package. The combination of the Gemini and CoPilot in one integrated system really allows end-users to get the most out of both the software and the sonar. This is another way in which we can add value to Tritech customers."

CoPilot permits pilot-controlled auto-transit and stop-and-hover, while providing automated sonar tracking and movement relative to a target. CoPilot is easily retrofitted to any ROV system, but is also available from the factory with VideoRay, Seatronics and SMD.

Available as a commercial off the shelf product, the Gemini 720is sonar provides enhanced real-time target tracking capabilities to users through SeeByte's advanced tracking analytics.

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

## New Sonic Wave Sensor RV

The Sonic Wave Sensor RV is a wave sensor that can measure fast submillimeter to large waves. It is excellent for polluted water, fresh or salt water, soapy, oily or muddy water. The Sonic Wave Sensor RV combines an ultrasonic sensor circuit, low power microprocessor and anti-aliasing filter in a rugged IP67 resistant to water submersion package. It has a measuring range from 0.2 to 2.7 m. It can be powered with any voltage from 4.5 to 45 V. There are three versions with different signal outputs.

The OSS-010-036-1 has a RS485 output and a 0-5V analog output. The OSS-010-036-2 has a RS232 output and a 0-5V analog output. The OSS-010-036-3 uses a standard 4-pole connector with RS485 and power for daisy chain units.

Laptops and PCs can easily receive the Sonic Wave Sensor RV's data using the RS232 or RS485 to USB adaptors that are supplied. Time-stamped data can be used to synchronize up to 8 Sonic Wave Sensor RVs. The Staff & Sonic Product Interface Program is available to download from our website to configure, display, analyze and store the sensor data.

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



## Teledyne Benthos announces new acoustic release technologies

Teledyne Benthos, a member of Teledyne Marine, is pleased to announce three new technologies that will greatly expand and enhance its proven Acoustic Release product line. Built on the strength and dependability of Teledyne Benthos' UDB-9400 Universal Deck Box, the company has released a newly upgraded universal top side unit. The new UTS-9400 offers a host of new features and capabilities including a user-friendly color touch-screen display, universal command capability, and advanced ambient acoustic noise analysis to ensure critical release commands get through despite environmental challenges.

Teledyne Benthos has also expanded its new R-Series next-generation acoustic release line to include the R2K Mid-Water Transponding Acoustic Release. Rated to 2,000 m, the R2K represents the latest in Teledyne Benthos acoustic release technology. The newly implemented electronics architecture provides leading-edge features, such as battery voltage indication, tilt measurements in 1° increments, and other enhancements, while retaining the trusted and proven release mechanical design, providing users with the best of both worlds.

In a complementary product development, Teledyne Benthos has also developed a new hand held test unit. The new TESTit is a fully functioning "in air" pre-deployment acoustic tester for the new "R" series of acoustic releases. This battery-operated, light-weight unit is capable of generating all commands needed to test acoustic releases in the lab or on deck prior to deployment, without the need for a topside unit nearby.

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



## Chet Morrison Contractors introduces waterless riser cleaning tool

Chet Morrison Contractors announces a new tool for cleaning drilling and production risers that is safer, faster and more cost-effective than current methods. MUDBUG is an air-actuated, self-propelled device that uses oscillating brushes to clean debris build-up inside risers, moving through the length of the riser and back out again.



Unlike other methods, MUDBUG does not require high-pressure water to remove the rust, scale and drilling mud that builds up in drilling and production risers. Instead, MUDBUG uses only 120-psi air to operate, thus eliminating the problem of water disposal and risk associated with high-pressure washing.

MUDBUG can be operated by a two- or three-man crew instead of the usual five-man team required to clean a riser. Because the device is portable, it can easily be transported via plane or

helicopter to any remote location either onshore or offshore. Its small job box (2 ft x 4 ft) takes up very little space, making it ideal for rigs or other offshore operations. When operational, MUDBUG is approximately 3 ft long and 19 in. in diameter.

It has been successfully tested and used in the offshore environment by major drilling contractors. The device comes with an extra motor and all brushes and is available exclusively through Chet Morrison Contractors in the U.S., Gulf of Mexico, Caribbean and Trinidad.

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

## CGG GeoSoftware releases Jason 9.5 to solve complex E&P reservoir challenges

CGG GeoSoftware has launched Jason 9.5, the latest version of its advanced reservoir characterization software that adds many new capabilities including depth inversion, broadband reservoir characterization and anisotropic inversion. These additions build on and improve Jason's unique technology that reveals essential reservoir facies and rock property information required for tough drilling and reservoir development decisions.

A new key product in version 9.5 is Depth Inversion, which allows the direct use of depth seismic in well tie, wavelet estimation, and inversion processes to deliver results calibrated to well depths. The unique technology in Depth Inversion and in the Jason Workbench combine to allow inversion of depth volumes to actually be performed in time using Jason's industry-leading RockTrace technology, for a scientifically robust solution to depth inversion.

New broadband seismic reservoir characterization workflows take advantage of the latest broadband seismic data available to deliver improved identification of reservoir facies and rock properties. In addition, Jason 9.5 helps users gain the most value from their multicomponent seismic data through probabilistic estimates and advanced geostatistical inversion for fine details. Another innovative Jason product, Anisotropic Inversion, has more constraint options added for improved anisotropy property estimates calibrated to well control, crucial for model accuracy, effective well design and optimum production.

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

## CEE HydroSystems announce launch of CEESCOPE-USV™ echo sounder for remote hydrographic surveying

CEE HydroSystems announce the release of a unique new single beam echo sounder survey system, designed specifically for the growing number of shallow water USV survey applications using both commercially available and custom manufactured remotely operated boats.

The CEESCOPE-USV™ is an all-in-one echo sounder, GNSS and broadband radio telemetry package that can be installed on practically any remotely operated boat.

As an entirely self-contained module requiring no interface with the USV, challenges of instrument data integration on the vehicle are minimized or eliminated. Rigorous data handling eliminates latency concerns resulting from radio transmission to the shore, and the CEESCOPE-USV brings a clear separation between the vehicle and the bathymetric data solution.

Using high-capacity radio telemetry, detailed 20 Hz dual-frequency soundings, up to 20 Hz RTK GNSS, and a detailed digital echogram are available to the USV operator on shore, via the CEE LINK™ radio base station.

Using software packages such as HYPACK® and Eye4Software Hydromagic, data from the CEESCOPE-USV telemetry link allows the operator to steer the USV along the survey line just like in any manned boat survey.

Users wishing to add real-time video or side-scan capability to their USV may plug the data output from these devices into the CEESCOPE-USV and those data are relayed to the shore with the GNSS and bathymetry data. Similarly, navigation data may be exported from the CEESCOPE-USV to vehicle control systems if needed, such as for waypoint guidance.

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



## Verison 6.6 of Underwater Survey Explorer released

CodaOctopus continues to enhance their real-time 3D software package, CodaOctopus® Underwater Survey Explorer (USE).



This release includes a number of new features along with general maintenance fixes. Some of the new features in this Version 6.6 are:

- Added support for our UIS camera in remote DIU configurations. This allows camera data to be incorporated into a remote DIU configuration in addition to a direct connection;
- Added ability to toggle displaying of measurement labels; and
- Maintenance and upgrade improvements include enhanced compatibility with very old USE projects and live motion strings not being applied in replay mode by default.

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

## Seatools introduces intelligent active heave compensation module: HeaveMate®

Based on Seatools' extensive experience and knowledge regarding heave compensation systems, the company introduces an intelligent active heave compensation module: HeaveMate®. This active heave compensator is an easy-to-integrate system for both new as well as existing offshore and subsea equipment such as winches, cranes, and LARS systems.

HeaveMate® can be delivered either as an OEM package with the essentials for heave compensation (black box controller with sensors and software) or as part of a complete turn-key system, including mechanical and hydraulic hardware. In any case, Seatools' simulation capabilities are applied to ensure

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## THE EUROPEAN BLUE GROWTH EXHIBITION



Photo: Jens Jørgen

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proper performance of the overall system in any sea condition and situation (including failure cases), and pre-tune the controller prior to commissioning, thus saving valuable vessel time.

The system is currently deployed in a retrofit project in which a passively compensated LARS will be upgraded towards an actively heave-compensated LARS.

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

## Support for AZFP binary data in latest Echoview 7.1 release

Echoview and ASL Environmental Sciences Inc. (ASL) are pleased to announce that support for ASL's acoustic zooplankton fish profiler (AZFP) has been added to Echoview 7.1. ASL's AZFPLink software already has the ability to export AZFP data to an Echoview-compatible text file format. With the new release of 7.1, Echoview is now able to read raw binary AZFP data files directly, bringing considerable performance and usability benefits.

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

## Self-contained hydroacoustic altimeter working at ocean depth (Echologger AA400-6000)

Echologger AA400 has been unique and sought after by major institutes around the world who used it mainly for sediment monitoring in various underwater environments. Company has recently developed the new 6,000 m version that was tested and certified by KORAS through Korea Research Institute of Ships and Ocean Engineering (KRISE). The product was supplied to the Ocean University of China who is looking into sediment behaviors at ocean depth.

The Echologger AA400 a very unique device that has been designed with the aim of monitoring remote underwater environments in a precise manner. This device is of use especially when cabling won't be possible.

Furthermore, the device consumes extremely low power and with just three AA alkaline batteries, it can last for many months. In order to offer seamless communication with the user, it comes with a high-speed wireless Bluetooth communication feature. Users do not

need to open the device for downloading data or uploading settings as it can all be done by the wireless communication. The only time users need to open the cap of the device is when batteries need to be changed.

This device is packed with the smartest features and it is a fully self-contained one that has been put to right uses such as monitoring sediment movement, calculating wave heights and monitoring tides.

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

## ABPmer updates weather downtime calculator

ABPmer, a recognized provider of metocean services, has launched Version 2 of its weather downtime calculator. The updated service now has wider application across the offshore wind, subsea cable and oil/gas sectors.

ABPmer has been providing metocean information to the offshore sector for nearly a decade. In recent times this has included weather downtime statistics to inform operational planning, tender pricing and program management.

The company's weather downtime calculator was originally developed as an in-house tool, but in 2015 ABPmer launched the express service that provided offshore contractors with direct access to the tool and its global hindcast database. Downtime calculations take less than 10 minutes, which dramatically speeds up contractor decision-making.

Since that time, the calculator has increasingly become the go-to tool for weather downtime calculations. The upgrades to the express service include:

- Allowing for specifying tasks that are "interruptible" during the working schedule;

- Providing additional information about partial completion of the whole operation, including Gantt charts showing the progress of the operations including weather downtime per task;

- Enabling the use of externally supplied data to be used in the tool for calculations (although our in-house SEASTATES dataset remains available for use as a default); and

- Adding more detail to the specification of input parameters (i.e., more detail about the wind speed or wave period.)

Bill Cooper, ABPmer managing director, said: "We are pleased to have been able to respond to industry requests and adapt the service to suit the differing needs of those operating in the offshore environment. Our online express service has proved to be extremely popular over the last year,

giving offshore developers and operators the means to generate statistical information themselves whenever they want was evidently something lacking in the market."

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

## Seafloor adds a second reson SeaBat T50-P MBES to rental pool

Seafloor Systems is pleased to announce the addition of a second SeaBat T50-P to their multibeam echosounder rental pool. The SeaBat T50-P was launched in 2015 as the new addition to the leading SeaBat T-series product range engineered from the ground up to evolve with your business. Combined with the portable sonar processor, the SeaBat T50-P provides unprecedented survey data, providing faster operational surveys and reduced processing time.



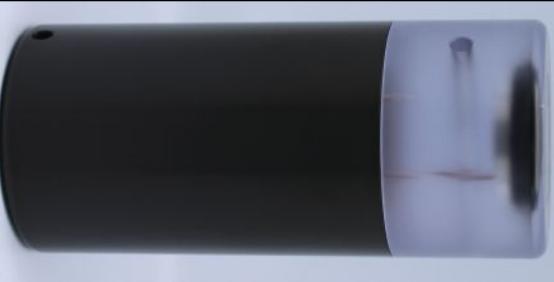
Seafloor Systems is known for their turnkey singlebeam and multibeam hydrographic sonar systems and maintains the largest multibeam echosounder rental pool in the U.S.A. The company offers a full range of rental equipment from a variety of manufacturers. The rental pool includes a variety of hydrographic survey equipment such as high-accuracy INS, magnetometers, motion sensors, sound velocity equipment, remotely and autonomously controlled vehicles, and more.

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

## Braeden Engineering introduces its new mobile digital charting system

Braeden Engineering and Consulting LLC, a leading engineering and construction firm, has announced the introduction of its new Digital Charting System 1200 series (DCS-1200).

The DCS-1200 records and charts data collected from various types of sensors and performs tests based on





parameters input by the user. While this technology has a multitude of uses including measuring temperature, torque, pH and more, its initial primary function is performing pressure tests.

The DCS-1200 package includes 12.1 in. touch panel PC equipped with Windows 7 Prof OS and our customizable user-friendly charting software capable of displaying multiple charts with multiple pens and simultaneously running tests based on parameters set by the user.

This fully customizable software and hardware package is built for purpose. The UPS and battery system allow for

hours of mobile operation in the field when power sources are not available. This mobile system is encased within a rugged carrying case with wheels and tow-handle for easy transport. Test reports are fully customizable by the user and are presented in PDF format for easy printing and transferring; data logging and archiving is also integrated.

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

#### Materia, Inc. introduces new Proxima thermoset resin portfolio for the oil and gas industry

Materia Inc., a leader in the development and manufacture of catalysts and advanced polymers, is pioneering the next generation of oil and gas solutions with Proxima® thermoset resins.

Proxima resins provide reliable, practical and economical solutions that solve major technology challenges in subsea thermal insulation, subsea buoyancy and downhole tools. Proxima resins are extremely easy to process due to their inherently low viscosity and controlled cure profile. The resulting durable products are ideal for use in extreme environments. Compared with

commonly used polymers, Proxima thermosets withstand the most extreme hot/wet conditions and provide excellent performance.

Proxima HTI resins for high temperature subsea thermal insulation provide an effective thermal barrier between high temperature flowlines and seawater. Proxima polymers maintain structural integrity in operating environments at water depths greater than 10,000 ft. and this advanced insulation technology can be rapidly and safely applied in the factory or the field.

Proxima STR thermosets are designed for use in syntactic foams in subsea buoyancy applications. These lightweight materials withstand the severe hydrostatic pressures of deepwater and ultra-deepwater environments while providing substantially improved buoyant support to critical subsea components.

Materia supports its customers with application engineering services provided from its state-of-the-art prototyping and polymer testing facility in Pasadena, California.

For more information, visit <http://oilandgas.materia-inc.com>.

July 2016

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Ocean News & Technology

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Liquid Robotics® announces the addition of three industry luminaries to their strategic advisory board. The new members will be joining an existing advisory board composed of 18 industry experts across the defense, foreign affairs, communications/ technology, and science industries. The new advisors are **Admiral Timothy J. Keating**, U.S. Navy (Ret.), former Commander of the U.S. Pacific Command, **General Walter "Skip" Sharp**, U.S. Army (Ret.), former Commander of the United Nations Command, Republic of Korea–U.S. Combined Forces Command, and U.S. Forces Korea, and **Dr. Francisco Chavez**, senior scientist and biological oceanographer, MBARI.

BIRNS, Inc. has announced the hire of **Xin Lian** as manufacturing engineer. As part of BIRNS' expanding engineering and production departments, Lian will be responsible for writing detailed work instructions, operation procedures, and job travelers for all BIRNS production operations. Reporting to the Production Manager, the role will include collaboration with the company's manufacturing, engineering and quality leadership to plan, direct and streamline production. Prior to joining the team at BIRNS, Lian served as manufacturing quality engineer for Quan Yun Company and quality control project manager for Fei Cui Yuan. She holds both MS and BS degrees in engineering management.

ECHO81 LLC proudly announces the addition of **Lisa N. Brisson** as their new senior systems engineer. Lisa comes to ECHO81 highly experienced in hardware and software design, integration, calibration, testing and field deployment of underwater sonar systems.

Intellian Technologies has opted for knowledge and experience in its latest senior appointment in a strategic move designed to assist ship-owners during a transformative period in maritime and offshore communications. **Ken Champagne**, who has more than 25 years of experience in delivering electronic technologies to the energy sector, becomes Intellian senior director, Americas sales, overseeing Intellian's sales activities in the Americas.

ACE Winches has strengthened its senior management team with the appointment of **Chris Waller** as engineering manager. He has more than 12 years of experience in the subsea industry and holds a BEng Honours in Engineering from The Open University.



Lian



Champagne

He joins ACE Winches from SengS, where he held the position of engineering director for 4 years.

WFS Technology has appointed **Mike Theobald** as project director for Australia and Southeast Asia. He brings considerable subsea control systems knowledge and understanding as well as an insight into how best to use Seatooth products and technology. He has worked in the subsea industry for over 25 years, starting his career with FSSL (formally Kvaerner Oilfield Products now Aker Solutions) in 1988, just as subsea systems were gaining popularity. His core discipline is in subsea control systems.

**AML Oceanographic** is pleased to announce the opening of a new office in Dartmouth, Nova Scotia, Canada. Situated at 800A Windmill Road, Unit 6C in Dartmouth, the new office will be staffed by recent additions to the AML team: **Mark Smith**, **Darrell Groom**, and **Murray Eisan**. Their extensive backgrounds in the ocean technology industry bring a wealth of practical experience to AML and its customers. In addition to providing customers extended access to AML service and support, their focus will be on the technical development and production of sensor platforms and instrumentation.

**James Fisher and Sons plc** (James Fisher) announces the acquisition of three renowned visual information design and communication brands, R2S Visual Asset Management (VAM), R2S Forensic and as digital product provider Max and Co. This acquisition will enhance James Fisher's expertise and abilities in asset integrity and management services in a wide range of markets worldwide. The pioneering use of technology that delivers dynamic, visual asset management solutions across a broad spectrum of applications and industries, will further consolidate and strengthen James Fisher's existing capabilities and provide further added value to clients.

**MBT GmbH** has acquired Bremen-based **CPU GmbH**, provider of equipment for underwater technical systems. Representing a profound commitment to fully support the challenging underwater technology market in Germany, **MacArtney** expand their business to strengthen their system sales capacity. CPU GmbH remains an independent entity with Christoph Reuter carrying on his job as managing director of the company.

Canadian manufacturer of subsea communication systems, **EMO Marine**, is the latest acquisition of the **MacArtney Group**. EMO Marine is a technology company founded in 2012 specializing in engineering and manufacturing of a range of fiber optic video/data transmission systems appropriate for various marine and subsea applications.

**Osbit**, a Northumberland based offshore engineering and technology company, is gearing up for its next phase of growth by launching an evolved brand. The business, formerly named Osbit Power Limited, is now trading as Osbit Limited and has refreshed its branding, with a new website to follow.

**Klein Marine Systems, Inc.** is pleased to announce the addition of **A2 Marine Solution** as an International, Representative for Klein Marine Systems side-scan and bathymetry sonar systems in Brazil. Located in Rio de Janeiro, A2 Marine has been a leading provider of commercial equipment for hydrographic survey equipment for over fifteen years.

**Tideland Signal Corporation**, now part of Xylem, announces that it has entered into a definitive agreement to acquire certain assets of **Julius Signal**, extending the company's extensive portfolio of marine and offshore aids to navigation offerings.

Leading specialist maritime agency **Saltwater Communications** has announced a comprehensive new service for the industry with the launch of company brand name, **Saltwater Stone**. The rebranded business has been created to reflect the addition to the company of a dedicated branding and design studio and a strengthened social media team, which build on the core PR, marketing and advertising expertise honed by Saltwater over the last 25 years.

To support the growing global demand for its state-of-the-art underwater sensors, **Impact Subsea** has significantly expanded its distributor network. Over the past 5 months, seven new companies have joined the Impact Subsea network of distributors. Each distributor provides local support for Impact Subsea's underwater altimeter, depth, range, heading, motion and temperature sensing solutions. The recent distributor appointments include All-Star Technology (Taiwan), Oceanvision (Singapore), Oceasian Technology (China), Pioneer Focus (Hong Kong), Seascape (The Netherlands), Tae Kwang Electronics Corp (South Korea) and Uncommon Technologies (Norway).

**Aquatec Group** is pleased to welcome **Seascape Subsea Technology** as a representative for the distribution of their established underwater instrumentation for oceanographic, environmental and coastal applications in the Netherlands, Belgium and Luxembourg.

**Swathe Services** is pleased to announce that they are now a **HYPACK** dealer for the UK and Ireland. They can now offer HYPACK hydrographic survey software to customers purchasing R2Sonic packages and also to anyone operating within the offshore industry.

# CALENDAR & EVENTS

July 18-20, 2016  
**Oceanography & Marine Biology**  
 Brisbane, Australia  
[www.oceanographyconference.com](http://www.oceanographyconference.com)

July 30 - August 3, 2016  
**IMCC**  
 St. Johns, Newfoundland  
[conbio.org/mini-sites/imcc-2016](http://conbio.org/mini-sites/imcc-2016)

August 9-11, 2016  
**Deepwater Intervention Forum**  
 Galveston, TX  
[www.deepwaterintervention.com](http://www.deepwaterintervention.com)

August 29 - September 1, 2016  
**Offshore Northern Seas**  
 Stavanger, Norway  
[www.ons.no](http://www.ons.no)

September 19-23, 2016  
**Oceans '16 MTS/IEEE**  
 Monterey, CA  
[www.oceans16mtsieeeomonterey.org](http://www.oceans16mtsieeeomonterey.org)

October 10-12, 2016  
**DP Conference**  
 Houston, TX  
[www.dynamic-positioning.com](http://www.dynamic-positioning.com)

October 11-13, 2016  
**Oil Comm**  
 Houston, TX  
[www.oilcomm.com](http://www.oilcomm.com)

October 17-18, 2016  
**Submarine Networks World**  
 Singapore  
[www.terrapinn.com](http://www.terrapinn.com)

October 19-20, 2016  
**Offshore Well Intervention GoM**  
 Houston, TX  
[www.interventiongom.offsnetsevents.com](http://www.interventiongom.offsnetsevents.com)

October 24-26, 2016  
**OTC Arctic Technology Conference**  
 St. Johns, Newfoundland  
[www.arctictechnologyconference.org](http://www.arctictechnologyconference.org)

October 25-26, 2016  
**AWEA Offshore Windpower**  
 Warwick, RI  
[www.awea.org](http://www.awea.org)

October 25-26, 2016  
**Offshore Energy '16**  
 Amsterdam, The Netherlands  
[www.offshore-energy.biz](http://www.offshore-energy.biz)

November 1-3, 2016  
**Clean Gulf**  
 Tampa, FL  
[www.cleangulf.org](http://www.cleangulf.org)

November 6-9, 2016  
**IEEE AUV 2016**  
 Tokyo, Japan  
<http://www.auv2016.org>

November 30 - December 2, 2016  
**International Workboat Show**  
 New Orleans, LA  
[www.workboatshow.com](http://www.workboatshow.com)

December 2016  
**Offshore & Deep Sea Mining**  
 London, UK  
[www.ibcenergy.com](http://www.ibcenergy.com)

December 12-16, 2016  
**AGU Fall Meeting**  
 San Francisco, CA  
<https://fallmeeting.agu.org/2016/>

January 31 - February 2, 2017  
**Euromaritime**  
 Paris, France  
[www.euromaritime.fr](http://www.euromaritime.fr)

## OCEAN NEWS & TECHNOLOGY

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**2 Describe your job function (circle 1):**

1. MANAGEMENT/EXECUTIVE      4. TECH'N/OPERATOR  
 2. EDUCATOR      5. BUYER/SALES  
 3. ENGINEER/SCIENTIST      6. OTHER (Specify) \_\_\_\_\_

**3 Describe your organization (circle 1):**

- A. Marine Industry (Shipyard, Naval Architecture; Shipping & Transportation; Construction; Salvage; Dive Services; Subsea Inspection; Marine Electrical/Electronics; Navigation and Positioning; Ports and Harbors)  
 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)  
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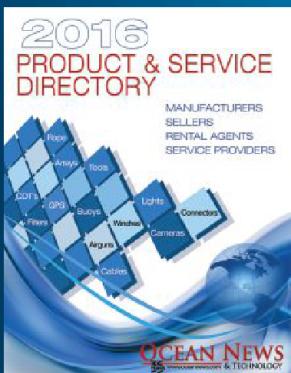
## OCEAN INDUSTRY MONTHLY DIRECTORY



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## CABLES

### Falmat Cable

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Fax: +1 760 471 4970  
E-mail: sales@falmat.com  
Website: www.falmat.com  
Contact: Shawn Amirehsani



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*High quality engineered cables for ROV, side scan sonar, video, communication, towed array, geophysical, instrumentation, deep-water Ethernet and many other specialized applications. We offer installing braided armored fairing, single and multilayered steel armored cables in short lengths. Falmat is a Certified ISO9001/AS9100 organization. Visit our web site: www.falmat.com.*

### South Bay Cable Corp

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



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

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Tel: +1 310 762 1600  
Fax: +1 310 762 1616  
E-mail: sales@ak-ind.com  
Website: 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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### BIRNS Aquamate LLC

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E-mail: sales@birnsaquamate.com  
Website: www.birnsaquamate.com  
Contact: Eli Bar-Hai



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

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E-mail: seacon@seaconworldwide.com  
Website: www.seaconworldwide.com



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

### Teledyne Impulse

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## 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



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

**EQUIPMENT RENTAL****Okeanus Science & Technology, LLC**

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Tel: 985-346-4666  
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*Okeanus is the premier rental provider for oceanographic and marine scientific research equipment utilized in nearshore and offshore projects around the world. Focused on providing industry-leading customer service, Okeanus offers advanced, high-quality technology coupled with knowledgeable and experienced staff that can deliver dedicated support regardless of a project's location.*

**FIBER OPTIC PRODUCT/SERVICES****Focal Technologies Corporation, Moog Inc.**

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



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

**Ocean Specialists Inc.**

8502 SW Kansas Ave  
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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.*

**Kongsberg Seatex AS**

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Fax: +47 73 51 50 20  
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Website: www.km.kongsberg.com/seatex  
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.*

**HYDROPHONES****High Tech, Inc**

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



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E-mail: insure@jwfisk.com  
Website: www.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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# OCEAN INDUSTRY DIRECTORY

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E-mail: sales@bartington.com  
Website: www.bartington.com



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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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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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Fax: +1 715 839 8248  
E-mail: info1@watson-gyro.com  
Website: www.watson-gyro.com  
Contact: Tom Henke



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



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## Kongsberg Seatex AS

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Tel: +47 73 54 55 00  
Fax: +47 73 51 50 20  
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Website: www.km.kongsberg.com/seatex  
Contact: Finn Otto Sanne at finn.otto.sanne@kongsberg.com



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## OCEANOGRAPHIC INSTRUMENTS/SERVICES

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Contact: Valérie Le Pen - vlepen@nke.fr or Goulven Prud'homme - gprudhomme@nke.fr

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Contact: Nathalie Le Bris - nlebris@nke.fr

**RBR**

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Ontario Canada K2K 2M5  
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Website: www.rbr-global.com



Based in Ottawa, Canada and established in 1976. The company is an industry leader in the design, development and manufacture of high precision instruments for oceanographic, freshwater, groundwater and cryospheric research. Products include CTDs, small temperature or depth loggers, tide gauges, wave loggers and multi-parameter sondes.

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



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Website: www.star-oddi.com  
Contact: Baldur Sigurgeirsson



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Email: info@oceanwise.eu  
Website: www.oceanwise.eu  
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E-mail: Klein.Mail@KleinMarineSystems.com  
Web: www.KleinMarineSystems.com  
Contact: Deborah Durgin, Supervisor, Marketing & Sales



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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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Website: [www.saiwas.no](http://www.saiwas.no)  
Contact: Gunnar Sagstad

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# OCEAN INDUSTRY DIRECTORY

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



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Email: [tdavis@hydraoc.com](mailto:tdavis@hydraoc.com)  
Website: [www.hydraoc.com](http://www.hydraoc.com)  
Contact: Trevor Davis



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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



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

## SUBSEA TOOLING

July 2016

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### Subsea Americas

3447 Hwy 182  
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Berwick, LA 70342  
Tel: +1 985 714 1767 or 985 518-0055  
E-mail: [charles@subseaamerica.com](mailto:charles@subseaamerica.com)  
Website: [www.subseaamerica.com](http://www.subseaamerica.com)  
Contact: Charles Mayea



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Fax: +1 508 563 3445  
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Website: [www.hydroid.com](http://www.hydroid.com)  
Contact: Graham Lester



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Website: [www.iver-auv.com](http://www.iver-auv.com)  
Contact: Jim Kirk



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



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Fax: 985-847-1106  
E-mail: [jeff@outlandtech.com](mailto:jeff@outlandtech.com)  
Website: [www.outlandtech.com](http://www.outlandtech.com)  
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E-mail: [info@qstar.es](mailto:info@qstar.es)  
Websites: [www.qstar.es](http://www.qstar.es) & [www.rovs.eu](http://www.rovs.eu)



*OSTAR was established to offer services for industries that require specialized skills 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



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Website: [www.videoray.com](http://www.videoray.com)  
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Website: [www.rovoco.com](http://www.rovoco.com)  
Contact: Jessica McKenney



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Website: www.hawboldt.ca  
Contact: Paul Phillips



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Tel: +44 (0) 1224 791001  
Fax: +44 (0) 1224 791002  
E-mail: admin@alloceans.co.uk  
Website: www.alloceans.co.uk  
Contact: Brian Abel

**MECHANICAL HANDLING UNDERWATER**

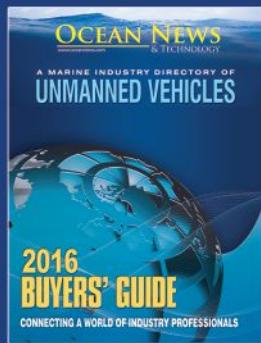
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For advertising information, contact:

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JW Fishers Manufacturing, Inc.	19	<a href="http://www.jwfishers.com">www.jwfishers.com</a>
New Industries	41	<a href="http://www.newindustries.com">www.newindustries.com</a>
Oceaneering International	80	<a href="http://www.oceaneering.com">www.oceaneering.com</a>
Ocean News	32, 40, 43, 47, 51, 70, 77	<a href="http://www.oceannews.com">www.oceannews.com</a>
Oceans '16	34	<a href="http://www.oceans16mtsieemonterey.org">www.oceans16mtsieemonterey.org</a>
Ocean Specialists, Inc.	55	<a href="http://www.oceanspecialists.com">www.oceanspecialists.com</a>
OI North America	67	<a href="http://www.oceanologyinternationalnorthamerica.com">www.oceanologyinternationalnorthamerica.com</a>
Okeanus Science & Technology	37	<a href="http://www.okeanus.com">www.okeanus.com</a>
Quest Offshore Resources, Inc.	57	<a href="http://www.questoffshore.com">www.questoffshore.com</a>
Radar Screen Report	3	<a href="http://www.subcableworld.com/radar-screen-report">www.subcableworld.com/radar-screen-report</a>
SeaCatalog	7	<a href="http://www.seacatalog.com">www.seacatalog.com</a>
SeaRobotics	49	<a href="http://www.searobotics.com">www.searobotics.com</a>
Shark Marine Technologies, Inc.	29	<a href="http://www.sharkmarine.com">www.sharkmarine.com</a>
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SubCtech GmbH	43	<a href="http://www.subCtech.com">www.subCtech.com</a>
VideoRay	2	<a href="http://www.videoray.com">www.videoray.com</a>



# UNDERWATER COMMUNICATION AND POSITIONING SOLUTIONS

# Evo Logics®

## S2C TECHNOLOGY: COMMUNICATION AND TRACKING COMBINED

- time, space and cost-saving solutions
- low power consumption for autonomous operations
- advanced data delivery algorithms, addressing and networking, remotely configurable settings
- extendable platform with multiple configuration options: power-saving Wake Up module, acoustic releaser, additional sensors, custom solutions, OEM versions available

## USBL POSITIONING SYSTEMS

**simultaneous positioning and communication** - no need to switch between positioning mode and modem mode

- flexible SiNAPS positioning software
- reliable data transmissions
- range: up to 8000 m
- accuracy: up to 0.04 degrees

## UNDERWATER ACOUSTIC MODEMS

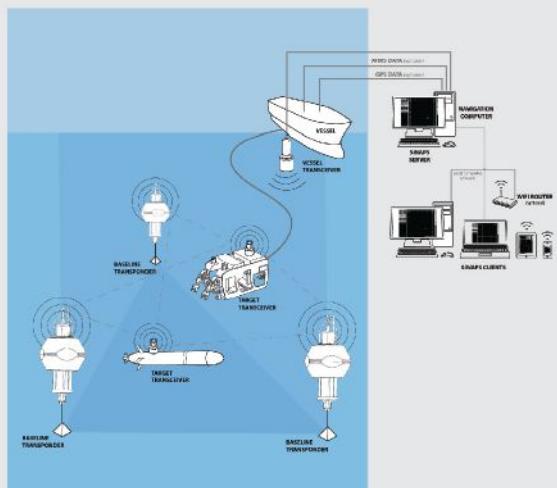
reliable data transmissions even in adverse conditions, customizable R-series modems, light and compact M-series "mini" modems, **new S2CM-HS high-speed modem**, special editions for developers, S2C communication and positioning emulator - remote access or standalone device

- range: up to 8000 m
- depth: up to 6000 m
- data rate: up to 62.5 kbps

## LBL POSITIONING SYSTEMS

highly accurate, precise and stable performance, simultaneous positioning and data transmissions

- flexible SiNAPS positioning software
- reliable data transmissions
- range: up to 8000 m
- accuracy: better than 0.01 m





Connecting What's Needed with What's Next™

Visit us at **Deepwater Intervention Forum**  
booth 300



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As the trusted subsea connection specialist, we focus intently on the many challenges that global offshore operators face—from routine to extreme. To solve beyond the status quo, our integrated rigless hydraulic well-intervention solution provides a safe flow path from the well into the reservoir to enable formation damage remediation and ultimately increase production. The result of this cost-effective rigless intervention is a faster production-enhancement solution that maximizes our clients' return on their investments.

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