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Geophysical Methods for the Mapping of Deep-sea Mineral Deposits

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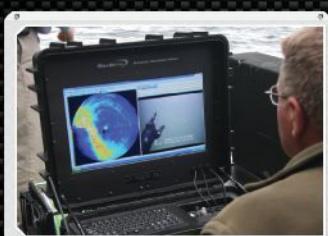
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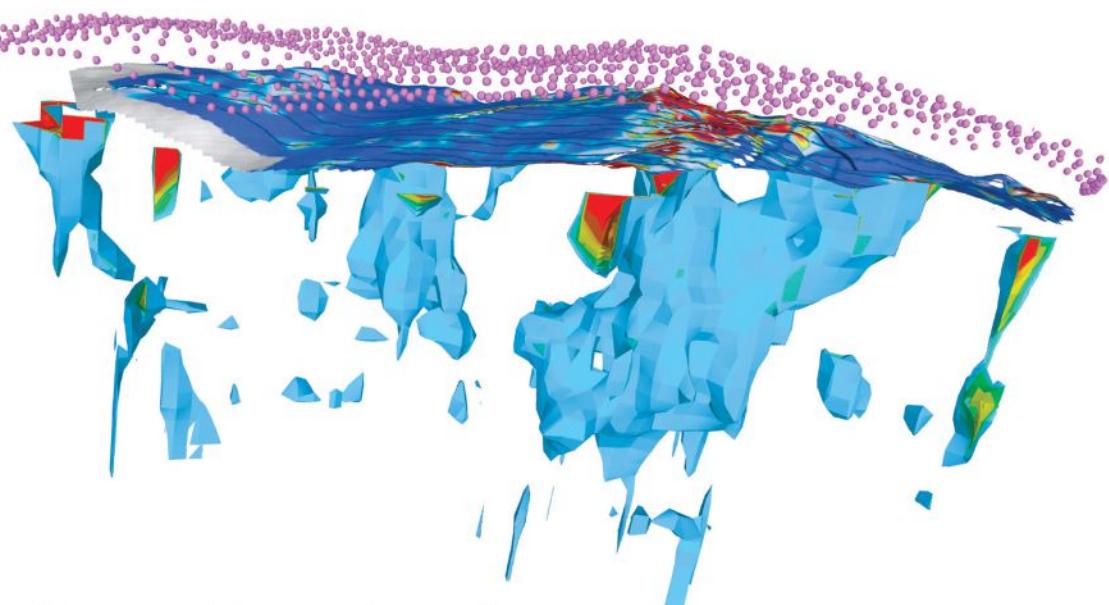
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Figure: Geophysical model of Solwara 1
EM and Bathymetric data and models:
OFG for Nautilus Minerals
Magnetic data: M. Tivey et al., WHOI
3D Magnetic Inversion: P. Kowalczyk, OFG

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Ocean Industry



Offshore Industry



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InterMoor towing the Innovator platform to Ingleside, Texas after successfully completing decommissioning operations in Gomez field, Mississippi Canyon Block 711, Gulf of Mexico.

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Subsea mining – a bright future at deeper and darker depths?

By Dr. Stef Kapusniak, Business Development Manager – Mining
Soil Machine Dynamics Ltd

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For any mining venture, either on land or at sea, the key questions are is it technically possible, is it economically viable and is it environmentally acceptable? On land the answers to these questions vary between mineral deposits. The answers also vary for different offshore mineral deposits.

From a technical perspective, the technology exists for both exploration and extraction of offshore minerals and it is improving all the time—with environmental sensitivity being a key driver of equipment and mining system design. Subsea mining is already occurring around the world in diamond, gold, tin and magnetite-bearing sands and gravels. Polymetallic nodules have also previously been mined in the bay of Finland. In the surf zone, walking jack-up platforms have enabled access. For soft materials in shallow water away from the beach, dredging technology has enabled access. And seabed crawlers have been used beyond the reach of standard dredging tools in the case of deeper offshore diamond mining. Improvements in deep-sea riser technology have enabled even deeper deposits to be targeted. Prototype equipment has been tested on seafloor massive sulphides to a depth of approximately 2,000 m and on polymetallic nodules in mid-ocean abyssal plains at depths of over 5,000 m. These operations are confined to the immediate vicinity of the seabed. But some countries are now starting to examine buried mineral resources at sea. Let's not forget that coal has previously been mined under the North Sea, initially as early as 1575 (not a misprint) off the coast of Scotland.

From an economic perspective, demand for many minerals is growing rapidly. This is partially driven by population growth. At the same time, urbanization and metal use per capita is growing in the world's emerging economies. Naturally, some of the resulting demand is offset by substitution and recycling—but this only accounts for a small proportion of the escalating requirement. For some key minerals, high-quality reserves on land are gradually being depleted. In general terms, this reduction in average ore grade has been accompanied by a rise in average stripping ratio (the ratio of barren rock and overburden to mineral bearing rock in the mining plan of a particular deposit) and an increase in average depth in the case of underground mining. This has led to increased extraction costs, increased processing costs, and increased selling prices over the longer term. But potential investors still need to be aware that there

are exceptions within these generalities. Metal prices can be highly volatile. Some key minerals that have high selling prices, such as "rare earths" or Cobalt, have relatively small global volume requirements. One decent find on land could change the comparative viability of a small subsea mine overnight. Of course, some offshore deposits have multiple potential products and include better concentrations of "high global volume" metals such as copper than those remaining on land. For some of these deposits, processing techniques that can extract one metal without excluding extraction of others can in some cases be the key to viability.

From the environmental perspective, all human activity has an environmental impact. It is, therefore, useful to look at relative impact. Some areas of the mid-ocean abyssal plains have lower species densities than the Sahara desert—but some offshore locations don't. Does it make sense from a carbon footprint perspective to transport phosphates from Morocco to New Zealand for use in fertilizers in the farming industry when there are substantial offshore resources nearby? Approximately 100 m tonnes of seafood are consumed globally per annum. Close to 1,500 m tonnes of oil are extracted offshore each year. So, on a comparative basis it is fair to ask the following thought-provoking question...

...Which of the three activities is likely to have the biggest impact on marine life: (a) trawling 100 m tonnes of seafood, (b) bringing 100 m tonnes of oil up a riser or (c) bringing 100 m tonnes of rock up a riser?

Some may say that we need to eat the fish to survive. Others may say that we need fuel-oil to operate the trawler. And others may say that we need metals to build the trawler. Of course, some may say it is a loaded question. But, it is also fair to say that key strategic metalliferous elements are required in clean energy (such as in offshore wind farms) and in clean fuel technologies. A joined-up approach to the exploitation of subsea resources in addition to a precautionary one from an environmental and sustainability perspective therefore seems to be necessary.

There are of course social, political and regulatory perspectives to consider, too. So what does the future hold? Nobody has a crystal ball, but offshore oil extraction has gradually grown to supply over a third of total world output. It is likely that the same shift will gradually occur for other strategic mineral resources.

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GEOPHYSICAL METHODS FOR THE MAPPING OF DEEP-SEA MINERAL DEPOSITS

By: Steve Bloomer, Ph.D.
Matthew Kowalczyk, Eng.

Deep ocean seafloor mining systems are being actively developed today for a number of different mineral deposit types. These include seafloor massive sulphides (SMS), poly-metallic nodules (nodules), and ferromanganese cobalt crusts to muds rich in rare earth minerals and deep-sea phosphate deposits. In the deep ocean, geophysical methods are a key exploration tool for finding and delineating these resources. The widest range of geophysical tools have been applied to the mapping of SMS and nodule deposits, and these provide case studies of the methods and instruments applied in the regional mapping, target generation and testing to prospect delineation stages of a deep-sea exploration project.

In 1977, the first black smoker was discovered on East Pacific Rise. Since then, many more hydrothermal vent occurrences have been discovered in the deep ocean worldwide and have been extensively studied by the scientific community. Associated with these vents are SMS deposits formed by the precipitation of metals when hot vent waters cool near the seafloor. These compact deposits can contain very high grades of copper, gold, and zinc and are highly prospective economic sources of these metals.

Polymetallic nodules, sometimes referred to as manganese nodules, are formed on the seafloor. They are extensively distributed worldwide and are most abundant in the oceanic abyssal plains at about 4,800 m depth. First discovered in the 19th century, they weren't considered of economic interest until the 1960s

and 1970s when a number of mining consortia explored for them and conducted pilot mining operations to assess the economics of mining them as a manganese, copper, cobalt, and nickel resource. A collapse in world metal prices stopped this work, but considerable design and resource estimation work was done.



Figure 1: AUV Deep 1 (Fukada Salvage and Marine) used for geochemical and geophysical mapping of seafloor mineral deposits. Photo credit: OFG.

Regional Mapping

Mapping of deep-sea mineral deposits begins with ship-borne sonar mapping in regionally favorable geological settings. Typically, this involves multibeam sonar surveys to produce maps of the regional bathymetry and deep towed side-scan sonar to map backscatter indicative of seafloor rock type.

For SMS deposits, active vents form tall chimneys that may be identified by the shadow they cast on side-scan sonar maps. Additionally, towed sleds equipped with water samplers, turbidity, and redox sensors are used to search for active plumes by flying the sled up and down through the water column. Due to the uncertainty in deep-sea current direction and magnitude, data from these sensors combined with the maps produced from the sonars only provide an indication of the general location of the source of active venting. Consequently further mapping is required, to pinpoint the targets, determine the extent of the mineralized system, and determine its economic importance.

Physical sampling with box corers remains the most important part of nodule exploration programs. Geophysics plays an important role as it has been demonstrated that the abundance of nodules can also be measured as a function of backscatter signal from a surface multibeam system and deep water side-scan imagery. Calibrated by the box coring results, this provides valuable information to help target further detailed mapping and sampling.

Target Generation

From the ship-borne sonar maps, potential targets for more detailed mapping are defined. A variety of geophysical instruments and platforms are available for use. These instruments not only respond to different physical properties of the local geology, but also target different volumes from the seafloor and the near subsurface downwards to hundreds of meters beneath the seafloor.

Autonomous underwater vehicle (AUV) surveys are often performed over areas of tens of square kilometers to focus exploration. An AUV payload typically includes multibeam, side-scan sonar, subbottom profiler, and chemical sensors. By flying the AUV at low altitudes, sub-meter bathymetric resolution is achieved, enabling the clear delineation of hydrothermal chimneys that are not seen in ship-borne bathymetry. Side-scan sonar and subbottom profilers provide detailed information on seafloor and shallow subsurface geology. For nodules, which are usually 5 to 10 cm in diameter and are often partially buried in sediments, an AUV-mounted multibeam may not provide enough detail to determine the distribution of the nodules with enough resolution. The high spatial resolution of AUV mounted LiDAR and laser profiling systems offer better results for nodule abundance measurements. Note that a trade-off occurs between systems flown higher off the seafloor, which cover more area, and systems flown close to the seafloor, which have high spatial resolution. A carefully designed survey can balance these costs, using high-resolution data to calibrate the response of lower resolution data, which can then be used as a proxy for the high-resolution results.

Magnetometers are also used in AUV-based surveys. SMS deposits can produce characteristic negative magnetic anomalies due to the destruction of magnetic minerals in the hydrothermal alteration halo associated with them. AUVs are an ideal platform for magnetic mapping of these deposits as magnetic data can be collected simultaneously with sonar and water chemistry data. The magnetic anomalies associated with SMS deposits cannot be resolved using ship-borne magnetometers due to the limited extent (typically a square kilometer or less) and the depths of these deposits. Proven methodologies exist to correct magnetometer data for the self-induced heading and attitude errors and the magnetic fields produced by the propulsion and control motors of the AUV, enabling the convenient mounting of fluxgate magnetometers inside the AUV during surveys. The corrected magnetic data then can be inverted to produce 3D maps of subsurface mineralization and structure.

Controlled source electromagnetic (CSEM) systems can also be used to determine the depth extent of exposed SMS deposits and to explore for buried deposits. CSEM systems consist of an electrical transmitter and one or more receivers that are either placed on the seafloor or towed behind the transmitter in a short streamer behind an ROV or towed vehicle. These towed streamer CSEM systems have been used

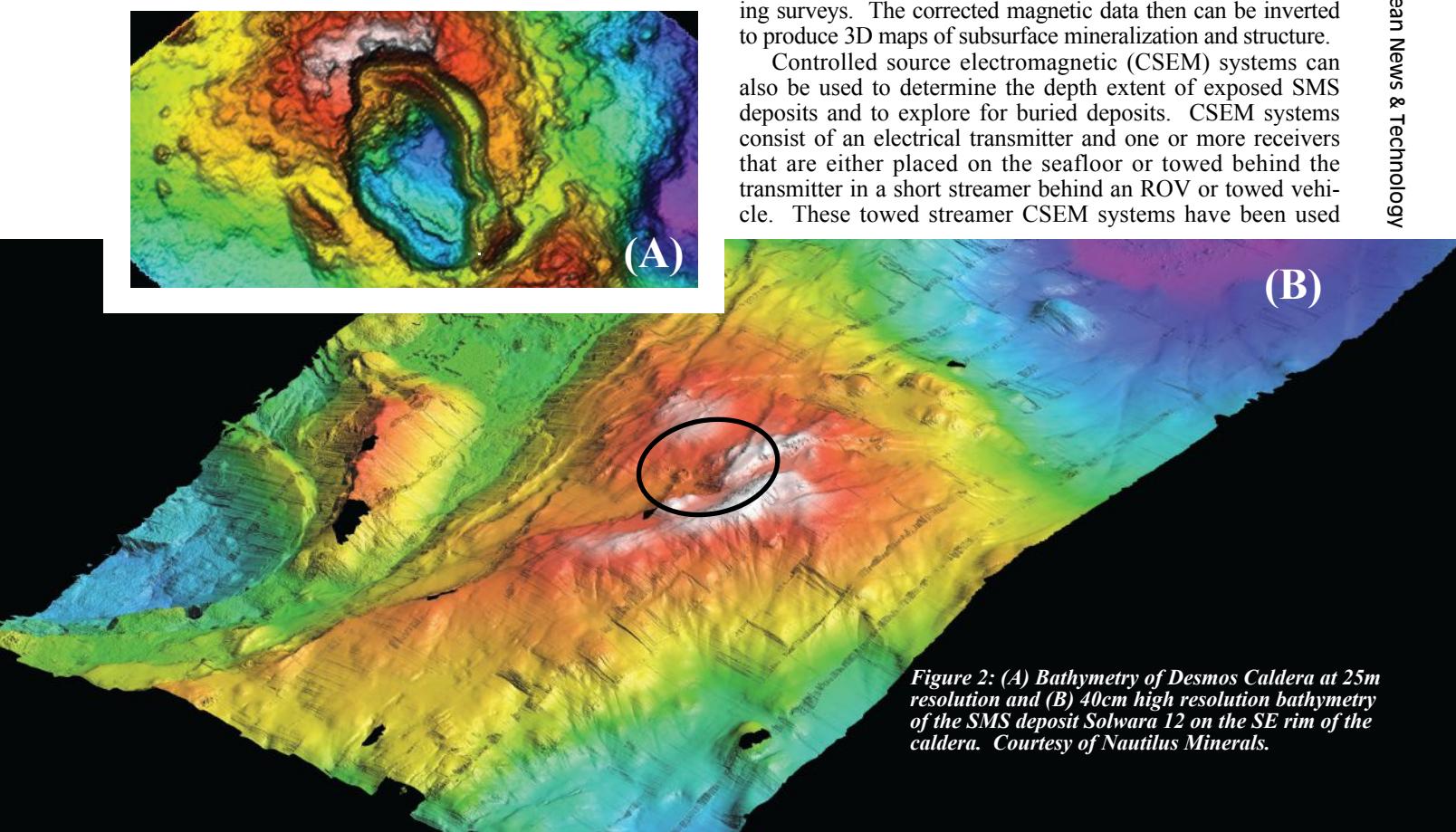


Figure 2: (A) Bathymetry of Desmos Caldera at 25m resolution and (B) 40cm high resolution bathymetry of the SMS deposit Solwara 12 on the SE rim of the caldera. Courtesy of Nautilus Minerals.

FEATURE STORY

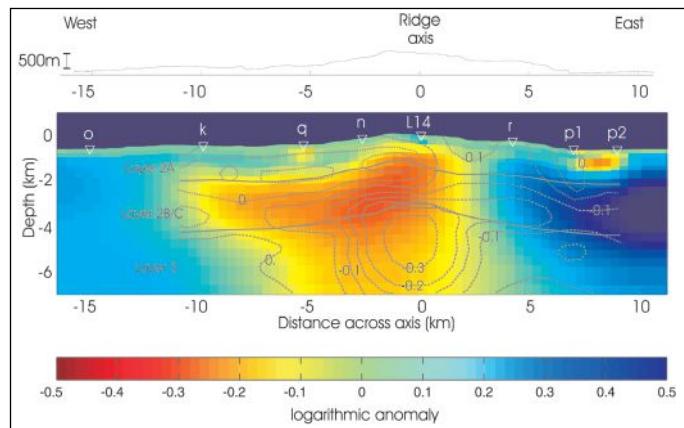


Figure 3: Inversion results of a CSEM survey at Valu Fa Ridge.
Courtesy of MacGregor et al.

successfully for mapping resistive subsurface gas hydrates. For conductive SMS deposits, the geophysical method used looks for current channelling through the conductive zones, diverting current flow from the ocean into the seabed. The conductivity of the deep ocean is constant, so electrical fields are a proxy for current density. Modeling has shown that SMS targets produce an electrical field anomaly that is readily detectable if using a towed streamer system with short offsets between the transmitter and receivers such as the Scripps Vulcan CSEM. Using 3D inversion of CSEM electrical field data, the subsurface extent of SMS deposits can be determined.

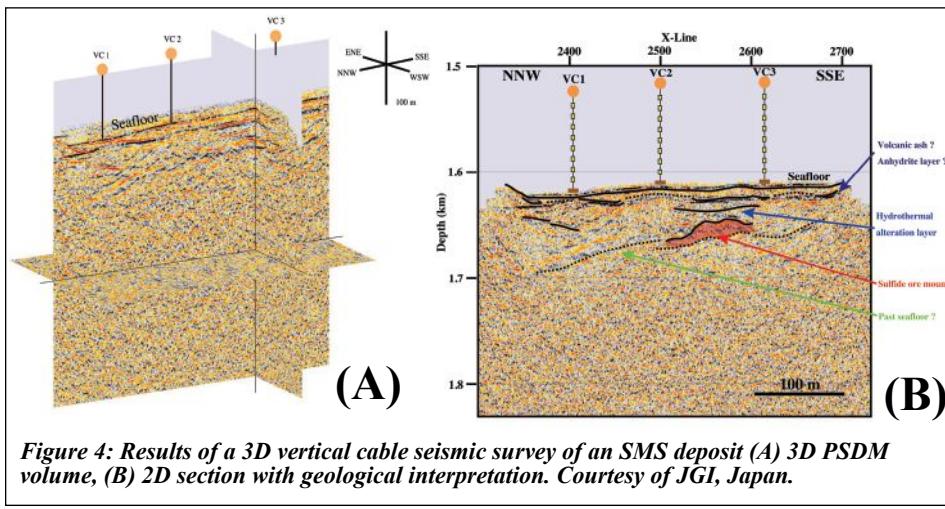


Figure 4: Results of a 3D vertical cable seismic survey of an SMS deposit (A) 3D PSDM volume, (B) 2D section with geological interpretation. Courtesy of JGI, Japan.

Prospect Delineation

Other EM surveying methods can also be used to determine the resistivity of surface and near-subsurface structure. SMS deposits fall into categories: zinc rich and conductive copper gold rich deposits. The OFG-EM system is an ROV-mounted EM system that operates at a height of 3 to 10 m above the seafloor. It comprises a transmitter coil and a set of receiver electrodes close in to the ROV. This system has successfully mapped high-conductive zones that correspond to high grades of copper in surface cores at a number of SMS deposits presently being explored as potential subsea mines.

Of all marine geophysical methods, seismic mapping provides the best vertical resolution. In the areas of SMS deposits, reflection seismic provides valuable information on subsurface structure such as buried sulfide mounds, but is difficult to obtain. In deep water, surface multichannel acquisi-



Figure 5: OFG EM Mark III system mounted on Hakuyo 3000 ROV (Fukada Salvage and Marine). Photo credit: OFG.

tion can be problematic because it does not provide adequate lateral nor vertical resolution of these compact deposits. The rugged terrain and active venting in these areas also makes placement of seafloor seismometers difficult. A proven solution is the use of a series of multichannel vertical cable seismic (VCS) arrays moored to the seafloor, such as the system developed by JGI, Japan. These arrays are typically composed of 8 to 12 hydrophones, spaced 10 m apart. In the areas of SMS deposits that cover a square kilometer or less, these arrays are spaced a couple of hundred meters apart. A surface-towed, high-frequency sparker is used as a source, enabling the vertical resolution of layers of less than a meter. A lower frequency air-gun source can be used if mapping deeper structures is required.

Conclusion

The world of marine geophysics is dominated by acoustic methods; however, knowledge of a wider array of geophysical technologies

and how to integrate and operate them in surface, towed, and subsea vehicle systems and deployed on the seafloor is vital to the success of any deep-sea mineral exploration program. An effective deep-sea exploration campaign will not only use these technologies, but will stage their deployment in a cost-efficient manner appropriate to the requirements of the project—be it wide area regional prospecting, project area exploration, or resource definition.

About the authors:

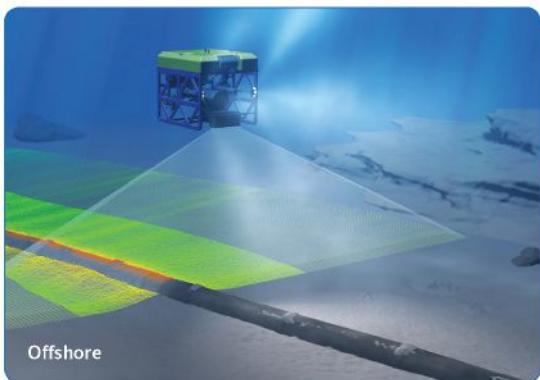
Matthew Kowalczyk, Eng. is the CEO of Ocean Floor Geophysics Inc. (OFG). Steve Bloomer, Ph.D. is a Senior Geophysicist with Ocean Floor Geophysics Inc.

Ocean Floor Geophysics is a marine geophysics company that provides deep-sea mineral exploration services as well as specialized geophysical services for the oil and gas industry.

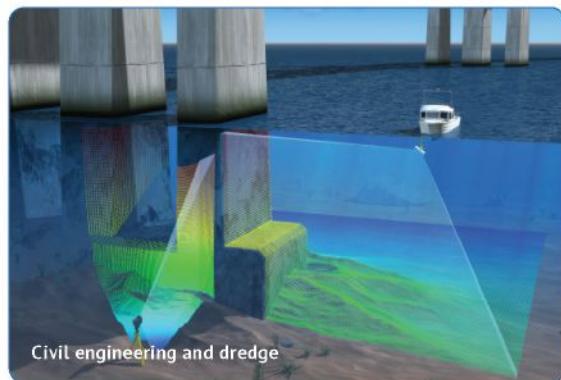


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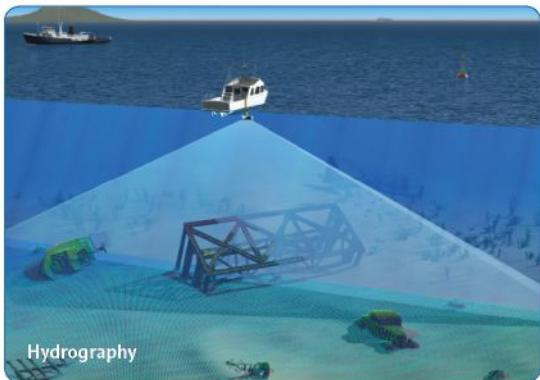
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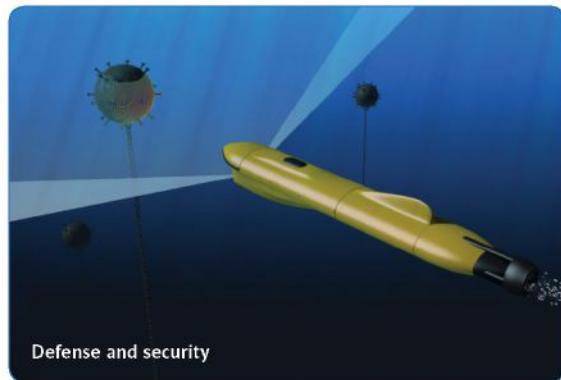
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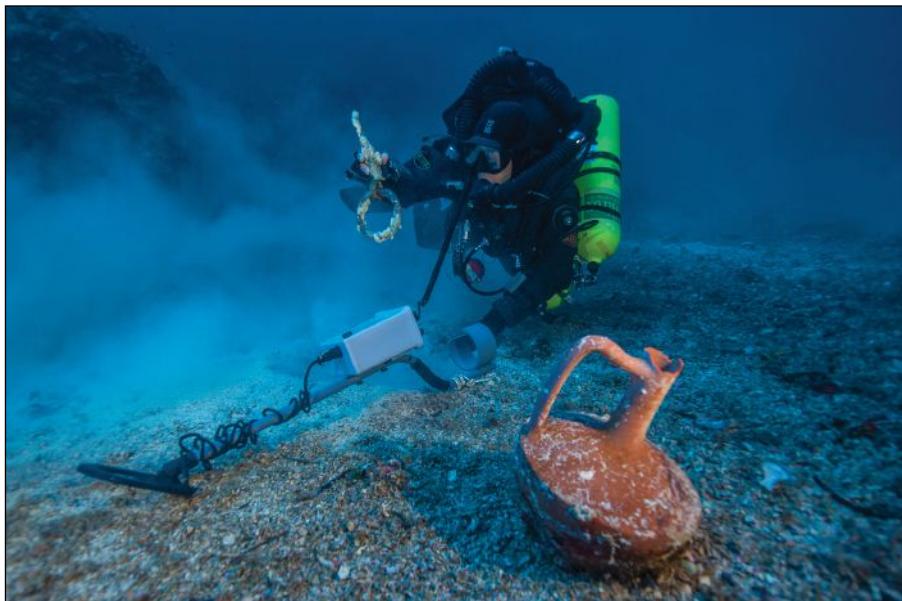
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OCEAN INDUSTRY

Stunning finds from ancient Greek shipwreck off Antikythera



Greek technical diver Alexandros Sotiriou discovers an intact "lagynos" ceramic table jug and a bronze rigging ring on the Antikythera Shipwreck. Credit: Brett Seymour.
Copyright: Return to Antikythera 2014

A Greek and international team of divers and archaeologists has retrieved stunning new finds from an ancient Greek ship that sank more than 2,000 years ago off the remote island of Antikythera. The rescued antiquities include tableware, ship components, and a giant bronze spear that would have belonged to a life-sized warrior statue.

The Antikythera wreck was first discovered in 1900 by sponge divers who were blown off course by a storm. They subsequently recovered a spectacular haul of ancient treasure including bronze and marble statues, jewelry, furniture, luxury glassware, and the surprisingly complex Antikythera mechanism. But they were forced to end their mission at the 55-m deep site after one diver died of the bends and two were paralyzed. Ever since, archaeologists have wondered if more treasure remains buried beneath the sea bed.

Now a team of international archaeologists, including Brendan Foley of the Woods Hole Oceanographic Institution and Theotokis Theodoulou of the Hellenic Ephorate of Underwater Antiquities, have returned to the treacherous site using state-of-the-art technology. During their first excavation season, from 15 September to 7 October 2014, the researchers have created a high-resolution, 3D map of the site using stereo cameras mounted on an AUV. Divers then recovered a series of finds that prove that much of the ship's cargo is indeed still preserved beneath the sediment.

Components of the ship, including multiple lead anchors over a meter long and a bronze rigging ring with fragments of wood still attached, prove that much of the ship survives. The finds are also scattered over a much larger area than the sponge divers realized, covering 300 m of the seafloor. This, together with the huge size of the anchors and recovered hull planks, proves that the Antikythera ship was much larger than previously thought, perhaps up to 50 m long.

For more information, visit www.whoi.edu.

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Anergy Capital Inc. to acquire Kraken Sonar Systems Inc.

Anergy Capital Inc., a capital pool company pursuant to Policy 2.4 of the TSX Venture Exchange, is pleased to announce that it has entered into a letter of intent with Kraken Sonar Systems Inc. pursuant to which Anergy has agreed to acquire all of the issued and outstanding shares of Kraken. Kraken is an arm's-length party and, as such, the acquisition will not be subject to shareholder approval. Kraken is engaged in the design, development and marketing of advanced sonar and sensors for AUVs.

Fishing boat branded 'illegal' as Greenpeace demands Korea stop unlawful catch

Protesting the arrival of the Korean flagged fishing vessel Insung 3 in Busan, Greenpeace accused the Korean Ministry of Oceans and Fisheries (MOF) of failing to regulate the illegal activity of its distant water fleet. Greenpeace activists painted "illegal" on the side of the Antarctic fishing vessel to highlight its involvement in illegal fishing. Reportedly carrying 60 tonnes of illegal catch, Insung 3 returned to her home port in Busan to be investigated by the MOF, following calls from Greenpeace after demanding the blacklisting of the illegal vessel Insung 7. Both Insung 3 and 7, owned by the Korean fishing company Insung, were documented fishing illegally in Argentina's Exclusive Economic Zone (EEZ) in 2013. The company's fleet has had a history of illegal fishing in the Southern ocean since 2009 and triggered international debate on the failure of Korea to control their own fleet. The U.S. identified Korea as an illegal, unreported and unregulated (IUU) nation in January 2013, followed by an EU pre-identification as IUU in November 2013. Insung not only ignores international law, but when the Korean MOF recently refused to issue a catch certificate for illegal catch, Insung refused to go to port for inspection and instead instructed one of its IUU vessels to stay at sea for 9 months, risking crew's lives. Inspite of the company's record, the Insung 3 reportedly faces punishment of a 30-day fishing ban and a fin of \$US 1,500. Greenpeace exposed 34 cases of IUU, non-compliance and human rights abuse history by Korean vessels last year, and cases continue to emerge from both Africa and the Southern Ocean.

Phoenix contracted to search for Malaysia Airlines flight 370

Phoenix International Holdings, Inc. has been contracted by DRB-HICOM Defence Technologies Sdn Bhd (DEFTECH) to provide deep-water towed side-scan sonar services in support of continuing underwater search operations for Malaysia Airlines flight 370. DEFTECH and Phoenix are working for Petroliam Nasional Berhad (Petronas), Malaysia's leading international petroleum corporation, and the Government of Malaysia. Phoenix will be an integral part of the international search team that will be closely coordinated by the Australian Transport Safety Bureau (ATSB).

Phoenix is teamed with Hydropheric Solutions, LLC, of Whitefish, Montana and Seattle, Washington, to provide deep-water side-scan sonar search services. Side-scan sonar operations will be conducted using the SLH PROSAS-60 towed synthetic aperture side-scan sonar (SAS) system, which is rated to operate in depths to 6,000 m. With this system, detailed high-resolution images of the search area will be collected and analyzed in real time by Phoenix and Hydropheric personnel in an effort to locate the wreckage of MH370.

"We are deeply honored to be selected to serve in support of the continuing search for MH370. We fully understand and appreciate the challenges ahead, and we are eager to get to work," says Mike Kutzleb, President of Phoenix International.

For more information, visit www.phnx-international.com.

BOEM and NOAA partner on ocean science with the Okeanos Explorer

Recently, BOEM officials had the opportunity to tour the NOAA ship Okeanos Explorer while it was docked at the Port of Baltimore. The ship is one of the premier U.S. ocean research vessels, and it has been used three times as a platform for research supported by BOEM's Environmental Studies Program and incorporated into its environmental assessment activities.

Commissioned by NOAA in August 2008, the Okeanos Explorer is "America's Ship for Ocean Exploration," and is the only federally funded U.S. ship assigned to systematically explore the largely unknown ocean for the purpose of discovery and advancement of knowledge.

Through BOEM's partnership with NOAA, including joint studies with their Office of Ocean Exploration and Research, which owns and manages the

Okeanos Explorer, researchers have gathered scientific data to expand understanding of the deep waters and marine life of the Gulf of Mexico and Atlantic Ocean. The discoveries help to inform and shape BOEM management decisions regarding offshore energy and marine mineral development.

Several impressive Okeanos Explorer expeditions related to BOEM's mission involved exploration of the Monterrey wreck, an early 19th century shipwreck in the Gulf of Mexico. Shell Oil Company found its remains while using side-scan sonar near one of its lease areas and notified BOEM about the probable shipwreck. BOEM is required under the National Historic Preservation Act to take steps that contribute to the preservation of sunken historic and archaeological properties.

In 2014, BOEM participated remotely in another research cruise to the same shipwreck, with the additional support of BOEM marine archaeologist Alicia Caporaso, BOEM geologist Kody Kramer, BOEM geophysicist Bill Shedd and scientists from other institutions.

For more information, visit www.boem.gov.

MTS announces election results and annual award recipients

The Marine Technology Society is pleased to announce the results of its recent elections for positions on its Board of Directors. Ray Toll was newly elected as President, Donna Kocak as President-Elect, Andrew (Andy) Clark as Vice President of Industry and Technology, and Erika Montague as Vice President of Publications. Election results were announced during the MTS Annual Meeting, which took place during the OCEANS'14 MTS/IEEE Conference this month in St. John's, NL, Canada, 15-18 September 2014. All will assume their new positions 1 January 2015.

Also during the conference, MTS announced the honors and recognitions it awarded at its annual meeting and awards presentation.

The Ocean News and Technology Award recognizes a member of our 'Next Generation' who has already demonstrated excellence in their profession and made significant contributions to MTS. The award recognized Michael Lombardi, who was also awarded \$1,000. As a diving contractor and technologist by trade, Lombardi has spent more than 6,000 hrs underwater, principally as a "mud diver" for inshore construction tasks. His early career included serving as Diving Safety Officer for NOAA's Caribbean Marine Research

Center, where he took a leading role in developing and implementing novel techniques for mixed-gas diving for science. His ongoing program development efforts in deep human scientific exploration have since resulted in multiple funding awards through the National Geographic Society's Waitt Grants Program. Last year he partnered with the J.F. White Contracting Company for project development work using the newly developed Nuytco Research ExoSuit Atmospheric Diving System.

The Compass (Publications) Distinguished Achievement Award was presented to Bjørn Jalving. Throughout his career, Jalving has been on the cutting edge of advancing AUV research, first as a scientist, then through direct involvement in the design, engineering, and commercialization.

The Compass (Publications) International Award honored Kongsberg Maritime Embient for their many contributions to the advancement of marine science and technology. A wholly owned subsidiary of Kongsberg Maritime, Kongsberg Maritime Embient focuses on the development and engineering of intelligent monitoring systems, bringing together the latest expertise from the scientific forefront with industry proven concepts and latest available technology.

The Compass (Publications) Industrial Award recognized RBR, LTD, honoring their rich heritage of research and development.

The Lockheed Martin Award for Ocean Science and Engineering was presented to Francis Rowe in recognition of his tremendous work in Doppler technology. In 1979, he developed the first commercial Acoustic Doppler Current Profiler for remote measurement of vertical profiles of 3-axis currents. In 1981, he co-founded RD Instruments, serving as president for 24 years.

The highest accolade a member can receive within MTS is to be designated an MTS Fellow. Two members, Karen Kohanowich and William Kohnen, were recognized at the MTS Annual Meeting.

Also honored at the Annual Meeting was Oceaneering International, recognized with the MTS Outstanding Service Award. The MTS Ocean Pollution Committee, chaired by MTS members Daniel Esser and Ryan Morton was recognized as Outstanding MTS Committee. The MTS San Diego Section was recognized as Outstanding MTS Section for their exceptional OCEANS'13 Conference. The Alpena Community College Student Section was recognized with the Outstanding Student Section award.

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New vessels will create jobs, increase amount of cargo moved between Florida and Puerto Rico

U.S. Transportation Secretary Anthony Foxx announced the approval of a \$324.6 million Title XI loan guarantee to TOTE Shipholdings, Inc., to finance the construction of two container ships that will utilize LNG as propulsion fuel. The Title XI Loan Guarantee program promotes the growth and modernization of U.S. shipyards and the U.S. merchant marine by ensuring the U.S. vessels are manufactured in U.S. shipyards by U.S. workers. The vessels will be constructed at National Steel and Shipbuilding Company (NASSCO) in San Diego, California. Construction of the vessels will generate 600 jobs at NASSCO, support companies throughout the nation that supply the materials and equipment, and once in service, the two new vessels will provide for 60 new U.S. merchant mariner jobs. As dual fuel vessels, primarily operating with LNG, but with light diesel as needed, the vessels will be the most environmentally friendly containerships in the world, with engines that reduce the discharge of particulates to well below the levels mandated by the U.S. Environmental Protection Agency. Expected to be delivered in 2015 and 2016, TOTE will operate the vessels in Jones Act trade between the Port of Jacksonville and Puerto Rico, transporting containers, automobiles and other cargoes. The ships will provide greater efficiencies and increase the available volume of refrigeration equipment used for shipping, which is critical to ensuring pharmaceuticals, produce, and other products vital to the residents of Puerto Rico are delivered in the best possible condition. The Title XI program guarantees the repayment of loans, obtained in the private sector by ship owners, for the construction reconstruction, or reconditioning of vessels in U.S. shipyards. MARAD currently guarantees approximately \$1.7 billion in U.S. shipyard projects.

Maersk Line and MSC's vessel sharing agreement approved by U.S. FMC

On 10 July 2014, Maersk Line announced a 10-year vessel sharing agreement (VSA) with MSC Mediterranean Shipping Company S. A. on the Asia-Europe, Transatlantic and Transpacific trades. The U.S. Federal Maritime Commission (FMC) announced that it will allow the VSA to come into effect. The U.S. was the only remaining jurisdiction where the VSA had to obtain approval. Maersk Line and MSC can now implement the VSA as planned. "We are very pleased that the FMC has decided to allow our VSA with MSC to become effective. In our view, this is a win-win situation. Due to a larger and more cost efficient network, we can continue to provide our customers in North America, Europe and Asia competitive and reliable container shipping services. We look forward to starting operations on our new East/West network in January 2015," says Vincent Clerc, Chief Trade and Marketing Officer, Maersk Line. The VSA will result in cost savings through the deployment of larger and more efficient vessels and improved utilisation. In addition, we will be able to lower our CO₂ emissions. In total, the VSA has an estimated capacity of 2.1 million twenty-foot equivalent units (TEU) or approximately 185 vessels. Maersk Line will contribute around 55 % of the total capacity.

Austal opens San Diego operations office

Austal recently celebrated the opening of their San Diego, California operations office with a ribbon cutting ceremony. Joining Austal's representatives at the ceremony were Mayor Cheryl Cox of the City of Chula Vista; City Councilwoman Pamela Bensoussan; Michael Meacham, Director of Economic Development for the City; and Admiral Jose Betancourt, USN (Retired). The building, located at 745 Design Court, Suite 602, Chula Vista, CA 91911, is a 7,350 square-foot combined office/warehouse facility. Since Austal's business is expanding to include fleet support, establishing an office in this location will allow Austal's post-delivery support personnel to use the facility as a base of West Coast operations. As the expert on our ships, we are the logical choice to provide the expertise required for post-delivery operations. Austal has been contracted to build ten 127-m Independence-variant Littoral Combat Ships (LCS) for the U.S. Navy as prime contractor subsequent to a \$3.5 billion block buy in 2010.

Eastern Shipbuilding Group, Inc. completes Columbia sea trials



Eastern Shipbuilding Group, Inc. is pleased to announce that the Columbia (ESG Hull 981), a steel hull exact replica of the historic Gloucester Fishing Schooner, has completed her sailing trials. The sailing trials were held directly offshore of Panama City, Florida. Ninety-one years earlier, the original "Columbia" was officially measured on 27 October 1923 just before her race with the "Bluenose" by Raymond J. Milgate, a marine surveyor of Halifax, N.S.

The original Columbia was a 141-ft classic wooden hull Gloucester Fishing Schooner built at the historic A.D. Story shipyard of Essex, Massachusetts. The town of Essex was the center for North American Fishing Schooner construction. Designed by the innovative William Starling Burgess, the original Columbia was bred for speed. In the fall of 1923, the Columbia challenged the Bluenose, Canada's legendary schooner in the International Fishermen's Cup Races held offshore of Halifax, Nova Scotia. Nearly winning the title, the Columbia was narrowly defeated by the Bluenose and was one of the few American schooners to provide a real challenge to Bluenose.

Tragedy struck the promising young Columbia on 24 August 1927 near Sable Island, the notorious "Graveyard of the Atlantic," where she was lost with all hands in a gale.

Working with John W. Gilbert & Associates of Boston, Massachusetts, the design was re-engineered with a steel hull instead of wood. An engine room and staterooms were added to the design. Covey Island Boatworks of Lunenburg Nova Scotia built the rigging and spars. Blocks were fabricated by A. Dauphinee & Sons, and all the sails were constructed by Michelle Stevens Sailloft, LTD, both from the Second Peninsula, Lunenburg, Nova Scotia. Teak decking was completed by Teakdecking Systems of Florida.

For more information, visit www.easternshipbuilding.com.

Crowley receives first two heavy-lift deck barges in Singapore to support Asia-Pacific market

Crowley Maritime Corporation's solutions group announced that it has received the first two of potentially four new heavy-lift, ballastable deck barges (HDBs) for use by clients in the Asia-Pacific region. These new barges, which

will be contracted and managed from the company's recently opened Singapore office, allow Crowley to better support regional customers in the oil and gas mining; Engineering, Construction and Procurement Management (ECPM); and Engineering, Procurement, Installation and Commissioning (EPIC) industries who are increasingly embarking on large-scale onshore and offshore projects.

These new 400-ft long, 120-ft wide (122 m x 36.5 m) HDBs, named HDB 01 and HDB 02, are moored in Batam, Indonesia. They have 25-ft (7.6-m) side shells, which provide both the capacity and deck strength (up to 4,200 psf or 25 tons per sq. m) needed to accommodate larger drilling and production units used for deepwater offshore energy exploration and development. They are designed with more robust ballast systems to deal with high tidal ranges found in the region's load and discharge ports and have higher internal strength, which allows tolerance when ballasting to the seabed, fully loaded—where tidal movement can be problematic.

The barges are ABS classed, with an

approximate deadweight capacity of 20,000 metric tons. Both were designed by Crowley's Seattle-based, naval architecture and marine engineering subsidiary Jensen Maritime and were constructed in China by Seabridge Marine Contractors Ltd/Jiangsu Yangzijiang Shipbuilding Co., Ltd.

The company announced the opening of its Singapore-based project management and logistics solutions office in July. The office is located at 77 Robinson Road on the 34th floor of the Robinson Building and can be contacted at +65 6809 2160. Additionally, Crowley's wreck removal, marine salvage and emergency response subsidiary TITAN Salvage, based in Houston, also maintains a local presence with a 45,000 sq. ft site west of the city, allowing for more rapid emergency response in the region.

Crowley's solutions group is a Project Management Organization (PMOrg), providing marine solutions as a prime contractor for the energy and resource extraction industries.

For more information visit www.crowley.com/solutions.

Chouest announces B-Port

Officials representing the Edison Chouest Offshore family of companies have announced that construction has begun on a massive logistics support base and naval repair shipyard for its own vessels at the Port of Acu, located in São João da Barra in northern Rio de Janeiro-RJ, Brazil.

Chouest signed an agreement with Prumo Logistica in April 2014, and the two companies signed the initial lease for the port property. They recently amending the agreement to include a total area of 574,200 sq. m, if all future contract options are exercised.

"We are already investing to meet the current demand of our international customers and new bids in the industry, and our unit at the Port of Acu is essential for such," said Chouest Brazilian director Ricardo Chagas.

Construction work has been underway for several months, and the expected start of operations will take place during the first half of 2015.

For more information, visit www.chouest.com.

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Ocean News & Technology



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Damen launches first PSV 3300 for PROMAR

Offshore ship manager PROMAR recently marked a milestone with the sideways launch into the Danube of the first of its two Damen PSV 3300s on order. On delivery in February 2015, the Swiss company believes the 80-m Mamola Reliance will give them a valuable competitive edge in the West African oil and gas market.

Recently, Damen Shipyards Galati launched the PSV 3300 Mamola Reliance at an official ceremony at the yard in Romania. Damen platform supply vessels have become a familiar sight on the Danube since Damen introduced its range of high specification designs up to 6,300 deadweight tonnes.



In particular, the offshore market has responded enthusiastically to Damen's PSV 3300, which PROMAR's chartering supervisor Olivier Meynis de Paulin describes as modern, reliable, and at the forefront of technology.

The innovative and ambitious Swiss company expects to gain a valuable competitive edge in the West African market by employing these North Sea standard offshore vessels in the region, Mr. Meynis de Paulin explains. "In addition, the design and the level of comfort proposed by these vessels are definitely an important advantage."

For more information, visit www.damen.com.

NRC Canada looking for partners

The National Research Council Canada (NRC) is working to deliver technologies to improve the operability of marine vehicles while lowering the risks and costs associated with their operation. Their Marine Vehicles initiative is developing advanced control technologies that optimize ship operational efficiency to reduce fuel consumption and annual greenhouse gas production. With an experienced, professional staff, NRC improve technologies that enable safe vessel operations for offshore exploration and production to take place in managed ice conditions.

The NRC is actively seeking partners and collaborators to help reduce

upfront engineering design costs of inshore and Arctic vessels, support the development of technologies to reduce risks and costs, enable secure drilling in the Arctic, and enhance safety of people and the environment. Potential partners include ship builders and designers, fuel efficiency managers, ship operators, and oil & gas operators.

The NRC marine vehicles initiative has been developed to address the priority challenges of the Canadian marine transportation industry, frontier oil and gas industry and the Canadian shipbuilding and ship design industry. Collaborating with partners, the initiative will reduce the cost of marine transportation operations, foster safe and economic Arctic and offshore exploration and production, and reduce the cost of vessel design, increasing vessel design capacity in Canada.

The initiative will work to reduce fuel consumption on Canadian vessels using advanced navigational control systems integrated with motion stabilization systems, and developing vessel equipment and performance monitoring technologies; increase vessel operability through improved station keeping in managed ice conditions by integrating numerical ice models with an advanced control system model; and reduce the cost of vessel design and enhancing Canadian design capability by increasing the use of performance evaluation methods, physical and numerical, at the conceptual and preliminary design stages.

For more information, visit www.nrc-cnrc.gc.ca.

exactEarth receives \$19.2M AIS data contract from the Government of Canada

exactEarth announced that it has been awarded a C\$19.2 million contract by the Government of Canada to provide extensive advanced Satellite AIS data services. This contract covers a period of 18 months and supersedes and significantly augments the existing AIS data services contract that had been in place since 2012 with the Canadian Space Agency and Department of National Defence. The superseded amount is C\$1.8 million, making the net new order booking C\$17.4M.

Under the new contract, the full exactAIS® data service is made available to all Canadian government departments and is expected to be used for a wide range of applications including but not limited to wide-area maritime surveillance and security, customs and border protection, Arctic vessel traffic monitoring, fisheries and environment moni-

toring as well as search and rescue.

"We are very pleased that the Government of Canada has recognized the fundamental importance and value of AIS data to the management, surveillance, security and safety of global maritime traffic," said Peter Mabson, president of exactEarth. "Since the Government of Canada first adopted the exactAIS® service in 2010 their usage has grown exponentially—both in terms of number of users and number of applications. This is not only indicative of the value provided by this service but is also a testament to the quality and reliability of the exactAIS® data service. exactEarth's data service is currently being provided to more than 40 countries, and we are committed to continuing to provide leadership in service quality and customer support to all of our customers around the world."

For more information, visit www.exactearth.com.

Bulgarian Naval Academy installs VSTEP simulators

The Nikola Vaptsarov Naval Academy in Varna purchased a 360° Class A Full Mission Bridge simulator and an Incident Management Simulator for training of its naval and merchant marine students. The simulators were officially opened by the IMO Secretary-General Mr. Koji Sekimizu and the Dutch Ambassador in Bulgaria Mr. Tom van Oorschot during a ceremony.

The NAUTIS DNV Class A Full Mission Bridge (FMB) Simulator and the RescueSim Incident Management Simulator were delivered and installed at the Naval Academy in Varna by VSTEP and its Bulgarian partner NavySim.

The NAUTIS Full Mission Bridge simulator has a complete 360° surround horizontal field of view and is compliant with the Class A DNV Standards for Certification No. 2.14 for Maritime Simulator Systems and IMO model courses 1.22 and 1.32. At the request of the Naval Academy, VSTEP has also added advanced oil spill recovery and onboard fire training to the simulator.

The RescueSim Incident Management Simulator will be used to train and prepare for any thinkable incident, both on and offshore. It has specialized modules focusing on training for Shipboard incidents, port incidents, and industrial incidents as well as offshore incidents. The port of Varna was custom made in full 3D and implemented into the RescueSim simulator.

For more information, visit www.vstepsimulation.com.

From its state-of-the-art facilities in the historic town of Totnes, Devon, UK, Valeport designs, manufactures, and supports its range of oceanographic, hydrographic, and hydrometric monitoring instrumentation. From this single site, Valeport handles all development and manufacturing and after-sales support. Their on-site facilities include a CNC machine shop, anti-static assembly areas, and twin calibration laboratories as well as all service staff, R&D engineers, sales and marketing, and back-office functions.

An independent family-owned business, Valport was established in 1969 and has a worldwide customer base that includes environmental, defense, oil and gas, renewable energy, construction, dredging, and civil engineering sectors. It employs more than 80 people and works with a global network of agents to ensure a responsive and efficient worldwide service. With an established reputation for high quality, reliable, and innovative instrumentation, Valeport products have an industry-leading 3-year warranty. The dedicated service facility and modern calibration laboratories at Valeport provide a responsive repair and calibration service, and they offer a unique 12-month warranty on all serviced products.



Latest Addition to ROV and AUV Products

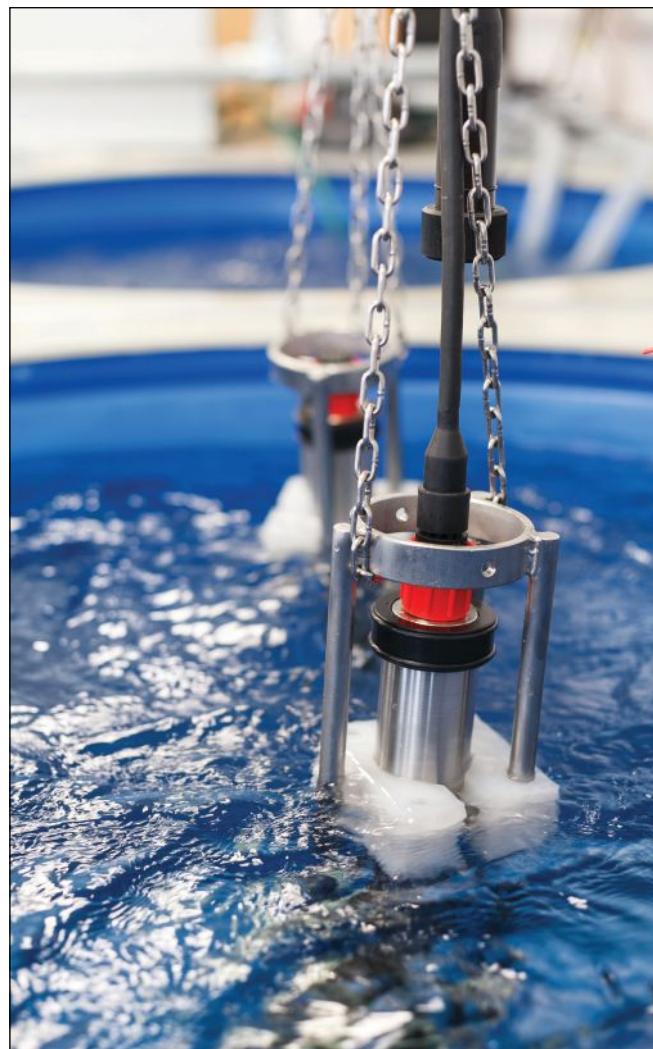
Valeport has released the smallest and most accurate sound velocity profiler (SVP) aimed primarily at AUV and ROV users that delivers high accuracy data. The UV-SVP is based on Valeport's miniSVS and offers a form factor designed for underwater vehicles where space is at a premium.

Measuring sound velocity, temperature and pressure, the UV-SVP uses Valeport's class-leading time-of-flight sound speed sensor, a PRT temperature sensor, and a 0.01% accuracy pressure transducer in a compact package weighing just 750 g in air. The lightweight titanium housing gives a depth rating to 3,000 m as standard. A wide range (9-30 VDC) isolated power supply and RS232 communications complete the package. The UV-SVP has already been adopted by Bluefin Robotics for integration into the Bluefin 9 AUV.

New Generation Operating Software

Valport's just released version of Datalog X2 was designed to interface, configure, and download data from both legacy and new products. Available free from www.valeport.co.uk, the software also includes bonus utilities. Datalog X2 ensures Valeport products will work across new software operating systems and, with an embedded Terminal X2 programme, it offers wider functionality to those not able to use other Terminal

packages such as Hyperterminal. Terminal X2 will work with any Valeport instrument that communicates via serial RS232, although functionality maybe limited with some older instruments. Datalog X2 and Terminal X2 have been tested on Windows XP, Vista 7, 8 and 8.1.



The Future

Valeport continues to invest significantly in R&D to develop exciting new product ranges and maintain Valeport's reputation as a strong, trusted brand supported by leading edge technology and the ethos of a family business that insists on putting the customer first.

For more information, contact Kevin Edwards, sales and marketing manager, +44 (0) 1803 869292 or sales@valeport.co.uk or visit www.valeport.co.uk.

NOAA Sea Grant awards \$15.9 M for projects to build resilient coastal communities

NOAA Sea Grant announced grants totaling \$15.9 million to support over 300 projects around the nation that help build resilient coastal communities and economies. Through university, state and other partnerships, Sea Grant Programs will supplement the federal funding with an additional \$7.9 million in non-federal matching funds, bringing the total investment to more than \$23.8 million. Community leaders in Hyde County, North Carolina, use the Vulnerability, Consequences and Adaptation Planning tool supported by Sea Grant to assist coastal communities be better prepared for severe storms and other hazards. The projects are part of a larger effort by President Obama's Administration to help reduce climate-related impacts on ocean, coastal and other resources and make our communities more resilient to climate change. Sea Grant's network of over 400 extension specialists will broadly integrate the research findings from these projects to help make their local coastal communities more resilient.

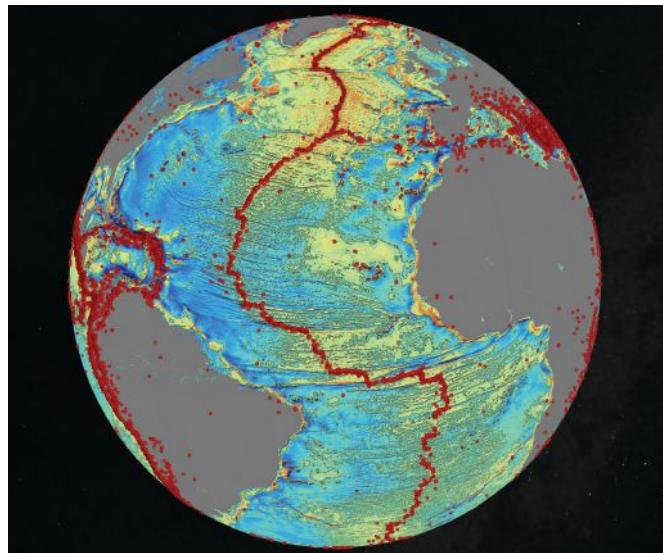
U.S. initiates prototype system to gauge national marine biodiversity

NOAA, NASA and the Department of the Interior's Bureau of Ocean Energy Management (BOEM) have joined together to support three demonstration projects that will lay the foundation for the first national network to monitor marine biodiversity at scales ranging from microbes to whales. The projects, to be funded at approximately \$17 million over the next 5 years, subject to the availability of funds, will demonstrate how a national operational marine biodiversity observation network could be developed. Such a network would serve as a marine resource management tool to conserve existing biodiversity and enhance U.S. biosecurity against threats such as invasive species and infectious agents. The three demonstration marine biological observation networks will be established in four locations: the Florida Keys; Monterey Bay and the Santa Barbara Channel in California; and on the continental shelf in the Chukchi Sea in Alaska. Marine biodiversity is a key indicator of ocean health and critical to sustaining natural resources such as fisheries. The three projects, selected from 19 proposals, will be established in different marine environments in U.S. waters to integrate existing observations ranging from satellite observations to DNA sampling and fill data gaps with new observations. The pilot research program is sponsored under the National Oceanographic Partnership Program, which facilitates joint funding of projects of mutual interest to different institutions in an effort to avoid duplication of research efforts.

National Ocean Sciences Bowl top two teams went on awards trip

Each year, the award for the top winning teams at the National Ocean Sciences Bowl Finals Competition is a trip that provides these teams with unique hands-on field and laboratory experience in the marine sciences. The trips expose students to science professionals and career opportunities, while enriching their understanding and stewardship of the ocean. These trips were made possible through funding from the IEEE Oceanic Engineering Society. The 2014 NOSB national champions from Boise High School (Idaho) were awarded a 6-day trip to Northern New England. The trip started in Portsmouth, NH where the team boarded a boat to Shoals Marine Laboratory on Appledore Island. The students spent 2 days touring the island, learning about the ecosystem as well as life on the island as an undergraduate or graduate marine science student. The team explored the island's intertidal environment and used transects to collect data on species coverage. They learned about research diving and the projects students at Shoals are conducting. After the island visit, the team toured the Chase Ocean Engineering Laboratory at the University of New Hampshire to see and learn about the cutting-edge equipment available to conduct research, including two wave tanks and 3-D mapping software. From there, the team headed to the University of Maine's Darling Marine Center for a day of hands-on work, including multiple cruises on Darling's research vessel to sample and ID benthic invertebrates and zooplankton, tours of the mudflats and the shellfish aquaculture facility, and an introduction to squid research. The trip wrapped up with visits to Bigelow Laboratory for Ocean Sciences and the Gulf of Maine Research Institute where researchers introduced students to their work and shared their diverse career paths.

New map exposes previously unseen details of seafloor



A marine gravity model of the North Atlantic. Red dots show locations of earthquakes with magnitude above 5.5 and highlight the present-day location of the seafloor spreading ridges and transform faults. This gravity information shows the details of the plate tectonic history of the rifting of these continents, including the subtle signatures of fracture zones that are currently buried by sediment.

(Credit: David Sandwell, Scripps Institution of Oceanography, UC San Diego)

Accessing two previously untapped streams of satellite data, scientists at Scripps Institution of Oceanography at UC San Diego and their colleagues have created a new map of the world's seafloor, creating a much more vivid picture of the structures that make up the deepest, least-explored parts of the ocean. Thousands of previously uncharted mountains rising from the seafloor and new clues about the formation of the continents have emerged through the new map, which is twice as accurate as the previous version produced nearly 20 years ago.

Developed using a scientific model that captures gravity measurements of the ocean seafloor, the new map extracts data from the European Space Agency's (ESA) CryoSat-2 satellite, which primarily captures polar ice data but also operates continuously over the oceans, and Jason-1, NASA's satellite that was redirected to map the gravity field during the last year of its 12-year mission.

Combined with existing data and drastically improved remote sensing instruments, the new map, described in the journal *Science*, has revealed details of thousands of undersea mountains, or seamounts, extending a kilometer or more from the ocean bottom. The new map also gives geophysicists new tools to investigate ocean spreading centers and little-studied remote ocean basins.

"The kinds of things you can see very clearly now are abyssal hills, which are the most common land form on the planet," said David Sandwell, lead scientist of the paper and a geophysics professor in the Cecil H. and Ida M. Green Institute of Geophysics and Planetary Physics (IGPP) at Scripps.

The authors of the study say the map provides a new window into the tectonics of the deep oceans. Previously unseen features in the map include newly exposed continental connections across South America and Africa, and new evidence for seafloor spreading ridges at the Gulf of Mexico that were active 150 million years ago and are now buried by mile-thick layers of sediment.

For more information, visit www.scripps.ucsd.edu.

Robot fleet observes marine life in the open ocean

A fleet of seven robotic vehicles were launched into the ocean off southwest England recently, in the most ambitious project of its kind in Europe. The vehicles are aiming to travel up to 300 mi over the next 20 days and will be collecting scientific data about ocean processes and marine life.

Co-ordinated by the National Oceanography Centre, the exercise includes battery-powered submarine gliders and novel surface vehicles that are powered by wind, wave and solar energy. All of the vehicles are unmanned, so the only communication with the fleet will be via satellite.

The vehicles will cross a series of physical boundaries in the ocean during their 3-week journey. These boundaries are called fronts, and they separate water masses of different properties. The targeted fronts off southwest UK provide ideal conditions for abundant plankton growth, which in turn can attract large numbers of fish, seabirds, dolphins and basking sharks.



The deployed vehicles are carrying a range of instruments for observing these animals. As well as measuring the temperature of the water and the weather conditions at the ocean surface, they can detect the density of plankton in the water, listen for clicks and whistles of dolphins and porpoises, and image seabirds using surface cameras. These data will help scientists map the distribution of the fronts and their associated fauna.

The exercise has brought together a wide range of partners, including scientists and engineers from research institutes and universities, commercial companies, government agencies, and also the UK Met Office and Royal Navy.

A control center has been set up for the duration of the project at the National Oceanography Centre in Southampton, although some of the vehicles will be operated by project partners from as far afield as California.

For more information, visit projects.noc.ac.uk/exploring-ocean-fronts.

NASA study finds Earth's ocean abyss has not warmed

The cold waters of Earth's deep ocean have not warmed measurably since 2005, according to a new NASA study, leaving unsolved the mystery of why global warming appears to have slowed in recent years.

Scientists at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California analyzed satellite and direct ocean temperature data from 2005 to 2013 and found the ocean abyss below 1.24 m (1,995 m) has not warmed measurably. Study coauthor Josh Willis of JPL said these findings do not throw suspicion on climate change itself.

"The sea level is still rising," Willis noted. "We're just trying to understand the nitty-gritty details."

In the 21st century, greenhouse gases have continued to accumulate in the atmosphere, just as they did in the 20th century, but global average surface air temperatures have stopped rising in tandem with the gases. The temperature of the top half of the world's oceans—above the 1.24-m mark—is still climbing, but not fast enough to account for the stalled air temperatures.

Many processes on land, air and sea have been invoked to explain what is happening to the "missing" heat. One of the most prominent ideas is that the bottom half of the ocean is taking up the slack, but supporting evidence is slim. This latest study is the first to test the idea using satellite observations, as well as direct temperature measurements of the upper ocean. Scientists have been taking the temperature of the top half of the ocean directly since 2005, using a network of 3,000 floating temperature probes called the Argo array.

"The deep parts of the ocean are harder to measure," said JPL's William Llovel, lead author of the study published Sunday in the journal *Nature Climate Change*. "The combination of satellite and direct temperature data gives us a glimpse of how much sea level rise is due to deep warming. The answer is not much."

To arrive at their conclusion, the JPL scientists did a straightforward subtraction calculation, using data for 2005-2013 from the Argo buoys, NASA's Jason-1 and Jason-2 satellites, and the agency's Gravity Recovery and Climate Experiment (GRACE) satellites. The remainder was essentially zero. Deep ocean warming contributed virtually nothing to sea level rise during this period.

For more information, visit www.nasa.gov.

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Fish moving poleward at rate of 26 km per decade

Large numbers of fish will disappear from the tropics by 2050, finds a new University of British Columbia study that examined the impact of climate change on fish stocks. The study identified ocean hotspots for local fish extinction but also found that changing temperatures will drive more fish into the Arctic and Antarctic waters.

Using the same climate change scenarios as the Intergovernmental Panel on Climate Change, researchers projected a large-scale shift of marine fish and invertebrates. In the worst-case scenario, where the Earth's oceans warm by 3°C by 2100, fish could move away from their current habitats at a rate of 26 km per decade. Under the best-case scenario, where the Earth ocean warms by 1°C, fish would move 15 km every decade. This is consistent with changes in the last few decades.

"The tropics will be the overall losers," says William Cheung, associate professor at the UBC Fisheries Centre and co-author of this study, published in ICES Journal of Marine Science. "This area has a high dependence on fish for food, diet and nutrition. We'll see a loss of fish populations that are important to the fisheries and communities in these regions."

Cheung and his colleague used modeling to predict how 802 commercially important species of fish and invertebrates react to warming water temperatures, other changing ocean properties, and new habitats opening up at the poles.

"As fish move to cooler waters, this generates new opportunities for fisheries in the Arctic," says Miranda Jones, a UBC Nereus Fellow and lead author of this study. "On the other hand it means it could disrupt the species that live there now and increase competition for resources."

This study follows previous research that looked at change in fisheries catch in relation to ocean warming since 1970.

For more information, visit www.ubc.ca.

Mangroves protecting corals from climate change

Certain types of corals, invertebrates of the sea that have been on Earth for millions of years, appear to have found a way to survive some of their most destructive threats by attaching to and growing under mangrove roots.

Scientists with the U.S. Geological Survey and Eckerd College recently published research on a newly discovered refuge for reef-building corals in

mangrove habitats of the U.S. Virgin Islands. More than 30 species of reef corals were found growing in Hurricane Hole, a mangrove habitat within the Virgin Islands Coral Reef National Monument in St. John.

Corals are animals that grow in colonies, forming reefs over time as old corals die and young corals grow upon the calcium carbonate or limestone skeletons of the old corals. Coral reefs make up some of the most biologically diverse habitats on Earth, and face many threats such as coastal pollution, dredging and disease. However, some of their most widespread threats involve warming ocean temperatures, solar radiation and increased ocean acidification.

It is from these threats that corals are finding refuge under the red mangroves of Hurricane Hole. Red mangroves, subtropical or tropical trees that colonize coastlines and brackish water habitats, have networks of prop roots that extend down toward the seafloor, and corals are growing on and under these roots.

When examining corals for this study, researchers found evidence of some species thriving under the mangroves while bleaching in unshaded areas outside of the mangroves. Boulder brain corals, for example, were found in abundance under the mangroves and were healthy, while many of those in unshaded areas a short distance away were bleaching.

For more information, visit www.usgs.gov.

Odyssey Marine Exploration and Morphogenesis discover biotech treasures in the deep

Morphogenesis Inc., a leading biotechnology and cancer-treatment research and development firm, has discovered substances with pharmaceutical properties beneficial to mankind from seafloor sediment samples that were recovered from the ocean bottom by Odyssey Marine Exploration, Inc. and Recovery Limited Partnership.

"Equally as exciting as the discovery of Gold Rush-era treasure is the rich source of pharmaceutical treasure that can be uncovered," commented Michael J.P. Lawman, PhD., president and co-founder of Tampa-based Morphogenesis Inc.

Dr. Lawman and his group have analyzed deep-ocean sand, mud and rock samples recovered from wreck sites by the renowned undersea exploration company, Odyssey Marine Exploration, and are in the process of identifying bacterial isolates and studying them for potential drugs that target cancer and infectious

diseases in both human and animal bio-pharmaceutical fields.

"We are obviously thrilled with the successful recovery of gold and silver, but the sediment we are recovering and delivering to Morphogenesis could hold its own valuable treasure," said Melinda MacConnel, Odyssey executive vice president and general counsel. "We are proud to provide these samples to Morphogenesis as their research and advancements in treatments for cancer and other diseases are amazingly impressive."

"In the harsh, forbidding deep-ocean environment, organisms are constantly evolving their own defense mechanisms, metabolic pathways and propagative stems in order to survive," observed Dr. Lawman. "Their unique capability and highly-evolved processes applied to sustain life under enormous pressure in extreme darkness and temperatures hold many secrets to improving the health and quality of life for humans and animals alike."

The sediment samples provided to Morphogenesis this month were recovered by Odyssey from the SS Central America, a side-wheel steamship that sank in 7,200 ft of water during a hurricane 160 mi off South Carolina in September of 1857. Odyssey is currently conducting an archaeological excavation of the shipwreck site in conjunction with a larger science program under contract for the Receiver of Recovery Limited Partnership.

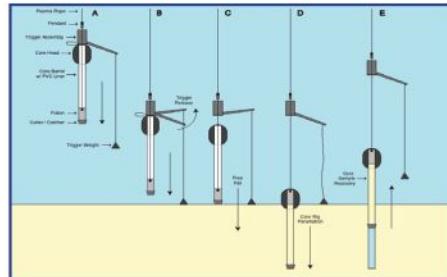
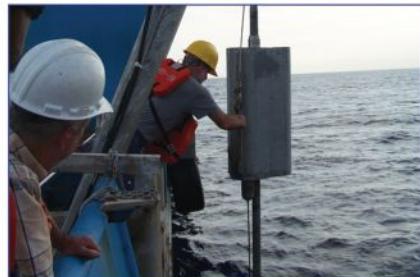
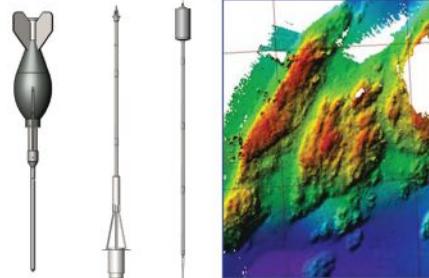
Seafloor sediment samples were also previously recovered from the ocean floor adjacent to the debris field around the wreck of the SS Republic, a Civil War-era side-wheel steamship that sank in 1,700 ft of water in a hurricane in October 1865 and discovered by Odyssey in 2003.

"Our R&D program with Odyssey Marine Exploration is particularly exciting because the treasure trove of products to be discovered is virtually infinite and has an unlimited potential to improve the quality of life on earth," declared Dr. Lawman.

Since the discovery of penicillin in 1929, more than 10,000 marine bacterial metabolites have been shown to have biological activity, and 100 of these are in use today as antibiotics and anti-cancer agents.

As of 2001, marine natural product chemists have determined the chemical structures of over 13,000 novel compounds with different natural products entering FDA sponsored clinical trials for cancers, infectious diseases, pain reduction and treatment of inflammatory diseases.

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archaeological and construction inspection

Wave and tidal energy worth £217M to Scots economy
 Scotland's flourishing wave and tidal energy sector has invested more than £217 million in the country to date, with £31.8 million spent in the last 12 months alone, a new Scottish Renewables report shows. Crucially, the study revealed almost two-thirds (62%) of the growing industry's supply chain is Scottish. Marine energy-in which Scotland is recognized as the world leader-has been forecast to be worth £50 billion by 2050. Scottish Renewables' Marine Milestones report, which details the level of investment by the sector, was launched at the organization's Marine Conference in Inverness. Seventeen organizations working in marine energy were surveyed for the Marine Milestones report. While providing updates on the progress of cutting-edge machines and projects, the firms were asked to provide investment statistics for compilation.

Global offshore wind market to soar by 2020

With more countries utilizing offshore wind potential, the global offshore wind power market is expected to increase more than fivefold from 7.1 GW in 2013 to 39.9 GW by 2020, representing a Compound Annual Growth Rate (CAGR) of 28%, according to research and consulting firm GlobalData. The company's latest report states that the global offshore wind energy space registered substantial growth between 2006 and 2013, rising from 0.9 GW in 2006 to 7.1 GW in 2013, at a higher CAGR of 33.9%. Of this, 1.6 GW came online in 2013, driven mainly by the UK, Germany, Denmark and Belgium. Offshore wind is now expected to become one of the largest renewable power market segments by 2020. The UK, Germany and China will contribute significantly towards this, thanks to a number of projects currently in the planning and construction stages. Swati Singh, GlobalData's Analyst covering Power, said, "Offshore wind power is increasingly being explored for its high yield, due to stronger and more consistent winds compared to onshore, and the scope that this provides for the construction of large-scale projects. An additional benefit is the fact that future offshore wind power technology development will ensure a decline in the average cost per megawatt, although overall project costs are expected to rise in countries with wind farms planned in deeper water and further from the shore." According to Singh, the main obstacles that will hinder market growth are environmental concerns, as well as the lack of skilled personnel and sophisticated technology catering to offshore requirements. "Despite these barriers, GlobalData expects offshore wind's share in the global wind power market to climb from 2.2% in 2013 to 6.1% by 2020, as more countries eye the advantages of this renewable energy technology," he said.

MOU signed for first offshore wind project in India

A Memorandum of Understanding (MOU) for setting up a Joint Venture Company (JVC) for the undertaking of the first demonstration offshore wind power project in India along the Gujarat coast has been signed by the Indian Ministry of New and Renewable Energy (MNRE), National Institute of Wind Energy (NIWE), and a consortium of partners consisting of National Thermal Power Corporation (NTPC), Power Grid Corporation of India Ltd (PGCIL), Indian Renewable Energy Development Agency (IREDA), Power Finance Corporation (PFC), Power Trading Corporation (PTC), and Gujarat Power Corporation Ltd (GPCL). The JVC will undertake a detailed feasibility study based on the inputs received from the pre-feasibility studies and take the necessary steps for the implementation of the first offshore demonstration wind power project. The first planned demonstration offshore wind power project along the Gujarat coast will be of about 100-MW capacity. It has been proposed that a subsidy would be provided for setting up the infrastructure between the offshore wind site and the mainland, including financial support for carrying out studies such as wind resource assessment, environment impact assessment, oceanographic survey and bathymetric studies. The ministry also would assist in obtaining clearances involved during the implementation of the project. Wind power development onshore has reached to commercial stage in India and is the fastest-growing renewable energy option. India also has around 7,600 km of coastline, which offers great potential for offshore wind power development.

Pelamis technology shortlisted for Ireland's first wave farm project



Pelamis Wave Power has been selected as one of just two technology developers to progress to the next stage of a competitive procurement process with Irish utility ESB for the deployment of Pelamis wave machines on the west coast of Ireland.

WestWave is a 5-MW capacity project led by ESB, which has secured €23.5m of NER300 funding from the European Commission. With proposed delivery of the wave farm by 2018, WestWave will be Ireland's first wave energy project.

Pelamis Wave Power has been involved in the WestWave project as a technology partner since the first WestWave Memorandum of Understanding was signed in 2010 and has been contributing expertise and information to the collaborative project since then, along with other technology developers and industry partners working together to develop Ireland's wave power industry.

For more information, visit www.pelamiswave.com.

Welsh company announces deal with major energy supplier

Tidal Energy Ltd, the developer of DeltaStream, Wales' first full-scale tidal power generator, has announced an important deal with EDF Energy, marking a significant milestone in the commercial development of tidal power in the UK.

DeltaStream will be among the world's first grid-connected demonstration devices to generate green, sustainable and predictable tidal power. The device, developed by tidal stream technology company Tidal Energy Ltd (TEL), was unveiled in August at Pembroke Port by The First Minister of Wales, the Rt. Hon. Carwyn Jones AM. It will be installed in Ramsey Sound, Pembrokeshire, and is expected to begin generating electricity for Welsh homes shortly afterwards.

The Power Purchase Agreement (PPA) announced guarantees that EDF Energy, the UK's largest producer of low carbon electricity, will purchase electricity and renewable certificates from the device for the first year of the project at a pre-agreed price, ensuring that it will be able to generate revenue for its owners, TEL, from both the electricity market and the Government's Renewables Obligation scheme. The Government has earmarked tidal power as a priority technology, allocating a subsidy of 5 ROCs for each unit of electricity generated, in order to fast-track its commercial development.

Power Purchase Agreements not only provide certainty of income for projects such as DeltaStream, but also provide a clear and useful benchmark of revenue for future investors and lenders. As such, the value of the contract to the DeltaStream project will extend well beyond its first year.

For more information, visit www.tidalenergyltd.com.

Oregon tidal power project not to advance

Snohomish County Public Utility District (PUD) will no longer pursue its pilot tidal energy research project in Admiralty Inlet, west of Whidbey Island.

"The PUD and its funding partners have worked for years to get regulatory clarity regarding the requirements and associated costs to enable a well-informed decision," said PUD general manager Steve Klein. "After 8 years in the federal, state and local permitting process and a decision by the U.S. Department of Energy to not share the rising costs of the next stage of the project, we cannot justify going forward. The tidal project, however, remains worthwhile to pursue on behalf of the nation to further the potential development of marine renewable energy."

The tidal project has not relied on ratepayer funding, but instead funding has come primarily from federal-based grants and in-kind contributions from various partners. Some additional funding came from the sale of excess renewable energy credits (environmental attributes) from the PUD's wind power projects. The research has been a partnership with several contributing participants, including the Department of Energy (DOE), the University of Washington (UW), the Bonneville Power Administration (BPA), Pacific Northwest National Laboratory (PNNL) and OpenHydro, a tidal energy equipment manufacturing company.

While the project will not move forward without additional research partner funds, a great deal of value has been derived from the study process over the past 8 years. The University of Washington developed numerous underwater monitoring devices that have application to a variety of ocean related activities. In addition, much of the work has been focused on the baseline conditions of the sea floor and related usage by various fish and marine mammals. These data have greatly enhanced the collective knowledge of the environment and species that inhabit Puget Sound. The results have helped inform tidal energy researchers worldwide.

The PUD has acted as a national leader in the research and development of renewable energy sources. The majority of its energy comes from clean, renewable BPA hydropower. Other renewable sources include wind energy, hundreds of customer-installed solar units, a biomass project fueled by wood-waste, biogas facilities tapping landfill gas and cow manure, and smaller hydropower projects in Sultan and Monroe. The utility has researched a diverse mix of other sources, including tidal and geothermal, as well as energy storage alternatives.

For more information, visit www.snopud.com.

First next generation Siemens 6-MW turbine erected

The first of 35 Siemens 6-MW turbines has been successfully erected at the Westermost Rough offshore wind farm, a joint venture between DONG Energy (50%) and its partners Marubeni Corporation (25%) and the UK Green Investment Bank (25%).

The Westermost Rough offshore wind farm marks the first time that the next generation Siemens 6-MW turbine will be used on a commercial scale—an important step on DONG Energy's cost of energy reduction strategy. The wind farm will have a capacity of 210 MW, producing enough electricity to power approximately 210,000 homes.

It is expected that the turbine installation on Westermost Rough will be completed in first half 2015. Offshore work is being carried out by one of the world's most advanced installation vessels, the Sea Challenger, owned by A2SEA.

Situated approximately 8 km off the Holderness coast, the Westermost Rough site is one of two offshore wind farms that DONG Energy is currently constructing in the UK along with West of Duddon Sands on the west coast. The wind farms, which will be operational in 2015 and 2014 respectively, represent more than 500 MW of green electricity that will be added to the UK Grid.

Construction is being managed from DONG Energy's office in the Fish Dock, Grimsby on Britain's east coast, by a team of around 50 people. Work is also currently underway onshore at the Royal Dock in Grimsby to construct the permanent home for the operations and maintenance team who will service the wind farm over its 25-year lifetime.

For more information, visit www.dongenergy.com.



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Masdar invests in offshore wind farm

Masdar announced its partnership with Norway's Statoil and Statkraft in the Dudgeon 402 MW offshore wind farm project, off the Norfolk coast in Eastern England.

Masdar acquired a 35% stake in the project from Statoil. This leaves Statoil retaining a 35% stake and remaining operator of the project, with the remaining 30% owned by Statkraft.

Masdar's stake in Dudgeon is the company's second major investment in the UK offshore wind energy market. The company also has a 20% stake in the 630-MW London Array project, the world's largest offshore wind farm.

When completed, Dudgeon will provide clean, reliable energy to approximately 410,000 households in the UK. Offshore construction is scheduled to start in 2016 and the project is expected to be fully operational in late 2017.

The decision to become a partner in Dudgeon underscores Masdar's belief that the UK represents a major market for investment in offshore wind energy. It also extends the UAE's leadership as



a major provider of energy. Dudgeon adds to Masdar's broad portfolio of existing clean energy projects. This includes one of the world's largest CSP plants—the 100-MW Shams 1 in the UAE—and the 117-MW Tafila wind farm in Jordan, alongside numerous other projects. Collectively, they illustrate how the UAE is leading the Middle East's response in accelerating the deployment and adoption of clean energy around the world.

The UK is the world's leader of installed, offshore wind power capacity. The UK government recently agreed to financially support eight new, large-scale renewable energy projects that will power millions of homes—five of

them being offshore wind farms. The projects are expected to add 4.5 GW of clean energy capacity to the grid—enough to power more than three million homes. The Dudgeon wind farm is one of the five wind farms being built.

In January, Siemens was awarded two contracts, valued at £516 million for the engineering, supply, assembly, commissioning and service of Dudgeon's 67 wind turbine generators.

For more information, visit www.masdar.ae.

ORPC's RivGen® Power System demonstration project success

ORPC is pleased to announce it has concluded its highly successful RivGen® Power System demonstration project in the Kvichak River at the remote river village of Igiugig, Alaska, 275 mi southwest of Anchorage.

ORPC's RivGen® Power System is a 25 KW system designed to reduce and stabilize the cost of power in remote communities located near rivers and tidal estuaries that currently use diesel fuel for power generation.

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For more information, visit www.orpc.co.

Meygen financial close completed

Atlantis resources, owner of the world's largest planned tidal stream energy project, MeyGen Limited (MeyGen), has announced that all conditions have been satisfied under the terms of the funding package announced on 21 August 2014 to enable the drawdown of funding for the project. Financing to fully fund Phase 1A of the MeyGen project has now been fully committed and funds will be released to suppliers and construction contractors to enable the commencement of construction.

A total of £51.3 million has been secured from syndicate members comprising the UK government, through the Department of Energy and Climate Change (DECC), Scottish Enterprise, Highlands and Islands Enterprise (HIE), The Crown Estate (TCE) and Atlantis.

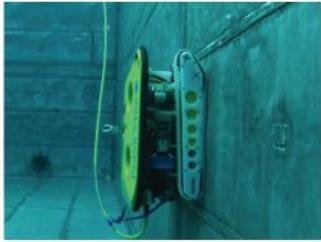
Of the total financing package, an aggregate of £17.5 million is in the form of senior project finance funding, comprising a £7.5 million project finance debt facility from Scottish Enterprise through its Renewable Energy Investment Fund (REIF) administered

by the Scottish Investment Bank, and £10.0 million of funding from TCE. A further £13.3 million is being provided in the form of direct grants to MeyGen from DECC and HIE.

The balance of £20.5 million is being provided as cash equity investment into Tidal Power Scotland Holdings Limited, the holding company of MeyGen, which has been established to invest in MeyGen and other tidal power projects in Scotland. Of this equity investment, £10.8 million is to be subscribed by Atlantis with Scottish Enterprise, through REIF, having committed to subscribe the balance of equity amounting to £9.7 million, with all such equity to be subscribed in a series of tranches over the coming months.

The first stage (Phase 1A) of the project will comprise the installation of four 1.5-MW turbines offshore as well as the construction of the onshore infrastructure to support the project. Three of the turbines will be supplied by Andritz Hydro Hammerfest and one Lockheed Martin-designed turbine supplied by Atlantis.

Construction is expected to commence in the fourth quarter of 2014



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In addition, Atlantis announced that MeyGen recently signed a 10-year Power Purchase Agreement with Smartest Energy that will guarantee revenue for the project, both for the electricity supplied to the grid and the 5 Renewable Obligation Certificates that the project will receive for each megawatt hour of electricity generated.

For more information, visit www.atlantisresourcesltd.com.

Australian companies complete design of wave energy project

BioPower Systems (BPS) and WorleyParsons have jointly announced that the two companies have completed the final engineering and design for a 250-kW grid-connected wave energy project in Victoria, Australia.

The project is being funded by the Australian Government, through the Australian Renewable Energy Agency (ARENA), the Victorian Government, through the Energy Technology Innovation Strategy (ETIS), and by BioPower Systems.

The unique bioWAVE comprises a

vertically-oriented frond-like structure that sways back and forth beneath the ocean swell. It is fully automated, but on-board control systems can be accessed at any time through a fiber-optic communications line that is bundled within the subsea power cable. The system self-regulates to provide smooth and consistent power directly to the grid. Importantly, during extreme wave conditions it will automatically assume a "safe" position lying flat against the seabed. This reduces the structural design requirements (and hence cost) while maintaining reliability.

The bioWAVE will be fitted with a 250-kW O-Drive module, which is a self-contained and detachable system capable of converting irregular hydraulic power into on-grid electricity. The O-Drive has been developed by BioPower Systems for wave, tidal and wind energy applications. Factory testing is complete and the O-Drive is ready to be deployed with the bioWAVE for ocean trials.

The engineering designs and installation methods for the project recently underwent an independent review by DNV GL, the world's leading technical

advisor and certification body for the offshore industry. The reviews confirmed the overall completeness and technical viability of the project to the satisfaction of all funding stakeholders.

The bioWAVE is currently scheduled for construction during 2014, with installation in the ocean to occur in 2015.

The bioWAVE consists of a structure that sways back and forth beneath the waves, integrated with a self-contained module (O-Drive) that converts the resulting oscillating forces to electricity by pressurizing hydraulic fluid, which is used to spin a generator to produce electricity for delivery to the grid via a subsea cable. The technology is designed to operate in depths of 25 to 40 m. The critical O-Drive module has been fully tested at its commercial scale of 250 kW. The O-Drive is designed to be detached and easily retrieved for onshore servicing. The energetic wave climate of the Southern Ocean is ideal for performance testing of the 250-kW pilot-scale bioWAVE, which will be independently assessed and validated for potential commercial development.

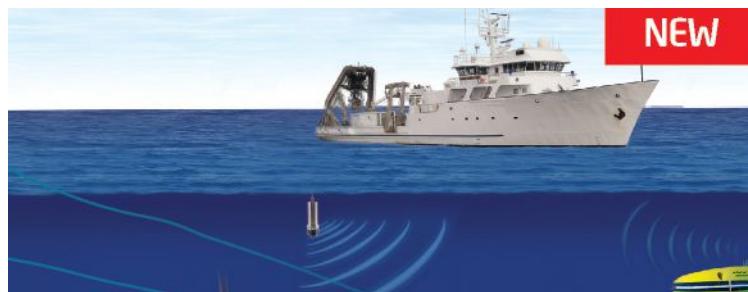
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Boeing and Liquid Robotics sign multi-year agreement to develop solutions for maritime surveillance

Boeing and Liquid Robotics, the market leader in unmanned ocean vehicles, signed a global, multi-year teaming agreement for collaboration on product development, maritime services and operational deployments. The initial focus of the collaboration will be to develop total integrated solutions for anti-submarine warfare, maritime domain awareness and other maritime defense applications. The agreement combines Boeing Defense, Space & Security's vast experience developing and fielding multi-layered intelligence, surveillance, and reconnaissance solutions with Liquid Robotics' award-winning autonomous ocean technology. "We look forward to teaming with Boeing to expand domestic and international opportunities that combine Boeing's expertise in aircraft systems and integrated defense solutions with Liquid Robotics' expertise in persistent unmanned ocean vehicles," said Gary Gysin, president and CEO of Liquid Robotics. "Together, Boeing and Liquid Robotics will provide customers an integrated, seafloor-to-space capability for long-duration maritime defense."

Coast Guard, NOAA sign fleet agreement

Senior leaders from the U.S. Coast Guard and NOAA signed a Fleet Plan and Officer Exchange memorandum of understanding (MOU) at a ceremony at U.S. Coast Guard Headquarters. Coast Guard Vice Adm. Charles Michel, deputy commandant for operations, and NOAA Vice Adm. Michael Devany, deputy under secretary for operations, were the signing officials for the joint letter of promulgation. The Coast Guard and NOAA have collaborated for over 200 years. The Fleet Plan supplements the Cooperative Maritime Strategy (CMS) that was signed in February 2013 and establishes a course of action to guide cooperation in the operation and maintenance of marine and aviation platforms. This direction also expands valuable inter-agency work currently underway, such as repairing NOAA ships at the Coast Guard Yard and advancing Arctic preparedness through collaboration with the Coast Guard's Arctic Shield test and evaluation program. The Officer Exchange MOU supports both the CMS and the Fleet Plan by allowing the exchange of officer personnel for the purpose of sharing professional knowledge, expertise, doctrine, and for the professional development of officers. Coast Guard officer candidates and the NOAA Corps already train together at the Coast Guard Academy in New London, Connecticut.

Sound & Sea Technology, Inc. awarded NAVFAC EXWC contract for ocean engineering support services

Sound & Sea Technology, Inc. was awarded an indefinite delivery indefinite quantity, multiple award contract totaling \$99,000,000 for worldwide ocean services by Naval Facilities Engineering Command (NAVFAC) Engineering and Expeditionary Warfare Center (EXWC), located in Port Hueneme, California. The term of the contract will be up to 42 months. Tasking under the contract is expected to cover a wide range of capabilities, including harbor/port security systems, specialized and fleet moorings, underwater instrument array design, installation, inspection and repair (magnetic silencing facilities), submarine cable projects, ocean system concept development, design, analysis, provide hardware, installation, and repair, ocean work platform support, heavy load handling engineering, offshore structure/buoy projects, seafloor engineering projects, marine power systems, ocean energy generation projects, underwater construction tools, environmental investigations and permitting support for ocean projects, other ocean engineering support, nearshore and across-the-beach load and logistics handling systems, and nearshore and inshore naval expeditionary mission systems. This contract is the fourth award that SST has received from NAVFAC, which comprises over 15 years of continuous support, \$125 million dollars in task orders, and over 330 projects successfully executed on nearly every continent. "We've had a long and successful relationship with the U.S. Navy and we are very pleased to continue that support under this new contract," said Judith Meggitt, president. "We look forward to continuing to work with our partners to accomplish the EXWC mission."

The future USNS Fall River (JHSV 4) delivered



The Navy accepted delivery of Joint High Speed Vessel (JHSV), the future USNS Fall River from the Austal USA shipbuilder, 15 September. The delivery marks a major milestone, the official transfer of the vessel from the shipbuilder to the Navy. USNS Fall River is the U.S. Navy's fourth JHSV.

"Today, the Navy received a tremendous asset," said Strategic and Theater Sealift Program Manager Capt. Henry Stevens. "The addition of Fall River to the fleet will enhance our forward presence and ability to bolster global security from the sea by quickly transporting significant resources to a wide array of geographic regions throughout the world in time of need."

Joint High Speed Vessels are versatile, non-combatant transport ships built from a commercial design with limited modifications for military use. These ships enable the fast, intra-theater transport of troops, military vehicles and equipment. Each JHSV is capable of transporting 600 short tons 1,200 nmi at an average speed of 35 kts.

The unique characteristics of JHSVs include a versatile off-load ramp and flight deck for helicopter operations. This further enhances port access and the Navy's operations in littoral areas.

The USNS Fall River has a core crew of 22 civilian mariners who operate and navigate the ship as part of the U.S. Navy's Military Sealift Command. The ship is designed to be used in support of a variety of different missions.

"The speed, cargo capacity and all around flexibility are game changing for military, relief, and humanitarian operations," said Stevens. "The ship's flight deck, ramp and shallow-draft provide options for employment across a wide spectrum of operations, particularly in austere regions of the world."

Delivery of Fall River follows the completion of its builder's and acceptance trials in July. The program continues to progress with JHSV 5's launch, which is expected to occur in the coming weeks. All 10 ships of the JHSV class are under contract with Austal USA.

As one of the Defense Department'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. Delivering high-quality war fighting assets—while balancing affordability and capability—is key to supporting the Navy's Maritime Strategy.

For more information, visit www.navy.mil.

Royal Navy of Oman takes delivery of steel clipper

The Royal Navy of Oman formally accepted ownership of its new sail training vessel at a ceremony at Damen Schelde Naval Shipbuilding in Vlissingen, the Netherlands. The three-masted steel clipper, named RNOV Shabab Oman II, will sail the world's oceans as an ambassador for Oman, demonstrating the country's centuries-old maritime tradition. The 87-m vessel is Damen's third such clipper.

Among the guests at the ceremony were representatives of the Royal Navy of the Netherlands and Omani diplomats. Speaking on behalf of the Omani Royal Navy, Commodore Khalifa said, "This new vessel will sail around the world with a message of peace and friendship. Thank you to Damen for building this magnificent ship for us."



The Dutch flag was subsequently lowered from the stern spanker line to be replaced by the Omani Naval ensign while a local orchestra played the Omani national anthem.

The acceptance ceremony follows the successful completion of sea trials in late July that took place in North Sea coastal waters around Vlissingen.

For more information, visit www.damen.com.

NATO and Japan conduct first ever joint counter-piracy drill

NATO and Japan conducted a joint counter-piracy drill in the Gulf of Aden on 25 September to test communications and tactical skills. It was the first such joint naval exercise between the two maritime fleets.

"By synchronizing our activities and sharing information we stand a much better chance to secure the waters in the region and thereby keeping the sea lanes safe and secure," said Commodore Aage Buur Jensen, the commander of NATO's counter-piracy mission, Operation Ocean Shield.

The exercise involved the Japanese destroyer JS Takanami and the Danish

frigate HDMS Ebern Snare, currently the flagship of the NATO mission. The drills included a range of tasks, including the boarding and securing of ships and communication procedures.

NATO ships have patrolled the waters off the Horn of Africa since 2009, part of broader international efforts to crack down on Somali-based pirates who threaten world shipping. NATO's Ocean Shield operation as well as European Union and other counter-piracy missions have significantly reduced attacks in the region. However, pirates continue to have the intent and capacity to attack ships.

Japan is a valued partner for NATO. In May 2014 NATO Secretary General Anders Fogh Rasmussen and Prime Minister Shinzō Abe of Japan signed an agreement to further political dialogue and practical cooperation between NATO and Japan, including in the areas of counter piracy, disaster relief and humanitarian assistance.

For more information, visit www.nato.int.

Newest Virginia-class submarine named USS Vermont

Secretary of the Navy Ray Mabus hosted a ship-naming ceremony 18 September to announce that SSN 792, a Virginia-class attack submarine, will bear the name USS Vermont. Mabus named the submarine to honor the long-standing partnership its namesake state has had with the Navy.

Vermont's Lake Champlain was the site of two critical historic naval battles. Under the command of Commodore Benedict Arnold, the 1776 Battle of Valcour Island had a profound impact on the outcome of the Revolutionary War, and during the War of 1812, the U.S. defended Lake Champlain against invasion from Great Britain in the Battle of Plattsburgh.

This is the first ship named for Vermont since 1920 when the second USS Vermont was decommissioned.

Virginia-class submarines have enhanced stealth, sophisticated surveillance capabilities, and special warfare enhancements that enable them to meet the Navy's multi-mission requirements.

They have the capability to attack



targets ashore with highly accurate Tomahawk cruise missiles and conduct covert long-term surveillance of land areas, littoral waters or other sea-based forces. Other missions include anti-submarine and anti-ship warfare, mine delivery and minefield mapping. They are also designed for special forces delivery and support.

Each Virginia-class submarine is 7,800-tons and 377 ft in length, has a beam of 34 ft, and can operate at more than 25 kts submerged. It is designed with a reactor plant that will not require refueling during the planned life of the ship, reducing lifecycle costs while increasing underway time. The submarine will be built in partnership with General Dynamics/Electric Boat Corp. in Groton, Connecticut.

For more information, visit www.navy.mil.

Fourth National Security cutter delivered to Coast Guard

The Coast Guard accepted delivery of the fourth National Security cutter, Hamilton, in Pascagoula, Mississippi on 15 September. Hamilton will be the first of two NSCs to be homeported in Charleston, South Carolina.

The cutter is now officially an asset of the Coast Guard and custody is turned over from the shipyard to its commanding officer and crew.

The Hamilton is the sixth cutter in Coast Guard history named after Alexander Hamilton, who as the first Secretary of the Treasury prompted Congress to create the Revenue Marine, a precursor to the modern Coast Guard.

The first three NSCs—Coast Guard Cutters Bertholf, Waesche and Stratton—are performing operations from their Alameda, California homeport. The fifth NSC, James, is scheduled to be delivered in the summer of 2015. The keel laying for the sixth, Munro, is scheduled for later this fall, with delivery scheduled for 2016. The seventh, Kimball, is under production, and long lead time materials for the eighth, Midgett, have been ordered.

The Legend-class NSC is the largest multipurpose cutter in the Coast Guard fleet and is replacing the 378-ft high endurance cutter, which has been in service since the 1960s. The NSC is 418 ft long and has a top speed of 28 kts and a range of 12,000 nmi. It is capable of performing 60- to 90-day patrols.

For more information, visit www.uscg.mil.

Singapore and Chinese navies conduct bilateral naval exercise

The Republic of Singapore Navy (RSN) Formidable-class frigate RSS Intrepid and the People's Liberation Army (Navy) (PLA(N)) Jiangkai II-class frigate Yulin conducted a bilateral naval exercise on 4 September. The exercise comprised naval helicopter cross-deck landings, maneuvering drills and gunnery firings.

Prior to the exercise, RSS Intrepid conducted a port call at Ma Xie Naval Base in Zhanjiang, China from 30 August to 3 September 2014. During the port call, RSS Intrepid hosted a reception for personnel from the PLA(N) South Sea Fleet. In addition, personnel of both navies engaged in exercise planning and ship visits.

Chief of Navy Rear-Admiral Lai Chung Han was also in China for a working visit from 1 to 3 September 2014, in conjunction with the port call. He earlier met with the PLA(N)'s Political Commissar Admiral Liu Xiaojiang and Commander of PLA(N) South Sea Fleet Vice-Admiral Jiang Weilie in Beijing and Zhanjiang, respectively.

Singapore and China enjoy warm and friendly defense ties. The professional and personal interactions at the leadership and working levels have enhanced mutual understanding and friendship between the RSN and the PLA(N).

For more information, visit www.mindf.gov.sg.

Development Squadron 5 receives first unmanned undersea vehicle

Commander, Submarine Development Squadron Five (CSDS 5), Detachment UUV, took delivery of Large Training Vehicle 38 (LTV 38), an unmanned undersea vehicle.

The delivery makes LTV 38 the first UUV to join the vehicle inventory used by Detachment UUV. Once a few final operational preparations are completed over the next few weeks, it will be ready to hit the water for both capabilities tests and proficiency training.

LTV 38 was originally developed for the Sea Stalker program. The vehicle is 27-ft in length and 38-in. in diameter, and was originally assembled in 2008 by Penn State University's UUV land-based test facility. It underwent its first

series of operational tests shortly after its assembly and made its first operational deployment on the Arleigh Burke-class destroyer USS Bainbridge (DDG 96).

As a UUV, LTV 38 is able to perform at a maximum depth of 1,000 m for up to 72 hours. It is designed as a full-pressure hull vehicle, capable of both line of sight and over the horizon communications, and can also conduct limited autonomous contact avoidance maneuvers via acoustic sensors while anchored and such missions are conducted and controlled remotely.

UUVs allow naval submarines to safely gain access to denied areas with revolutionary sensors and weapons. These areas may be denied based on unacceptable risks to a submarine such as extremely shallow water, very poor acoustic conditions, or mined waters. UUVs provide unique capabilities and extend the "reach" of naval platforms while reducing the risk to the submarine and its crew.

The use of unmanned vehicles in the undersea environment is projected to grow for the Navy.

For more information, visit www.csp.navy.mil.

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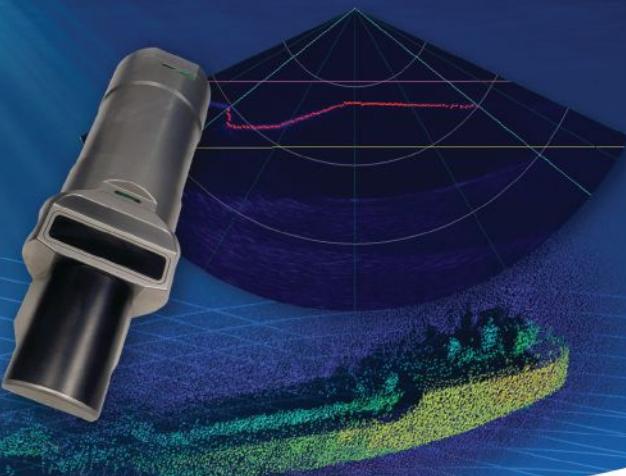
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SESAM – 45 YEARS OF PIONEERING SOFTWARE

Engineers have relied on DNV GL's Sesam software for strength analysis of maritime and offshore structures for more than 45 years. It is used in all phases of a structure's lifecycle — from concept to design, analysis, requalification, modifications, and decommissioning.

Sesam software has a history that began with the discovery of oil in the North Sea and with the first advances in computer technology in the 1960s. Created as a joint research project between Det Norske Veritas and the Norwegian University of Science and Technology in Trondheim, it was the first software for structural analysis of maritime and offshore structures based on the revolutionary finite element methodology previously used in the aerospace industry. Since 1969, Sesam has been owned and developed by DNV GL.

For the first time, engineers could do virtual design by running complex calculations that would give them answers to how the structures would be affected by and respond to the powerful dynamic forces in the North Sea such as wind and wave impact. The calculations were so complex, with millions of linear equations, that the mainframe computers of the day sometimes took more than a week to complete the analyses.

Expansion of Sesam Software

Sesam software has expanded over the years, with DeepC, GeniE, HydroD, and Sima as the main modeling tools, accompanied by software tools covering many areas, such as hydrostatic and hydrodynamic analysis with seamless load transfer to structural strength and fatigue analysis, mooring and riser analysis, marine operations, and design analysis of offshore pipelines.

Sesam has been through decades of customer- and market-driven development based on the accumulated knowledge of DNV GL experts and has consistently been a pioneer in its field. Today, with an increased focus on advanced 3D visualization, user-friendliness, and cost efficiency in all stages of the design, Sesam's powerful graphics, fast modeling speeds, accuracy, and ability to handle frequent and significant changes in the design process are well known.

Sesam software is used for fixed structures, ships, and offshore floaters including their risers, mooring lines, pipelines,

umbilicals and subsea equipment. It represents the latest generation of design and analysis software for construction, transportation, installation, and in-place condition of fixed structures, including offshore wind tower foundations. It can model all types of floaters, such as barges, FPSOs, semi-submersibles, TLPs, spar buoys, bulk carriers, oil tankers, cargo ships, and container ships. It handles small, local models up to large, global models for nominal strength check.

Structural analysis, including load effects from hydrodynamic analysis and non-linear pile analysis, gives engineers the needed results, whether this involves deflections, forces, stress-sets, code check results, or fatigue.

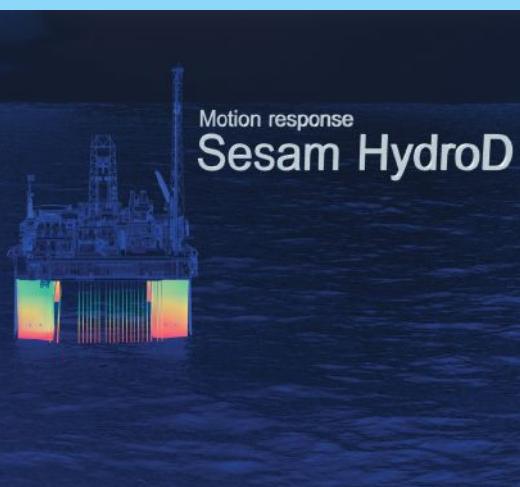
One Common Model

Its unique concept based on "one common model" allows the use of the same data model in all stages, growing the model with increased complexity as needed. The same engineering platform used across disciplines enables flexibility and collaboration among engineers, including training and concurrent engineering. Sesam software is designed to integrate data, making it easy to re-use existing data from other finite element analyses or computer-aided design (CAD) systems.

Sesam has pioneered "concept modeling" where the connections between structural components such as beams and plates are maintained when changes are made in the design, ensuring that connectivity between structural components is automatically updated.

When Sesam was created 45 years ago, it revolutionized the design and strength analysis methods used by maritime and offshore engineers. Today, Sesam is the most comprehensive software package in the market and enables users to efficiently design the strongest and safest solutions of the future.

Watch "The world of Sesam" video online at dnvgl.com/sesam.





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OFFSHORE INDUSTRY

Deep and ultra-deepwater capex growth to continue: Infield Systems

Deepwater and ultra-deepwater capital spending is forecast to grow at about 8% between 2014 and 2018, according to Infield Systems.

Infield's recently released Global Perspectives Deep and Ultra-deepwater Market Report to 2018 sees Brazil as a key driver, cornering 32% of the total deepwater capex during the period. However, there are other driving factors to consider, including FLNG technology, with capex demand expected from FLNG-FPSO projects within the Middle East, Australasia, and Southeast Asia. Offshore Europe deepwater capex should rise, with the possible South Stream pipeline development and Norway's Aasta Hansteen development.

The traditional "deepwater triangle" of West Africa, Latin America, and the Gulf of Mexico will be joined in the forthcoming 5 years growth in deep and ultra-deepwater development elsewhere in the world, Infield reported.

Significant increases in deepwater activity are expected offshore India with developments such as the Krishna-Godavari UD project and the continued development of Reliance's Dhirubhai fields and offshore Malaysia.

Among operators, the 5-year period is expected to see Petrobras' dominance in market share decrease as independent operators such as Anadarko and Noble increase capex. Altogether, Infield Systems expects a total of 81 operators to direct capital expenditure towards the deep and ultra-deepwater sector over the 2014-2018 timeframe—an increase from 55 operators over the previous 2009-2013 period.

Labor income from industry to hit \$60B in 2025: IHS Global Insight

A study from IHS Global Insight, commissioned by the Energy Equipment and Infrastructure Alliance, finds total labor income generated by employment in industries across many aspects of the energy sector supply chain could reach \$60 billion in 2025. That's a 46% increase from 2012.

"America's rise as an energy superpower is creating an economic ripple effect of fast-paced growth, higher wages, and new jobs," said Kyle Isakower, vice president of economic

policy for the American Petroleum Institute. API released its own survey of 30,000 vendors and supporting businesses in every state that helps deliver affordable energy to U.S. consumers.



Kyle Isakower

much oil production, like Florida, could see as much as \$1 billion in economic gains by 2020 because of the boom.

Shale oil and natural gas developments are behind exponential growth in economies in states like North Dakota. A corresponding increase in violent crime there has prompted state authorities to issue an appeal for federal assistance.

WoodMac: EOR could boost U.S. tight oil output 3 mmbbl/d by 2030

Additional volumes from enhanced oil recovery (EOR) expected to come on stream after 2020 could boost tight oil production in the United States by 1.5 to 3 mmbbl per day by 2030, up to 25% more oil than is being forecasted today, according to analysis from Wood Mackenzie.

"Growth in U.S. tight oil continues to impress as development technology and techniques have yet to mature beyond adolescence," said Phani Gadde, WoodMac senior North America upstream analyst.

WoodMac said that these technologies are in early test phases and not yet commercial, but indicators suggest up to a 100% increase in recovery rates.

"This is going to happen, like horizontal drilling and (hydraulic fracturing), leading to another step-change in production technology," noted Skip York, WoodMac principal analyst, Americas downstream, midstream and chemicals.

The crude oil export ban, however, could delay such advancement, York cautioned. Excessive production could drive down U.S. oil prices by more than \$30/bbl compared with their international benchmarks, stranding barrels in reservoirs and leading to no net change in U.S. tight oil volumes.

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Panama Canal expansion will allow larger tankers with greater volumes

The expansion of the Panama Canal would allow passage of larger ships carrying nearly a quarter more crude oil through the route, the U.S. Energy Information Administration said.

That could have broad implications for the United States should it decide to remove restrictions for exporting crude oil and liquefied natural gas, as it would lower the price for fuel shipped from the country and therefore make it more attractive to buyers.

However, the Panama Canal, an important route connecting the Pacific Ocean to the Caribbean Sea and the Atlantic Ocean, currently has a limited role in global crude and petroleum product transport. Currently, it can only fit ships carrying between 400,000 and 550,000 bbl of light sweet crude through it.



Oil tanker in the Gatun Locks.

But the remodel, scheduled to open in late 2015, would enable ships large enough to haul as much as 680,000 bbl of crude to enter the canal. Also, roughly 80% of the world's liquefied natural gas tankers could pass through it as well, compared with just a small fraction today, according to the EIA.

Larger vessels or vessels that are slightly over the draft limit can use the Trans Panama Pipeline, which runs parallel to the canal and has both the loading and unloading points for a complete transfer, but doing so adds to shipment costs.

Meanwhile, the debate over whether to end the 39-year-old near-ban on oil exports is heating up. For example, supporters have pushed the Obama administration to act faster to green-light natural gas exports to nations that lack a free-trade agreement with the United States. So far, three projects have all the necessary federal permits to ship the fuel to such countries.

OFFSHORE INDUSTRY HEADLINES

Research & Development • Environmental Assessment • Discovery

Nearly 30,000 businesses support U.S. oil and gas industry: API

The American Petroleum Institute (API) has unveiled a new vendor survey that demonstrates the diverse array of suppliers, service providers, and other small and midsized businesses supporting the U.S. energy renaissance.

"Oil and natural gas companies are only one part of a much larger economic success story that is creating job growth up and down the supply chain," said API upstream group director Erik Milito. "From the folks who make work gloves to environmental consultants, these businesses represent just a small cross-section of the opportunities created by America's energy revolution."

API's 2014 vendor survey lists nearly 30,000 operators, contractors, service companies, suppliers, and other vendors that support oil and natural gas operations in every state and the District of Columbia. It includes individual state profiles, which detail job gains and salary information for industry-related work, as well as information on survey participants organized by congressional district.

"Thanks to innovations in horizontal drilling and hydraulic fracturing, America's potential as an energy superpower is growing, and businesses of all types are growing with it," said Milito.

"Even outside of major oil and natural gas producing areas, the industry is creating jobs that pay about double the average salary for all industries. Overall, as of 2011, the oil and natural gas industry directly or indirectly supported 9.8 million U.S. jobs, and many more are expected over the next decade."

Ebola threat may hit oil and gas E&P offshore West Africa

Oil and gas exploration and production in parts of West Africa are under increasing risk due to the failure to contain the Ebola virus, according to consultants GlobalData.

John Sisa, lead analyst covering upstream oil and gas in the Sub-Saharan region, said many of the exploration and production operations depend heavily on expatriates working and living in the region. Some operators may withdraw personnel and halt activities, he suggested, until the Ebola situation is controlled in the countries presently most affected.

"Although most of the drilling in Guinea, Sierra Leone, and Liberia occurs offshore in water depths ranging from 984 to 14,764 ft, almost all oil workers are based in onshore stations, exposing them to Ebola," Sisa said. "Oil workers who are local nationals and return to their onshore homes in dangerous, infected zones could



bring the virus to the drillships and platforms when reporting for duty."

Sisa said Nigeria was the only country in the region with sufficient resources to contain the outbreak, but even there a risk remains of an uncontrolled spread of the virus. As the world's eighth largest crude oil producer, there is a substantial threat of supply disruption should the virus spread further in the country, he pointed out.

"Almost 80% of Nigeria's total oil production comes from offshore areas, while the remaining portion comes from onshore areas considered high-risk Ebola zones," he said. "If the outbreak spreads



further, it could potentially disrupt all Nigerian onshore oil production, equivalent to \$40 million per day."

In the worst case, Sisa said, Ebola may spread to East Africa, endangering operations in Kenya, Mozambique, Tanzania, and Uganda.

U.S. seeks to strengthen helicopter safety on fixed offshore facilities

The Bureau of Safety and Environmental Enforcement (BSEE) has published an advanced notice of proposed rulemaking in the Federal Register soliciting public comments on improving the safety of helideck and aviation fuel operations on fixed offshore facilities. This is the most recent step in BSEE's continued efforts to strengthen safety on the Outer Continental Shelf (OCS).

"We know that transportation accidents account for the majority of fatalities on the OCS, and that helicopter-related accidents are a significant concern," said BSEE director Brian Salerno. "We are looking at our regulations to ensure that the aviation-related areas over which we have jurisdiction have the benefit of rigorous safety standards."

Specifically, BSEE is seeking comments on whether to incorporate in its regulations certain industry and international standards for the design, construction and maintenance of offshore helidecks, as well as standards for aviation fuel quality, storage and handling. The bureau is also soliciting information on past accidents or other incidents involving helidecks, helicopters or aviation fuel on or near fixed OCS facilities.

Comments can be submitted through the Federal eRulemaking Portal: www.regulations.gov.

Subsea equipment market seen reaching \$35.84B in 2018: analysis

Increasing demand and decreasing reserves in existing wells are two main factors driving the adoption of subsea equipment in the oil and gas industry. An analysis by Frost & Sullivan goes on to predict the subsea equipment market in 2018 to reach \$35.84 billion, up from \$23.13 billion in 2013.

"Technological advancements that have led to higher production and safer, cleaner processes encourage energy companies to move further offshore, thus widening the scope of the global subsea equipment market," said Frost & Sullivan Energy and Environmental Industry analyst Rajalingam Chinnasamy.

"As the subsea factory of the future is expected to include a complete production system on the seafloor, the prospect for equipment vendors is secure."

The report also points to shortage of skilled labor, vessel crews, and equipment as constraining factors. Other short- and medium-term constraints include the high costs of subsea projects and reluctance on the part of manufacturers to invest in research and development.

One way suppliers may succeed in the market is to establish niche areas of technology, according to the report.

"Mergers, acquisitions and partnerships will help subsea equipment suppliers leverage expertise across the board and penetrate the market successfully," Chinnasamy said.

Chinnasamy added: "Major participants must especially partner with or acquire hardware suppliers and software providers to widen their product and service portfolios."

Industry makes huge advances in reducing methane emissions: EPA

Reported methane emissions from the petroleum and natural gas systems sector have decreased by 12% since 2011, with the largest reductions coming from hydraulically fractured natural gas wells, which have decreased by 73% during that period, according to data recently released by the U.S. Environmental Protection Agency (EPA).

"We're proud to see our industry's efforts demonstrated in EPA data that show emissions are far lower than EPA projected just a few years ago, even as U.S. production has surged," said Howard Feldman, director of regulatory and scientific affairs for the American Petroleum Institute (API).

Average U.S. crude oil production climbed 1% to 7.45 mmbbl per day in 2013 from 6.5 mmbbl per day in 2012, while U.S. gas production grew 1.5% year-to-year to 70.18 bcf per day from 2012's 69.15 bcf per day, the U.S. Energy Information Administration said.

Feldman said U.S. oil and natural gas companies are leading the charge to reduce emissions by making investments in new technology developed by the industry.

"Creating good paying jobs and growing the economy go hand in hand with our efforts to reduce emissions both voluntarily and in compliance with EPA emissions standards that take effect in January," he added. "Thanks in large part to innovations like hydraulic fracturing and horizontal drilling, America is leading the world in producing natural gas and reducing greenhouse gas emissions."

Greenhouse gas emissions from more than 8,000 large U.S. industrial sources totaled 3.18 billion tons of carbon dioxide equivalent in 2013, about half of total domestic GHG emissions, EPA said in its fourth annual GHG inventory.

The amount was 20 million tonnes, or 0.6%, more than 2012's total, driven largely by increased use of coal for power generation, EPA said in the report. Power plants remained the largest single industrial source of GHGs, with more than 1,550 emitting more than 2 billion CO₂ equivalent tons, 13 million more than in 2012 and roughly 32% of the US total.

Petroleum and natural gas systems were the second largest stationary source in 2013, reporting 224 million tons of GHG emissions, 1% less than in 2012, EPA indicated. Refineries, the third largest source, reported 177 tons, a 1.6% year-to-year increase. EPA noted that oil and gas methane emissions are expected to see further reductions as its 2012 oil and gas standards are fully implemented.

Wild Well Control unveils Singapore capping stack

Wild Well Control, Inc., a Superior Energy Services company and a global leader in firefighting and well control, has unveiled its new subsea capping stack for response to a global deepwater well control incident.

The subsea capping stack, located in Singapore, is a part of Wild Well's comprehensive emergency response system, WellCONTAINED™, which provides experienced personnel and equipment to plan, prepare and respond to global subsea well control events. Based on nearly four decades of conventional and subsea well control experience, the WellCONTAINED system not only includes the physical capping stack and equipment but also technical planning, advanced engineering and response training.

The Singapore capping stack is Wild Well's second unit; the first capping stack unit is located in Aberdeen. The full intervention system at each location includes a capping stack, debris removal shears, hardware kits for the subsea application of dispersant and inhibition fluids at a wellhead and ancillary equipment.

The new 18-3/4-in. 15K capping stack is available for a variety of offshore conditions and designed for subsea use up to 10,000 ft. The system is maintained in a state of readiness and can quickly be transported by sea or air.

"Since we now have two capping stacks geographically located in the northern and southern hemispheres, our team at Wild Well can provide an enhanced level of response to a client's well site," said Freddy Gebhardt, president at Wild Well. "Our flexibility to deploy from two strategic locations now mitigates any potential delays due to deployment constraints and adds another level of assurance to the operators' drilling programs while positioning Wild Well as the global leader in subsea well control."

Wild Well said it responds to 80% of international well control incidents and is a key resource for many of the world's largest oil and gas operators, assisting not only during emergency events, but also in the planning and preparedness of drilling programs.

Dozens of companies form to curb oilfield methane emissions: study

An increased focus on reducing oilfield methane emissions has helped the environment, saved oil and natural gas producers money and created a new, thriving industry, according to a new report from the Environmental Defense Fund and Datu Research.

In the paper "The Emerging U.S. Methane Mitigation Industry," researchers reported that at least 76 companies (more than half small businesses) from over 500 different locations across 46 states now either make equipment designed to reduce methane emissions or



Wild Well Control's Singapore capping stack.

provide emission reduction services.

Ten states had the highest concentration of facilities: Texas, Oklahoma, Colorado, Pennsylvania, Louisiana, California, Wyoming, Illinois, Ohio and New Mexico. These states stand to gain the most from future growth associated with this industry, according to the report.

"To help the oil and gas industry meet these challenges, dozens of companies from different backgrounds have developed technologies and services to reduce methane emissions," the report stated.

"The result is a new and rapidly emerging methane mitigation industry," the report added.

Aker Wayfarer wins 5-year contract from Petrobras

Aker Solutions' subsidiary Aker Oilfield Services has won a contract worth \$465 million over five years from Petrobras to provide subsea intervention services offshore Brazil from the Aker Wayfarer vessel. The contract will start within the fourth quarter of 2016 and has a five-year option extension. Aker will at the end of September become part of Akastor, an oil-field services investment company that will be one of two companies formed as part of the announced separation of Aker Solutions.



Intervention vessel Aker Wayfarer.

The Aker Wayfarer vessel will be outfitted at a yard in Norway to become a deepwater subsea equipment support vessel (SESV). It will have a fiber-rope deployment system, deck skidding systems and a subsea orientation equipment system, allowing it to install and retrieve subsea trees and modules, including subsea structures and manifolds. The Aker Wayfarer will be the second vessel of this type operated by Aker in Brazil. Skandi Santos, the first vessel of this type operated by Aker, has performed SESV services successfully for Petrobras since starting operations in March 2010.

Teledyne lands materials, engineering support contract

Teledyne Technologies Inc. said its Teledyne Oil & Gas group was awarded a contract by Aker Solutions for materials and engineering support covering subsea electrical and optical wet mate interconnects. Shipments are expected to commence late in the fourth quarter of 2014 and continue throughout 2015. In April 2014, Aker Solutions announced the award of a contract from Total to provide a subsea production system for the Kaombo Block 32 development, located approximately 150 km off the coast of Angola. The project includes the delivery of 20 subsea manifolds, 65 vertical subsea wellsets, and associated controls and work over and tie in systems. "Teledyne Oil & Gas has a well established partnership with Aker Solutions," said Robert Mehrabian, chairman, president and chief executive officer of Teledyne. "We are honored and pleased to be selected to play a significant role in the success of the Kaombo project."

GE secures subsea equipment contract from Petrobras

GE Oil & Gas has secured a subsea equipment contract worth more than \$300 million from Brazilian energy firm Petrobras. Under the contract, GE will deliver the subsea manifold systems for Petrobras' pre-salt fields, located offshore Brazil in water depths up to 6,500 ft. The deal requires GE to deliver eight manifolds that will be designed with retrievable injection modules to allow water-alternated gas injection for up to four wells and system integration with subsea controls. GE will manufacture the contract's equipment in Brazil as part of its commitment to comply with local content needs. "This contract illustrates how GE Oil & Gas has expanded its portfolio of solutions to support development of Brazil's pre-salt fields," said Rod Christie, chief executive officer for GE Oil & Gas' subsea systems. "Our company has developed solutions that are standardized around a series of pre-approved modules to meet our customers' specific local needs." GE signed a frame agreement in 2012 to supply subsea wellheads for pre-salt fields. Petrobras said the most productive oil wells in Brazil are in the pre-salt fields. Located in the Sapinhoá field, in the Santos Basin, the best well in the country produces an average of 34,000 bbl per day.

Shell to invest billions developing Cardamom, to yield 50,000 boe/d

Shell said it's making a significant, multi-billion dollar investment to develop its major Cardamom oil and gas field in the deep waters of the Gulf of Mexico. The Cardamom project is expected to produce 50,000 boe per day at peak production and more than 140 mmboe over its lifetime.

"Technological advances in seismic imaging and drilling have allowed us to both discover and access this new field," said Marvin Odum, Shell's upstream Americas director.

"This is another sizeable deepwater investment by Shell that strengthens energy supplies to the USA. It will also secure employment for more offshore workers."

He added: "Shell's rigorous global safety standards underpin our approach to deep-water exploration and production."

Shells's exploration plan for Cardamom

(Shell interest 100%) was the first to receive approval since the lifting of the federal government's moratorium on drilling in the U.S. Gulf. As a result of the final investment decision, Shell said it will move ahead with further development drilling and installing undersea equipment.

Shell discovered the Cardamom reservoir in 2010 using advanced seismic technology that was able to produce improved images versus traditional seismic methods. The discovery was confirmed by drilling a well from Shell's Auger platform that broke records for length and depth. The exploration wells were drilled more than 4 mi below the seabed.

Production from Cardamom will flow through the Auger platform, minimizing the offshore footprint by using existing infrastructure, the company said.

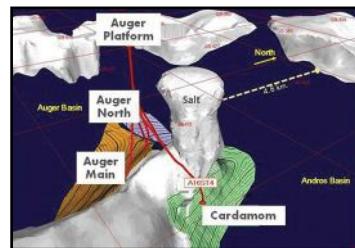
The development of the Cardamom field is the latest step in Shell's deepwater energy production activities in the U.S. Gulf. Perdido, the world's deepest offshore production facility, came on-stream in 2010. Later that year, Shell announced the decision to go ahead with a second platform in the Mars B field in the U.S. Gulf.

Shell said its final investment decision for Cardamom is in line with the company's continued drive to increase global oil and gas production.

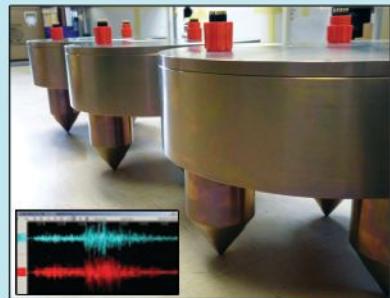
"The rapid progress from discovery of the reservoir to the launch of development plans represents Shell's ability to move forward with projects of major value," Shell said.



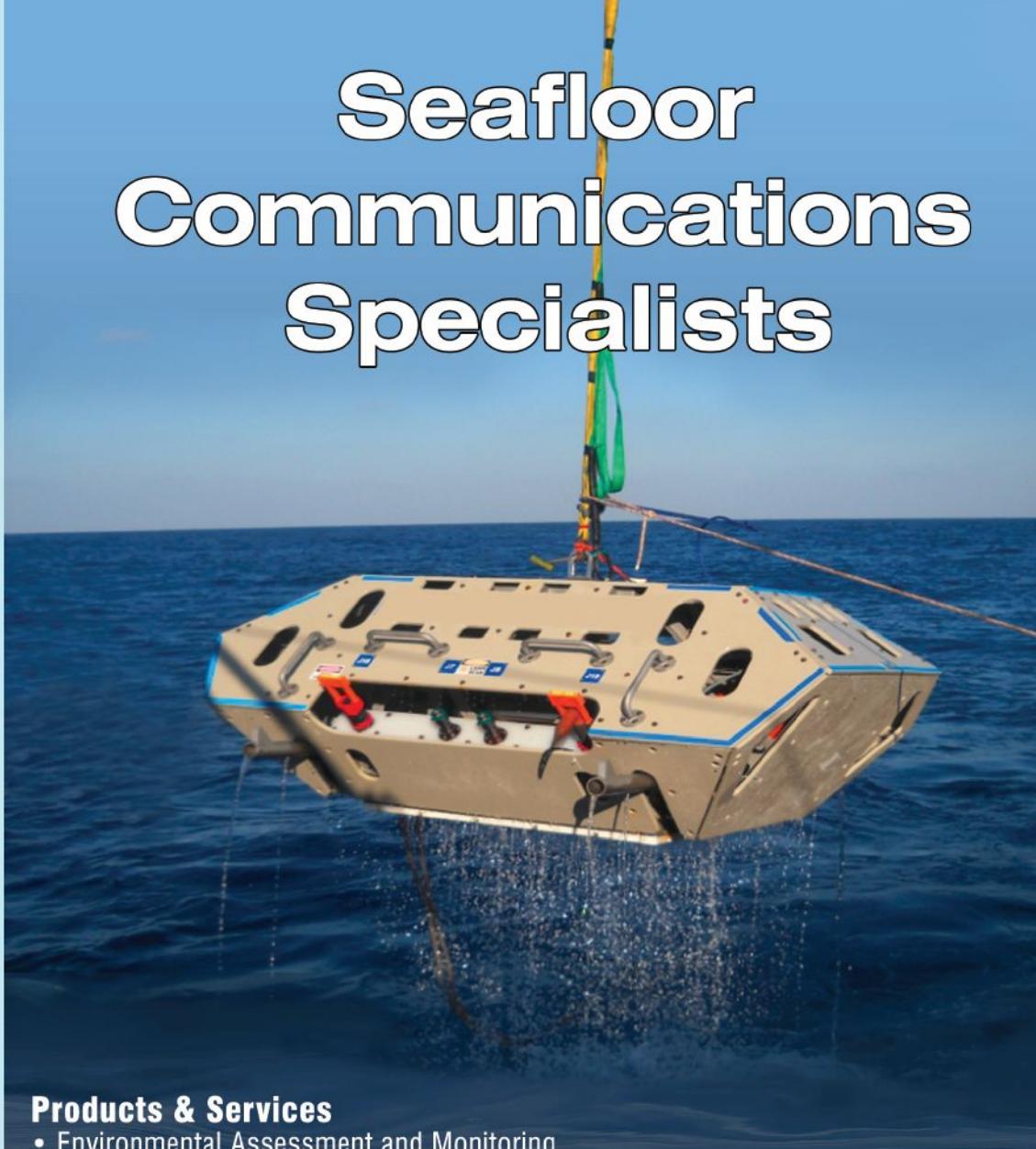
Cardamom to produce through Auger.



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Offshore Communications Backbone

The OCB is a modular seafloor communications network that is directly connected to the Internet. Clients can provide and control their own sensors and data outputs, or CSnet can provide a suite of sensors from the surface to the seafloor with data directly forwarded to the client's onshore facilities. CSnet's OCB allows for individual component and end to end networked testing of power and communications functionality during the buildup and pre-deployment phases, ensuring a cost effective and successful installation. The OCB represents a proven network module that has been designed, constructed and tested, eliminating upstart time and cost. Each OCB module is expandable and so can be configured to accommodate large or small applications at a predictable cost.



McDermott CSV108 is expected to join the fleet in 2015 (photo: Business Wire).

McDermott christens construction support vessel - CSV108 - in Spain

McDermott International, Inc. has christened its construction support vessel CSV 108 at Metalships & Docks shipyard in Vigo, Spain. The shipyard hosted a naming ceremony in September attended by Tony Duncan, executive vice president, subsea for McDermott and Manuel Rodríguez, chairman of Metalships & Docks, SAU, local dignitaries and project staff.

"We expect the CSV108 to join the fleet in 2015, once the final deck equipment has been installed," said Duncan. "The vessel will service the immediate needs of the subsea market as a construction support vessel, and should our client requirements for pipelay require additional capacity in the future, the versatility of CSV108 allows us to convert it for pipelay services."

CSV108 was to immediately transit to Norway for the installation of two port-side active heave compensated cranes for the final stage in its construction.

Knutsen NYK Offshore Tankers orders two DP-2 shuttle tankers

Knutsen NYK Offshore Tankers has entered new long-term charters with a subsidiary of BG Group to provide shuttle tanker services in Brazil. The contract with BG will be serviced by two new-build Suezmax-size DP-2 shuttle tankers to be constructed by Hyundai Heavy Industries in South Korea.

Upon delivery in 2016, the vessels will operate under long-term time charters. If BG declares all extension options, the vessels could operate under the charters for up to a maximum of 20 years.

For a period of 1 year BG will also have the option to increase the number of shuttle tankers to three or four in total at similar terms. Pursuant to the omnibus agreement between Knutsen and KNOT Offshore Partners LP requiring KNOT to offer to KNOP vessels with contracts longer than 5 years, KNOP will have the

option to acquire the vessels at fair market value from Knutsen following the charterer's acceptance of the vessels.

Rig overcapacity forces Statoil to temporarily lay up COSL Pioneer

Due to overcapacity in its rig portfolio, Statoil said it will lay up the COSL Pioneer rig in the fourth quarter of 2014. The rig was on assignment at the Visund field in the North Sea and was scheduled to complete this work at the end of September.

In the beginning of July, Statoil also announced that the drilling rig Scarabeo 5 would be temporarily suspended. Scarabeo 5 was to be taken out of operations at the end of September for the rest of the year.

Statoil said that COSL Pioneer has demonstrated consistent, high efficiency in drilling operations. The rig is contracted until 2016.

Salamander plans further Bualuang field expansion offshore Thailand

Salamander Energy said the converted Suksan Salamander FSO has entered service on the Bualuang field in the B8/38 concession in the Gulf of Thailand.

Use of this vessel, which replaces an FPSO, along with new power and processing modules should bring operating cost savings of up to \$25 million per year, Salamander said.

The company continues planning and design work for a third platform (Bualuang Charlie) to develop newly identified resources and will submit a program for sanction later this year.

During the first half of this year, 10 development wells were completed from the Bravo platform following the 11 drilled in 2013. As 16 slots were already in use, four more were added to the well bay and three have already been used to increase the number of producing wells.

This year's intake has been conventional horizontal wells in the T4 and T2 reservoirs in both the main field and the East Terrace. Salamander said production in the East Terrace in particular has bene-

fited with lower water cuts and higher well deliverability. The company now plans to drill various dual lateral production wells with a view to increase the number of production drain points per slot. The first of these wells has just been completed and is entering production.

Salamander added that it has identified a new exploration prospect, the Southern Culmination, south of the East Terrace, which it aimed to drill during the fall.

FPSO Cidade de Ilhabela headed from Brasa shipyard to sea trials



The FPSO Cidade de Ilhabela.

The FPSO Cidade de Ilhabela has sailed from the Brasa shipyard for sea trials ahead of service on Petrobras' Sapinhoá field in the Santos basin presalt block BM-S-9.

Of the FPSO's 18 modules, Brasa fabricated 10, with a total weight of around 13,779 tons. It also performed integration of the hull and topsides using its own heavy-lift crane barge. According to Cidade de Ilhabela's co-owner and operator SBM Offshore, the vessel has passed all necessary audits and inspections and has sailed to an anchorage for sea trials and preliminary acceptance.

SBM's joint venture partners are Queiroz Galvão Óleo e Gás and Mitsubishi. They will operate the vessel under a 20-year lease contract for Petrobras and its block partners BG and Repsol YPF.

Brasa will next receive the twin FPSOs Cidade de Maricá and Cidade de Saquarema.



The converted Suksan Salamander FSO.

Deep Sea Mooring wins service contract with Repsol off Norway

Global energy company Repsol has selected Deep Sea Mooring (DSM) to provide a range of mooring services for its drilling operations on the Norwegian Continental Shelf. DSM will be responsible for marine engineering and supplying the mooring equipment. The company will also assist in offshore operations, including both pre-lay and rig move.

"Winning this contract further proves that major energy companies appreciate our experience, robust technology and competence in delivering complete mooring systems for the harsh environment of the North Sea," said Åge Straume, chief executive officer of Deep Sea Mooring.

He added that this was the first time the two companies have worked together. "It's always exciting to showcase our expertise with a new client and we look forward to developing a solid and long-term partnership with Repsol," he explained.

The framework agreement is set to commence immediately and last 4 years including options. Deep Sea Mooring will manage the contract from its headquarters in Bergen.

iSURVEY awarded contract with Island Offshore, operations begin

iSURVEY AS, a provider of survey and positioning services to the global oil and gas, offshore renewables and telecommunications markets has been awarded a 2-year contract with offshore vessel owner, Island Offshore Management.

The contract will see iSURVEY provide positioning services to Island Offshore as part of a call off arrangement. Operations have already commenced on the first vessel, Island's DP2 Light construction vessel, the Island Valiant.



DP2 construction vessel Island Valiant.

Following current well head cutting work in the Danish sector, iSURVEY will be supporting Island Offshore for further subsea work in the North Sea.

"We are extremely pleased to have been selected as a key service partner by Island Offshore," said Øivind Røegh, managing director at iSURVEY.

"This contract award underlines iSURVEY's capabilities and highlights our expertise in the subsea sector. We look forward to continuing the relationships with Island Offshore and growing our presence in subsea projects internationally."

Fairmount Marine tugs deliver FPSO Petrojarl Knarr to Norway

Three tugs of Fairmount Marine have towed the new FPSO Petrojarl Knarr from South Korea to Norway in just 61 days. Petrojarl Knarr, one of world's largest FPSOs for harsh environments, was delivered in the port of Haugesund, Norway, in September. The entire voyage was under command of lead tug master Kees de Graaff on board of the leading tug Fairmount Sherpa.

Petrojarl Knarr is 256.4 m long and 48 m wide with a dwt of 135,000 tons. The vessel is owned by Teekay Corp. and built by Samsung Heavy Industries in Geoje, South Korea. Petrojarl Knarr will be deployed later in the Knarr oil and gas field offshore Norway.

On her way to Norway, the convoy made stops in Singapore, Port Louis (Mauritius) and Las Palmas (Canary Islands) to take bunkers and for replenishments. For the last leg of the voyage the convoy sailed west of Ireland via Fair Isle (just south of the Shetland Isles) toward Norway. Offshore the port of Haugesund the Petrojarl Knarr was delivered ahead of schedule.

GMS jack-up barge starts first charter in the Middle East

Gulf Marine Services said its new self-propelled self-elevating support vessel (SESV) GMS Enterprise has been completed ahead of schedule and under budget. The vessel has completed sea trials and has started its first charter, a 4-month contract for an unnamed EPC contractor working for a Middle East-North Africa (MENA)-region national oil company.

GMS Enterprise is the first of six new SESVs that will expand the company's fleet from 9 to 15 vessels by 2016. The company builds the vessels, also known as jack-up barges, at its quayside yard in Mussafah, Abu Dhabi. The hull for the next newbuild, the smaller GMS Shamal, is due to arrive at the yard later in the current quarter and is to be completed next spring.

GMS Scirocco, another mid-size class vessel, will be completed in 2015. All of the group's existing fleet is contracted to support brownfield oil and gas recovery, well services and maintenance work in the MENA region, and oil, gas and other operations in northwest Europe.



Coastal survey vessel Fugro Pioneer.

Fugro takes delivery of second offshore coastal survey vessel

Fugro has taken delivery of the second of the three Fugro offshore coastal survey vessels (FOCSVs) being built by Damen. The Fugro Pioneer is a compact survey ship capable of undertaking a wide range of survey, monitoring, and inspection operations.

The vessel, under diesel electric propulsion, is designed for a variety of survey and inspection duties including light geotechnical work, environmental baseline surveys, monitoring and inspection, and moon pool deployments.

Fugro Pioneer is the second of three survey vessels ordered by Fugro for delivery in 2014. Each will be operating in different parts of the world and so they have been adapted for the individual environments in which they will work. The operating company is a specialist in the acquisition of the full spectrum of survey data. The vessels have been tailored to be adaptable for a wide range of tasks.

Vard Marine awarded U.S. patent for design, engineering of vessel

Vard Marine, formerly STX Marine, has been awarded a U.S. patent for its design and engineering of a dual fuel vessel. The company said that later this year, the first of six 5100DWT vessels to be built under this patent, designed by Vard Marine and built by Gulf Coast Shipyard Group for Harvey Gulf International Marine will be delivered. These innovative vessels represent the first U.S. flag vessels capable of operating exclusively on natural gas or diesel fuel oil.

The patent is applicable to: a small size, self-propelled floating vessel having a dual fuel system, monohull or catamaran hull shape with an overall length ranging from 60 m to 170 m, azimuthing thrusters, and with LNG tank capacities between 100 and 1,200 cbm. Vard Marine is headquartered in Vancouver, Canada.

SBM Offshore to produce GoM fields through Thunder Hawk

SBM Offshore has signed a production handling agreement with Noble Energy to produce the Big Bend and Dantzler fields to the Thunder Hawk DeepDraft Semi located in 6,060 ft of water in the U.S. Gulf of Mexico.

Production fees associated with produced volumes are estimated to lead up to projected revenue of \$400 million to be delivered over the 10-year primary contract period. First oil from Big Bend and Dantzler are expected in late 2015 and early 2016, respectively. At these levels, both fields will utilize a maximum of 85% of total daily asset capacity, and brownfield construction to upgrade the facility will be handled by Noble Energy.

The Big Bend field is 18 mi from the Thunder Hawk platform in 7,200 ft of water in Mississippi Canyon block 698. Noble Energy operates a 54% working interest in Big Bend, alongside W&T Energy VI LLC (a wholly owned subsidiary of W&T Offshore Inc.) with 20%, Red Willow Offshore LLC with 15.4%, and Houston Energy Deepwater Ventures V LLC with 10.6%.

The Dantzler field is 7 mi from the Thunder Hawk platform in 6,580 ft of



Thunder Hawk platform.

water in Mississippi Canyon block 782. Noble Energy operates Dantzler with a 45% working interest.

Additional interest owners are entities managed by Ridgewood Energy Corp. (including ILX Holdings II LLC, a portfolio company of Riverstone Holdings LLC) with 35%, and W&T Energy VI with 20%. Big Bend and Dantzler will be developed via a dual pipe-in-pipe loop system.

The Thunder Hawk DeepDraft Semi, installed in July 2009, was developed as a steel catenary riser (SCR) friendly floater solution. The deck and hull can be integrated quayside, avoiding costly offshore lifting and system commissioning operations.

Santos confirms discovery in Browse basin offshore Australia

The Lasseter-1 exploration well offshore Western Australia in Browse basin has discovered gas and condensate, according to operator Santos.

The well found a gross gas-condensate interval of 1,238 ft and wireline logs confirm 256 ft of net pay in Jurassic Lower Vulcan and Plover intervals between 16,006 ft and 17,335 ft measured from below the rotary table.

Total depth of the well is reported to be 17,479 ft about 298 mi north-northeast of Broome in 1,325 ft of water.

The samples confirm good mobility in the higher porosity sands in the Lower Vulcan, Santos said. Multiple independent hydrocarbon columns are interpreted, including an estimated 820 ft column for the Lower Vulcan reservoirs. The well will now be P&A'd as planned.

"The Lower Vulcan reservoir system, which is optimally developed between the Ichthys and Poseidon structural trends, holds great promise," said Bill Ovenden, Santos head of exploration.

Santos holds a 30% interest in WA-274-P and is the operator. Joint venture partners are Chevron (50%) and INPEX (20%).

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CNOOC offering 33 offshore exploration blocks for bids

State-owned China National Offshore Oil Corp. has launched its 2014 tender for upstream blocks offshore China. CNOOC is opening for bids 33 blocks covering 48,691 sq mi. Fifteen of these blocks were previously offered, according to the company.

Blocks 25/12, 33/02, 41/14, and 04/02 are in the East China Sea basin, while blocks 24/17, 14/18, 11/34, and 19/11 are in the South Yellow Sea basin.

Of the total number, 17 are in the Pearl River Mouth basin. These comprise 14/21, 16/15, 16/28, 27/04, 28/06, 28/16, 29/31, 29/11, 29/24, 41/12, 42/10, 43/08, 44/07, 55/05, 15/33, 16/25, and 42/12.

Five exploration blocks – 53/32, 53/36, 64/05, 64/03, and 64/26 – are in the Qiong Dongnan basin. The remaining blocks are in the Beibu Gulf basin and block 50/13 in the Yinggehai basin.

Data rooms are open in Shanghai, Guangzhou, and Zhanjiang for interested bidders. The data rooms close at year end, and bids are due by April 30, 2015.

Italy's Eni scores oil discoveries offshore Angola and Ecuador

Eni has made a new oil discovery in Block 15/06, in the Ochigufu exploration prospect, in deepwater offshore Angola. Oghigufu is the 10th commercial oil discovery made in Block 15/06. The new discovery is estimated to contain 300 mmbbl of oil in place.

The Ochigufu 1 NFW well, which has led to the discovery, is 93 mi off the coast and 6 mi from the Ngoma FPSO (West Hub). The company said the proximity to the Ngoma FPSO allows the increase of the resource base of the West Hub project, currently under way.

The well was drilled by the ocean rig Poseidon in a water depth of 4,386 ft and reached total depth (TD) of 14,665 ft, the company said.

Eni is the operator of block 15/06 with a 35% stake. Other joint venture partners for the block are Sonangol P&P (30%), SSI Fifteen Ltd. (25%), Falcon Oil Holding Angola SA (5%), and Statoil Angola Block 15/06 (5%).

In Block 15/06, the two oil development projects, West Hub and East Hub, have been sanctioned. Production start-up of the West Hub project, through the FPSO Ngoma, is expected by the end of 2014, the company noted.

Eni also made an oil discovery in Ecuador that could hold around 300 mmbbl in place. The company has discovered oil at the Oglan-2 exploration well located in Block 10, about 260 km southeast of Quito.

Drilling encountered a 236-ft column of crude oil and initial production tests yielded a flow rate of 1,100 bbl of oil per day, the company reported. The discovery was made just 7 km away from processing facilities, which are already producing about 12,500 bbl per day. Eni has been operating Block 10 since February 2000 through its Agip Oil Ecuador unit.

The Oglan discovery is the result of Eni's new exploration campaign, which the company is carrying out as part of its

strategy to develop Block 10 under the new service contract signed with the Ecuadorian Government in 2010. In Ecuador, Eni developed techniques to minimize the effect of its pipelines and production facilities on the environment and the company has also implemented a biodiversity program.

Ecuador, which is the smallest member of the Organization of the Petroleum Exporting Countries, currently produces around 555,000 bbl of crude oil per day.

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Rosneft discovers offshore Arctic oil jointly with ExxonMobil

Rosneft has completed drilling at the Universitetskaya-1 well in the Arctic and discovered oil at the East-Prinovozemelskiy-1 license area in the Kara Sea. However, further progress at the site is likely to be problematic as international oil majors, including Rosneft partner ExxonMobil, have to wind down work in Russia due to Western sanctions following the Ukraine crisis.

Rosneft and its head Igor Sechin were among the targets of the sanctions, imposed over Moscow's role in the Ukrainian conflict, which has claimed the lives of more than 3,000 people. The sanctions, introduced by the United States and European Union, effectively freeze access by Russian companies to foreign technology and ban Western companies from cooperating in the Arctic, as well as in shale exploration and deepwater drilling.

The company said the sea depth at the drilling site is 81 m, while the designed depth of the vertical well is 2,113 m. The drilling resulted in obtaining samples of rock, drilling a pilot hole with an 8.5-in. diameter at a depth of 600 m and collecting horizontal core samples.



Rosneft said it will analyze the data from the well and come to a conclusion on the reserves at the site.

"The first oil was extracted. It is an astonishing sample of light oil, which, based on the results of the analysis performed, is comparable to the Siberian Light oil," Rosneft's Sechin said, adding that the resource base estimate of just this oil trap is 338 bcm of gas and more than 100 mm tons of oil.

"And this is just the estimates of this very structure. This is an outstanding result of the first exploratory drilling on a completely new offshore field," he said. "This is our united victory; it was

achieved thanks to our friends and partners from ExxonMobil, Nord Atlantic Drilling, Schlumberger, Halliburton, Weatherford, Baker, Trendsetter, FMC."

The Universitetskaya structure covers a 1,200,000 km area with a 550 m high hydrocarbon trap. The site's resources amount to over 1.3 billion tons of oil equivalent and approximately 30 structures were identified in three East Prinovozemelskiy areas of the Kara Sea.

The entire resource base of the three areas is estimated at 87 billion bbl or 13 billion tons of oil equivalent. According to experts, the amount of oil and gas in the Kara Sea oil province is comparable to the resource base of Saudi Arabia.

However it was not yet clear if commercially viable quantities of oil could be recovered from the well. Rosneft said data from the well will be analyzed and only then could a conclusion be reached on the reserves there.

ExxonMobil and Rosneft signed a \$3.2 billion agreement in 2011 to develop the region.

Russia is one of the world's top crude producers and the biggest supplier to Europe, but its reservoirs are in decline and is being forced to look to new sources to retain its positions.

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Arup Concept Elevator platform.

ACE platform nears installation on Xcite's Bentley field in North Sea

Arup is close to installing the Arup Concept Elevator (ACE) platform on Xcite Energy Resources' Bentley Oil field located in the UK section of the northern North Sea.

Working with Xcite, Amec Group and Aibel, the company has successfully completed the conceptual design and assurance scopes of work and has moved into the preliminary front-end engineering design (pre-FEED) stage.

Xcite selected Arup's ACE platform due to a proven analogue to the Bentley field application in addition to its ease of installation and removal.

"The Bentley Field is a major asset for the UK but the harsh weather conditions can make the installation of production facilities difficult and expensive," Arup oil and gas leader Rob Duffin said. "The self-installing ACE platform is a proven and safe, environmentally sensitive, efficient, and cost-effective solution."

The company's platform can quickly and efficiently install without the requirement for a specialist heavy-lift vessel, reducing overall schedule uncertainty and project risk. In addition, the platform can be easily decommissioned at the end of its field life, which makes it an environmentally sensitive and cost-effective solution.

Arup is also working with Teekay Shipping Norway and other key stakeholders to create an innovative infrastructure-based development concept for the Bentley Field, which is expected to deliver more than 35 years of predictable production. The concept would be based on proven technologies for the drilling, production, storage and offloading of oil, which reduces the overall project risk profile.

To date, Arup has developed four ACE platforms, of which three have been operating worldwide since 2001, while the fourth is currently being fabricated locally for Shell Philippines Exploration B V, for installation offshore Palawan on the Malampaya Field as a depletion compression platform.

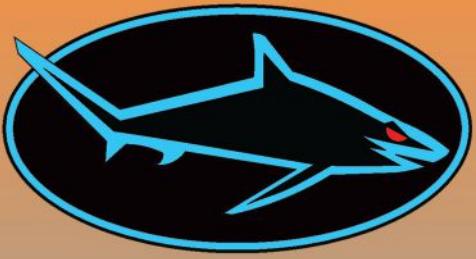
Fafnir selects Aptomar technology for Polarsyssel vessel off Svalbard

Aptomar has secured a contract to deliver its oil spill detection and combatting technology to Fafnir Offshore's Polarsyssel vessel, which will operate offshore Svalbard.

Svalbard, which is a Norwegian archipelago in the Arctic Ocean, is located north of Europe in the midway between continental Norway and the North Pole. Fafnir Offshore recently received delivery of the Polarsyssel PSV from Havyard

Ship Technology's yard in Leirvik in Sogn, Norway. The vessel will operate 6 months a year in the next 6 years for the Governor of Svalbard under a long-term contract. Aptomar will deliver its SECurus system, which combines stabilized long-range infrared, digital video cameras and a search light with an electronic chart system.

The SECurus will identify alarms generated by an oil spill detection (OSD) radar processor and offer decision support data to combat oil spills.



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PMI Energy Services opens new shorebase in Louisiana's Morgan City



PMI Energy Services has opened a shorebase in Morgan City, supporting oil and gas production and drilling activities.

PMI Energy Services, a Superior Energy Services company, has opened a shorebase in Morgan City, Louisiana, focused on supporting shelf, coastal and inland waters production and drilling activities.

PMI's shorebase is centrally located on the Louisiana coast and provides better protection from weather events than ports located directly on the Louisiana coastline. It also maintains a close proximity to established fuel docks, mud docks, 29-B waste transfer stations, rental and supply companies, fabrication yards, shipyards, repurpose facilities and other industry and civil infrastructure to support offshore or inland oil and gas properties.

The 12.5-acre site with a 600-ft bulkhead dock can easily accommodate the necessary services expected for a first class shorebase facility. It includes ample acreage for material handling and temporary storage, both open and enclosed, for dry goods and sensitive equipment; secure short-term and long-term parking; marine and aviation crew changes; meeting rooms; a safety training facility; customer office space; and satellite offices for logistics coordinators.

"As the demand for resources in Louisiana's deepwater port has increased with projections for deepwater drilling activities continuing that upward trend, PMI is providing an alternative solution for operators that are experiencing inefficiencies supporting their operations," said Don Mehrtens, PMI vice president. "The lower demand on resources at our new base will create value to operators with more efficient uses of their marine assets, lower equipment and personnel transportation costs into and out of this port."

Jamie Holt, general manager of PMI's Gulf of Mexico business unit, said, "We will focus on safe material handling and minimizing marine vessel port time to lower an operator's LOE and AFE expenses. We have created a first-class facility in the birthplace of the offshore oil and gas industry to provide shorebase support for production facilities, drilling programs and well work, as well as construction projects and decommissioning activities."

Mzia well test supports potential hub development

BG Group plc reports that results from a recently completed second drillstem test on the Mzia discovery in Block 1 offshore southern Tanzania provided further support for a hub development to supply a potential onshore LNG project.

The DST on the Mzia-3 appraisal well, drilled in 5,906 ft of water located 4 mi north of the original Mzia-1 discovery, included sustained gas production at a maximum flow rate of 101 mmcf per day.

"The excellent results from this latest drillstem test further reduce reservoir risk, a critical factor as we progress design of the upstream production facilities and infrastructure," said Sami Iskander, BG Group's chief operating officer. "Also, the Mzia-3 DST, along with previous appraisal activities, supports our efforts to optimize the value of a development across our Block 1 discoveries."

Technip wins contract for Kodiak tieback in U.S. Gulf

Deep Gulf Energy II has awarded Technip a lump-sum contract to develop the Kodiak field in Mississippi Canyon blocks 727 and 771 in the Gulf of Mexico at water depths from 4,829 to 5,610 ft. The project consists of a subsea tieback to the Devils Tower truss spar in Mississippi Canyon Block 773.

To withstand Kodiak field's high temperature and pressure, as well as corrosive production fluids, the pipeline will be of a bi-metallic construction, lined with corrosion-resistant alloy.

Technip's operating center in Houston, Texas will perform the overall project management. The infield flowline and riser will be welded at the Group's spoolbase in Mobile, Alabama.

The offshore installation is expected to be performed in 2H 2015 by vessels from Technip's fleet: the Deep Blue and the Global Orion, a support vessel.

Dana Gas secures \$100M for Zora offshore gas field

Dana Gas has secured \$100 million of financing to develop the Zora offshore gas field in the northern part of the UAE. To be built in the waters off Sharjah and Ajman, the gas field will feature a tilted fault block structure with a closure of about 25 sq. km, the company said.

The gas field is located in the Shrajah Western Offshore Concession block off the coast of the Sharjah coastline at a water depth of 24 m. Upon completion, the gas field is expected to produce 40 mmscf per day, with first delivery expected in the first-half of 2015.

Dana Gas raised the financing via a credit facility maturing in November 2018, with Emirates Bank NBD Capital leading a syndicate of regional banks to provide the loan. The repayment for the financing is over a period of 15 quarterly investments and will start in the second-half of 2015 after completion of the project, subject to a cash sweep mechanism.

JV spuds Manora development well offshore Thailand

A joint venture led by Mubadala Petroleum has spudded the first of 15 planned development wells in the Manora oil development in the northern Gulf of Thailand. The well, MNA-02, along with the MNA-01 well, will be batch drilled by the Atwood Orca jack-up drilling unit to total depths of 6,903 ft and 8,009 ft, respectively, and will be completed using electric submersible pumps prior to production.

Drilling and completion of both wells was planned to take 24 days. Production is expected to begin shortly after completion, and eventually peak at 15,000 bbl per day of oil.

The joint venture estimates a field life of 11 years. The development drilling program, expected to last until the end of the first quarter of 2015, involves drilling and completion of 10 production wells and five injection wells.

Shell picks IKM to provide riserless mud recovery for Malikai off Sabah

Shell has contracted IKM Energy Services to provide a riserless top-hole mud circulation system for the Malikai project offshore Sabah.

This will be the first application of IKM's MRR (mud recovery without riser) technology outside the North Sea. IKM said the system has been developed to reduce deck footprint, the number of offshore personnel, and the overall cost of top-hole mud recovery operations.

Shell will employ the drillship Norshore Atlantic to batch drill eight top-holes in a water depth of 1,558 ft. Drilling fluids will be collected at the wellhead and pumped back to the vessel by means of MRR, enabling use of engineered drilling fluids. This method of top-hole drilling, IKM said, leads to minimized environmental impact with no discharge of drilling fluids, reduces risk, and brings benefits in terms of logistics.

The contract is between Sarawak Shell-Sabah Shell Petroleum Co. and IKM Energy Services.

In the Norwegian Sea, Subsea 7 has contracted IKM Testing for subsea pre-commissioning of pipelines and risers for Statoil's Aasta Hansteen project.

McDermott completes work on Jack & St. Malo project

McDermott International, Inc. successfully completed a Jack and St. Malo project for Chevron USA, Inc. The project involved the installation of jumpers, flying leads, subsea pump stations, umbilicals and subsea landing of some of the industry's largest and complex umbilical end terminations to a host floating production platform in 7,200 ft of water 279 mi offshore Louisiana.

The project is part of the first stage of development of the Jack South, St. Malo South and St. Malo North Drill Centers.

McDermott executed in-house fabrication of 21 high specification rigid flowline, manifold and pump jumpers and installed the structures using the Derrick Barge 50 (DB50) with its specialized deepwater lowering system.

In addition, more than 80 flying leads, five additional rigid production well jumpers and other subsea control and production boost components were installed by the DB50, including three pump stations each weighing 209 tons to a depth of 6,988 ft.

The DB50 was assisted by a fleet of up to 12 support vessels delivering material from various Gulf Coast fabrication and staging facilities to the offshore installation site. Additionally, three control and two power umbilicals totaling 65 mi were transported and installed by the subsea construction vessel North Ocean 102 (NO102) along with other related subsea structures.



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Caterpillar's new solution for offshore power generation

Caterpillar Oil & Gas launched the Cat® Offshore Power Generation Module, a new modular solution for FPSO and offshore platform main power at the 2014 Rio Oil & Gas Expo and Conference held in September in Rio de Janeiro, Brazil.

The Cat Offshore Power Generation Module is a turnkey EPC scope, scalable, single lift, modular power plant product that includes full integration into the FPSO or platform structural design. This attractive product leverages the broad array of proven Caterpillar engine technology with the vessel design expertise of Deltamarin, a Finnish naval architecture and engineering company who was integral to the development of the Cat Offshore Power Generation Module.

"The Offshore Power Generation Module was engineered to serve as a flexible solution for diverse offshore customers with varying operational, fuel and power needs," Antti Ekqvist, Caterpillar Oil & Gas global offshore business development leader noted. "Beyond offering proven performance in the module outputs, the Offshore Power Generation Module was carefully designed with Deltamarin for the seamless integration into vessels and platforms."

The Cat power generation solution was designed specifically to meet the needs of FPSO and fixed production platform main power applications in cases where a gas turbine is not ideal. By utilizing experience-based, operational modeling Caterpillar is prepared to ensure the optimal configuration is selected.

Available from 4 to 17.3 eMW per module, the Cat Offshore Power Generation Module is designed to run on liquid, diesel, crude and heavy fuel oil, gas or in dual fuel mode and meets current and future emission regulations to maximize flexibility and reduce operating costs. The global Caterpillar offshore oil



and gas team collaborates extensively with the vessel's designer to ensure all interface and connection points are easily accessible. The module is fully tested and certified to be easily integrated in the vessel systems.

The modular layout is easily expanded to provide power for future upgrades and is a fully self-contained unit that provides a single lift capability. The integrated design is complemented with flexible manufacturing to enable the Offshore Power Generation module to be assembled anywhere in the world, providing customers with the added advantage of meeting any local content regulations and on-time delivery for project requirements. Additionally, the power module is equipped with remote monitoring to enable it to be managed from the vessels main control room or an onshore location.

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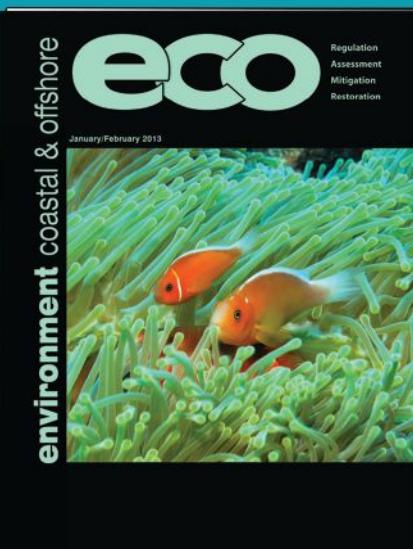
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Statoil's new compressor to boost output by an additional 220 mmboe

The new compressor in operation on the Kvitebjørn field in the North Sea is expected to increase production there by 220 mmboe and extend the field's lifetime with 8 years. The new compressor contributes to an increase in the recovery rate at the Kvitebjørn field from 55% to 70%.

"These are very profitable barrels, which make a considerable contribution to wealth creation on the Norwegian continental shelf. Increased production and extended lifetime for the field also provides increased ripple effects across the entire value chain," said Kjetil Hove, Statoil's senior vice president for operations in development and production for Norway.

The Kvitebjørn gas and condensate field is in Block 34/11, east of Gullfaks. The field was discovered in 1994 by the discovery well 34/11-1.

The compressor project is making a substantial contribution to the increased recovery of gas resources from the field, which has increased its reserves by 50% since the plan for development and operation was submitted in 2000. The extra barrels from the compressor are equivalent to a medium-sized, separately developed field.

"Many people don't realize that these relatively small modules are able to contribute as much or more value as new fields and that they cost much less to develop because the platform is already in place," said Statoil brownfield projects senior vice president Terese Kvinge.

The reason why the new compressor is being installed on a field that has been in production for some years is that pressure in the reservoir has gradually fallen as the oil and gas has been produced. By lowering the pressure on the platform, more can be produced.

The compressor module was built by Bergen Group Rosenberg (now Rosenberg Worley Parson Group) in Stavanger. The 1,000-ton module was lifted into position during the summer of 2013. This is the first phase of pre-compression on Kvitebjørn, but space has been left in the new module for a potential second pre-compression phase as well.

Rich gas and condensate (light oil) from Kvitebjørn are piped to Kollsnes near Bergen and Mongstad further north, respectively. After processing at Kollsnes, the dry gas is piped to continental Europe. The separated NGL is transported by pipeline to the Vestprosess plant at Mongstad for fractionation into propane, butanes and naphtha. Condensate travels through the

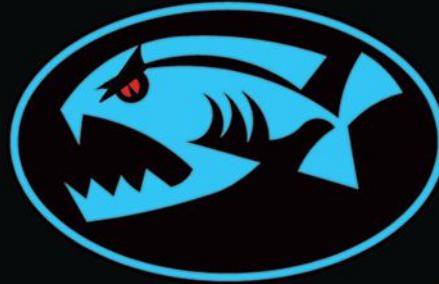
Kvitebjørn Oil Pipeline, which ties into the Troll Oil Pipeline II to Mongstad.

Norway-based Statoil expects to recover about 19 tcf of gas and about 777 mmcf of condensate from the field.

Statoil is also working on a technologically advanced and significant sub-sea gas compression project that will be delivered in 2015 as a global first. It will provide a vital new means of extracting additional volumes from current oil and gas fields in the Norwegian shelf.



The Kvitebjørn gas condensate field.



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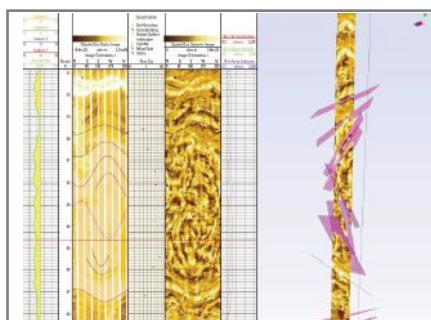
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Schlumberger unveils Quanta Geo photorealistic reservoir geology

Schlumberger has launched the Quanta Geo photorealistic reservoir geology service. The new service includes the industry's first microresistivity imager that produces oriented, photorealistic, core-like images of the formation in wells drilled with oil-base mud (OBM). The company said interpretation of the images identifies geological features and predicts reservoir trends in 3D with a high degree of certainty.

"Geological imaging in wells drilled with OBM has long been recognized by operators as a major technical challenge, particularly in deepwater," said Hinda Gharbi, president, Wireline, Schlumberger. "The Quanta Geo service provides photorealistic images that can be used to condition and constrain reservoir models, enabling our customers to better understand their reservoirs and make decisions with more confidence."

The physics of the Quanta Geo service's high-resolution array of 192 micro-electrodes overcomes the electrically resistive barrier imposed by OBM. The articulated caliper and independently applied pads enable down-logging at up to 3,600 ft/hour, which reduces rig time



while mitigating operational risk and delivering data assurance. The service is combinable with most other Schlumberger wireline open-hole tools.

Using the company's Techlog wellbore software platform, data acquired by the Quanta Geo service are easily rendered, creating an image of 0.24-in. resolution that resembles a whole core. Geologists interpret these images in the same manner that they would perform continuous core description, with the added benefit that these images cover a longer continuous interval and are precisely oriented. This enables extraction of key reservoir parameters such as the structural dip or the identification of sand body type, extent, and orientation.

The new service has been field test-

ed in more than 50 wells in deepwater, unconventional, and carbonate environments in the Gulf of Mexico, West Africa, North Sea, North America, and Australia.

SIGMA partners with FracGeo for next-gen geomechanical modeling

Sigma Cubed Inc. and FracGeo have formed a strategic partnership to introduce technology to help operators predict and evaluate the geomechanical response of the reservoir to hydraulic stimulation.

Combining elements never before used in the oil and gas industry, this new technology takes into account the propagation and interaction of multiple hydraulic fractures with natural fractures to predict differential stress, strain (good proxy for microseismicity), and frac energy to enable engineered completions and optimized reservoir drainage.

"The ability to simulate the impact of stimulation on the continuous natural fracture network and predict the micro-seismic response further enhances the benefits of integrated G&G workflows," said Dr. Ahmed Ouenes, chief executive officer of FracGeo. "Together we are building new workflows that will change the way frac stage locations are selected."

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INDUSTRY DEALS

Siemens to buy oilfield equipment Dresser-Rand for \$7.6B in cash

Germany's Siemens AG has agreed to buy U.S. oilfield equipment maker Dresser-Rand Group Inc for \$7.6 billion in cash. The acquisition, which ranks among the biggest in the history of the industrial group, will strengthen Siemens' position in the United States, its weakest region, and bring it nearer catching up with rival General Electric Co.

Siemens will pay \$83 a share in cash, the Munich-based company said in a statement. That's a premium of about 37% to Dresser-Rand's share price in July before reports about a potential bid boosted the stock.

Siemens' oil and gas revenue will increase to around \$11 billion, including the acquisition of Rolls-Royce Holdings Plc's energy gas turbine and compressor business, announced in May, from less than \$7 billion before the two deals.

While Siemens said it expects to close the transaction by summer 2015, there is leeway for potential competing offers to be placed as the takeover must still be approved by Dresser-Rand shareholders.

Total resumes \$2.5B Nigerian deepwater oil field sale: Reuters

France's Total SA, Europe's second largest oil company, has put one of its offshore Nigerian oil fields up for sale again, the company said, after a 2012 deal with Sinopec Corp. failed, according to Reuters news service.

Total has hired BNP Paribas to find buyers for its Usan deepwater oil field located in the Nigeria Oil Prospecting Lease (OML) 138, which could be worth about an estimated \$2.5 billion.

Usan is not expected to be an easy sale for Total because deepwater exploration requires significant investment and the new owner's returns could be limited if Nigeria rises taxes on foreign investor profits as part of a long expected sector reform called the Petroleum Industry Bill.

Before deciding to sell the asset, which is about 100 km off the coast, Total was planning to drill several horizontal deepwater wells and build a deep offshore drilling rig.

Murphy to sell 30% of Malaysian oil and gas assets for \$2B

Murphy Oil has agreed to sell 30% of its Malaysian oil and gas assets to PT Pertamina Malaysia Eksplorasi Produksi for \$2 billion. The transaction is subject to the approval of Malaysia's state-owned oil and gas firm Petroliam Nasional

Berhad (Petronas). The deal is expected to be completed in the first quarter of 2015. Murphy Oil entered the Malaysia market in 1999 and the country accounted for over 40% of the company's net production in 2013.

The company owns majority stakes in seven separate production sharing contracts, which include Block K, Block H, Block P, SK 309, SK 311, SK 314A and three gas holding agreements in PM 311.

Murphy Oil's Malaysia net production was around 86,000 boe/d in 2013 with total proved reserves of 125 mmbbl of oil and 406 bcf of gas.

The company said it wants to establish a long-term partnership with Pertamina.

"This transaction marks the value of the high-margin, long-term assets in our Malaysian business. We are excited to strengthen our partnership with Pertamina and look forward to working with them and our other partners in Malaysia," said Roger Jenkins, Murphy Oil's president and chief executive officer.

"We will continue to evaluate all aspects of our portfolio. This transaction allows us to re-deploy the proceeds through an individual or combination of strategic and financial initiatives such as increased drilling capital in the Eagle Ford Shale, acquisition opportunities, debt reduction and share repurchases."

Cairn Energy sells 10% stake in UK Catcher oil field to Dyas

Cairn Energy has sold a 10% stake in its Catcher development in the North Sea and nearby fields to Dyas UK for approximately \$182 million. Under the deal, Cairn will retain a 20% interest in the Catcher license and trim down its capital expenses on the project from \$380 million to \$200 million.

"Cairn remains focused on delivering value for shareholders from disciplined capital allocation and portfolio management across a balanced asset base," said Simon Thomson, Cairn Energy's chief executive officer. "This value-enhancing transaction provides us with significant additional operational flexibility to deliver the group's strategy."

Cairn's Catcher development comprises three fields in the UK North Sea, including Catcher, Burgman and Varadero, which include 22 wells at water depths of 90 m. Reports suggest that the development is expected to contain about 80 mmbbl of oil.

In June, the UK Department of Energy

and Climate Change (DECC) approved the Field Development Plan (FDP) of License P1430 (Catcher), while licenses P2040, P2070, P2077 and P2086 are nearby licenses in the Greater Catcher area. In March, Cairn successfully extracted heavy oil from its Juby Maritime-1 (JM-1) well, offshore Morocco.

Woodside takes 40% interest to explore with Noble offshore Gabon

Woodside has acquired a 40% interest in an exploration, exploitation, and production sharing for Block F15 in the Gabon coastal basin. Noble Energy operates with a 60% interest.

Block F15 is 87 mi offshore southwestern Gabon and covers more than 1,042 sq mi, in water depths ranging from 7,546 to 9,842 ft. The contract has a seismic acquisition commitment and option for future drilling.

Woodside chief executive Peter Coleman said that this was an opportunity for the company to secure significant acreage in a high-graded emerging oil-prone province with a like-minded and experienced partner.

Earlier this year, the two parties had been in discussions to bring Woodside into the deepwater Leviathan field development offshore Israel, although Woodside eventually pulled out.

UK's Atkins acquires Houston Offshore Engineering for \$73M

UK-based project management firm Atkins has acquired Houston Offshore Engineering (HOE) for \$73 million.

Texas-based HOE offers engineering services to support offshore oil and gas developments. The company specializes in deepwater projects and has experience in all types of marine engineering projects including terminals, loading buoys, fixed platforms, floating platforms and ultra-deep developments.

HOE's projects range from conceptual studies, which help maximize value early in field development, to fully detailed design and engineering support for construction. The company's clients include major and independent oil and gas firms, drilling and engineering contractors, fabricators, transport and installation contractors.

HOE, which has approximately 150 employees, reported revenues of \$41 million in the year to 31 December 2013.

"This acquisition considerably strengthens Atkins' position in the active oil and gas design and engineering market, and is in line with our strategy to invest in growing our energy business, our key sector focus area," said Uwe Krueger, Atkins' chief executive officer.

Saab receives ROV system order from FMV for the Swedish Navy

Defense and security company Saab has received an order from the Swedish Defense Materiel Administration (FMV) for 10 ROV systems, which will be deployed operationally for seabed surveys, inspections, light underwater operations and recovery of objects. Saab will fulfill the deliveries using the Seaeye Falcon system, which is being adapted to meet FMV's specifications. The systems, which will be delivered as stand-alone systems, will be introduced and partially integrated aboard patrol boats and auxiliary ships operated by the Swedish Navy. "This is another example of how Saab combines civil and military technology and adapts it for the requirements and purposes stipulated by the military. Over the years, we have developed and established unique expertise within the field and we are delighted and proud of being able to deliver the system to the customer," says Agneta Kammeby, head of the underwater systems business unit at Dynamics. The systems will be delivered within 12 months.

DeepOcean awarded seabed survey services contract by Statoil

DeepOcean AS, subsidiary of DeepOcean Group Holding BV, has been awarded a contract for seabed survey services for 2015 by Statoil. The Contract award support DeepOcean's strong position as a provider of advanced light construction and seabed survey services, and confirms Statoil's continued trust in contractor's consistent performance over years. Contract covers services on Norwegian Continental Shelf. "We are pleased to receive this award that will add at least 6 months of backlog to our 2015 order book. Winning this contract in strong competition with other established subsea contractors show DeepOcean's competitiveness in finding suitable spreads for our clients' requirements," says commercial director Rolf Ivar Sordal. DeepOcean plans to use its light construction and survey vessel Volstad Surveyor for the work in 2015.

Marine robot competition winners announced

The NATO Centre for Maritime Research and Experimentation (CMRE) has just concluded two intense weeks of student challenges with a multi-domain demonstration. After the Student Autonomous Underwater Vehicle Challenge - Europe (SAUC-E), hosted for the fifth year in a row in CMRE's sheltered harbour, from 20 to 26 September, the first euRathlon sea robotic competition was held in the same venue from 29 September to 3 October. Six teams from five universities participated in euRathlon: ENSTA Bretagne (France) with two teams called SAUCISSE and CISSAU; the DFKI GmbH-University of Bremen team (Germany) with the robot Avalon; the mixed industry/academy Robdos/UPM team (Spain) with the robot Robdos; the Scuola Superiore Sant'Anna team (Italy) with the robot Shark, and the University of Girona (Spain) with the robot Vicorob. The competition consisted of five different marine scenarios: "Long range autonomous underwater navigation," "Environmental survey of the accident area," "Leak localisation and structure inspection," "Interaction with underwater structures" and a "Combined scenario," any of which could have led to a winner. Teams and their robot vehicles had the possibility to compete in one or more scenarios. SPARUS II robots were loaned to participant teams with poor expertise in the marine domain in order to help them better facing the underwater challenges. Thanks to this facilitation, two teams (Robdos and Scuola Superiore Sant'Anna) without any experience in the field successfully competed. Vicorob by the University of Girona won four out of five scenarios. Only in the "Environmental survey of the accident area" one Vicorob won the 2nd prize jointly with SAUC-ISSE from ENSTA Bretagne. This scenario was dominated by DFKI GmbH-University of Bremen team (Germany) with the robot Avalon. Teams were fostered to test multi-vehicle collaboration in order to improve precise sonar based navigation, data processing and mission reporting in real time, during the contest's missions. In euRathlon, in particular, the cooperation between an underwater and surface vehicle was even more emphasized and encouraged. Furthermore, in order to simulate a realistic situation, an operator was able to communicate with the underwater vehicle by using acoustic communication. Finally, for the first time at CMRE, euRathlon '14 introduced tasks involving underwater manipulation, which is a really promising area of research.

Coast Guard deploys AUV for Arctic science mission



Scientists from the Coast Guard Research and Development Center and their colleagues traveled to the Arctic aboard the Coast Guard Cutter Healy this year to evaluate a wide variety of technologies for use in responding to oil in icy water. While some of those technologies were designed for viewing the ice and simulated oil from above however, an Autonomous Underwater Vehicle was being used to see the ice from below.

One of the many challenges of working in Arctic waters is the year-round presence of ice in the water. Oil can be difficult enough to recover when it is spread across open water, but ice formations with their irregular shapes and often enormous sizes can provide the substance with plenty of nooks and crevices to hide in making recovery efforts even more challenging. The Coast Guard and its partners are hoping to circumvent this problem through the use of AUVs, unmanned submarine-like devices that can get under ice to provide a clear view of what lurks below its surface.

"AUVs have a lot of potential for enhancing Coast Guard operations," said Scot Tripp, AUV demonstration lead for the RDC aboard the Healy. "In addition to their uses in locating and tracking oil beneath the ice edge, AUVs could be used for resource monitoring or patrolling living marine resource zones by acoustically detecting when fishing vessels enter restricted waters."

For this year's exercise, the Coast Guard and University of Cambridge deployed a Gavia Scientific AUV equipped with side-scan sonar and obstacle avoidance radar. This allowed the device to map underneath ice ridges and provide underwater imagery that will help researchers to better understand the topography of ice floes. During an oil spill response, this information could give responders a more accurate picture of how much oil needs to be recovered from the ice and the direction it is drifting.

"In the event of something like an oil spill, there are going to be times you need to be able to study the features of the ice that are under water," said Dr. Peter Wadhams, a professor of oceanic physics with Cambridge University traveling aboard the Healy. "You can't always get out onto the ice and drill a hole into it, but a benefit of the AUV is that it can go under the ice to provide that imagery."

The Coast Guard's work with AUVs is only just beginning, but the strengths of the technology are already becoming apparent to the RDC. The devices are portable, allowing for easy deployment and their autonomous design allows for some models to operate for weeks or even months at a time.

For more information, visit www.dvidshub.net.

UNDERWATER INTERVENTION

Ultimate trenching spread delivers

Long-standing SMD customer DeepOcean has now received delivery of its 1,000 hp QTrencher (QT) 1000 and successfully completed a number of projects. The recently upgraded T-3200 heavy duty trenching tractor is set to sit alongside the industry-leading free flying, jet trenching ROV on DeepOcean's Havila Phoenix vessel.

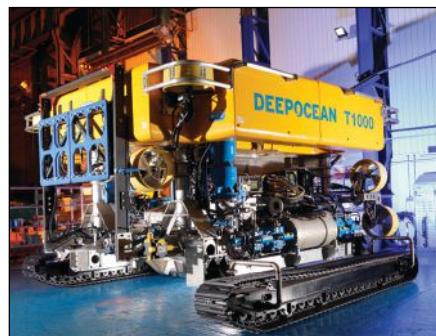
The class-leading Havila Phoenix vessel will offer construction, installation and trenching support. It is equipped with a unique combination of features allowing it to satisfy combined construction and trenching requirements of DeepOcean's customers. As well as two SMD vehicles, the vessel's ultimate trenching spread features a 250-te active heave compensated offshore crane, 1500 sq. m deck area, 140 berth accommodation and optional 2000-te carousel.

The QT1000 embraces the latest technologies in jet trenching and ROV design. With 1,000 hp of total installed power and 940 hp of variable jetting power. The QT1000 is capable of trenching pipelines, umbilicals and cables up to 3 m in the seabed, at up to 2000 msuw.

Both the QT1000 and heavy duty T-3200 trencher were supplied with high sea state handling systems, with proven technology for operation in rough conditions associated with the North Sea.

As the world's largest trencher, the T-3200 offers unrivalled performance in terms of speed, soil conditions and trench depths. Originally supplied by SMD, the OEM recently worked with DeepOcean to upgrade the vehicle, adding new jetting and mechanical cutting tools. The upgrade also included conversion to state-of-the-art DVECS II control system; both vehicles are now operated from common control system software that offers advanced diagnostics, fault finding and the facility for remote monitoring from the office.

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Hugin AUV chosen by leading survey providers

World-leading survey providers DOF Subsea of Norway, Fugro Geoservices of Lafayette, Louisiana, Northwest Maritime of Norway and AXA Engehnaria Submarina of Brazil have chosen Kongsberg Maritime's AUV Hugin for offshore operations.

In October 2014, Kongsberg Maritime will deliver a new Hugin vehicle to Fugro Geoservices Inc. The latest HUGIN ordered by Fugro is rated for operations from 10 to 4,500 m and carries a very high specification payload suite that enables it to perform advanced survey operations and inspections.

Designed for portability and operation from ships of opportunity, the sophisticated AUV is supplied in a series of packing cases and configured for easy assembly after arriving in the area of operation.

DOF Subsea AS has also recently ordered another Hugin AUV System that will add to the company's growing subsea survey capability. The newest addition is rated to 3,000 m and carries a range of sensors making it capable of completing several tasks in parallel. The launch and onboard Stinger is designed to operate from ships with freeboards of up to 5 m in up to Sea State 5, making it highly flexible to use.

Northwest Maritime AS and AXA Engehnaria Submarina have recently taken delivery of the first of two Hugin AUV systems specifically configured for pipe survey operations. Supplied as a containerized system, the first vehicle is tailored for survey operations, including launch and onboarding system and post-mission analysis of collected software. The vehicle is fitted with one of the world's most advanced sonars that provide acoustic pictures and sea maps with high resolution, and a still camera providing georeferenced high-resolution pictures of subsea pipes. The second Hugin will be delivered to Northwest Maritime and AXA later in 2014, equipped with a similar payload suite and rated to 3,000 m.

For more information, visit www.km.kongsberg.com.

Underwater robot for port security

At the International Conference on Intelligent Robots and Systems, MIT researchers unveiled an oval-shaped submersible robot, a little smaller than a football, with a flattened panel on one side that it can slide along an underwater surface to perform ultrasound scans.

Originally designed to look for cracks in nuclear reactors' water tanks, the robot could also inspect ships for the false hulls and propeller shafts that smugglers frequently use to hide contraband. Because of its small size and unique propulsion mechanism — which leaves no visible wake — the robots could, in theory, be concealed in clumps of algae or other camouflage. Fleets of them could swarm over ships at port without alerting smugglers and giving them the chance to jettison their cargo.

Half of the robot — the half with the flattened panel — is waterproof and houses the electronics. The other half is permeable and houses the propulsion system, which consists of six pumps that expel water through rubber tubes.

Two of those tubes vent on the side of the robot opposite the flattened panel, so they can keep it pressed against whatever surface the robot is inspecting. The other four tubes vent in pairs at opposite ends of the robot's long axis and control its locomotion.

In the robot's watertight chamber are its control circuitry, its battery, a communications antenna, and an inertial measurement unit, which consists of three accelerometers and three gyroscopes that can gauge the robot's motion in any direction. The control algorithm constantly adjusts the velocity of the water pumped through each of the six jets to keep the robot on course.

In their initial experiments, the researchers were just testing the robot's ability to navigate to an underwater surface and stay in contact with it while traveling in a straight line, so the prototype is not yet equipped with an ultrasound sensor.

For more information, visit web.mit.edu.

OceanServer awarded AUV contract

OceanServer Technology, Inc. has recently been awarded a contract for one Iver3 AUV by the U.S. Naval Undersea Warfare Center (NUWC) in Newport, Rhode Island. This system will include several Iver3 options just released including the Rowe Technologies, Inc. (RTI) SeaPILOT 600 kHz Doppler Velocity Log with ADCP.

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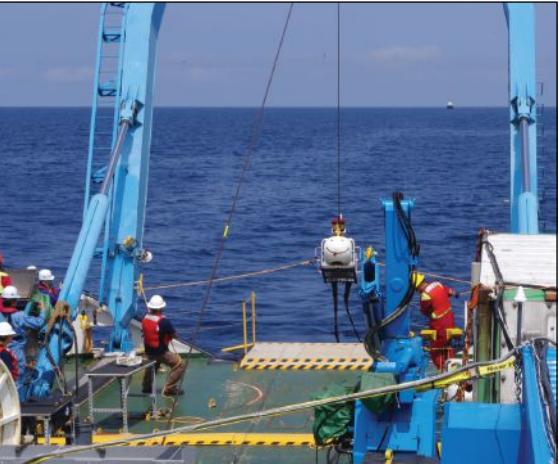
The RTI's SeaPILOT family of Doppler Velocity Logs (DVLs) represents some of the industry's newest and state-of-the-art acoustic Doppler technology. The compact form factor and powerful electronics provide a versatile platform capable of producing precise bottom referenced velocity and/or current profile measurements for ROVs, AUVs, and other manned/unmanned submersibles. For vehicle navigation applications that require a custom fit like the Iver3, RTI provided four individual piston transducers along with compact electronics to facilitate repackaging into the AUV.

OceanServer designs and manufactures a feature-rich family of low-cost Iver AUVs utilized for coastal applications such as general survey work, subsurface security, environmental monitoring, behavioral research and sensor development by both academia and military organizations. These modern AUVs are single man-portable and feature simple point-and-click mission planning. The latest generation of Iver3 AUVs will offer two different RTI DVL units in 600 and 1,200 kHz configurations.

For more information, visit www.ocean-server.com.

Ocean Floor Geophysics completes CSEM gas hydrate survey

Ocean Floor Geophysics Ltd. (OFG), in cooperation with Fukada Salvage and Marine Works Co. Ltd. (Fukada), has completed a high resolution CSEM survey of near surface gas hydrates using



the Scripps Institution of Oceanography Vulcan system for the National Institute of Advanced Industrial Science and Technology (AIST) in Japanese waters. The survey comprises over 500 line km of high resolution data collected using the Fukada vessel Shin Nichi Maru. Water depths were from 400 to 1100 meters. A 3D inversion of the EM data for an area of interest has been completed. The contract for the 3D inversion of the data for the entire survey area has also been awarded to OFG and will be completed in November this year. Fukada Salvage and Marine Works acted as prime contractor.

For more information, visit www.oceanfloorgeophysics.com.

CMRE uncovers seabed secrets with underwater robots

From 22 September to 13 October 2014, multiple AUVs equipped with modern sensors relevant to NATO minehunting missions were employed at sea during the Multinational AutoNomy Experiment (MANEX '14) along the Italian coast, between Framura and Bonassola, in the Ligurian sea. Onboard the NATO Research Vessel Alliance, operated by the NATO Centre for Maritime Research and Experimentation (CMRE), part of the NATO Science and Technology Organization, scientists and engineers from eight institutions and 10 nations exercised state-of-the-art high resolution underwater acoustic imaging systems and autonomous vehicle behaviours. The purpose of the trial was to collect data that will allow NATO researchers to advance the state-of-the-art in the area of seabed mapping using autonomous vehicles, mainly for mine countermeasures applications. The use of robots removes the need for Navy personnel to operate in a potentially dangerous area like a minefield, and ensures their safety. Improved capabilities in seabed mapping can also lead to positive advancements in other fields such as support for environmental and archeological surveys.

During MANEX '14, CMRE capabilities, AUVs and sensors were challenged in a very complex environment where the sea bottom characteristics varied over the range of flat sand, seabed ripples, and heavy clutter. In particular, so-called Automatic Target Recognition (ATR) algorithms, computer programs used to find and identify

underwater objects in sonar imagery, were "stressed" in such a high clutter and complex environment with the objective of maximising detection rates while minimising false alarms. The data collected will greatly help to enhance the quality of the scientific research conducted by the Alliance in this field. Overall, the multinational aspect of the MANEX '14 trial allowed NATO and nations to gain experience in how autonomous systems can be used in joint mine countermeasures missions. The MANEX '14 sea trial is funded by the Allied Command Transformation.

For more information, visit www.cmre.nato.int.

DeepOcean now working with new Teledyne TSS cable trackers

A recent investment by DeepOcean in four pipe/cable tracking systems from Teledyne TSS is now bearing fruit with the company putting them to work on a number of different subsea projects. DeepOcean took delivery of two TSS 440 and two TSS 350 systems at the start of the summer season and has been using them regularly since then.

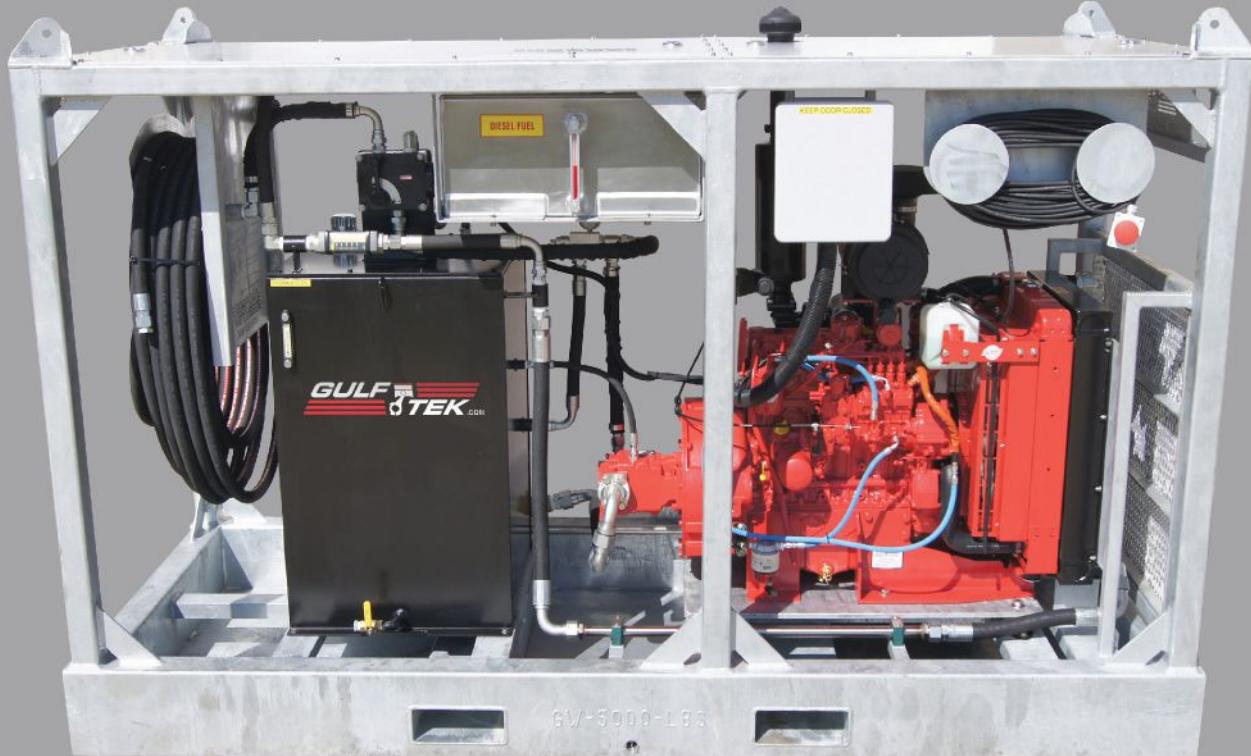
The four high-value systems are occupying an essential role in DeepOcean's high technology equipment inventory. The company undertakes a wide range of subsea services that include survey and seabed mapping, subsea installation and intervention, inspection, maintenance, repair and decommissioning. The Teledyne TSS systems can be used for cable and pipe tracking which is essential for many of these tasks and DeepOcean is now making good use of their capabilities.

A state-of-the-art new-build cable lay vessel was recently chartered by DeepOcean from Maersk Supply Services and the cable trackers are expected to be used to support its work. The new ship will be involved with Interconnector projects as well as work in the oil, gas and renewable sectors.

Other projects that are likely to require the use of the new pipe and cable trackers include a recently announced contract to provide inspection, repair and maintenance services for the subsea assets of Dong Energy in Danish and Norwegian waters. The company has a strong track record in the inspection of subsea pipeline systems and will be fitting the TSS systems to its ROVs when surveys are required.

For more information, visit www.deepoceangroup.com.

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MARITIME COMMUNICATIONS

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NSSLGlobal and ESL merge

NSSLGlobal, the independent service provider of satellite communications, has announced its merger with the ESL group of companies, a satellite solution provider and system integrator specializing in custom solutions for the government, fishing, commercial shipping and offshore industries. The merger allows both companies to pool their engineering expertise and experience to provide their respective customers with increased global support and a broader product and service offering focused on developing solutions to meet the ever changing needs of our customer's. NSSLGlobal and ESL both target similar market sectors within specific geographies that are complementary. The merger gives each company a broader global reach; NSSLGlobal benefiting from increased presence across Europe through ESL's offices in Germany, Denmark and Poland, and ESL gaining a broader global footprint through NSSLGlobal's offices in the UK, New Orleans and Singapore. The combined group will have an expected annual turnover in the region of 90MEUR, with 150 employees and sales and service offices globally. As part of the combined transaction the former owners of ESL will become part Owners of the combined NSSLGlobal group. As part of the merger NSSLGlobal welcomes Henrik Christensen (current ESL CEO) and Nikolaj Hvegholm (current ESL COO) to its executive management team. Christensen and Hvegholm will continue to lead the original Group of ESL companies, with Christensen also taking on global responsibility for sales and strategy in the Maritime sector across the NSSL Group. Hvegholm will become the NSSL Group Commercial and Marketing Director. Current NSSLGlobal managing director Sally-Anne Ray will lead the merged companies, which will be re-named NSSLGlobal group by the end of year.

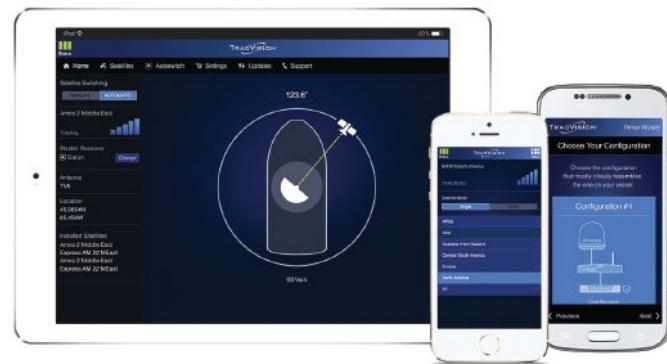
Seasat A/S selected for Maersk supply service vessels

Seasat A/S, specialized in delivering reliable broadband, television and voice services for the maritime market, has been awarded a multi-year contract with Maersk Supply Service. The contract covers the delivery of 60+ VSAT systems with broadband airtime from Eutelsat and SpeedCast, and is based on SAILOR 900 antennas from Cobham SATCOM. The contract runs for 36 months—Seasat A/S will install and commission the systems as well as provide service and support to the vessels. With this service setup, Maersk Supply Service will be able to enhance crew welfare and ship to shore connectivity in a global footprint. Maersk Supply Service vessels will benefit from Eutelsat's maritime connectivity services using SAILOR 900B VSAT antennas produced by Cobham that will be deployed and maintained by SEASAT. Using resources on four Eutelsat satellites, Maersk Supply Service will be able to enhance crew welfare and ship to shore connectivity in a footprint extending from the Gulf of Mexico to South-East Asia. Peter Faurhoj, Head of Navcom Systems at Maersk Supply Service, said, "Increasing charter and crew demand for fast and reliable internet require high quality equipment, a proven satellite provider and second to none service support. This additional multiyear contract with SEASAT will address our growing needs for reliable and cost effective communications services onboard our vessels. We are very satisfied with the tailor made setup, we have developed together with Seasat, and we are sure that our crew members and charters will be satisfied too."

UASC selects Wavecall™ Plus VSAT

United Arab Shipping Company (UASC) has selected WaveCall™ Plus VSAT services from Marlink to provide reliable connectivity for its new build fleet of 17 advanced container ships, first vessel due for delivery by the end of 2014. All 17 new container ships are designed to embrace "smart shipping" in order to reduce fuel use and environmental impact. UASC is deploying various technology solutions to support this, including a web-based fleet management system and electronic document handling systems, in addition to enhancing its crew welfare offering. WaveCall™ Plus, the global connectivity solution, seamlessly combining Ku-band VSAT with L-band, ensures that these systems can provide the data and decision support needed to maximize both vessel and fleet efficiency whilst improving crew services to stay in touch with family and friends on the phone, by email or other online applications. WaveCall™ Plus is one of the innovations that have come out of the AuroraGlobal multi-band satellite communications portfolio ensuring UASC with the most stable connectivity which is also future proof for High Throughput Satellite (HTS) services when available.

KVH offers "pay-as-you-go" DISH network service



KVH Industries, Inc., is bringing the benefits of "Pay-As-You-Go" satellite TV service from DISH Network to customers in the marine market for the first time. This program gives seasonal boaters with TracVision satellite TV antenna systems the flexibility to pay for DISH Network service only when their boat is in the water. There is no charge for starting or stopping monthly service.

This new program broadens the appeal of satellite TV on a boat. With a KVH TracVision satellite TV antenna system onboard, boaters can enjoy cruising to a favorite anchorage without worrying about being out of range of their favorite programming or local TV channels. They can also access high-definition TV service just like they get at home. Marine customers of the Pay-As-You-Go program can get more than 200 high-definition channels of DISH Network programming anywhere in the U.S., with no contract required; all packages are on a 30-day, month-to-month basis. The flexibility of the Pay-As-You-Go program is designed to suit the needs of many types of boat and yacht owners – from those who only occasionally voyage offshore to those who have never enjoyed the benefits of satellite TV onboard.

To promote the new Pay-As-You-Go program, KVH offers the option of a free DISH HD receiver with every TracVision TV-series marine satellite TV antenna system purchased. KVH's TracVision TV-series is a powerful family of fully stabilized antenna systems offering sizes, features, and options for every size boat. The four systems – TV1, TV3, TV5, and TV6 – are extremely compact, ranging in size from 12.5 to 24 in. in diameter, yet they offer superior in-motion performance.

For the Pay-As-You-Go program, KVH is working with Pace International, of Rochester, MN, an authorized national distributor for DISH.

For more information, visit www.kvh.com.

Elcome subcontracted for Oman Coastal Radiocommunication Network

Elcome International is playing a key role in building a new maritime communication network for the Sultanate of Oman. Under a subcontract awarded in April 2014 by Frequentis AG of Austria, Elcome is supplying key components of the network as well as system integration, installation, training and maintenance for equipment in the operations center and remote sites.

The network is deployed and operated by Qnective Middle East. The local subsidiary of the Swiss company Qnective

was awarded through its Omani partner company, Al-Madakhel Investment LLC, a First Class A License for network construction and operation by the Sultanate of Oman. The network will provide the obligatory shore-based terrestrial and satellite-based Global Maritime Distress and Safety System (GMDSS) communication services covering Sea Areas A1, A2 and A3 of Oman's territorial waters and beyond. This includes an upgrade of the existing NAVTEX maritime safety information broadcasting system. In addition, the integrated system encompasses a new coast-wide Automatic Identification System (AIS) and a ground-based segment for receiving and processing COSPAS-SARSAT distress alerts from emergency beacons.

The Oman network will be managed from a dedicated Maritime Radiocommunication Operations Center (MROC), operated by Qnective Middle East in Muscat, which is equipped with state-of-the-art technology for control of all maritime communications in Oman. The operations center is manned 24 hrs a day. The MROC also has a large training facility.

The coastal infrastructure includes strategically located radio sites around Oman's coastline from Khasab in the north to a location west of Salalah, as well as two NAVTEX transmission sites in Wattayah and Salalah to give coverage of Oman's sea lanes out to 275 nmi. AIS receivers and direction-finding antennae are co-located at remote radio sites to track and monitor vessels out to 30 nmi offshore, including Oman's large commercial fishing fleet.

For more information, visit www.elcome.com.

XChange 3.1 introduces new features

Airbus Defence and Space has added new features to its XChange communications management platform with the release of version 3.1 at SMM 2014. Headlining the new version is a unique system that provides Universal Remote Access to any device connected to on-board networks or the IT network itself and new functionality that builds on the recently released BYOD (Bring Your Own Device) solution for XChange.

Universal Remote Access as a new option for XChange provides secure remote access to computers on board a vessel from anywhere. It meets the growing need from ship-owners, communications equipment manufacturers, satcom service providers and maritime service companies to easily access IT networks on board from shore for maintenance and troubleshooting.

XChange Universal Remote Access differs from standard remote access solutions, which are designed for specific terminals or protocols and require their own IP address. The new system is a universal, single tool to control any device onboard. It supports all protocol formats and is completely carrier independent, working on all connectivity types from VSAT (Very Small Aperture Terminal) to Inmarsat FleetBroadband and Iridium OpenPort or even non-satcom connectivity.

In addition XChange version 3.1 includes a new functionality that automates and, thus, reduces action required for managing and allocating crew credit. XChange's new user admin and credit management functionality frees the Captain or Master on board from time consuming admin tasks, they just need to configure the monthly amount of data allowance per crew member, which is then renewed automatically—month after month as long as they are on board. The new version also makes it easier for crew to use online connectivity/communications credit while being on board for the first time. When a new crew member comes on board, they can self-register with one click via the XChange interface. After having registered, they can purchase a PIN vouch-

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er at the crew kiosk and go online, either using a Crew PC in the crew room or their own device in the cabin.

Airbus Defence and Space has so far shipped 1200 XChange systems, with more than 80 shipping companies currently using it. Over 70% of vessels with XChange installed use it for switching between satellite terminals on board with a 50:50 split between VSAT and FleetBroadband services. Over 60% of these vessels use XChange as their main router. XChange is a key component of Airbus Defence and Space's AuroraGlobal portfolio. Launched in March 2014, AuroraGlobal offers the full capabilities of Airbus Defence and Space's satellite services and infrastructure, offering flexible solutions based on X-, Ka-, Ku-, C and L-bands.

For more information, visit www.airbusdefenceandspace.com.

Intellian FB500 approved for Inmarsat XpressLink

Inmarsat announced that Intellian has been selected to deliver XpressLink services across its FB500 antenna.

XpressLink is the world's leading, fully integrated Ku-band and L-band solution used with VSAT and FleetBroadband terminals. It is proving highly popular with ship owners across the world with its offer of unlimited data for a fixed monthly fee, while also delivering a fully redundant and resilient service. XpressLink also offers an easy upgrade path to Global Xpress.

Previously approved to deliver XpressLink services over its V100GX VSAT antennas, the inclusion of FB500 within the XpressLink terminal offerings further strengthens Intellian's position as an important partner supporting Inmarsat's future Maritime portfolio. An Inmarsat partner since 2011, Intellian provides services primarily to the maritime sector, as well as to luxury yachting, offshore energy, and defense and intelligence.

The FB500 antenna has demonstrated its effectiveness in supporting XpressLink services, having been deployed on vessels of a number of Inmarsat's commercial maritime customers.

The addition of the Intellian FB500 complements the inclusion of Intellian's V100GX antenna in the XpressLink hardware set up. Inmarsat has been using the V100GX VSAT antenna as part of its XpressLink offering for the last 2 years.

For more information, visit www.inmarsat.com.

Marlink VSAT for 75 new Scorpio tankers and bulkers

Scorpio Ship Management (SSM) has chosen Marlink's WaveCall VSAT services for 75 new build tankers and bulkers to be delivered throughout 2015 and 2016. Following a separate contract in 2013 to provide VSAT services for 46 new buildings and upgrading of the existing 27 vessels, this new contract adds into a total of 148 SSM managed vessels that will operate using WaveCall Plus services.



Marlink was selected for the original 46 new buildings and existing fleet upgrade in a competitive bidding process, with WaveCall winning due to its exceptional quality of service during testing. Happy with the performance offered by WaveCall, based on 512-kbps uplink and 256-kbps downlink, SSM has selected the same service parameters for its 75 new vessels. Each vessel is being fitted with a 1-m Ku/Ka-band convertible antenna, L-band backup, and Iridium handheld with external antenna for security and anti-piracy applications. WaveCall is the first maritime innovation from the AuroraGlobal multi-band portfolio, providing Scorpio with the most stable connectivity and future proof service, also offering HTS satellites when available.

Marlink's Quality of Service and Support is matched by a high performing IT organization in SSM. Marlink's service provides the bandwidth that SSM IT staff need to remotely manage SSM vessels from shore, ensuring their ability to increase safety and efficiency across the entire fleet. In addition, WaveCall Plus will enhance the free internet services provided to the crew on SSM-managed vessels by adding more bandwidth for crew to use.

Delivery of WaveCall VSAT for the first 46 SSM new build vessels is proceeding as planned, with 30 installations already completed and ready for service as of the end of August.

For more information, visit www.marlink.com.

Videotel content to be delivered by KVH IP-MobileCast TRAININGlink

Videotel, the leader in maritime e-Learning and a company of KVH Industries, Inc., has announced plans to continually update its training programs via KVH's IP-MobileCast TRAININGlink, a move that has the potential to transform maritime training at sea. Videotel's new continual improvement model of application and content updating will be implemented for its flagship products Videotel on Demand (VOD) and Networked Videotel on Demand (NVOD) by utilizing the multicasting technology of KVH's IP-MobileCast content delivery service.

Subscribers to VOD and NVOD who are also customers of KVH's mini-VSAT Broadband service and IP-MobileCast content delivery service will receive new training material as soon as it is released, with free delivery over their broadband connection. This is an unparalleled improvement over current practices, where annual training program updates must be sent by CD-ROM or USB stick via courier, which can often involve an average time of 1-3 months to reach a vessel. The VOD system is a computer-based solution for crew training and records management onboard ship; the NVOD enables access across the vessel's network system allowing multiple users to train simultaneously on different or the same subjects, with all training being recorded.

With the immediacy of the IP-MobileCast delivery method, Videotel can more effectively help maritime operators keep their crew training completely up to date. Good training, an essential element of any industry, can be particularly challenging to implement in the maritime industry because of the logistics involved in reaching mariners. The fact that the shipping industry faces complex maritime regulations, ship inspections, and company audits makes it even more critical that ships keep their crews current with effective, high-quality training.

Videotel's training solutions are currently available onboard more than 11,000 vessels worldwide. In addition to an extensive portfolio of training films, Videotel's platform also includes recording and reporting management software, enabling shipping companies to monitor and track training of their crews using cloud-based technology.

KVH provides maritime broadband connectivity to vessels worldwide through its TracPhone V-IP series termi-

nals and mini-VSAT Broadband service. KVH shipped its 4,000th TracPhone system for mini-VSAT Broadband earlier this year; its mini-VSAT Broadband service is the market share leader in maritime VSAT, according to an industry report by Euroconsult released in March 2014. KVH introduced the IP-MobileCast content delivery service in May, which provides fast and affordable delivery of news, sports, entertainment, training, and operations content to vessels at sea; TRAININGlink is the channel that delivers training materials to vessels subscribing to the IP-MobileCast service.

For more information, visit www.kvh.com.

Elite Communications selects EMC as its satellite connectivity provider

Elite Communications has selected Emerging Markets Communications (EMC) as its satellite connectivity provider for existing oil and gas customers in North America and prospects worldwide. Elite Communications provides full service telecommunications, including on-site support, monitoring, and equipment to the industry in onshore and offshore remote sites. EMC will deliver a satellite virtual network operator (VNO) solution that includes bandwidth capacity, implementation, 24 x 7 support from the Global Operations Center, and on-demand scalability for growth. EMC's connectivity solution will provide increased reliability and flexibility for Elite's customers in the Gulf of Mexico and throughout North America, onshore in over 100 sites.

"We selected EMC as our VSAT provider based on their proven experience in delivering reliable connectivity to the oil and gas industry," said Trey Duplechin, general manager, Elite Communications. "Our relationship with EMC goes beyond the VNO solution for North America by providing access to EMC's global infrastructure, capacity, field support locations and teleport. For our customers, this results in faster scalability and more connectivity options."

EMC's virtual network operator solution will deliver internet access for Elite's existing and future customers in the Gulf of Mexico and North America. The solution utilizes Elite's existing hardware, requiring minimal up-front capital costs; a quickly-deployed implementation, providing immediate availability of on-demand satellite capacity and the teleport link.

For more information, visit www.emc-corp.net.

NSSLGlobal adds new beams to extend global coverage

NSSLGlobal has added two new satellite beams to improve the quality and geographical reach of its global VSAT network. The additional beams will provide customers in the Nordics, Europe, North Africa, the Middle East and Far East with better coverage at sea and on land.

The Telenor Thor 6 Nordic beam, positioned 1 degree West, is a new addition to NSSLGlobal's existing VSAT network covering the Nordics and Europe and will operate from NSSLGlobal's Norwegian Teleport. It will improve connectivity for customers from Svalbard and Iceland to France and Romania, covering the majority of Europe.

The Eutelsat 70B, positioned 70.5 degree East, will operate from NSSLGlobal's Cyprus Teleport, and is a replacement for the existing ABS2 beam. This will allow vessels traveling between Europe and the Far East via the Suez Canal to stay connected via one beam for their entire journey, rather than switching between different beams. This will ensure customers have a consistent connection to phone lines and the internet around Europe, North Africa, the Middle East and the Far East.

The introduction of the two new beams provides NSSLGlobal customers access to higher levels of bandwidth, faster broadband and more reliable voice/data communications at sea and on land. The beams were operational from 1 September 2014 to current and new customers.

For more information, visit www.nsslglobal.com.

GVF launches glossary of maritime communications

During the Informa VSAT 2014 conference in London, the Global VSAT Forum (GVF) announced the launch of its Maritime SatCom Forum (MSF) Glossary. The document, earlier iterations of which were developed by the Maritime SatCom Forum Working Group of the GVF, has been further developed by the joint-chairs of the MSF, Martin Jarrold, chief of international programme development, GVF, and Roger Adamson, chief executive, Futurenautics.

"The Glossary comprises a highly comprehensive A to Z of the terminology used on a daily basis by the satellite communications industry in its

dialogues with one of its key customer vertical markets," commented Martin Jarrold. Mr. Jarrold further remarked that having a working group, such as the MSF, which is focused on the maritime space, is a reflection of the fact that "The technology of communications and the exchange of information it facilitates has undergone a highly-accelerated development, and with such advanced communications the maritime communications service environment has now progressed fully into the broadband age. Against this evolving technology and service backdrop, the MSF has built a strong relationship with InterManager—the international association of ship managers—the Secretary General of which, Captain Kuba Szymanski, has been a constant and forthright advocate of the Glossary."

Roger Adamson added that, "The development of the Glossary was driven by requests from the maritime customer marketplace for a detailed explanation and elaboration of the terminology commonly used by satellite communications solutions vendors, and this document will serve to improve the quality and effectiveness of discussions at the interface of the solutions seller and the solutions buyer."

Martin Jarrold further commented, "Roger Adamson has previously collaborated with GVF in connection with the GVF-EMP Conference Partnership Broadband Maritime/Maritime Insights Conference Series and brings a wealth of maritime-related experience, as well as background knowledge of satellite communications in the maritime space."

Following the launch of the Glossary during the conference proceedings, the GVF, in collaboration with InterManager and Futurenautics, will engage in a continuing program to disseminate the Glossary as a key resource to enhance the future dialogues between the satellite solutions community and the maritime solutions customer environment.

Commented Captain Szymanski, "The shipping industry needs more standardization and I am delighted to see this joint project completed. Our new 'Glossary' shows that it is possible to identify and agree on terms to make the industry understandable for all stakeholders, with special attention to seafarers who are, ultimately, the end users."

For more information, visit www.gvf.org.

JDR wins contract for German offshore wind farm

VBMS has awarded JDR the inter-array cable contract for the Vattenfall AB Sandbank offshore wind farm. JDR will design and manufacture 105 km of inter-array cable, including a new coilable 630 sq. mm copper core cable and a range of cable accessories. The Sandbank offshore wind farm will be constructed 90 km west of Sylt Island, within the exclusive economic zone off the German North Sea coast. The farm will comprise 72 x 4 MW turbines in water depths between 25 and 37 m. Construction is expected to start in 2015. The JDR engineering team will design and manufacture two inter-array cables; a 185-sq. mm copper conductor cable and a 630-sq. mm copper conductor cable. The Sandbank cable incorporates JDR's qualified coilable design. This approach, which enables cables to coil into a static tank or basket removing the need for powered turntables or vertical reels, utilizes a helically wound polypropylene string serving over the cable armoring.



Both cables will be supplied in splice-free lengths, be XLPE insulated and type tested

to IEC 60502-2 and CIGRE standards. Alongside the inter-array cables, JDR will supply a range of accessories including pulling grips, hang-offs, connectors, cable cleats and subsea repair joints. The cables will be manufactured at JDR's custom-built Hartlepool facility. This specialist facility is alongside a deepwater dock with direct access to North Sea shipping lanes, ideally positioned for loadouts for European wind farm projects.

Normandie 3 makes connection to Guernsey

64

Restoring full electricity import capacity to Guernsey has moved a step closer as engineers have begun the process of energizing Normandie 3, the Channel Islands Electricity Grid's new undersea power cable connection to France. The cable, linking Periers in France with Jersey, has a 100-MW capacity, doubling the amount of electricity the Channel Islands can import. The project is running ahead of schedule and engineers from Guernsey, Jersey and France plan to complete the testing phase and bring the cable into service before the winter months. Investment in this new cable is part of Guernsey Electricity's strategy for long-term investment, which is centered on further strengthening the undersea cable network.

Multinational group to build U.S.-Latin America cable

Algar Telecom (Brazil), Angola Cables (Angola), Antel (Uruguay) and Google announced plans to build a new submarine fiber optic cable connecting the key cities of Santos and Fortaleza in Brazil with Boca Raton, Florida, in the United States. TE Connectivity SubCom is the selected provider for the project. This investment is part of a joint effort to help build the fabric of the Internet to sustain the current needs of Internet users in the Latin American region and to prepare for increased demands in the future. Currently, Latin America has a connected population of almost 300 million people and has become one of the fastest growing regions in the world in terms of Internet penetration. In addition, with the increasing deployment of LTE networks and fiber-optic network access, as well as the offer of high-quality contents (HD/4K) and cloud-based services, there is an ever growing demand for capacity access to data centers and the Internet globally. The new route will be 10,556 km (6,560 mi) long and have six fiber pairs. According to estimations, it will increase the overall bandwidth of existing subsea cable systems by 64 Tbps of capacity. The cable will be built and operated by these four leading companies. Construction is expected to begin immediately and is planned to be completed by the end of 2016.

EQT Infrastructure II acquires Islalink



The EQT Infrastructure II Fund has agreed to acquire a majority shareholding of IslaLink Submarine Cables, S.L., an independent and neutral operator of submarine fiber optic cables in and around Spain. IslaLink will be acquired, through a series of transactions, from an investment entity related to the Cube Infrastructure Fund and from the founders Alfonso Gajate and Ross Mullins. The founders and the management team will remain with the company.

IslaLink was founded in 1999 by Alfonso Gajate and Ross Mullins. IslaLink deploys and operates submarine cables in underserved routes to provide telecom operators with the managed bandwidth services required for their retail operations. The company owns and operates one of the main fiber optic cables connecting the Balearic Islands to mainland Spain and manages international IP-traffic for customers such as telecom operator Algérie Télécom. IslaLink is headquartered in Madrid, Spain and has around 20 employees.

"EQT has been monitoring the developments in the telecom fiber sector for a long time and is excited about the acquisition of IslaLink. IslaLink is a well-run business with an excellent management team and strong partnership-based relationships with its customers. We believe that data traffic over fiber optic cables will continue to grow and see substantial value creation opportunities both in IslaLink's existing business as well as through new expansion and growth initiatives," says Daniel Pérez Wikmark, responsible for Spain and Portugal at EQT Partners, Investment Advisor to EQT Infrastructure II. "The acquisition will also be EQT's second investment in Spain and we are exploring additional investment opportunities both in the Spanish and Portuguese markets," continues Daniel Pérez Wikmark.

"After 7 years of continuous growth and development of the company, we made the decision with the founders to let IslaLink open a new chapter to support its development. We are confident that under EQT control, IslaLink will continue its growth for the satisfaction of its clients," said Henri Piganeau, managing partner at Cube.

Closing of the transaction is expected in the fourth quarter of 2014, subject to customary anti-trust approvals.

For more information, visit www.eqt.se or www.islalink.com.

HC2 acquires Global Marine

HC2 Holdings, Inc. announced the acquisition of Bridgehouse Marine Limited, the parent holding company of Global Marine Systems Limited.

Global Marine is a leading provider of engineering and underwater services, responding to the subsea cable installation, maintenance and burial requirements of its customers around the world. With a fleet of vessels and specialized subsea trenching and burial equipment, the company brings a 160 year legacy in deep and shallow water cable operations. The company's main operating offices are in Chelmsford, UK, and Singapore.

The Board of Global Marine will be strengthened with the addition of Dick Fagerstal as executive chairman. Mr. Fagerstal brings a wealth of industry-relevant experience to the board alongside current directors, Ian Douglas and Global Marine's chief financial officer Bill Donaldson.

HC2 acquired Bridgehouse pursuant to a Sale and Purchase Agreement between Global Marine Holdings, LLC, a subsidiary of HC2, and the stockholders of Bridgehouse. The purchase price reflects an enterprise value of approximately \$260 million, including assumed indebtedness of Global Marine, and was funded through a new senior secured credit facility provided by Jefferies Finance LLC and a sale of convertible preferred stock to DG Capital Management, LLC and another investor. The sale of preferred stock will also provide HC2 with additional working capital for general corporate purposes.

HC2 operates as a holding company of operating subsidiaries primarily in the United States and the United Kingdom. Founded in 1994, HC2 is headquartered in Herndon, Virginia.

For more information, visit www.globalmarinesystems.com.

Jee Ltd awarded pioneering tidal energy cable solutions contract

Jee Ltd, a leading independent multi-discipline subsea engineering and training firm, has been awarded a contract from Scottish Enterprise to develop subsea electrical array cable solutions for tidal energy installations.

The contract is part of a pioneering study for the marine energy industry in Scotland and will see Jee develop solutions for locating, securing, protecting and recovering electrical array cables for tidal energy installations. The cables will transport power generated from tidal energy devices deployed in high tidal flow areas to the shore.

Jee is one of five companies to work on the project, which has been supported

by £2.4 million of funding. As part of Task A of the project, up to three solutions from the five presented by the participating companies will be chosen to progress through to practical demonstrations in sea conditions by autumn 2015.

Jee has approached the problem by developing four innovative concepts that have been assessed for the practicalities of installation and retrieval in order to identify the most suitable solution.

For Task B of the project, Jee will develop a conceptual design for a solution to meet longer-term requirements for cable protection in tidal arrays. The produced solution could involve substantial shifts in the way cables are manufactured and installed, and significantly contribute to the growth of the emerging tidal energy industry.

For more information, visit www.jee.co.uk.

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Green light for COBRAcable

The Dutch transmission system operator, TenneT TSO B.V., and its Danish counterpart, Energinet.dk, have given their final approval for the development of COBRAcable. This new, over 300-km long subsea direct-current electricity connection (interconnector), will directly connect the Dutch and Danish power grids. Completion of the cable is scheduled early 2019.

The new interconnector will have a transmission capacity of approximately 700 MW and will run from Eemshaven (Netherlands) to Endrup (Denmark). The connection will be constructed as a High-Voltage Direct Current (HVDC) cable, since the use of DC technology minimizes transmission losses over long distances.

To transport the alternating current (AC) on the on shore grids of TenneT and Energinet.dk via a direct current (DC) sea cable, it is required to build a so called converter station on the mainland in both the Netherlands (Eemshaven) and Denmark (Endrup). These stations convert alternating current into direct current and vice versa. All on shore electricity grids are all carried out on the basis of alternating current.

In both countries the COBRAcable will have a positive socio-economic effect. The expected investment of over EUR 600 million is made by TenneT and Energinet.dk on behalf of the electricity producers and consumers. Each of the two TSOs has a 50% stake in the COBRAcable project. TenneT's part of the investment is expected to be reimbursed by the revenues of auctions of transmission capacity on TenneT's existing interconnectors which are managed by the Foundation for the Management of Allocated Funds.

COBRA is an abbreviation of 'COpenhagen BRussels Amsterdam.' The European Commission is supporting the COBRA project with a EUR 86.5 million subsidy under the European Energy Programme for Recovery (EEPR). The subsidy was granted to the COBRAcable because this project can be integrated into a future offshore electricity grid in the North Sea, will promote competition in the electricity market, and will contribute to the integration of large volumes of wind energy in the electricity grid.

TenneT and Energinet.dk will now set to work on securing the required



permits and putting the project out to tender. The expectation is that the contracts will be awarded in late 2015, followed by the start of construction work in 2016 and completion of the cable in early 2019.

For more information, visit www.tennet.eu or www.energinet.dk.

Alcatel-Lucent starts construction of SEA-ME-WE 5

The South East Asia-Middle East-Western Europe 5 (SEA-ME-WE 5) consortium has announced that the contract for the deployment of the SEA-ME-WE 5 undersea fiber optic cable system spanning 20,000 km from Singapore to France has come into force.

The new 100G SEA-ME-WE 5 will deliver ultra-broadband capacity and faster access to consumers and businesses. Its ultimate design capacity of 24 Terabit per second (Tbps) will be used to serve the countries along its route.

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The system will connect Singapore to Europe (Italy and France) and traverse Indonesia, Malaysia, Thailand, Myanmar, Bangladesh, Sri Lanka, India, Pakistan, Oman, UAE, Yemen, Djibouti and Kingdom of Saudi Arabia. Alcatel-Lucent has started construction of the segments spanning from Sri Lanka to France. Co-contractor NEC will be deploying the Singapore to Sri Lanka segment.

The SEA-ME-WE 5 consortium is composed of Bangladesh Submarine Cable Company Limited, (BSCCL), China Mobile International, China Telecom Global, China United Network Communications Group Company, Djibouti Telecom, Emirates Integrated Telecommunications Company (PJSC), Orange, Myanma Posts and Telecommunications, Saudi Telecom Company, SingTel, Sri Lanka Telecom, TOT, PT Telekomunikasi Indonesia International, Telecom Italia Sparkle, Telekom Malaysia Berhad and Yemen International Telecommunications (TeleYemen).

SEA-ME-WE 5 will integrate Alcatel-Lucent's latest innovations in subsea communications, including the Alcatel-Lucent 1620 Light Manager submarine line terminal using Advanced Coherent technology and incorporating the latest Soft Decision Forward Error Correction (SDFEC) technology as well as its advanced ROADM branching unit offering dynamic features for enhanced system resilience. Alcatel-Lucent will also install cable and repeaters, and the cable system will be managed by Alcatel-Lucent's end-to-end submarine network management system. As part of the contract, Alcatel-Lucent will also be in charge of project management, system design, marine operations and system commissioning.

For more information, visit www.alcatel-lucent.com.

Xtera reports on latest unrepeated performance

Xtera Communications, Inc. reported on the industry's leading unrepeated transmission performance for an ultra-high line capacity of 15 Tbps at the ECOC 2014 conference held in Cannes, France (21-25 September 2014).

These latest unrepeated transmission demonstrations follow the results jointly presented by Xtera, Verizon and Corning at the Post-Deadline Paper session of the OFC 2014 conference (9-13 March 2014 in San Francisco, California, USA) where the maximal

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unrepeated reach was explored with a record distance of 557 km of Corning® Vascade® EX2000 optical fiber.

The purpose of the work presented at ECOC 2014 was to demonstrate high cross-sectional capacity over very long unrepeated reach. Using Xtera's commercial Nu-Wave Optima™ optical networking platform, built around Xtera's Wise Raman™ solution, 150 x 100G channels were transmitted on 334 km of ITU-T G.652 compliant Corning® SMF-28® ULL fiber with an average Aeff of 83 μm^2 . When a Remote Optically Pumped Amplifier (ROPA) is inserted in the line at about 115 km from the receiver end, a distance of 390 km of Corning® SMF-28® ULL fiber can be bridged, still at the 150 x 100G capacity.

These unrivalled transmission results were further improved with the transport of 150 x 100G channels over 410 km of Corning® Vascade® EX2000 optical fiber with an average Aeff of 112 μm^2 .

Xtera's Wise Raman™ technology increases the optical span length by turning some parts of the line fiber into an amplification medium. This is achieved via the Raman nonlinear effect where optical pump waves are launched

into the fiber to create optical gain for the WDM carriers.

For more information, visit www.xtera.com.

Contract for extension of AAE-1 comes into force

The consortium behind the Asia-Africa-Europe-1 (AAE-1) submarine fiber optic cable project—connecting Asia, the Middle East, East Africa and Europe—has signed a supply contract with NEC Corporation for the S1H segment, representing the Thailand-Vietnam-Hong Kong section of the network. The supply contract has come into force as of 8 October 2014.

This milestone announcement follows awards to a contractor for the AAE-1 S1S and S2 segments, and signals major progress in linking the major cities of Asia, Africa and Europe.

Stretching approximately 25,000 km, AAE-1 is scheduled to be ready for service in 2016 as the first high-capacity intercontinental submarine cable to pass through the Songkhla and Satun provinces of southern Thailand. In fact, AAE-1 will be the first high-capacity cable system to link all major South

East Asian nations to Africa and Europe via the Middle East.

Serving unprecedented growth in Asia-Africa trade—as well as the booming markets of Vietnam and neighboring countries—this new cable system will deliver robust, reliable and low-latency connectivity. It will also provide desperately needed diversity for the congested subsea systems currently connecting countries along the route.

The consortium will work with NEC to ensure AAE-1's Thailand-Hong Kong segment is ready for service (RFS) at the same time as the Europe-Asia segment. This is yet further demonstration of a commitment to providing superior connectivity on the Europe-Middle East-Asia route, with increased diversity of connectivity to major telecom hubs in Hong Kong via a terrestrial link across Thailand.

Overall project progress is on schedule, with implementation works underway for the Europe-Asia segment—following award of a supply contract earlier in the year—together with marine survey activity in the Middle East and Mediterranean.

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When completed in 2016, the AAE-1 cable network will connect Hong Kong (SAR of China), Vietnam, Malaysia, Singapore, Thailand, India, Pakistan, Oman, UAE, Qatar, Yemen, Djibouti, Saudi Arabia, Egypt, Greece, Italy and France, with other locations under consideration.

For more information, visit www.nec.com.

AAG upgrades with Ciena

The Asia America Gateway (AAG) consortium recently selected Ciena® for a 100G expansion to significantly enhance its trans-Pacific cable network to address the growing demand for any-

where, anytime broadband access. Ciena's converged packet optical solutions will add multi-terabit data capacity, and enable AAG's network to reliably meet the demands of on-demand data networking services and traffic growth driven by mobile applications, high-definition video and cloud computing.

AAG is a 20,000-km submarine communications cable system, connecting Southeast Asia with the U.S. mainland, across the Pacific Ocean via Guam and Hawaii. It provides connectivity between Malaysia, Singapore, Thailand, Brunei Darussalam, Vietnam, Hong Kong SAR, Philippines, Guam, Hawaii and the U.S. West Coast.

The AAG submarine cable system was designed to serve as an alternative connectivity and as a complementary solution for links between Southeast Asia to the United States. The AAG cable system offers a more secure and diversified route that avoids the hazardous Pacific Ring, thus mitigating the effects from natural disasters such as earthquakes or tsunamis. AAG is also known as the first direct Terabit submarine cable system that offers competitive latency between Southeast Asia and the U.S.

The AAG consortium will deploy Ciena's GeoMesh submarine solution, including the 6500 Packet-Optical Platform, powered by WaveLogic coherent optics with Flexible Grid technology, to maximize ultimate capacity and provide greater return on investment of its subsea cable assets. With Ciena's plug-and-play programmable network elements and 100G coherent technology, the AAG consortium is able to cost-effectively extend the lifetime lifespan of its network by increasing the ultimate cable capacity by as much as three times the original design capacity in some segments.

In addition, Ciena's OneControl Unified Management System together with the integrated test set capabilities of WaveLogic will provide the operators of AAG end-to-end network management and visibility for early detection, diagnosis, and prioritization of any faults, ensuring that the operators of AAG can resolve issues proactively and maintain network availability.

For more information, visit www.ciena.com.

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The advertisement features a dark blue background with white and yellow text. The main title 'MCEDDEEPWATER DEVELOPMENT 2015' is in large white capital letters. Below it, 'Increasing Value through Industry Collaboration' is written in a smaller white font. The dates '24 - 26 MARCH, 2015' and location 'ExCeL • LONDON' are also in white. Logos for 'Quest Offshore' and 'ICI' are at the bottom left. On the right, a red rounded rectangle contains the text 'Get Involved' above three white ovals with black outlines. The ovals contain the words 'Exhibit', 'Sponsor', and 'Attend'. At the bottom right, there are logos for 'bp', 'REPSOL', 'SHELL', and 'TOTAL'. The bottom of the ad has a yellow bar with four small images: the London Eye, Big Ben, Tower Bridge, and British Royal Guards. The website 'WWW.MCEDD.COM' is at the bottom left.

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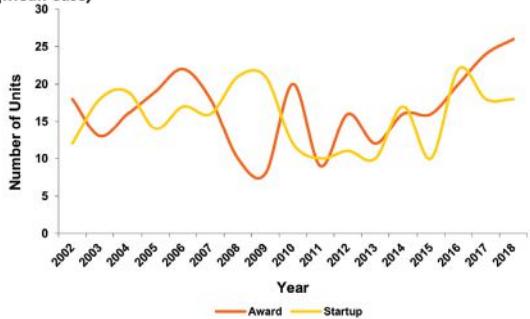
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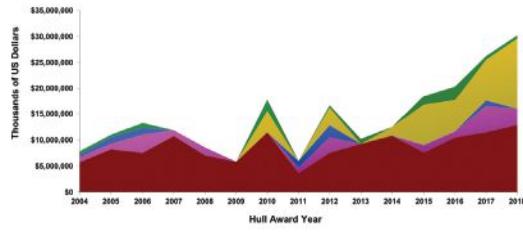
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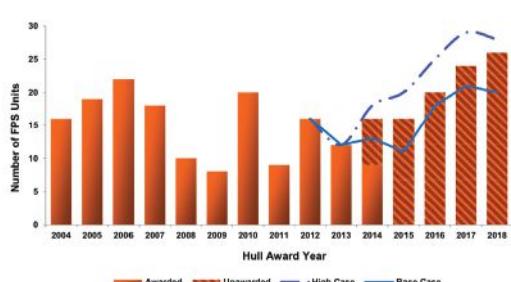
Worldwide Floating Activity by Year 2002 – 2018e
(Mean Case)



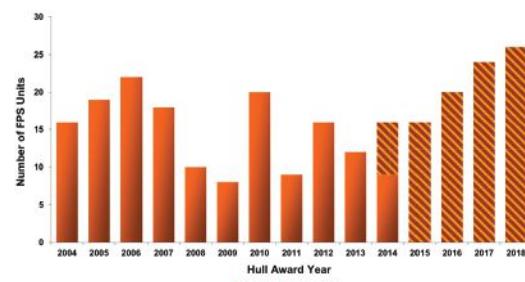
Worldwide Forecast FPS Spending by Year
Type Contribution Thousands of US Dollars by FPS Award Year



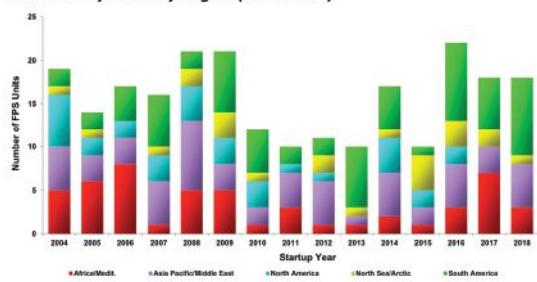
Worldwide Floating Awards by Year 2004 – 2018e
(Mean Case)



Worldwide FPS Forecast Awards 2004 – 2018e
By Award Status (Mean Case)



Worldwide Forecast Floating Activity by Startup Year 2004 – 2018e
Area Activity Share By Region (Mean Case)



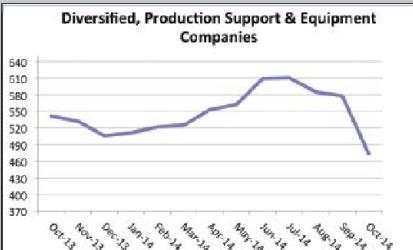
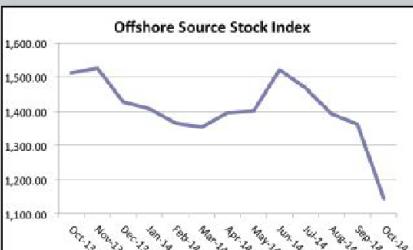
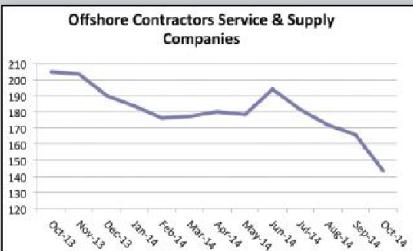
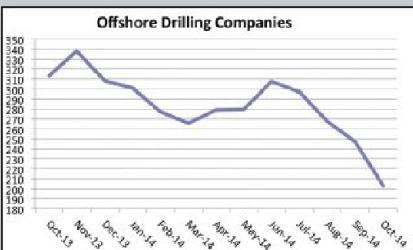
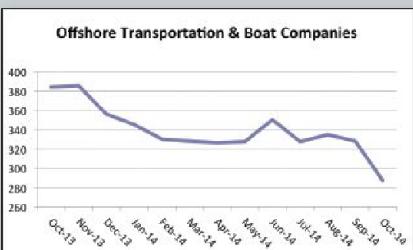
Worldwide Forecast FPS Spending by Year
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(Mean Case)



Monthly Stock Figures & Composite Index

Industry Company Name	Symbol	Close(Mid) October	Close(Mid) September	Change	Change %	High	52 week	Low
Diversified, Production Support and Equipment Companies								
Baker Hughes, Inc.	BHI	52.34	67.75	-15.41	-22.7%	75.64	49.52	
Cameron Intl. Corp.	CAM	55.95	71.19	-15.24	-21.4%	74.89	52.50	
Drill-Quip, Inc.	DRQ	83.21	92.73	-9.52	-10.3%	121.07	78.41	
Halliburton Company	HAL	49.27	66.76	-17.49	-26.2%	74.33	47.60	
Tenaris SA	TS	39.17	46.90	-7.73	-16.5%	48.67	38.60	
Newpark Resources, Inc.	NR	10.41	12.80	-2.39	-18.7%	13.64	10.17	
Schlumberger Ltd.	SLB	87.56	104.70	-17.14	-16.4%	118.76	84.91	
Superior Energy Services, Inc.	SPN	23.13	34.25	-11.12	-32.5%	37.05	22.33	
Weatherford International, Inc.	WFT	15.61	22.59	-6.98	-30.9%	24.88	13.07	
Deep Down, Inc.	DPDW	1.00	1.47	(0.47)	-32.0%	2.70	1.00	
FMC Technologies	FTI	56.12	56.12	-	0.0%	63.92	47.58	
Total Diversified, Production, Support and Equipment.....		473.77	577.26	-103.49	-17.9%	655.55	445.69	
Geophysical / Reservoir Management								
Dawson Geophysical Company	DWSN	18.08	22.35	-4.27	-19.1%	34.90	16.82	
Mitcham Industries, Inc.	MIND	11.12	11.35	-0.23	-2.0%	17.82	9.96	
Compagnie Gnrale de Gophysique-Veritas	CGV	7.86	10.21	-2.35	4.50%	23.17	7.54	
Total Geophysical / Reservoir Management.....		37.06	43.91	-6.85	-15.6%	75.89	34.32	
Offshore Drilling Companies								
Atwood Oceanics, Inc.	ATW	38.30	44.12	-5.82	-13.2%	58.46	37.50	
Diamond Offshore Drilling, Inc.	DO	37.70	38.42	-0.72	-1.9%	65.65	32.71	
ENSCO International, Inc.	ESV	37.66	45.25	-7.59	-16.8%	62.25	35.96	
Nabors Industries, Inc.	NBR	16.54	24.40	-7.86	-32.2%	30.24	15.32	
Noble Drilling Corp.	NE	18.33	26.94	-8.61	-32.0%	35.54	17.94	
Parker Drilling Company	PKD	4.11	5.62	-1.51	-26.9%	8.67	3.80	
Rowan Companies, Inc.	RDC	21.71	27.59	-5.88	-21.3%	37.81	21.19	
Transocean Offshore, Inc.	RIG	28.79	35.08	-6.29	-17.9%	55.74	27.80	
Total Offshore Drilling.....		203.14	247.42	-44.28	-17.9%	354.36	192.22	
Offshore Contractors, Services, and Support Companies								
Helix Energy Solutions Group, Inc.	HLX	21.78	25.52	-3.74	-14.7%	28.00	19.44	
Gulf Island Fabrication	GIFI	17.57	19.8	-2.23	-11.3%	26.82	16.43	
McDermott International, Inc.	MDR	3.75	6.44	-2.69	-41.8%	9.36	3.60	
Oceaneering International	OII	60.8	65.61	-4.81	-7.3%	87.64	58.54	
Subsea 7 SA	SUBCY.PK	11.86	14.52	-2.66	-18.3%	22.32	11.74	
Technip ADS	TKPPY.PK	18.11	21.33	-3.22	-15.1%	31.08	18.04	
Tetra Technologies, Inc.	TTI	9.21	11.68	-2.47	-21.1%	13.43	8.66	
Cal Dive International, Inc.	DVR	0.33	0.91	-0.58	-63.7%	2.10	0.26	
Total Offshore Contractors, Service, and Support.....		143.41	165.81	-22.40	-13.5%	220.75	136.71	
Offshore Transportation and Boat Companies								
Seacor Holdings, Inc.	CKH	75.43	78.50	-3.07	-3.9%	99.00	73.14	
Gulfmark Offshore, Inc.	GLF	29.74	36.61	-6.87	-18.8%	53.89	27.42	
Bristow Group	BRS	66.87	71.05	-4.18	-5.9%	85.70	64.10	
PHI, Inc.	PHII	39.78	42.85	-3.07	-7.2%	52.98	33.50	
Tidewater, Inc.	TDW	35.93	46.08	-10.15	-22.0%	63.22	34.90	
Trico Marine Services, Inc.	TRMAQ.PK	13.42	13.42	0.00	0.0%	10.39	13.73	
Hornbeck Offshore	HOS	25.88	39.44	-13.56	-34.4%	59.93	24.93	
Total Offshore Transportation and Boat		287.05	327.95	-40.90	-12.5%	425.11	271.72	

Monthly Stock Figures & Composite Index

Industry	Close(Mid) October	Close(Mid) September	Change October	Change % September	High 52 week	Low 52 week	
	Total Diversified, Production, Support and Equipment	473.77	577.26	-103.49	-17.9%	655.55	445.69
	Total Geophysical / Reservoir Management	37.06	43.91	-6.85	-15.6%	75.89	34.32
	Total Offshore Drilling	203.14	247.42	-44.28	-17.9%	354.36	192.22
	Total Offshore Contractors, Service and Support	143.41	165.81	-22.40	-13.5%	220.75	136.71
	Total Offshore Transportation and Boat	287.05	327.95	-40.90	-12.5%	425.11	271.72
	Total Offshore Source Index	1,144.43	1,362.35	-217.92	-16.0%	1,731.66	1,080.66

DISCLAIMER

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

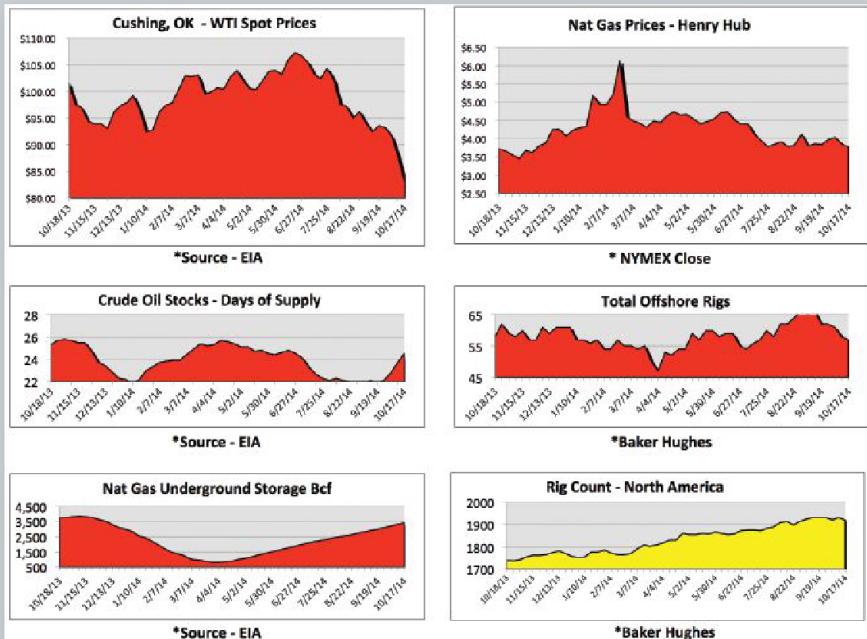
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Ocean News & Technology

Oil & Gas Industry Trends

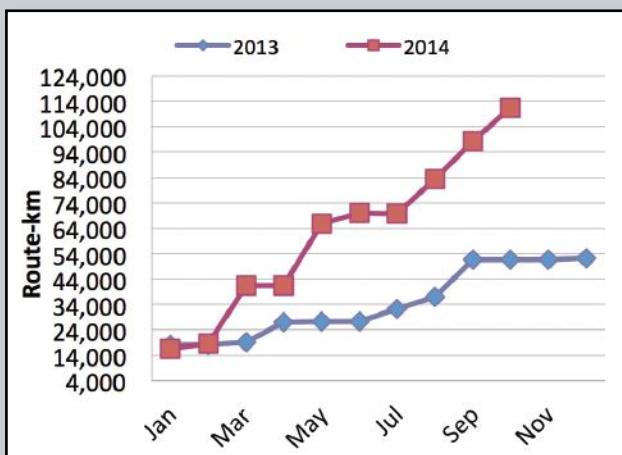
Monitoring the Pulse of the U.S. Offshore Oil & Gas Industry



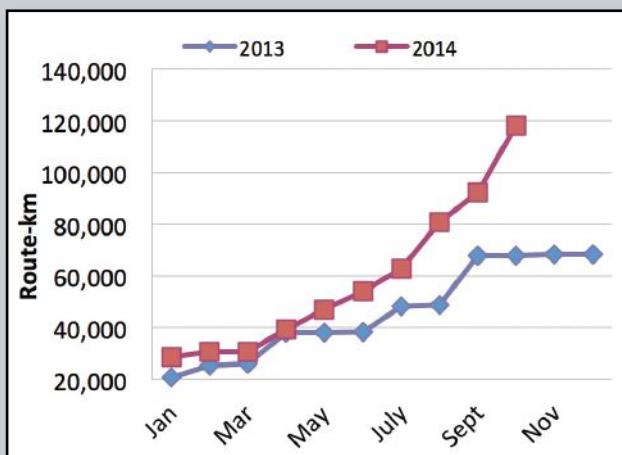
Positive trend, at least 3 weeks
 Changing trend, less than 3 weeks
 Negative trend, at least 3 weeks

Subsea Telecom & Power Cable Data

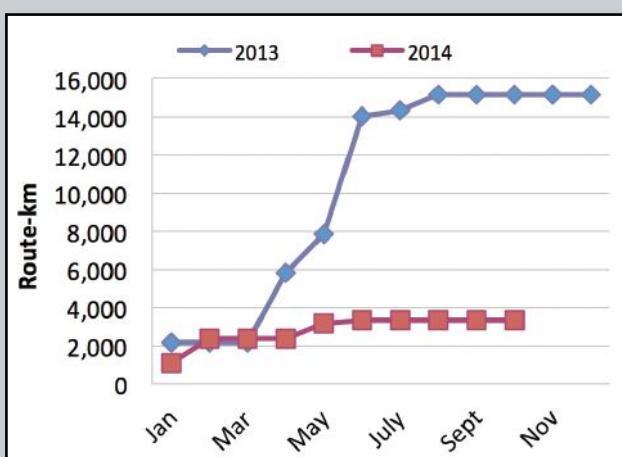
FO Cable Awards by Month



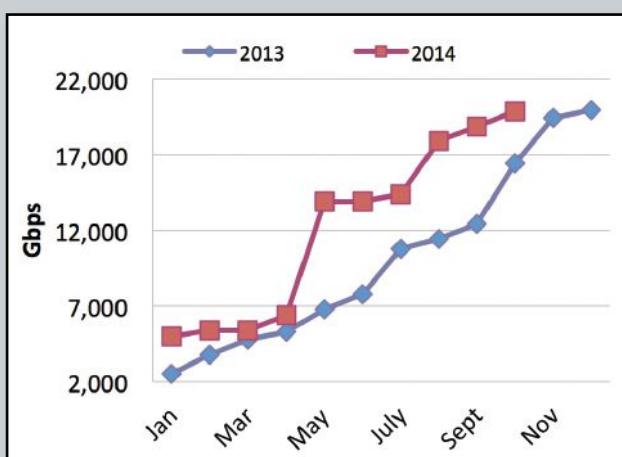
FO Cable Announcements



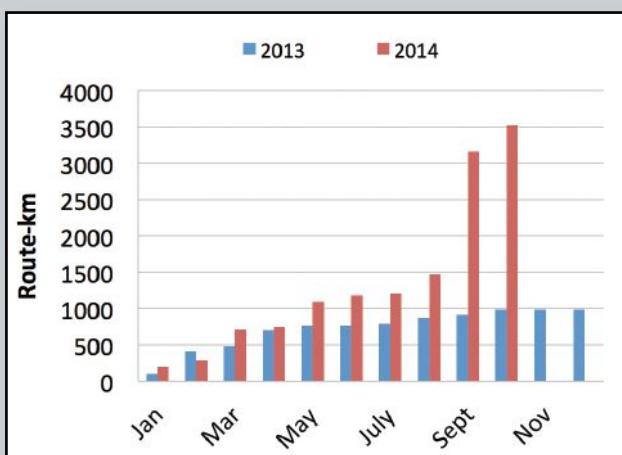
Submarine FO Cables Entering Service in Route-km



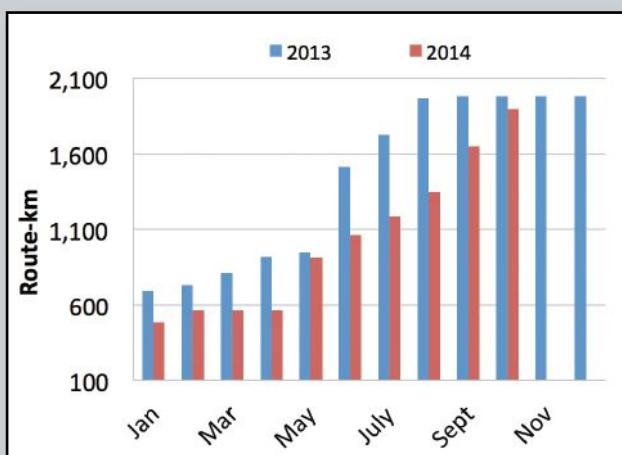
Upgrades of Existing Cable Systems in Gbps



Submarine Power Cable Awards in Route-km



Submarine Power Cable Announcements in Route-km



Gulf of Mexico Data

Current Deepwater Activity

Operator	Area	Block	OCS Lease	Rig Name	Prospect Name	Water Depth (ft)
Shell Offshore Inc.	WR	508	G17001	NOBLE JIM DAY	Stones	9,560
Anadarko Petroleum Corp.	LL	50	G23458	COIL TUBING UNIT (N.O. DIST)	Atlas-atlas nw	8,953
Anadarko Petroleum Corp.	LL	50	G23458	CAL-DIVE Q-4000	Atlas-atlas nw	8,953
Shell Offshore Inc.	AC	857	G17561	H&P 205	Great White	7,824
Shell Offshore Inc	DC	398	G25854	NOBLE GLOBETROTTER	Vicksburg/Gettysburg	7,579
ExxonMobil Corp.	WR	584	G20351	MAERSK VIKING	Julia	7,138
Marathon Oil Co.	WR	578	G33379	MAERSK VALLIANT	Belalcazar	6,958
Anadarko Petroleum Corp.	KC	875	G21447	WIRELINE UNIT (LAF #3)	Lucius	6,840
Anadarko Petroleum Corp.	KC	875	G21447	NOBLE BOB DOUGLAS	Lucius	6,840
Chevron USA Inc.	KC	785	G25806	PACIFIC SHARAV		6,827
Anadarko Petroleum Corp.	KC	875	G21447	WIRELINE UNIT (LAF #2)	Lucius	6,817
Anadarko Petroleum Corp.	KC	875	G21447	ENSCO 8500	Lucius	6,817
Chevron USA Inc.	KC	829	G25814	T.O. DISCOVERER CLEAR LEADER	Buckskin	6,428
BHP Billiton Petroleum (GOM) Inc.	AT	618	G08035	T.O. DEEPWATER INVICTUS	Neptune at 574	6,266
Repsol E&P USA Inc.	KC	642	G33335	ENSCO DS-5		6,124
Anadarko Petroleum Corp.	WR	52	G25232	DIAMOND OCEAN BLACKHAWK	Shenandoah	5,874
BP Exploration & Production, Inc.	MC	775	G09866	SEADRILL WEST CAPRICORN	Thunder Horse North	5,673
Eni US Operating Co. Inc.	MC	772	G16647	T.O. DEEPWATER PATHFINDER	Triton (mc)	5,639
BP Exploration & Production, Inc.	MC	778	G09868	T.O. DISCOVERER ENTERPRISE	Thunder Horse North	5,631
Anadarko Petroleum Corp.	GC	903	G24197	ENSCO 8506	Heidelberg	5,274
Chevron USA, Inc.	GC	807	G31752	PACIFIC SANTA ANA	GC 807 (Anchor Well)	5,183
Shell Offshore, Inc.	MC	687	G05863	ATWOOD CONDOR	Mensa	5,150
BP Exploration & Production, Inc.	GC	825	G09981	ENSCO DS-3	Mad Dog Phase 2	4,950
BP Exploration & Production, Inc.	KC	93	G25780	ENSCO DS-4	Gila	4,860
Hess Corp.	MC	726	G24101	STENA FORTH	Tubular Bells	4,570
Statoil Gulf Properties Inc.	DC	231	G33780	MAERSK DEVELOPER	DC 231 (Perseus Well)	4,495
BP Exploration & Production Inc.	GC	782	G15610	MAD DOG SPAR RIG	Mad Dog Phase 2	4,428
BP Exploration & Production Inc.	GC	627	G25174	SEADRILL WEST SIRIUS		4,416
Freeport-McMoRan Oil & Gas LLC	GC	645	G11080	HOLSTEIN SPAR RIG	Holstein	4,344
BHP Billiton Petroleum (GOM) Inc.	GC	653	G20084	GSF C.R. LUIGS	Shenzi development p	4,238
Shell Offshore, Inc.	MC	943	G34467	STENA ICEMAX	Oasis	4,213
Chevron USA, Inc.	GC	596	G16759	T.O. DISCOVERER INSPIRATION	Tahiti North	4,023
Chevron USA, Inc.	KC	10	G27698	T.O. DISCOVERER INDIA		3,958
Freeport-McMoRan Oil & Gas LLC	GC	643	G35001	NOBLE SAM CROFT		3,885
LLOG Exploration Offshore, LLC	MC	79	G27259	SEADRILL SEVEN LOUISIANA	Humphrey	3,861
Shell Offshore, Inc.	MC	809	G09873	NOBLE DON TAYLOR	Princess	3,853
Shell Offshore, Inc.	MC	809	G12166	H&P 204	Princess	3,800
Anadarko Petroleum Corp.	EB	602	G14205	HELIX 534	Nansen	3,503
Anadarko Petroleum Corp.	EB	602	G14205	WIRELINE UNIT (L.J. #2)	Nansen	3,503
Shell Offshore, Inc.	GC	248	G15565	T.O. DEEPWATER NAUTILUS	Glider	3,233
Shell Offshore, Inc.	MC	762	G07957	NOBLE BULLY 1	Deimos	3,144
Shell Offshore, Inc.	GC	158	G07998	H&P 202	Brutus	2,985
Shell Offshore Inc.	MC	807	G07963	H&P 201	Mars (Ursa/Princess)	2,945
Shell Offshore Inc.	GB	427	G07493	NOBLE JIM THOMPSON	Cardamom	2,719
Apache Deepwater LLC	MC	674	G13687	ENSCO 8505	Pluto	2,710
Anadarko Petroleum Corp.	VK	869	G13065	WIRELINE UNIT (N.O. #2)	Nile	2,423
Murphy Exploration & Production Co.	MC	538	G16614	T.O. DISCOVERER DEEP SEAS	Medusa North	2,047
Energy Resource Technology GoM, Inc.	GC	237	G15563	ENSCO 8502	Phoenix	1,940
Marubeni Oil & Gas (USA) Inc.	GC	155	G16698	NOBLE DRILLER	Manatee	1,939
SandRidge Energy Offshore, LLC	GC	65	G34539	H&P 206	Bullwinkle	1,353
SandRidge Offshore, LLC	EB	165	G06280	WIRELINE UNIT (L.J. DIST)	East Breaks 164	863
Ankor Energy LLC	MC	21	G22850	NABORS MODS 200		668
SandRidge Offshore, LLC	EB	110	G02650	NABORS S.D. IV	Tequila	660

Deepwater prospects with drilling and workover activity: 53

Current Deepwater Activity as of Monday, 6 October 2014

Activity by Water Depth			
Water Depth (m)	Active Leases	Approved Applications	Active
0 to 200	1,467	35,710	2,428
201 to 400	108	1,121	20
401 to 800	225	881	10
801 to 1,000	352	583	9
1,000 & above	3,325	1,967	26

Rig Activity Report 10 October 2014					
Location	Week of 10/10	Week +/- Ago	Week +/- Ago	Year Ago	Year Ago
Land	1859	+9	1850	+191	1668
Inland Waters	13	+2	11	-4	17
Offshore	58	-3	61	0	58
U.S. Total	1930	+8	1922	+187	1743
Gulf of Mexico	56	-3	59	0	56
Canada	420	-10	430	+63	357
N. America	2350	-2	2352	+250	2100

Activity by Water Depth Information current as of Monday, 6 October 2014

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

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

WindSentinel floating LiDAR ordered by U.S. energy company

AXYS Technologies Inc (AXYS) is pleased to announce that a major Eastern U.S. energy company has awarded AXYS the contract to supply a WindSentinel floating LiDAR system. The system will be used as part of a research and development project supporting offshore wind generation.

"One of the key objectives of this project is to demonstrate how wind power can be generated offshore in the United states at a cost comparable to conventional generation sources," says Chad MacIsaac, international accounts manager at AXYS. "AXYS is pleased to support this objective by the application of floating LiDAR technology, which reduces the cost of offshore wind resource assessment by a factor of ten."

The WindSentinel is expected to be deployed in the first quarter of 2015 and will gather comprehensive wind speed and wind direction data up to heights of 200 m, along with metocean data including directional waves, ocean currents, tide, salinity, water temperature, atmospheric pressure and air temperature. This data will help the project stakeholders to understand the wind resource available at the proposed development location and lay the groundwork for future offshore wind

development at a commercial scale in the region.

AXYS Technologies Inc. designs, manufactures, distributes and maintains remote environmental data acquisition, processing and telemetry systems.

For more information, visit www.axystechnologies.com.



DRDC integrate SeeByte's SeeTrack Neptune software into SeaRobotics' USV-2600, a 4.0 m general purpose catamaran USV

SeeByte, the global leader in creating smart software for unmanned maritime systems, and SeaRobotics, a leading provider of autonomous and unmanned systems, are proud to announce the integration of SeeByte's SeeTrack Neptune with SeaRobotics' family of general purpose Unmanned

Surface Vehicles (USVs) as part of a Defence Research and Development Canada (DRDC) contract.

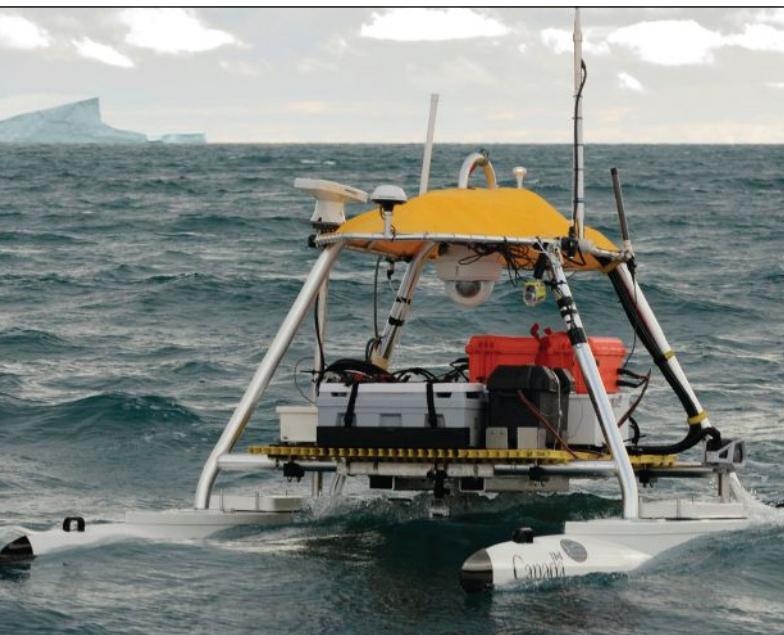
SeeTrack Neptune provides a payload control architecture and real-time autonomy engine for unmanned systems to plan and execute well-known patterns of behavior that expedite and optimize single vehicle and multi-vehicle operations. In other words, the operators plan what to do and SeeTrack Neptune decides how to do it.

The SeaRobotics USV-2600, 4-m general purpose USV is a small but capable USV. It can be used for numerous applications and is able to accommodate specific designs. It is also highly maneuverable and is equipped with high efficiency hulls.

This integration will enable the USV to act as a relay to an Unmanned Underwater Vehicle (UUV) squad. This is an important step needed in order to enable over-the-horizon UUV operations.

SeeTrack Neptune can be run through SeeTrack Military, the leading technology used by Explosive Ordnance Disposal (EOD) and Clearance Divers around the world to manage their off-board assets during dangerous and demanding missions.

For more information, visit www.seebyte.com.



PRODUCT NEWS

Kongsberg ocean laboratories for seabed research

The Centre for Arctic Gas Hydrate, Environment and Climate (CAGE) has selected Kongsberg Maritime to develop and deliver two ocean observatories. The observatories will be deployed off the coast of Svalbard (Norwegian islands in the Arctic Ocean) during 2015 to monitor methane leaks from the seabed.

The observatories will be self-contained, advanced autonomous sensor systems with a range of different sensors integrated. They will be deployed for 12 months continuous operation on the Arctic seabed and are fully self-contained, powered by battery packages and able to wirelessly keep contact with the surface through Kongsberg Maritime developed acoustic communication technology.

"It is the first time that research is being done on the entire methane emission system from the seabed to the atmosphere. To measure these emissions we need a lot of instruments that are at the forefront of development," says Benedicte Ferré, team leader at CAGE responsible for the observatories.

The ocean observatories will be used as instruments in CAGE's research activities related to frozen methane hydrates under the seabed in the Arctic areas and monitoring of methane gas leaks from natural processes. Monitoring of methane in the water column is essential to understand possible effects on the marine ecosystem and the atmosphere. CO₂, ocean acidification and circulation are among other parameters monitored, together with monitoring of marine life. The data from these observatories will help to understand processes related to climate change and changes to the oceans.

"KONGSBERG has in recent years gone through several major R&D programs within subsea environmental monitoring and underwater sensor networks, with the Statoil Integrated Environmental Monitoring (IEM) project being the most comprehensive," says Arild Brevik, business development manager, Kongsberg Maritime.

For more information, visit www.km.kongsberg.com.



USVs with a Mission

- Survey
- Environmental monitoring
- Surveillance/Security

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- Cleaning
- Inspection

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HullBUG grooming ship hull

November 2014

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Ocean News & Technology

IEEE 

**REGISTRATION IS OPEN FOR THE
2015 IEEE/OES ELEVENTH CURRENT, WAVES AND
TURBULENCE MEASUREMENT WORKSHOP (CWTM)**

March 2-6, 2015

Hilton St. Petersburg Bayfront | St. Petersburg, Florida

Workshop Theme: "Quality from End to End"

www.cwtm2015.org

The CWTM Workshop provides the ocean community with a forum for technical information exchange and promotes coordination among those concerned with measuring current, waves and turbulence. It is the "go-to" forum for people who need to know how to measure motions and how to translate those measurements into meaningful information.

Early Registration Deadline: February 2, 2015

Miss this opportunity and you will have to wait until 2019 for the next CWTM Workshop!

Thank you to our Patrons:

Survey Engine 4 now available

CodaOctopus is delighted to announce the release of Survey Engine 4, our powerful side-scan and seismic processing, interpreting and reporting software suite for geophysical surveys.

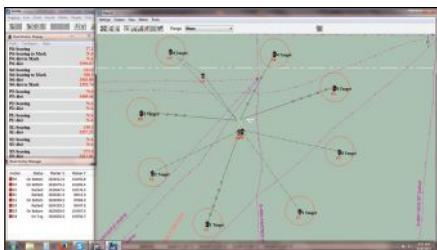
This comprehensive package allows the user to integrate all sensor data within a single project, which massively reduces interpretation time resulting in significant cost-savings.

This major upgrade brings two completely new modules, Mosaic+ and Pipeline+ to the Survey Engine platform. All additions are fully integrated with Seismic+ and Sidescan+ and bring a host of new features for our existing Survey Engine user base.

For more information, visit www.codaoctopus.com.

C&C selects HYPACK

HYPACK Inc. announces the selection of HYPACK® 2014 by C&C Technology as the standard solution for their anchor handling and positioning application.



Starting in the fourth quarter of 2014, the C & C Technologies Marine Construction Survey Division will use HYPACK 2014 as the standard solution for anchor handling and positioning.

The new anchor handling routine in HYPACK 2014 enables the operators on both the rig (main vessel) and anchor handling vessels (tugboats) to graphically display the status and location of anchors and their cables, track their deployment and movement, and send the anchor locations to the anchor handling vessel operators.

"HYPACK's versatile anchor handling solution will be used to create and monitor anchor spreads for C & C projects in the Gulf of Mexico. Surveyors will use HYPACK to provide better data to rig mover, barge and 4-point vessel captains and to ensure the safety of subsea assets while monitoring multiple anchor handling vessels. HYPACK's robust logging system will also allow C&C to more quickly generate anchor reports for clients and permitting agencies," said Ryan Larsen of C&C Technologies.

The selection of the HYPACK solution by the Marine Construction division complements the existing work of the C&C survey team, which currently operates the HYPACK and HYSWEEP® software. The standardization minimizes the training needed across the fleet personnel to operate the system.

The collaboration between HYPACK and C & C Technologies promises to deliver excellent results and mutual benefits. While C & C Technologies seeks to improve efficiency and safety of the operation, HYPACK benefits from the extensive experience and track record as world leader in the marine construction of C&C Technology.

The new ANCHOR HANDLING routine is ideal for offshore construction applications where anchor handling is one of the most demanding and inherently dangerous tasks performed. Moving the rig into the location before and after drilling can also be a substantial cost item. The HYPACK anchor handling routine will help improve efficiency and safety of the operation.

For more information, visit www.hypack.com.

AXYS deploys first WindSentinel in Europe

AXYS Technologies Inc. (AXYS) is pleased to announce the WindSentinel platform ordered by EDP Inovação (EDPi) under the European funded project, DemoWFfloat, has been deployed off the coast of Portugal near Viana do Castelo. The WindSentinel floating LiDAR platform was delivered ahead of schedule and EDPI will now use it to test and monitor the performance of their prototype floating wind turbine and contribute for the development of new methodologies for deep offshore resource assessment and also refine the wind estimate for this location. Since deployment in late July, the WindSentinel platform has experienced winds exceeding 20m/s as well as 8m waves, and has operated with over 98% data availability.

The Demowfloat project is receiving funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 296050. It aims at demonstrating the Windfloat (floating Offshore wind turbine prototype) technology and gathers 13 entities of 6 different countries.

"We are very pleased to deploy the first European WindSentinel platform as part our EU sponsored Demowfloat initiative," said Carlos Martin Rivals, director of floating offshore wind at EDP. "Our selection was based on the basis of AXYS' experience and capacity to adapt to our rigorous wind measurement standards. The AXYS team has delivered the WindSentinel on time and we look forward to continuing the good collaboration achieved so far."

"We are delighted to have deployed the first European WindSentinel with EDPI," said Terry Tarle, AXYS president & CEO. "AXYS remains committed to reducing the cost of offshore wind and will be running a campaign in accordance with the Carbon Trust roadmap to validate the performance of floating LiDAR within the next year."

For more information, visit www.axystechnologies.com.

RJE International introduces a new acoustic subsea receiver

The STI-350 surface acoustic receiver is the next generation in underwater acoustic receivers. Self-contained, the STI-350 uses a staff-mounted directional hydrophone to track and relocate underwater sound sources. Designed for the rigorous marine environment, the STI-350 allows an operator to locate underwater pingers that operate between 25 and 45Khz. In addition, the STI-350 can be used with a custom line of underwater transponders that provide an operator range and bearing to a marked subsea target. Battery operated, the STI-350 uses a LCD to display range/signal strength and bearing to the target beacon. Sealed switches allow the operator to access the many functions of the STI-350. A rugged aluminum anodized staff assembly allows easy deployment of the highly directional hydrophone. The STI-350 sets a new standard in subsea acoustic receivers.

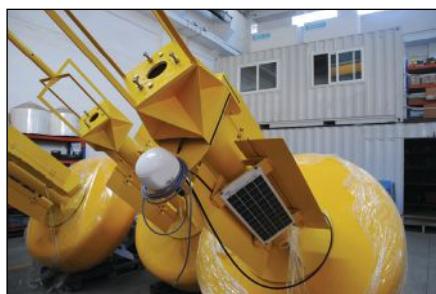
For more information, visit www.rjeint.com.



Almarin supplies 14 buoys to OAS

Almarin Spanish AtoN supplier has provided 14 buoys to OAS for the marking of the works of GNL del Plata project in Uruguay. OAS, S.A. is a Brazilian constructor with considerable growth in Latin America and recently awarded with part of the construction of the LNG Terminal located in west of Montevideo (Uruguay). The project is currently under construction and OAS contacted Almarin for the supply of the navaids to mark an exclusion zone for the provisional marking of the works.

The B1600S model was selected from the Balizamar range for their optimum performance in shallow water with strong currents. B1600 Balizamar buoys have a diameter of 1,600 mm and a rotomoulded polyethylene hull filled of expanded polyurethane making them unsinkable. One of these buoys is equipped with AIS AtoN type 3 to interact with boats with ECDIS system.



"This Uruguayan project selected an offshore terminal, which means that LNG regasification and storage will take place in the sea, due that the option to build a terminal ashore requires more time of implementation and a greater cost of investment," according to Gas Sayago, a company that launched the public tender of the gas pipeline. This project is strategic for the country in terms of energy diversification, economic development, environmental improvement and cost reductions.

For more information, visit www.almarin.es.

Renewable NRG Systems and FLIDAR enter exclusive partnership

U.S.-based Renewable NRG Systems and Belgium's FLIDAR announced that they have entered an exclusive partnership for the distribution of FLIDAR's offshore wind measurement buoys in the Americas. Under this agreement, Renewable NRG Systems will provide the WindCube Lidar systems to FLIDAR to equip the floating wind measurement technology



that the Belgian company is bringing into the offshore market in the Americas. FLIDAR will also be able to take advantage of Renewable NRG Systems' world-class Lidar service and supply center.

In Europe, FLIDAR has already established itself as the offshore wind measurement leader with commercial contracts in place with DONG Energy and Mainstream Renewable Power and multiple validations. The company's wind measurement buoy has recently been validated by DNV GL as being at Stage 2 on the Carbon Trust road map for commercial acceptance, dramatically reducing the uncertainty associated with the measured data. It is the only floating wind measurement system in the market to hold the stage 2 certification.

The main reason behind FLIDAR's market success is that it enables offshore developers to dramatically reduce the cost of their wind resource assessment campaigns. In addition, deploying this equipment requires far fewer permitting constraints, can be done much faster and lowers the overall offshore wind investment risk.

Powered by Leosphere's industry leading WindCube Lidar technology, FLIDAR is a floating wind measurement system able to measure wind speed and direction up to 200 m. It has successfully completed multiple third party validation tests with DTU, Frazer Nash and DNV GL. FLIDAR has been used over the last couple of years in significant commercial offshore wind resource assessment campaigns, which all use FLIDAR as the only on site wind measurement source.

For more information, visit www.flidar.com.

CARIS releases HIPS and SIPS 9.0 and Bathy DataBASE 4.1

CARIS is pleased to announce new releases of its hydrographic data processing and bathymetric data management and analysis solutions. The latest releases of HIPS and SIPS 9.0 and

Bathy DataBASE 4.1 feature significant enhancements, as well as providing streamlined connectivity and smart utilization of shared functionality.

The release of HIPS and SIPS 9.0 brings the leading hydrographic data processing system into the next generation. With over 20 years of development, the latest version has been redesigned to enhance the user experience by creating more intuitive workflows through a new interface. This release also provides HIPS and SIPS users with powerful terrain manipulation and analysis capabilities that previously only existed in BASE Editor. Some of the latest features in HIPS and SIPS 9.0 include:

- Creation of raster products. The new export tool provides powerful tiling and clipping functions for the supported raster formats.
- Enhanced GIS file format support, including OGC services and new export options.
- Direct-reading of multiple navigation sources allows the user to choose their position on the fly.
- Redesigned Navigation and Attitude Editors to support multiple data sources and quality indicators.
- New integrated Sediment Analysis Editor for GeoCoder Analysis tool.

The latest release of Bathy DataBASE 4.1 includes significant performance improvements, enhanced support for BAG and IHO S-102 data and powerful extensibility through custom data handling and creation tools.

Some additional features in Bathy DataBASE 4.1 include:

- The CARIS Python API has been extended with a new coverage module for working with raster and cloud datasets. The API provides opportunities for building and integrating complex workflows into simple processes.
- The creation and management of user roles has been updated to provide database administrators with more control and flexibility in assigning privileges to individual users.
- A Catalogue Editor is now provided for customizing objects and attributes in the BDB Server feature catalogue making it simple to extend the feature model.
- LOTS Limits and Boundaries is now available as an extension to the BASE Editor application providing robust boundary delineation workflows, 3-D visualization and geodetic assurance.

For more information, visit www.caris.com.

Kongsberg Maritime launches innovative solution for 3D subsea monitoring

Kongsberg Maritime, a leading maritime, offshore and subsea technology developer has launched a unique solution for the detection of Scouring, Corrosion, Deformation and Marine Growth, which can destabilize wind turbines and underwater structures causing expensive, and potentially environmentally hazardous damage.

The new K-Observer system, which is part of Kongsberg Maritime's Modular Subsea Monitoring Network (MSM), provides accurate, remote hydroacoustic 3D monitoring using the Dual Axis Scanning Sonar (DAS) to continuously monitor the seabed and the substructure.

The 3D point cloud data created by the DAS is logged and transmitted to shore via the telemetry infrastructure of the K-Observer System (cabled, wireless or satellite) installed on the turbine. The system is designed for long-term installations and performs fully autonomously, from sensor control, data acquisition, to data processing, presentation of results and issuing of alarms (e.g., by text message or email).

K-Observer accurately scans and interprets the condition of the seabed around the base of the structure (scouring and sediment displacement), as well as the state of the substructure itself (deformation, marine growth and corrosion) so experts on shore can initiate immediate action or preventative maintenance if required. This is a comparably low cost, safe and time-efficient method of monitoring and detection compared to diver surveys.

K-Observer is a highly advanced system that not only monitors and observes the depth of the seabed around each wind turbine or subsea structure (scour and sediment displacement), which is important information in itself, but also provides insight regarding the current state of the substructure itself (deformation, marine growth and corrosion). This translates into lower intervention costs for maintaining the structure within the design parameters and avoids reductions in the life span of the wind turbine associated with unstable foundations and vibration induced structural fatigue.

Advanced data processing and power management strategies ensure the MSM's ability to deliver critical sensor data continuously, for long duration missions. The modularity and scalability of the MSM allows for easy deployment and adaptation to different monitoring tasks, ranging from very early leak detection and condition monitoring around subsea structures to environmental monitoring on the seabed and in the water column.

The MSM was developed in co-operation with the Kongsberg Maritime owned, Germany-based company, Kongsberg Maritime Embient. Over the last years Embient has developed a strong in-house competence within underwater inspection and monitoring, as well as on subsea leak detection.

For more information, visit www.km.kongsberg.com.

WFS Technologies announces collaboration with NuStar Technologies and Precision Technologies

WFS Technologies (WFS), NuStar Technologies and Precision are pleased to announce an agreement to offer a subsea wireless datalogging system to support flow metering for JAMSTEC, the Japan Agency for Marine-Earth Science and Technology.

The project being led by NuStar Technologies involves cultivation and extraction of rare earth minerals in Japanese waters at sea depths between 1,600 and 3,000 m. WFS will supply a Seatooth®S100 datalogger to be used to log mineral rate data from a Hoffer flowmeter.

Seatooth®S100 is a compact, low-power, wireless modem, data logger, multiplexer and controller. It supports a variety of underwater applications, pro-



viding a robust wireless communication link up to 15 ft in the most challenging conditions. Seatooth®S100 is equipped with standard data communication interfaces, making it well-suited to underwater sensor, diver and vehicle applications. It can be deployed swiftly on temporary or permanent installations to support a range of offshore survey applications.

"We are pleased to be working with NuStar and Precision to support JAMSTEC on this important project. The collaboration delivers an innovative solution and strengthens our presence in Asia," said Ian Crowther, executive VP for WFS Technologies.

"We are pleased to work with WFS Technologies as their technology helped simplify our mineral flow rate data harvesting process, through direct flowmeter magnetic frequency data logging, effectively eliminating the need for additional signal conversion electronics and substantially reducing overall logging system power consumption, weight and size," said Mr. Teo Sim Guan engineering director of NuStar Technologies.

For more information, visit www.wfs-tech.com.

SES partners with Rowe Technologies: purchases multiple deep-water dual-frequency systems

Rowe Technologies Inc., Poway, California, is pleased to announce the appointment of Survey Equipment Services (SES), Houston, Texas, as an Authorized Rental and 24/7 GOM Service & Support facility. In addition to the appointment, SES made an initial investment by ordering multiple deep-water Dual-Frequency SeaWATCH ADCP and SeaPILOT DVL systems.

The SeaPILOT DVLs (300 kHz/600 kHz/1200 kHz) models are RTI's most versatile DVLs. They use RTI's acoustic Doppler Piston (DP) technology and are well suited for navigation applications in shallow water or in deep water, down to 6,000 m. The





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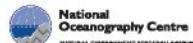
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SeaPILOT's compact size, extended range, and precision make it an ideal solution for ROVs, AUVs, and other submersible platforms. The product is available in three different frequencies (300, 600, and 1,200 kHz) all configured with Doppler Piston transducers and is available in different depth ratings, shallow to deep-water.

The SeaWATCH Dual Frequency (DF) ADCPs (300/600/1,200 kHz) extends the capabilities of the SeaWATCH self-contained product family by introducing an ADCP that uses two independent acoustic frequencies in the same instrument. Each of the frequencies can be independently controlled allowing for near simultaneous acquisition of high resolution, short range current profiles from the high frequency channels, and longer range, lower resolution profiles from the low frequency channels. With the SeaWATCH DF, you truly have two ADCPs in one. Dual frequency systems are available in a combination of frequencies – 1200 KHz/300 KHz, 1200 KHz/600 KHz, or 600 KHz/300 KHz, all configured with Doppler Piston transducers and have depth ratings ranging from 300 to 6,000 m.

For more information, visit www.rowetechinc.com.

Sound Ocean Systems, Inc. delivers two mooring winches

SOSI recently delivered two large mooring winches. These all-electric, custom-designed, VFD-controlled winches were developed for Oregon State University and the University of Washington. Although configured differently, both the 175 HP OSU Heavy Lift winch and the 75 HP UW Medium Lift winch contained SOSI's continuous position sensing level wind system.

The Heavy Lift Winch is capable of deploying or recovering 25,000 lbs. mooring loads at full drum while the Medium Lift Winch is capable of similarly deploying or recovering 8,000 lbs. loads at full drum. Both winches can accommodate a variety of line diameters and have the unique feature that the spooling lay factor can be programmed for one to three times the line diameter, allowing the operator the choice of tight or loose spooling form factors. Both winches can pass mooring hardware such as thimbles and large shackles, and both were supplied with measurement and display of line scope, line speed, and line tension.



During their recent maiden voyage aboard the R/V Thomas G. Thompson, the winches were used to deploy two complicated two-leg moorings. The Medium Lift Winch was also used to recover a vertical profiler system. After initial deployments aboard the R/V Thomas G. Thompson and OSU's R/V Oceanus, the winches, which were funded by NSF, will be moved to the UNOLS winch pool and will be available for use throughout the UNOLS fleet. Both winches were recently featured on UW's Interactive Oceans Visions'14 Expedition broadcasts live from the R/V Thomas G. Thompson.

For more information, visit www.soundocean.com.

Xeos Technologies announces first shipment of beacons to China

Xeos Technologies Inc. is pleased to announce it has shipped the first segment of a large order of KILO Sub-surface Iridium Mooring Beacons to be deployed as part of the Western Pacific Ocean System (WPOS) project, a large-scale ocean monitoring project undertaken by the Institute of Oceanology, Chinese Academy of Sciences.

The opportunity was perfect for the Xeos' Kilo Sub-surface Mooring Beacon, designed and priced for large-scale projects like this one with the additional advantage of end user rebattery-ing options and submersion to 2,500 m below sea level.

The purpose of the Western Pacific Ocean System (WPOS) is to gather scientific data from the ocean to help better explain the roots of the East Asia summer monsoon and the mechanics behind the ocean temperature shift that generates El Niño and La Niña. These three events have profound meteorological impacts on countries on/or adjacent to the Pacific Ocean.

For more information, visit www.xeostech.com.

Pay as you go vessel and fleet tracking

Rock Seven, the established manufacturer of Iridium-based satellite tracking & communication systems and air-time provider has launched its next generation solution for tracking merchant and offshore vessels. With no annual contract and Pay As You Go use, RockFLEET is designed to simplify and reduce the cost of single vessel and entire fleet tracking, supporting shipowners to increase safety and efficiency through improved fleet management.

Rock Seven has used its experience as an established developer of reliable, accurate tracking solutions for maritime, defense, government and aerospace customers to design an advanced new tracking unit for the professional maritime environment. Completely waterproof and with no moving parts, the RockFLEET unit is a robust, ultra-compact (13 cm diameter / 4 cm high) device with multiple mounting options.

RockFLEET is the only device of its kind with an internal battery back-up, so it can continue to transmit position for up to 2 weeks if external power is cut. With facility to mount covertly, this makes it especially suitable for vessels traversing piracy hotspots. Other innovations include Machine to Machine (M2M) data capability, Bluetooth connectivity for iOS and Android devices, which enables system set-up and configuration, and text messaging over Iridium. Crew can purchase credits to use RockFLEET for messaging on their own devices for an extremely low-cost way to contact friends and family on shore.

Operating on the Iridium network, specifically using the "Short Data Burst" (SBD) capability, RockFLEET provides pole-to-pole global coverage on a Pay As You Go basis. With no annual contract required, the user only pays for the months the system is in use and pre-purchases credits for transmitting tracking positions. An optional module enables RockFLEET to switch automatically to GSM services when in range, providing further cost savings.



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RockFLEET obtains a position using the GPS satellite network and then transmits that position at user-defined intervals. A single location transmission uses a single pre-paid credit, which can cost less than 3¢, making the RockFLEET approach to tracking extremely cost-effective. Tracking data is viewed on the Rock Seven fleet management platform, The Core, or on the user's own fleet management system. The CORE fleet management platform is a secure, user friendly web-based tracking service that can be used standalone or integrated with a user's own fleet management system using an open API.

For more information, visit www.rock7.com.

New RiverPro ADCP

Teledyne RD Instruments is pleased to introduce RiverPro – the newest member of our growing family of acoustic doppler current profilers (ADCPs) for inland water resources applications.

The 1,200 kHz RiverPro has been purpose-built to fill two specific needs: to provide an ADCP designed specifi-



cally for shallow river applications (20 cm to 25 m range) and to provide an upgrade path for our current industry gold-standard Rio Grande ADCP users.

Like our next-generation RiverRay ADCP, the RiverPro offers users a 5-beam solution, auto-adaptive sampling, user-friendly interface, and Teledyne RDI's unsurpassed quality, service, and support.

The RiverPro has also been designed to fit into our RiverRay float, allowing users to swap out their ADCPs based upon their environment, eliminating the need to purchase and transport a second float.

For more information, visit www.rdinstruments.com.

Outland Technology introduces underwater dual LED LASER

Outland Technology is proud to announce the UWL-810 underwater dual LED LASER. The LEDs are 100 mm apart from each other making it a great tool to add to an ROV for providing measurements and calibrating sizes.

The UWL-810's housing is made of black acetal and is rated to 800 m. An optional anodized aluminum housing is available, as is a 20,000-m rated deep water housing.

The unit is 25 mm in diameter and 172 mm long excluding its MCBH2M connector and weighs .12 kg dry and .03 kg wet.



The UWL-810 operates at .5 W at 5 to 30 VDC, giving an output power of 5 mW for each beam.

Production is starting soon and advance orders are being accepted.

For more information, visit www.outlandtech.com.

Teledyne BlueView - LandScope Engineering purchase BV5000 3D

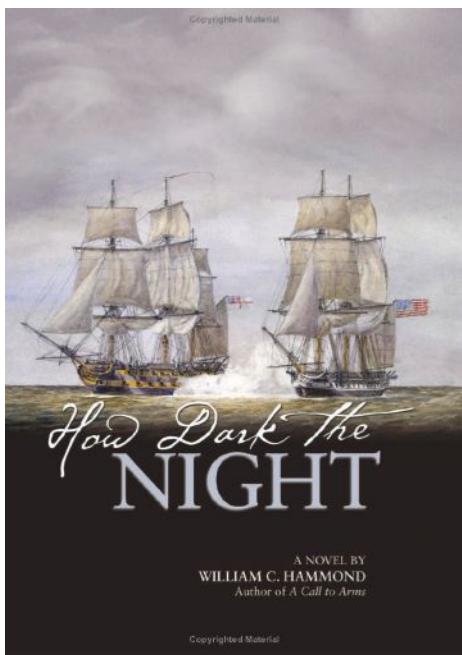
Teledyne BlueView is pleased to announce the recent purchase of a 3D multibeam scanner by UK based LandScope Engineering.

"Having rigorously tested the BlueView BV5000 3D scanning sonar technology in several demanding underwater environments, we have been impressed with the system's versatility and data resolution. Integration of the BlueView system allows us to take our established 3D scanning service below the waterline, providing an unprecedented level of detail and accuracy to underwater asset owners and operators", said Tom Card, 3D Survey Services Manager at LandScope.

Scanning underwater provides clear and objective real world 3D data to evaluate the current condition of underwater assets. The BV5000 delivers highly informative data that can cut risks and eliminate guesswork, saving time and money. This allows engineering firms to make smarter decisions, more accurate estimates and undergo repair/preventative maintenance sooner.

For more information, visit www.blueview.com.

MEDIA SHOWCASE



How Dark the Night: A Novel

by William C. Hammond

William Hammond's award-winning series carries on the tradition of Patrick O'Brian and C.S. Forester. It is the only nautical fiction series that offers the American perspective during the Age of Fighting Sail. How Dark the Night continues the seafaring adventures of the Cutler family by picking up the action where the fourth volume, A Call to Arms, ends in 1805. The years leading up to the War of 1812 were devastating ones for the young republic. The life-and-death struggle between Great Britain and France caught the United States in a web of financial and political chaos as President Jefferson and Secretary of State Madison labored to keep the unprepared United States out of the conflict without compromising the nation's honor. On the home front, Jefferson's embargo threatened the livelihood of the Cutlers and other New England shipping families as merchant ships rotted on their moorings and sailors sat on the beach, penniless. Far worse for the Cutler family is a grave illness that threatens the life of its most beloved member.

Like previous books in the series, the action in How Dark the Night is brought to life by such colorful historical figures as the infamous pirate Jean Lafitte, Secretary of the Navy Robert Smith, Robert Fulton and his prototype for a submarine, Captain Stephen Decatur, Captain Salusbury Pryce Humphreys RN, and Commodore James Barron. Historical events include the decline of slavery in the West Indies, the stark political differences between the Federalists in New England and the "War Hawk" Republicans in the South and West led by Henry Clay and John Calhoun, as well as the abuses at sea perpetrated by the Royal Navy against America.

Naval Institute Press; ISBN:978-1-61251-467-3; Fiction
Hardcover, 224 pages, April 2014

November 2014

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Ocean News & Technology

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Walter Steedman was elected chairman of the offshore survey division of the International Marine Contractors Association (IMCA), which represents the interests of nearly 1,000 offshore, marine and underwater engineering companies in over 60 countries. One of four IMCA operating divisions, the offshore survey division's principal remit is to help raise awareness of contracting issues among members, their clients and the wider industry. Steedman, who holds a BSc (Hons) degree in topographic science from Glasgow University, is chief executive officer of the Veripos group, the specialist provider of satellite positioning services. He is a surveyor by profession and has over 30 years of experience in the survey and offshore business in a variety of roles including offshore, project management, commercial, general business management and latterly at executive level. He has served on the offshore survey division management committee for over 16 years and also serves on IMCA's overall management committee.

Patricia Vega is the new president and chief executive officer of GE Oil & Gas for Latin America. She will assume the role of João Geraldo Ferreira, who leaves the company after 7 years. Vega

will be responsible to maintain the company's position in the oil and gas market, contributing to the development of customized solutions that meet the specific demands of customers and partners in the region. Vega has 20 years of experience in the oil industry, including technical, operational and leadership positions in the United States, Mexico, Colombia and Brazil. Based in Rio de Janeiro, she will lead the 5,400 employees of GE Oil & Gas in Latin America and will be responsible for developing regional capabilities. Vega has held leadership positions at various companies in the oil and gas sector, including a role as vice president of operations and director of human resources for Latin America.

Rowan Companies said that **J. Kevin Bartol**, executive vice president, chief financial officer and treasurer, has decided to leave the company to pursue other opportunities. Bartol will continue to serve until a successor is chosen and a smooth transition is completed, Rowan said, adding that the company was conducting a search and intended to name



Vega

Bartol's successor in short order. The company also said that **Melanie M. Trent** was promoted to executive vice president, general counsel and chief administrative officer and would assume responsibility for the legal function, as well as retain responsibility for the human resources, information technology and communications departments. Trent succeeds **John L. Buvens, Jr.** who is retiring from Rowan after more than 30 years with the company.

Alex Imperial has taken over as DNV GL Oil & Gas' regional manager for South America just as the company is creating a dedicated research unit in Brazil. Imperial recently left Singapore, where he was director for DNV GL's Deepwater Technology Centre, to take over DNV GL's oil and gas division in South America. Imperial started as an intern in DNV GL 23 years ago, and has since gained experience from a variety of roles in Brazil and Asia within the maritime and oil and gas divisions, as both a technical expert and leader. Imperial started his management career as a station manager in Macaé while also being rig coordinator for Brazil's Petrobras. He has also served as the global key account manager for Petrobras.

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Odyssey Marine Exploration, Inc., a pioneer in the field of deep-ocean exploration, has implemented its planned management transitions that were announced in August. Odyssey president **Mark D. Gordon** assumed the additional role of chief executive officer, succeeding **Gregory P. Stemm**, who had held the position since 2007. Stemm has become chairman of the board, succeeding **Bradford B. Baker**, who will continue to serve as lead director. Stemm, in his new role, will continue to provide counsel to the company, focusing his efforts on identifying and developing new business opportunities for Odyssey.

Unique Maritime Group has formally announced the joining of a new member to its family, **Steve MacMillan**, as the global project director for its Diving Division and the global QHSE director. He will be based at UMG's head office in Sharjah, UAE. His main responsibilities will focus on managing and coordinating large and complex diving-related projects through all phases of design, permitting and construction. He will also provide leadership for the regional site project management teams by managing, coordinating and developing UMG staff. MacMillan will also be responsible for developing and driving the companies QHSE culture in his role as Director of QHSE. He started his early career in the Diving industry in 1981 as an air diver, working out of Singapore. He then rapidly progressed on to becoming a saturation diver and onwards as a Saturation supervisor. In 1995, he joined McDermott as an operations manager and ultimately became the Director of International Diving for McDermott as well as Director of HSES for the Subsea Group. MacMillan's focus on Health & Safety has always been at the forefront of his leadership style.

Well-known industry figure, **Peter Blake**, has taken up the role of chairman of the National Subsea Research Initiative (NSRI) and **Dr. Gordon Drummond** has joined as project director. Mr. Blake is subsea systems manager at Chevron's Energy Technology Company and Dr. Drummond is technology manager at Subsea 7. NSRI has been set up to ensure the UK's subsea technology needs are understood and met within the country's increasingly complex and competitive technology strategies and associated funding landscape.



MacMillan

David Rhodes has been voted in by fellow members of the International Marine Contractors Association's (IMCA) Remote Systems and ROV Division Management Committee. The committee is one of the association's technical groups committed to the promotion of good working practices in the areas of health, safety, the environment, quality and efficiency, as well as giving technical guidance. This is the first time an employee from inspection, repair, maintenance, (IRM), and light construction company Harkand has been elevated to such a position within the industry body. With a career spanning 31 years in the IRM business, Mr. Rhodes has been Harkand's IMCA representative since 2003.

Hydroid, Inc., a subsidiary of Kongsberg Maritime and the leading manufacturer of AUVs, announced that it has officially opened a new, state-of-the-art manufacturing and applied research facility in Pocasset, Massachusetts. The eco-friendly facility, located at 3 Henry Drive, is 40,000 sq. ft and houses the company's engineering, manufacturing and quality assurance operations. The building includes a 20-ft testing pool, a 6,000-m rated hyperbaric test chamber and a 289-kw solar array.

International energy consultancy **Xodus Group** announced the launch of a global subsea engineering company in partnership with major oil and gas contractor Saipem and mid and downstream oil and gas giant Chiyoda Corporation. The new organization plans to challenge the largest tier one subsea engineering companies for a share of the global market. It will be headquartered in London and have a presence in several cities across Europe, Africa, the Americas, Middle East and Asia Pacific including eight dedicated engineering centres in priority energy locations.

Reef Subsea has signed a service agreement with the Port of Blyth for a new storage, maintenance and mobilization facility as part of the company's continued growth plan. The new facility provides 1,800 sq. m of serviced internal and external storage space for asset maintenance and storage combined with office facilities for a team of personnel. Reef Subsea now has direct access to two mobilization quays and the required infrastructure to support mobilization and demobilisation at immediate notice.

FoundOcean and **Ranger Offshore, Inc.** signed a strategic agreement, formalizing the already strong relationship that has developed between the two oil and gas sector specialists.

Combining complementary resources and a wealth of industry expertise, the partnership will offer clients a competitive, design-to-installation solution for a range of projects. Headquartered in Houston, Texas, Ranger Offshore provides marine and subsea construction support services including vessel and diver hire; inspection, repair and maintenance (IRM) solutions; and pipeline and offshore construction. FoundOcean will bring its 50 years of grouting experience to the partnership.

To meet the growing demand in the region, **DNV GL** has now opened a new office in Malaysia. The official opening of the office coincided with the company's celebration of a double milestone – 150 years of proud history as a world leader in classification and technical assurance services and its first year as a newly merged company. The new eco-friendly office over three floors will house DNV GL's four core business areas – Maritime, Oil & Gas, Energy and Business Assurance – under one roof. This will create greater synergies and provide more integrated service offerings to customers. The new location in Menara Prestige, at the heart of Kuala Lumpur's Golden Triangle, accommodates 250 employees from both legacy DNV and legacy GL.

FoundOcean Group announced that it has acquired a majority stake in CAPE Holland Group, the vibro-piling specialist based in The Netherlands. The two entities will continue to operate as separate businesses under the newly formed parent company, FoundOcean Group.

Harvey Gulf International Marine, LLC is pleased to announce its continued strategic business growth by establishing Harvey Gulf International Marine de Mexico S.A.P.I. de C.V. With a presence in Mexico, Harvey Gulf is now able to fully service the needs of its clients currently operating in the offshore oil and gas segment of Mexico, and position itself to fully service the needs of future clients that will enter the market. Recently approved changes in Mexican law allow foreign ownership in hydrocarbons, which facilitates this growth.

Thrustmaster of Texas, a leading manufacturer of commercial marine propulsion products, signed a deal Monday to expand its Houston based production facility by 100,000 sq. ft. The multi-million dollar investment has been in the making for two years and is scheduled for completion in the summer of 2015 by Third Coast General Contractors.

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www.estuaries.org

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November 5-7, 2014
Oil Comm
 Houston, TX
www.oilcomm.com

November 17-18, 2014
Offshore Asset Retirement, North Sea
 Aberdeen, UK
www.decomworld.com/asset-retirement

November 24-26, 2014
International Tidal Energy Summit
 London, England
www.tidaltoday.com/tidal-conference

December 2-4, 2014
Clean Gulf
 San Antonio, TX
www.cleangulf.org

December 3-5, 2014
International Workboat
 New Orleans, LA
www.workboatshow.com

December 9-11, 2014
Renewable Energy World Conference
 Orlando, FL
www.renewableenergyworld-events.com

February 3-5, 2015
Euromaritime
 Paris, France
www.euromaritime.fr

February 4-5, 2015
Naval Future Forces
 Washington, D.C.
www.navalengineers.org/events

February 10-11, 2015
Deepwater Decommissioning Workshop
 Houston, TX
decommissioninggom.offsnetevents.com

February 10-12, 2015
Underwater Intervention
 New Orleans, LA
www.underwaterintervention.com

February 11-13, 2015
Subsea Expo 2015
 Aberdeen, UK
www.subseaexpo.com

February 16-19, 2015
GOM Oil Spill & Ecosystem Science
 Houston, TX
www.gulfofmexicoconference.org

February 22-27, 2015
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www.aslo.org/meetings

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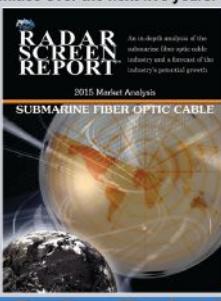
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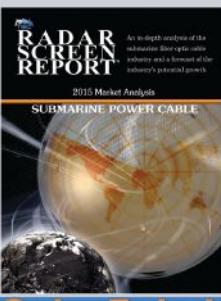
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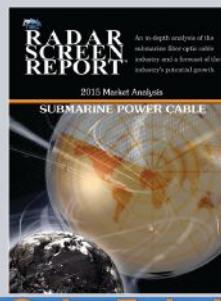


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FEBRUARY

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

MARCH

Editorial: Subsea Fiber Optic Networks; Maritime Security
Distribution: GMREC; Offshore Well Intervention Conference
Product & Services Focus: Connectors, Cables & Umbilicals; Diver Detection Systems

APRIL

Editorial: Offshore Technology; Ocean Mapping & Survey
Distribution: OTC; AUVSI; Well Control and Containment Conference
Product & Services Focus: Subsea Tools & Manipulators; Offshore Risk Assessment; Training/Safety

MAY

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JUNE

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Nortek USA

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Boston, MA 02210
Tel: +1 617 206 5750
Email: inquiry@nortekusa.com
Website: www.nortek-as.com



Nortek's products span from single point turbulence sensors to long range current profilers. Our customers are scientists, consulting engineers and professionals working in the offshore oil and gas industry. Nortek provides solutions measuring surface waves to currents 6,000 m deep. Nortek is global, positioned to help you wherever your solution is needed.

RBR

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Fax: +1 613 599 8929
E-mail: info@rbr-global.com
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RBR designs and manufactures rugged submersible data loggers, recorders, sondes, controllers, and sensors for water quality measurement. Our standard data logging instruments range from one to 24 channels, configured as a CTD, or multi-parameter (sensor) recorders. Specialty loggers are available with specific sensors for harsh environments or unique applications like measuring tides and waves.

Sea-Bird Scientific

13431 NE 20th St.
Bellevue, WA 98005
Tel: +1 425 643 9866
Fax: +1 425 643 9954
E-mail: info@sea-birdscientific.com
Website: www.sea-birdscientific.com
Contact: Calvin Lwin, Sales



SEA-BIRD
SCIENTIFIC

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

Star-Oddi

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

TDI Brooks

14391 South Dowling Road
College Station, Texas 77845 USA
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Fax: +1 979 693 6389
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Toll Free: +1 877 316 8049 x149
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Website: www.tinitron.com
Contact: Tinny Srinivasan, President & CEO,
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Email: Klein.Mail@L-3com.com
Web: www.L-3Klein.com
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Marine Sonic Technology, Ltd.

P.O. Box 730
White Marsh, VA 23183-0730
Toll Free: +1 800 447 4804
E-mail: jdemail@marinesonic.com
Website: www.marinesonic.us



Marine Sonic Technology, Ltd. builds high quality, high resolution side scan sonar systems. Located in Gloucester, Virginia, Marine Sonic has been in business for more than 20 years. Our towed systems are rugged, easy to deploy and easy to operate. We also offer highly efficient embedded side scan systems for use in AUVs which occupy minimal space in the vessel and operate with minimal power consumption.

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Laksevag, Norway
Tel: +47 56 11 30 66, Fax: +47 56 11 30 69
E-mail: info@savias.no
Website: www.savias.no
Contact: Gunnar Sagstad

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Inertial Products – Integrated Solutions – Marine Works
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6032 Railroad Avenue
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Tel: +1 985 385 6789
E-mail: bill.new@newindustries.com
Website: 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, PLEMs and manifolds.

OCEAN INDUSTRY DIRECTORY

ON&T's Product & Service Directory

SUBSEA TOOLING

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8860 Fallbrook Drive
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Tel: +1 713 934 3100
E-mail: info@seanicusa.com
Website: www.seanicusa.com
Contact: Karen North

Seanic was formed to address the growing demand for simple, rugged and reliable subsea tooling for remote intervention. Along with engineered solutions, Seanic also offers experience in the design, manufacturing, storage, repair & maintenance of subsea products. Seanic provides a worldwide standard product line of ROV tooling such as torque tools, FLOT's, hot stabs, manifolds, buckets and ROV interface panels.

Subsea Americas

3447 Hwy 182
P.O. Box 185
Berwick, LA 70342
Tel: +1 985 714 1767 or 985 518-0055
E-mail: charles@subseaamericas.com
Website: www.subseaamericas.com
Contact: Charles Mayea



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

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Bellville, TX 77418 USA.
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Fax: +1 979 865 8859
E-mail: sales@seacon-ap.com
Website: www.seacon-ap.com

SEACON Advanced Products, LLC., manufactures a wide variety of versatile and robust switches to suit a number of applications. These include Limit, Positive Action and Proximity switches in a range of materials including Titanium, Plastic and Stainless Steel which can be supplied in varying load capacities up to 7 amps and pressure rated to 10,000 psi. To further aid simplicity, our proven range of Modular Proximity Switches have been integrated with the Micro WET-CON electrical wet-mate connector making this switch a very modular component that is easily installed and replaced in the field, but without compromising reliability.



UNDERWATER VEHICLES/AUVS

Exocetus Development LLC

1444 East 9th Avenue
Anchorage, AK 99501
Tel: 858-864-7775
Fax: 907-569-0268
Contact Ray Mahr
Email: sales@exocetus.com
Website: www.exocetus.com



The Exocetus Coastal Glider, designed for coastal waters where high currents and large variations in water densities occur, has a larger buoyancy engine than legacy gliders, enabling the glider to operate in 2+ knots of current, handling water densities from 7 - 37 ppt, operate for 60 days with a lithium battery and integrate additional sensors.

Hydroid, Inc.

a subsidiary of Kongsberg Maritime
6 Benjamin Nye Circle
Pocasset, MA 02559-4900 USA
Tel: +1 508 563 6565
Fax: +1 508 563 3445
E-mail: glester@hydroid.com
Website: www.hydroid.com
Contact: Graham Lester



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

OceanServer Technology, Inc.

151 Martine Street
Fall River, MA 02723 USA
Tel: +1 508 678 0550
Fax: +1 508 678 0552
E-mail: sales@ocean-server.com
Website: www.iver-auv.com
Contact: Jim Kirk



OceanServer Technology, Inc. is a leading provider of man-portable Autonomous Underwater Vehicles (AUVs) with over 200 AUVs deployed worldwide. The Iver AUV is an affordable, commercial vehicle used for general survey and sub-surface security work, and serves as a research platform for autonomy, behavioral and sensor development studies at universities and navy research facilities.

UNDERWATER VEHICLES/ROVs

Deep Ocean Engineering Inc.

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Contact: Bill Charbonneau



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

i-Tech

22330 Merchants Way
Katy, TX 77449
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Website: www.interventiontechnology.com
Contact: Katarina Tehlirian



i-Tech is a global division of Subsea 7 delivering world class remotely operated vehicle (ROV) and intervention tooling support services to the offshore energy industry, operating from four regional centers: Europe & Africa, Asia-Pacific the Americas and Brazil.

Perry

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Fax: +1 713 329 8299
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SUBSEA TECHNOLOGIES
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Forum Energy Technologies' Perry brand supplies deepwater work class ROVs, tooling solutions, burial systems, and control-system-based products to the oil, gas, and telecommunications industries. Providing the most advanced, robust and dependable ROVs and subsea products in the world, Forum's Subsea group has facilities in the US and UK and sales offices and agents around the world.

Schilling Robotics, LLC

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Tel: +1 530 753 6718
Fax: +1 530 753 8092
Contact: Peter MacInnes
E-mail: peter.macinnes@finci.com
Website: www.fmctechnologies.com



Schilling Robotics, a business unit of FMC Technologies, is a leading global producer of high-technology subsea systems, including remotely operated vehicles (ROVs), manipulators, and custom-engineered systems for subsea production. We bring nearly 30 years of technological expertise and innovation to the challenges facing customers in the subsea environments. www.fmctechnologies.com

SeaBotix Inc.

2877 Historic Decatur Road, Suite 100
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Fax: +1 619 450 4001
E-mail: Info@SeaBotix.com
Website: www.SeaBotix.com



SeaBotix is a world leading manufacturer of capable underwater MiniROVs that perform a multitude of tasks including maritime security, search and recovery, hull and pipeline inspection, hazardous environment intervention, aquaculture, sensor deployment and oceanographic research. The Little Benthic Vehicle systems have become the benchmark in compact ROVs around the world.

Sub-Atlantic

Woodburn Rd.
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Blackburn, Aberdeen
AB21 0PS, Scotland
Tel: +44 (0) 1224 798660
Fax: +44 (0) 1224 798661



Forum Energy Technologies' sub-Atlantic brand manufactures world class ROVs ranging from portable units to light work class systems. Sub-Atlantic also supplies thrusters, hydraulic power units, valve packs, compensators and pan and tilt systems to other ROV manufacturers. Sub-Atlantic is part of the FET subsea group and has facilities in the US and UK and sales offices and agents around the world.

VideoRay

212 East High Street
Pottstown, PA 19464
Tel: +1 610 458 3000
Fax: +1 610 458 3010
E-mail: sales@videoray.com
Website: www.videoray.com
Contact: Brian Luzzi



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UNDERWATER VIDEO EQUIPMENT

Kongsberg Maritime Ltd.

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Email: km.camsales.uk@kongsberg.com
Website: www.km.kongsberg.com/cameras
Contact: Mark Esslemont



Kongsberg Maritime Ltd is a world leader in providing harsh environment underwater camera & imaging technology and marine CCTV systems to the Offshore Oil Field & Renewable Energy, Power Generation, Scientific, Maritime and Military sectors.

ROVSCO, Inc.

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Website: www.rovco.com
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Rovco provides support and solutions to the offshore subsea and marine industries: work-class ROV and Commercial Diving operations. We manufacture a number of tools/equipment and subsea video items. We have an excellent reputation worldwide based on our product knowledge, dependability, commitment to customer service and speed of response.

SIDUS Solutions, LLC

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SIDUS Solutions, LLC is a full service manufacturer offering integrated subsea and hazardous area security & surveillance solutions, from conceptual design through engineering to technical & customer support. Our subsea products are currently operational to depths exceeding 6,500m. Worldwide, SIDUS serves the oil, gas, academic, scientific & military industries.

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Hawboldt Industries

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Fax: 902 275 5014
E-mail: paul.phillips@hawboldt.ca
Website: www.hawboldt.ca
Contact: Paul Phillips



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Markey Machinery Company

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Radoil, Inc.

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E-mail: admin@alloceans.co.uk
Website: www.alloceans.co.uk
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One great little duet...



...and another.



RBRduet

A photograph of the RBRduet, a small cylindrical underwater logger. It has a yellow body with a black cap on the right end. The word "RBRduet" is printed in blue on the yellow part. A faint reflection of the device is visible on the surface below it.

Introducing the RBRduet - our new, smaller, two-channel logger.

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Includes temperature and pressure sensors, with tide and wave options.

RBR

rbr-global.com