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& TECHNOLOGY

February 2015

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Emerging Complex Subsea
Sensor Systems Data
Transmission Challenges

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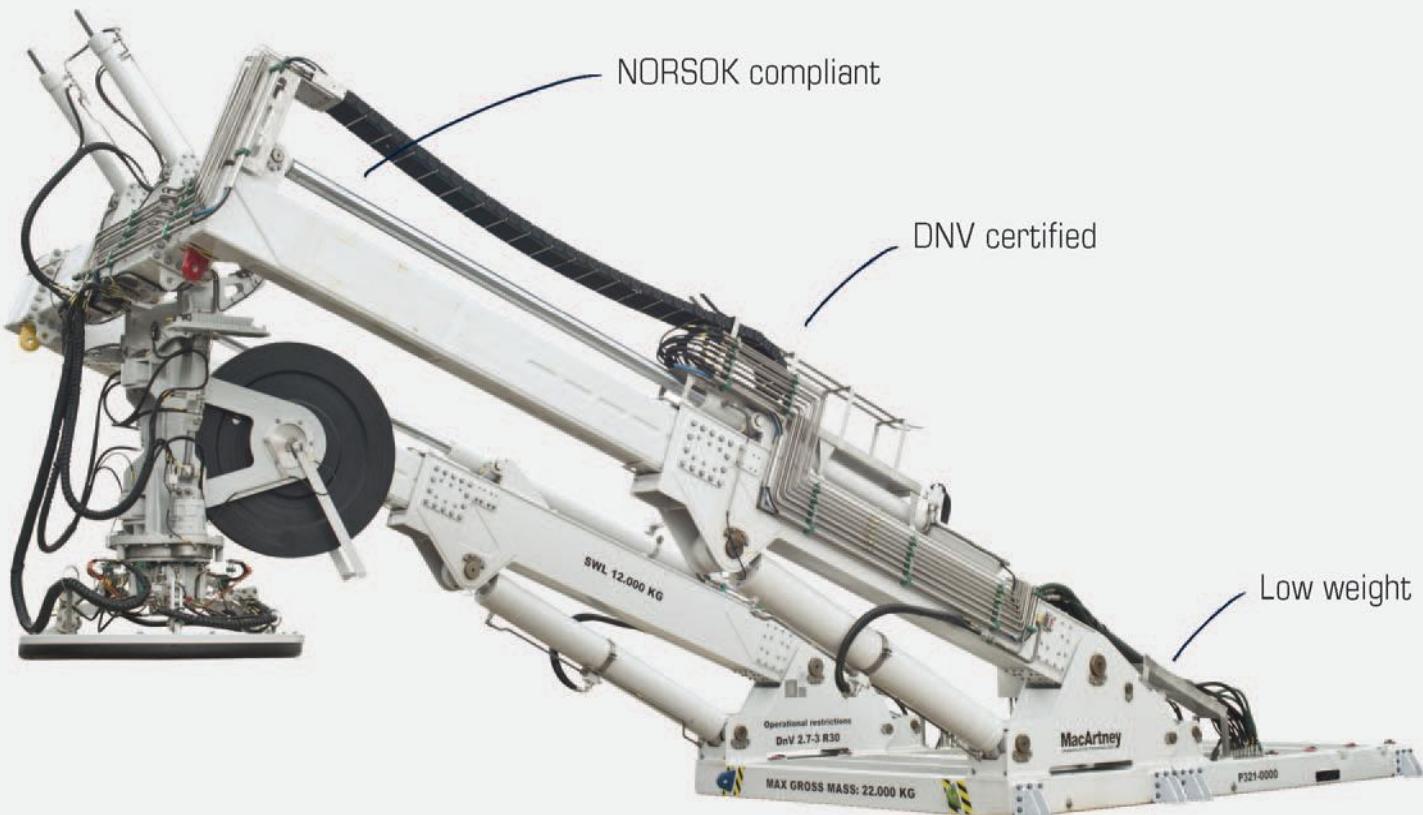
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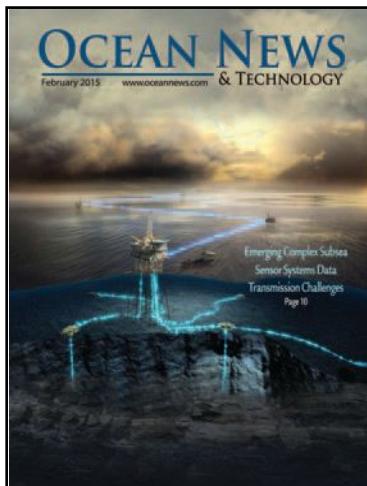
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Fiber-based, high-speed, low-latency IT infrastructure required for the modern oil field. Image by Tampnet.

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EDITORIAL

By John Manock



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Submarine Fiber Optic Cable Market Takes off in 2014

The last time I wrote an editorial in which I looked back at the previous year, I was able to work in a reference to the fact that the Boston Red Sox had won the World Series. Needless to say, I have a different approach this year that will not include any fond remembrances of the past baseball season. I can, however, look back fondly on the submarine fiber optic cable market, which had one of its strongest years so far.

I have been involved in analyzing the submarine fiber optic cable market almost since its inception in the 1980s. At the start of each year for the past decade, I have written a summary of the market for the Radar Screen Report. The significance of the title has to do with the state of the market as it was in 2004. Back then, the entire submarine cable industry was in the throes of a slump so severe that some were saying it was the end of the industry. Virtually no new cable systems were contracted in 2002 and 2003 and barely any in 2004; the result of fallout from the dot-com crash and overbuilding during the previous few years had left cable owners with an oversupply of capacity and virtually no demand. Many were filing for bankruptcy.

The title "Radar Screen Report" was selected to evoke the image of the lonely radar operator scanning the screen for signs of activity that might indicate the end of the bad times.

Gradually, the market recovered, largely due to the explosive growth in demand for Internet bandwidth. This growth had been forecasted in the late 1990s, which resulted in the overbuilding of submarine cable systems. Unfortunately, the Internet explosion came a few years too late to prevent the collapse of the market, but when it came it rekindled the market's growth.

After the market crawled out of the darkness of those dreadful years, it had a few high points, but mostly a steady though unsatisfying growth. New systems were contracted and built and capacity on the old systems, once lying almost unused, began to fill up. It remained a difficult market, however, especially for the suppliers. There was demand, which made things better than they were in the dark years, but not

enough for any of them to really thrive.

For the 5-year period from 2009 through 2013, the market, infamous for its "booms" and "busts," was remarkably steady, but at a level well below total manufacturing capacity.

2014 broke the pattern, much to the pleasure of the entire industry. There was a tremendous amount of optimism throughout the market. New cable systems were planned and reached fruition and, unlike previous years, financing was available for many new projects.

Overall, demand for new subsea fiber optic cable systems doubled in 2014, based on the total amount of cable represented in announced supply contracts. The "Big 3" submarine system suppliers — Alcatel-Lucent, NEC, and TE SubCom — all won lucrative contracts, while smaller suppliers and subcontractors also reaped the benefits.

Unfortunately, this probably is not the beginning of a lengthy boom of submarine cable system construction. The global subsea network is largely built out and there are only so many new systems that will be required each year. Before too long, suppliers are likely to be engaged in fierce competition for new contracts again.

The good news is that subsea fiber systems are popping up where they have rarely been seen before — offshore oil and gas platforms, scientific networks, and distant islands and communities so small and remote that submarine cables were never before considered an option. And, of course, Internet bandwidth demand is not going to slow down anytime soon as it continues to evolve into the primary entertainment medium for billions of people around the world.

The bottom line is that 2014 will not be the last big year for the industry, but there will not be too many like it in the near future. Like a winning playoff team, the submarine fiber optic cable industry should enjoy the victory while preparing for the next battle.

TSC's Radar Screen Report, published every January with a mid-year update, is an in-depth analysis and forecast of the fiber optic cable market. The 2015 edition is now available. For more information please visit www.subcableworld.com.



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EMERGING COMPLEX SUBSEA SENSOR SYSTEMS DATA TRANSMISSION CHALLENGES

By: Gregory Eskridge, Technology Manager – Fiber Optics, Teledyne Oil & Gas

February 2015

10

Ocean News & Technology

Deepwater systems for oil & gas production and scientific exploration are experiencing significant increases in sensor complexity and density aimed at monitoring the performance and health management of the subsea environment, therefore demanding greater bandwidth capabilities as well as high-integrity, real-time data transmission to levels never imagined a decade ago. These increased sensor demands, coupled with the growing use of large subsea power systems, are driving the need for configurable, high-reliability, electromagnetic interference (EMI)-immune networks for data acquisition and control, often with a 30-year design life expectation. This article focuses on the challenges of this emerging subsea optical industry and current research and development trends for subsea optical hardware, including the creation and maintenance of a subsea materials database for the development of new long life performance subsea products. Reliability engineering, from start to completion of new product development and technology enhancement, is the key to verifying solid engineering through science.

BACKGROUND

Deepwater oil & gas production field systems are experiencing ever-increasing levels of complexity as the fields cover larger ocean floor surface areas, enter deeper waters, and strive for increased percentage levels of oil and gas harvested to improve the economics of production. In addition, momentum on these new oil fields is moving towards even longer performance life expectations, pushing as high as 40 years. These combined complexities are, in turn, driving a surge in the requirements to design equally large health monitoring and management systems using a network of sensors to collect and report data at record levels. The need for greater bandwidth and faster, more reliable data transmission translates well to the use of fiber optical data transmission systems.

This paper will highlight various technology challenges already met by optical products and identify technology gaps that offer areas for further innovation. Specifically, the optical fiber attributes of EMI-immunity, long step-out distance, and long-term performance with increased bandwidth and transmission speed.

CHALLENGES AND EMERGING TECHNOLOGY

EMI Immunity

Enhanced oil recovery initiatives and equipment aimed at increasing product recovery percentages focus primarily on boosting and pumping equipment and systems on the ocean floor that introduce high power transmission at levels not seen just a decade earlier. The case for using fiber optic data transmission networks strengthens in this environment as a byproduct of the inherent EMI immunity of fiber optic transmission.

Subsea pumps that support enhanced recovery of reservoir assets are a key technology for the growing trend of subsea processing. Pump lifetime performance is of great interest to operators, so real-time monitoring of the health of the pump via internal sensors is an attractive solution. For pumps incorporating a large number of sensors, the problem of EMI prohibits the use of electrical sensing in many places.

Electromagnetic waves oscillating in the radio frequency range propagate from pump motors. These waves often interfere with electrical communication of electrical sensing systems, significantly reducing the signal-to-noise ratio and, ultimately, increasing the bit error rate of digital systems also operating in the radio frequency range. Optical fiber offers an attractive mitigation because the optical waves guided within fiber oscillate at frequencies in the hundreds of terahertz, far beyond the reach of the EM noise from the pump motor. Therefore, optical sensors are preferred for investigating vibrational modes of the turbines inside of pump. Analysis of this vibrational data allows predictions of failure modes and pump lifetime.

As on Shell's Parque das Conchas (BC-10), an optical connector or penetration must separate the fluids within the pump from the seawater outside, while providing a continuous optical throughput for the sensor data.

Lower Back Reflection

Optical sensing also finds a home in Life of Field Seismic (LoFS) applications. Fixed, permanent 4D seismic survey systems demonstrate value by delivering more highly accurate data used to analyze the health and life of a field. Often, a seismic interrogation pulse is injected into the earth and the reflected seismic waves are coupled into sensors on the seafloor. Fiber Bragg Gratings (FBGs) offer a unique way to perform this measurement. A broadband optical signal is launched into the fiber from the platform, and the FBG, based on Bragg's law, reflects a certain slice of the optical spectrum when the fiber is at rest. With these FBGs laid strategically, as on Petrobras Jubarte field, strain induced by the seismic reflections can alter the reflected spectrum and this wavelength shift can be interpreted, eventually producing information about the structure and health of the field. Optical wet-mate connectors provide a configurable, repairable method of linking optical sensor arrays to each other and back to shore.

Legacy optical connectors use an Ultra Physical Contact (UPC) polish for the optical end face, resulting in a connector-level return loss of >30 dB. In order to ensure that the FBGs in LoFS systems have adequate bandwidth, Fresnel reflections must be reduced at the optical interface and Angled Physical Contact (APC) polished end faces must be used, as shown in Figure 1. While UPC end faces employ a non-angled polish, the APC end face geometry has a polish angle of 8°. This contact angle of 8° between the two optical end faces results in a wet-mate connector return loss typically >45 dB, which offers sufficient bandwidth for most optical LoFS systems.

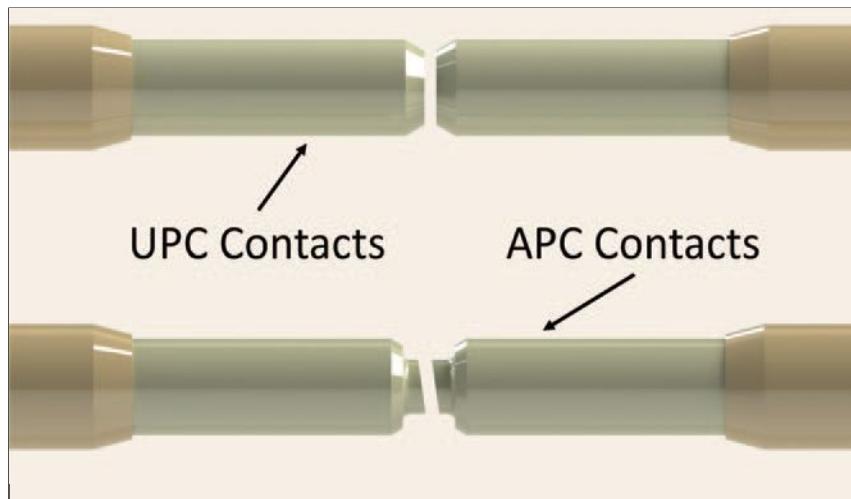


Figure 1. Photo rendered fiber optic contact comparison.

Increased Channel Count

The increasing number of sensing and data communication channels has reasonably increased the number of required optical communications channels for a given subsea system. Although multiplexing technologies have been introduced, many oil & gas operators have expressed the desire for redundancy via separate dedicated optical fibers, resulting in an increased number of optical fibers per subsea optical connector. Whereas eight optical fibers were previously the standard for wet-mate optical connectors, 12-fiber and even 24-fiber solutions are now desired to take advantage of all available fibers from the subsea umbilical. To meet these demands, wet-mate connector manufacturers may be able to build on historical designs and increase the channel count. However, in many instances, new optical connectors that incorporate new sealing and actuation technologies must be designed to meet these increased channel count demands.

Electrical/Optical Media Conversion for Long Step-Outs

Along with higher channel counts, longer step-outs have increased the need for subsea fiber optics. Long step-outs prove challenging for electrical cables because of excessive voltage drop. In contrast, optical fiber possesses extremely low loss over long distances. Commonly, subsea hardware vendors incorporate electrical/optical media converters into electronics modules, and the long distance is spanned by pressure-balanced oil-field jumpers with optical flying leads at either end or a long span of optical cable terminated to optical flying leads at each end. However, due to developments in circuit boards and subsea electronics packaging, media converters can now be embedded in the flying leads, reducing the complication of the subsea control

FEATURE STORY

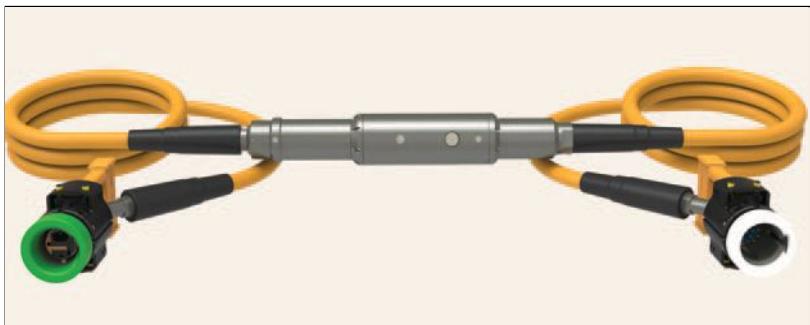


Figure 2. Flying lead incorporating electrical to optical conversion.

modules and providing unique architectural flexibility. A flying lead incorporating electrical to optical conversion is shown in Figure 2. Qualification of new packaged subsea electronics often follows industry specifications originally intended for electronics modules, such as ISO 13628-6.

Downhole Challenges

Due to the availability of powerful optical interrogation techniques such as Distributed Temperature Sensing (DTS) and Distributed Acoustic Sensing (DAS), downhole optical sensing continues to increase in popularity. Sensors based on fiber backscatter, discrete gratings, and more exotic optical techniques are used to record temperature, pressure, moisture content, strain, and other well characteristics. As these technologies mature and more optical sensors are deployed subsea, a technology gap exists in the optical wet-mate connector to transfer data in and out of the downhole environment. Such an optical feedthrough may take advantage of technologies like high-temperature epoxies, high-temperature thermoplastics, and elastomers. More extreme pressure and temperatures require the removal of epoxies altogether, as well as the use of metal seals and new, not yet developed materials. The 30-year performance of these materials must then be proven in the service conditions.

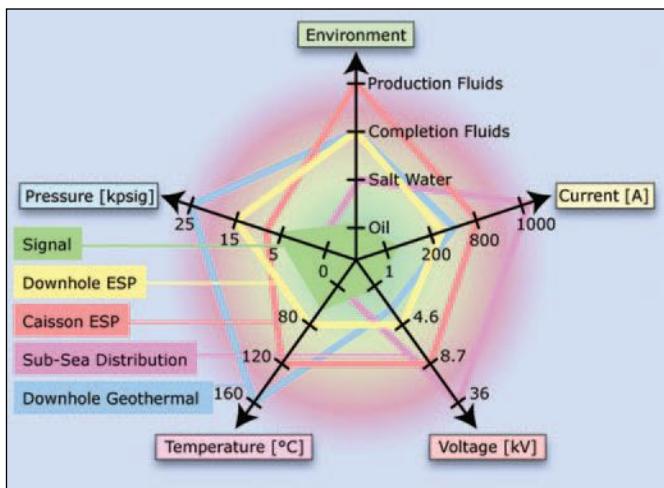


Figure 3. Stress combinations for electrical connectors in various subsea applications.

Qualified Subsea Performance Material Database

Originally developed to investigate new materials for the control of electric fields for subsea power interconnects, the Teledyne Oil & Gas Materials database, in partnership with

Teledyne Scientific, is set to provide that valuable material data. Over 186 materials have been tested so far, resulting in over 23,556 completed analyses. The importance of multi-stress testing is shown in Figure 3, where different stress combinations are associated with different subsea power applications.

While conventional test methodologies previously encompassed separate pressure, thermal, or fluid compatibility tests and multi-stress testing, integrating all stressors into a single test demonstrates the true performance of materials during use as they produce the synergistic effects of combined stresses. This method of accelerated aging enables the prediction of end-of-life performance for the development of new, robust elastomers, thermoplastics, and ceramic materials. For example, data on thermoplastic compatibility with operator-specified production fluids while at high temperatures and in-well pressure will support decision-making during the development of the optical feedthrough system (OFS).

The Importance of Reliability

Reliability of the optical products is the cornerstone of addressing these challenges subsea. A well-designed, deployed, and accountable reliability program takes a proactive approach to product development and improvement through the use of various reliability tools. Examples of key tools in the reliability program are the Accelerated Life Test (ALT) implemented within the TOG materials database and the Failure Modes Effects and Criticality Analysis (FMECA). Through Design FMECAs, Teledyne has examined each part in its wet-mate fiber optic connector to determine likely failure modes and understand how each failure mode will affect the functionality of the connector. Similarly, the Process FMECA examines each step in the manufacturing process to look for potential process errors and their effects. By ranking the severity, likelihood of occurrence, and detectability of each failure mode and then combining these rankings, the highest risk items in the design and manufacturing of the wet-mate fiber optic connector have been identified and preventative actions taken to ensure that these failure modes are mitigated. Continuous revisiting of the FMECAs during yearly reviews of field data forms a feedback loop of continuous improvement that has led to the ever increasing reliability of these connectors.

SUMMARY & CONCLUSION

Recent fluctuations and a downturn in the price of crude oil supports development and deployment of even more innovative new technologies aimed to increase oil recovery percentages in new and existing subsea oil production fields. Tremendous investments in time and currency are made towards building these installations, and economies of increased levels of recovery are even more compelling. It is apparent that the complexities of the subsea fields will continue to rise and the need for more accurate and higher densities of sensors to understand and determine field health management and life of field decisions will follow. The introduction of new and more prevalent high-power equipment subsea and the larger step-out and transmission distances will demand fiber optic systems and optical transmission for long-life, high-reliability systems with even more channels and more redundancy than we can forecast today. It will be up to system designers and suppliers to keep pace in order to drive these production economies for the continued health of the energy sector, independent of oil pricing.

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OCEAN INDUSTRY

NOAA, partners reveal first images of historic San Francisco shipwreck

NOAA and its partners released three-dimensional sonar maps and images of an immigrant steamship lost more than 100 years ago in what many consider the worst maritime disaster in San Francisco history.

On 22 February 1901, in a dense morning fog, the SS City of Rio de Janeiro struck jagged rocks near the present site of the Golden Gate Bridge and sank almost immediately, killing 128 of the 210 passengers and crew aboard the ship.

NOAA's Office of National Marine Sanctuaries Maritime Heritage Program is engaged in a 2-year study to discover and document shipwrecks in the Gulf of the Farallones National Marine Sanctuary and nearby Golden Gate National Recreation Area. In November, Hibbard Inshore and Bay Marine Services donated a research vessel and crew, along with a high-powered remotely operated vehicle, to help NOAA pinpoint and map the City of Rio de Janeiro wreck site using three-dimensional Echoscope® sonar developed by Coda Octopus.

"This exploration of the San Francisco Bay is about our overall efforts to learn about the area's important marine heritage, as well as to test recent advances in technology that will allow us to better protect and understand the rich stories found beneath the Bay's waters," said James Delgado, director of maritime heritage for NOAA's Office of National Marine Sanctuaries. NOAA has so far plotted nine of nearly 200 ships including four never before found vessels.

California-based salvagers found the wreck in the 1980s, but its exact location was unknown as the coordinates they provided did not coincide with any wreck charted by NOAA through years of sonar work.

During this expedition, Robert Schwemmer, West Coast regional maritime heritage coordinator for NOAA's Office of National Marine Sanctuaries, worked with Delgado and multibeam sonar expert Gary Fabian to locate the wreck site again. They located the site in 287 ft of water, positioned inside the main ship channel, and largely buried in mud. Schwemmer and the Hibbard team captured the first detailed sonar and three-dimensional images of City of Rio resting in the dark, muddy waters outside the bridge.

For more information, visit sanctuaries.noaa.gov.

Commonwealth awards \$5M R&D grant for Center for Marine Robotics

The Commonwealth of Massachusetts has awarded the Woods Hole Oceanographic Institution (WHOI) a \$5 million grant toward the construction of new facilities for the testing and research into innovative marine robotics. The 5-year grant award is being made as part of the Collaborative Research and Development Matching Grant Program, managed by the Massachusetts Technology Collaborative (MassTech). The grant to WHOI's Center for Marine Robotics will help accelerate the deployment of new and existing marine robotics technologies in Massachusetts.

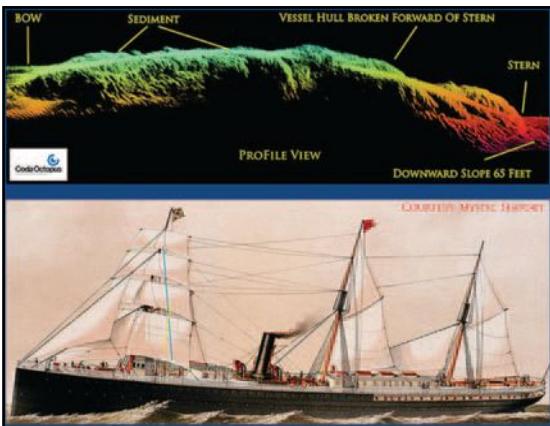
The award is a 5-year grant estimated at \$5,084,754. Under the terms of the program, the state funds will be met with a 3-1 match, bringing the project's total to

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Lotte Hass dies

Lotte Hass passed away at the age of 86 on 14 January 2015. By being the first woman to dive with autonomous diving equipment, Lotte Hass opened up a formerly male-dominated field for females. Against strong opposition she first starred as an underwater photo model before moving behind the camera to become an underwater photographer. She was inducted into the Women Divers Hall of Fame and the International Scuba Diving Hall of Fame in 2000. Spectacular film scenes that showed her diving fearlessly with sharks certainly contributed to the big success of her husband Hans Hass' movies in the 1950s. After having left the public limelight, she focused more than ever on being an advisor to her husband Hans Hass.



C & C Technologies to be acquired by Oceaneering International

C & C Technologies, a leading international provider of survey and mapping services, announced that it has agreed to be acquired by Oceaneering International, Inc. The transaction is anticipated to be completed in early April 2015, subject to customary closing conditions. C & C Technologies and Oceaneering both have strong financial and operational histories, and both have concentrations in global deep water energy arenas. Each are committed to providing the most advanced products and services to improve their customers' performance. The combined experience and resources of C & C Technologies and Oceaneering International will allow for substantial and widespread growth. C & C Technologies will retain its name and continue to be headquartered in Lafayette, Louisiana.

Teledyne acquires Bowtech

Teledyne Technologies Incorporated announced that it has acquired Bowtech Products Limited ("Bowtech") through a U.K.-based subsidiary. Based in Aberdeen, Scotland, Bowtech designs and manufactures harsh underwater environment vision systems. Terms of the transaction were not disclosed. Founded in 1989, Bowtech is a leading supplier of rugged cameras and LED lighting sources deployed in the most extreme environments within the remotely operated vehicle (ROV), defense, oceanographic, nuclear and marine science industries.

over \$20 million. The investment will help drive increased outside investment in Massachusetts-based R&D programs and has the potential to grow to over \$50 million in total. The grant will go toward new testing facilities, including a rapid prototyping center, an advanced pressure test facility, an indoor robotic test tank facility, and an in-ocean test environment. In addition, funds will be used to support applied research, product development and novel testing activities.

For more information, visit www.whoi.edu.

Pew unveils pioneering technology to help end illegal fishing

The Pew Charitable Trusts launched groundbreaking technology that will help authorities monitor, detect, and respond to illicit fishing activity across the world's oceans. The development of Project Eyes on the Seas, as the system is known, furthers a long-term effort by Pew to dramatically reduce illegal or "pirate" fishing.

The system is being developed in partnership with Satellite Applications Catapult, a British company established through a U.K. government initiative.

The technology analyzes multiple sources of live satellite tracking data and then links to information about a ship's ownership history and country of registration, providing a dossier of up-to-the-minute data that can alert officials to suspicious vessel movements.

Experts estimate that up to \$23.5 billion worth of fish enter the world market each year from illegal fishing, which averages to approximately 1 in 5 fish caught in the wild. In some regions, as much as 40% of the catch is thought to have been caught unlawfully.

For more information, visit www.pewtrusts.org.

NOAA appoints members to Marine Protected Areas Federal Advisory Committee

NOAA, in consultation with the Department of the Interior, has appointed 10 new members to the Marine Protected Areas Federal Advisory Committee.

The new members and the constituencies they represent are:

- Brian Baird, former assistant secretary for ocean and coastal policy, California Resources Agency, Novato, California (state agencies).

- Rick Bellavance, charter boat captain, Rhode Island (recreational fishing).

- Mark Carr, Ph.D., professor of ecology at University of California, Santa Cruz California (natural science).

- Martha Honey, Ph.D., director of the Center for Responsible Travel, Washington, D.C. (tourism).

- Stephanie Madsen, executive director of the At-Sea Processors Association (APA), Juneau, Alaska (commercial fishing).

- Samantha Murray, Pacific program director for the Ocean Conservancy, Portland, Oregon (conservation).

- Ryan Orgera, Ph.D., legislative representative, Coastal States Organization, Washington, D.C. (social science).

- Pete Stauffer, senior ocean program manager, Surfrider Foundation, Portland, Oregon (non-consumptive users).

- Trisha Watson, J.D., Ph.D., principal, Honua Consulting, Honolulu, Hawaii (cultural heritage resources).

- Margaret Williams, managing director of the Arctic Field Program, World Wildlife Fund, Anchorage, Alaska (conservation).



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Sentinel Intruder Detection Sonar (IDS)

As above-surface surveillance systems become ever more sophisticated at detecting threats and terrorist groups look to exploit their vulnerability, a sub-sea intruder detection system is necessary to provide a full surveillance capability. Sonardyne's Sentinel Intruder Detection Sonar (IDS) is the system of choice to ensure complete surveillance, providing the underwater solution that is always alert to the danger.

The protection of strategic and high-value marine assets — including oil and gas installations, power stations, ports and harbors, megayachts, and commercial and naval vessels — from terror threats and insurgents is becoming critical. Above-surface systems have become more sophisticated but can be bypassed with relative ease by a diver. This has driven the demand for an underwater security solution that provides complete and detailed coverage 24/7, is easy to operate, and can be integrated with other sensors to provide a comprehensive security solution.



Sentinel sonar head deployed, offering 360° detection and tracking.

To help customers both detect and deter this emerging threat, Sonardyne's Maritime Security division has developed the world's best-selling underwater surveillance system, Sentinel IDS. Introduced in 2007, it is easy to deploy and has proven low false alarm rates. The system reliably detects, tracks, and classifies divers approaching strategic and high-value marine assets from up to 1 km away and in a full 360° arc, providing ample warning time for security teams to react.

Quick and easy to install, Sentinel IDS can be put to work virtually anywhere. The small design of its sonar head enables a variety of deployment options, including light weight alloy frames for short term deployment; seabed mounts; wall, pile, or rail mounts for shore-side facilities; and hull or over-the-side deployment for mounting on vessels.

Besides its proven capabilities and cost-effectiveness, a major benefit of Sentinel IDS is that once deployed the system requires minimal user intervention. Its autonomous operation means that it can be positioned and left to do what it does best; seeking out and detecting intruders that shouldn't be there.

To provide underwater surveillance at larger facilities, such as ports and harbors or shore-side critical national infrastructure, up to 10 sonar heads can be deployed and networked together to provide the required underwater surveillance coverage. The multi-head systems are fully integrated so that a target can be seamlessly tracked as it passes from the view of one sonar head to the next.

Using acoustic signature classification, Sentinel IDS can determine the type of threat that has been detected and identify whether the threat is a scuba or closed circuit diver, underwater vehicle, or assisted diver. This information is automatically separated from tracked non-threats such as fauna, cetacean, fish, and flotsam for low false alarm rates.



Sentinel system including sonar head, Command Workstation, and Scylla loud hailing device.

So what to do once the intruder has been detected? Sentinel IDS can also be configured to automatically trigger Scylla, an underwater loud hailing device. Using a pre-recorded or live broadcast, security personnel can deliver an audible early warning to the incoming threat that they have entered a protected area. If the target continues to approach, action can be escalated to include optional third-party deterrents.

Different users have different needs, so Sentinel is available as either a rack-mounted system for permanent deployment or in a rugged casing for expeditionary deployment. Additionally, Sentinel XF (Extra Functionality) is designed to meet the requirements of military and government organizations.

That's today, but what of tomorrow? As the threat landscape changes, Sonardyne's maritime security division's ongoing development program will ensure that the Sentinel range is constantly evolving to keep pace with customer needs. For more information on Sentinel and future developments, visit the products section of the Sonardyne website (www.sonardyne.com).

ABS awards AIP for next-generation HD12000 drillship
ABS, the leading provider of classification services to the global offshore industry, has awarded approval in principle (AIP) for Hyundai Heavy Industries' next-generation HD12000 heavy duty, wide beam drillship design. The drillship, which can accommodate a 20,000-psi blowout preventer system, has been designed in full compliance with the ABS Guide for the Classification of Drilling Systems (CDS Guide) and other applicable ABS Rules and industry standards. The HD12000 drillship will be capable of operating in 12,000 ft (3,658 m) water depth with a drilling depth to 40,000 ft (12,192 m). Featuring an innovative hull form, the design based on HHI's proprietary technology includes enhanced dynamic positioning (DPS-3) capability through reduced hull resistance and thruster interaction, improved motion performance in maximum roll angle, and reduced wave resistance at field transit conditions. As part of the basic approval work scope, ABS reviewed the concept design and associated configurations interfacing with the drilling equipment and systems that will be installed on board the drillship.

ClassNK gives green light to new Niigata dual-fuel engine design

Leading classification society ClassNK has granted approval to the design of the new 28AHX-DF dual-fuel engine developed by Niigata Power Systems Co., Ltd. The new engine is slated to be used as the main engine on a new LNG-fueled tugboat being built by Keihin Dock Co., Ltd. for NYK Line. The vessel will be Japan's first LNG fueled vessel, excluding LNG carriers. New regulations for Emission Control Areas (ECA), including new stricter limits on sulfur emissions as well as the IMO's Tier III NOx emission limits, are driving demand for new engine and emission control technologies. The high costs associated with low sulfur fuels, and the increasing availability of LNG is driving both vessel owners and machinery manufacturers to consider the use of LNG as a vessel fuel. Niigata's 28AHX-DF is a medium-speed dual-fuel engine with a maximum rated power per cylinder of 320 kW and was developed for use primarily in offshore support vessels and tugboats. The engine, which operates on both diesel fuel and LNG, will meet the strict 0.1% sulfur emissions regulations in the ECA that are set to go into effect in 2015, as well as comply with the IMO's stringent Tier III NOx emission requirements. Technologies used in the new engine were developed with the support of Japan's Ministry of Land, Infrastructure, Transportation & Tourism (MLIT), as well as ClassNK as part of the society's Joint R&D for Industry Program.

Janiece Longoria reappointed chairman of Port Commission of the Port of Houston

Janiece M. Longoria was unanimously reappointed Chairman of the Port Commission of the Port of Houston Authority in a joint session of the Harris County Commissioners Court and the Houston City Council. During the meeting both Houston Mayor Annise D. Parker and County Judge Ed Emmett lauded the Port Authority's performance under Chairman Longoria's leadership. "I want to salute all of your board members and you for the great results that the port has achieved over the past 2 years," Parker said. Mayor Parker highlighted the recent centennial celebration for the Houston Ship Channel, as well as the importance of the port and the need to continue to seek support for infrastructure improvements around the port. Emmett, who is a recognized transportation expert, said the ship channel and port are vital to the region and he indicated strong leadership is crucial. "Clearly the Port of Houston is one of the great ports in the world and has great leadership," Emmett said. "So a lot of that is attributed to you (Longoria)." Chairman Longoria noted the Port Authority achieved record results in years 2013 and 2014 and is poised for a solid 2015. She noted the ongoing importance of partnership with the city and county as well as other stakeholders. Chairman Longoria has served on the Port Commission on behalf of the City of Houston since September 2002 and was appointed Chairman in 2013. Port Commissioners serve 2-year terms without pay.

Third and final Fugro Offshore Coastal Survey Vessel delivered



Three months after its last delivery, Fugro has received the third of a series of three Fugro Offshore Coastal Survey Vessels (FOCSV) being built by Damen on 12 December 2014. Like her sisters, Fugro Frontier is a compact, diesel-electric FOCNV designed for a variety of tasks. However, Fugro Frontier has benefited from tailoring to the conditions she will meet in its chosen market off the coast of Africa.

All three have an advanced design capable of taking on geotechnical work, environmental baseline surveys, moon pool deployment plus monitoring and inspection duties. "However since these vessels are to work in different areas, each is adapted to suit a particular environment. As a result, this series has been developed specifically to allow for a number of optional configurations," says Mijndert Wiesenekker, sales director for Damen's Benelux region.

Therefore the Fugro Frontier, which is aiming to work across a number of various African markets, has a slightly different deck layout to her sisters, including a small daughter craft. This will be utilized as a survey vessel where areas of shallow water would prevent a larger craft from entering.

Although Fugro Frontier is the third vessel to have been recently built directly by Damen for Fugro, recent years have seen the two groups developing a relationship through collaboration on a number of refit projects. An additional vessel for Fugro is also presently under construction in Brazil.

For more information, visit www.damen.com.

Aalesund University College upgrades to all new K-Sim Navigator simulator

Aalesund University College in Norway has become one of the first Kongsberg Maritime simulator users to migrate to the cutting-edge new simulator technology platform, K-Sim Navigation. In a contract signed on 6 January 2015 following an open tender by the College, Kongsberg Maritime will deliver a new K-Sim Navigation aft and forward bridge configuration, which is DNV Class B compliant with an integrated DP2 simulator. Installation is scheduled for May 2015. The University College has also signed a contract for an upgrade of all hardware of the College's existing KONGSBERG Polaris ship's bridge simulators to K-Sim Navigation.



Launched in September 2014, K-Sim Navigation is based on a new technology platform enabling more realistic training scenarios and enhanced user benefits for both instructors and students. In addition to extensive upgrades to the simulator's instructor facilities, K-Sim Navigation features a significantly enhanced physical engine and state-of-the-art hydrodynamic modeling, allowing vessels, objects and equipment to behave and interact as in real

life. The simulation system can easily be integrated with other Kongsberg Maritime simulators to enable a comprehensive range of training scenarios.

"K-Sim Navigation represents a significant upgrade to our simulator facility, enabling us to expand our course offering and make the most of the latest training technology. We will run courses on our new K-Sim Navigation simulators for students in navigation and DP as well as training courses for external

companies. We will soon be positioned to offer the most realistic simulator training available and believe that this will benefit our students and their employers greatly," says Norvald Kjerstad, professor in Nautical Science, Aalesund University College.

In addition to upgrading its simulator facility, the College has also taken out a 5 year "Long Term System Support Program" (LTSSP) with Kongsberg Maritime, ensuring its new simulators are the first to get any new software or hardware developments. For Aalesund University College, this means upgrade from Polaris to K-Sim Navigation software. Operational benefits of the LTSSP include fixed and predictable costs, software and hardware updates and direct connection to system experts and the Kongsberg Maritime helpdesk. All simulator LTSSPs are precisely matched to the needs of the customer and Kongsberg Maritime's simulator development, enabling equipment performance to improve over time and ensuring continuity of simulator availability.

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

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Bollinger adds 12,000 tons lifting capacity to dry-dock fleet

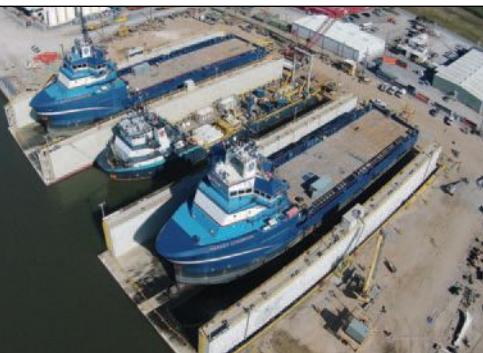
Bollinger Shipyards has taken delivery of two dry-docks with a total lifting capacity of 12,000 tons. The announcement was made by Bollinger chief operating officer, Ben Bordelon, "We are very pleased to announce the addition of two new dry-docks. These two docks will position us well in the diverse customer markets that we serve and will further enhance our position in the market with lifting capacity needed by our customers." Terms and conditions of the purchase were not made available.

One of the docks, a 10,500 ton dry-dock will be located at the Bollinger Port Fourchon facility, and measures 320-ft x 100-ft between the wing walls. Bollinger now has three commercial dry-docks located in Fourchon with a combined lifting capacity of over 22,000 tons.

The second dock, a 1,500 ton dry-dock will be located at the Bollinger Quick Repair (BQR) facility in Harvey, Louisiana, and measures 160-ft x 60-ft between the wing walls. BQR is located off the Mississippi River on the Harvey Canal and provides service to both the inland and offshore marine transportation sector with six dry-docks ranging from 900 to 3,400 ton lifting capacity.

Bollinger recently announced the development of Bollinger Fourchon North at the Port of Fourchon. Scheduled to open in the 2nd quarter of 2015, the facility will have ample dry-dock capacity for most all of the vessels operating in the Gulf and out of the port. In addition to the three docks currently in the port for Bollinger, the facility will include a business park with housing, fabrication and machining for subsea equipment, structural components for subsea pipelines and deepwater developments, as well as project and equipment laydown areas. The current Bollinger facility, Bollinger Fourchon South, will remain the rig, topside repair and conversion facility on the main channel in the Port of Fourchon.

For more information, visit www.bollingershipyards.com.



World's first high-speed LNG-fuelled RoPax ferry to be powered by Wärtsilä

A new passenger ferry being built for Swedish operator Rederi AB Gotland will be fuelled by liquefied natural gas (LNG) and will feature a Wärtsilä integrated solution. The Wärtsilä integrated solution includes a complete LNG-powered propulsion and fuel storage and supply system, as well as comprehensive project services. This will be the first Swedish flagged LNG powered passenger vessel and the first LNG-fuelled high-speed RoPax ferry in the world. The vessel is being built at the Guangzhou Shipyard International (GSI) yard in China and, when delivered, will sail between the Swedish mainland and the island of Gotland. GSI placed the contract with Wärtsilä.

By operating on LNG, the new 200-m long ferry will comply with the International Maritime Organization's (IMO) Tier III regulations regarding emissions of nitrogen oxides (NOx). Furthermore, it will meet the sulphur (SOx) emissions limitations required for operating in the Northern European sulphur emissions controlled areas (SECA), while emissions of particulates will also be reduced to virtually zero. In addition to its compliance with emissions legislation, the ferry will also meet the requirements of the IMO's recently agreed IGF Code regarding the safety of LNG-fuelled ships.

Wärtsilä and GSI have successfully cooperated for many years on projects involving various types of vessels. However, this is the first project between the companies involving an LNG-fuelled ship. It is expected that as LNG becomes increasingly accepted as a marine fuel, and given Wärtsilä's capabilities in LNG solutions, such cooperation will continue into the future.

In addition to the complete LNG-powered propulsion and fuel & storage system, the Wärtsilä integrated solution will include services relating to project management, integration engineering, on-site support and overall commissioning responsibility. The selection of Wärtsilä for the supply of a significant portion of the ship's equipment, as well as for the project services, was based on the company's vast experience in gas-powered propulsion and its capability to supply everything needed for operating on gas fuel, from the bunkering stations to the propulsion solutions. No other company is able to match this experience.

For more information, visit www.wartsila.com.

Panama becomes first port state to use Pole Star's PurpleTRAC service for sanctions compliance and risk management

The Panama Maritime Authority (PMA) has become the first port state to use Pole Star's PurpleTRAC sanctions compliance and risk management service as part of its wider port risk management strategy and as a precaution against the outbreak of Ebola.

As part of the PMA's risk management strategy, all ships intending to enter a Panamanian port are required to post arrival data via their agent into the PMA's system. In an enhancement to that process, the PMA will use PurpleTRAC to screen port arrivals and Panama Canal transits to ensure compliance against a comprehensive range of economic sanctions and blacklisted ports. Crucially, PurpleTRAC will also provide Ebola-risk warnings for any ships that have visited countries where the World Health Organisation (WHO) deems the outbreak of Ebola severe—currently the West African countries of Guinea, Liberia, and Sierra Leone.

Where a vessel is found to have called at any of these countries within the last 90 days, an automatic system/operator alert will trigger an enhanced ship inspection by the PMA, the Panama Coast Guard and the Ministry of Health.

Panama receives approximately 9,000 ship port calls per year.

Andrew Peters, chief executive officer of Pole Star comments: "We are delighted to work with the Panama Maritime Authority, the largest flag in the world, to deliver the tools they need to expand and strengthen their risk management strategy. This highlights the flag's willingness to adopt innovative solutions to create best management practice. It is also further validation of Pole Star's market leading technology and product delivery capability bringing tangible benefits to the maritime industry."

PurpleTRAC is a comprehensive ship-centric economic sanctions compliance and risk management service used by banks, trade and commodity finance companies, international commodity trading and shipping companies, ship financers, insurers, flags, and Port-State agencies to underpin their KYC / AML best practice and mitigate against the reputational, financial, and criminal risk of accidental money laundering and terrorist financing non-compliance.

For more information, visit web.polestarglobal.com.



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Craig McLean named new leader for NOAA Research

NOAA Administrator Kathryn Sullivan, Ph.D., announced that Craig McLean, deputy assistant administrator for NOAA's Office of Oceanic and Atmospheric Research (OAR), has been selected to head the office, which is responsible for NOAA's research enterprise, including laboratories and programs across the country. "Our scientific and research activities are critical to the products and services we provide to millions of Americans every day," said Sullivan. "Craig has been part of the NOAA family for more than three decades and is passionate about our mission and public service. His leadership and management expertise will serve our team well as we strive to provide science-based data and information to build community resilience against natural disasters and other long-term changes." Prior to this position, McLean served as deputy assistant administrator for OAR's Programs and Administration, as executive officer of the National Ocean Service, and was the founding director of NOAA's Office of Ocean Exploration. McLean served in uniform for nearly 25 years, retiring from NOAA's Commissioned Corps in the grade of captain. He served aboard hydrographic, oceanographic, and fisheries research ships.



NOAA announces two new habitat focus areas

NOAA has selected two sites in the southeast and Caribbean as Habitat Focus Areas – places where the agency can maximize its habitat conservation investments and management efforts to benefit marine resources and coastal communities. These two new areas are Puerto Rico's Northeast Reserves and Culebra Island, and Florida's Biscayne Bay. Under NOAA's Habitat Blueprint, which provides a framework for NOAA to effectively improve habitats for fisheries, marine life, and coastal communities, Habitat Focus Areas are selected to prioritize long-term habitat science and conservation efforts. As a Habitat Focus Area, NOAA and partners will provide conservation planning and development of a watershed management plan. "NOAA's Habitat Blueprint illustrates our commitment to building resilient communities and natural resources by improving habitat conditions for fisheries and marine life, while also providing economic and environmental benefits," said Bonnie Ponwith, Ph.D., director of NOAA Fisheries' Southeast Fisheries Science Center. "This effort will promote the exchange of ideas and transfer of best management practices between the two sites. NOAA is eager to bring the whole team to the table with our partners to focus on these areas and achieve benefits for these communities and natural resources."

The Emirates Nuclear Energy Corporation completes artificial reef off coast of Barakah

The Emirates Nuclear Energy Corporation (ENEC), has announced the completion of the final stages of an artificially constructed reef, located 3.8 km from the shoreline of Barakah, the home of the UAE's peaceful nuclear energy program. Developed in partnership with the National Marine Dredging Company (NMDC), and in line with guidance from ENEC's environmental regulator, the Environment Agency – Abu Dhabi (EAD), the Barakah Artificial Reef Project is just one of the proactive environmental initiatives being implemented by ENEC to ensure the long-term sustainability of the natural areas surrounding the Barakah site. The almost 6,700 sq. m reef, roughly the size of one football field, was constructed using recycled molded concrete core-locs originally utilized in the assembly of Barakah's coastal breakwater. Almost 1800 of the large concrete units were carefully positioned on the ocean floor using a GPS aided crane to create the underwater reef structure. The lattice formation of the reef is designed to replicate a natural coral reef, and works to stimulate the local ecosystem by improving the existing seabed habitat, providing additional shelter for marine life, and encouraging biodiversity.

Robot cameras monitor deep-sea ecosystems



Autosub returning from a successful mission

Scientists at the National Oceanography Centre (NOC) have used advanced photographic tools in an unmanned AUV to make major advancements in estimating deep-sea ecosystem diversity at "landscape" scales.

By using a camera on the Autosub6000 AUV to take a continuous stream of high-resolution photographs of life on the seafloor, this new method revealed a ten-fold increase in the precision of deep-sea ecosystem diversity estimates relative to the use of scientific trawling. Autosub6000 was developed by the NOC as part of an ongoing project. This research showed that anemones were the most abundant animal on the sea floor, information that has been previously missed from trawling because they became damaged in the nets and rendered unrecognizable.

Dr. Kirsty Morris, the lead author of this research, published in Limnology and Oceanography: Methods, said "This is an important step towards the automated imaging of the deep sea, which is essential for understanding the complexity of seafloor biodiversity and its future management."

Once the images were taken they were analyzed to identify the types of creatures seen, calculate their relative abundances and estimate their size relative to the image pixels. This allows for an overall estimate of the biomass to be calculated and compared with later/earlier images to monitor how these ecosystems change over time.

As climate change and potential exploitative pressure of seafloor resources impact the ocean, it is increasingly important to better document deep-sea marine biodiversity and ecosystems. Currently trawling is one of the most common methods of assessing what creatures live in these habitats; however, trawling has drawbacks in terms of poor accuracy and a bias in sampling seafloor biota. The new method, developed at the NOC, will substantially improve the accuracy and efficiency of seafloor surveying.

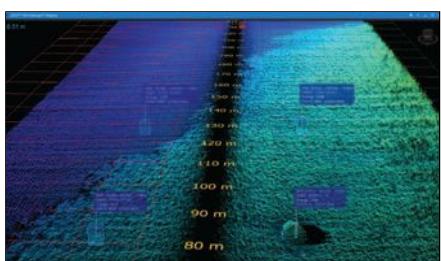
This method was developed and tested as part of the NERC-funded AESA (Autonomous Ecological Surveying of the Abyss) project. It is currently being used to map the proposed marine conservation zone, known as Haig-Fras, as well as to estimate the seafloor carbon dynamics within the vicinity. This project will involve evaluating the role of habitat and sediment type, as well as discovering which animals live there.

Dr. Henry Ruhl, coordinator of the AESA project, said "We are creating photographic maps of animals on the seafloor, which can scale up to the size of cities. This allows us to understand links between ecology, ecological functioning, and human impact in a way that was not previously feasible."

For more information, visit www.noc.ac.uk.

BioSonics and Ping DSP Sonar Technologies combine for seagrass surveys

Two sonar manufacturers from the Pacific Northwest have joined forces in a cooperative effort aimed at improving efficiencies in aquatic habitat mapping. Seattle-based BioSonics Inc. and Ping DSP, with headquarters located in Victoria, BC, recently conducted trials to evaluate the effectiveness of a Ping DSP 3D side-scan sonar combined with a BioSonics MX single beam echosounder as a means of locating and quantifying seagrass beds.



The Ping DSP 3DSS-DX-450 provides wide-swath bathymetric data with full-water-column three-dimensional backscatter imagery, while the BioSonics MX echosounder uses a focused, relatively narrow beam (90°) capable of penetrating the vegetation canopy and accurately locating the bottom beneath the plants.

When deployed simultaneously, the hybrid 3D sidescan/single beam system offers a unique combination of capabilities ideal for mapping and quantifying submerged aquatic vegetation. The Ping 3DSS provides qualitative information across large areas whereas the BioSonics single beam sonar provides quantitative subsampling across areas where plants are known to exist.

Paul Kreutner, owner of Ping DSP summarized, "With the Ping 3DSS, we could clearly visualize seagrass beds at distances over 50 m on either side of the survey vessel. This allowed us to quickly locate the edges of the grass patches and navigate directly through the plant beds where the MX system was used to collect accurate height and density measurements of the vegetation."

For more information, visit www.subsea2020.com.

Ice Studies in Cook Inlet Alaska for an LNG terminal

ASL Environmental Sciences has a contract for a 3-year metocean-ice study program in Cook Inlet, Alaska for the proposed Alaska LNG Project terminal site. This turnkey metocean program includes program management, a PSO (protected species observer), vessel,

HSE lead, data processing and analysis, and engineering inputs.

During the summer and fall of 2014, ASL deployed three Ice Profiler™/ADCP moorings close to Nikiski, Alaska on the Kenai Peninsula. Each mooring consisted of an Ice Profiler, ADCP, CT, and OBS Turbidity and was mounted in ASL's own designed bottom frame or a taut-line mooring. An additional eight ADCP moorings were deployed through the northern Cook Inlet June through October 2014. Sediment transport and sand waves will be studied in this highly dynamic area (6 kt currents). In late October, the eight moorings were replaced with four custom-built heavy duty frames each containing an Ice Profiler, ADCP, CT and OBS. ASL will return to the sites biannually to download data and service the moorings.

For more information, visit www.aslenv.com.

Arctic ice cap slides into the ocean

Satellite images have revealed that a remote Arctic ice cap has thinned by more than 50 m since 2012—about one sixth of its original thickness—and that it is now flowing 25 times faster.

A team led by scientists from the Centre for Polar Observation and Modelling (CPOM) at the University of Leeds combined observations from eight satellite missions, including Sentinel-1A and CryoSat, with results from regional climate models to unravel the story of ice decline.

The findings show that over the last two decades, ice loss from the south-east region of Austfonna, located in the Svalbard archipelago, has increased significantly. In this time, ice flow has accelerated to speeds of several kilometres per year, and ice thinning has spread more than 50 km inland—to within 10 km of the summit.

"These results provide a clear example of just how quickly ice caps can evolve and highlight the challenges associated with making projections of their future contribution to sea level rise," said the study's lead author Dr. Mal McMillan, a member of the CPOM team from the University of Leeds.

The study, published in Geophysical Research Letters and reported online by the European Space Agency (ESA), is the first to make use of measurements from ESA's latest Earth observation satellite, Sentinel-1A.

Sentinel-1A, the first satellite developed for Europe's Copernicus programme, was launched in April last year, while CryoSat has been in orbit since 2010.

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Dr. McMillan said: "New satellites, such as the Sentinel-1A and CryoSat missions, are essential for enabling us to systematically monitor ice caps and ice sheets and to better understand these remote polar environments."

Melting ice caps and glaciers are responsible for about a third of recent global sea level rise. Although scientists predict that they will continue to lose ice in the future, determining the exact amount is difficult, due both to a lack of observations and the complex nature of their interaction with the surrounding climate.

"Glacier surges, similar to what we have observed, are a well-known phenomenon," said Professor Andrew Shepherd from the University of Leeds, the director of CPOM.

"However, what we see here is unusual because it has developed over such a long period of time and appears to have started when ice began to thin and accelerate at the coast."

There is evidence that the surrounding ocean temperature has increased in recent years, which may have been the original trigger for the ice cap thinning.

"Whether or not the warmer ocean

water and ice cap behavior are directly linked remains an unanswered question. Feeding the results into existing ice flow models may help us to shed light on the cause and also improve predictions of global ice loss and sea level rise in the future," said Professor Shepherd.

Long-term observations by satellites are the key to monitoring such climate-related phenomena in the years and decades to come.

For more information, visit www.leeds.ac.uk.

Ocean acidification changes balance of biofouling communities

A new study of marine organisms that make up the biofouling community—tiny creatures that attach themselves to ships' hulls and rocks in the ocean around the world—shows how they adapt to changing ocean acidification. Reporting in the journal *Global Change Biology*, the authors examine how these communities may respond to future change.

There is overwhelming evidence to suggest the world's oceans are becoming, and will continue to become more acidic in the future, but there are many

questions about how it will affect marine life. The biofouling community—consisting of tiny species like sea squirts, hard shell worms and sponges—affects many industries including underwater construction, desalination plants and ship hulls. Removing these organisms, (a process called antifouling), is estimated to cost around \$22 billion a year globally.

For the first experiment of its kind, over 10,000 animals from the highly productive Ria Formosa Lagoon system in Algarve, Portugal were allowed to colonise hard surfaces in six aquarium tanks. In half the tanks, the seawater had the normal acidity for the lagoon (PH 7.9) and the other half were set at an increased acidity of PH 7.7. The conditions represented the IPCC's prediction for ocean acidification over the next 50 years.

After 100 days, animals with hard shells (*Spirobidae* worms—*Neodexiospira pseudocorugata*) reduced to only one fifth of their original numbers, while sponges and some sea squirts (*Ascidian Molgula sp*) increased in number by double or even fourfold.

Lead author professor Lloyd Peck from British Antarctic Survey (BAS) says, "Our experiment shows the response of one biofouling community to a very rapid change in acidity, but nonetheless shows the degree to which these communities could be impacted by ocean acidification, and to which its associated industries may need to respond. What's interesting is that the increased acidity at the levels we studied destroys not the building blocks in the outer shell of the worms itself, but the binding that holds it together. Many individuals perish, but we also showed their larvae and juveniles are also unable to establish and create their hard exoskeleton."

Professor Peck continues, "Although a PH reduction of 0.2 is less than the IPCC's 'business as usual' scenario of PH 0.3 to 0.4 in ocean surface waters by 2100, it will likely be achieved between 2055 and 2070."

Author, Dr. Deborah Power, from Centro de Ciências do Mar says, "Taking into consideration the importance of the Ria Formosa lagoon as a natural park, the modified community structure driven by a reduction in PH, while potentially reducing biofouling issues, will almost certainly affect lagoon productivity and impact on biodiversity."

For more information, visit www.antarctica.ac.uk.

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Cape Wind dealt blow as energy buyers back out

Cape Wind, the \$2.5 billion project that hopes to become the first U.S. offshore windfarm by placing 130 turbines delivering 468 MW off the coast of Cape Cod, Massachusetts, has suffered a major blow as two utilities cancelled their power purchase agreements. Nstar, a Northeast Utilities subsidiary, and National Grid have terminated agreements because Cape Wind had missed a 31 December deadline contained in the contracts to obtain financing and begin construction, and have chosen not to put up financial collateral to extend the deadline. Under the 2012 agreement, Northeast Utilities and NStar agreed to buy 27.5% of Cape Wind's production. National Grid had previously signed on to purchase 50%.

Sound & Sea Technology, Inc. awarded offshore wind development contract

Sound & Sea Technology, Inc. (SST) was awarded a purchase order with cost share totaling \$162,000 from Lake Erie Development Corporation (LEEDCo) located in Cleveland, Ohio for a desktop study, database and GIS development to support an offshore wind turbine foundation design effort. Last year, LEEDCo developed a conceptual design through a U.S. Department of Energy (DOE) competition in which Sound & Sea Technology also participated. A recent DOE award of \$2.8 million will allow LEEDCo to pursue detailed engineering design and assess the technical and cost performance of the Icebreaker foundation throughout the East Coast, Gulf Coast, and the Great Lakes regions, as compared to other alternatives. The term of the contract will be approximately 6 months. "Sound & Sea Technology is excited to be part of this project, which is on the forefront of renewable energy technology and its implementation in the U.S." said Judith A. Meggitt, president of SST. "We have substantial experience in wave, ocean thermal and tidal renewable marine energy engineering projects, which will integrate well with this offshore wind project. This project will help diversify SST's ocean renewable energy portfolio," said Dallas Meggitt, SST's technical director.

Dudgeon Offshore Wind awards service operation vessel contract

Dudgeon Offshore Wind Limited has awarded a 5-year contract for the Service Operation Vessel to Esvagt AS. The contracted Service Operation Vessel (SOV) for Dudgeon wind farm is of the Havyard-832 design with a length of 83.7 m and a width of 17.6 m. The vessel is a DP-2 Class operated vessel, accommodating 60 persons of which 40 cabins are available for technicians and service personnel used for the maintenance of the wind farm. The vessel is utilized with a gangway system and a heave-compensated crane for the safe transfer of personnel and goods to/from the turbines and the substation. The noise and vibration criteria as specified in the Clean Design and Comfort Class combined with the installation of an anti-roll stabilizing system further adds to the comfort levels of the people onboard. The warehouse logistics onboard is containerized, allowing quick turnaround's in port. The contract includes for options for extension, up to a total of 5 additional years.

G9 publish good practice guidelines for offshore wind safety

The G9 Offshore Wind Health and Safety Association (G9), in partnership with the Energy Institute (EI), has published two good practice guidelines for offshore wind safety, which were presented to the industry at a Stakeholder Forum in London. Available to download from the G9 website, www.g9offshorewind.com, the publications "Working at Height in the Offshore Wind Industry" and "The Safe Management of Small Service Vessels Used in the Offshore Wind Industry" are the first guidelines to be issued by the G9. They represent an important step towards fulfilling the association's ambition to provide leadership on the HSE challenges facing the rapidly-growing offshore wind industry. The 90 delegates in attendance at the Stakeholder Forum heard from key G9 members on the achievements of the association in 2014, with a focus on the efforts undertaken to develop the good practice guidelines. An overview was also given on the future G9 work program for 2015, with particular focus on diving operations and helicopter operations. Attendees were given the opportunity to ask questions about the G9's work, with panel sessions involving senior industry representatives who gave their opinions on implementation of the good practice guide.

MHI Vestas Offshore Wind receives first order for V164-8.0 MW



MHI Vestas Offshore Wind has received the first commercial order for the V164-8.0 MW from DONG Energy, the world's leading developer of offshore wind power. MHI Vestas Offshore Wind will deliver 32 machines for the 258 MW Burbo Bank Extension project off the coast of Liverpool Bay in the UK.

Blades for the project will be produced at the recently announced MHI Vestas Offshore Wind manufacturing facility on the Isle of Wight, off the southern coast of the UK—the first facility with the capacity to serial produce blades for future UK offshore projects.

The 258-MW Burbo Bank Extension project lies off the coast of Liverpool Bay, in the UK. When installed, the power plant will produce enough energy to meet the electricity requirements for approximately 180,000 houses.

The order includes supply, installation and commissioning of the wind turbines as well as a 5-year full scope service contract. Installation is expected to begin in 2016, and commissioning is expected to be completed in 2017. Pre-assembly of the turbines will take place in Belfast, Northern Ireland.

MHI Vestas Offshore Wind will utilize the production hall at Vestas' blades technology center on the Isle of Wight from 1 January 2015 and will invest in upgrading the facility for serial production. The facility was opened in 2011 and was specifically designed to develop large blades for the latest wind turbines. The facility consists of two halls 170 m long and 50 m wide, one for testing and verification, and one for blade production, which will be leased by MHI Vestas Offshore Wind.

"The Isle of Wight is a world class R&D center for developing and testing blades. The blades for the V164-8.0 MW prototype were designed, manufactured and tested at the Isle of Wight facility so we have developed the unique skills and processes necessary to manufacture blades, which makes it a good location to ramp up to serial production," said CEO Jens Tommerup.

For more information, visit www.mhivestasoffshore.com.

Reef Subsea concludes year with completion of £80m Gwynt y Môr installation project

Reef Subsea has successfully completed its campaign of installing and burying inter-array power cables on the Gwynt y Môr Offshore Wind Farm. The wind farm is owned by RWE Innogy and partners and is one of the largest in the world, located 13 km off the North Wales coast in Liverpool Bay.

The work scope included project management, engineering and installation of 124 inter array cables over the course of 20 months. Gwynt y Môr is not only a landmark achievement for the UK renewables industry, but it is also the largest project Reef Subsea has completed to date and will be used as a benchmark against forthcoming offshore wind farms projects.

For Reef Subsea, the project has been a fundamental part of the last 2 years and included some significant milestones. One of these was the £5million investment in specialized subsea equipment including a cable lay spread and an SMD built HDIA Plough that was designed, built and used in the first instance for the project. As a burial method, ploughing has often been overlooked in favor of other solutions, but by introducing the HDIA Plough and trusting in the technology, Reef Subsea demonstrated that ploughing is an efficient and effective method of cable burial.



In addition, the delivery of the project saw Reef Subsea award significant services to a number of companies including the provision of crew transfer vessels, diving and cable installation support and supply of cable protection. The project employed upwards of 250 people per day at the height of construction and has made a significant contribution to the renewables subsea industry.

RWE expects that the wind farm will be fully operational in early 2015 and will supply power for up to 400,000 homes.

For more information, visit www.reefsubsea.com.

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Ocean News & Technology



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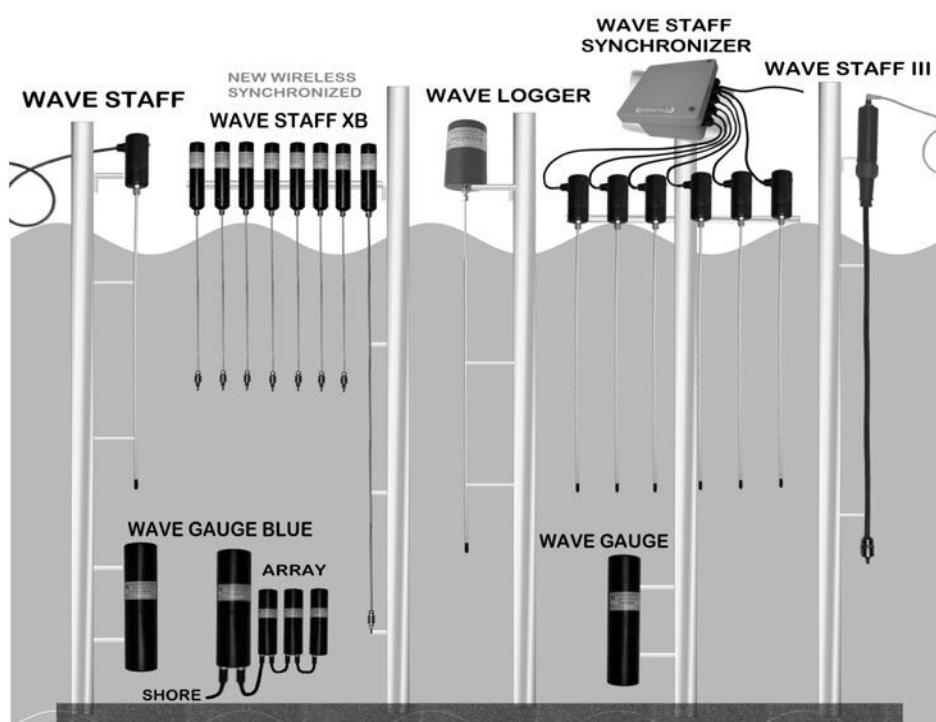
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HiDef commissioned by DONG Energy for Burbo Bank Extension

HiDef Aerial Surveying Limited has been commissioned by DONG Energy to undertake high-resolution digital video aerial surveys at the recently consented Burbo Bank Extension project. These surveys, which may continue into the operational phase of the Burbo Bank Extension, have been designed to determine how Red Throated Diver, an important seabird species, may interact with the project.

The surveys have been designed to cover both the Burbo Bank Extension site as well as the wider Liverpool Bay area, an internationally important site for marine conservation. Answering the big questions about how offshore wind farms affect birds and marine mammals is key in ensuring that the United Kingdom's (UK) vision for clean, healthy, safe, productive and biologically diverse oceans and seas can be achieved alongside the deployment of marine renewable energy to support carbon reduction targets and ensure security of supply.

Despite the difference in size of the

two companies, there are remarkable similarities: DONG Energy is a world leader in offshore wind, while HiDef is the international market leader in high-resolution digital video marine wildlife surveys. Both companies are committed to helping deliver investment and innovation in UK industry.

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

LEEDCo to optimize offshore wind foundation design

The Lake Erie Energy Development Corporation (LEEDCo) is leading an international engineering team to design an offshore wind turbine foundation optimized for fabrication in the United States. The design will catalyze domestic manufacturing growth by removing barriers to entry faced by U.S.-based steel fabricators that want to supply foundations for the offshore wind industry.

LEEDCo developed the conceptual design of the foundation system last year through a U.S. Department of Energy (DOE) competition. A new DOE award of \$2.8 million was finalized to complete the detailed engineering.

LEEDCo has partnered with GLWN, a leading wind industry supply chain adviser, to engage local and regional fabricators. GLWN is an initiative of WIRE-Net, a Cleveland-based manufacturing support organization. With their help, LEEDCo selected American Tank & Fabricating (AT&F), a Cleveland-based steel fabricator, as a partner to represent U.S. fabricators during the design process. AT&F is the leader among several U.S. companies with the sophistication necessary to fabricate monopiles of the scale and complexity needed for use in the offshore wind industry.

LEEDCo will work with several other key project partners. A team at Case Western Reserve University led by Professor David Zeng, chair of the Department of Civil Engineering, will conduct laboratory testing to validate the design; Offshore Design Engineering, a U.K.-based company that has designed and installed several European offshore wind projects, will lead the detailed engineering of the foundation; the Cold Regions Research and Engineering Laboratory, located in Hanover New Hampshire and part of

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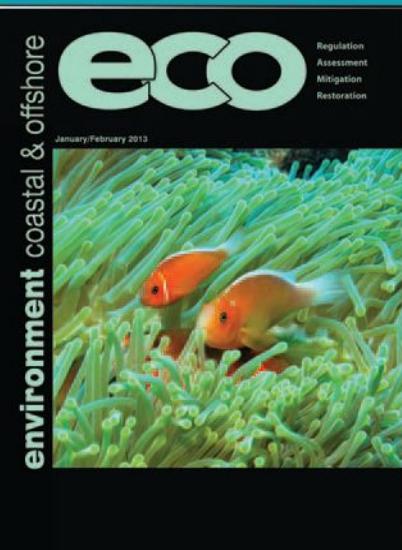
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the U.S. Army Corps of Engineers' Engineer Research and Development Center, will characterize ice formations in Lake Erie to inform the loads analysis; and Sound and Sea Technology, an ocean engineering firm based in Lynnwood, Washington, will perform geophysical and geotechnical analysis.

The foundation design will be used first for LEEDCo's Project Icebreaker, a six-turbine offshore wind demonstration project planned for the Ohio waters of Lake Erie 7 mi north of downtown Cleveland. The design team will collaborate closely with Fred. Olsen Windcarrier, LEEDCo's key partner for developing an installation strategy for offshore wind the Great Lakes.

For more information, visit www.leedco.org.

MPI acquires additional wind turbine-installation vessel

MPI Offshore announced the acquisition of Victoria Mathias from RWE Innogy. Victoria Mathias is a 2011-built wind-turbine-installation vessel, designed to transport, lift and install wind turbines and their foundations. Key features include a 1,000-ton-capacity main crane, a maximum operating depth of 45 m and the ability to jacked with 4,350 tons of cargo on board.

Victoria Mathias will bring valuable added strength and breadth to MPI's fleet, creating new opportunities and enabling them to provide a wider range of services to clients, both existing and new. In addition to the vessel itself, MPI has also purchased a range of installation equipment, including a pile hammer, pile gate, specialist lifting tackle and numerous vessel spares, all of which complement the ship's operations. MPI personnel have been impressed by the performance of Victoria Mathias during jacket foundation and 6.2-MW turbine installation processes and by the installation rates achieved. They see this as an excellent opportunity to combine the experience and synergies of both organizations and enhance MPI's future business performance.

Following closely in the traditions of the existing MPI fleet (MPI Resolution,



MPI Adventure and MPI Discovery), Victoria Mathias will be renamed "MPI Enterprise" and will operate under the Dutch flag. The vessel was delivered to MPI in early January 2015 and will continue her current charter at RWE Innogy's offshore wind farm Nordsee Ost off the German coast.

For more information, visit www.mpi-offshore.com.

Atlantis awarded feed-in tariff for tidal generation in Canada

Atlantis Resources Limited's Canadian subsidiary has been awarded a feed-in tariff for up to 4.5 MW of tidal generation to be deployed at the Fundy Ocean Research Center for Energy (FORCE) in Nova Scotia, Canada. The developmental feed-in-tariff award of C\$530 per MWh provides revenue support for Atlantis to deploy and operate up to three state-of-the art AR-1500 turbines at FORCE.

The approval on Friday from the Nova Scotia Government allows Atlantis' wholly-owned subsidiary Atlantis Operations (Canada) Limited to enter into negotiations for a 15-year power purchase agreement with incumbent network operator Nova Scotia Power Limited, under which it may deploy and operate up to three state-of-the art 1.5-MW AR-1500 turbines at FORCE. The Nova Scotia Utility and Review Board set the developmental feed-in tariff in November 2013 with the goal of enabling the tidal energy industry to grow and develop in Nova Scotia. The Nova Scotia Department of Energy manages the developmental feed-in tariff program.

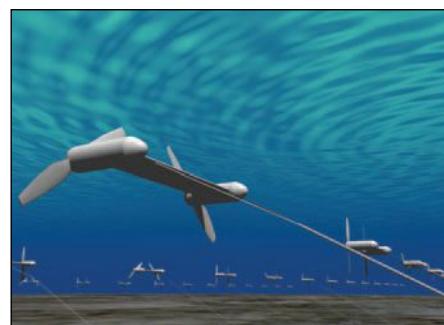
The feed-in tariff award is the latest in a series of major developments for Atlantis in Canada. In June 2014, the company concluded a C\$5 million grant agreement with Sustainable Development Technology Canada (SDTC). In October 2014, Atlantis signed a sublease agreement for a tidal turbine berth at the FORCE facility, together with a project agreement with the Nova Scotia Department of Energy. Subsea electrical cables were laid at the FORCE facility in October 2014.

Under the planned project, Atlantis intends to initially deploy a single 1.5-MW AR-1500 tidal turbine system—enough to power up to 750 local homes. The company intends to open a project office in Halifax, N.S., in early 2015, with turbine deployment operations planned for late 2016.

For more information, visit www.atlantisresourcesltd.com.

IHI, Toshiba to launch demonstration research of ocean power generation

IHI Corporation and Toshiba Corporation have been selected by Japan's New Energy and Industrial Technology Development Organization (NEDO) as co-researchers in the "Research and Development of Ocean Energy Technology – Demonstration Research of Ocean Energy Power Generation." After concluding the formal contract with NEDO, the companies will conduct demonstration research of a turbine system driven by the ocean current.



IHI and Toshiba, together with the University of Tokyo and Mitsui Global Strategic Studies Institute, have conducted R&D financed by NEDO's "R&D of Ocean Energy Technology – R&D of Next-Generation Ocean Energy Power Generation (Underwater Floating Type Ocean Current Turbine System)" since fiscal year 2011. The demonstration research is based on their achievements to date.

Power generation driven by ocean energy from currents, temperature differences, tidal movements, waves, etc. is undergoing extensive study in Europe and the U.S. as a measure to counter global warming, and there are expectations of market growth. NEDO has promoted R&D projects in ocean energy power generation technologies since 2011, with the goal of developing world-leading technology and contributing to lower CO₂ emissions in Japan.

Within this framework, the unique "underwater floating type ocean current turbine system" developed by IHI and Toshiba will demonstrate power generation in a real ocean environment, in a project expected to continue until 2017. The research work is expected to prove the viability of ocean energy power generation and to create the framework for an industry, and also to contribute to improved energy security for Japan.

The underwater floating type ocean current turbine system is a power genera-

tion device with two counter-rotating turbines. It is anchored to the seafloor and floats like a kite carried and driven by the ocean current. IHI is the lead company in the co-research project and will manufacture the turbine and floating body. Toshiba will supply electric devices, such as the generator and transformer.

Ocean currents, such as the Kuroshio Current, are a natural energy resource with little fluctuation in flow regardless of time or season. In Japan success in converting the massive power of the ocean current will create a large-scale, stable power source.

IHI and Toshiba will continue R&D of the underwater floating type ocean current turbine system to realize a sustainable renewable energy source.

For more information, visit www.ahi.co.jp or www.toshiba.com.

All wind turbines installed at Nordsee Ost

The installation team for the Nordsee Ost offshore wind farm can look back on eventful weeks. The last of the 48 wind turbines was successfully installed over Christmas around 30 km

to the north of the island of Heligoland.

"We worked on the completion of the 48 wind turbines with two installation vessels at the same time and, besides the conventional rotor star installation, the rotor blades of the 6-MW turbines have also been attached to the hub individually for the first time at sea," explained Marcel Sunier, project director for the Nordsee Ost wind farm at RWE Innogy. "We were able to successfully complete the turbine installation over Christmas after only 7 months. All our attention now is on the commissioning. The goal is to connect the wind power units to the grid one by one and ensure complete operational readiness of all turbines by the coming spring. The first wind turbine has commenced trial operation in the past few days and is already feeding her green electricity into the grid."

The installation of the 48 wind turbines took place from the base port in Bremerhaven. Like the foundations, the tower segments, nacelles and rotor blades were also stored, pre-assembled and loaded on the installation vessels "Victoria Mathias" and "Friedrich

Ernestine" at the Eurogate Container Terminal.

The individual components of the 6-MW turbines from Senvion impress through their huge dimensions: With around 160 m from sea level to the tip of the blade, the wind turbine stands higher than Cologne Cathedral. The nacelle has a weight of approx. 350 tons and the dimensions of a detached house. Inside the nacelle are the machine components like gearbox and generator. The tower consisting of two individual segments is in total over 70 m long and weighs over 240 tons. The individual rotor blades are 60 m long and weigh approximately 23 tons.

After completion and start of commercial operations in the coming spring, the Nordsee Ost offshore wind farm will have installed power of around 295 MW and supply the equivalent of around 320,000 households with electricity. Equipped with the presently most powerful offshore turbines, Nordsee Ost is one of the biggest commercial wind farm projects off the German coast.

For more information, visit www.rwe.com.

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OceanServer awarded AUV Contract

OceanServer Technology, Inc. has recently delivered an Iver AUV for the MODUM project supported under the NATO Science for Peace and Security (SPS) Program. The purpose of the MODUM is to move "towards the monitoring of dumped munitions threats in the Baltic Sea." The goal of the project is to establish a cost-effective, research-based monitoring network using underwater vehicles to enhance understanding about dumped munitions in the Baltic Sea that pose both environmental and human security threats. The Iver AUV is equipped with high-resolution side-scan sonar, a magnetometer and a full suite of environmental sensors utilizing the YSI Sonde 6600. This combination of sensors enables the AUV to identify likely munitions and take geo-registered environmental readings in close proximity to the targets. The vehicle will primarily be operated out of The Institute of Oceanology of the Polish Academy of Sciences (IO PAN) in Sopot, Poland. Dumped Chemical Weapons pose an environmental and security hazard in the Baltic Sea region. The Iver AUV should help determine the location of munitions (many of which are unknown), and allow for environmental impacts originating from corroded munitions to be continuously assessed. The status of the munitions in the Baltic Sea area are of particular concern given the high ship traffic, impact on fish/fishing and development of offshore energy (i.e., wind farms).

General Dynamics National Steel and Shipbuilding Company awarded multiple contracts

General Dynamics National Steel and Shipbuilding Company of San Diego, California was awarded a \$498,116,529 modification to a previously awarded fixed-price-incentive, firm-target contract (N00024-09-C-2229) for the procurement of the detail, design and construction of the fourth Mobile Landing Platform Afloat Forward Staging Base. Work is expected to be completed by March 2018. Fiscal 2014 shipbuilding and conversion (Navy) contract funds in the amount of \$498,116,529 will be obligated at time of award and will not expire at the end of the current fiscal year. The Naval Sea Systems Command, Washington, District of Columbia, is the contracting activity. Also awarded was a \$7,279,014 modification to a previously awarded contract (N00024-13-C-4404) for USS Peleliu (LHA 5) fiscal 2015 decommissioning. After 35 years of service, USS Peleliu (LHA 5) will be removed from active service and placed in decommissioned status. Work will be performed in San Diego, California and is expected to be completed in March 2015. Fiscal 2015 operations and maintenance (Navy) funding in the amount of \$7,279,014 will be obligated at time of award and will expire at the end of the current fiscal year. The Southwest Regional Maintenance Center, San Diego, California, is the contracting activity.

Argon ST to supply Navy with decoy systems

Argon ST Inc., Smithfield, Pennsylvania, is being awarded a \$6,532,838 modification to a previously awarded contract (N00024-12-D-6216) for the procurement of five AN/SLQ-25A/C countermeasure decoy systems and spares that provide improved naval defense for current threat torpedoes in support of the Undersea Defensive Warfare Programs. The AN/SLQ-25A/C is a digitally controlled, modular design, electro-acoustic softkill countermeasure decoy system. It employs an underwater towed body acoustic projector, which is deployed astern by a fiber optic tow cable including dual tow capability, enhanced torpedo countermeasures, and the Littoral Fiber Optic Tow Cable. The system defends ships against wake homing, acoustic homing, and wire guided torpedoes. Work will be performed in Smithfield, Pennsylvania and is expected to be completed by September 2016. Fiscal 2014 and 2015 shipbuilding and conversion (Navy) funding in the amount of \$6,532,838 will be obligated at time of award. Contract funds will not expire at the end of the current fiscal year. The Naval Sea Systems Command, Washington, District of Columbia, is the contracting activity.

Phoenix upgrades U.S. Navy Deep Drone ROV

Phoenix International Holdings, Inc. recently completed an upgrade of the U.S. Navy's 8,000-ft depth capable remotely operated vehicle (ROV) Deep Drone. All work was performed under a multi-year contract with the U.S. Navy's Office of Supervisor of Salvage and Diving (SUPSALV). The upgrade included installing a new umbilical, sonar, high-definition camera, LED lighting system, an updated frame, and a new foam pack. In addition, and at the heart of the upgrade, Phoenix installed a completely new Programmable Logic Controller (PLC)-based vehicle control system.

This new PLC-based control system was designed to increase the vehicle's bandwidth to accommodate advanced sensors and provide intuitive, accessible functionality to allow ROV technicians to address common software related challenges (e.g., installing and integrating new sensors to address specific operational requirements). To support the greater demand for bandwidth, the overall system design also included fiber optics throughout the vehicle and within the vehicle's new umbilical. Additional advantages of the PLC based control system design include improved maintainability and reliability due to commercial off-the-shelf (COTS) components and software that are readily available and supported worldwide. Incorporated into the PLC-based control system was an extensive graphical user interface (GUI) for both control and diagnostics with GUI screens. In designing the GUI, the effort focused on supporting rapid customization, including information displayed, items controlled, and layout of each GUI page. With the design in place, Phoenix engineers and technicians commenced a step-by-step process to replace Deep Drone's legacy control system with a PLC-based control system.

Work started with the development of the basic control system using simulated digital inputs and outputs. Phoenix personnel then assembled and tested the complete system, including the vehicle control station, ROV-housed PLCs, and maintenance van, within a laboratory environment. This approach had the added benefit of keeping Deep Drone fully operational during the control system development process. Once fully tested in the laboratory environment, the system was tested with the vehicle operating in Phoenix's above ground vehicle test tank. A final series of open ocean system tests were conducted aboard USNS Grasp (T-ARS-51) near Andros Island, Bahamas. During these tests, Phoenix personnel fully exercised the vehicle and its new control system. Following these successful tests, the upgrade was complete and Deep Drone was placed back into a mission-ready status.

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

Bollinger delivers the CGC Isaac Mayo

Bollinger Shipyards LLC has delivered the ISAAC MAYO, the 12th Fast Response Cutter (FRC) to the United States Coast Guard.

The announcement was made by Bollinger's president and C.E.O., Ben Bordelon. "We are very pleased to announce the delivery of the latest FRC built by Bollinger, the ISAAC MAYO, to the 7th Coast Guard District in Key West, Florida. We are looking forward to honoring and celebrating the heroic acts of Isaac Mayo at the vessel's commissioning."

The 154 ft patrol craft ISAAC MAYO is the 12th vessel in the Coast Guard's Sentinel-class FRC program. To build the FRC, Bollinger used a proven, in-service parent craft design based on the Damen Stan Patrol Boat 4708. It has a flank speed of 28 kts, state-of-the-art command, control, communications and computer technology, and a stern launch system for the vessel's 26-ft cutter boat. The FRC has been described as an operational "game changer," by senior Coast Guard officials.

The Coast Guard took delivery on 13 January 2015 and is scheduled to commission the vessel in Key West during March 2015.

Each FRC is named for an enlisted Coast Guard hero who distinguished him or herself in the line of duty. This vessel is named after Coast Guard Hero, Isaac Mayo. In the spring of 1879, a raging snowstorm blanketed the shores of the Northeastern U.S. The perilous seas and weather caused a three-masted schooner, the Sarah J. Fort, to wreck on the shores of Cape Cod, Massachusetts. Mayo, a junior surfman at Life-Saving Station 7 displayed exemplary character during the disarray as he and his crew faced the storm to rescue the schooner's sailors. Because of Mayo's exemplary surfman and leadership skills throughout the challenging rescue, Mayo was awarded the Gold Lifesaving Medal on 10 November 1879.

For more information, visit www.bollingershipyards.com.



U.S. Navy divers search for AirAsia flight

An eight-member team from Mobile Diving and Salvage Unit (MDSU) 1 onboard USS Fort Worth (LCS 3) is supporting the ongoing Indonesian-led search effort for AirAsia flight QZ8501 with advanced tow fish side-scan sonar systems capable of providing high-resolution images of the ocean floor.

The tow fish side-scan sonar system

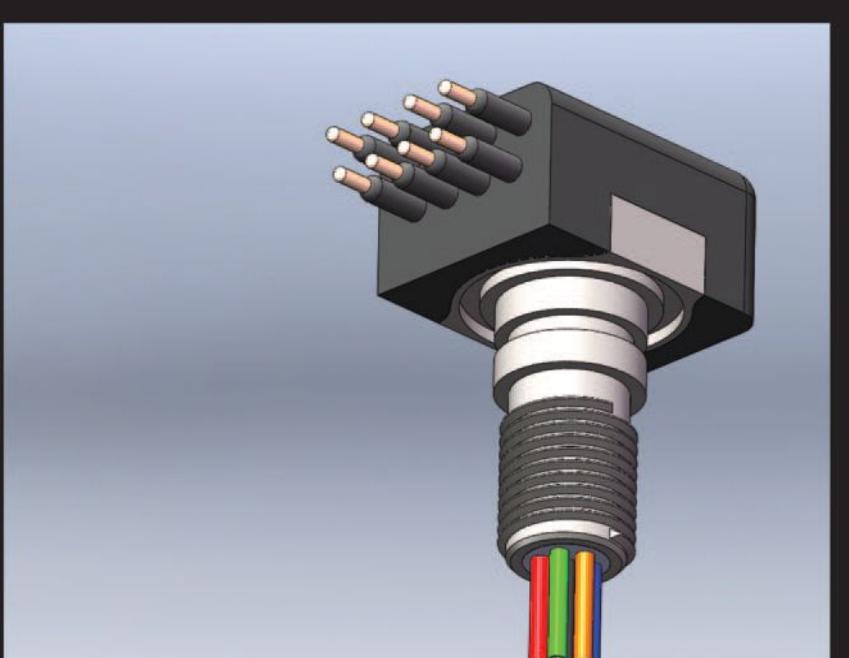
is used to identify objects on the seafloor and provide accurate imagery for analysis. The sonar carries a passive listening device for detecting an acoustic pulse and is towed behind a vessel between 1 and 5 kts. The acoustic signal is then transmitted to a computer where the trained operators are able to analyze the feedback.

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using different kHz spans," said Navy Diver 2nd Class Daniel Clarke. "Should we find targets out there, we will switch over to a very high resolution; we'll go [over the area] very slowly and get very clear images. We can see everything on the seafloor using our computer."

Similar sonar systems have been crucial in past operations in 7th Fleet. In early 2014, U.S. 7th Fleet dedicated assets, including Bluefin-21 side-scan sonar systems, to assist in the search for MH370 and the Korean ferry Sewol search and rescue operations.

"We use this equipment quite often," said Clarke. "This type of equipment was used in stuff like finding MH370, or in the Sewol [South Korean ferry capsized tragedy], also with finding any type of other aircraft that might have gone down in the past."

As one of the U.S. Navy's diving and salvage units, MDSU 1, stationed in Pearl Harbor, is equipped to rapidly deploy specialized dive teams to conduct harbor clearance, underwater repairs and search and recovery operations in any environment.

USS Fort Worth is forward deployed to 7th Fleet and arrived in the search for Air Asia 3 January 2015 at the request of the Indonesian government. Fort Worth is operating alongside USS Sampson (DDG 102), which arrived on station 30 December 2014.

For more information, visit www.navy.mil.

Kongsberg Maritime supplies CCTV upgrade for USNS Zeus

Kongsberg Maritime has successfully completed a project to supply a new Horizon Marine CCTV System upgrade for the "USNS Zeus." The new system replaces the first large vessel CCTV System supplied by Kongsberg Maritime, originally delivered to the USNS Zeus in 2002.

The new Kongsberg Maritime CCTV systems replace the original ships' CCTV systems and will be used to monitor critical processes both above and below deck. The system also incorporates 29 high-speed PTZ dome cameras.

The CCTV system has been fully upgraded in two phases, culminating in final delivery in November 2014. The Kongsberg Horizon CCTV range is a scalable harsh environment marine platform that incorporates a combination of high-quality, in-house design with modified off the shelf (MOTS) video camera stations, telemetry and control components.



Engineered to withstand harsh exposed marine environments, many system components also comply with the highest military level specifications for shock, vibration, EMI, temperature and humidity.

The system deployed on USNS Zeus comprises a range of marine-grade camera stations including 10 above deck PTZ (pan, tilt & zoom) IR Color cameras with integrated IR LED lighting. These cameras utilize a high-resolution low light color/mono sensor with 28x optical zoom (12x digital) and feature an integrated wiper system.

The system also incorporates 29 high-speed PTZ dome cameras suitable for above/below deck operation with a high-resolution color/mono sensor and 36x optical zoom. High-quality images are distributed via a large video matrix and full control of all cameras is made available at telemetry keyboards with three axis joystick control.

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

CTF-150 intensifies maritime security operations

Combined Maritime Forces (CMF) Combined Task Force 150 (CTF-150) started the New Year with an intensification of its regular maritime security and counter-terrorism operations across the Arabian Sea, Gulf of Oman, Gulf of Aden and the Red Sea.

Maritime security and counter-terrorism operations aim to deter and disrupt terrorist organizations from making illicit uses of the seas to conceal their movements or generate funding.

CMF warships and aircraft from Australia, France, New Zealand, the UK and the U.S. are contributing to this focused operation by patrolling the mar-

itime domain to collect information on a variety of local traffic, building positive relations with local fishermen, and helping to ensure security, safety and freedom of movement for commercial shipping in international waters.

Law Enforcement Agencies from the U.S. and the UK will also take part in the international effort, providing agents onboard warships and in the headquarters ashore in order to improve interoperability between navies and these agencies.

Commodore Brian Santarpia from the Royal Canadian Navy is the Commander of CTF-150. He said, "Combined Maritime Forces ships involved in maritime security and counter-terrorism operations were hugely successful in 2014. We denied international terrorist networks millions of dollars from illegal trafficking by seizing and destroying around 21,500 kg of different illicit narcotics. We also assisted in rescuing numerous fellow mariners from the dangers of the seas and promoted cooperation and coordination between regional maritime security agencies through leadership engagements, conferences and visits. With the renewed support of the 30 CMF contributing nations this year, we are set to continue this good work throughout 2015."

CTF-150's mandate is to promote a lawful and stable maritime environment free from terrorism, trafficking and other illegal activities across an area of two million square miles, covering the Red Sea, Gulf of Aden, Arabian Sea, Indian Ocean and Gulf of Oman. Canada is currently commanding CTF-150 with a combined Canadian and Australian staff.

U.S. and Korean Navies embrace training opportunities

The guided-missile destroyers USS Mustin (DDG 89) and USS John S. McCain (DDG 56) participated in a bilateral training exercise with their counterparts in the Republic of Korea navy.

The routine bilateral exercise is taking place in international waters east of the Korean peninsula and features a full spectrum of maritime operations to include antisubmarine warfare training, communication drills, dynamic ship maneuvers, and liaison officer exchanges with the ROK navy.

For U.S. Navy crews, the bilateral training provides valuable opportunities for Sailors to sharpen their tactical skills early in the year.

COMPANY SPOTLIGHT

www.oceanspecialists.com



Ocean Specialists, Inc. (OSI) provides design, engineering, and delivery of fiber-based data networks for offshore facilities. The company is globally renowned for its advisory services and full project delivery of end-to-end communications solutions for telecom, oil & gas, and ocean observing applications.

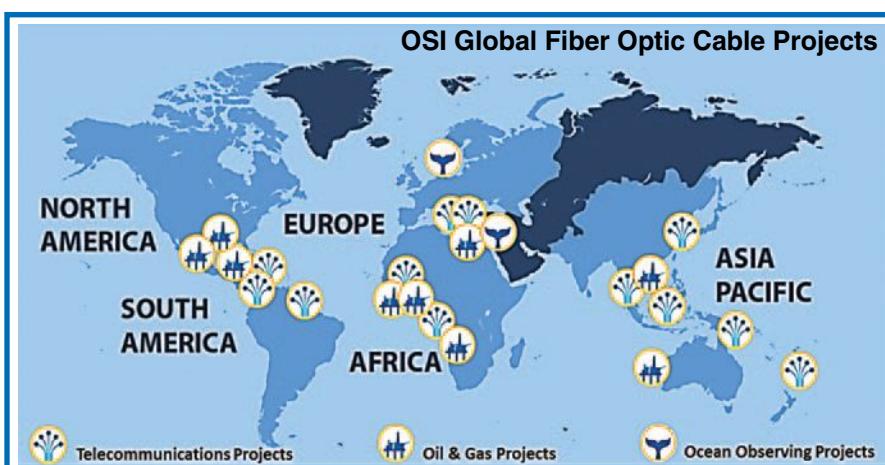
Having successfully conducted more than 100 subsea data network projects for its global client base, OSI has developed the expertise to ensure data connectivity requirements are addressed in the most technically sound, cost-efficient way possible.

With offices in Stuart, Florida; Boston, Massachusetts; Houston, Texas and Singapore, and additional resources strategically located around the world, OSI helps clients minimize risk, optimize investment, and maximize the value of subsea fiber-based data networks. With extensive hands-on experience in the commercial and economic analysis, design, implementation, and management of subsea networks, OSI has met the needs of customers across telecommunications, oil & gas, and environmental monitoring companies and governments worldwide.

Contact OSI today for the planning, design, delivery, and operation of your offshore communications network.

Recent and Ongoing Projects – A Brief Overview

- Design, development, and ongoing operations for the Poseidon fiber network, the first hybrid offshore Oil & Gas and Ocean Observing Network.
- Network design, feasibility, and project implementation on five major oil and gas submarine fiber optic projects in four regions within the past 24 months (U.S., Australia, SE Asia, and Africa).
- Technical, market, and commercial advisory services to owners of three major regional telecommunications networks (Asia and Africa).



Maximizing ROI with Digital Oilfield Solutions

Cost savings are particularly important today in the oil & gas market. Improvements in information flow that are generated by bringing fiber to offshore fields have led to proven financial benefits. Companies have reported results of up to 25% reduction in operating costs and an 8% increase in production rates at fields around the world as a result of advances in digital communications. OSI plans and installs fiber networks to maximize efficiencies, minimize risks, and optimize investments in offshore fields.

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Enhancing Production and Efficiency by Maximizing Your Flow of Data

Connecting fiber-based subsea data cables to offshore oil & gas platforms is an excellent way to manage and benefit from the ever-increasing amounts of data flowing from offshore fields to onshore management. Fiber optic connectivity is unequalled in security and reliability and is the most efficient technology to carry voice, video, and data between platforms and from fields to onshore facilities.

Companies that have installed subsea fiber connections have reported significant advantages:

- Operational cost reductions with decreases in down time, improved geosteering decisions, better well placement, and reductions in offshore personnel requirements.
- Life of Field improvements with improved collaboration, better and faster decision-making, and 3D modeling that significantly improves field efficiencies.
- Improvements in HSSE, reduced exposure to risk, reduced cost of transport, optimized manning levels and reduction in offshore man-days.
- Improved decision support and more efficient work processes through remote operation of equipment, remote support for running and training new tools, and remote support for running downhole tools.
- Leveraged drilling and geological expertise with more information and the right people available for decision-making (on- and offshore).

INSTALLING FLYING LEADS IN ROUGH SEAS

By: Fernando Hernandez, Reaching Ultra

The article “FLYING LEADS: The How,” previously published in the March 2014 issue of Ocean News & Technology detailed the “deployment, handling, and mating via specific tools and methods” of single and bundled conduits (1). The intent of this follow up article is to emphasize the manner by which weather conditions affect the management and installation of single and bundled conduits; illustrate the role that topside cranes play in regard to their handling; and, above all, to have this article serve as a field/reference guide for existing and future offshore personnel.



A vessel operating during rough seas in the North Sea (Source: Steffen Nerhus).

Single Conduits in Operation

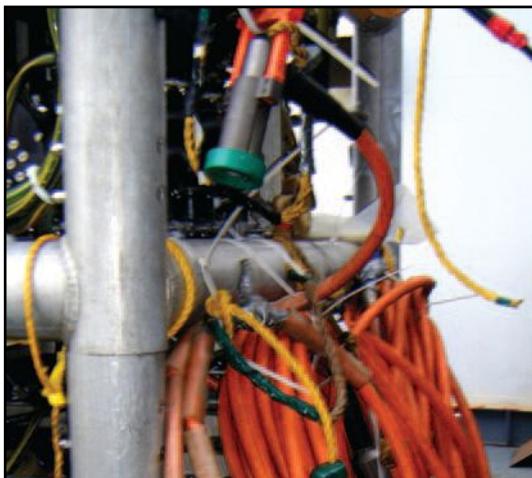
From an installation and handling standpoint, there are two commonly used methods by which to trip a single conduit via their respective deployment source to operational depth (see Table 1). Once a single conduit has reached its operational depth, it can then be installed, allowing for a path of continuity to be bridged between two assets in open water. The following definition for single conduits, as set forth per Reaching Ultra (1)—will be referenced in order to give the reader a better understanding of their composition and application:

When electrical and/or fiber optic lines are run in a single conduit Flying Lead, Pressure Balanced Oil Filled (PBOF) hoses are required, giving way to Electric, Optical, and Electrical Optical (Hybrid) Flying Leads (EFL, OFL, EOFL, respectively). A key feature of PBOF hoses is that all lines are housed within a single hose, making it the sole protective barrier for these lines...via its Kevlar properties, for example.

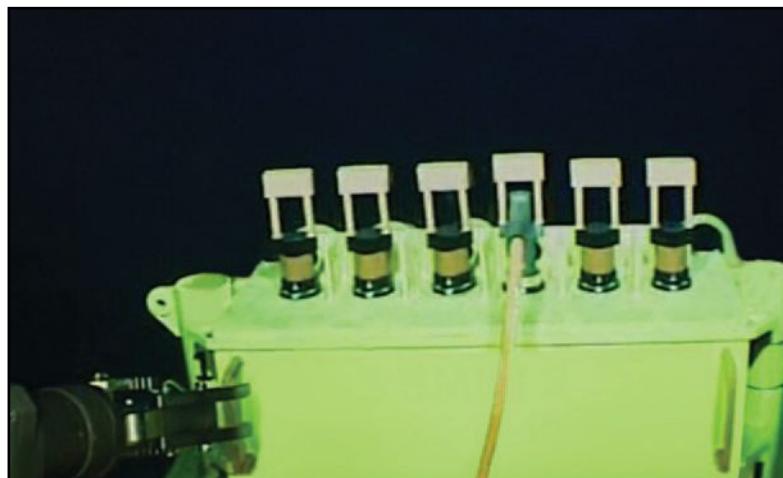
With the definition for single conduits reaffirmed, Table 1 highlights the manner by which single conduits make the transition from a topside to a subsea environment.

Deployment Method	Surface Mounting	Crane Dependency and Use for Unspooling at Depth	Installed Via	Mating Process
1 Attached to an ROV's cage in a Figure 8 fashion	Flying Lead is spooled on to an ROV's cage	Crane not required: ROV is tasked with unspooling Flying Lead from cage	An ROV's manipulators: ROV tooling not required	Each end of conduit terminates to an ROV connector, which contains ROV grab handles, allowing an ROV to handle and install said conduit on to a mating point on a subsea asset
2 Figure 8 deployable frame	Flying Lead is spooled on to said frame in a figure 8 overlapping fashion	Low: Crane is solely used to land frame on the sea floor, an ROV then unspools the lead with free degree of travel		

Table 1. Top level description of single conduit interfacing.



Single conduit Flying Lead attached to external area of an ROV's cage.

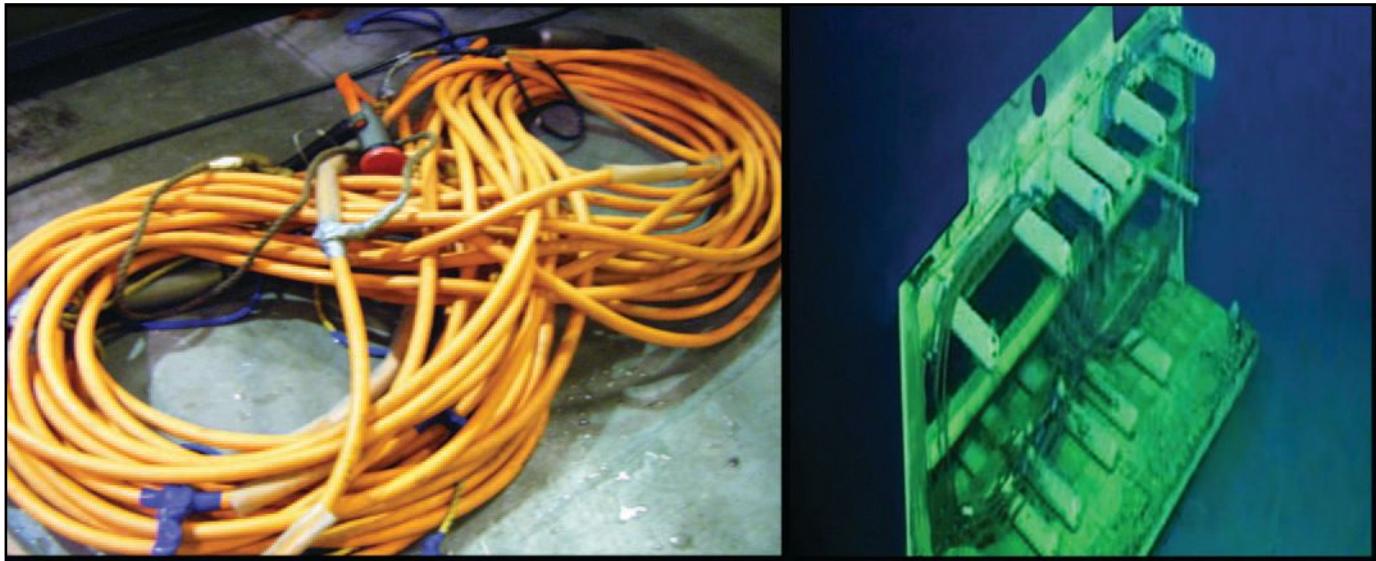


Installation of single conduit; reference connector with orange hose.

Weather and Crane Considerations

Of the two methods listed in Table 1, Flying Leads deployed using Method 1 are at greater risk of becoming damaged during anomalous weather. This is due to the fact that an ROV has to fly out of its cage and travel to the area where the Flying Lead is mounted. Dismounting the Flying Lead from here can be a difficult task during anomalous conditions, which can cause both the cage and ROV to heave, resulting in unsynchronized upward and downward motion, making it difficult to dismount the lead.

Should an ROV attempt to dismount a single conduit in this backdrop, the fiber optic and electric lines housed within the conduit can be damaged due to an ROV manipulators' inability to accurately grasp the Flying Lead. Conversely, because Method 2 places the Flying Lead on a deployment frame, once the frame has landed on the seafloor—and is unhooked from a crane—it remains fixed there. With this completed, the lead can be unspooled with a great degree of mobility via an ROV.

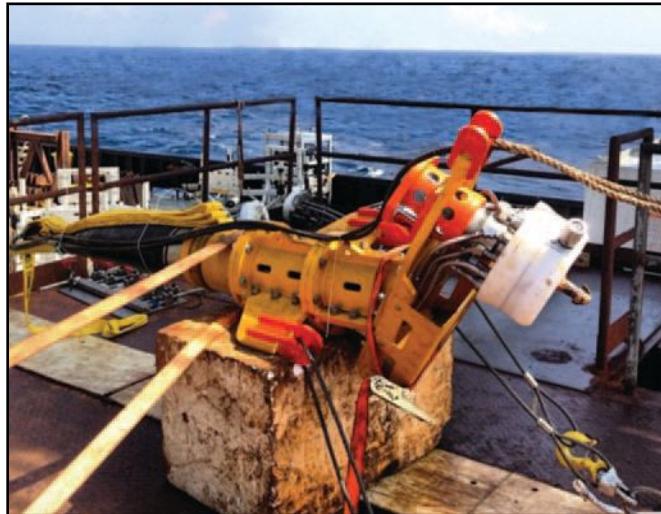


(Left) Flying Lead in a Figure 8 position; (Right) Figure 8 deployment frame resting on seafloor—comparable frame is used for bundled conduits.

Launching Bundled Conduits

From an installation and handling vantage point, landing a bundled conduit to operational depth is achieved via three distinct methods. Table 2 highlights the manner by which bundled conduits travel from surface to their operational depth. Bundled conduits, as is the case with single conduits, are used to bridge a path of communication between two separate sub-sea points. Here, too, bundled conduits will be defined to give the reader a better understanding of their composition and application (1):

Bundled conduits [which utilize junction plates at each end]...are specifically used for the running of hydraulic and chemical lines, giving way to Hydraulic Flying Leads (HFL) and Chemical Flying Leads (CFL). Bundled conduits can also be outfitted with electrical and fiber optic lines. A jump out panel is typically utilized to connect a PBOF hose and connector to its designated point in this backdrop.



A bundled conduit flying lead prior to being installed in the South China Sea (Source: Alex McKinley).

It must be noted that because bundled conduits run an array of lines—this greatly increases their weight—thus requiring a crane to be used in conjunction with an ROV to unspool them.

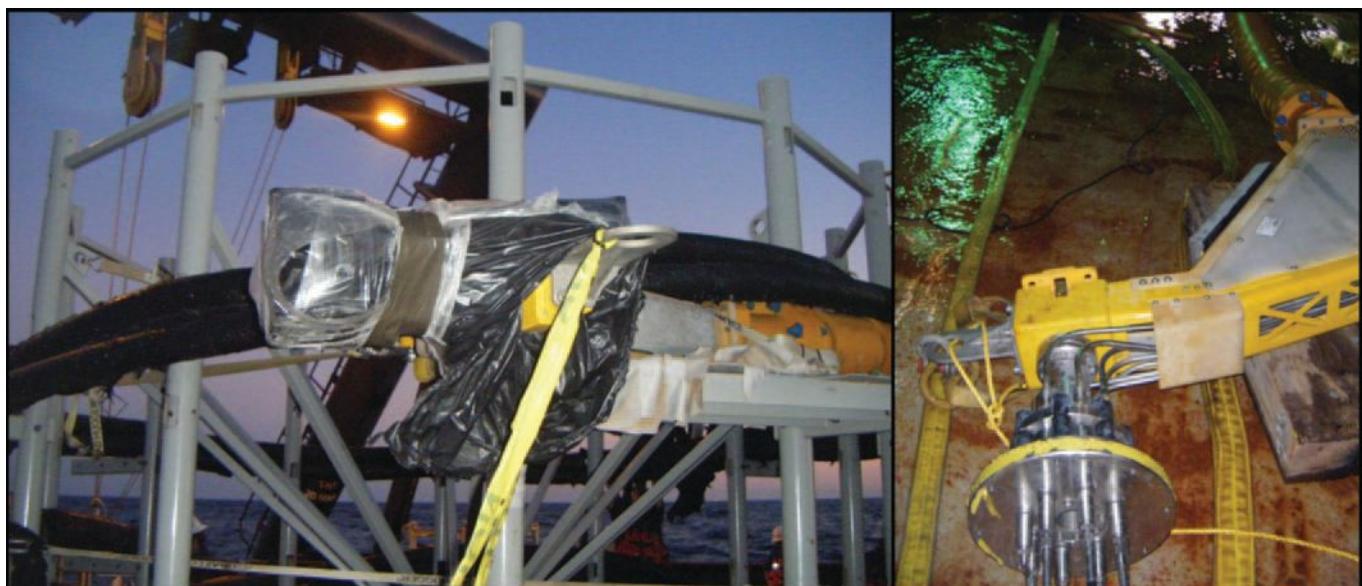
Weather and Crane Considerations

Of the methods listed in Table 2, Method 2 has the highest likelihood of being affected by adverse weather, due to the fact that a crane must work in unison with a topside carrousel to overboard one end of a bundled lead at a time via a chute that is typically located on a vessel's stern. Furthermore, when bundled leads and accompanying junction plates are deployed during adverse sea states via a carrousel, such sea states can impact their physical integrity, especially when entering the splash zone because this is when they are the nearest to the bottom part of the chute and vessel's stern.

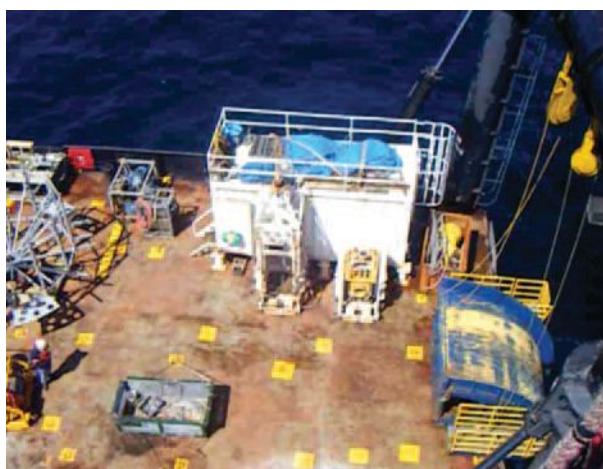
It is important to note that deploying a bundled conduit in this fashion is further compounded by the fact that an ROV must interface with the unspooled lead once it has reached its final hang off point, which can be difficult due to the lead's upward and downward movements. In contrast, bundled conduits via Methods 1 and 3 can be unspooled with greater ease once their deployment frame is unhooked from the crane upon landing on the seafloor. However, a crane is utilized to assist in handling and installing said conduit when a bundled conduit weight exceeds an ROV's handling capabilities. And in the presence of anomalous weather, it is difficult for a crane to keep a bundled conduit in a fixed position while an ROV attempts to handle and install a conduit.

Deployment Method	Surface Mounting	Crane Dependency and Use for Unspooling at Depth	Installed Via	Mating Process
1 Figure 8 deployable frame	Flying Lead is spooled on to a frame in a figure 8 overlapping fashion	Medium: With frame on mudline the Flying Lead is unspooled by way of crane and ROV		
2 Topside carousel	Leads are spooled on a mechanical spooling unit. The carousel is not deployed Subsea	High: Flying Lead ends are spooled out individually below water line. Crane and ROV interface with lead as it is suspended subsea	An ROV Torque Tool (RTT) turns locking and unlocking stem located on the end of conduit A Flying Lead Orientation Tool (FLOT) orients the RTT at proper angle	Each end of a bundled conduit has a mechanical mating plate and an ROV bucket— both are key for mating and unmating a bundled conduit's couplings onto an asset's receiving plate via a stem located at the bucket's center.
3 Helical deployable frame	Leads are helically installed on a subsea deployable frame	Medium: Once frame is on mudline, Flying Leads are unspooled upward and in a helical fashion via crane and ROV		

Table 2. Top level description of bundled conduit interfacing.



(Left) Flying Lead spooled on carousel; (Right) Deck testing of lead before prior to being installed.



Bundled conduit completely unspooled from carrousel.

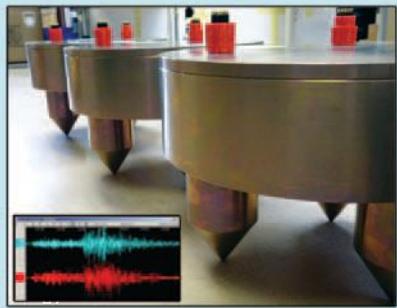
Conclusion

Now that Reaching Ultra has answered the “what” and “how” of Flying Leads via two previously published articles featured in Ocean News & Technology (1)(2), this article serves as an inseparable link between the two. A link that will further assist existing and future offshore professionals in having a full understanding of the manner by which to commandeer Flying Leads within a subsea production scheme—from the surface to the ocean floor.

Works Cited

1. Flying Leads: The How. Hernandez, Fernando, Ocean News & Technology, March, 2014.
2. Flying Leads and Production Schemes. Hernandez, Fernando, Ocean News & Technology, November 2013.

Seafloor Communications Specialists



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Experts in Seafloor Communications Network

CSnet offers end-to-end solutions providing global users a pre-engineered, expandable, portable system that can be deployed and redeployed anywhere – in water depths up to 3,000 meters. Meeting the needs for a wide range of spatial, power or bandwidth requirements, the Offshore Communications Backbone (OCB) serves research, industrial and government applications, providing the infrastructure needed to deliver power in support of continuous 24/7 monitoring; delivering data and providing command and control on-shore via satellite or shore-ended cable.

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.

OFFSHORE INDUSTRY



Deepwater Horizon on fire in U.S. Gulf.

U.S. seeks BP fine of up to \$18B for Gulf of Mexico oil disaster

The government wants BP to pay \$16 billion to \$18 billion in water-pollution fines for the worst offshore oil spill in U.S. history while seeking more than \$1 billion from the co-owner of the blown-out well that caused the 2010 Gulf of Mexico disaster.

The federal government said BP deserves the maximum fine, which BP said would be the biggest Clean Water Act penalty ever and called it a "gross outlier" compared to other cases.

U.S. District Judge Carl Barbier in New Orleans ruled in September that London-based BP acted with gross negligence in drilling the well, a finding that quadruples the per-barrel penalty. As of October 28, the company had set aside \$3.51 billion for the penalties, saying that's a reliable estimate of its liability if it wins an appeal of the judge's ruling.

Barbier was to conduct a non-jury trial in January to set pollution fines for BP and its well partner, Anadarko Petroleum Corp., after weighing multiple factors including the spill's size and the level of responsibility each company bears for the disaster.

BP said it deserved a fine "at the lower end of the statutory range" because it already has incurred \$42 billion in liabilities from the spill, including more than \$14 billion spent to stop and clean up the damage. The company said a smaller fine is also appropriate because the spill caused less environmental and economic harm than had been expected.

More energy market turmoil in 2015 as oil demand slows: IEA report

Slowing demand for oil and more rapid growth in production point to more energy market turmoil in 2015, the

International Energy Agency said in its December report. The IEA reduced its 2015 forecast for growth in global oil demand down by 230,000 bbl a day to 900,000 bbl per day. That would bring demand to 93.3 mmbbl per day.

"Several years of record high prices have induced the root cause of today's rout: a surge in non-OPEC supply to its highest growth ever and a contraction in demand growth to 5-year lows," the IEA said in its report.

The relentless rise of U.S. oil could push total non-OPEC production to record growth of 1.9 mmbbl a day this year, but the pace is expected to slow to 1.3 mmbbl a day in 2015, the IEA said.

The agency said demand will fall in Russia, the world's third-largest oil producer, as the country slips into recession caused by international sanctions and falling oil prices.

Slowing growth in China and Europe has also weakened demand. China's industrial production rose 7.2% the 12 months ended November. In Europe, France turned in its first negative change in core consumer prices, a sign the country's economy was slowing down.

FPS market expected to exhibit strong growth from 2013-2019

The floating production systems market, estimated to be worth US\$12,616.0 million in 2012, is poised to expand substantially to reach US\$38,752.7 million by 2019, a latest report by Transparency Market Research states. The TMR report is titled "Floating Production Systems Market: Global Industry Analysis, Size, Share, Growth, Trends and Forecast, 2013 - 2019." The report focuses on forecasting the global market for floating production systems by value.

TMR analysts conducted detailed analyses of key product segments within the floating production systems market: floating production storage and offloading (FPSO), Tension Leg platform (TLP), floating storage and offloading (FSO), and Single Point Anchoring Reservoir (SPAR).

The report finds that FPSO ranked as the largest product segment, constituting a 63.8% share of the total market as of 2012. The next most prominent segment in 2012 was that of FSO, with a moderate share. These two segments were followed by others such as SPAR and TLP.

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Blue Ocean Technologies sets another subsea intervention record at 8,200 ft

Blue Ocean Technologies has set another record for deepwater subsea interventions.

The Woodlands, Texas-based company said its Interchangeable riserless intervention system (IRIS) recently intervened on a deepwater production well in the Gulf of Mexico's Desoto Canyon, reaching a record-breaking 8,200 ft (2,499 m).

The patented IRIS is an ROV-compatible, fully integrated, multi-functional system that streamlines subsea interventions, completing numerous open-water wireline runs. This project marks the first time that wireline has been run in open water at 8,200 ft (2,499 m) deep.

For deepwater riserless interventions, Blue Ocean Technologies has set and shattered its own record-breaking depth achievements, including 2,950 ft (899 m) in 2009, 4,300 ft (1,220 m) in 2012, and 6,700 ft (2,042 m) in July of 2014. The July intervention took place in Atwater Valley Block 426, 130 nmi (240 km) south-southeast of Port Fourchon, Louisiana, also in the U.S. Gulf.

Blue Ocean also completed the well with its interchangeable riserless intervention system, using a dynamically positioned vessel as the work platform. This project marked the first time that wireline had been successfully run in open water at depths of 6,700 ft.

"We encountered multiple hurdles throughout the intervention, such as strong currents between 2.8 and 5.8 kts. Our team partnered with the operator's crew to overcome these obstacles and set new industry records," said Neil Crawford, president and co-founder of Blue Ocean Technologies. "We are particularly proud of this project."

OFFSHORE INDUSTRY HEADLINES

Research & Development • Environmental Assessment • Discovery

Feds nearly double the limit of liability for offshore oil spills

The U.S. Bureau of Ocean Energy Management (BOEM) has increased the limit of liability for oil-spill related damages from \$75 million to around \$134 million for offshore oil and gas facilities. The move is part of government's ongoing efforts to ensure the safe and responsible production of domestic offshore energy resources.

Facilities that handle oil and gas in federal and state waters seaward of the coastline will be applicable under the new liability increase.

Damages that occur from oil spills are applicable in the liability cap. Other liabilities such as oil spill removal costs remain unlimited. The rule also features a mechanism to regularly update the limit of liability cap in the future to reflect changes in inflation over time based on the Consumer Price Index.

"BOEM is taking an important step to better preserve the 'polluter pays' principle of the Oil Pollution Act and further promote safe and environmentally responsible operations," BOEM acting director Walter Cruickshank said. "This is the first administrative adjustment since the Oil Pollution Act was enacted in 1990 and is needed to keep pace with inflation, which has increased 78% since then."

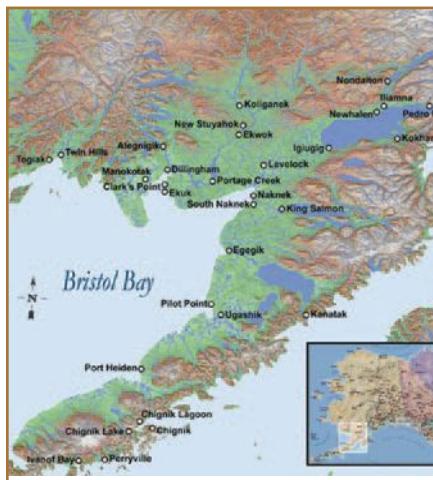
The BOEM's move to increase the limit of liability comes 4 years after the BP Deepwater Horizon oil spill in the Gulf of Mexico. The Deepwater Horizon drilling rig exploded in April 2010, killing 11 men and injuring several others. The well, which discharged millions of barrels of oil into the Gulf of Mexico, was capped in July and permanently sealed in September 2010.

Industry questions Obama decision to close Bristol Bay to oil, gas leasing

Industry proponents are questioning President Obama's decision to permanently close Alaska's Bristol Bay to oil and gas activity, suggesting that such a radical move aimed at protecting the area's world-class salmon fishery should first be subjected to public scrutiny.

"Although it might not be prudent today to consider oil and gas leasing in Bristol Bay, it is unclear why President Obama would choose to address this issue in such absolute terms, particularly given it could have been more properly addressed through the established Outer Continental Shelf leasing process," Kara Moriarty, president and chief executive officer at the Alaska Oil and Gas Association, said in a statement.

The president announced in a mid-



December that Bristol Bay and nearby waters, covering an area roughly the size of Florida, would be withdrawn from consideration for oil and gas leasing. He called Bristol Bay one of the country's great natural resources and a massive economic engine.

"It's something that's too precious for us to be putting out to the highest bidder," Obama said. "It supports about \$2 billion in the commercial fishing industry. It supplies America with 40% of its wild-caught seafood."

Obama claimed that the Outer Continental Shelf Lands Act of 1953 gave him the authority to withdraw the Bristol Bay area permanently. According to the White House, Republican President Dwight Eisenhower was the first to use presidential authority to withdraw acreage from offshore drilling consideration. Eisenhower in 1960 withdrew an area now included in the Florida Keys National Marine Sanctuary, and presidents from both parties have withdrawn other areas.

Obama and former Interior Secretary Ken Salazar announced in March 2010 that a planned 2011 lease sale in what the Interior Department refers to as the North Aleutian Basin (Bristol Bay) would be canceled. Salazar cited a lack of infrastructure and the bay's valuable natural resources. The temporary withdrawal was set to expire in 2017.

U.S. Sen. Lisa Murkowski, R-Alaska, said she didn't object to Obama's decision at this time, given the industry's lack of interest in the area and a public divide over allowing oil and gas exploration there.

"I think we all recognize that these are some of our state's richest fishing waters," she said in a statement. "What I do not understand is why this decision could not be made within the context of the administration's upcoming plan for offshore leasing, or at least announced at the same time."

Optimism for U.S. oil self-sufficiency seen within decade: Deloitte survey

America has enough affordable natural gas production to meet rising and changing sources of demand, and the United States also will be self-sufficient in oil in 5 to 10 years, according to those who participated in a new Deloitte survey titled, "2014 Oil & Gas Survey: The Next Chapter of the Energy Renaissance."

Compared with the Deloitte 2012 Oil & Gas Survey, there has been a 150% increase in the number of respondents who think the United States is or will be self-sufficient in oil within the next 5 years (20%). The vast majority (90%) believe America now has enough affordable domestic natural gas production to meet rising and changing sources of demand. The rosy production outlook may have contributed to a general sense of industry optimism, with 80% of respondents believing the U.S. energy situation has improved versus 5 years ago and is headed in the right direction.

The survey was conducted in late October, prior to the initial steep decline in global crude prices, Republican sweep of the midterm elections and ban on hydraulic fracturing within the city limits of Denton, Texas.

"The industry is watching politics and prices closely especially when it comes to exports—an issue seen as crucial for continued success, with 83% of respondents indicating that exports are important for the long-term viability of unconventional oil and gas production in the U.S.," explained John England, vice chairman for Deloitte LLP.

Additional concerns weighing on the minds of industry executives were related to costs. Those who believed oil and gas capital spending would rise remained fairly constant with more than half (56%) expecting more capital spending in 2015.

Expectations for mergers and acquisitions activity showed that half of the respondents expect an increase in M&A activity over the next year. As it pertains to downstream, over 80% of the respondents believe that profitability will strengthen or remain the same even as the industry continues to deliver very strong results. These responses related to downstream profitability and M&A activity will likely have become even more optimistic since the survey was conducted, in light of the oil price decline.

Approximately 66% of respondents, meanwhile, believe that technological advancements in shale extraction have improved the economics of shale. Nearly half (44%) point to the smaller environmental footprint of shale as a significant improvement.

Energy IPOs reach record of over \$12B in 2014: Renaissance Capital

Energy initial public offerings reached a new record in 2014, with over \$12 billion in proceeds raised, according to investment advisory firm Renaissance Capital. The high volume was fueled by large exploration and production companies and yield vehicles spun off by companies such as Antero Resources, Shell, Abengoa and SunEdison, Renaissance noted in its annual IPO review.

For the IPO market as a whole, 2014 was an active year, with \$84.9 billion being raised. By Renaissance's reckoning, there were more IPOs (273) this year than anytime over the last 14 years.

This year marked the highest number of offerings since 2000, when 406 offerings raised \$97 billion. Of the IPOs this year, energy accounted for 30, which raised a total of \$12.7 billion.

On average, energy sector IPOs raised \$423.3 million, based on the Renaissance Capital numbers. Renaissance Capital said it believes 2015 may prove to be an active year for IPOs as well.

Lower-cost subsea processing must be a priority, say analysts

The decline in oil prices could impact prospects for subsea processing (SSP) in deepwater production, according to analysts firm Douglas-Westwood.

SSP encompasses numerous technologies, all with the potential to reduce costs and improve recovery from deepwater fields. DW's Subsea Joint Industry Study last year concluded that there was demonstrable interest in technologies such as boosting, but that progress had been slow in other areas of SSP such as separation or gas compression.

Costs are a major concern for operators, with the outlay for Statoil's Åsgard compression project in the Norwegian Sea estimated at \$2.5 billion. These concerns will likely be exacerbated by the oil price and the associated cuts in capital spending, according to DW.

Cost reductions will be needed to boost implementation of SSP solutions, the analysts suggest, although there have been positive developments of late in standardization, as instance by the joint industry project between Statoil and DNV GL.

Nevertheless, the benefits of SSP must be clear and readily understood. If operators are less willing to engage in capital spending-intensive projects this will limit further field trials, DW says, severely impacting relatively unproven technologies such as compression.

Meanwhile, offshore oil-drilling contractors, who last year were able to

Feds advance rules aimed at making BOPs more reliable

Federal regulators are advancing rules to boost the reliability of blowout preventers, 4 years after the Deepwater Horizon disaster. The Interior Department's Bureau of Safety and Environmental Enforcement (BSEE) has forwarded its proposed rule on BOPs to the White House's Office of Information and Regulatory Affairs for an interagency review, often the final stage before planned mandates are unveiled. The move sets the stage for a proposal in spring.

The review is expected to include a close look at the cost of the proposal and its effectiveness. While OIRA is studying the proposal, lobbyists with oil companies, environmental groups and other stakeholders are expected to weigh in with their own views on the possible mandates. Regulators have been drafting the proposal for years, initially focusing closely on blowout preventers, with the goal of boosting the likelihood that shearing blades on the hulking devices will cut through debris and seal off well holes in emergencies.

During an emergency, shearing and sealing rams in the devices can be activated to cut drill pipe and block off the well hole. But a forensic investigation of the blowout preventer used at BP's failed Macondo well in 2010 concluded that a powerful rush of oil and gas caused drill pipe to buckle and shift, ultimately preventing powerful shearing rams on the device from cutting the pipe and sealing the hole.

The blowout caused explosions and a fire on the Deepwater Horizon, leading to the deaths of 11 personnel onboard and serious injuries to 17 others. Nearly 100 others escaped from the burning rig, which sank 2 days later, leaving the Macondo well spewing oil and gas into U.S. Gulf of Mexico waters for 87 days. By that time the resulting oil spill was the largest in offshore history. The failure of the BOP directly led to the oil spill and contributed to the severity of the incident on the rig, investigators concluded.

Interior Department officials have said the forthcoming rule will require BOPs to cut whatever is in their way, be better maintained and contain sensors to reveal what is happening in the devices.

In crafting the proposal, regulators have drawn heavily on a 2012 Interior Department forum on blowout preventers. But the measure has grown in scope, and it is now expected to go beyond blowout preventers to also address well control broadly. Safety bureau director Brian Salerno previously said the measure will be "comprehensive" and aimed at "everything that is associated with controlling a well."

An Interior official said the proposed rule will require "more stringent design requirements for critical well control safety system equipment, traceability through the life cycle of blowout preventer systems and other well control equipment, rigorous testing to ensure that equipment remains operable, continuous oversight of operations through real-time monitoring and the requirement for operators to utilize industry best practices in controlling a well."

Regulators also have indicated they will give the oil industry time to adapt, especially given the prospect that requirements could cause speed the retirement of some older industry equipment.



Last year GE tested this prototype 20,000 psi ram blowout preventer at its Houston Technology Center.

charge record rates for their vessels, are now under pressure to scrap old rigs at an unprecedented pace, according to Bloomberg. The recent five-year low in oil prices is threatening an industry already grappling with a flood of new vessels and weakening demand. More than 200 new rigs are scheduled to be delivered in the next six years. That's a

25% jump from the number currently under contract. To cope, many rig owners will try to keep revenue up by culling older vessels to balance supply and demand, Bloomberg reported. The news service added that about 140 older rigs would need to be scrapped to make way for the new vessels scheduled for delivery by 2020.

Schlumberger lands contract for Statoil's Mariner project
 Schlumberger Oilfield UK has secured a drilling and well services contract from Statoil for the Mariner project on the UK Continental Shelf. Under terms of the contract, Schlumberger will provide the main drilling and well services for Mariner, including drilling, completion, electrical submersible pumps, cement and fluids. The contract includes a total of 22 drilling and well services, as well as logistics support responsibilities. The contract, which commences in January 2015, will run for 4 years with options for extensions of a further 4 years. Situated about 150 km east of the Shetland Isles, the Mariner field will be in production for approximately 30 years. Drilling is expected to commence in 2016 with production start-up following in 2017. The Mariner heavy-oil field features two shallow reservoir sections, which include the deeper Maureen Formation at 1,492 m and the shallower Heimdal reservoir at 1,227 m. The development will contribute more than 250 mmbbl of reserves with an average plateau production of around 55,000 bbl per day. Statoil operates the Mariner field with a 65.11% stake, while JX Nippon Exploration and Production (UK) and Dyas Mariner have 28.89% and 6% interests, respectively.

FMDS wins contract to support Liverpool Bay Development

Fendercare Marine Diving Services (FMDS) has secured a contract to deliver diving services and equipment for the Liverpool Bay Development, offshore UK. The development features four oil and gas fields, together with offshore and onshore facilities used for extracting, transporting and processing the reserves. FMDS mobilized the Seabed Worker DPII diving support vessel with an air diving and nitrox surface demand diving spread. Total recoverable reserves in Liverpool Bay are currently estimated to be in excess of 150 mmbbl of oil and 1.2 tcf of gas. The company also mobilized two work class remotely operated underwater vehicles (ROVs), a pipeline hydrographic survey facility and the James Fisher Hydro-Digger for survey and remedial works. The works included the hydrographic surveys and mooring integrity surveys. Offshore operations at Liverpool Bay are focused on the Douglas complex, a facility that monitors and controls the development's three satellite platforms at Lennox, Hamilton and Hamilton North, with oil and gas from all four fields being sent to Douglas.

InterMoor completes Delta House hook-up in Gulf of Mexico

InterMoor, an Acteon company, successfully installed and hooked up a permanent mooring system for the Delta House field floating production system (FPS) in the Gulf of Mexico. Project developer LLOG Bluewater, a joint venture between LLOG Exploration and Blackstone Energy Partners and its affiliates, contracted InterMoor to design, fabricate, and install 12 suction pile anchors; to install 12 preset chain-polyester mooring lines; and to hook up the FPS in 4,450 ft of water in Mississippi Canyon Block 254, 130 mi southeast of New Orleans, Louisiana. The company fabricated the suction piles at its 34-acre facility in Morgan City, Louisiana. The piles, which were used as permanent anchors for the project, are 85 ft long, 16 ft in diameter, and weigh about 165 metric tons. Installation began in the second quarter of 2014 and was followed by the hook-up in third quarter. The hook-up system was successfully connected under high loads, with close attention to tolerances and connection interfaces, according to the company. The FPS is designed for a peak capacity of 100,000 bbl per day of oil and 240 mmcf per day of gas. First production from the facility was expected in the first half of 2015.

Cardona goes online in the Gulf of Mexico

Stone Energy reported the initial start of production operations at its Cardona field in the Mississippi Canyon area of the U.S. Gulf of Mexico. Wells 4 and 5 were placed on stream in November and were being monitored, while flow rates were being ramped up over a 4-week period.

Gross combined rates of 12,000 boe per day were expected during the initial period. Both wells were flowing to the 100% Stone-owned Pompano platform at Viosca Knoll Block 989.



The Stone-operated Pompano platform.

"We are excited to announce that the Cardona deepwater development project came online...ahead of its sanctioned schedule and under budget," the company said.

In 2011, Stone acquired BP's majority operated working interest in Pompano, plus significant positions in the adjacent Mississippi Canyon Block 29 and in the Mica field, which ties back to the Pompano field.

"The successful execution of the Cardona project is an important milestone for Stone Energy as it is projected to bring significant production and cash flow to the company," Stone added.

"Our team was able to commence production on this deep water project less than 1 year after the first well commenced drilling, which is a best-in-class timetable. The planning, preparation and successful start-up on the Cardona project demonstrates our deepwater development capabilities. We hope to build on this success as we initiate our multi-year deepwater drilling program in mid-2015, which we expect will feature both development and exploration drilling."

The Pompano platform is located about 120 mi southeast of New Orleans. First oil was produced from the field in October 1994 after being discovered by BP and Kerr-McGee in 1985. Pompano was developed using a four-leg, 12-pile fixed production platform. One of the first deepwater projects in the Gulf, Pompano is being used as a production hub for area fields.

Separately, the Madison exploration well (Mississippi Canyon 479) spud in late October of 2014 and is expected to be at the targeted depth in early 2015. Stone currently controls a 40% working interest in the prospect, which is operated by Noble Energy. Additionally, drilling at both the Vernaccia prospect (32% working interest – Mississippi Canyon 34/35) and the Harrier prospect (37% working interest – Mississippi Canyon 118) is projected for the first quarter of 2015.



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The Vantage Titanium Explorer.

SKF, Vantage combine resources to improve drillship fleet reliability

SKF USA Inc. and Vantage Drilling Inc. have combined resources to improve the reliability of the Vantage Titanium Explorer and Platinum Explorer drillships. These vessels are designed for operation in the deepest waters of the Gulf of Mexico and other offshore global basins of oil and gas exploration.

Based on SKF's experience in the application of condition-monitoring systems and Vantage's philosophy of improving the mechanical reliability of its drilling ships, these ships will be equipped with a comprehensive monitoring system for the propulsion and positioning thrusters.

SKF undertook a study of the thruster mechanical system, including bearings, lubrication, gearboxes, and drive motors to design a condition-monitoring solution, supported by remote diagnostics services that will provide Vantage with timely information about the mechanical health of their thrusters, along with advanced warning of issues that could impact drilling or propulsion system operation.

Application of this system, coupled with the remote diagnostics services provided by SKF, will enable Vantage to comply with American Bureau of Shipping (ABS) guidelines for condition-based maintenance procedures.

A factor in maintaining ABS certification is the monitoring strategy and data analysis process that SKF will provide from its recently certified SKF Solution Factory in Houston.

Noble Energy subsea vessel charter Nordic Prince reaches Haifa, Israel

Nordic Maritime's renamed DP-2 subsea service vessel Nordic Prince (ex-Mokul Nordic) has started a five-year charter for Noble Energy after arriving in Haifa, Israel. The vessel was recently equipped with a work ROV for inspection, maintenance, and repair duties.

It also features a 110-ton active heave-compensated offshore knuckle-boom crane and built-in swell compensation systems rated to 6,562 ft water depth. Nordic Prince, which complies with the SPS 2008 Code & Clean and Comfort class notation, can accommodate 60 personnel.

Petrobras transports P-66 hull to Brazilian shipyard Brasfels

Petrobras is transporting the hull of P-66, the first platform in a series of eight "replicant" FPSOs being constructed to meet oil production demands in Brazil. This is the first FPSO hull completely built in Brazil.

Having left the Rio Grande 1 shipyard in the state of Rio Grande do Sul, P-66 was on its way to the Brasfels shipyard in Angra dos Reis, where it was expected to arrive on December 18. At Brasfels, the modules will be installed on the hull, and equipment and systems will be integrated, interconnected and tested.

The 177-ft wide hull, which is 945 ft long, will be moored at a water depth of 7,218 ft. P-66 will be deployed in the Lula field, on the Lula South module, in the presalt of Santos basin, which is operated by Petrobras (65%) in partnership with BG E&P Brasil (25%) and Petrogal Brasil (10%).

Statoil releases rig Stena Carron after dry holes offshore Angola

Statoil has terminated its contract for the drilling rig Stena Carron after completing commitments on blocks 38 and 39 in the Kwanza basin offshore Angola. Results were disappointing and although Statoil sees further prospectivity on its acreage, it wants to evaluate the well data and work up new prospects before deciding on future plans.

Stena Carron drilled wells on the pre-salt Dilolo and Jacaré structures.

Statoil is participating in eight commitment wells across five blocks in the Kwanza basin, four of which have so far been drilled. Another, operated by Total, is under way in block 40. Costs of termi-

nating the operations and associated services could reach \$350 million.

Latest Subsea 7 pipelay vessel Seven Rio is near completion

Royal IHC has launched Subsea 7's latest pipelay vessel Seven Rio, with Petrobras' executive manager for the Libra project in the Santos basin performing the naming ceremony.

Seven Rio is the second of four vessels Subsea 7 has ordered to operate for Petrobras offshore Brazil. The Seven Cruzeiro and Seven Sun are due to be delivered in 2016.

Seven Rio has an overall length of 479 ft, a beam of 98.4 ft and a Class-2 dynamic positioning system. Equipment



The pipelay vessel Seven Rio.

includes a vertical (tiltable) lay system, with a 550-ton top tension capacity, and twin ROVs.

Additionally the vessel has two under-deck storage carousels, with respective capacity for 2,500 tons and 1,500 tons of product. Previously, IHC built the Seven Oceans, Seven Seas, and Seven Pacific pipelayers for Subsea 7.

Rosneft cancels offshore support contracts with Seim in Kara Sea

Russia's Rosneft has canceled contracts with Siem Offshore for three offshore support vessels for work in the Kara Sea. Sanctions placed on Rosneft have forced its joint venture partner ExxonMobil to scale back their collaboration in the Arctic Kara Sea.

Siem Offshore has received notices of termination from Karmornetegaz SARL in respect of the seasonal work in Kara Sea for the year 2015 for the two anchor handling tug supply vessels Siem Topaz and Siem Amethyst and for the platform supply vessel Siem Pilot.

Karmornetegaz SARL is the joint venture established between Rosneft (66.67%) and ExxonMobil (33.33%) for the project in the Kara Sea. While ExxonMobil is scaling back collaboration in the Kara Sea, Rosneft said it has remained determined to carry out exploration and production in this play with or without its joint venture partner.



The drilling rig Stena Carron.

Deepwater pipelay vessel Ceona Amazon headed to Huisman yard

Ceona's new flagship deepwater construction vessel Ceona Amazon has undergone a naming ceremony in northern Germany. The Lloydwerft shipyard completed the vessel less than 2 years after being awarded a letter of intent for the job. It completed outfitting at Bremerhaven followed by floatation of the hull April 2014 at the Crist yard in Poland, including installation of all main machinery, equipment and the helideck being installed.

Ceona Amazon is designed to perform in various pipelay and operational modes and features a large storage capacity. The vessel will next head southwest to the Huisman yard in Schiedam, the Netherlands, to be fitted with a multi-lay pipe tower and two heavy-duty 441-ton offshore cranes, all built by Huisman.

The g-lay pipelay system, developed and patented by Ceona, features an inclinable lay spread with a top tension of 628 tons firing line system. It provides offshore assembly of rigid pipe joints along a traditional firing line, followed by plastic bending of the pipe through a route similar to that of a reel-lay vessel, completed by a vertical exit through the moonpool (for j-lay installations).



Ceona's new flagship construction vessel.

Ceona Amazon, which has capacity to carry 9,369 tons, will be able to lay rigid and flexible pipelines and umbilicals and install heavy subsea structures with its two subsea cranes working in tandem. The vessel is 654 ft long, 105.6 ft wide, with a draft of 26.2 ft and gross tonnage of 33,000 tons. It is due to enter service in early 2015.

Keppel AmFELS delivers fourth jack-up rig to Perforadora Central

Keppel AmFELS LLC has delivered the jack-up rig Coatzacoalcos to Mexico's Central Panuco SA De CV, a subsidiary of Mexico's Perforadora Central SV De CV on time, within budget, and with zero lost-time incidents.

Coatzacoalcos is the fourth jack-up rig built by Keppel AmFELS for Perforadora Central and the third based

on the LeTourneau Super 116E design. The yard is currently building a fifth jack-up to Keppel's proprietary KFELS B Class design for Perforadora Central. Pemex will charter Coatzacoalcos for work in the Gulf of Mexico.

Vaalco reassesses offshore Gabon drilling plans following H2S inflow

Vaalco Energy said the jack-up Transocean Constellation II has completed the first development well drilled from the recently installed Etame platform offshore Gabon.

Etame 8-H was drilled to 10,485 ft, penetrating the Gamba Sand reservoir interval at 5,971 ft and contacting 443 ft of good-quality reservoir within the oil-bearing portion. Additionally, the wellbore encountered the current oil-water contact at 6,000 ft, with a 29-ft vertical oil column.

However, the well was subsequently shut in due to production of hydrogen sulfide (H_2S) during the initial testing process. Investigations are in progress to determine the root cause and how this may affect the development.

Transocean Constellation II has since relocated to drill the Etame 10-H development well, targeting the Gamba sand formation in the 1-V fault block in the Etame field, where Vaalco has been producing oil since 2002 via subsea wells. Operations to date in the fault block, south of the main Etame reservoir, have not encountered H_2S .

Following the recent results the planned third well (Etame 9-H) in the Etame platform campaign, located in the same fault block as Etame 8-H, will be re-evaluated, according to the company.

Ranger 2 commissioned for world's largest offshore construction vessel

The Swiss-based Allseas Group, a global leader in offshore pipeline installation and subsea construction, has selected Sonardyne's Ranger 2 Ultra-Short Baseline (USBL) acoustic positioning system for the world's largest pipelay and platform installation-decommissioning vessel, Pieter Schelte.

Built by Daewoo Heavy Industries in South Korea, at 382 m long and 124 m wide, Pieter Schelte is almost as long as the Empire State Building and as wide as London's Big Ben is tall. When complete early this year, the vessel will be able to lift loads of 48,000 tons and has sufficient deck space to deliver or remove a complete topside module and jacket in one trip.

The Ranger 2 USBL system will be used as a high-precision independent acoustic reference for the vessel's



Allseas Group, owners of the world's largest construction vessel Pieter Schelte, have put its faith in Sonardyne's Ranger 2 acoustic positioning technology.

Kongsberg dynamic positioning (DP) system during structure installation or pipelay operations when maintaining a steady position is a critical requirement.

The Sonardyne system measures the range and bearing from a vessel-mounted acoustic transceiver to a transponder deployed on the seabed or attached to a pipe as it is lowered from the surface. The vessel's relative position to the transponder is continuously reported to the DP system in order that the vessel can be maneuvered to remain in the required location.

A key factor in Allseas' decision to select Sonardyne acoustics for its new record-breaking vessel was the Ranger 2's ability to deliver fast, accurate and repeatable position updates in all water depths and operating conditions. This performance comes as a result of the digital wideband signal technology and Sonardyne 6G hardware platform on which the system is built.

As many field development projects around the world now specify 6G-equipped vessels, Pieter Schelte will be able to arrive at a location and begin working alongside other vessels without any delay or interruption to ongoing subsea operations.

Abu Dhabi's National Drilling Co. receives latest newbuild jack-up

Lamprell has completed construction of the jack-up Shuwehat within budget and has delivered the rig to Abu Dhabi's National Drilling Co. (NDC). This is the fifth in a series of eight LeTourneau Super 116E (Enhanced) Class rigs that the fabricator has been building for NDC. Earlier this year it delivered the third and fourth rigs, Qarnin and Marawwah. Last month, NDC commissioned two more jack-ups of the same design under a \$365-million contract. Shuwehat is scheduled to drill offshore Abu Dhabi.

Chevron turns up ‘significant’ oil find at U.S. Gulf Anchor prospect

Chevron Corp. said it made a significant oil discovery at the Anchor prospect in the deepwater Gulf of Mexico. Anchor is Chevron’s second discovery in the deepwater U.S. Gulf in less than a year.

“The Anchor discovery, along with the previously announced Guadalupe discovery, are significant finds for us in the deepwater Gulf of Mexico,” said Jay Johnson, senior vice president of Chevron’s upstream activities.

The company had one of its best years with the drill bit in 2014, reporting more than 30 discoveries worldwide and adding an estimated 1 Bbbl of new resources to its holdings.

The Green Canyon Block 807 Well No. 2 encountered oil pay in multiple Lower Tertiary Wilcox Sands. The well, which was spudded in August 2014, is located about 140 mi off the coast of Louisiana in 5,183 ft of water and was drilled to a depth of 33,749 ft. Appraisal drilling will begin in 2015.

“Chevron’s leading position in the Gulf, where we are expecting further growth in the near-term from recent project startups at Jack-St. Malo and Tubular Bells, is further underpinned by this dis-



The Anchor well was drilled by Pacific Drilling's Pacific Santa Ana drillship.

covey,” Jeff Shellebarger, president of Chevron North America Exploration and Production Co., said, noting that the company currently has five deepwater drillships operating in the Gulf, two of which are focused on exploration activities.

Chevron subsidiary Chevron USA Inc. is the operator, with a 55% working interest in the Anchor prospect. Anchor co-owners are Cobalt International Energy, Inc. with 20%, Samson Offshore Anchor, LLC with 12.5%, and Venari Resources LLC with 12.5%.

NEC granted go ahead to restart production at Huntington field

Norwegian Energy Co. said that a temporary approval has been granted to restart production at the Huntington oil field, located in Block 22/14b of the UK

central North Sea area. The field, which is now on-stream, will resume production at a reduced rate. Huntington oil field is covered by production license P1114 and is situated about 205 km east of Aberdeen, Scotland.

ONGC makes oil, gas discoveries in KG basin, Mumbai offshore India

ONGC has made new offshore oil and gas discoveries, one in the deepwater KG basin off the east coast of India and the second in the Mumbai offshore basin off the west coast. In the KG basin offshore, ONGC has made a gas discovery in its nomination deepwater block, KG-OS-DW-III. The new discovery well, GD-11-1, was drilled down to a depth of 9,219 ft in a water depth of 2,664 ft to explore the hydrocarbon potential of Pliocene sands.

The Pliocene sequence has indicated the presence of about 118 ft of gas pay. In Mumbai offshore, ONGC made a new pool discovery in the well WO-5-11 (WO-5-G), situated around 99 mi west from the nearest coastline in Maharashtra. On testing, the well flowed oil at the rate of around 1,500 bbl per day and gas at the rate of around 353,147 cf per day through half-inch choke.

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Positive drilling results at GoM's Holstein Deep, Dorado projects

Freeport-McMoRan Inc. disclosed positive drilling results from the Freeport-McMoRan Oil & Gas 100%-owned Holstein Deep and Dorado development wells in the deepwater Gulf of Mexico. Production from these projects is expected to total approximately 30,000 boe per day in 2016.

During the fourth quarter of 2014, the Holstein Deep delineation well in the Green Canyon area reached a total depth of about 31,100 ft. Recent wireline logs and core data combined with previously reported interim results confirmed that the well encountered a total of roughly 234 net ft of Miocene oil pay with excellent reservoir characteristics and good correlation to the discovery well and previous confirmation sidetrack penetration.

Production from the planned three-well development program is expected to reach about 15,000 boe per day in 2016 and will be tied back to the existing Holstein production facility. Based on the results from the Holstein Deep delineation well, FM O&G has increased the net unrisked resource potential of the Holstein Deep field to more than 250 mmboe from the previous estimate of about 140 mmboe.

The data also supports the potential for additional development opportunities at Holstein Deep to achieve production of up to 75,000 boe per day by 2020. The Holstein Deep development is located in Green Canyon Block 643.

The company also reported positive drilling results at the 100%-owned Dorado development project that commenced drilling in October 2014. In December 2014, the well reached a total depth of approximately 14,600 ft and encountered around 245 net ft of Miocene pay with excellent reservoir characteristics and good correlation to offset productive wells. This well is the first of three planned subsea tieback wells to the Marlin facility targeting undrained fault blocks and updip resource potential south of the Marlin facility.

Chevron scraps plan to drill well in Canada's Arctic Beaufort Sea

Chevron has dropped plans to drill a deepwater well in Canada's Arctic Beaufort Sea, citing economic uncertainty due to the sharp decline in oil prices. The company has submitted a letter to Canada's National Energy Board (NEB) withdrawing from a hearing on Arctic drilling rules.

Chevron planned to drill the EL481 offshore block, 250 km northwest of Tuktoyaktuk, Northwest Territories.



According to Reuters, Chevron said in its letter to the regulator, which was confirmed by a company spokesman, the company has put its drilling plans for

EL481 on hold indefinitely. The filings with the NEB reveal that Chevron planned to drill the prospect by 2020. Chevron holds two exploration licenses in the Beaufort, holding EL481 outright and controlling 60% in the other alongside Statoil. The company had earlier outlined expectations to have highly significant capital outlays in the area. Chevron paid more than C\$103 million for the rights to explore the 508,000-acre block.

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The Starfish field is located about 50 mi off the coast of Trinidad and Tobago. Photo courtesy of BG Group.

BG delivers first gas from Starfish, Trinidad and Tobago

UK company BG Group has delivered the first gas from its Starfish field offshore Trinidad and Tobago. The company said the start-up of the initial well in the program will ensure a consistent gas flow to the domestic market and the Atlantic LNG export facility.

Located about 50 mi offshore, the field in the East Coast Marine Area of Trinidad is linked to the 3,000-ton Dolphin platform. BG Group operates the East Coast Marine Area with a 50% equity interest, while Chevron Trinidad and Tobago Resources owns the remaining 50% stake.

"With Starfish coming on stream in our 25th year of operating in the country, this is a great demonstration of our ongoing commitment to the safe and responsible development of natural gas resources," BG Trinidad & Tobago president Garvin Goddard said.

"Starfish also shows our capability to deliver complex offshore projects. We look forward to our next period of growth and continuing our contribution to the economy of the country."

BG Group also has interests in four Atlantic LNG trains in Trinidad. The company's worldwide liquefied natural gas (LNG) portfolio receives cargo from trains 2, 3 and 4.

BP turns on oil flow at Kinnoull field in North Sea

BP said it has drawn its first barrels of oil from a field in the central North Sea off the coast of Scotland, where it expects to harvest petroleum for another decade.

The Kinnoull field at its peak should be able to flow 50,000 bbl of crude a day, BP said. It's the oil major's seventh oil project startup this year.

Petroleum from the Kinnoull field, 143 mi east of Aberdeen, moves through a 17-mi pipeline system to a 772-ton processing module on BP's 18-year-old Andrew production platform that the company has refurbished for the project.

Trevor Garlick, regional president for BP's North Sea business, called the project in a written statement "one of the most challenging offshore projects BP has undertaken in the North Sea."

"The combination of brownfield and greenfield development work—carrying out material upgrades, improving the reliability of existing facilities and retrofitting new facilities onto an existing platform—added significantly to the complexity of this project," Garlick said.

The Andrew production platform has processed more than 200 mmbbl of oil since it started production in 1996. BP has a 77.1% working interest in the field, with partner JX Nippon Exploration and Production owning 22.9% of it.

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Ahoy, Offshore Wind: Advanced Buoys Bring Vital Data to Untapped Energy Resource

Two massive, 20,000-pound buoys decked out with the latest in meteorological and oceanographic sensors are being used to generate predictions of the power-producing potential of winds that blow off U.S. shores. The bright yellow buoys—each worth \$1.3 million—are being commissioned by the Department of Energy's Pacific Northwest National Laboratory in Washington state's Sequim Bay. More>>>



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Myanmar to offer 15 exploration blocks in 2015 bidding round

By the end of 2015, the Myanmar government plans to further open up its oil and gas sector with the release of 15 exploration blocks.

Four companies – Oil India Ltd., Mercator Petroleum Ltd., Oilmax Energy Pvt Ltd., and Ophir Energy – have entered into production sharing contracts with the Myanmar Oil & Gas Enterprise (MOGE), according to the Global Post.

The companies will explore for oil and gas in the Mottama M-4 block and Taninthayi offshore YEB block. Ophir Energy will partner with Parami Energy Development Ltd. for offshore block AD-03. Last year, Myanmar updated its Foreign Investment Law, stipulating that companies acquiring offshore blocks are not required to incorporate a local partner into their operations, but that companies acquiring onshore blocks must operate with a local partner company.

Iran to open more offshore fields for development: Shana news service

National Iranian Oil Co. (NIOC) plans to offer 40 to 50 projects for development at the company's planned conference in London next March, according to news service Shana.

Iran hopes to stage the event to introduce its new oil contract frameworks "Iran Petroleum Contracts" (IPC), according to Shana.

NIOC's deputy for integrated planning, Moshtaghali Gohari, said some of the projects to be offered concern development of remaining phases of the South Pars gas field in the Persian Gulf, along with exploration and development of other offshore-onshore fields.

BP, Socar to explore shallow water in Caspian off Absheron Peninsula

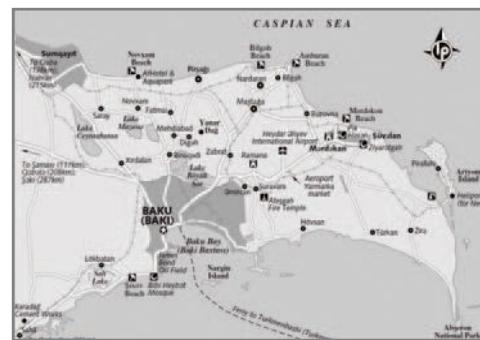
BP and Azerbaijan's Socar have signed a new production sharing agreement (PSA) to jointly explore for and develop potential prospects in the shallow water area around the Absheron Peninsula in the Azerbaijan sector of the Caspian Sea. This new agreement is part of the government's plan to ensure that all of Azerbaijan's offshore areas are fully explored.

The PSA was signed by Rovnag Abdullayev, president of Socar, on behalf of the government of the Republic of Azerbaijan, and Gordon Birrell, BP's regional president for Azerbaijan, Georgia and Turkey.

"This phase will enable us to work together to ensure the long-term future for Azerbaijan's oil and gas production through exploring new opportunities,"

Socar's Abdullayev said.

"This new partnership is based on BP's extensive experience in responsibly exploring and developing in shallow water areas around the world and our expertise in using the best technology available in the industry," BP's Birrell said. The PSA contract area stretches along the margins of the Caspian basin to the south of the Absheron Peninsula. The acreage features water depths of up to 40 m with potential reservoir depths of 3,000 to 5,000 m.



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Maari redevelopment starts oil production offshore New Zealand

OMV has delivered first oil from its Maari field redevelopment drilling campaign offshore New Zealand. The Maari Growth project is designed to increase production and recovery from the producing Maari field, 49.7 mi off the Taranaki coast in 328 ft of water. Production started in February 2009 but has declined.

W MR-8A, which came online on November 28, is producing from a previously undrained compartment in the field. The well was side tracked out of an abandoned injection well and drilled horizontally into the Moki formation to a total length of 12,543 ft. OMV estimates production capacity for this well at 4,500 bbl per day of oil.

"Conditions in the Tasman Sea are challenging and remote, but the team has been able to safely deliver the project. Additional production from Maari through existing facilities will greatly improve efficiency and reduce operating cost per barrel," said Jaap Huijskes, OMV executive board member responsible for exploration and production.

In April the drilling rig Enisco 107 began abandonment, workover, and drilling on the field. The first well was drilled into the untapped Mangahewa formation and has been suspended in order to enact a revised completion concept.

OMV and its partners Todd Maari, Horizontal Oil International, and Cue Taranaki plan to drill five wells into already producing and new reservoirs. The campaign is expected to be completed by mid-2015.

Russia, Turkey agree on Black Sea gas pipeline

Officials from Gazprom and Botas Petroleum Pipeline Corp. have signed a memorandum of understanding to construct an offshore gas pipeline across the Black Sea toward Turkey.

This would replace the South Stream pipeline from Russia to Bulgaria, which Russia's government has decided to cancel following deterioration in relations with the European Union.

The proposed new gas pipeline would have a capacity of 2.2 tcf, of which 494 bcf would go to Turkish consumers. The remainder will be conveyed to a delivery point on the border between Turkey and Greece.

The Russkaya compressor station in Russia's Krasnodar Territory, under construction for South Stream, will serve as the pipeline starting point.

Ghana gives ENI the OK for \$6B offshore gas project

Ghana's government has given Italy's ENI the final green light to develop gas resources in the offshore Cape Three Points block, expected to begin production in 2017, Reuters reported.

The government also plans to acquire a third FPSO to be used for the \$6 billion offshore project, which must now be approved by Ghana's parliament.

“This project promises to deliver up to 170 mmcft per day for the next 20 years and put Ghana on its way to a future where one of the critical constraints to power generation (cheaper fuel) will be addressed,” it said.

The \$6 billion project covers all costs leading to production of oil and gas, including the initial cost of the FPSO, which will be leased, according to a senior official at Ghana National Petroleum Corp. Eni operates the OCTP block, while Vitol and GNPC serve as partners.

Statoil submits plan for Gullfaks Rimfaks Valley

Statoil and its partners have decided to develop the Rutil discovery located in the Gullfaks Rimfaks valley in the North Sea. Providing close to 80 mmboe, the development will extend the lifetime of the Gullfaks A platform. The plan for development and operation (PDO) was submitted to the authorities on 16 December 2014.

Gas and condensate will be transported in existing pipeline for processing in the gas processing facility at Kårstø north of Stavanger. The processed gas is transported to markets on the European continent.

The investment costs of the Gullfaks Rimfaks valley development are estimated at 4.6 billion 2014 NOK.

The Gullfaks Rimfaks valley development will consist of a standard subsea template with two simple gas production wells, and possibilities of connecting two more wells. The well stream will be connected to the existing pipeline to the Gullfaks A platform. Production start is scheduled for the first quarter of 2017. The license partners are Statoil (operator) (51%), Petoro (30%) and OMV (19%).

2H to deliver lightweight conductor-supported platform

2H Offshore will deliver a lightweight conductor-supported platform for EQ Petroleum Developments Malaysia Sdn Bhd for installation in the Tanjung Baram field, offshore Malaysia. The award follows completion of a competitive tender process, in which 2H successfully developed a jack-up installable platform design to meet EnQuest's project timeline and budget.

Installed in 10-m water depth, the platform has three decks with a subsea template and will host two wells with spare capacity for future additions. The decks will be supported by three 30-in. well conductors. A boat landing and crane will also be provided. The platform will be tied back with an 8-km long flexible pipeline to the existing West Lutong-A facility, and will be fabricated locally in Malaysia. Installation is planned for the first and second quarters of 2015.

2H's scope of work includes all platform and conductor detailed engineering, equipment procurement, fabrication, installation support and offshore commissioning.

Nexans delivers power umbilicals for subsea plant

Nexans has delivered power umbilicals for the world's first subsea gas compression station that will begin operating next year at the Statoil-operated Åsgard gas field in the Norwegian Sea. The umbilicals combine power, fiber-optic, and hydraulic lines in a single cross-section and will be used to transmit power, signals and fluid to compressors and pumps, and for communication between the Åsgard A and Åsgard B platforms and the subsea compression station.

Midgard and Mikkel, two seabed satellites tied back to Åsgard, are experiencing decreasing reservoir pressure. The compressor station will help boost the well flow and increase recovery from these fields. For the Åsgard project as a whole, Nexans has designed, developed, qualified, and delivered more than 1,112 mi of static and dynamic power umbilicals, power cables and fiber-optic cables.

Eni starts production at West Hub Development offshore Angola

Eni has started production of first oil from the West Hub Development Project in Block 15/06 in the Angolan deep offshore, about 350 km northwest of Luanda and 130 km west of Soyo.

The field is currently producing 45,000 bbl of oil per day through the N'Goma FPSO, with production ramp-up expected to reach a daily production of up to 100,000 bbl per day in the coming months. The start-up of the East Hub Development, expected in 2017, will raise overall production from block 15/06 to 200,000 bbl per day.

The development project started with a very successful exploration campaign. Having won the international bid round in 2006, in block 15/06 Eni drilled 24 exploration and appraisal wells, discovering over 3 Bbbl of oil in place and 850 mmbbl of reserves. The discoveries were then developed quickly and efficiently.

Eni will also continue its exploration program in block 15/06: potential discoveries tied in quickly and cost efficiently. A recent example is the Ochigufu discovery, which added 300 mmbbl of oil in place and will be tied in to the N'Goma FPSO within the next 2 years.

McDermott completes Banyu Urip installation off Indonesia

McDermott International, Inc. has concluded the transportation and installation of a Yoke-type Single Point Mooring tower and hook up to a Floating Storage Offloading (FSO) vessel for PT Rekayasa Industri offshore Indonesia in the Banyu Urip field.

PT Rekayasa Industri was appointed by Mobil Cepu Ltd., an ExxonMobil subsidiary, as one of the engineering, procurement, construction and installation contractors for the field.

"PT Rekayasa Industri awarded the contract to McDermott earlier this year," noted Hugh Cuthbertson, vice president and general manager, Asia Pacific. "The McDermott Derrick Barge 30 undertook the mooring tower installation and hook up to the FSO, successfully completing the offshore campaign without any lost time incidents."

The Yoke-type Single Point Mooring Tower is a critical component that enables mooring of the FSO unit at the site. The Banyu Urip full field development is planned to produce 165,000 bbl of oil per day from facilities that include 48 wells on three well pads, a central processing facility, and a 60-mi pipeline to transfer the processed oil to a 1.7 mmbbl of floating storage and offloading (FSO) unit in the Java Sea, the company said.



McDermott installs Yoke-type SPM tower offshore Indonesia.

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Ocean News & Technology

-Jack Fisher,
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A.K. Suda delivers on design of world's largest pipe leg liftboat

A. K. Suda has successfully completed the design of a 335-ft pipe-legged liftboat. This vessel, which is the world's largest pipe leg liftboat, was to be delivered to its owners in the fourth quarter of 2014. This vessel follows on the heels of the world's largest liftboat, the SUDA 450-L3T, delivered last year.

This state-of-the-art vessel is a three-legged, self-propelled, self-elevating, general service liftboat, known as the SUDA 335-L3P. It is ABS classed with Unrestricted Service, A-1, AMS, DPS 1 Accommodation Service, Wind Farm Installation Maintenance, and Repair Certification. The hull dimensions are 194 ft x 131 ft x 16 ft. It has two leg encircling cranes of 250 tons each, with a maximum reach of 129 ft. The quarters arrangement can accommodate 160 persons including crew.

With its long legs, this self-elevating unit is capable of working in water depths up to 262 ft. It also has a CAP 437 heliport, capable of supporting Sikorsky helicopter models S-61N & S-92A.

The liftboat is the first of a series of this design to be delivered. Two additional vessels based on this design are cur-



The SUDA 450-L3T lifeboat.

rently under construction. There has been a large increase in demand for liftboats in recent years, with many owners and charterers not being able to wait out the time frame that it takes to have the vessels built.

Breakthrough increases Electro flotation technology effectiveness

OriginOil Inc., developer of Electro Water Separation™ (EWS), a high-speed, chemical-free process to clean up large quantities of water, said it made a significant breakthrough in electrode design for its second-stage electro flotation process. OriginOil calculates this design increases extraction effectiveness by 54% over earlier plate designs, for the same amount of power consumption.

Dissolved Air Flotation (DAF) is used in both oil and gas and waste markets to extract suspended solids in very large installations. Generating air bubbles at a large scale is relatively energy intensive and requires the extensive use of chemicals. With this latest innovation, OriginOil's EWS further increases the advantage of electro flotation over dissolved air flotation, while enabling retrofits into existing installations.

The new design optimizes the placement of electrodes within flotation tanks to lower energy consumption and improve particle recovery at higher flow rates. It increases effective contact area and improves the inter-electrode gap for increased bubble generation with the same power settings.

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Coretrax unveils game-changing Inflation Support Tool (CX-IST)

Coretrax has launched its award-winning CX-IST (Inflation Support Tool) to the oil and gas market, following a U.S. \$3 million development investment. The company said it successfully unveiled its ground-breaking cement placement technology, which significantly reduces rig time, offering substantial cost savings.

The CX-IST provides operators with a critical solution to the challenges of traditional cement placement, Coretrax said, adding it gives a positive indication that the cement will be set in the correct place before latching at the bottom of the work string using a pre-installed landing sub. Once secure, pump pressure inflates the elastomer to seal the wellbore. The IST is then released by simply picking up the work string.

The tool creates a 100% wall-to-wall base for well fluid or cement. The operator can deploy as many ISTs as needed in the same or multiple zones without tripping drill pipe in and out of the hole, providing significant operator time and cost savings.

"This is a monumental success for Coretrax and a game changer for the entire industry. The team is passionate about the business and has worked tirelessly for 3 years, from initial stages, to produce an innovative product, which will benefit the oil and gas sector," said Kenny Murray, managing director at Coretrax.

In 2012, Coretrax was announced as the winner of the New Idea category at the Offshore Achievement Awards for its CX-IST, which was awarded in recognition of the excellence in the development of the technology. Since then, the product has undergone extensive field trials in the UK and has received excellent customer response, the company said.

Driven by demand and to reflect its commitment to business in the Middle East, the company has made a \$7.6 million investment in Saudi Arabia, where a Coretrax hub has been operational for 12 months. Currently, nine members of staff are operational from the office, due to grow to 16 in the coming months.

DNV GL establishes RP to manage subsea production system integrity

Hot on the heels of a new Recommended Practice (RP) for subsea lifting, DNV GL has published an RP providing guidance on how to establish, implement and maintain an integrity management system (IMS). The aim is to help operators carry out maintenance activities at the most cost-effective intervals, increase confidence in the condition of the subsea equipment and ensure an unified and reliable reference for both authorities and the industry. Failures in subsea production systems can for example arise from inadequate design, manufacturing and installation. In operation, material degradation as well as structural threats, natural hazard and operational threats, might cause failure of the system.

"Integrity management is not only a matter of operational control on a daily basis, it should start from the outset of the design phase and continue through the entire life span of the system," said Bente Helen Leinum, DNV GL business development leader subsea. The RP (DNV GL-RP-0002 (Management of Subsea Production Systems) is the result of a 2-year joint industry project (JIP) involving DONG Energy, FMC Technologies, GDF Suez, Norske Shell, Statoil, Talisman, Petroleum Safety Authority and Norwegian Oil and Gas. The JIP work explored the typical failures of existing subsea equipment and how the integrity of subsea equipment could be controlled.

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Two of CHC's helicopters in current hangar in Dyce, Aberdeen.

CHC unveils plan for major terminal, hangar complex

A major investment by CHC Helicopter in its longtime base in Dyce, Aberdeen will benefit offshore workers, the oil and gas companies for which they work, and CHC's own people.

The multimillion-pound investment will transform CHC's facilities and further raise its capabilities in Dyce by significantly expanding hangar capacity, creating a larger and more streamlined passenger terminal, and providing for a new operations center.

The development will be delivered in two phases. The first phase will double the size of the existing hangar, creating a world-class, purpose-built facility in which CHC's expert engi-

neers can maintain more than 20 heavy aircraft. The new operations center will bring together CHC's pilots, engineers and technical and support staff to deliver services from a state-of-the-art environment. That work is planned to begin during the first half of calendar 2015.

In the second phase, expected to start the following year, CHC will redevelop its passenger terminal, improving the experience for offshore workers. The transformed two-story terminal will include a new passenger lounge as well as dedicated space for CHC's major oil and gas customers.

Mark Abbey, regional director for CHC West North Sea, said that the company is investing in people, its fleet and its facilities in Aberdeen, other UK locations and around the world.

"This increased financial commitment is part of a very broad, ongoing commitment in Aberdeen and to the people who rely on us," said Abbey. "We are determined to not only respond to the needs of customers, but anticipate them, and to constantly enhance the experience of offshore workers."

He added: "Customers are responding favorably to our improved tools, systems and processes, rewarding us with a number of major, long-term contracts this year. The expansion of our operations in Aberdeen is expected to broaden and extend that trend."

Presently, CHC carries more than 140,000 people on over 9,000 flights a year from the Aberdeen base. CHC has more than 20 helicopters in Scotland serving the offshore oil and gas industry. Those helicopters are modified and maintained by CHC people to operate at the highest levels of performance and safety in the North Sea environment.

CHC, the operating company of CHC Group, operates more than 230 aircraft in about 30 countries around the world.

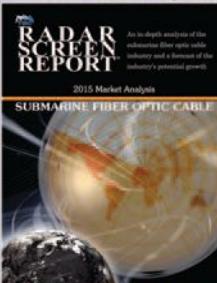
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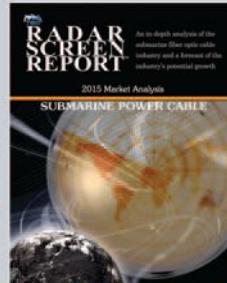


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INDUSTRY DEALS

GE to buy Oceaneering's subsea electric actuator product line

GE has agreed to purchase Oceaneering's subsea electric actuator product line, which will be used to improve remote subsea production and processing capabilities.

Oceaneering offers engineering services and products, primarily to the offshore oil and gas industry, with a focus on deepwater applications. The product line to be acquired by GE will go to market under the Oceaneering Subsea All Electric and Ifokus brand.

The agreement will see Oceaneering's 16-strong Stavanger-based engineering team join GE Oil & Gas. It will then be transitioned into the Subsea Systems business, which also operates in Stavanger, Norway.

The transaction, which is subject to regulatory approvals, was anticipated to be closed in the first quarter of 2015 and would expand GE's existing subsea controls product line portfolio.

"With Ifokus as part of our solutions portfolio, GE has the opportunity to pave the way for electrification in the oil and gas subsea space, giving us a new technology that is faster to operate for processing applications, has excellent enhanced diagnostic capabilities and can be seamlessly integrated into a customer's existing controls, communications and power network," said Rod Christie, GE Oil & Gas Subsea Systems' business chief executive officer.

Apache Corp. to sell LNG stakes in Australia, Canada for \$2.75B

U.S.-based Apache Corp. will sell its stakes in two separate liquefied natural gas projects for \$2.75 billion, the company said, marking one of its most significant steps yet toward paring back its international portfolio.

Australia-based Woodside Petroleum agreed to purchase the company's interest in Wheatstone LNG, located in western Australia, and Kitimat LNG, located in western Canada. Both projects are designed to ship LNG to Asian markets.

Woodside Petroleum will also pay \$1 billion to reimburse Apache for money it's spent on the projects from June 30 2014 to the closing date, expected to be in the first quarter of 2015.

The move comes as investors are pushing Apache to focus exclusively on the United States.

"I am proud of Apache's legacy in advancing the Wheatstone and Kitimat LNG projects, and I am confident that

Woodside's participation will have a positive impact in seeing these world-class LNG facilities through to first production," Apache Chief Executive G. Steven Farris said in a statement.

Apache has a 50% interest in the Kitimat LNG project, along with Chevron. As part of that agreement,



The Apache-operated Varanus Island Gas hub is located in western Australia.

Apache manages development and production of natural gas from British Columbia's Liard and Horn River basins, which would then feed into the Chevron-operated LNG facility. Apache acquired its stake in the project in 2010.

Halliburton taps CFO McCollum to lead Baker Hughes integration team

Services major Halliburton tapped CFO Mark McCollum to lead the joint integration team that will guide the company's acquisition of rival services player Baker Hughes. He will serve as executive vice president and chief integration officer and will remain on Halliburton's executive committee, Halliburton said. He also is expected to reassume his CFO duties once the merger is complete.

Senior vice president and chief accounting officer Christian Garcia has been appointed senior vice president of finance and will assume McCollum's CFO responsibilities on an interim basis. Garcia will join Halliburton's executive committee.

Vice president of finance Charlie Geer will become vice president and corporate controller. Geer will take over Garcia's accounting responsibilities on an interim basis. All three appointments were effective January 1, 2015.

President of global products and services for Baker Hughes Belgacem Chariag will head the Baker Hughes side of the joint integration team.

Halliburton agreed to purchase Houston-based Baker Hughes on 17 November for \$34.6 billion in cash and stock. The combined companies had a pro-forma 2013 revenue of \$51.8 billion, beating Houston-based Schlumberger's \$45.3 billion in revenue.

Spain's Repsol to buy Canada's Talisman Energy for U.S. \$8.3B

Repsol of Spain agreed to acquire Talisman Energy, a Canadian oil and natural gas producer, for \$8.3 billion, significantly expanding its portfolio of energy assets and production. Repsol, which is also assuming \$4.7 billion in debt, will add operations in Colombia, Britain, Norway, North America and Southeast Asia.

Repsol said in a statement that the takeover bid would be financed with cash "essentially obtained from the recovery of value from YPF," the Argentine company that was seized from Repsol by the Argentine government in 2012. Last February, Repsol agreed to receive \$5 billion in compensation for the expropriation as part of a settlement with the Argentine government that was half the amount that Repsol initially claimed.

The loss of YPF, which had been majority-owned by Repsol, forced the Spanish company to seek alternative markets. The purchase of Talisman will mean that Repsol will have almost half of its capital in exploration in North America, compared with 22% in Latin America. The deal will increase Repsol's output by 76%, to 680,000 boe a day, and will bolster reserves by 55% to 2.353 billion boe.

Hal Kvisle, chief executive of Talisman, said Repsol's financial strength would now allow the Canadian company to follow up on plans to focus its operations in the Americas and Southeast Asia and shift away from high-cost, declining North Sea operations in Britain, which it runs through a joint venture with Sinopec of China. Talisman said previously that it might write down the value of its British assets.

Nido Petroleum makes offer on Otto Energy's interest in Galoc oilfield

Nido Petroleum has made an offer to acquire Otto Energy's 33% working interest in the Galoc oilfield in the Philippines for \$108 million. Galoc Production Co. WLL holds Otto's interest in the Galoc oilfield, which is situated 60 km northwest of Palawan under the Philippines Department of Energy (DOE) service contract 14C1. The oilfield was discovered in 1981 and production started in October 2008.

The water depth ranges between 290 and 400 m at the Galoc field with oil located in a turbidite sandstone reservoir at a depth of about 2,100 m below the sea surface. Nido plans to fund the acquisition via a combination of existing cash reserves and debt. Nido's stake in the Galoc field will increase to 55.88% if its offer is successful. The company will also assume operatorship of the project.

Research Vessel Investigator produces its first Tasmanian seafloor maps

Over the past few weeks hydrographers on board Australia's new Marine National Facility research vessel, Investigator, have created the first 3D images of the ocean floor around Tasmania. Investigator has recently undertaken sea trials off the coast of Tasmania to test and calibrate around \$20 million worth of scientific equipment in preparation for research voyages in 2015. The manager of the geophysical survey and mapping team at CSIRO, Dr. Tara Martin, said all onboard sonar systems were fully operational and delivering clear and impressive images. "Investigator is equipped with sonar that will map the seafloor in 3D to any depth, and a subbottom profiling system that can look further up to 100 m into the actual seabed, to determine its composition," Dr. Martin said. "We've been heading out 120 nmi northeast and southeast of Hobart to test and calibrate a range of equipment and the seafloor data is being collected where ever we go. While there have previously been images of Tasmania's surrounding seafloor collected in sections, the data we're collecting is at higher resolution than ever before and will fill in a lot of gaps for local fishermen, the maritime industry and scientists. The sonar on the previous research vessel, Southern Surveyor, operated to 3,000 m and there are waters around Tasmania much deeper than this." All of the data collected on board Investigator will be made public as soon as practical. Under direction of an independent Steering Committee, the Marine National Facility is owned and operated by CSIRO on behalf of the nation.

Woods Hole Group awarded current profiling system for Helix Energy Solutions

Woods Hole Group announces that on 14 November 2014 it was awarded a contract to design and install a current profiling system for a subsidiary of Helix Energy Solutions Group Inc. The current profiling system will consist of dual (upward and downward looking) Acoustic Doppler Current Profiling (ADCP) instrumentation, a launch and recovery system (LARS), onboard real time displays of the water column speed and direction to 1,000 m below the semisubmersible vessel. The system will be installed on the semisubmersible well intervention vessel, 'Q5000' and is expected to become operational in the Gulf of Mexico during the summer of 2015. The Q5000 is a Helix Energy Solutions vessel. This will become the 6th Woods Hole Group current profiling system operating in the Gulf of Mexico for a major oil company.

Teledyne SeaBotix, Inc. – Leading the way in underwater technology solutions for the nuclear industry

James Fisher Nuclear Ltd (JFN) of Egremont, Cumbria, in England has just released video footage, by kind permission of Sellafield Ltd, of one of its three Teledyne SeaBotix vLBV300 ROV systems currently operating and working in hazardous environments within storage ponds at the Sellafield nuclear facility in Northern England. The video clip shows the ROV grabbing and lifting a cobalt 60 cartridge weighing approximately 5 kg. The ROV then moves the cartridge to a new location (not shown in the video). Since May 2014, over 4,500 kg of waste material has been inspected and repositioned within storage ponds at Sellafield in over 200 hrs of operations using Teledyne SeaBotix vLBV300 ROVs. The vehicles are fitted with a specialized grabber arm skid that allows the operator to remotely position the arm vertically below the center of mass of the vehicle. This technique ensures the vehicle remains stable and fully maneuverable while it carries heavy loads. While the basic vehicles used in this application are a standard design, Teledyne SeaBotix has worked closely with JFN to develop specialized components and procedures to achieve these results. The Teledyne SeaBotix vLBV, built and delivered from the SeaBotix factory in San Diego, California is an ideal solution for this task. The vLBV is light enough to be deployed by hand but still has sufficient power and lift capability for payload, tooling, and sensors in order to carry out meaningful work in extremely robust and hazardous environments. *Video courtesy of Sellafield Ltd & James Fisher Nuclear Ltd.



Ensub delivers DEEP 4000 deepwater deployment systems



Ensub has completed the design and manufacture of two innovative work class ROV deployment systems that have been designed and manufactured for ROVOP and are due to be installed into a new build, tier one pipelay vessel early in 2015.

A number of senior figures from the oil and gas industry were given insight into Ensub's DEEP 4000 system recently before visiting its new Teesside premises.

The demonstration showed the equipment's capabilities, which include a unique cable handling solution designed to maximize umbilical lifespan, particularly in ultra-deepwater and other high-fatigue applications such as active heave compensation. The system also has a high-speed electric winch with full active-heave compensation, semi-dipping extendable A-frame and transfer skidding system for large tool packages. A new control system and human machine interface (HMI) provides the client with a fully integrated and centralized operating station.

Ensub's integrated ROV launch and recovery solutions offer a next generation approach to ROV deployment, particularly in supporting top-tier subsea construction assets where reliability and performance are required.

Scott Macknocher, managing director, said: "We believe this technology highlights our ambition to become a leader in the field deepwater deployment solutions worldwide. The equipment presently under delivery offers a number of novel solutions to many of the current problems experienced by the ROV operating community. These include industry-leading umbilical handling, compact deck footprint, reduced hydraulic hosing and many enhanced control features which will have been designed in co-operation with experienced ROV operators and which will reflect the need for safety and reliable operation."

The company offers a range of deep and ultra-deepwater deployment solutions for ROVs, subsea modules and bespoke subsea packages in addition to a suite of pipeline installation-related products and pipeline repair solutions. It also boasts an operations-led approach to design to suit the specific requirements of its customers.

Earlier this month, Ensub was awarded a contract worth £2 million by Benthic to build a newly enhanced and portable launch and recovery system to complement the latest addition to its seabed drilling and geotechnical drill fleet.

For more information, visit www.ensub.com.

UNDERWATER INTERVENTION

Bourbon expands fleet by three subsea ROVs

Bourbon has commissioned three next-generation heavy duty (HD) work ROVs designed by FMC Technologies Schilling Robotics. Capable of operating at depths of up to 3,000 m, these underwater vehicles will be deployed on Multi-Purpose Support Vessels (MPSV) such as the Bourbon Evolution 800 series.

Fitted with high-tech equipment—manipulator arms, dynamic positioning, high definition camera, sonar and software—these HD work ROVs are highly maneuverable. They can carry up to 3,000 kg of special measurement or intervention tools. They are therefore ideal for activities such as survey, well-head installation, or asset tie-in.

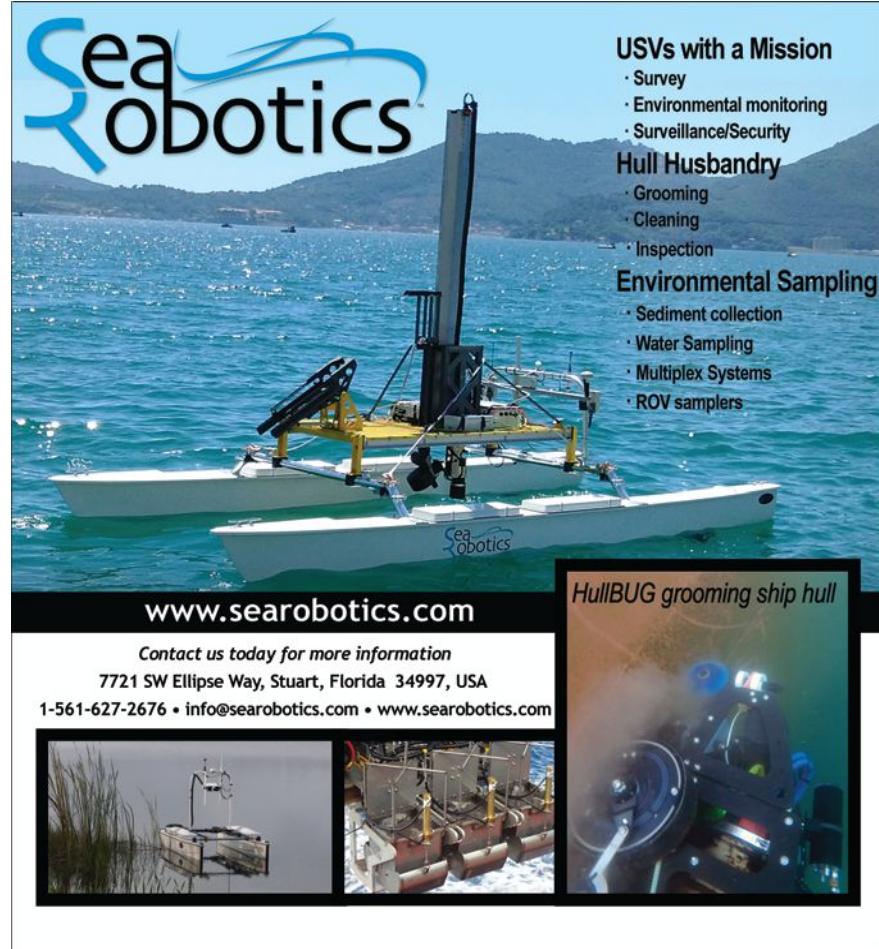
These HD work ROVs help to perform a wide variety of tasks, including monitoring of operations through video coverage; inspecting structures to check on corrosion; installing subsea equipment; assembling production systems; or taking measurements and collecting survey data.

Like the group's MPSV vessels, the Bourbon ROV fleet is deployed across the world near the areas of operation of its clients, major oil companies and contractors. Most of the ROVs are deployed in Mediterranean waters, in West Africa, and soon in the Far East. For example, three ROVs are operating in Italian waters for Eni on survey and inspection missions; and five in West Africa (Nigeria, Angola, etc.) under contract with Total and Saipem for survey, inspection, maintenance, reparation and construction missions.

In line with the group's standardization strategy, these ROVs are purchased as a series. This standardization yields many advantages for clients in terms of reliability and continuity of service. It helps to make ROV maintenance easier and to develop specific simulator training sessions.

Since 2009, Bourbon is expanding its fleet of HD work ROVs, working closely with FMC Technologies Schilling Robotics. Three other next-generation ROVs will be further added to the fleet of ROVs by the end of 2015, which will then amount to 18 units, including 11 work-class ROVs. "We are very excited that Bourbon continues to experience the superior reliability of our ROV technology, and continues to expand their fleet with us," says Tyler Schilling, president of FMC Technologies Schilling Robotics.

For more information, visit www.bourbonoffshore.com.



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Unique Maritime Group sets new standards for diver safety in the Middle East

Unique Maritime Group (UMG) announced that it has set up the first Hyperbaric Reception Facility (HRF) in the Middle East, thus raising the safety level for all divers currently operating in this area to a new level. The purpose built system by Unique Hydra, a division of UMG, will be installed at UMG's facility in the Hamriyah Free Zone, Sharjah. Major oil companies and dive operators with a view to utilizing the system have already shown considerable interest, and the first contract announcement by UMG is expected before the end of the month.

Harry Gandhi, CEO of Unique Maritime Group, commented, "Bringing one of our state-of-the-art Hydra HRF systems to this region is testimony to our commitment for safety, diver care and providing first class services to the operators in this area. I am very proud that we are the first company to offer this potentially lifesaving facility and congratulate Ian and the team on the job they have done in setting this up in UAE."

HRF units are used in the diving industry to ensure that in the event of an emergency evacuation of a diving support vessel (DSV) with divers in saturation; a more controlled and comfortable decompression and medical treatment will be available for the divers. The HRF dive chamber is able to receive a self-propelled hyperbaric lifeboat (SPHL) with a bottom mating trunk or a hyperbaric rescue chamber (HRC) via an end-mate or a side-mate custom spool and clamp arrangement. Their HRC or SPHL after launch can be transported to the HRF that is set up at a shore facility where monitoring and decompression of the divers can be safely completed.



Commenting on this initiative, Ian Huggins, GM @ Unique System FZE stated, "Unique sees a demand for this type of life support unit in the region and have made the decision to build and deploy the HRF into the local region to support commercial diving operators in their process to further enhance the safety of their diving teams. We are offering to closely work with the diving operators to make sure that their respective hyperbaric lifeboat chambers will mate with the HRF here."

For more information, visit www.uniquegroup.com.

SMD supply Quasar MkII ROV to Jan de Nul

Industry leader in dredging and marine construction activities Jan de Nul have confirmed an order with SMD for a Quasar MkII 150 hp 3,000 m rated work class ROV. The high specification system including Tophat tether management system, A-frame, umbilical winch and dual control system (vessel bridge and control cabin) will be delivered in the second quarter of this year.

SMD is one of the world's leading subsea engineering companies designing and manufacturing work class ROVs, trenching systems, and subsea mining machines. They have a worldwide customer base operating in oil and gas, telecoms, mining, salvage, renewables, defence and scientific markets, with offices in the UK, USA, Singapore and Brazil.

The Quasar work class ROV is the mid-sized vehicle in SMD's Q-Series work class ROV range offering class leading in-current performance, tooling, instrument space and access for maintenance. Utilizing the latest multi-platform Curvetech™ components, the Quasar is an all-round performer capable of survey, construction and drill support operations.

"SMD is delighted to have been awarded this order from Jan De Nul," said Mark Collins, SMD's deputy managing director. "This is Jan de Nul's second Quasar ROV, the first delivered in 2009 and for them to return to SMD for work class equipment is great news. The new system will be used for high end survey operations as well as construction work which really suits the Quasar as it's an excellent all round performer."

Jan De Nul Group is an industry leading expert in dredging and marine construction activities, as well as in specialized services for the offshore industry of oil, gas and renewable energy.

Commenting on the contract award,



Rutger Standaert, project engineer, said: "From the first contact on, Jan de Nul appreciated the efforts by SMD to adapt the standard Quasar MkII to our specific requirements. The vessel bridge control, which makes it possible to have direct communication between all operators and superintendents during operations, is a valuable additional feature. By making the Quasar MkII interchangeable with our first Quasar, SMD gives us the maximum flexibility for our constantly changing and growing fleet."

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

ASI Marine wins on two continents with Falcon

In both Australia and Canada, ASI Marine has established the record for the longest tunnel swim with a Falcon ROV. By creatively modifying a Saab Seaeye Falcon ROV, they were able to send the vehicle through a pipeline stretching over 4 km under Gladstone Harbour, Queensland to Curtis Island.

They also sent the same modified Falcon through 5 km of feeder pipes in Lake Ontario.

Under Lake Ontario in Canada, the Falcon worked in the worst freezing conditions on record to run 5 km down each of three separate 1.6 m diameter pipes in a unique project to create the world's largest cooling system.

This deep lake cooling system feeds the city of Toronto in summer with cold water to cool the city's offices—as a sustainable alternative to air-conditioning—then sends the water onwards to top-up Toronto's municipal water supply.

Bob Clarke, ASI Marine's senior operations manager, says they achieved this by modifying the power supply to the system so that the Falcon could operate over 5 km of tether.

This was particularly important for the Australian project, as their client wanted just a single point of access to inspect the 4.3-km pipeline.

The inspection on the Santos

Gladstone LNG Project was conducted with the Falcon to confirm the condition of the pipeline that was pushed through the utility tunnel. The utility tunnel had been bored to minimize environmental impact at the site and provide a protected conduit through which to pass the pipeline and other utilities. This was the last segment of the pipeline that delivers liquefied natural gas (LNG) to the Santos LNG plant on Curtis Island. The ROV inspection was conducted to ensure the pipe's integrity during and after the push.

The Falcon was outfitted with video plus profiling sonar with a BlueView imaging sonar and Mesotech scanning sonar as additional navigation aids.

Bob Clarke says they chose the Falcon for its "moderate size, good thrust-to-weight ratio and telemetry capacity." It is also capable of unlimited inspection durations, he adds.

The Falcon's intelligent architecture means each device on the vehicle can have its own microprocessor for individual control and systems can be easily changed or added.

Although small enough to be easily manhandled, its intelligent control, combined with five-strong thruster power and precise maneuverability, allows it to operate sensors, tooling and complex systems typically found on much larger ROVs.

As a module-focused concept, the Falcon generates automatic diagnostics on power-up to ensure each device is fully interfaced and working correctly.

In modifying the Falcon to undertake the longest runs ever attempted by a vehicle of this class, ASI Marine has continued its tradition of developing innovative solutions for demanding projects. Established in 1987 this specialist underwater structure inspection and repair company has since pioneered many innovations, including becoming the first company to develop an ROV for internal pipeline inspection.

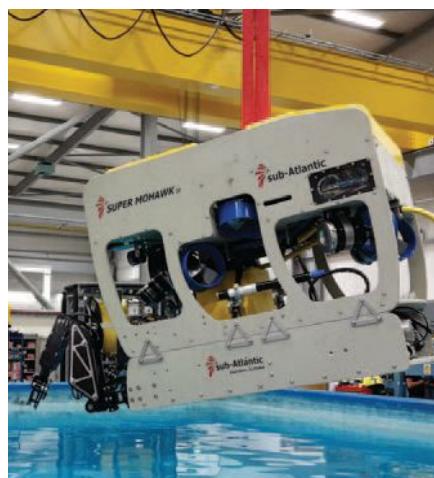
For more information, visit www.seaeye.com.



Sub-Atlantic secures three contracts

Sub-Atlantic has secured three international contracts with a combined value of over £3.5 million for the manufacture of three specialist ROVs.

The firm will provide IKM Subsea in Norway, Italy's Globe Exploration and Total Marine Technology of Australia with state-of-the-art observation class vehicles that are widely used across the offshore energy and defense industries.



Sub-Atlantic, which is part of the Forum Energy Technologies group, has its operations hub in Aberdeen and a manufacturing base in Kirbymoorside, Yorkshire. The company is the world leader in the design and manufacture of powerful and maneuverable electric ROV systems and components for operation in the world's harshest environments.

This announcement follows a significant investment in the group's Kirbymoorside facility to create a manufacturing center of excellence. The company is also on a recruitment drive to boost its operational workforce in Aberdeen and add 20 manufacturing jobs in Yorkshire where it employs 300 people.

Ryan Lumsden, global product director for Sub-Atlantic, said: "By bringing Sub-Atlantic's manufacturing capabilities alongside the Perry facility in Kirbymoorside and investing significantly in additional resources, plant and machinery, we have created a real center of excellence which brings together our combined expertise and innovation and is unrivaled within our industry globally. Aberdeen remains a crucial center of operations for us and we are looking to strengthen the team there to ensure we continue to meet our client's needs."

For more information, visit www.f-e-t.com.

Unique specialized survey ROV tested offshore

MMT Sweden AB and Reach Subsea ASA have jointly invested in developing a new special underwater tool for seabed mapping and pipeline inspection with the Norwegian ROV manufacturer Kystdesign AS. The potential market for pipeline inspection and survey in the North Sea is 2 billion NOK yearly.

This new ROV, called Surveyor Interceptor, has the innovative shape, powerful propulsion and advanced instrumentation to perform the work 4 to 8 times faster than existing work class ROVs. The umbilical and handling system yields up to 6 times better endurance than AUVs. The automatic tracking and station holding system delivers unsurpassed stability.

"This machine has a punch I could never have dreamt of. Together with the high precision instruments we can map at a quality not ever achieved before at reasonable cost," says Ola Oskarsson Founder MMT Sweden AB.

"I am very pleased with the team and the effort resulting in this fantastic machine. Looking forward to presenting this extreme surveyor to the market" says Jostein Alendal, CEO Reach Subsea ASA.

Gassco operates the Norwegian gas transportation system, embracing nearly 8,000 km of large diameter pipelines.

"We welcome this new technology and believe this will provide high quality in pipeline inspection and cost-effective solutions to manage our assets," says vice president in Gassco's transport network department, Kristin Kinn Kaste.

The ROV is designed to carry survey instrumentation to perform Pipe line inspection, route surveys, subsea installation surveys and environmental surveys down to 2,000-m water depth. By combining a hydrodynamic favorable hull, thin umbilical and extreme propulsion with the latest state-of-the-art sensors the vehicle is intended to deliver never before ultra high-resolution data at a substantial lower cost per km.

The offshore testing is performed in the Haugesund area in Norway with economic support from Gassco AS. The ROV is onboard MV Edda Fonn and manned by survey specialists from MMT Sweden and ROV specialists from Reach Subsea and Kystdesign.

The tests are covering launch & recovery, maneuvering, velocity, automatic pipe tracking and survey systems.



Great emphasis is put to high resolution and accuracy. To achieve this the ROV is equipped with an onboard inverted USBL from Sonardyne doubled by normal Kongsberg Hipap transponders. This will increase accuracy and ensure redundancy. Also the positioning is supported by two INS systems and a DVL. The test of station holding, line running and tracking have given outstanding results.

The thruster management routines by Kystdesign have astounded us with reliability and precision.

The ROV propulsion has allowed us to reach speeds well over 6 kts with auxiliary power intact. The driveline will be adjusted after finishing the trials to ensure stability and power management up to 8 kts. We believe this is a world record for a ROV.

The Multibeam system delivers 40 Hz ping up to 20 m above seafloor. This together with the 800 beams ensures dense point coverage, even at high speed. To improve top of pipe accuracy and ovality measurements a 25-Hz triangulating laser system from Cathx Ocean covers the central 5 m of the survey corridor delivering millimeter accuracy measurements.

Three photomosaicing cameras are synchronized with powerful strobe lights, taking 3D, stereo and geocorrected photos of the pipe to produce high resolution GIS data of pipe status and possible third-party intervention. The exposure time is very short <5 ms to avoid motion blur and ensure crisp color seafloor imagery. This is also a very valuable tool for environmental investigations and geohabitat classification. The quality of these systems are approximately 8 to 10 times that of standard HD video with georeferenced frames. The systems detail and mosaicking capacity is astonishing and a huge improvement over standard video.

For more information, visit www.mmt.se.

U/W search equipment aids recovery efforts at crash site

On 28 December 2014 AirAsia Flight QZ8501 with 162 people on board left Surabaya, Indonesia bound for Singapore. Forty-six minutes later the plane disappeared from radar. Air traffic control said they lost communications with the crew somewhere over the Java Sea. The flight path took the Airbus A320 between the islands of Borneo and Sumatra. For 3 days, 30 ships and 21 aircraft from Indonesia, Australia, Malaysia, Singapore, South Korea, and the U.S. scoured the area. Finally on 30 December, it was confirmed floating debris had been spotted, along with several bodies.

An international team was brought together to recover the victims and find as many pieces of the aircraft as possible to allow a thorough investigation. The 100-ft water depth allows divers to be used in the recovery and work alongside ROVs; however, strong currents and high seas caused delays. The operation has been led by Indonesia's national search and rescue agency, Basarnas, which is getting assistance from teams in Singapore, Malaysia and Australia. Fortunately Basarnas recently acquired several of JW Fishers ROVs and side scan sonars, along with diver-held video systems—essential pieces of equipment for this type of underwater search operation. One of the first instruments to arrive on site was a side scan sonar, which was able to confirm pieces of the aircraft were scattered on the seafloor. ROVs were the next to be deployed. Unlike divers, the remote controlled underwater camera systems can stay submerged all day and all night, without any concern of decompression, running out of air, being cold or tired. The ROV is also equipped with a scanning sonar, which is like radar for underwater use. The sonar can “see” much further than

the vehicle’s video camera, and can scan an area more than 300 ft in diameter around the ROV. The scanning sonar produces detailed images of any objects lying on the ocean floor.

One of the primary objectives of the mission was to locate the plane’s “black box” flight recorder that contains complete details of what was happening on the aircraft, up until the time of the crash. The black box is equipped with an acoustic pinger, which began transmitting a sonar signal when submerged. A pinger receiver is used to detect the sonar signal being emitted by the pinger. The receiver can either be mounted on an ROV or carried by a diver. Singapore military divers equipped with JW Fishers PR-1 pinger receivers were trying to locate and retrieve the black box.

For more information, visit www.jwfishers.com.

Visions '14 deploys remaining cabled array infrastructure

The Research Vessel (R/V) Thomas G. Thompson set sail 13 July 2014 on the Visions '14 expedition to complete construction of the OOI cabled array in the Northeast Pacific. The cruise was led by an OOI team from the University of Washington, utilizing the state-of-the-art Canadian ROV, ROPOS. The cruise comprised seven legs totaling 83 days.

Visions '14 involved heavy use of ROPOS in the deployment of seven instrumented sites (five at Axial Seamount and two Hydrate Ridge), one cabled shallow profiler mooring at slope base, and deep & shallow cabled profiler moorings at axial base. A total of 89 instruments were deployed.

ROPOS was also used in the deployment of over 20 mi of extension cables to connect these instrumented sites to their respective primary nodes. Throughout these operations the students and crew onboard the R/V Thompson worked around the clock conducting tests and surveys, including numerous CTD casts and bathymetric multi-beam sonar surveys.

Work during Visions '14 also focused on cabled sites associated with the endurance array on the continental shelf. With the help of ROPOS, cables were laid to connect the Oregon line of the endurance array to cabled array primary nodes. Two benthic experiment packages were deployed at the endurance array as well as one cabled



surface-piercing profiler mooring, one cabled deep profiler mooring, and one cabled shallow profiler mooring. A total of 46 instruments were deployed.

When the cabled array is fully operational in 2015, each study site will be provided with real-time, two-way, high-bandwidth communication and power through 540 mi of primary electro-optical telecommunications cable connected to the shore station in Pacific City, Oregon. Each primary node within the cabled array provides two-way communication and supplies instrument arrays with up to 10 Gbps of communications bandwidth and 8 kw of power. Data will be collected by over 30 different types of seafloor and water column sensors, transmitted by cable, and made publicly available onshore in near-real time via the Internet.

For more information, visit www.oceanobservatories.org.

Falcon key to diver safety in Concordia salvage

With Concordia finally in dock, Italian marine contractor Micoperi reports that the Saab Seaeye Falcon ROV played a vital role in diver safety during the largest maritime salvage operation in history.

Fabio Bartolotti of Micoperi, the contractor responsible for the project, says that the Falcon worked every day of the salvage operation, spending over 1,000 hrs in the water. He says that every single time a diver entered the water the Falcon was deployed in support and for their safety. The ROV was sent into places too dangerous for divers and on examination and survey missions without the need for divers.

In addition the Falcon was employed for tasks including the scanning procedure needed to measure the distance between the legs of the support platform built below the ship ready for the raising of the vessel.

For salvage operations such as this, the Falcon has the advantage of being small enough to be easily manhandled into the water, yet has the thruster power to work in strong currents and the intelligent architecture to handle a range of tools including manipulator, cutters, cameras and survey and sonar systems. This special blend of muscular intelligence makes it a vehicle of choice for salvage tasks where investigation, search and recovery are involved.

Powerful cutters can be fitted to

clear debris and entanglements—including polypropylene rope up to 19 mm thick and steel rope up to 12 mm diameter. Its sophisticated manipulator has both a powerful grip and a light touch for handling hefty or delicate items.

Cameras, along with variable intensity lighting, can be employed to view places too difficult or too confined for divers to access safely.

If a diver must be deployed, the ROV can preview the area, identify hazards and pinpoint the site of interest. It can then take down a safety line, if needed, ready for the diver to descend to the location. Tools and equipment can be transported back and forth to the diver, saving valuable dive time.

For more information, visit www.seaeye.com.

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ORBCOMM completes acquisition of SkyWave

ORBCOMM Inc. completed the acquisition of SkyWave Mobile Communications, the largest M2M service provider on the Inmarsat global L-band satellite network, on 1 January. Based in Ottawa, Canada, SkyWave adds more than 250,000 subscribers, 400 channel partners, annualized revenues of over \$60 million and adjusted EBITDA of over \$12 million. The acquisition of SkyWave furthers ORBCOMM's strategy to provide the most complete set of options and capabilities in the industry, while adding multiple synergies to strengthen its M2M solutions portfolio. With the addition of SkyWave, ORBCOMM now has one of the largest combined engineering teams in the M2M industry and gains significant economies of scale in operations and manufacturing. SkyWave's robust distribution channels in South America, Asia and the Middle East, along with Inmarsat's support, provide ORBCOMM with even broader global distribution. ORBCOMM gains access to new geographies in Eastern Europe and Asia while adding diverse vertical markets such as security and marine. The addition of SkyWave's higher bandwidth, low-latency satellite products and services that leverage the IsatDataPro (IDP) technology, which is now jointly owned by ORBCOMM and Inmarsat, also further expands the breadth of ORBCOMM's solutions portfolio.

Wärtsilä to acquire L-3 Marine Systems International

Wärtsilä Corporation is set to acquire L-3 Marine Systems International (L-3 MSI) from L-3 Communications Holdings Inc. L-3 MSI is a business sector within L-3's Electronic Systems business segment primarily focused on the commercial ship industry. The transaction is valued at Euro 285 million (enterprise value), subject to customary adjustments including an estimated reduction of Euro 60 million for L-3 MSI employee pension-related liabilities to be assumed by Wärtsilä Corporation. Financing for the deal will be from existing cash resources and credit facilities. The acquisition is subject to clearance from the regulatory authorities. The acquisition is expected to be closed during the second quarter of 2015. L-3 MSI is expected to generate approximately Euro 400 million of sales with an operating margin of approximately 6.5% for the year ending 31 December 2014. Headquartered in Hamburg, Germany, L-3 MSI currently has more than 1,700 employees in 38 locations in 14 countries. The company is well regarded internationally for its technology and systems integration capabilities. L-3 MSI delivers automation, navigation and electrical systems, as well as dynamic positioning technology, and sonar and underwater communications technology for the marine, naval and offshore markets. It has a leading position in the cruise & ferry and large container vessel markets. L-3 MSI's portfolio comprises various product brands, including SAM Electronics, L-3 Valmarine, Lyngsø Marine, L-3 Dynamic Positioning & Control Systems, Jovyatlus Euroatlas, L-3 Elac Nautik, Funa and APSS. The operation of vessels is becoming ever more sophisticated and the number of ships with electric propulsion is increasing. This trend is expected to continue because of the growing needs for flexibility, compliance with environmental regulations, and higher operational efficiency. Wärtsilä has a strong position in all of these areas, which will be further strengthened by its acquisition of L-3 MSI. L-3 MSI has extensive experience in supplying a variety of vessel and offshore installation types. Combining this strength with Wärtsilä's engines, propulsion equipment, environmental offering, gas fuel solutions, and electrical & automation systems creates a unique offering that is unmatched by the competition. Both shipyards and owners serving the marine and offshore oil & gas sectors will benefit from this alliance. In announcing the acquisition agreement, Mr. Jaakko Eskola, senior executive vice president & president, ship power, Wärtsilä Corporation, commented, "By combining forces with L-3 MSI, we create a powerful electrical and automation business, which is unique in its sector competence and breadth of capabilities. The deal is fully in line with our growth strategy to become the leading provider of innovative products and integrated solutions in the marine and oil & gas industries. This enables us to have a dedicated focus on both markets with an industry leading portfolio that features solutions from both companies." Wärtsilä foresees that the new unit will be able to capture new market opportunities and improve operational efficiency for its customers, thereby increasing both the sales and profitability of the business. The acquisition is expected to be EPS accretive as of 2015.

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Ocean News & Technology



NRL researchers demo TREC ship-to-shore data link

Scientists at the U.S. Naval Research Laboratory (NRL) along with Mercury Continuity (MC) have successfully demonstrated the Tactical Reachback Extended Communications (TREC) system in the port of Miami. This NRL-developed communications technology, which provides a very high data rate transmission over long ranges, was tested as part of a CRADA (Cooperative Research and Development Agreement) with MC and Intelligent Designs, LLC.

The full-duplex connection was set up between a node on top of a 760-ft tall building near the harbor and another on board the vessel Norwegian Sky, a cruise ship owned by Norwegian Cruise Line, as she operated both pier side and then while transiting the harbor out to sea. During the proof-of-concept demonstration, the team achieved data rates of 720 Mbps, exceeding by orders of magnitude the data connectivity that these vessels have in the harbor currently. As the cruise ship tracked out to sea, the data rate was ratcheted down to 100 Mbps and the link was operated out to ~16 nmi. On the return voyage, operating at the minimum data rate the link became solid over 22 mi from shore and was ratcheted up to 720 Mbps in steps as the vessel drew closer to port. There were multipath effects evident, but the tracking of the directional antennas on the ship and on shore was more than sufficient to maintain a consistent signal level at or beyond those ranges.

Prior to the testing on Norwegian Sky, NRL and its industry partners put the ship node on a chartered vessel for two separate trials, validating the operation and tracking of the terminals, as well as establishing and validating test procedures for the actual cruise ship testing that would follow. These tests on the chartered vessel established the dependability of the link at a variety of data rates and helped identify blockages (for example, cranes at the shipyard) that affected performance.

The TREC technology not only benefits the Navy and the DoD but could also have civilian applications, especially given MC's plan to debut modified commercial TREC configurations for maritime and energy customers later this year. The industry partners hope to apply this technology to supporting the cruise industry with a high data rate connectivity while in harbor and out to sea more than 25 nmi from shore.

According to Adam Jaffe, CEO of Mercury Continuity, Inc., TREC represents more than just a cutting-edge communications system. "Beyond the relatively niche sector servicing commercial cruise lines and yachts, there is a substantially broader base of government and civilian customers who have long been eager for a wireless communications solution with 'TREC-like' capabilities. MC is excited about continuing our

relationship with NRL to further develop this disruptive technology. We believe our work on TREC will end up having a significant impact across government and civilian sectors and on the industry at large." NRL initially developed TREC as a very high speed, full duplex line-of-sight data link between airborne assets and a ground station. TREC began as a 6.2 research effort at NRL sponsored by the Office of Naval Research (ONR) in 2008, and NRL has remained on task by ONR to guide the contracts developing the advanced hardware and conducting all integration and testing of the various systems in the air and on the ground."

TREC had previously met all of its threshold benchmarks for performance (300 Mbps at 50 nmi), weight (less than 12 lbs) and power draw (less than 57 W). NRL has operated TREC successfully in repeated trials, including during experimentation where TREC provided a reliable high data rate link from a manned aircraft to the ground, in support of a payload from NRL Optical Sciences Division.

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

Ericsson's Maritime ICT Cloud enables ships to join the Networked Society

Despite the fact that ships carried an estimated total of 9.6 billion tons of cargo in 2013—around 80% of global trade by volume and over 70% of global trade by value—the maritime industry lags behind alternative transport industries in terms of its use of information and communications technology. Ericsson aims to change that with the introduction of Maritime ICT Cloud, an end-to-end offering that combines a managed cloud solution with industry applications, service enablement, connectivity management, and consulting and systems integration services.

At present ships rely on manually updated traffic, cargo, port, weather and safety information that is sent point-to-point rather than made available to all parties simultaneously via a network. This is a time-consuming process and the lack of access to real-time data significantly increases the margin for error.

Ericsson's Maritime ICT Cloud will connect vessels at sea with shore-based operations, maintenance service providers, customer support centers, fleet/transportation partners, port operations and authorities. At the same time, the offering enables services used to manage fleets, monitor engines and fuel consumption, oversee routes and navigation, and ensure the well-being of the crew. Ericsson will provide everything from satellite connections to application support in one complete package, and manage operation of the Maritime ICT Cloud on behalf of its customers.



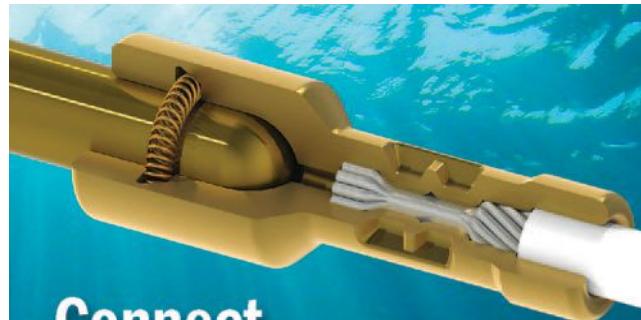
Orvar Hurtig, head of industry and society at Ericsson, said, "Vessels at sea do have systems in place that allow them to monitor critical functions and fuel usage, set and maintain an optimal course and ensure the welfare of their crew, but they are not particularly well integrated with fleet management systems onshore and they do not maximize the potential of real-time data. As the dri-

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ving force behind the Networked Society and the world leader in telecommunications, Ericsson is the right partner to help connect these disparate systems and enable them to share information with low latency."

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By the end of 2014, the largest ships were able to carry 19,000 20-ft equivalent units (TEUs). Keeping track of so much cargo is incredibly challenging, and there is much to be gained from connecting containers wirelessly, monitoring them and making real-time information about their whereabouts and environmental conditions easily available via an integrated dashboard.

As a result of the latest amendments to the Maritime Labour Convention (2006), ship owners are expected to provide broadband connectivity for crew communication, entertainment, training and telemedicine. Maritime ICT Cloud includes a multi-service communication platform with optimized connectivity and bandwidth for different types of traffic. The end results include increased staff satisfaction and retention rates, efficient coaching and development, and increased ability to cope with health crises as they arise by remotely accessing medical information.

For more information, visit www.ericsson.com.

Uplogix delivers virtual remote management of systems at sea

Uplogix announced it has deployed its first virtual local management solution onboard maritime vessels with MTN Communications (MTN). The Uplogix software, running on VMWare servers, provides out-of-band access and management for broadband communications solutions and provides local intelligence for communications systems onboard vessels.

Uplogix runs as a VM and utilizes USB-to-serial connectors for network-independent links to managed devices. Out-of-band connectivity through exist-

ing mobile satellite services ensures management access to network and satcom devices.

"Deploying Uplogix software supports one of many initiatives we have underway to transform at-sea communications for customers," said Livio Arleo, vice president of product development at MTN.

Uplogix combines secure out-of-band access and local automation to improve management of networking and satcoms devices without using the network itself. Continuous monitoring and trend analysis is performed on site, reducing management traffic on the network and triggering alerts or actions based on pre-set thresholds. Technicians can connect remotely to devices through Uplogix as if they were actually there, improving service quality while reducing support costs.

MTN integrates Uplogix into its solutions that deliver enhanced visibility and control of local and wide-area networks on vessels.

"We are breaking new ground when it comes to options for local management," said Lisa Frankovitch, Uplogix CEO. "Up until now, our installations in the maritime satellite world have been dependent on dedicated hardware. The option of deploying on a customer's existing servers opens up new opportunities for networks at sea offering a user experience like that on land."

For more information, visit www.uplogix.com.

GHC to develop telemedicine solution for rescue vessels and offshore windfarms

Germany's Global Health Care (GHC), it is developing a telemedicine solution for offshore windfarms and rescue vessels, in partnership with two Berlin hospitals and the German Maritime Search and Rescue Service (DGzRS).

The system will be based on GHC's AescuLink technology, and will feature real time audio and video communication, as well as live transmission of vital parameters such as ECG data, heart rate, arterial oxygen saturation, and temperature. Video assistance will be delivered to seafarers with the help of either satellite or mobile communications networks.

Nicolaus Stadeler, managing director of the DGzRS stated that they plan to equip the search and rescue vessels of the DGzRS with the technology so that they can apply it not only during emergency situations in offshore wind farms, but also during classic 'high sea' rescue and emergency operations.

GHC commented that the system can be operated by people without medical experience and that the technology facilitates monitoring of the patient during transport to shore by helicopter or rescue vessel.

Dr. Trong-Nghia Nguyen-Dobinsky, managing director of GHC expressed that they have developed a technology which excels in easy and intuitive handling, light network payload and high resilience, even in the case of a shaky link quality.

For more information, visit www.seenotretter.de.

Content Express™ maritime platform ready to implement

On 27 August 2014, Motive Television PLC, the technology provider to broadcasters and pay television operators, announced that its 100% owned subsidiary, Motive Television Services Limited, signed an Agreement with Twin Peak S.A of Athens, Greece to develop its proprietary Content Express™ technology for deployment in the global maritime industry.

The company is pleased to announce that Motive has completed the development and testing of this new platform at our engineering centers in Barcelona and Casablanca, and the product is scheduled for an initial deployment on ferries in Greece during Q1 2015.

Integrated with Twin Peak's VoDo technology, the new Motive platform will provide television channels, video-on-demand (VOD) movies and TV content to the rapidly growing demand for BYOD (bring-your-own-device) on commercial ships, private yachts, oil rigs, ferries, and cruise ships worldwide. It will have the advantage of providing television to the television and mobile devices through a single server with a satellite feed at a significantly lower cost than other solutions currently on the market.

The agreement with Twin Peak S.A. contains a share of net revenues for Motive with a minimum guarantee in the first 12 months, subject to certain cumulative income benchmarks being achieved.

Leonard M Fertig, CEO of Motive, commented, "The completion of this new application of Content Express™ and its extension to the maritime market opens up a huge global opportunity for Motive. We are excited to see the first deployment about 6 months after starting the project."

For more information, visit www.motivetv.com.

Tampnet continues its success with roll-out of their offshore 4G services

Tampnet announces that it continues to have success with both their coverage plan and service delivery on their offshore 4G services in the North Sea. The company continues to add sophisticated and bandwidth hungry rigs and vessels to their 4G portfolio.

For example, recently installed base station on Thistle platform in the northern part of the North Sea will work seamlessly in conjunction with the already established base stations offshore. This is yet another important step in the company's 4G LTE infrastructure project towards providing full coverage for the North Sea offshore industry.

The Thistle base station will, in addition to the Thistle field itself, provide high capacity, low-latency broadband services for mobile rigs and vessels in the area at a radius of up to 55 to 60 km. This includes a number of assets and fields on both the Norwegian and British sector, including Snorre, Statfjord, Valemon, Gullfaks, Brent, Dunlin, Murchison, Magnus, Ninian, Eider, Cormorant Alpha, Tern and Western Isles.

Managing Director of Tampnet, Per Helge Svensson comments: "This is another important milestone in our roll out of 4G services in the North Sea. It proves that we are well on our way towards reaching our goal of providing full coverage for the industry in the area in which we operate. The new service will change the nature of how mobile rigs and vessels communicate in the field. Furthermore, it will have significant spin-offs in terms of safety and crew welfare."

Tampnet operates the largest offshore high capacity communication network in the world, carrying traffic for approximately 130 platforms in the North Sea. Pioneering the industry, Tampnet has developed a high capacity, resilient and low latency communica-

tion network of fibre backbone cables, radio access links and 4G connections, serving both the Norwegian and the UK sectors. The goal is to become the preferred offshore network provider, and the company is constantly expanding the infrastructure and improving the services and capacity.

Tampnet was established in 2001 by Statoil. In November 2012, EQT acquired Tampnet to further develop the company in the North Sea and on the global arena in order to enable their clients to fully implement their collaboration and integrated operations strategies.

For more information, visit www.tampnet.com.

EMC picked for on-board communications for Ceona Amazon

Emerging Markets Communications (EMC) announced that Ceona has selected the company to provide on-board communications solutions for its newest, most innovative field development asset, the Ceona Amazon. Christened on 3 December 2014, EMC delivered satellite connectivity services for the vessel's main operations, including voice, and crew welfare communications using SpeedNet for faster internet browsing.

The Ceona Amazon is a unique, one-stop-shop vessel with expanded storage capacity, 400-mt mast cranes working in tandem, a 570-mt laying tower, and a massive deck that can be configured to enable the installation of FPSOs, semi-submersibles or TLPs. The massive field development asset will enter operations in early 2015 to support deepwater projects worldwide.

"The Ceona Amazon is designed with advanced features and technology to provide our global clients with the most efficient and safe field development services, whether EPIC or T&I contracts in the oil and gas market," said Mark Preece, EVP business development of Ceona. "We needed a global communications provider, with reliable network coverage to complement the high-tech capabilities of the Ceona Amazon," said Stuart Cameron, COO of Ceona. "We chose EMC as our connectivity service provider to leverage their global infrastructure, reliable satellite capacity, teleports and field support."

EMC delivers satellite connectivity services using its Global Ku-Band Network, landing traffic in its Mount Jackson teleport facility in Washington D.C. The technical solution incorpo-

rates dual antennas to avoid blockage caused by the main pipe-laying tower on the vessel.

"We are excited to bring Ceona on as a customer to provide communications for its newest and most innovative field development vessel," said Jesus Barber, Sr. vice president of maritime energy. "We look forward to supporting The Ceona Amazon in maintaining safe and efficient operations' services worldwide."

As part of the fully managed service, EMC provides field engineering support to maintain services. These field support centers are located in key oil and gas markets and store antennas, equipment, and spare parts for quick deployment of services.

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

Carnival Corporation chooses MCP for cellular communication services

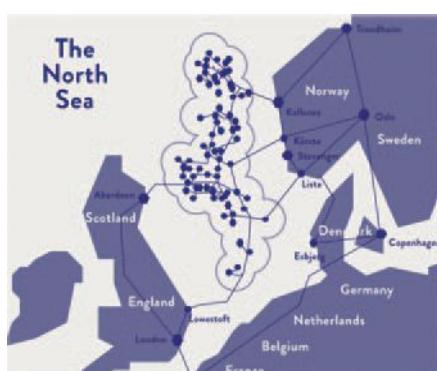
Maritime Communications Partners (MCP) has signed a long-term contract with Carnival Corporation to provide 33 cruise ships with advanced mobile cellular communication services. The agreement provides close to 130,000 people each day mobile voice, texting (SMS) and data (mobile internet) coverage while at sea.

In order to deliver outstanding mobile solutions to crew and passengers, Carnival Corporation has signed a multi-year contract serving six of the company's nine brands. The agreement is a consolidation and extension of existing agreements and the addition of new ships. MCP will be the exclusive onboard cellular provider for 12 AIDA ships, 5 Costa ships, 3 Cunard ships, 2 Princess Cruises ships, 3 P&O Cruises (Australia) ships and 8 P&O (UK) cruise ships.

"Technologies and services like this showcase how Carnival Corporation is leveraging our scale to drive strategic advantages," said Ramon Millan, CIO of Carnival Corporation. "The size of our company enables opportunities like this one, in which we can optimize services and technologies to enhance guest experience."

"It is rewarding to be able to supply Carnival Corporation ships with solutions that empower crew and passengers with services that enrich their lives. This contract strengthens MCP's position in the cruise market, and we especially increase our European ship-portfolio," said CEO of MCP, Frode Støldal.

For more information, visit www.mcp.com.



NKT Cables awarded offshore order

NKT Cables has been awarded the order for delivery of export cable systems to the Race Bank Offshore Wind farm by DONG Energy. The order is NKT Cables' 11th large offshore wind farm project since 2010 where the company first started production of submarine cables. For NKT Cables, the order will have a contract value of approximately Eur 80 million in standard metal prices and comprises supply of more than 150 km of 220 kV high voltage submarine cables. The cables are to be manufactured in Cologne, Germany, with the first phase delivered ready for installation in 2016. The second and last phase is to be delivered ready for installation in 2017. The order is conditional upon DONG Energy making a final investment decision for the offshore wind farm. The Race Bank Project is a large offshore wind farm to be placed in the southern North Sea, 27 km north of Blakeney Point off the coast of Norfolk. The offshore wind farm will have a capacity of up to 580 MW.

Prysmian wins project in the Philippines

Prysmian Group has been awarded a contract by the Filipino grid operating company NGCP (National Grid Corporation of the Philippines) worth a total of around Euro 90 million for the design, supply, installation, and commissioning of a submarine power cable link to connect Negros and Panay islands in the Philippines. The Negros-Panay connection project, known as CNP-1 (Cebu-Negros-Panay phase 1), is the first stage of a larger development plan by NGCP, aimed at connecting the Cebu, Negros and Panay islands to each other and at strengthening the Country's power transmission network. The submarine cable link will be one of the main assets to play a core role in this plan as it will back up the existing 138 kV oil-filled cable circuit, which is currently the only connection among the islands. The CNP-1 cable connection comprises three HVAC (High Voltage Alternating Current) 230-kV single core cables with XLPE insulation and single wire armoring along a 22 km submarine route across the Guimaras Strait. As part of the complete system Prysmian will also supply and install underground cables for the land portions of the link and will erect the two Cable Terminal Stations (CTS) in Barotac Viejo on the Panay side and in Magalona on the Negros side. Cables will be produced in the Group's excellence center for submarine cables in Arco Felice, near Naples, Italy. Delivery and commissioning is scheduled for the first half of 2016.

Carriers to construct new trans-Tasman cable

The three telecommunications companies planning to build a new 2,300-km submarine cable between New Zealand and Australia have confirmed their investment and a commencement of the project in early 2015. Spark New Zealand, Vodafone and Telstra will invest approximately US\$70 million on the new Tasman Global Access (TGA) Cable, which will significantly improve New Zealand's international broadband connectivity and resilience. With New Zealand's international capacity requirements growing 60% year-on-year, the TGA Cable will support the future needs of consumers and the growth aspirations of New Zealand businesses. Spark New Zealand and Vodafone account for more than 70% of the New Zealand broadband market. The project will begin early in 2015. Alcatel-Lucent has been selected as the cable laying contractor after a competitive tender process, and the TGA Cable is expected to be built and providing data traffic by mid-2016. The cable system will have two fiber pairs with total capacity of 20 Tbps. Designed with a capacity of at least 20 Tbps, the new TGA system will offer low-latency connectivity across the Tasman Sea, between Raglan, in New Zealand, and Narrabeen, in Australia. The system will provide an alternative route for trans-Tasman traffic, significantly improving New Zealand's international connectivity, as well as strengthening links into fast-growing Asian markets.

ABB, Hitachi partner for HVDC in Japan



ABB and Hitachi announced an agreement to form a joint venture for high voltage direct current (HVDC) system solutions, including submarine cables, in Japan. The new entity, to be based in Tokyo, will be responsible for the design, engineering, supply and after-sales services related to the DC system of HVDC projects bringing ABB's latest technologies to the Japanese market where Hitachi will be the prime contractor.

Hitachi and ABB will take equity interests of 51% and 49%, respectively. This is the first step of a strategic partnership between the two companies to contribute to the evolution of Japan's power network. Hitachi and ABB will explore further strengthening of the relationship and address opportunities to widen the scope for future collaboration.

The joint venture is expected to commence operations in the coming months, subject to the necessary approvals and statutory procedures.

The global HVDC market has seen many projects using line commutated converter technology (LCC) HVDC systems since the 1970s, while the development of voltage source converter (VSC) systems has advanced as a new technology since around 2000. In recent years there has been a particular focus on using HVDC to connect renewable energy sources. This has seen an increase in VSC-HVDC transmission systems, which facilitate grid-stabilization. The technology is ideal for long-distance underground and underwater power links and interconnections and is increasingly being deployed across a range of applications. These include the integration of renewable energies from land-based and offshore wind farms, the mainland power supply to islands and offshore oil and gas platforms, city center in-feeds where space is a major constraint, and cross-border interconnections that often require subsea links. Its ability to comply with grid codes ensures robust network connections regardless of application.

In Japan, nine HVDC projects were carried out up to 2006, all of them using the LCC type. Now, with the increasing introduction of renewable energy and innovation in electric power systems, demand for VSC-HVDC systems is expected to increase for applications such as wide-area power transmission grids and connection of offshore wind farms.

The new joint venture will combine Hitachi's sales network, project management expertise, quality assurance processes and delivery performance record, with ABB's state-of-the-art HVDC technologies, and contribute to innovation in electric power systems in Japan.

For more information, visit www.abb.com or www.hitachi.com.

Ofgem grants license for Thanet transmission assets

Ofgem closed the first tender round of its Offshore Transmission Owner (OFTO) regime. It granted Thanet OFTO Limited a license to own and operate the £164 million transmission link to the Thanet offshore wind farm.

Thanet becomes the ninth and final offshore transmission project to reach financial close and license grant in tender round one of the innovative regime. The first tender round has delivered over £1.1 billion of transmission assets, connecting 1.5 GW of offshore wind. The Thanet Offshore Wind Farm, located off the Kent coast, comprises 100 turbines with an installed capacity of 300 MW.

The innovative approaches used by OFTOs for financing, operating and maintaining offshore transmission assets have also led to significant cost savings for consumers, between £200 million and £400 million in the first tender round alone. A key reason for this is the competitive pressure from the tender process, which results in efficient costs of financing and running the assets. With future projects being further from shore and more complex, the competitive tendering approach is expected to achieve even greater savings in future.

Dermot Nolan, Ofgem chief executive, said, "With the license granted for Thanet, we mark a major milestone for the offshore regime. The successful competitive process has saved consumers hundreds of millions of pounds. To date, the regime has attracted over £1.9 billion of new investment into the UK transmission sector including £1.1 billion from the first tender round alone. Billions of pounds of further investment will be needed by 2020 to connect the wind farms under development."

"Introducing competition to offshore transmission has demonstrated the savings that can be achieved for consumers and we must now look at opportunities to introduce competition elsewhere. We have recently set out proposals to extend competition to new Strategic Wider Works projects onshore and to improve the OFTO built model offshore," he continued.

Together with the Department of Energy and Climate Change (DECC), Ofgem launched the offshore transmission regime in 2009. It uses competitive tendering for licensing offshore electricity transmission systems—something that had not been done before anywhere else in the world.

Ofgem have begun three tender rounds to date. Tender round one is the first tender round where all the projects have reached financial close and been granted Offshore Transmission Owner (OFTO) licenses. Financial close is where the developer completes the sale of the offshore transmission system to the OFTO.

To date all offshore transmission systems have been built by the wind

farm developer before being transferred to an OFTO when construction is complete. In future tender rounds we expect to see projects where OFTOs, design, build, operate and maintain the transmission assets.

Thanet Offshore Wind Farm Limited is 100% owned by Vattenfall. It is located approximately 12 km off Foreness Point—the most eastern part of Kent—and comprises 100 Vestas V90 3-MW wind

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turbines with a maximum installed capacity of 300 MW. Vattenfall estimate that the wind farm is capable of supplying enough clean power to meet the equivalent annual electricity demand of 200,000 UK households.

Thanet OFTO Limited is 100% owned by Balfour Beatty Investments Limited. Balfour Beatty are also part of the consortium that owns and operates the offshore transmission links for the Greater Gabbard wind farm, and part of the consortium that has been appointed as the preferred bidder for the Gwynt y Môr offshore wind farm's offshore transmission system.

A recent independent report by consultants CEPA and BDO estimates that through competition and appropriate allocation of risks, the regime has already saved consumers between £200 and £400 million. CEPA and BDO also estimate that if the same cost benefit analysis methodology used to evaluate the TR1 projects was applied to projects in Tender round two (TR2), the cost savings could be considerable.

For more information, visit www.ofgem.gov.uk.

TenneT ready to start NordLink

TenneT has given the green light to its participation in the construction of the NordLink cable from Germany to Norway. The power cable, which largely runs across the seabed, has a capacity of 1,400 MW, the equivalent of 466 wind turbines of 3 MW, 580,000 solar panels or a very large conventional power plant.

Mel Kroon, TenneT CEO, "Together with our partners Statnett and KfW, we will create the first direct connection between Germany and Norway by building the NordLink cable, which will supply renewable energy to 3.6 million households. This connection has it all: it enables the highly efficient exchange of renewable energy between Germany (wind energy) and Norway (hydropower), has a positive impact on energy prices, and furthers the integration of the European electricity market."

The KfW, formerly KfW Bankengruppe, is a German government-owned development bank based in Frankfurt. Its name originally comes from Kreditanstalt für Wiederaufbau. It was formed in 1948 after World War II as part of the Marshall Plan.

All necessary internal processes, including approval by TenneT's share-



holder, have led to a positive outcome. A formal final investment decision by the three partners (Statnett, TenneT and KfW) is expected to be taken in the first quarter of 2015, after negotiations with contractors are completed.

Connecting Norwegian hydropower to German wind energy will benefit both countries. If a surplus of renewable energy is produced in Germany, this can be transmitted to Germany via NordLink. The water reservoirs in Norway will then function as natural storage capacity for wind energy by retaining the water in the reservoirs. Likewise, Germany can import the cheaper, renewable Norwegian hydropower when demand is high. The NorNed cable between the Netherlands and Norway, which has been operational since 2008, works in the same way.

An important part of the socio-economic benefit of the NordLink cable is generated by revenues from the tradable transmission capacity of the cable. These revenues are used to finance other grid projects or to lower tariffs. German consumers can benefit from lower energy prices: if the prices in Germany are high because solar panels and wind turbines produce little electricity, cheaper hydropower can be imported from Norway via NordLink. In Norway, a beneficial socio-economic effect will occur in periods of heavy rainfall, as this will result in an overproduction of electricity from hydropower plants, that Norway can sell. In dry periods, Norwegian consumers will benefit from lower energy prices thanks to the import of cheaper wind energy from Germany.

For more information, visit www.tennet.eu.

Reef completes offshore wind farm installation

Reef Subsea has successfully completed its campaign of installing and burying inter-array power cables on the Gwynt y Môr Offshore Wind Farm. The wind farm is owned by RWE Innogy and partners and is one of the largest in the world, located 13 km off the North Wales coast in Liverpool Bay. The work scope included project management, engineering and installation of 124 inter array cables over the course of 20 months. Gwynt y Môr is not only a landmark achievement for the UK renewables industry, but it is also the largest project Reef Subsea has completed to date and will be used as a benchmark against forthcoming offshore wind farms projects.

For Reef Subsea, the project has been a fundamental part of the last 2 years and included some significant milestones. One of these was the £5 million investment in specialized subsea equipment including a cable lay spread and an SMD-built HDIA Plough that was designed, built and used in the first instance for the project. As a burial method, ploughing has often been overlooked in favor of other solutions but by introducing the HDIA Plough and trusting in the technology, Reef Subsea demonstrated that ploughing is an efficient and effective method of cable burial.

In addition, the delivery of the project saw Reef Subsea award significant services to a number of companies including the provision of crew transfer vessels, diving and cable installation support and supply of cable protection. The project employed upwards of 250 people per day at the height of construction and has made a significant contribution to the renewables subsea industry.

RWE expects that the wind farm will be fully operational in early 2015 and will supply power for up to 400,000 homes.

For more information, visit www.reefsubsea.com.

Nexans delivers DEH system

Nexans has provided to BP the first delivery in what will be the world's largest and most complex Direct Electrical Heating (DEH) system to date. Nexans is supplying a comprehensive subsea DEH system solution, including complete system design and 130 km of cables with accessories for

installation. This will provide flow assurance for 10 subsea flowlines serving the Shah Deniz high-pressure gas condensate development located in the Azerbaijan sector of the Caspian Sea.

The Shah Deniz DEH contract, worth around Euro 100 million, forms part of a 10-year frame agreement between Nexans and BP, the operator of the project, to supply umbilical cables, DEH systems, accessories and services for various deepwater oil and gas projects worldwide.

The first delivery consisted of DEH cables and accessories for four flowlines. The second delivery of the six remaining subsea systems is scheduled for 2016.

DEH provides cost-effective and reliable flow assurance and is therefore an important factor in ensuring successful production from Stage 2 development of the Shah Deniz field located in the Caspian Sea. The DEH system for the 10 Shah Deniz flowlines is more complex than previous DEH projects. This is due to the multiple systems in close proximity and the unique operating environment in the Caspian Sea.

The cables and accessories will be manufactured in the Nexans' facility in Halden, Norway.

DEH is a technology for flow assurance, developed to safeguard the well-stream flow through the pipeline to the platform. Alternating current (AC) transmitted from the DEH cable runs through the steel in the pipe, which heats up due to its own electrical resistance. This allows the pipeline to be operated in a cost-efficient and environmentally safe manner.

By controlling the current, the pipeline inner wall can at all times be maintained above the critical temperature for hydrate formation. As a result, problem free and reliable transportation is achieved. Traditional methods for flow assurance, by the use of chemical treatments and pressure evacuations, have considerable operational costs with long down times and may present a risk to the environment.

Nexans has delivered nine pre-qualified DEH systems in operation to date and has, from involvement of the technology qualification from early 1990s, built up internal competence on the design of DEH systems and cables needed for these systems.

For more information, visit www.nexans.com.

MakaiLay Power used by OUOCI Consortium to install power cable

Makai Ocean Engineering, Inc. recently modified the popular telecom cable lay software, MakaiLay, to address specific issues experienced by the subsea power cable industry. The result of this effort was MakaiLay Power, a real-time software tool for controlling power cable deployment at-sea. This software was recently purchased and used by the OUOCI Consortium to install a subsea power cable in Venezuela for the Chacopata-Margarita Submarine Cable Interconnection Project. The OUOCI Consortium, which stands for Oceanus Co., Ltd. (OU) and Ocean C&I (OCI), used the cable ship CS Creator (IMO No. 9630846) for the lay. The cable installation involved two separate 230-kV XLPE (polyethylene-insulated) power cable lines from and was completed by OUOCI Consortium successfully in November 2014, with the following highlights: length: ~31 km x 2 lines; depth: approximately 30 m; placement accuracy: within 1 m from the planned RPL; no cable suspensions; on time (installation completed 3 days earlier than planned); bottom tension maintained below 0.2 tons.

MakaiLay Power enables operators to accurately model the cable shape, bottom tension and touchdown location as it is installed on the seafloor, reducing the risk of damage to the cable. This software can greatly enhance the speed, safety, and accuracy of a power cable lay in any water depth. In the transition from shallow-water to mid- and deep-water, and for bathymetry with steep slopes, it becomes difficult to accurately control the cable's tension and bend radius at the seafloor unaided. In these situations, MakaiLay Power's cable payout and navigation instructions become critical. With the accurate picture of subsea cable conditions provided by MakaiLay Power, operators can con-

trol cable bottom placement and tension accuracy, which significantly reduces the time, labor, cost, and risk involved in subsea power cable installation. The MakaiLay suite includes a route planning tool, and a simulating/training tool as well as the real-time, at-sea tool for controlling cable deployment.

For more information, visit www.makai.com.

Corals relocated from cable route

CSA Ocean Sciences Inc. (CSA) is currently monitoring the health of 149 corals successfully relocated in association with a submarine fiber optic cable system laid offshore Hollywood, Florida in the fall of 2013. The cable system traverses nearly 17,500 km of seafloor and now connects Florida to South America, the Caribbean, and Central America. CSA provided comprehensive consulting services for the initial acquisition of the cable's permits and also served as the permitting agent to ensure compliance regarding pre-installation, post-installation, mitigation, and monitoring.

At the onset of the project, CSA worked closely with county, state, and federal agencies and the client to facilitate positive pre-application communication and to simplify and streamline the complicated Florida multi-agency permitting process. Creative routing suggestions through reef gaps and cable landing alternatives eliminating beach construction were included in the cable project design to minimize regulatory challenges and environmental impacts.

Through the use of benthic video surveys and existing spatial data, CSA mapped the cable route of least impact through the environmentally sensitive reef system populated with listed endangered coral species, such as the staghorn coral (*Acropora cervicornis*) and elliptical star coral (*Dichocoenia stokesii*). Using underwater navigation systems, CSA divers carefully delineated the cable route through the reef, relocating listed corals from the planned cable pathway. After cable deployment, CSA divers relocated and re-attached additional benthic organisms dislodged during the cable installation.

As a part of mitigation efforts for the cable installation, CSA also removed and disposed of more than 400 tires from Osborne Reef, a well-meaning but unsuccessful artificial reef created from the placement of over 1 million tires in



the 1970s. Unfortunately, over time, the tire bundles broke apart and drifted onto adjacent natural reefs damaging them in the process. The tires removed for mitigation were those closest to the natural reef edge with the highest mobility and greatest potential for crushing and covering the natural reef.

During the spring of 2014, a 6-month post-installation coral monitoring effort was performed to document and assess coral reattachment success and relative health as well as to evaluate selected control specimens. Prior to and following installation, seven reattachment areas were established to relocate the 149 specimens moved away from the cable route to minimize impacts related to installation activities. These specimens were predominantly hard corals, particularly the target species *Acropora cervicornis* and *Dichocoenia stokesii*. The 6-month post-installation monitoring indicates that the reattached specimens are generally in very good condition and are responding well to the relocation. CSA will continue biological monitoring through 2017 in accordance with the permit conditions outlined in federal, state, and local permits issued to the project.

"The execution of this effort from project planning, regulatory interactions, multi-agency permitting, installation assistance, mitigation, through continued monitoring demonstrates CSA's unique ability to offer a complete suite of the highest quality in-house environmental permitting, science, and marine operation services available anywhere. I am proud of our staff and their dedication to our clients and to their work to help protect our dynamic and sensitive marine environment," said Kim Olsen, business line manager for CSA's Permitting business line.

For more information, visit www.csaocean.com.

Hibernia Networks to connect Express cable to Cork, Ireland

Hibernia Networks will land a direct connection of its Express cable to Cork, Ireland via a new landing station. Hibernia is the only transatlantic cable provider to own and operate three diverse cable landing stations in Ireland and the only provider with six diverse routes connecting the island of Ireland to North America and Europe on its wholly owned and operated infrastructure.

The connection of Express to Southern Ireland will serve as an eco-

nomic catalyst for the entire region. Ireland has become a crucial market for data centers and cloud services globally. The connection to Hibernia Express provides Ireland the strategic connectivity it needs to support its technology community for the next 25 years and further adds to Ireland's preeminent position in the global cloud infrastructure and technology services marketplace.

This high capacity, direct transatlantic connection will grant Irish companies the opportunity to expand their global footprint. The new link will provide direct connectivity to both the UK and North America.

"TE Connectivity SubCom is pleased to continue our support of Hibernia in delivering their network," said John Mitchell, president, TE SubCom. "The cable route survey has been completed and more than 90% of lightweight cable, as well as 65% of armored cable needed for the system has been manufactured, bringing us even closer to the installation phase. We're confident that the project is on target to be ready for provisional acceptance in summer 2015."

"Hibernia Networks is proud to be able to deliver this high capacity direct transatlantic connection to Southern Ireland," stated Bjarni Thorvardarson, CEO of Hibernia Networks. "Our company started its work in Ireland in 2003 and has continued to invest in Ireland. Ireland is a major hub for international business and our investment connecting Express to Ireland is a symbol of our company's deep commitment to economic progress in Ireland."

For more information, visit www.hibernianetworks.com.

Telstra acquires Pacnet

Telstra has announced it would acquire Asian telecommunications and service provider Pacnet Limited, a provider of connectivity, managed services and data center services to carri-

ers, multinational corporations and governments in the Asia-Pacific region.

The acquisition of the Singapore and Hong Kong headquartered Pacnet includes interests in its China joint venture, PBS, which is licensed to operate a domestic Internet Protocol Virtual Private Network and provide data center services in most major provinces in China.

Pacnet gives Telstra ownership of an extensive range of services, including software defined networking, an expanded data center network, more submarine fiber optic cables and major customers across the region.

The US\$697 million acquisition is subject to completion adjustments. The transaction is subject to regulator and Pacnet financier approvals and is expected to complete by mid-2015. Telstra Chief Executive Officer, David Thodey said the acquisition was aligned to Telstra's growth strategy and was a significant step for Telstra as it continued to expand the business beyond Australia.

"Asia is an important part of our growth strategy. We believe this acquisition will help us become a leading provider of enterprise services to multinational companies and carriers in the region," Thodey said. "The enterprise services market is evolving rapidly and Pacnet will strengthen our networks data center and submarine network as well as boosting our service offerings and people capabilities.

In the year ended December 2013, Pacnet generated revenues of US\$472 million and earnings before interest, tax, depreciation and amortization (EBITDA) of US\$111 million. The combined entity would become a leader in the Asia service provider market. Telstra's GES business in Asia would almost double in size and it is expected to drive operational and cost synergies.

Pacnet is headquartered in both Singapore and Hong Kong with approxi-





mately 815 employees across 25 offices (including PBS China) located in 24 cities in 11 countries and regions, including Australia, China, Hon Kong, India, Japan, Malaysia, the Philippines, Singapore, South Korea, Taiwan, Thailand, the UK and the U.S.

Pacnet's core assets comprise an integrated network of points-of-presence (PoPs), data centers and submarine cables across Asia-Pacific, operated out of delivery centers throughout the Asia-Pacific region. Pacnet operates 109 PoPs across 61 cities in the Asia-Pacific region and 8 cities outside of the region (U.S. and Europe) aimed at both carrier and enterprise customers.

Pacnet operates a network of 29 interconnected data centers in 17 cities across the Asia-Pacific region, 7 of which have Tier III accreditation. Pacnet also has Asia's largest privately-owned submarine cable network, which lands at 21 cable landing stations in China, Hong Kong, Japan, the Philippines, Singapore, South Korea and Taiwan. In addition, Pacnet controls two of the five fiber pairs on the Unity trans-Pacific submarine cable network connecting Japan to the U.S.

Pacnet has a broad customer base. It focuses on two key customer segments: enterprise and carrier customers. In the enterprise segment, Pacnet has about 2,400 customers with strong penetration of financial services, internet, social networking players, e-commerce, technology and professional services. In the carrier segment, Pacnet has about 220 customers comprising both retail and wholesale telecommunications players. Pacnet has also developed a strong franchise with the over-the-top segment, in line with Telstra's strategy.

For more information, visit www.telstraglobal.com.

Alcatel-Lucent, Cinia to deploy Finland-Germany cable

Alcatel-Lucent and Cinia Group, previously Corenet, a Finnish government-owned venture, will deploy a submarine fiber optic cable system that will provide the first direct cable link between the Nordic region and continental Europe.

The project, named Sea Lion, calls for the deployment of a new 100G system that will span more than 1,100 km from Helsinki in Finland to the Rostock-Ribnitz area in Germany. Expected to be completed in early 2016, the system will play a critical role in

strengthening the provision of reliable and secure ultra-broadband connectivity for cloud and data center applications. According to the Cinia Group's own analysis, cloud services are expected to grow annually by approximately 40% on a global basis, with the volume of telecommunications data expected to triple by 2017.

Designed with an ultimate capacity of 15 Tbps, Sea Lion is part of the Finnish Government's strategic plan to enhance the country's international data transfer capacity. The data will be then transported across the country through the Finnish fiber-optic network running along the national rail infrastructure.

Cinia said that institutional investors Ilmarinen and OP Financial Groups insurance and pension affiliates are matching the Finnish government entity Governia's €20 million investment to inject a combined total of €40 million equity funding into the Cinia Group's new submarine infrastructure.

Senior debt capital markets will provide the remaining funds required, enabling this investment to support the new digital hub being created in Helsinki and Finland. This will strengthen the Nordic IT platforms and highlights the potential for further investments in data centers, connectivity and industrial internet companies in the emerging cloud cluster.

Despite the current economic cycle, traffic rates continue to grow and the industry requires new infrastructure to serve as backbone for the digital economy in robustness, scalability and reliability.

Direct connectivity between Finland and Germany with robust and future-proof technology is essential. The key selection criteria for the landing station location included the existing infrastructure, route diversity and sustainable routing through sea areas. Surveys and preparatory works for the permitting and landing sites have begun and construction works will be conducted during 2015.

The European Commission's notification, SA.36918 (2014/N) Finland Baltic Sea Backbone Cable, confirms that the infrastructure initiative meets the needs of the new digital EU and is promoting the emergence of future digital hubs in Europe. The vendor selection was based on criteria set out in the notification.

The Baltic Sea Cable is a key initiative for both the Finnish government and the EU. It will enable connectivity

and redundancy to the Nordic region and promote growth for the region's emerging data centers. This investment relating to the Baltic Sea Cable will lead the way in promoting the Nordic region and Finland as an attractive location for data centers and IT-related investments.

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

First transpacific telephone cable recognized as historic achievement

The world's first transpacific telephone cable, TPC-1, which was brought into service by KDDI (formerly KDD), AT&T and Hawaiian Telcom in 1964, has been recognized by IEEE Milestones, a program which honors historic achievements in fields related to electricity, electronics and information.

TPC-1, the world's first transpacific cable providing international telephone communication between Japan and the US, was laid between Japan, Guam and Hawaii, a distance of approximately 10,000 km, and brought into service on 19 Jun 1964. Together with the inauguration of the Tokaido Shinkansen, in the run-up to the Tokyo Olympics which were held in October 1964, TPC-1 was a national project culminating in a commemorative phone call between then Prime Minister Ikeda and U.S. President Johnson.

International calls in 1964 were commonly transmitted on short wave with its attendant problems of long connecting time, high level of noise and static, and inability to mutually support simultaneous conversations. Such problems were solved by TPC-1. TPC-1 technology has been recognized by IEEE Milestones as forming the basis of subsequent submarine optic fiber cable construction technology and contributing significantly to the main communications infrastructure technology of today's internet age. IEEE Milestones awards honor inventions that greatly benefit society, such as Alexander Graham Bell's telephone.

In preparation for the Tokyo Olympics in 2020, KDDI is working toward commercialization of 8K video resolution in the broadcasting sector, and enhancement and diversification of communications services through development of fifth-generation mobile communications technology aimed at attaining 10 Gbps in the communications sector.

For more information, visit www.kddi.com.

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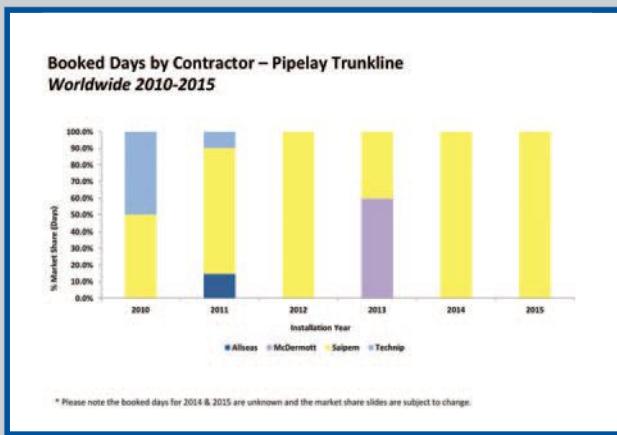
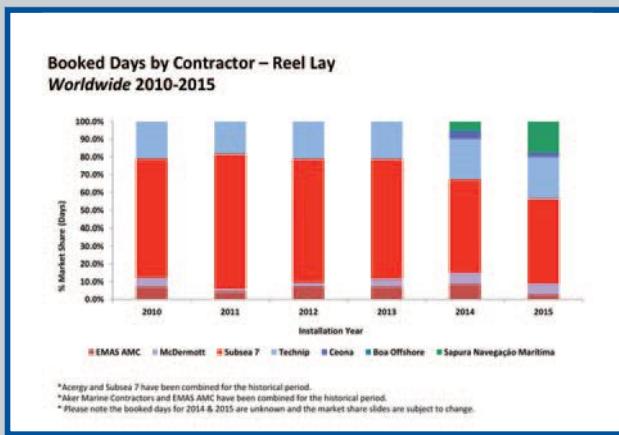
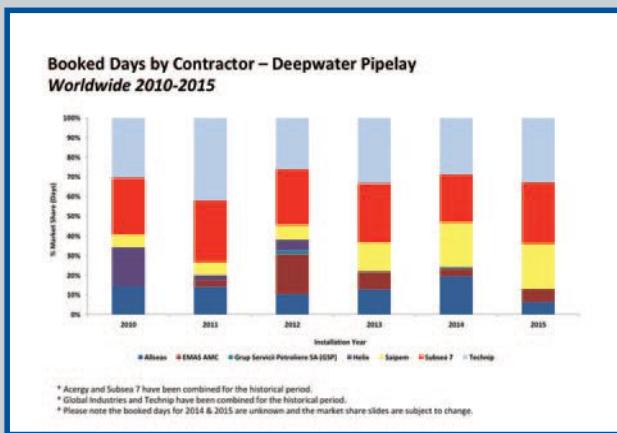
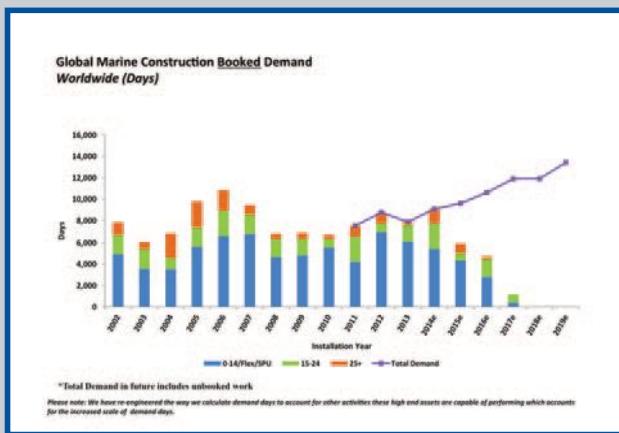
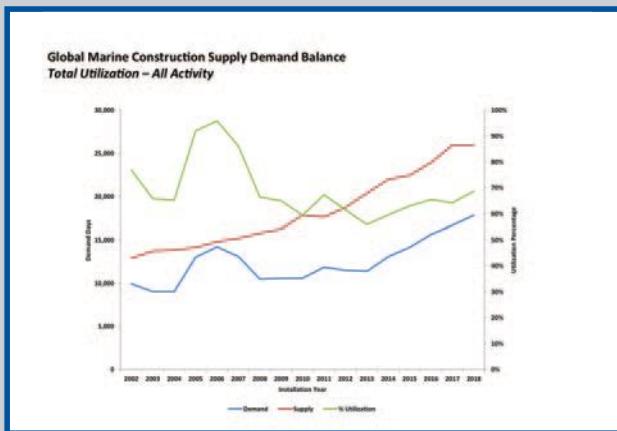
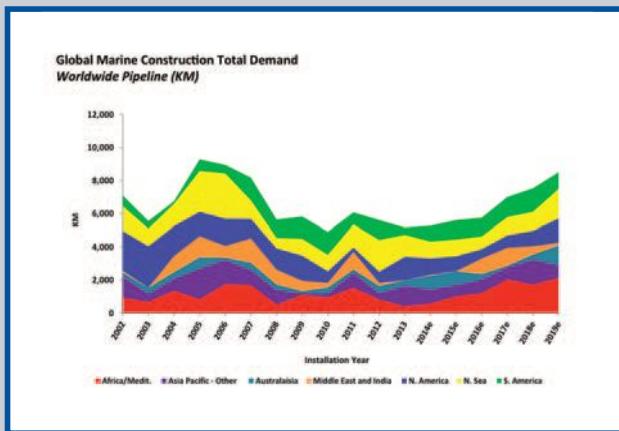
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Monthly Stock Figures & Composite Index

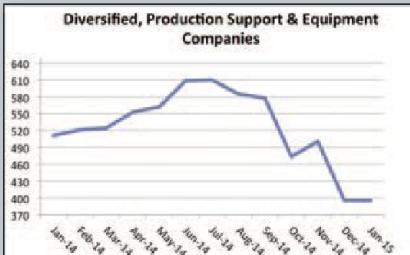
Industry Company Name	Symbol	Close(Mid) January	Close(Mid) December	Change	Change %	High 52 week	Low
Diversified, Production Support and Equipment Companies							
Baker Hughes, Inc.	BHI	55.40	54.93	0.47	0.9%	75.64	47.51
Cameron Intl. Corp.	CAM	43.03	45.33	-2.30	-5.1%	74.89	42.04
Drill-Quip, Inc.	DRQ	73.97	70.00	3.97	5.7%	116.53	68.09
Halliburton Company	HAL	38.61	37.82	0.79	2.1%	74.33	37.21
Tenaris SA	TS	27.46	28.18	-0.72	-2.6%	48.45	26.28
Newpark Resources, Inc.	NR	8.54	8.41	0.13	1.5%	13.60	8.07
Schlumberger Ltd.	SLB	79.76	79.90	-0.14	-0.2%	118.76	75.60
Superior Energy Services, Inc.	SPN	18.32	17.19	1.13	6.6%	37.05	16.70
Weatherford International, Inc.	WFT	10.12	10.32	-0.20	-1.9%	24.88	9.40
Deep Down, Inc.	DPDW	0.93	0.75	0.18	24.0%	2.10	0.61
FMC Technologies	FTI	39.42	42.75	-3.33	-7.8%	63.92	38.94
Total Diversified, Production, Support and Equipment.....	395.56	395.58	-0.02	0.0%	650.15	370.45	
Geophysical / Reservoir Management							
Dawson Geophysical Company	DWSN	11.60	10.49	1.11	10.6%	33.92	10.40
Mitcham Industries, Inc.	MIND	5.63	5.69	-0.06	-1.1%	17.01	5.40
Compagnie Gnrale de Gophysique-Veritas	CGV	5.66	6.11	-0.45	4.50%	17.55	5.37
Total Geophysical / Reservoir Management.....	22.89	22.29	0.60	2.7%	68.48	21.17	
Offshore Drilling Companies							
Atwood Oceanics, Inc.	ATW	28.38	26.76	1.62	6.1%	53.90	26.12
Diamond Offshore Drilling, Inc.	DO	31.34	35.27	-3.93	-11.1%	55.37	29.00
ENSCO International, Inc.	ESV	28.96	26.41	2.55	9.7%	55.89	25.88
Nabors Industries, Inc.	NBR	10.42	10.28	0.14	1.4%	30.24	9.91
Noble Drilling Corp.	NE	16.19	20.67	-4.48	-21.7%	31.73	14.47
Parker Drilling Company	PKD	2.64	2.62	0.02	0.8%	8.35	2.52
Rowan Companies, Inc.	RDC	21.57	20.10	1.47	7.3%	33.82	19.50
Transocean Offshore, Inc.	RIG	15.15	16.25	-1.10	-6.8%	47.45	14.50
Total Offshore Drilling.....	154.65	158.36	-3.71	-2.3%	316.75	141.90	
Offshore Contractors, Services, and Support Companies							
Helix Energy Solutions Group, Inc.	HLX	18.12	20.21	-2.09	-10.3%	28.00	17.14
Gulf Island Fabrication	GIFI	16.93	18.76	-1.83	-9.8%	24.01	16.27
McDermott International, Inc.	MDR	2.3	2.31	-0.01	-0.4%	9.36	2.21
Oceaneering International	OII	53.15	57.49	-4.34	-7.5%	79.05	50.81
Subsea 7 SA	SUBCY.PK	9.06	8.86	0.20	2.3%	21.10	8.82
Technip ADS	TKPPY.PK	13.98	14.44	-0.46	-3.2%	28.75	13.39
Tetra Technologies, Inc.	TTI	5.54	5.02	0.52	10.4%	13.43	4.90
Total Offshore Contractors, Service, and Support.....	119.08	127.09	-8.01	-6.3%	203.70	113.54	
Offshore Transportation and Boat Companies							
Seacor Holdings, Inc.	CKH	70.64	69.27	1.37	2.0%	90.69	67.50
Gulfmark Offshore, Inc.	GLF	20.67	20.12	0.55	2.7%	50.70	19.49
Bristow Group	BRS	60.56	58.58	1.98	3.4%	81.60	57.89
PHI, Inc.	PHII	34.75	36.00	-1.25	-3.5%	52.98	32.79
Tidewater, Inc.	TDW	30.52	28.71	1.81	6.3%	57.15	28.02
Trico Marine Services, Inc.	TRMAQ.PK	13.28	12.80	0.48	3.7%	10.39	13.77
Hornbeck Offshore	HOS	21.19	19.53	1.66	8.5%	47.45	19.16
Total Offshore Transportation and Boat	251.61	245.01	6.60	2.7%	390.96	238.62	

February 2015

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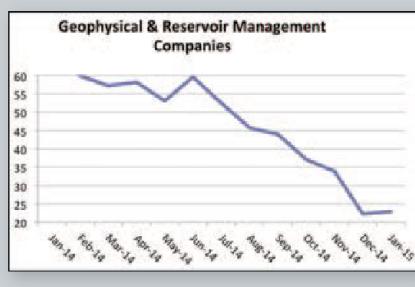
Ocean News & Technology

Monthly Stock Figures & Composite Index

Industry	Close(Mid) January	Close(Mid) December	Change	Change %	High 52 week	Low	
Diversified, Production Support & Equipment Companies							
	Total Diversified, Production, Support and Equipment	395.56	395.58	-0.02	0.0%	650.15	370.45
Total Geophysical / Reservoir Management	22.89	22.29	0.60	2.7%	68.48	21.17	
Total Offshore Drilling	154.65	158.36	-3.71	-2.3%	316.75	141.90	
Total Offshore Contractors, Service and Support	119.08	127.09	-8.01	-6.3%	203.70	113.54	
Total Offshore Transportation and Boat	251.61	245.01	6.60	2.7%	390.96	238.62	
Total Offshore Source Index	943.79	948.33	-4.54	-0.5%	1,630.04	885.68	

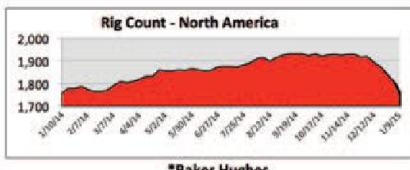
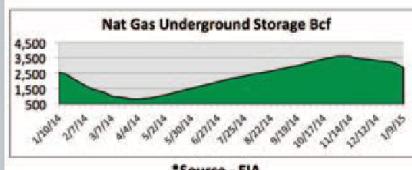
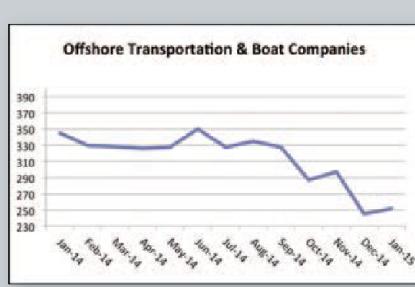
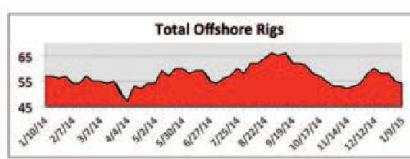
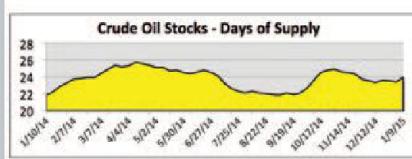
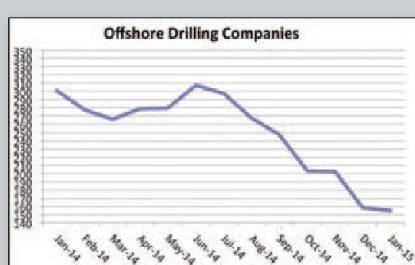
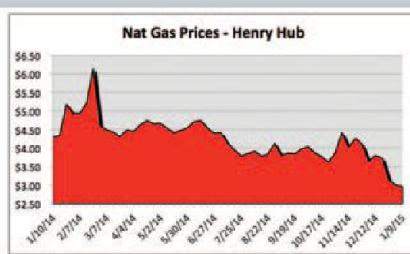
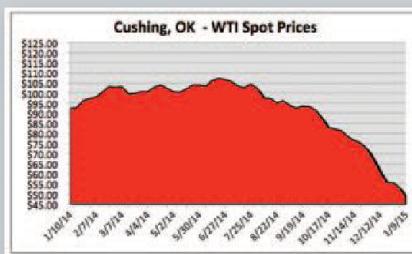
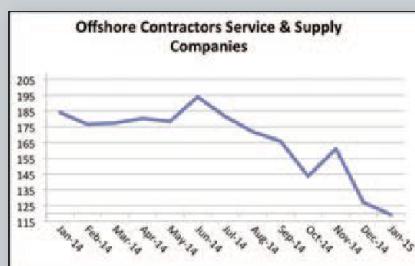
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Oil & Gas Industry Trends

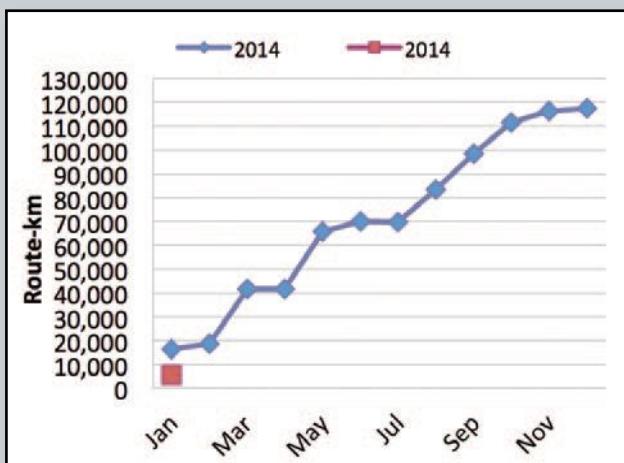
Monitoring the Pulse of the U.S. Offshore Oil & Gas Industry



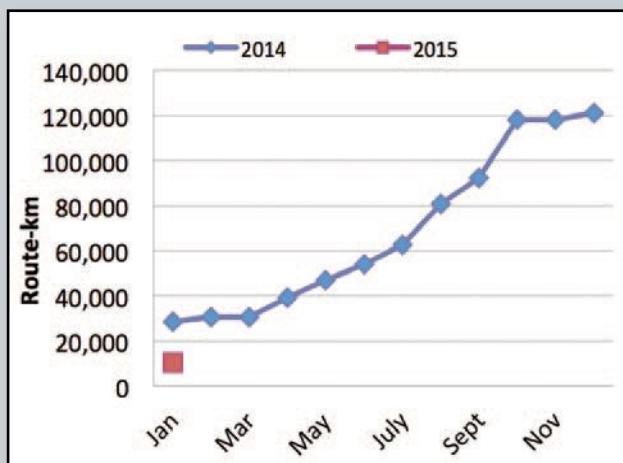
- Positive trend, at least 3 weeks
- Changing trend, less than 3 weeks
- Negative trend, at least 3 weeks

Subsea Telecom & Power Cable Data

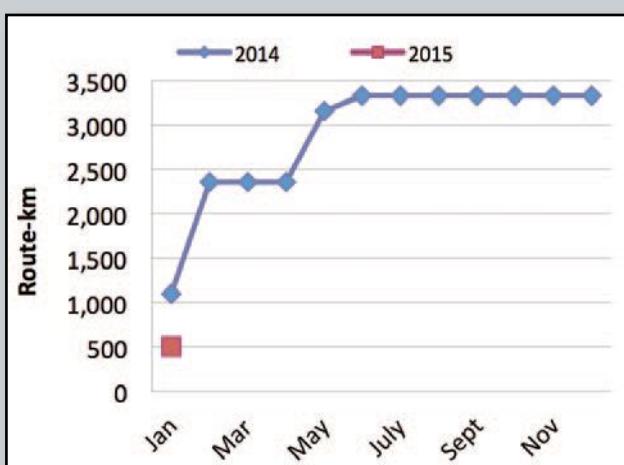
FO Cable Awards by Month



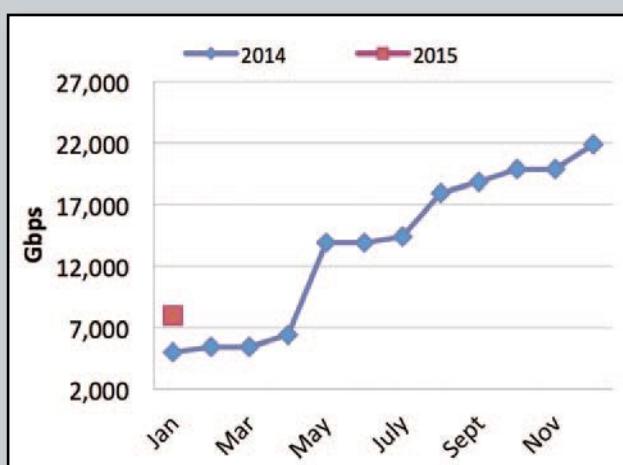
FO Cable Announcements



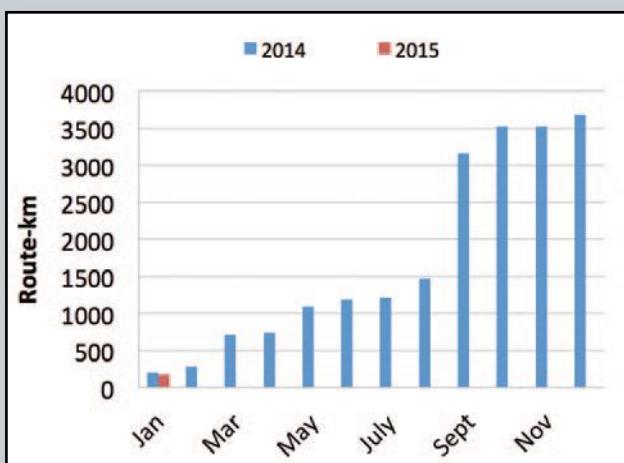
Submarine FO Cables Entering Service in Route-km



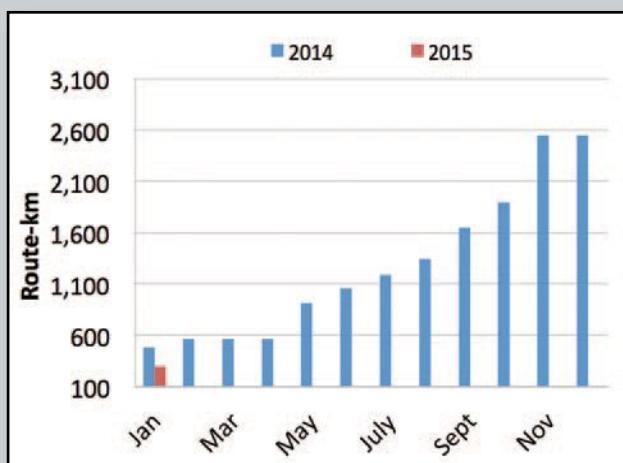
Upgrades of Existing Cable Systems in Gbps



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	CAL-DIVE Q-4000	Atlas NW	8,953
Petrobras America Inc.	WR	469	G16997	VANTAGE TITANIUM EXPLORER	Chinook	8,835
Shell Offshore Inc.	AC	857	G17561	H&P 205	Great White	7,824
Murphy Exploration & Production Co.	MC	697	G34019	ENSCO DS-5	Blind Faith	7,164
Noble Energy, Inc.	MC	479	G31503	ENSCO 8501		7,149
ExxonMobil Corp.	WR	584	G20351	MAERSK VIKING	Julia	7,120
Union Oil Co. of California	WR	677	G21245	T.O. DISCOVERER CLEAR LEADER	Saint Malo	7,038
Marathon Oil Co.	WR	578	G33379	MAERSK VALLIANT	Belalcazar	6,958
Anadarko Petroleum Corp.	KC	919	G21447	ENSCO 8500	Lucius	6,941
BP Exploration & Production, Inc.	MC	522	G08823	ENSCO DS-3	Fourier	6,932
BP Exploration & Production, Inc.	GC	743	G15607	SEADRILL WEST AURIGA	Atlantis	6,816
Union Oil Co. of California	WR	634	G18745	PACIFIC SHARAV	Saint Malo	6,803
Union Oil Co. of California	KC	814	G25810	PACIFIC SANTA ANA		6,678
Noble Energy, Inc.	MC	782	G33757	ATWOOD ADVANTAGE	Caterpillar	6,569
LLOG Exploration Offshore, LLC	MC	300	G22868	SEADRILL SEVEN LOUISIANA	Delta House	6,131
BP Exploration & Production, Inc.	MC	778	G09868	THUNDER HORSE PDQ	Thunder Horse North	6,031
Deep Gulf Energy II	MC	215	G24060	ENSCO 8505		5,996
Statoil Gulf of Mexico	WR	160	G34634	MAERSK DEVELOPER		5,895
Anadarko Petroleum Corp.	WR	52	G25232	DIAMOND OCEAN BLACKHAWK	Shenandoah	5,874
Murphy Exploration & Production Co.	DC	4	G10437	HELIX 534	Dalmatian	5,822
LLOG Exploration & Production Co.	MC	300	G24064	SEADRILL WEST NEPTUNE	Delta House	5,746
BP Exploration & Production, Inc.	MC	775	G09866	SEADRILL WEST CAPRICORN	Thunder Horse North	5,673
BP Exploration & Production, Inc.	MC	776	G09866	T.O. DISCOVERER ENTERPRISE	Thunder Horse North	5,638
Chevron USA Inc.	KC	414	G26748	T.O. DISCOVERER INDIA		5,510
BP Exploration & Production, Inc.	GC	743	G15607	T.O. DEVELOPMENT DRILLER III	Atlantis	5,414
Anadarko Petroleum Corp.	GC	859	G24194	ROWAN RESOLUTE	Heidelberg	5,346
Shell Offshore, Inc.	MC	687	G05863	ATWOOD CONDOR	Mensa	5,292
Anadarko Petroleum Corp.	GC	903	G24194	ENSCO 8506	Heidelberg	5,254
Freeport-McMoRan Oil & Gas LLC	MC	85	G08484	NOBLE TOM MADDEN	King	5,177
Anadarko Petroleum Corp.	GC	680	G22987	BLAKE 1007	Constitution	4,972
Anadarko Petroleum Corp.	GC	680	G22987	DIAMOND OCEAN STAR	Constitution	4,972
LLOG Exploration Offshore, LLC	MC	253	G32303	ENSCO 8503	Delta House	4,924
BP Exploration & Production, Inc.	KC	93	G25780	ENSCO DS-4	Gila	4,860
Deep Gulf Energy II, LLC	MC	727	G24107	NOBLE DANNY ADKINS	Kodiak	4,818
Hess Corp.	MC	726	G24101	STENA FORTH	Tubular Bells	4,570
Anadarko Petroleum Corp.	GC	683	G18421	NOBLE BOB DOUGLAS	Caesar	4,487
Anadarko Petroleum Corp.	GC	683	G18421	WIRELINE UNIT (N.O. #2)	Caesar	4,487
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
Chevron USA, Inc.	GC	640	G16770	T.O. DISCOVERER INSPIRATION	Tahiti 2	4,298
BP Exploration & Production Inc.	KC	147	G30926	SEADRILL WEST VELA		4,248
BHP Billiton Petroleum (GOM) Inc.	GC	653	G20084	T.O. DISCOVERER INVICTUS	Shenzi development	4,238
Shell Offshore, Inc.	MC	943	G34467	STENA ICEMAX	Oasis	4,213
Anadarko Petroleum Corp.	EB	690	G22296	WIRELINE UNIT (L.J. DIST)	Navajo	4,202
Freeport-McMoRan Oil & Gas LLC	GC	643	G35001	NOBLE SAM CROFT		3,885
Freeport-McMoRan Oil & Gas LLC	VK	915	G06894	T.O. DEEPWATER CHAMPION	Dorado	3,867
Shell Offshore, Inc.	MC	809	G09873	NOBLE DON TAYLOR	Princess	3,853
Shell Offshore, Inc.	GC	248	G15565	T.O. DEEPWATER NAUTILUS	Glider	3,233
Shell Offshore, Inc.	VK	956	G06896	NABORS 202	Ram-Powell	3,214
Shell Offshore, Inc.	MC	762	G07957	NOBLE BULLY 1	Deimos	3,144
Shell Offshore, Inc.	GC	158	G07995	H&P 202	Brutus	2,985
Shell Offshore Inc.	MC	807	G07963	H&P 201	Mars (Ursa/Princess)	2,945
Apache Deepwater LLC	MC	718	G13687	DIAMOND OCEAN ONYX	Juno	2,799
Shell Offshore Inc.	GB	427	G07493	NOBLE JIM THOMPSON	Cardamom	2,719
LLOG Exploration Offshore, LLC	MC	546	G25098	NOBLE AMOS RUNNER	Longhorn MC 502 546	2,570
Energy Resource Technology GoM, Inc.	GC	237	G34971	ENSCO 8502	Phoenix	2,240
Murphy Exploration & Production Co.	MC	538	G16614	T.O. DISCOVERER DEEP SEAS	Medusa North	2,047
Stone Energy Corp.	MC	28	G09771	WIRELINE UNIT (N.O. #3)	Pompano	1,853
Chevron USA Inc.	VK	786	G12119	NABORS	Petronius	1,751
EnVen Energy Ventures, LLC	EW	1003	G13091	NABORS S.D. XVI	Prince	1,490
Fieldwood Energy Offshore, LLC	GC	65	G05889	H&P 206	Bullwinkle	1,353
Stone Energy Corp.	VK	989	G06898	NONE RIG PA OPERATION	Pompano	1,293
SandRidge Energy Offshore, LLC	GC	165	G06280	COIL TUBING UNIT (L.J. Dist)	East Breaks 164	863
Whistler Energy II, LLC	GC	18	G04940	NABORS MODS 201	Boxer	750
Ankor Energy LLC	MC	21	G22850	NABORS MODS 200		668
SandRidge Offshore, LLC	EB	110	G02650	NABORS S.D. IV	Tequila	660
W&T Offshore, Inc.	EW	910	G13079	H&P 203		560

Deepwater prospects with drilling and workover activity: 69

Current Deepwater Activity as of Monday, 5 January 2015

Activity by Water Depth

Water Depth (m)	Active Leases	Approved Applications	Active
0 to 200	1,434	35,908	2,347
201 to 400	109	1,124	20
401 to 800	222	886	10
801 to 1,000	348	584	9
1,000 & above	3,220	1,991	27

Rig Activity Report 9 January 2014

Location	Week of 01/09	+/-	Week Ago	+/-	Year Ago
Land	1684	-60	1744	+7	1677
Inland Waters	12	0	12	-8	20
Offshore	54	-1	55	-3	57
U.S. Total	1750	-61	1811	-4	1754
Gulf of Mexico	53	-1	54	-2	55
Canada	366	-158	208	-111	477
N. America	2116	-97	2019	-115	2231

Activity by Water Depth Information current as of Monday, 12 January 2015

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

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

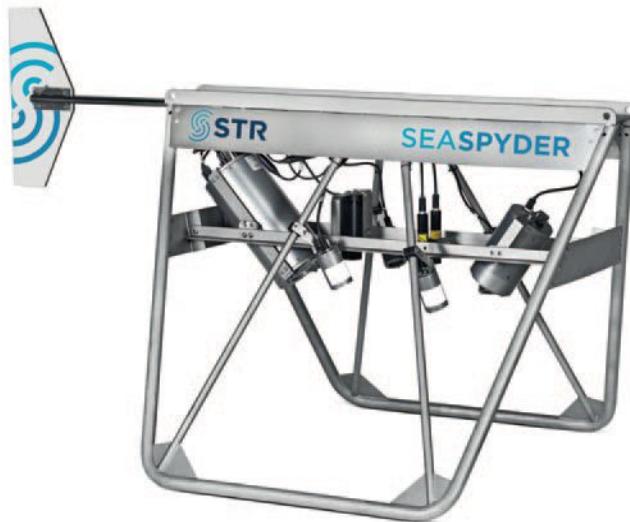
STR SeaSpyder explores IFCA habitats

Great Yarmouth-based marine technology experts Subsea Technology and Rentals (STR) are pleased to announce the supply of two SeaSpyder underwater camera systems to the Association of Inshore Fisheries and Conservation Authorities (AIFCA), for use by its 10 individual statutory organizations. The delivery of SeaSpyder underwater camera systems and deployment solution to the IFCAs is to improve their ability to gather information on seabed habitats and species across England's inshore waters. This work is to support Defra's ambitious target of achieving a well-managed network of marine protected sites by 2016.

The SeaSpyder underwater drop camera system is part of a family of field-proven underwater camera systems manufactured by STR for the marine survey and environmental communities. The SeaSpyder is designed for operation in shallow-medium water depths with the standard system having a working depth range of 500 m. For applications demanding a deeper rating, a "telemetry" model is offered and operates over longer cable lengths for operation down to 1,000 m. Both models are fitted with a next generation digital SLR camera offering high-resolution digital stills and HD video for the highest imagery detail. The high-specification digital SLR camera offers an impressive 18.0 mega pixels resolution and both manual and automatic focus for achieving the sharpest

images. The captured digital stills are framed with the aid of a dedicated real-time video camera and images are transferred "on the fly" to the topside for real-time review.

For more information, visit www.str-subsea.com.



Mactech Offshore's articulating diamond wire saw receives patent approval



Mactech Offshore recently received patent approval for their Articulating Diamond Wire Saw.

The saw, ideal for conductor removal, is designed for subsea and topside cutting in the offshore oil industry utilizing an articulating cutting arm. It is designed to cut multi-string applications or

heavy wall legs and cross members in the offshore platform decommissioning industry. The vertical stance means the saw can fit into cofferdams or excavations with minimal dredging. The articulating design requires only 2 ft of clearance around casings and the cut is made at the bottom of the saw eliminating extra dredging.

The best decommissioning strategy is the one that is safe, effective, and efficient. The agility in the field of the Articulating Offshore Diamond Wire Saw has proven to be a catalyst for effectiveness and efficiencies offshore.

The compact design reduces setup, installation and removal time. The guiding arms can be closed around pipes and used as guides while the saw is lowered to the cut location. This also increases safety on the job as the contractor is able to minimize the need for divers in the water.

For more information, visit www.mactechnoffshore.com

Advanced Navigation releases Subsonus USBL underwater acoustic positioning system

Advanced Navigation has announced the release of their Subsonus USBL underwater acoustic positioning system.

Subsonus is a next generation USBL underwater acoustic positioning system that provides high accuracy position, velocity and heading at depths of up to 1,000 m. The system features an industry leading calibrated hydrophone array combined with an internal tightly coupled INS, all packed into a miniature titanium enclosure small enough to fit in the palm of your hand.

Subsonus is the result of 4 years of development at Advanced Navigation's acoustic research facility. The system is currently undergoing final in-field testing and will start shipping to customers in Q2 2015. Indicative pricing is AUD 25,000 per unit.

For more information, visit www.advancednavigation.com.au.



New quick-deploy "PulSAR" side scan sonar for S&R operations

Kongsberg Maritime has introduced a new tow fish side scan sonar for use in search and recovery (SAR) missions as well as underwater inspection, engineering and scientific surveys. Developed by Kongsberg Geoacoustics and available now, PulSAR is designed for intuitive operation and easy deployment by non-specialized personnel, enabling effective short-notice surveys using vessels of opportunity.



The PulSAR system acquires high-resolution acoustic images of the seabed using a compact, rugged stainless steel tow fish that is operated with a water protected (IP66) deck unit and small cable hand reel. The system can be deployed on small vessels such as open RIBs. Large areas can be surveyed efficiently, revealing small objects and structures in great detail. PulSAR operates in a frequency range of 600 kHz to 1 MHz and both FM and CW source signals can be selected in order to optimise the range and resolution for the given survey task.

"With quick and easy deployment and high survey performance, PulSAR is an ideal tool for search and recovery, where the ability to act quickly is vital to a mission's success," comments Helge Uhlen, product sales manager underwater mapping, Kongsberg Maritime. "It is a versatile solution that can also be used for underwater inspection and engineering surveys without large overheads for survey platforms and survey specialists. The high resolution achievable with the system results in seafloor maps with detail that may form the basis for scientific investigation in areas such as marine geology and geophysics as well as marine archaeology."

PulSAR is battery or mains powered, using 24 VDC or 110/230 VAC. It has an integrated GPS system that provides positioning information with SBAS differential corrections and an external positioning system can be connected via a serial port.

The system is delivered with a dedicated software package to be run on a laptop computer connected via Ethernet

to the deck unit. It allows the user to plan and conduct the survey and acquire sonar data with embedded positioning information. The data can be processed, visualized and interpreted in the software package and exported in industry standard formats to third-party packages for further use.

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

EdgeTech provides additional side scan sonars to USACE

EdgeTech, the leader in high-resolution sonar imaging systems, recently announced the shipment of additional 4125 side scan sonars to the U.S. Army Corps of Engineers (USACE). The most recent shipment to the Wilmington District brings the total units shipped to USACE districts this year in the double digits. Other USACE districts purchasing 4125 side scan sonars from EdgeTech in the recent past include New England District, Norfolk District, New Orleans District, St. Louis District, and Kansas City District. Many of the districts have purchased multiple units.

The EdgeTech 4125 side scan sonar is a small, portable and versatile system. The 4125 utilizes EdgeTech's Full Spectrum® CHIRP technology, which provides high-resolution imagery for fast and accurate surveys. Two dual simultaneous frequency sets are available for the 4125 depending on the application. The 400/900 kHz set is the perfect tool for shallow water survey applications, providing an ideal combination of range and resolution. The 600/1600 kHz set is ideally suited for customers that require ultra-high resolution imagery in order to detect very small targets. The 4125 systems are often used for classifying targets, searching for lost buoys and mooring and reviewing any other potentially dangerous underwater obstructions in the waterways.

For more information, visit www.edgetech.com.



Mooring-free buoy

Ocean Scientific International Ltd (OSIL) have teamed up with UK-based company ASV Ltd to offer a low-cost, mobile alternative to a permanent moored buoy system for all monitoring applications, particularly targeted at oil, gas, dredging activities and environmental monitoring.



OSIL are experienced manufacturers of data buoy systems for all applications and locations, including dredge monitoring projects and environmental management schemes. ASV Ltd design, build and operate unmanned marine vehicle systems for commercial, government and military customers. Together they are offering a rugged, reliable and effective unmanned system using the latest sensors and GPS positioning.

The system utilizes one of the ASV C-Stat station keeping buoys that can be deployed for up to 4 days at a time, running either on hybrid diesel or full electric power and can be fully programmed to remain in position with a set watch circle, shadow a vessel (i.e., dredgers) or follow a set patrol route, allowing data to be gathered over a much wider area than could normally be achieved with a fixed point buoy.

OSIL's knowledge of instrumented and telemetered data buoy systems allows the buoy to be equipped with different instrument options, including a turbidity probe, an ADCP, or a multiparameter sonde, which could be configured for various sensors such as hydrocarbons, DO, pH and turbidity. Separate telemetry systems for data and vessel control mean that data can be viewed in real time via radio, GSM/GPRS or satellite without interrupting navigation or command signals.

The 2.4-m, 450-kg system is easy to set up and quick to deploy. Licenses are not required to deploy the buoy, and the lack of moorings combined with superior navigation control software means that the system is easy to re-position or remove from site completely with minimal environmental impact. An added benefit to the mooring-free system is a reduced potential for damage or theft of components.

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

Flexible control for winches and cranes

Working on the basis of years of industry experience in the control of hydraulic winches and cranes, Rexroth has developed a new control solution that is suitable for both simple and complex winch and crane drives. Designers can generate new systems quickly and flexibly with it.

The control system from Rexroth can easily be connected to the customer's system using predefined interfaces. Numerous hardware variants in the form of an extensive modular system allow the designer maximum flexibility and reduce costs and errors during commissioning by means of a simple "plug-and-play" interface.

Through the software, for example, the designer can access standardized modules for control functions. Integrated security features ensure compliance with the required safety level. The modular structure of the software makes using the control system very flexible, in both simple and complex applications. The designer can freely choose the degree of networking, also in terms of security features, according to the specific application requirements.

For example, for applications with a hydraulic power unit and a single winch drive Bosch Rexroth offers with this solution a cost-effective and extremely compact integrated control system based on its BODAS RC28-14/30 controller.

Originally developed for mobile applications, the controller is designed especially for use in harsh environments, as it can withstand large temperature changes as well as vibrations and shocks. The control solution is also very compact and can be installed saving space on deck for workboats or platforms.

Modifications, enhancements, and the interface to the customer's system can be tested and adjusted by the designer directly on a test stand provided by Rexroth. This saves an expensive commissioning and testing of the solution on board the ship.

Based on proven technology, field-tested components and validated software, Rexroth's control solution enables engineers to develop crane and winch systems with optional active heave compensation capabilities faster and cheaper.

For more information, visit www.boschrexroth-us.com.



New harsh environment fiber optic connectors from HUBER+SUHNER

Global connectivity solutions company HUBER+SUHNER has set a new benchmark for outdoor fiber optic connectivity with the launch of its new Q-ODC®-12 interface for industrial and FTTA applications. Designed to be the smallest and most robust products in their class, the new connectors also have the highest fiber density - based on the proven QN push-pull mating system. Q-ODC®-12 connectors are similar in size to the two-fiber Q-ODC® but can connect up to 12 fibers in a single mating step.

The Q-ODC®-12 connectors have achieved outstanding results in a series of rigorous industry tests to ensure their durability and performance under extreme outdoor conditions, proving them to be extremely water-proof, dust-proof and corrosion-resistant. In particular, the connectors survived 30 days' submersion in over 3 m of water and passed extended IP68 waterproof testing. They have been subjected to stringent vibration testing without suffering any performance loss.



The HUBER+SUHNER Q-ODC®-12 fiber optic connectors also achieved excellent performance in the IP6X dust ingress testing and in extended IPX8 tests for water immersion.

For more information, visit <http://extreme.hubersuhner.com>.

Eaton's new Pauluhn™ DLL series linear LED for oil platforms

Power management company Eaton now offers a new LED lighting solution specifically developed to combine reliability, flexibility, and energy efficiency for land-based and offshore drilling platforms. The new Pauluhn™ DLL Series Linear LED by Eaton's Crouse-Hinds Business features a rugged and durable design and flexible mounting options for high vibration, impact and hose down conditions found in drilling environments.

The new Pauluhn™ DLL Linear LED, with a system efficacy of up to

130 lumens per watt, is specifically designed to replace fluorescent T12, T8 and T5HO lighting in land-based drilling and offshore rigs. The fixture can also be easily retrofitted into the mounts of existing Pauluhn™ DuraPro and MagnaPro fixtures, as well as Rig-A-Lite or Snelson fluorescent fixtures.

The Pauluhn™ DLL Linear LED fixture features a low-profile design under 3-in., a copper-free aluminum housing with Corro-free™ epoxy powder coating, and a polycarbonate or glass lens. The fixture is designed for extreme durability and will perform reliably in ambient operating temperatures of -40°C to +65°C. The DLL LED is also able to withstand 2,000 psi of hose pressure and high vibration applications.

The Pauluhn™ DLL Linear LED is a Class I, Division 2 luminaire and meets several NEC, UL and CSA standards and certifications. The fixture comes with seven mounting options: ceiling, swivel, wall, flush, pole, back, and pendant.

For added convenience there are four points of secondary retention and through-feed wiring options available with this fixture. For added safety, the fixture is available with an optional emergency battery 90-min back-up and surge protection up to 10 kV.

For more information, visit www.crouse-hinds.com.

Oceanlab's Hadal Lander fitted with NETmc Marine DVR

Oceanlab's record-breaking video footage of fish at a depth of 8,145 m in the Marianas Trench was recorded using a NETmc Marine 73fifty DVR.

The 73fifty DVR is widely used in the offshore ROV and diving industry on a range of projects from drill support to pipeline inspections; it is also used by energy companies as part of their plant inspection programs. The technology in the 73fifty was chosen for the Hadal Lander due to its low power consumption, quality of recording, compact size and reliability. NETmc Marine also wrote the mission control software for the Hadal lander, programming sleep and on/off periods for filming thus preserving the precious battery life and extending the dive time of the Lander.

A spokesman for NETmc Marine stated, "This is the second video system we have developed for Oceanlab, the first, in 2008, was based on our DVR Inspector. That mission discovered new species of fish between 6,000 and 8,000 m, a depth record at that time." He added, "For the latest mission we used the 73fifty DVR, this allowed us to

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make a smaller DVR and thus save space in the Lander's pressure pod. We look forward to our continued cooperation with Oceanlab in taking DVRs to where no DVR has ever been before."

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

Mark 2 Tritex Multigauge 3000 underwater thickness gauge

The Mark 2 Tritex Multigauge 3000 Underwater Thickness Gauge, from UK-based Tritex NDT Ltd, uses multiple echo to completely ignore coatings up to 20 mm thick, only the metal thickness is measured. All measurements are error checked to ensure only accurate readings are displayed, even on uncoated metal. The gauge is simple to use, with little operator input, and has a large, bright 10-mm display that ensures it can be easily read by the diver, even in poor visibility.

The gauge uses multiple echo and single crystal probes in accordance with class society regulations. The excellent performance means that one probe type can be used for all applications, including extremely corroded metal, with no probe zeroing. The Multigauge 3000 is extremely rugged and built to withstand the harsh conditions of the underwater industry. It has an integral battery with 55 hours runtime on a single 2-hour fast charge. In addition, the gauge can be easily upgraded to a topside repeater by simply exchanging the end cap and all probes have protective membranes fitted to prevent damage from rough surfaces. The gauge is supplied completely ready to use in a Peli case with all the necessary spare parts. As with all Tritex NDT products it also comes with a 3-year warranty and free annual calibration for the life of the gauge.

For more information, visit www.tritexndt.com.

Torqeedo introduces cutting-edge Deep Blue Hybrid

With the announcement of Deep Blue Hybrid, Torqeedo grows its innovative, high-powered Deep Blue product line into a comprehensive hybrid solution. More than simply propulsion, this is the first fully integrated system that acts as an energy supply for both the hybrid drive and all AC/DC electrical loads on board. This groundbreaking solution can harness solar, wind, plug-in and regenerative power in the system's high-capacity batteries, keeping generator runtime to an absolute minimum.

Ample and always available electrical power presents many benefits. Large house loads, such as air conditioning and cooking, can be met by batteries alone, leaving owners to enjoy all the

comforts of home with no generator noise or exhaust to spoil the serenity. Work and service boats can run large tools, winches, and test equipment directly off the high-capacity batteries. Environmental research and monitoring vessels can access sensitive areas and take measurements in clean, quiet, and undisturbed water conditions.

The modular nature of the components means Deep Blue Hybrid can be configured to match the specific requirements of each application. It is available as inboard, outboard, or saildrive in the 40 to 160 hp power classes, and as a single or twins.

"Taking existing Deep Blue components and adding the utility of multiple charging sources was the next logical development for this powerful system," said Steve Trkla, president of Torqeedo, Inc.

"Deep Blue Hybrid offers all the benefits of pure electric propulsion, including an unprecedented level of luxury and utility on board, while allowing for extended motoring. It is proving to be a very compelling option for cruising sailboats between 40 and 80 ft, as well as professionally operated vessels."

"People are excited about the possibilities and we are certain it will have wide appeal," Trkla continued. "Because Deep Blue Hybrid provides such a complete solution that it benefits from project integration, our team is currently meeting with OEMs and repower specialists to plan the first round of installations."

For more information, visit www.torqeedo.com.

Okeanus announces acquisition of DT Marine winches

Okeanus Science and Technology, LLC (Okeanus) is pleased to announce the addition of three types of DT Marine winches to its fleet of oceanographic and marine scientific rental equipment. The winches can be outfitted with various types of cable and synthetic rope to perform nearly any job requiring the launch and recovery of subsea equipment and assets.

With three horsepower options available for rental (25, 50 or 125 hp), Okeanus' selection of winches feature line pull capacities ranging from 4,000 to 20,000 lbs. The 25 and 50 hp winches, typically included in rental packages with smaller equipment, can be spooled with 2,000 and 6,000 m of 0.5-in. line respectively, while the 125 hp model can be spooled with 6,000 m of .680-in. line for dependable towing and launch of large pieces of equipment.

Each model is highly reliable and simple to operate and can be outfitted

with a variety of coaxial cable, wire rope or synthetic rope to tow survey equipment or perform sampling operations. Winches are available for rental individually or as part of one of Okeanus' customized launch and recovery packages, which includes an accompanying A-frame, hydraulic power unit, hydraulic hose and valve kit, and appropriately sized block to match the cable type in use. A launch and recovery equipment rental package can be tailored to suit nearly any project's specifications.

For more information, visit www.okeanus.com.

New Industries announces delivery of offshore laboratories

New Industries, Inc. has announced the delivery of two laboratories and two operational modules to CSA Ocean Sciences Inc. (CSA). The mobile laboratories, outfitted with oil spill water monitoring equipment, instrumentation, and supplies, are designed to minimize response time for marine environmental operations and enable rapid mobilization of required equipment to an oil spill incident.

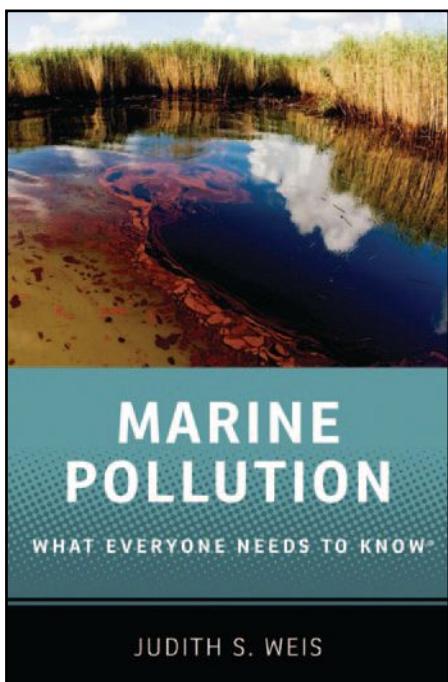
New Industries is an industry frontrunner in the development and manufacture of state-of-the-art service modules that provide laboratory, storage, and operational space for offshore use. The modules are certified structurally to Det Norske Veritas (DNV) 2.7-1 standards, the most stringent in the world, as well as American Bureau of Shipping (ABS) container safety standards, ensuring the highest quality in offshore safety and handling.

In addition to meeting DNV and ABS container safety standards, the modules are A60 fire rated and have been outfitted with a fire and general alarm system that complies with the latest U.S. Coast Guard standards. Due to the potential hazards posed by a laboratory environment, New Industries supplemented customary module construction with the inclusion of loss of oxygen sensors and the assurance of proper air changes for personnel in order to maximize safety.

For more information, visit www.newindustries.com.



MEDIA SHOWCASE



Marine Pollution What Everyone Needs to Know

by Judith S. Weis

Marine pollution occurs today in varied forms—chemical, industrial, and agricultural—and the sources of pollution are endless. In recent history, we've seen oil spills, untreated sewage, eutrophication, invasive species, heavy metals, acidification, radioactive substances, marine litter, and overfishing, among other significant problems. Though marine pollution has long been a topic of concern, it has very recently exploded in environmental, economic, and political debate circles; scientists and non-scientists alike continue to be shocked and dismayed at the sheer diversity of water pollutants and the many ways they can come to harm our environment and our bodies.

In *Marine Pollution: What Everyone Needs to Know*, Judith Weis covers marine pollution from numerous angles, each fascinating in its own right. Beginning with its sources and history, she discusses common pollutants, why they are harmful, why they cause controversy, and how we can prevent them from destroying our aquatic ecosystems. Questions ask what actually happened with the Exxon Valdez, and why harmful algal blooms are a serious concern. Covering pollutants that are only now surfacing as major threats, such as pharmaceuticals, personal care products, and metal nanoparticles, she explains how these can begin in the water and progress up the food chain to emerge in human bodies. Looking at the effects of climate change and acidification on marine pollution levels, we learn how we can begin to reduce pollution at the local and global levels.

Oxford University Press; ISBN: 978-0199996681
Paperback, 296 pages, November 2014

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Alexander B. Cummings Jr. was elected to Chevron's board of directors, and he will serve on the company's audit committee. Cummings, 58, is executive vice president and chief administrative officer of The Coca-Cola Company, where he oversees a variety of functions including legal, human resources, community engagement, strategic planning, information technology, sustainability, security and aviation, research and development, product integrity, innovation, and procurement. He joined Coca-Cola in 1997 as region manager in Nigeria. In 2000, he was named president of the company's North & West Africa Division, and, in March 2001, he became president and chief operating officer of the Africa Group. Prior to joining Coca-Cola, he held several positions for The Pillsbury Co. He currently serves on the board of directors of Coca-Cola Bottling Co. Consolidated; S.C. Johnson & Son, Inc.; the African Leadership Foundation; CARE USA; and Clark Atlanta University.

Rowan Companies plc appointed **Stephen M. Butz** as executive vice president, chief financial officer and treasurer of the company. Butz joins the company from Hercules Offshore, Inc., where for

the past 9 years he has served in various corporate development, treasury and finance functions, most recently as executive vice president and chief financial officer. He also has more than 10 years of experience in commercial and investment banking. "I believe his keen industry knowledge and vast experience will be instrumental as we complete our drillship newbuild program and consider our future capital allocation options," said Tom Burke, Rowan's president and chief executive officer. Butz has taken over from **Kevin Bartol**, whose resignation was previously announced.

GE named three new company officers. **James Mock**, 37, was appointed vice president, finance for GE Oil & Gas. Mock joined GE in 1999 and has held a series of leadership roles in finance for GE Corporate Finance, GE Capital and GE Aviation. Most recently, he served as senior executive, finance for GE Oil & Gas. **Raj Thakkar**, 45, was appointed vice president, supply chain and sourcing for GE Energy Management. Thakkar joined GE in 1994 and has held a series



Butz

of leadership roles in engineering, Six Sigma, manufacturing, sourcing and supplier quality for GE Consumer & Industrial, GE Energy Services and GE Energy Management. Most recently, he served as senior executive, sourcing and supplier quality for GE Energy Management. **Michael Gosk**, 44, was appointed vice president, global tax director for GE Capital. Gosk joined GE in 2008 and has held a series of leadership roles in tax for GE Capital. Most recently, he served as GE Capital tax director.

Abdulaziz F. Al Khayyal was named to Halliburton's board of directors. The appointment was effective 4 December 2014, and Al Khayyal will stand for election by stockholders at the annual meeting in May 2015. Al Khayyal spent more than 30 years at Saudi Aramco before retiring from the company as senior vice president, industrial relations in April 2014. Al Khayyal held a variety of managerial positions in oil and gas operations and maintenance while at Saudi Aramco, including senior vice president, international operations, and senior vice president, refining, marketing and International. In 2004, Al Khayyal was appointed to the board of directors of Saudi Aramco.



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2H Offshore, an Acteon company, has appointed **Madhu Hariharan** as an additional director in its London office. Hariharan's considerable riser engineering experience further strengthens the senior management team in the UK and will help develop 2H Offshore's growing client base in Europe and the Middle East. Hariharan holds a master's degree in ocean engineering from Texas A&M University and has worked for 2H Offshore in its Houston office since 2000. He has extensive understanding of deep-water steel catenary and lazy wave risers, drilling, completion and intervention risers and in-depth knowledge of integrity engineering and design, fabrication and installation verification.

Bollinger Shipyards announced that **Ben Bordelon** will assume the duties of chairman, president and chief executive officer of the company. Ben Bordelon, along with the Chouest has acquired all assets and stock of Bollinger Shipyards, Inc. Bordelon has served in many capacities during his career at Bollinger, and has been a member of the Board of Directors since 2002. He has served as executive vice president of repair and most recently as chief operating officer of Bollinger Shipyards.

EdgeTech, the leader in high resolution sonar imaging systems and underwater technology, recently announced that **Tom Hiller** has joined its team as director of international business development. Hiller is a technically experienced sales and business development professional with over 16 years in the marine sector. Working out of the UK, he will help continue to strengthen the growing Multi Phase Echo Sounder (MPES) vessel-mounted, AUV, ROV and ASV-based sonar products in addition to business development activities with other core EdgeTech sonar products. His reach will extend beyond the UK and is expected to help the company with recent growth in Europe, Russia, Middle East, Africa, China, India and beyond.

Nautronix is pleased to announce the strengthening of its management team with the promotion of **Cara Lewis** to marketing manager. Lewis, who has been with the company for 2 years as senior marketing coordinator, will be responsible for managing Nautronix's branding and marketing strategy. Prior to joining Nautronix, Lewis gained her experience within the oil and gas industry in a marketing role at DOF Subsea.



Bordelon

Oceaneering International, Inc. announced the promotion of **Alan R. Curtis** to senior vice president, operations support. In this new role, Mr. Curtis will be responsible for human resources, information technology, supply chain management, internal audit, and facilities. Mr. Curtis joined Oceaneering in 1995 as a financial controller and most recently served as vice president and controller of subsea products. He is a graduate of Texas A&I University with a Bachelor's degree in Accounting and is a Certified Public Accountant in the State of Texas.

Phoenix International Holdings, Inc. is pleased to announce the hiring of **Patrick Keenan** as manager of special projects. His responsibilities include overseeing Phoenix's One Ocean Network alliance with partner underwater service providers and UMC. Prior to joining Phoenix, Mr. Keenan served as global director of operations for Titan Salvage. In this role he spent several months in Giglio, Italy during Titan's successful refloat of M/V Costa Concordia.

Imtech Marine has appointed **Fergus Campbell** as the new director of Imtech Marine USA. Campbell has worked for the Imtech Martine company previously (Radio Holland USA) from 2000 to 2010 as respectively branch manager Florida, national service manager and national sales manager. Before Radio Holland, he worked, among others, at Consilium Marine as sales and service manager and at Caledonian MacBrayne as superintendent.

The **MacArtney Underwater Technology Group** is pleased to announce the inauguration of its fifth dedicated business unit in North America. Located in Jupiter, Florida, just north of West Palm Beach, the new MacArtney 'Southeast Operations' will cover a six-state area including Tennessee, North Carolina, South Carolina, Alabama, Georgia and Florida. Headed by general manager, **Lou Dennis**, the new operations will supply cutting edge underwater technology products and solutions to clients and operators within the region. Before joining MacArtney, Dennis entered the industry as a commercial diver with Taylor Diving & Salvage after graduating from Florida Institute of Technology. He then joined Subsea International's engineering group in the U.S. as a project and production coordinator focused on deepwater ROV and intervention tooling system design. He later joined ROV manufac-



Dennis

turer Perry Slingsby Systems in 2000, where he held the positions of project manager and VP of programs for 11 years prior to joining Lockheed Martin as a business development manager in undersea systems.

DeepOcean has organized in two main regions, the Greater North Sea ("GNS") region and the International region. Ottar Mæland will head up the GNS region as Group EVP GNS. Group support functions such as IT, procurement, asset management, ship management and engineering will reside in the GNS organization. Mads Bårdesen will lead activities in the rest of the world including operating regions (Asia Middle East, Brazil, Africa and Gulf of Mexico) as the Group EVP International. Mads and Ottar will report to Bart Heijermans, DeepOcean's CEO.

Champlain Group (CG) completed the acquisition of The Kane Kompany, Inc. The company, owned and operated by Gary and Valerie Kane, provides expertise in diving, marine construction, decommissioning and subsea intervention. Gary Kane has over 40 years experience in the offshore subsea industry. The goal of CG in acquiring The Kane Kompany, Inc. is to be the preferred partner when providing diving and offshore oil and marine construction consultants. Further, CG is officially changing its company name to **GATE Premier Solutions (GPS)**.

Emergency response specialists **Wild Well Control**, a superior energy services company, announced that Prospect Flow Solutions has joined Wild Well to serve as its new Advanced Engineering group. Prospect is a proven industry provider of state-of-the-art engineering solutions and complements Wild Well's comprehensive well control services.

Following a successful move into a 30,000 sq. ft facility, **PREVCO Subsea, LLC**, a subsea engineering consultancy, specializing in submersible pressure vessels, instrumentation housings, junction boxes, pressure relief valves and other subsea enclosures and accessories, is increasing their pressure testing capabilities with the installation of a large 15,000 psi hydrostatic test chamber. The vessel should be operational by the end of February 2015 and joins two other test tanks, increasing the in-house pressure testing capability and services offered to outside companies needing pressure testing.

Acteon has announced the start-up of **Clarus Subsea Integrity Inc.**, a new group company created from 2H Offshore's subsea integrity business segment. Based in Houston, USA, the new company plans to expand globally.

CALENDAR & EVENTS

February 10-11, 2015 Deepwater Decommissioning Workshop Houston, TX decommissioninggom.offsnetsevents.com	March 3-5, 2015 Subsea Tiback New Orleans, LA www.subseatiebackforum.com	May 31 - June 5, 2015 OMAE St. John's, Newfoundland www.asmeconferences.org/omae2015
February 10-12, 2015 Underwater Intervention New Orleans, LA www.underwaterintervention.com	March 15-19, 2015 NACE Corrosion Dallas, TX www.nace.org	June 2-4, 2015 Energy Ocean Portland, ME www.energyocean.com
February 11-13, 2015 Subsea Expo 2015 Aberdeen, UK www.subseaexpo.com	March 16-19, 2015 U.S. Hydro National Harbor, MD www.hypack.com/ushydro/2015	June 3-5, 2015 UDT Rotterdam, Netherlands www.udt-global.com
February 16-19, 2015 GOM Oil Spill & Ecosystem Science Houston, TX www.gulfofmexicoconference.org	March 17-19, 2015 DECOM Summit Houston, TX www.decomworld.com	June 16-18, 2015 Seawork International Southampton, UK www.seawork.com
February 22-27, 2015 ASLO Ocean Sciences Meeting Grenada, Spain www.aslo.org/meetings	April 14-16, 2015 Ocean Business Southampton, UK www.oceanbusiness.com	June 16-18, 2015 Clean Pacific Vancouver, BC www.cleanpacific.org
March 2-6, 2015 IEE/OES CWTM Workshop St. Petersburg, FL www.cwtmc2015.org	May 4-7, 2015 AUVSI Atlanta, GA www.auvsishow.org	September 8-11, 2015 Offshore Europe O&G Aberdeen, UK www.offshore-europe.co.uk

February 2015

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Ocean News & Technology

MECHANICAL OCEAN ENGINEER

PREVCO Subsea, LLC is a subsea engineering consultancy, specializing in submersible pressure vessels, instrumentation housings, junction boxes, underwater camera housings, underwater housings, subsea housings pressure relief valves and other subsea enclosures and accessories. We are seeking a talented individual with the following minimum requirements:

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JANUARY

Editorial: Forecast: 2015 and Beyond; Underwater Navigation; Manned Submersibles
Distribution: Euromaritime; Naval Future Forces; Deepwater Decommissioning Workshop; GOM Oil Spill & Ecosystem
Product & Services Focus: Multibeam & Side Scan Sonars; Research & Development Services

FEBRUARY

Editorial: Subsea Fiber Optic Networks; Decom & Abandonment
Distribution: IEEE/Current, Waves, Turbulence Measurement Wkshp; NACE Corrosion; Decommissioning and Abandonment Summit; U.S. Hydro Product & Services Focus: Connectors, Cables & Umbilicals; Diver Detection Systems

MARCH

Editorial: Oceanology & Meteorology; Maritime Security
Distribution: Ocean Business; Offshore Well Intervention Conf. North Sea; Well Integrity and Lifecycle Digitalization Conference
Product & Services Focus: Buoys & Monitoring Instrumentation; Environmental Monitoring/Testing Services

APRIL

Editorial: Offshore Technology; Ocean Mapping & Survey
Distribution: OTC; AUVSI; Oceans '15 MTS/IEEE Genova, Italy
Product & Services Focus: Subsea Tools & Manipulators; Offshore Risk Assessment; Training/Safety

MAY

Editorial: UW Imaging & Processing; Marine Salvage/UW Archeology
Distribution: OMAE – Ocean/Offsh/Arctic Eng; Energy Ocean; Seawork Intl; UDT
Product & Services Focus: Magnetometers; Water Dredges & Airlifts; Diving Services

JUNE

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

JULY

Editorial: Ocean Engineering; Marine Construction; Special Focus Section: Products & Services Case Studies
Distribution: TBA
Product & Services Focus: Navigation, Mapping & Signal Processing; Data Processing Services

AUGUST

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

SEPTEMBER

Editorial: Ocean Observing Systems; Subsea Telecom; Offshore Wind Installation & Maintenance
Distribution: SPE ATCE; AWEA Offshore Windpower; Oceans '15 MTS/IEEE Washington DC; Offshore Well Intervention Conf., GOM
Product & Services Focus: Water Sampling Equipment; Cable Installation Services

OCTOBER

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

NOVEMBER

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

DECEMBER

Editorial: Light Workclass ROVs; Commercial Diving; Year in Review
Distribution: TBA
Product & Services Focus: Diving Equipment & Services; Buoyancy Materials; Construction & Repair Services

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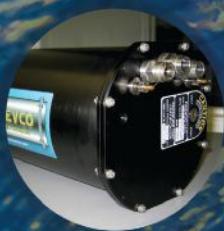
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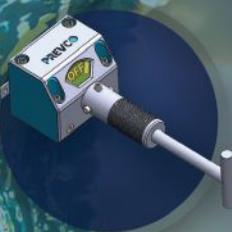
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