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February 2014

A New Biofouling Control Technology for Instrumentation

Feature Story - Page 10





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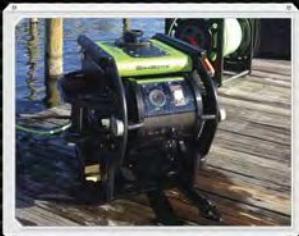
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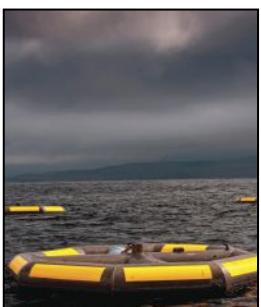
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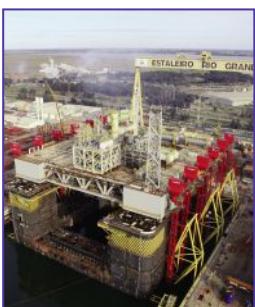
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in this issue

Ocean Industry



Offshore Industry



Feature Story

10 A New Kind of Antifoulant

- | | |
|----------------------------|--------------------------------|
| 15 Ocean Industry Briefs | 41 Offshore Industry Headlines |
| 18 Maritime Transportation | 46 Upstream Oil & Gas |
| 22 Ocean Science | 60 Underwater Intervention |
| 26 Ocean Energy | 64 Maritime Communications |
| 34 Defense | 68 Subsea Cables |

February 2014

6

Departments

- | | |
|----------------------|-----------------------------|
| 8 Editorial | 75 Offshore At-A-Glance |
| 76 Stock Watch | 78 Product News |
| 84 Media Showcase | 86 People & Company News |
| 88 Calendar & Events | 91 Ocean Industry Directory |

Ocean News & Technology

Cover Photo



Sampling of deep sea sediments using a box-corer in the Mediterranean

Editorial Focus

- | | |
|---|---|
| 32 DANTE System Makes Real-Time Monitoring Simple and Affordable | 38 New Research Provides State of Nation Report on Decommissioning Sector |
| 59 DEEP OCEAN ENGINEERING, INC.: Providing Integrated ROV Solutions for Over 32 Years | |

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More News, More Technology, More Data

in the next issue

Editorial Focus

- Subsea Fiber Optic Networks
- Maritime Security

Product Focus

- Connectors, Cables, and Umbilicals
- Diver Detection Systems



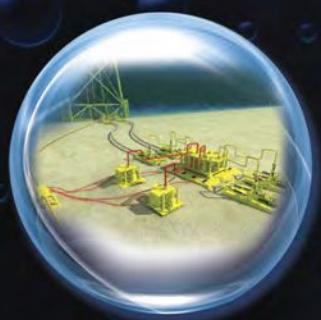
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EDITORIAL

By John Manock



Broadband's "Last Frontier"

As a Boston Red Sox fan, 2013 is a tough year for me to let go of, but I must move forward into 2014 and hope for a repeat. As we welcome in the New Year, I thought I would indulge in a little forecasting on what 2014 might bring. I will refrain from any further discussion of baseball, although if the Sox do repeat there will be no doubt about what the focus of next January's editorial will be.

I decided to devote this editorial to the maritime communications market. This relatively small market sometimes gets overlooked, but it is a fascinating example of the march of technology and the influence of the Internet in our lives.

We have become accustomed to the concept that the Internet is pervasive in our lives onshore, but what about on the ocean? It is here that I am going to use the old cliché of the ocean being the "Last Frontier." Now that the Internet is entrenched in all of the continents, with more and more remote locations are being connected every year, the ocean is truly the "Last Frontier" for broadband Internet. This could be an area of significant development in 2014.

The trend in maritime communications over the past two years has been of increasing bandwidth. This, of course, mirrors what is happening in every other aspect of telecommunications. Whether you are talking about transcontinental cables, national backbones, metro networks or local access, it is all about the demand for faster services and higher capacities.

A quick example from the submarine fiber optic cable industry demonstrates the pace of technological development in the Internet Age. Submarine cable transmission technologies were, for about a decade, limited to the Megabit per second range until superseded by 2.5 Gigabit per second (Gbps) technology. It took more than five years to move from 2.5 Gbps to 10 Gbps. The next move, to 40 Gbps, was highly anticipated, but in reality the technology leaped ahead to 100 Gbps almost overnight. While 100 Gbps has only taken hold in the last two years, 400 Gbps and 1 Terabit per second technologies are developing rapidly, with the former already being deployed in trial networks in North America and Europe.

This rapid pace is driven by the insatiable demand for high-speed Internet access. In seemingly the blink of an eye,

the Internet has changed from an email and business productivity tool to the primary entertainment medium for a couple of billion people worldwide. When these people go out onto the ocean, they want and sometimes demand that their Internet go with them.

In response, many satellite companies are looking to deliver higher and higher speed Internet to ships at sea. One example of this is broadband for cruise ships. This is a market that is developing almost identically to what we have all seen in hotels in the earlier stages of the growth of the Internet. It has moved from a very rudimentary service to a far more sophisticated one that hotels (and now cruise lines) are marketing to try to differentiate themselves from the competition by offering higher speeds and more reliable service.

Perhaps the biggest driver pushing broadband at sea is not for those spending a couple of weeks on a cruise ship, but for those who spend their lives at sea – merchant sailors. Crew welfare has become a huge issue for shipping companies and the broadband at sea has become almost synonymous with it. Broadband Internet access provides entertainment and improves the quality of life for sailors like nothing we have seen before and shipping companies are responding by improving their Internet access at sea and using it as an incentive to hire and retain sailors.

The importance of Internet access for crew welfare was highlighted by the recent disaster in the Philippines caused by Typhoon Haiyan. A huge percentage of merchant sailors worldwide are Filipino. In the immediate aftermath of the typhoon, the Internet was the only way for many to get information about their families back home.

2014 should bring continued development of high-speed Internet access by satellite to ships at sea. It is likely to be a slowly developing process, however, rather than a great leap forward. Speeds have gradually been pushed from the kilobit per second range to a few megabits. Bigger things lay ahead, however. Some companies are talking about speeds per ship in the hundreds of megabits. While it remains to be seen how quickly this happens, it is the inevitable trend as the Internet becomes as essential to people on the ocean as it is for those on land.

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A NEW KIND OF ANTIFOULANT

By: Chris Bueley, AML Oceanographic

AML Oceanographic has developed a novel UV-based antifouling technology for use on virtually any submerged surface. The performance of the system in reducing fouling-induced measurement error on in-situ conductivity cells is comparable to the leading chemical-based system, as demonstrated in a described trial.

Introduction

Many systems used to monitor the world's oceans consist of long-term, in-situ deployments of sensors. It is widely understood that the primary factor limiting the duration of these deployments is biofouling [1], defined as the unwanted and oftentimes rapid accumulation of marine growth on submerged equipment [2]. Unchecked, this marine growth will overwhelm cameras, block lights, confound sensors, and inundate structures. In light of these limitations, significant effort has been exerted over the years towards developing mitigation strategies, with mixed results.

Existing commercially available antifouling techniques may be categorized into two groups: (1) mechanical methods that consist of wipers or scrapers, and (2) chemical dosing techniques. Limitations of mechanical antifouling methods include poor reliability and an inability to protect complex geometries; conductivity cells, for example, are difficult to brush effectively. Alternatively, chemical dosing techniques are subject to a range of environmental concerns.

In previous years, there have been promising investigations into the use of Ultra-Violet radiation (UV) as an antifoulant [1], [3], [4]. This method is attractive as it is non-contact, non-toxic, mechanically simple, and suitable for protection of complex geometries. AML Oceanographic has developed the industry's first commercially available UV-based antifouling system, which may be used to protect virtually any submerged surface. This article presents the mechanical embodiment of the technology, hereafter referred to as UV•Xchange, and describes a trial that demonstrates that its ability to reduce fouling-induced measurement error is comparable to leading chemical-based techniques.

System Description

UV as an Antifoulant

Biofouling generally occurs in five stages [4], with the first three stages characterized by the progression of organic biofilms, and the remaining two stages described by the growth of higher order organisms. UV primarily functions as an antifoulant by disrupting development of the first three stages.

The driving mechanism of early stage growth is the cellular replication of colonizing cells – a process susceptible to interruption by UV. Much of the radiation present in the UV-C band (200 to 280 nm) is absorbed by DNA nucleotides, which damages them and

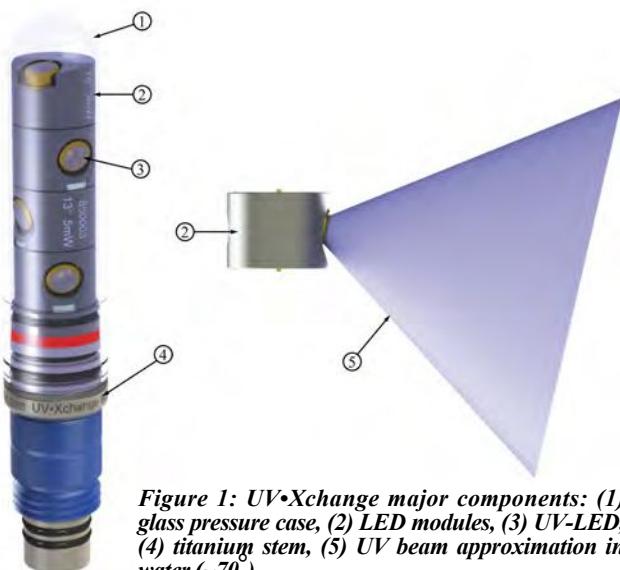


Figure 1: UV•Xchange major components: (1) glass pressure case, (2) LED modules, (3) UV-LED, (4) titanium stem, (5) UV beam approximation in water (~70°)

arrests cellular division. This prevents the replication of early-stage adsorbing cells such as biofilms and other colonizers, precluding progression to late-stage higher order communities and ultimately resulting in the complete arrest of biofouling development.

Mechanical Embodiment

UV•Xchange is designed to provide antifouling protection to any submerged equipment. It is composed of a series of stackable LED modules housed within a glass pressure case, as shown in Figure 1.

The LED modules (2) emit UV radiation through the wall of the glass pressure case (1) in broad 70° cones (5) to irradiate target surfaces. Each module may be independently rotated to provide coverage in multiple directions. The stem (4) is compatible with AML Oceanographic X-Series instruments. Operation of the system is controlled through a configurable duty cycle which allows users to tailor the level of protection to the aggressiveness of a particular fouling environment.



Figure 2: (Left) UV•Xchange configured to provide protection to a conductivity sensor, a turbidity sensor and a pressure sensor. The protective cage that normally surrounds these sensors is omitted for clarity. **(Right)** UV•Xchange systems mounted on Micro•X instruments. In this configuration, UV•Xchange may be used to provide bio-fouling protection to any equipment



To provide protection to AML sensors, UV•Xchange mounts on an endcap with the LED modules appropriately aimed, as shown in Figure 2. Alternatively, mounting UV•Xchange on a Micro•X allows the system to be fixed to any equipment, enabling the protection of any lights, cameras, sensors, etc.

UV•Xchange In-Situ Trials

HURL Demonstration

AML Oceanographic has conducted a number of in-situ trials to establish the performance of UV•Xchange. One such trial has been conducted at the Hawaiian Undersea Research Laboratory (HURL), located near Honolulu, Hawaii – a location known for its aggressive fouling. The 2- month trial consisted of four Metrec•X instruments outfitted with conductivity sensors. Two of the instruments were protected with UV•Xchange systems (referred to as UV1 and UV3), with two left unprotected as controls. Reference conductivity readings were provided by a Sea-Bird CTD (Sea-Bird Electronics, SBE-19 PlusV2) with a chemical-based antifouling system.

After 2 months, the housings of all instruments were heavily fouled, as shown in Figure 3. The primary control conductivity sensor (Figure 3, left) was inundated with growth while the sensing elements of two UV-protected instruments (center and right) remained clear.

Of note is the protection provided to the instrument rack from incidental UV radiation, identified as (3) in Figure 3. This demonstrates the broad area of influence of a UV•Xchange module (refer to item 5 in Figure 1). For reference, the distance from the LED module to the clean area is approximately 12 cm in the middle image.

A plot of measurements from each instrument is included in Figure 4. As shown in the figure, the unprotected control instrument (dashed line) exhibits clear deviation from the three protected instruments (Reference, UV1, UV3) in less than one week. In contrast, measurement plots from the protected instruments overlap for the entire duration of the deployment and no systematic drift is evident.

Performance of UV•Xchange may be quantified through comparison of Mean Average Error (MAE), defined as the mean of differences between two data series. The MAE error budget is the maximum error attributable to sensor accuracy limitations and is calculated by summing accuracy specifications of the compared sensors. For example, the MAE for the control sensor versus the reference sensor is 1.395 mS/cm, as shown in Figure 5. This significantly exceeds the error budget of 0.013 mS/cm (based on published accuracies of 0.003 mS/cm and 0.010 mS/cm for the Sea-Bird and AML sensors, respectively) and indicates clear measurement error in the control (unprotected) sensor due to fouling. In contrast, the MAE for UV3 against the reference sensor and UV1 is calculated to be 0.042 and 0.030 mS/cm, respectively – a clear improvement over the control instrument. Measurement disagreement is attributed to sediment buildup on the horizontal conductivity tubes of UV3 (refer Figure 3). Alternatively, the MAE for instrument UV1 against the reference sensor is 0.011 mS/cm. This is less than the error budget and indicates that UV•Xchange's ability to limit fouling-induced measurement error is comparable to chemical-based methods. In summary, the HURL trial has quantifiably validated the ability of UV•Xchange to retard biofouling on in-situ sensors and structures.

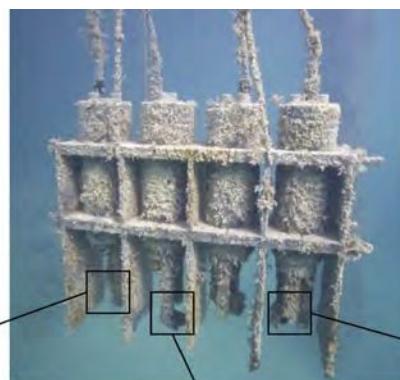
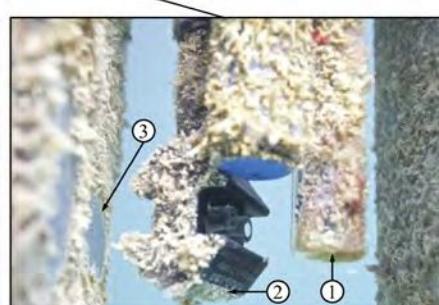
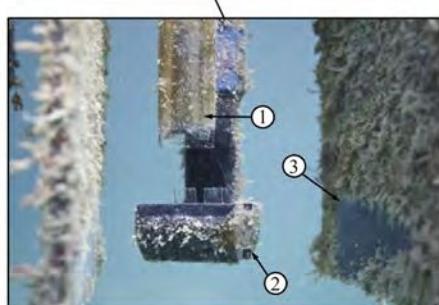
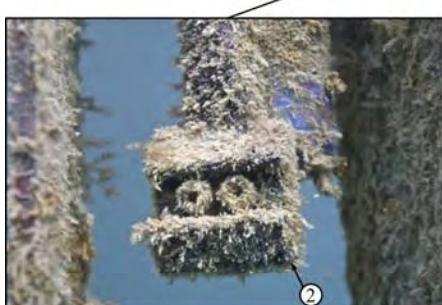


Figure 3: AML instruments after 2 month deployment at HURL. (1) UV•Xchange, (2) conductivity sensors, (3) incidental clean patches on rack. From left to right: primary control sensor, UV1, UV3



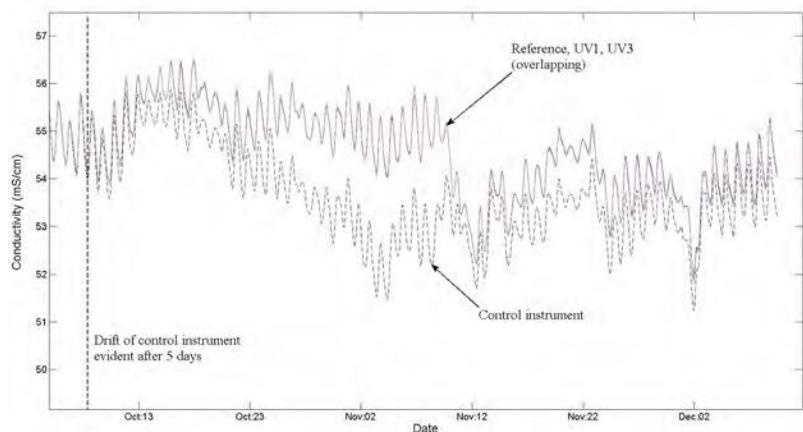


Figure 4: Conductivity measurements from HURL test instruments. Control (unprotected) instrument shown as dashed line, UV1, UV3 and Reference in blue, green and purple (overlapping), respectively. Control instrument demonstrates drift in under a week

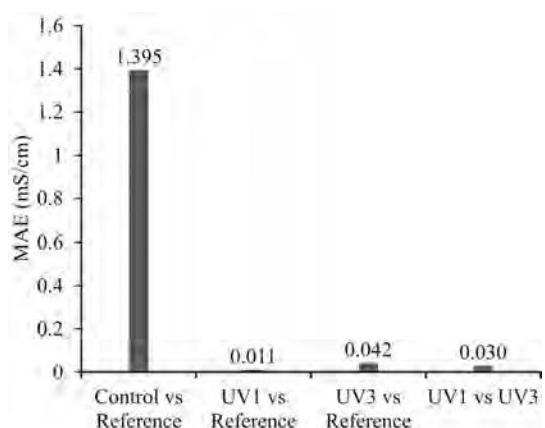


Figure 5: Mean Average Error (MAE) of sensor measurements. A lower MAE indicates less measurement error

Ocean Networks Canada Demonstration

In addition to the trial conducted at HURL (and others not mentioned), AML Oceanographic has partnered with Ocean Networks Canada (ONC) to conduct a technology demonstration of UV•Xchange in a long-term in-situ deployment. In October of 2013, AML Oceanographic deployed three instruments to the Folger Pinnacle observatory off the coast of Bamfield, British Columbia. Two instruments are protected by UV•Xchange systems and one is an unprotected control. The trial is currently ongoing and is scheduled to operate for a year, with high-definition video feedback of the instruments and real-time measurements available to the public (refer to www.AMLOceanographic.com).

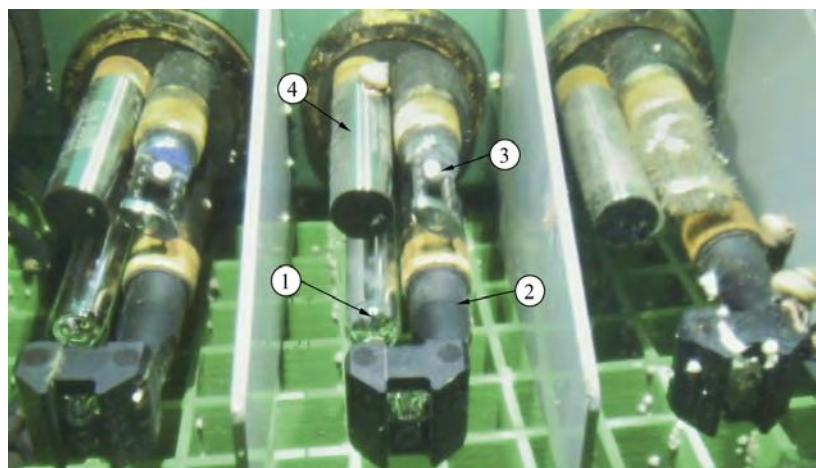


Figure 6: AML Oceanographic instruments deployed on ONC's Folger Pinnacle platform, approximately 2 months after deployment. Left and center instrument protected by UV•Xchange system, right instrument is unprotected control. (1) UV•Xchange system, (2) C•Xchange sensor, (3) SV•Xchange sensor, (4) Tu•Xchange sensor. Extensive barnacle and algae growth is apparent on the unprotected conductivity and sound velocity sensors, respectively

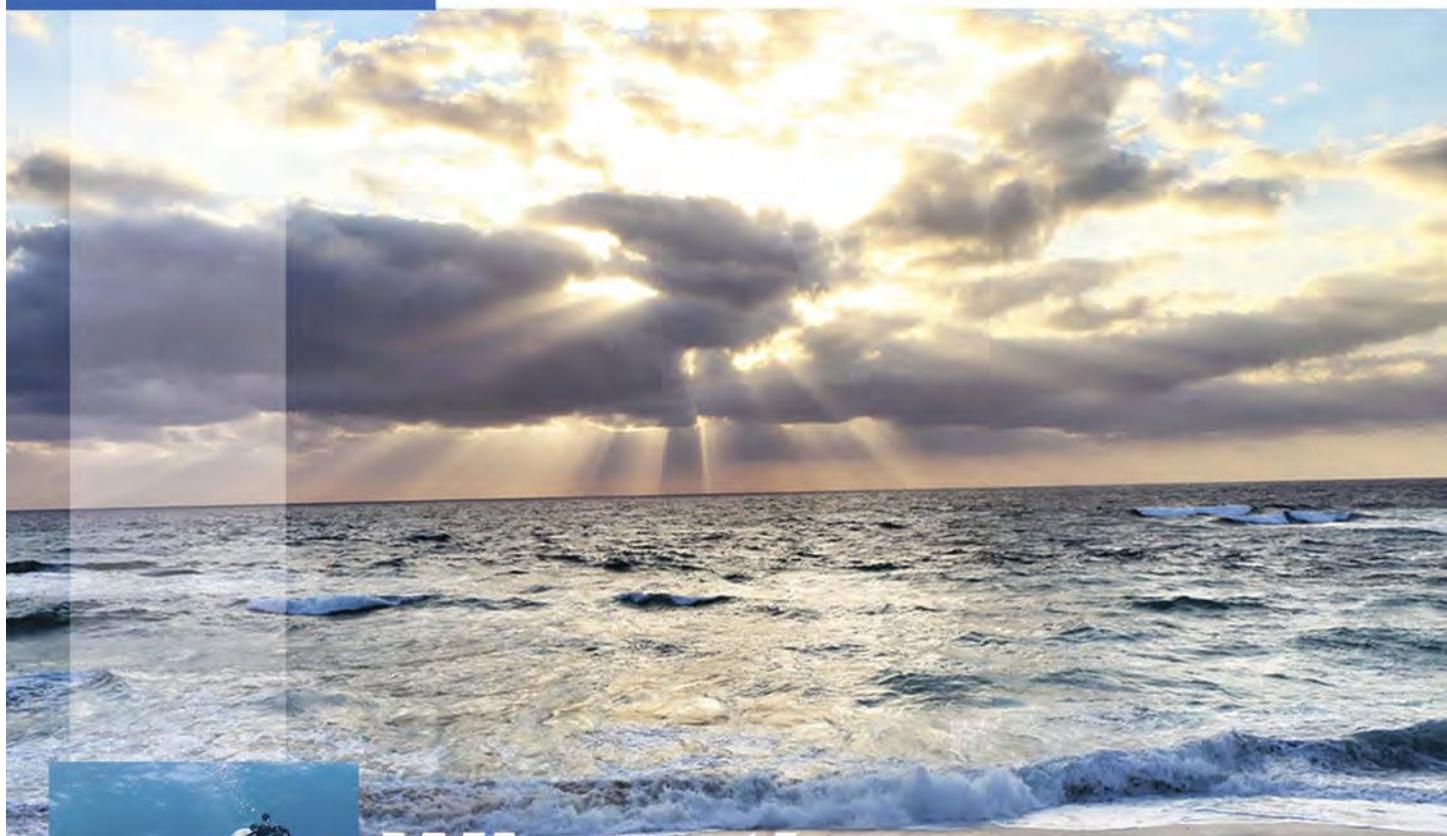
inherent advantages of this system over existing commercially available technologies, UV•Xchange may allow for deployments and durations not previously possible. Further information about this system is available at www.AMLOceanographic.com.

Remarks

The author of this article extends thanks to Ocean Networks Canada and the Hawaiian Undersea Research Laboratory for their support in testing this technology.

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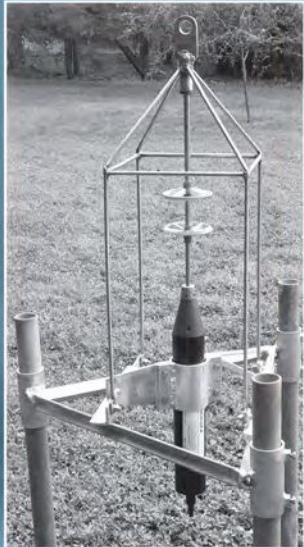
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OCEAN INDUSTRY

Historic steam powered tugboat raised from Alameda Slough



Built in 1945, the 141-ft steam powered tugboat was utilized by the Atchison, Topeka, and Santa Fe Railroads. Originally named the Edward J Engel, it moved railroad car barges from Oakland to San Francisco until 1969. After which she passed through several hands and eventually her name was changed to TV Respect. She remained a steam powered vessel until 2007, when she sank at her moorings in the Oakland Estuary.

In 2013, the U.S. Environmental Protection Agency embarked on a program to clean up the Oakland Estuary. Global Diving & Salvage, Inc. performed a dive survey to assess the situation and took sediment samples throughout the sunken vessel site. Tests determined that the sediment contained a high level of bunker oils both surrounding and inside the vessel.

By October, the U.S. Coast Guard was involved due to the presence of the bunker oil, working with the various agencies to remove the contamination from the Estuary.

The vessel had become fully silted in, with all the interior spaces filled with contaminated buildup. An in-depth plan was developed to capture and treat the deposit. Divers operated suction dredges to remove the accumulated silt and contaminants. A tank farm was built along the shore to decant the spoils collected and treat the water before discharge. Flocculent was added to the water to accelerate the settling of the silt, which was then trucked away for proper disposal.

Complicating the salvage operation was the orientation of the vessel, listed hard over at 110 degrees starboard, and fully submerged at low tide. Heavy lift rigging and equipment, staged in Global's California regional office in Vallejo was brought to the site and used to dead lift the 705-ton vessel to the surface, where the vessel was patched and pumped out. The vessel was refloated and delivered to CalRecycle who will take custody of the vessel.

For more information, visit www.gdiving.com.

in this section

Ocean Industry Briefs	15
Maritime Transportation	18
Ocean Science	22
Ocean Energy	26
Defense	34

EurOceanique becomes MacArtney France

The MacArtney Group is pleased to unveil that long standing MacArtney Group member, EurOceanique, will carry out a name change to become MacArtney France. Founded in 1994 and operating out of modern office and workshop facilities in Rousset, MacArtney France employs a strong and experienced team of engineers, sales professionals and technicians supporting the entire range of MacArtney systems and products. Under the locally established name EurOceanique, the company has operated as a MacArtney Group subsidiary for the last 8 years. With the name change, MacArtney France looks to emphasize its ties to the MacArtney Group and make explicit that French and Southern European underwater technology customer and operators benefit from as well dedicated local service as global MacArtney Group support.

N-Sea acquires the subsea business of Stork Technical Services

The acquisition of the subsea business of Stork Technical Services in Aberdeen is a logical next step in the realization of the growth strategy pursued by both companies and re-affirms the commitment of N-Sea to its strategy of becoming a leading Survey and IMR company. The combined businesses will have a strong position in North Europe delivering IMR and Survey solutions to operators with subsea infrastructures in the oil & gas as well as renewable industries. Post acquisition the enterprise will employ more than 120 onshore staff, and on average 150 offshore staff, have 10 diving systems, 9 ROVs, 3 offshore diving & ROV support vessels and 3 daughter craft diving RHIBs + 3 support RHIBs as well as extensive data management and sub-sea engineering capabilities.

Outlook Conference

Now in its 37th year, the 2014 Offshore Industry Outlook Conference is hosted in association with the National Ocean Industries Association (NOIA) and the Texas SeaGrant College Program. It will be held on March 27, 2014 at the Westchase Hilton in Houston. Cost to attend is \$150 per attendee. The highly acclaimed Conference is designed to assist all those within the offshore oil and gas industry with a 3-year forecast of both domestic and international developments, trends and critical issues that will impact business planning and future growth. The half-day Conference and lunch will be held at the Westchase Hilton, 9999 Westheimer, Houston Texas 77042, from 9:00 am - 1:00 pm and will include the regularly scheduled MTS Houston luncheon.

Vice Adm. Devany named NOAA Deputy Under Secretary

NOAA Vice Adm. Michael S. Devany has assumed the role of NOAA's deputy under secretary for operations following President Obama's approval of his appointment by Commerce Secretary Penny Pritzker. Devany served most recently as director of the NOAA Commissioned Officer Corps and NOAA's Office of Marine and Aviation Operations.



As deputy under secretary, Devany is NOAA's chief operating officer, responsible for the day-to-day management of NOAA's national and international operations for

oceanic and atmospheric services, research and coastal and marine stewardship. Image credit NOAA.

For more information, visit www.noaanews.noaa.gov.

Navy training and testing activities imperil marine mammals

A coalition of conservation groups, represented by Earthjustice, amended their complaint in a case filed in Hawai'i federal court that challenges a 5-year plan by the U.S. Navy for testing and training activities off Hawai'i and Southern California. The operations include active sonar and explosives, which are known to cause permanent injuries and deaths to marine mammals and sea turtles.

The amended complaint adds the Navy as a defendant, claiming that the Navy and National Marine Fisheries Service violated the National Environmental Policy Act when they relied on a legally defective environmental impact statement to give the green light to the Navy's plan, which the agencies admit will cause nearly 9.6 million instances of harm to whales, dolphins and other marine mammals — including 155 marine mammal deaths and over 2,000 permanent injuries — and will kill up to 85 critically imperiled sea turtles.

For more information, visit www.earthjustice.org.

DNV GL launches new global brand

"In defining our new identity as DNV GL, our company's vision of making a global impact for a safe and sustainable future has never been more relevant than it is today," says Henrik O. Madsen, President & CEO, DNV GL Group. "The new brand that we launch reflects our broader service offering aimed at enabling our customers to make the world safer, smarter and greener."

The merger of DNV and GL in September this year, led to the creation of DNV GL, a world leading ship and offshore classification society, a leading independent service provider in the oil and gas sector, a powerhouse in energy and renewables, and one of the world's top three certification bodies.

As a foundation for this, DNV GL is making a significant and continuous investment in strategic research and development. Innovative projects are taking technology and standards to new, advanced levels in collaboration with our customers.

For more information, visit www.dnvg.com.

Secretary Jewell honors BOEM and two dozen environmental research partners

Secretary of the Interior Sally Jewell presented the Partners in Conservation Awards to two science teams conducting ocean research sponsored by the Bureau of Ocean Energy Management (BOEM) at a Department of the Interior ceremony. The research involved collaboration with about two dozen federal, academic and private sector partners over the past 4 years through the bureau's Environmental Studies Program, with both projects leveraging the National Oceanographic Partnership Program, or NOPP, framework.

One BOEM study team was honored for its work on the mid-Atlantic Canyons partnership, which resulted in several significant biological and marine archaeological discoveries. The other study involving eight components produced an extensive array of environmental protocols and monitoring tools to support offshore renewable energy planning and operations.

The mid-Atlantic canyons study team consisted of researchers from 17 institutions. Scientists discovered abundant deep-water coral habitats off the

mid-Atlantic outer continental shelf, and vast communities of deep-sea mussels that depend upon methane gas seeps for sustenance. Research has yielded a wealth of oceanographic data never before assembled about this region, and information about historic shipwrecks and their biological communities.

In addition to BOEM, organizations being honored for this study are: the National Oceanic and Atmospheric Administration, U.S. Geological Survey, CSA Ocean Sciences, Inc., Florida State University, University of North Carolina at Wilmington, Texas A&M University, Netherlands Institute of Sea Research, Oregon Institute of Marine Biology, University of Rhode Island, University of Louisiana at Lafayette, Bangor University (Wales), Woods Hole Oceanographic Institution, University of Connecticut, Cape Fear Community College, Artwork, Inc., and the North Carolina Museum of Natural Sciences.

For more information, visit www.boem.gov.

Eileen Sobeck named assistant administrator for NOAA Fisheries

Dr. Kathryn Sullivan, acting NOAA administrator, appointed Eileen Sobeck as assistant administrator for NOAA Fisheries. She takes the helm from Samuel Rauch, who has served as acting assistant administrator since 2012. Rauch will return to his previous position as deputy assistant administrator for Regulatory Programs.



As assistant administrator, Sobeck will oversee the management and conservation of recreational and commercial fisheries, and the protection of marine mammals, marine protected species, and coastal fisheries habitat within the U.S. exclusive economic zone. NOAA Fisheries employs 4,800 people in five regional offices, six science centers, and 12 laboratories in 15 states and U.S. territories.

For more information, visit www.noaanews.noaa.gov.

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Reduced shipping emissions in the North and Baltic seas

The European Union will support with 6.7 million from the TEN-T Programme a series of studies followed by real life trials to evaluate a new generation lightweight pilot scrubber solution for ro-ro (roll on, roll off) ships. The initiative also contributes to the realization of the "Motorways of the Sea" (TEN-T Priority Project 21) concept. The studies, selected for funding under the 2012 TEN-T Multi-Annual Programme, will assess, install, demonstrate and evaluate a new generation of innovative lightweight scrubber technology on two existing ro-ro vessels operating in the Baltic and North Sea. Three EU Member States – Sweden, Finland and The Netherlands – will work together to verify and evaluate the specific port infrastructure and preparatory investments needed for full scale implementation of this technology. The studies will also investigate how a financial mechanism can be set up in order to support ship owners/operators adopting the new technology and give recommendations to decision-makers on how to implement this mechanism. Dissemination of results and best practices will provide guidance to the shipping community and will assist on how to choose optimum Sulphur Emission Control Area (SECA) compliance strategies.

China's first self-developed mega-container ship delivered

China's first 10,000 TEU container ship with independent intellectual property rights was delivered at Dalian Shipbuilding Industry Co Ltd in Dalian, Northeast China's Liaoning province. "It marks a new leap in China's shipbuilding industry," said Yu Fengping, general manager of DSIC, a subsidiary of China Shipbuilding Industry Corp. According to Yu, the manufacturing of 10,000 TEU container ships had been monopolized by big shipbuilders in Europe, the United States, Japan, and South Korea. This ship was built for China Shipping Container Lines Co Ltd. It is capable of carrying 10,036 TEUs (20-ft equivalent units) and can travel 20,000 mi on one journey. Its Energy Efficiency Design Index can meet reduction standards for carbon emissions to be implemented in 2025. DSIC focused on manufacturing large-sized ships with superior performance and low energy consumption after the international shipping industry was severely influenced by the financial crisis in 2008. Currently, DSIC has completed the design of 14,000 TEU, 16,000 TEU, and 18,000 TEU container ships and independently developed DSJ300/350/400 type jack-up drilling platforms. In addition, it launched the eco-friendly 319,000-ton VLCC with world-leading speed and fuel consumption indicators.

New patrol boats for SEA

Taiwanese boat builder Lung Teh Shipbuilding Co., Ltd. (LTS) has won the contract to deliver a series of patrol boats to an unspecified government in South East Asia. The first boat in the series will be delivered early 2015. The boats are highly sophisticated having 19-m long aluminum hulls equipped with twin MJP DRB 400 waterjets coupled to MAN 1650-hp engines. They will reach speed of about 50 kts. They also have beaching capability. Since the vessels are expected to have a very high number of annual working hours, the customer specified equipment with an emphasis on low life cycle cost. Marine Jet Power DRB-series waterjets are built in high-quality materials and with heavy-duty design leading to low maintenance cost plus high reliability. High-efficiency mixed-flow pump means high top speed and low fuel consumption. Marine Jet Power's 5-year warranty and a regional office in Singapore were also appreciated by the customer. The boats will have a crew of six and are capable of operating in territorial waters under year-round weather and sea conditions. Lung Teh Shipbuilding builds fast speed boats in aluminum, steel and GRP at five different yards in I-Lan with about 200 employees. Further to this order, LTS has under production ferries and a 60 m missile catamaran for Taiwan Navy. This vessel will be equipped with quad MJP CSU 850 waterjets.

Twin oil tankers delivered by Damen Shipyards



The Damen double hull oil tanker 8000 "Kestrel Fisher" was delivered to Dutch managers De Opfeart Beheer. In a two-tanker deal, the Kestrel Fisher's sister vessel "King Fisher" was delivered in June 2013. Both have been built by Damen Shipyards Bergum. The oil tankers' names are a reference to James Fisher Everard Ltd, which have taken up their commercial management.

The 7,076 deadweight, 8,363 cu.m tankers were christened at the DSB-yard in Harlingen where they were outfitted; their hulls were built by Damen Shipyards Galati, Romania. Referring to the vessels' trade, their lady sponsors, Mrs. Petra Gaensbacher for the King Fisher and Mrs. Michelle Hartnup for the Kestrel Fisher, of the UK both work in the oil trading industry.

The vessels will dominantly carry gasoline, diesel oil, lubrication oil and jet fuels along the British Isles, the Continent and in Scandinavian and Baltic waters. Whereas the company will operate the two new tankers on an open management basis, James Fisher has previously had two of its own tankers built by Damen Shipyards Bergum, the Shannon Fisher and Solway Fisher, in 2006. With the fleet of oil tankers ranging from 3,000 to 14,000 tons, the company is a full service provider to the oil industry.

The King Fisher and Kestrel Fisher are the latest new-builds according to the patented "Damen Double Hull Oil Tanker 8000" design. The 8000 represents the 8,363 cbm cargo carrying capacity. "We design oil tankers up to 15,000 tons deadweight, which are then constructed at a yard in the Damen Shipyards Group," Erik Schultz, director sales with Damen Shipyards Bergum says. As such, he oversees all cargo vessel newbuilding contracts within the Group, irrespective of which yard will actually construct the vessels, or where. "It is a Damen product, with the contracting and coordination done from our offices in the Netherlands. Equally, engineering and design of most, if not all cargo vessels, is concentrated at the DSBe head office in Bergum, be this dry cargo, gas or oil tankers or otherwise. This way we can assure the quality and the performance of the vessels at a true Built in Europe grade."

For more information, visit www.damen.com.

DNV Class A certification for new Kongsberg dynamic positioning simulator

The latest version of K-Sim DP, a Dynamic Positioning (DP) Manouvring simulator from Kongsberg Maritime, has received the prestigious Class A Certification from Det Norske Veritas (DNV). This makes it compliant with the highest DNV standard for DP simulators according to Standard of Certification of Maritime Simulators number 2.14 (January 2011).

K-Sim DP Manouvring is the most advanced in a long line of Dynamic Positioning simulators developed by Kongsberg Maritime. It is built on the same advanced technology platform as the market leading K-Sim Offshore (previously known as the KONGSBERG Offshore Vessel Simulator) and has the power to provide realistic and relevant DP training in various simulated conditions and environments.

The new K-Sim DP Manouvring simulator is configured with a dual redundant DP system and a 240° or wider visual scene. It includes a fully integrated Power Management System and is delivered with standard DP refer-

ence systems such as Artemis, Hydroacoustic Position Reference system (HPR), DPS and DARPS. FanBeam and RADius position reference systems are also available as options.

K-Sim DP includes an extensive Instructor system, which has the power to design realistic scenarios and introduce faults and alarm settings throughout the entire training exercise. Recording and replay of all simulation exercises in addition to objective assessment, allow the students to build competence and to be prepared for both daily and emergency situations that might occur in real life.

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

Hybrid electric SWATH design advances following feasibility study

A feasibility study around a hybrid powertrain SWATH, commissioned this year by CTruk, has given the company further impetus in its ongoing development of a hybrid electric offshore wind support vessel design.

The study was based on the CTruk CWhisper SWATH, a 20-m craft fitted with twin Cummins QSM-11 marine

diesel engines and Rolls-Royce Kamewa FF41 waterjets. The feasibility report concluded that the implementation of a parallel hybrid solution would result in substantial operational cost savings on this particular vessel, an attractive prospect coupled with the already well-documented advantages of the SWATH hull form in offshore wind operations.

Marine craft in the offshore wind support sector typically have two major transit periods each day, with the rest of their time at sea spent idling or slow maneuvering with the occasional high speed peak. This usage profile makes OWSVs ideally suited to a hybrid configuration. The introduction of an electric motor to handle the load during low power demand periods allows the boat's engines to be turned off or run as generators at a more optimised power rating. As well as the obvious fuel savings incurred, this reduces hours and wear on the engines, a key point for commercial marine vessels which typically require engine services every few weeks. The life expectancy of an engine could be increased dramatically if the craft ran electric during idling downtime, as these craft can idle for up to 50% of a

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19

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shift offshore. Resulting reduced maintenance and direct costs also represent significant savings.

For more information, visit www.ctruk.com.

Canada's most powerful tug enters service

The 6,000-kW ASD tug Ocean Tundra was commissioned into service recently for its owners, Ocean Groupe Inc. (Ocean) of Quebec City, Canada. This icebreaking escort tug becomes the most powerful tug in Canadian registry, and heralds a new generation of extremely capable tugs that will provide the highest degree of year-round escort towing capability to Canada's east coast and the St. Lawrence River and Seaway system.

The Ocean Tundra is the latest addition to the TundRA 100 series (with a nominal 100 tonnes Bollard Pull) of ice-breaking tugs designed by Robert Allan Ltd., Naval Architects of Vancouver B.C.. This tug was built to the highest standards at Ocean's own shipyard, Ocean Industries, on Iles aux Coudres, Quebec.

This powerful tug has been designed to provide a wide range of services,



including tanker escort, terminal support, general ship-docking operations and icebreaking/ice-management services in various ports along the St. Lawrence River. The vessel is also equipped for coastal and rescue towing and is equipped with a major fire-fighting capability. In addition the vessel is equipped to carry lube oil as cargo, for transfer to transiting ships.

For more information, visit www.ral.ca.

Combined ocean and tidal currents—industry first vessel optimization data

The first vessel optimization application offering combined tidal and non-tidal (ocean) current data has been launched for integrated vessel speed and route optimisation.

Developed by oceanographic data specialist Tidetech, the new application offers resolution of six nmi (one tenth degree) at 60-min intervals in a 6-day forecast. Significant passage time savings

have been demonstrated in simulations.

Tidetech managing director Penny Haire said this was the first time ships could access global tides and ocean currents in the same application.

Tidal currents are fast moving, dynamic and dominant inside the continental shelf—in water depths of 200 m or less—and are inherently predictable years ahead. Non-tidal currents are slow moving and dominant in the deep ocean, driven by entirely different processes that cannot be accurately forecast beyond 5 to 6 days.

Ms Haire said Tidetech currently uses MERCATOR as its front-line ocean current model, a six-day ocean forecast at five nmi resolution, forced by ECMWF weather data.

"We provide [MERCATOR] as a standalone product and also use it as a component of our Global Current integration. FOAM or HYCOM are second-line models providing redundancy.

In simulations for various northern European and eastern Asian shipping routes, Tidetech has been able to demonstrate significant projected time savings.

For more information, visit www.tidetech.org/commercial.

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Scientists discover extracellular vesicles produced by ocean microbes

Marine cyanobacteria — tiny ocean plants that produce oxygen and make organic carbon using sunlight and CO₂ — are primary engines of Earth's biogeochemical and nutrient cycles. They nourish other organisms through the provision of oxygen and with their own body mass, which forms the base of the ocean food chain. Now scientists at MIT have discovered another dimension of the outsized role played by these tiny cells: the cyanobacteria continually produce and release vesicles, spherical packages containing carbon and other nutrients that can serve as food parcels for marine organisms. The vesicles also contain DNA, likely providing a means of gene transfer within and among communities of similar bacteria, and they may even act as decoys for deflecting viruses. In a paper published in *Science*, postdoc Steven Biller, Professor Sallie (Penny) Chisholm, and co-authors report the discovery of large numbers of extracellular vesicles associated with the two most abundant types of cyanobacteria, Prochlorococcus and Synechococcus. The scientists found the vesicles (each about 100 nanometers in diameter) suspended in cultures of the cyanobacteria as well as in seawater samples taken from both the nutrient-rich coastal waters of New England and the nutrient-sparse waters of the Sargasso Sea.

Long-term warming and environmental change trends persist in the Arctic in 2013

According to a new report released by NOAA and its partners, cooler temperatures in the summer of 2013 across the central Arctic Ocean, Greenland and northern Canada moderated the record sea ice loss and extensive melting that the surface of the Greenland ice sheet experienced last year. Yet there continued to be regional extremes, including record low May snow cover in Eurasia and record high summer temperatures in Alaska. "The Arctic caught a bit of a break in 2013 from the recent string of record-breaking warmth and ice melt of the last decade," said David M. Kennedy, NOAA's deputy under secretary for operations, during a press briefing at the American Geophysical Union annual meeting in San Francisco. "But the relatively cool year in some parts of the Arctic does little to offset the long-term trend of the last 30 years: the Arctic is warming rapidly, becoming greener and experiencing a variety of changes, affecting people, the physical environment, and marine and land ecosystems." The Arctic Report Card presents strong evidence of widespread, sustained changes that are driving the Arctic environmental system into a new state and we can expect to see continued widespread and sustained change in the Arctic," said Martin Jeffries, principal editor of the 2013 Report Card, science adviser for the U.S. Arctic Research Commission, and research professor at the University of Alaska Fairbanks. "But we risk not seeing those changes if we don't sustain and add to our current long-term observing capabilities. Observations are fundamental to Arctic environmental awareness, government and private sector operations, scientific research, and the science-informed decision-making required by the U.S. National Strategy for the Arctic."

GPS traffic maps for leatherback turtles

The leatherback turtle in the Pacific Ocean is one of the most endangered animals in the world. Its population has declined by more than 90% since 1980. One of the greatest sources of mortality is industrial longlines that set thousands of hooks in the ocean to catch fish, but sometimes catch sea turtles as well. Using modern GPS technology, researchers are now able to predict where fisheries and turtles will interact and to reduce the unwanted capture of turtles by fishermen. In a new study in the *Proceedings of the Royal Society B*, researchers show the use-intensity distributions for 135 satellite-tracked adult turtles and distributions of longline fishing effort in the Pacific Ocean. The overlap of these distributions in space and time allows prediction of bycatch risk. The researchers argue that time and area closures for the fisheries are essential to protect these animals as well as to maintain the health of the commercial fishery.

Coral reefs in Palau surprisingly resistant to naturally acidified waters



Despite living in waters that are more acidic than average seawater, the corals living in the bays around Palau's Rock Islands are unexpectedly diverse and healthy. (Photo courtesy of Palau International Coral Reef Center)

Ocean researchers working on the coral reefs of Palau in 2011 and 2012 made two unexpected discoveries that could provide insight into corals' resistance and resilience to ocean acidification and aid in the creation of a plan to protect them.

The team collected water samples at nine points along a transect that stretched from the open ocean, across the barrier reef, into the lagoon and then into the bays and inlets around the Rock Islands of Palau, in the western Pacific Ocean. With each location they found that the seawater became increasingly acidic as they moved toward land.

"When we first plotted up those data, we were shocked," said lead author Kathryn Shamberger, then a postdoctoral scholar at Woods Hole Oceanographic Institution (WHOI) and a chemical oceanographer. "We had no idea the level of acidification we would find. We're looking at reefs today that have levels that we expect for the open ocean in that region by the end of the century."

Shamberger conducted the fieldwork in Palau with other researchers from the laboratory of WHOI biogeochemist Anne Cohen as well as scientists from the Palau International Coral Reef Center (PICRC).

Through analysis of the water chemistry in Palau, the scientists found the acidification is primarily caused by the shell building done by the organisms living in the water, called calcification, which removes carbonate ions from seawater. A second reason is the organisms' respiration, which adds CO₂ to the water when they breathe.

The scientists' next steps are to determine if these corals are genetically adapted to low pH or whether Palau provides a "perfect storm" of environmental conditions that allows these corals to survive the low pH. "If it's the latter, it means if you took those corals out of that specific environment and put them in another low pH environment that doesn't have the same combination of conditions, they wouldn't be able to survive," said Cohen. "But if they're genetically adapted to low pH, you could put them anywhere and they could survive."

For more information, visit www.whoi.edu.

Study uncovers new evidence for assessing tsunami risk from very large volcanic island landslides

The risk posed by tsunami waves generated by Canary Island landslides may need to be re-evaluated, according to researchers at the National Oceanography Centre. Their findings suggest that these landslides result in smaller tsunami waves than previously thought by some authors, because of the processes involved.

The researchers used the geological record from deep marine sediment cores to build a history of regional landslide activity over the last 1.5 million years. They found that each large-scale landslide event released material into the ocean in stages, rather than simultaneously as previously thought.

The findings—reported recently in the scientific journal *Geochemistry Geophysics Geosystems*—can be used to inform risk assessment from landslide-generated tsunamis in the area, as well as mitigation strategies to defend human populations and infrastructure against these natural hazards. The study also concluded that volcanic activity could



be a pre-condition to major landslide events in the region.

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

Ecuador adds more TRIAXYS wave buoys to coastal network

AXYS Technologies Inc. (AXYS) has recently delivered three more TRIAXYSTM Next Wave Directional Wave Buoys to Instituto Oceanográfico De La Armada (INOCAR) of Ecuador. These TRIAXYS buoys will be added to the existing coastal wave monitoring network of TRIAXYS buoys owned by INOCAR and deployed along the Ecuador coastline.

INOCAR chose to use the TRIAXYS wave buoy based on its success

in other coastal monitoring networks for similar clients in South America. INOCAR has implemented a large network of AXYS systems along the coast-line of Ecuador.

The mission of INOCAR is to plan, direct, coordinate and control the technical and administrative activities related to Hydrographic Service, Navigation, Oceanography, Meteorology, Marine Sciences, Marine Signaling and administration of specialized equipment to its activity.

For more information, visit www.axystechnologies.com.

Tracking the last mile before oil meets the beach

To understand the mechanisms that move water-borne objects or contaminants onshore, over 30 researchers from 16 universities gathered in Ft. Walton Beach, Florida—armed with drifters, dye, and drones—and conducted a 3-week Surfzone Coastal Oil Pathways Experiment (SCOPE).

“We’re studying the region most hit by the Deepwater Horizon oil spill, which includes the coasts surrounding the Gulf,” explained Tamay Özgökmen,

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the team's principal investigator, "to learn more about how things in the water get outside of the surf zone and onto the beaches."

Scientists are tracking elusive ocean processes to visualize the movement of Gulf waters in 3D. For this experiment, they deployed 250 GPS-equipped drifters (30 were biodegradable) to track surface waters, using a "release and catch" method for repeated use of these specially-outfitted devices. Researchers injected an EPA-approved dye both along and outside the surf zone to trace its movement through the water column. Various in-situ instruments recorded water and atmospheric conditions.

"This study will collect important data necessary to understand the currents in the near shore marine environment," said Ad Reniers, co-lead scientist for SCOPE. "The information collected will be used to develop computer models of the coastal zone, to improve our scientific understanding of this region in the event of future oil spills, and to better understand how larvae or pollutants travel close to shore."

For more information, visit www.gulfresearchinitiative.org.

Keeping whales safe from sound

A step-by-step guide to reducing impacts on whales and other marine species during seismic seafloor surveys has been developed by experts with IUCN's Western Gray Whale Advisory Panel (WGWAP) and Sakhalin Energy Investment Company Ltd.

In the study, published in the journal *Aquatic Mammals*, the authors present the most thorough, robust and practical approach to minimizing and monitoring the risk of harm to vulnerable marine species when intense sounds are used to survey the seafloor primarily in the search for oil and gas.

The study describes the most comprehensive whale protection program ever developed for a seismic survey, used by Sakhalin Energy Investment Company Ltd—an oil and gas company with Gazprom, Shell, Mitsui and Mitsubishi as shareholders—in a survey close to the main Western Gray Whale feeding area near Sakhalin Island, on the Russian coast, just north of Japan.

Based on the experience in developing and conducting Sakhalin Energy's survey and associated mitigation and monitoring program, the authors pro-

pose a broader approach that can be adapted to seismic surveys in any environmentally sensitive area.

For more information, visit www.iucn.org.

New study finds extreme longevity in white sharks

Great white sharks – top predators throughout the world's ocean – grow much slower and live significantly longer than previously thought, according to a new study led by the Woods Hole Oceanographic Institution.

In the first successful radiocarbon age validation study for adult white sharks, researchers analyzed vertebrae from four females and four males from the northwestern Atlantic Ocean. Age estimates were up to 73 years old for the largest male and 40 years old for the largest female.

Assuming a lifespan estimate of 70 years or more, white sharks may be among the longest-lived cartilaginous fishes. While they are predominantly found in temperate and subtropical waters, white sharks migrate long distances and can be found throughout the global ocean.

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Dept. of Interior to offer wind site off Maryland
 U.S. Secretary of the Interior Sally Jewell and Bureau of Ocean Energy Management (BOEM) Director Tommy P. Beaudreau joined Maryland Governor Martin O'Malley to announce the proposed notice of sale for nearly 80,000 acres offshore Maryland for commercial wind energy leasing. BOEM identified the Maryland Wind Energy Area in consultation with members of its Maryland Intergovernmental Task Force, which includes Federal, State, tribal, and local government partners. The part of the wind energy area closest to shore is located about 10 nmi off the coast of Ocean City, Maryland. Based on analysis prepared for BOEM by the Department of Energy's National Renewable Energy Laboratory, if fully developed, the Maryland Wind Energy Area could support between 850 to 1450 megawatts of commercial wind generation, enough electricity to power approximately 300,000 homes. Efforts to spur responsible development of offshore wind energy are part of a series of Obama Administration actions to increase renewable energy both offshore and onshore by improving coordination with state, local and federal partners. As part of a 'Smart from the Start' program for expediting commercial-scale wind energy on the federal Outer Continental Shelf, Interior identified Wind Energy Areas well suited for commercial development with marginal impacts to the environment and other important uses. The proposed notice of sale offshore Maryland builds upon two successful offshore wind energy actions that Interior has held last year. A September 4 auction of 112,799 acres offshore Virginia for wind energy development was provisionally won by Virginia Electric and Power Company, generating a high bid of \$1.6 million. Earlier last summer, the Department held its first successful offshore wind lease sale of 164,750 acres offshore Rhode Island and Massachusetts won by Deepwater Wind New England, LLC, generating \$3.8 million in high bids. BOEM proposes to auction the wind energy area as two leases, a North Lease Area and a South Lease Area. The North Lease Area consists of 32,737 acres, and the South Lease Area consists of 46,970 acres. The sale, which will be held in the form of an online auction, is expected in 2014. To be eligible to participate in the lease sale, each bidder must have been notified by BOEM that it is legally, technically and financially qualified by the time the Final Sale Notice is published.

Breakthrough technology to measure Fundy tidal speeds
 The Fundy Ocean Research Center for Energy (FORCE), in partnership with Nortek Scientific, announced the construction of the world's first instrument to provide high-resolution, real time measurements of turbulent water flow at turbine hub height – called the Vectron. A leap forward in site characterization technology, the Vectron is able to capture highly accurate measurements of turbulence at a specific height above the sea over long periods of time – critical to understanding turbine performance. The FORCE test site in the Bay of Fundy, Nova Scotia, offers unique challenges and opportunities: the tidal flow boasts 14 billion tonnes of water moving at speeds in excess of five mps. Understanding this environment is critical to successful turbine design, monitoring environmental effects, and ultimately unlocking Fundy's enormous energy potential. Until now, most tidal speed measurements have been taken using acoustic Doppler current profilers (ADCPs), which use diverging beams to approximate the velocity. But averaging across the beams filters out much of the turbulence information. Alternatively, acoustic Doppler velocimeters (ADV)s use converging beams to measure turbulence accurately, but they have very limited range and are not well suited for long-term, persistent measurements in the harsh environment at tidal energy sites. The Vectron uses patented technology to combine the range of a typical ADCP with the accuracy of the ADV. The Vectron will be deployed on FORCE's Fundy Advanced Sensor Technology (FAST) platform. The FAST platform is a recoverable instrument platform designed to monitor and characterize the FORCE site. FAST provides the perfect opportunity to develop and test the Vectron. FORCE and Nortek Scientific will partner to provide hardware, firmware, software, turbulence processing, platform mounting, and a rigorous deployment and field-testing program.

Seatrivity plugs into Wave Hub



UK-based Seatrivity plans to deploy its second generation device at Wave Hub in 2014 before building out to a full scale grid-connected array in 2015.

Seatrivity's first generation Oceanus 1 device has undergone extensive and successful sea trials in Scotland, and we are ready to make the next step to Wave Hub. The technology is scalable so once testing is completed the company hopes to move quickly to a full array.

Seatrivity is intending to build its next generation Oceanus 2 device in Cornwall and use the local supply chain to support its marine operations. The company will also be locating its custom-built workboat Ocean Enterprise in Wave Hub's home port of Hayle shortly.

UK Business and Energy Minister Michael Fallon, said, "The UK is one of the leading nations in the development of marine energy with around a quarter of the world's wave and tidal technologies developed here in the UK. So it is good news that forward-thinking companies like Seatrivity are continuing to develop the newest, most effective technologies. Thanks to our investment of more than £13 million in the Wave Hub facility, they and others can test their products right here in this country."

Seatrivity's patented Oceanus technology involves an aluminum float that travels up and down with the waves and operates a pump to pressurize sea water to drive a hydroelectric turbine to produce electricity. The floats are tethered to blocks on the seabed, and the pumps are linked together to generate substantial amounts of highly pressurized water.

Ten MW of electricity generated from the waves off Hayle will be sufficient to power up to 10,000 homes.

The announcement follows confirmation of the UK Government's commitment to offshore renewables. Energy Secretary Ed Davey has confirmed that subsidy levels for wave energy will be unchanged from last summer's draft proposals.

For more information, visit www.seatrivity.net.

Minesto awarded funding for pre-study for full-scale ocean trials

Vinnova, the Swedish Innovation Agency, has awarded 200,000 SEK to Minesto for a pre-study for full-scale ocean trials of its tidal power system. The project will prepare and plan for full-scale verification testing of Minesto's power plant, Deep Green, in the offshore environment. Deep Green is undergoing ocean trials in scale 1:4 in Strangford Lough,

Northern Ireland, and the next step is to develop a full-scale prototype and test it in the ocean. The project funded by Vinnova will plan these full-scale trials and assess feasibility and budget.

The Deep Greenpower plant operates at sites where no other known technology is cost effective. Deep Green has a unique ability to produce electricity from low velocity tidal and ocean currents. Minesto's solution expands the marine energy potential and offers a step change in cost for tidal energy.

Vinnova's vision is for Sweden to be a world-leading country in research and innovation, an attractive place in which to invest and conduct business. The agency promotes collaborations between companies, universities, research institutes and the public sector by stimulating a greater use of research, by making long-term investment in strong research and innovation milieus and by developing catalytic meeting places. Vinnova's activities also focus on strengthening international cooperation.

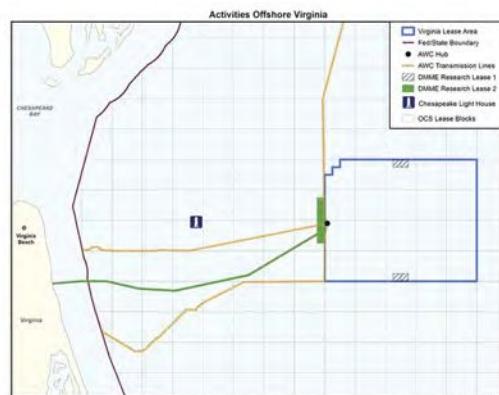
For more information, visit www.minesto.com.

Milestone cleared for second wind energy research lease

The Bureau of Ocean Energy Management (BOEM) has taken another important step toward issuing a wind energy research lease to the Commonwealth of Virginia's Department of Mines, Minerals and Energy (DMME), after finding there is no competitive interest in the area where the state agency proposes to conduct activities. This would be the second wind energy research lease offshore Virginia that BOEM is considering.

DMME proposes to design, develop, and demonstrate a grid-connected, 12-MW offshore wind test facility on the Outer Continental Shelf (OCS) off the coast of Virginia. The data obtained under this lease will be made publicly available and inform the future production of renewable energy within Virginia's Wind Energy Area (WEA).

The U.S. Department of Energy (DOE) announced funding awards for seven proposed "Offshore Wind Demonstration Projects" off the nation's coasts. One of the awards was given to Dominion Resources, Inc.,



which partnered with DMME and others to establish the Virginia Offshore Wind Technology Advancement Project. This project proposes to build the wind test facility on the OCS, adjacent to the BOEM-designated WEA offshore Virginia.

DMME submitted an unsolicited nomination to BOEM for a proposal to install and operate two 6-MW turbines, associated cabling to shore, and ancillary metocean facilities (e.g., meteorological buoys).

For more information, visit www.boem.gov.

February 2014

27

Ocean News & Technology

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www.elac-nautik.com

Cal Poly wins Department of Energy Research Grant

Cal Poly, San Luis Obispo's Institute for Advanced Technology and Public Policy has been selected to receive a grant of up to \$750,000 from the U.S. Department of Energy (DOE) to assess the feasibility of locating a National Wave Energy Test Facility in California (CalWave).

The Department of Energy intends to pick one site for a test facility. California is competing with Oregon and Washington and states on the Eastern seaboard to be selected.

Wave energy is an emerging renewable technology designed to convert energy from the ocean's waves into electricity for consumer use. The electricity would be transmitted ashore and distributed on existing land-based transmission lines. The California Energy Commission estimates the statewide wave energy generation potential to be 7,500 MW, or about three and a half times the power produced by the recently retired San Onofre Nuclear Generating Station off the coast of Southern California. According to DOE, America's total wave-energy potential

could account for as much as one-third of the U.S.'s yearly power usage.

DOE has indicated its interest in cooperatively funding \$25 million to \$50 million, pending Congressional appropriations, in the expansion of wave-energy technologies through the establishment of a National Wave Energy Testing Facility. The initial grant awarded to Cal Poly, combined with other matching funds, will be used to research and determine which location along California's coast has the best potential to accelerate the development of a commercial ocean renewable energy industry by serving as the National Wave Energy Testing Facility.

If chosen, California would become an international leader in the development of this emerging clean energy technology.

For more information, visit www.calpoly.edu.

Lease agreement secures landmark floating wind project for UK

The UK's first floating wind farm is set to be located off the Scottish coast following the announcement that The Crown Estate has granted an agreement for lease to Statoil for the next phase of its Hywind project.

The project comprises five, 6-MW floating turbines operating in waters exceeding 100 m in depth at a site in Buchan Deep, approximately 20 to 30 km off the coast of Peterhead, Aberdeenshire. At a total capacity of 30 MW, the scheme is set to be the largest floating wind project announced to date in Europe and one of the largest announced worldwide.

The Buchan Deep floating wind farm builds on the success of the first phase of Hywind, the successful demonstration of the world's first full-scale floating turbine, in operation since 2009 off the coast of Norway.

The Crown Estate and Statoil have been working together closely over the past 2 years to progress this project, which will further enhance the UK's position as a global leader in offshore wind technology development. Statoil is now working to secure the necessary consents from Scottish Government.

The UK has one of the best offshore wind resources in the world. Floating technology can play an important part in realizing this potential, allowing developers to access new sites in deeper water, where installing conventional offshore

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wind turbines is not viable, and helping to substantially lower the cost of energy generated from offshore wind. The site at Buchan Deep will also play an important role in demonstrating that the technology can operate as part of an array as well as showing how knowledge, gleaned from Hywind's first stage, has been incorporated into the latest designs.

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

Carnegie receives \$1.2 million in Australian government grants

Australian wave energy developer Carnegie Wave Energy Limited announced the receipt of \$748,849 from the Australian Government for progress on the desalination plant, foundations, onshore power plant and pipelines of the Perth Wave Energy Project, with an additional \$451,480 received from the Western Australian State Government.

Carnegie received \$470,159 for completion of three milestones from the Australian Government under its grant from the Australian Renewable Energy Agency (ARENA) Emerging Renewables Program. The milestone payments were awarded for Carnegie's

progress on the Project's foundation system, onshore plant and pipeline. Carnegie previously received a payment of \$451,480 for these same milestones under its LEED Grant from the Western Australian State Government.

Separately, Carnegie also received a quarterly grant payment of \$278,690 as part of a \$1.27 million AusIndustry grant that supports the design, construction and operation of a CETO wave powered desalination pilot plant that will desalinate seawater to produce freshwater. This is the third quarterly payment received and takes the total funds received to date to \$601,598, which is approximately half the total grant funding.

This follows on from successful completion of detailed design, environmental investigations and the awarding of the contract for manufacture and construction of the desalination plant. Onsite works and construction of the Desalination Pilot Plant have now commenced. Installation and commissioning is scheduled for the first half of 2014.

For more information, visit www.carnegiewave.com.

Marine Renewable Energy Collaborative established

Announcing the formation of the Marine Renewable Energy Collaborative (MRECo), a non-profit corporation dedicated to developing offshore renewable energy (wave, tide and wind) in New England. Executive Director, John Miller retired this summer from the University of Massachusetts Dartmouth (UMD) and the Marine Renewable Energy Center that he founded in 2006. MRECo will continue the industry development work that was underway at UMD by helping companies commercialize new technologies and by bridging the gap between academia and industry. Several device demonstrations are in the planning stages and will be reported upon in upcoming MRECo newsletters. In addition, MRECo is working with both the International Conference on Ocean Energy (ICOE) and Energy Ocean to ensure the wealth of research and development being done in New England receives the exposure it warrants.

For more information, e-mail MRECnewengland@gmail.com.



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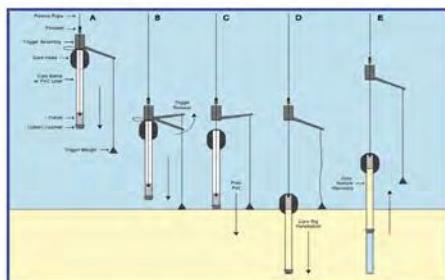
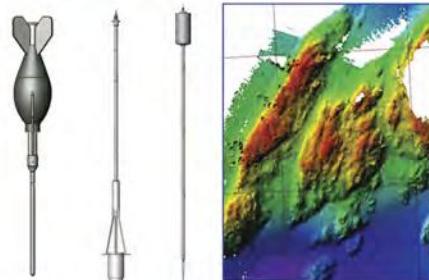
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DANTE system makes real-time monitoring simple and affordable

Attach one small box to a platform (buoy, piling, tower, etc.). Plug in your sensors and connect the power source. View your data within minutes. DANTE makes it that easy.

The DANTE system lowers technical and cost barriers to getting remote real-time data and enables more individuals, companies, environmental organizations, colleges, and regional and local government agencies to create remote monitoring systems without staff engineers and programmers.

The DANTE Buoy Controller from Soundnine Inc. (S9) sets a new standard for buoy controllers. It combines a GPS receiver, telemetry modems and tilt/acceleration sensors with very low-power data logging, power management and system watchdog functions in one extremely rugged immersion-proof enclosure, making it easier and less expensive to build buoys or other data collection platforms.

DANTE is designed to endure repeated submersion and asymmetric water pressure. The built-in GPS and telemetry antennas eliminate expensive failure-prone RF connectors and cables, and the standard DANTE connectors withstand a 2,000 PSI pressure washer spray from 10 cm away — easily typhoon-proof. Buoys no longer need to provide the electronic equipment with watertight protection from storms or opportunist fishing vessels that can pull a buoy meters underwater. This permits simpler, smaller buoy designs that allow submergence in extreme events, reducing mooring stress and system cost.

The DANTE Buoy Controller has the connectivity needed to easily integrate a large suite of modern instruments, and it supports virtually any oceanographic or environmental sensor in use today. The uniquely modular controller design makes a DANTE monitoring system extremely expandable and configurable, allowing future requirements to be met with new types of plug-in modules.

Each DANTE is typically preconfigured for the customer's specified sensor suite, required sampling and telemetry schedules, and data destinations. Sensor installation is simplified with optional made-to-order sensor cables available from S9. The user experience can be essentially plug and play. Within minutes



DANTE Buoy Controller installed on piling



DANTE Buoy Controller with GSM and Iridium telemetry, cover removed

after powering the controller, data is automatically delivered to a user's computer, and data server hosting is free for the first 6 months.

Users are not hostage to S9 to reconfigure the system. DANTE Config software is a free, well-organized utility that organizes all programs and instrument drivers in a single file for upload to the controller, either via PC interface or remotely by modem. DANTE Config allows driver selection from a list and has advanced features like context coloring and balloon help. The drivers and sampling programs are simple text scripts that users can edit and save for new configurations. Virtually any sensor can be supported, and new drivers are provided at no cost.

The controller delivers data through DANTE Server, which forwards both raw data and user configurable parsed data to user-specified targets, including email, ftp, and MySQL databases (MySQL works well with websites for real-time displays). S9 server hosting is inexpensive and includes data text and graphic displays delivered to your website.

Data display is easy with free DANTE Vis software that allows data parsing, plotting and conversion to csv and other common formats. It can display raw data received from DANTE Server, data from the controller's removable memory card, or data published to databases by DANTE Server.

The hardware, software and data server together form the DANTE System, offering data stakeholders a cost-effective alternative to in-house custom system integration or expensive commercial turnkey buoy systems.

Soundnine Inc. was founded in 2011 to develop innovative products that advance marine sciences and enable more widespread and cost-effective marine monitoring efforts. S9 is headed by former Sea-Bird colleagues Darius

Miller and Doug Bennett, who have decades of combined experience in instrumentation development, applications, service and support to U.S. and international mooring programs.

For more information, visit www.soundnine.com.



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General Dynamics awarded \$30M for development of advanced submarine technologies and \$122M for Virginia-Class submarine procurement

General Dynamics Electric Boat has been awarded a \$29.8 million contract modification from the U.S. Navy to develop advanced submarine technologies for current and future undersea platforms. Under the terms of the modification, Electric Boat will perform advanced submarine research and development studies in support of a wide range of technology areas, including manufacturability, maintainability, survivability, hydrodynamics, acoustics and materials. Electric Boat also will conduct research and development work in affordability, manning, hull integrity, performance, ship control, logistics, weapons handling and safety. Additionally, the contract supports near-term Virginia-class technology insertion, future submarine concepts and core technologies. Initially awarded in November 2010, the contract has a potential value of \$711 million over 5 years if all options are exercised and funded. Also funded was a \$121.8 million contract modification to buy long lead-time material for three Virginia-class submarines, SSN-793, SSN-794 and SSN-795. The contract provides funding for steam and electrical-plant components, main propulsion unit and shipservice turbine generator sets, as well as miscellaneous hull, mechanical and electrical-systems components to support construction of the submarines.

U.S. Navy homeports more ships at Pearl Harbor

The U.S. Navy announced that the USS Mississippi will move its homeport to Pearl Harbor, saying that it will bring with it an additional 132 billets and over \$10 million of funded positions to Hawaii. Earlier, the Navy announced the USS John Paul Jones will swap homeports with USS Lake Erie this summer. The USS Preble will also leave San Diego for Hawaii this summer. The Navy has said that Pearl Harbor will reach 33 homeported hulls during peak times.

Navy aircraft carrier moves underscore Pacific rebalance strategy

The U.S. Navy announced that the aircraft carrier USS Ronald Reagan (CVN 76) will replace USS George Washington (CVN 73) in Japan and become part of the U.S. 7th Fleet forward-deployed naval forces (FDNF) in Yokosuka, Japan. As part of the rebalance strategy to increase the Navy's presence in the Pacific Fleet, USS Theodore Roosevelt (CVN 71) will move from Norfolk, Virginia to San Diego. Theodore Roosevelt will serve as a U.S. 3rd Fleet rotational carrier allowing Ronald Reagan to depart her current homeport in San Diego and proceed to Yokosuka. George Washington will depart Japan and proceed to Virginia in preparation for its mid-life refueling complex overhaul at Newport News Shipbuilding, Huntington Ingalls Industries. Specific timelines will be announced separately, closer to the actual movement of the carriers. The U.S. values Japan's contributions to the peace, security and stability of the Indo-Asia-Pacific and its long-term commitment and hospitality in hosting U.S. forces forward deployed there. These forces, along with their counterparts in the Japan Self-Defense Forces, make up the core capabilities needed by the alliance to meet our common strategic objectives. The security environment in the Indo-Asia-Pacific requires that the U.S. Navy station the most capable ships forward. This posture allows the most rapid response times possible for maritime and joint forces and brings our most capable ships with the greatest amount of striking power and operational capability to bear in the timeliest manner. The ship rotation will not necessitate a change in the assigned air wing, nor in the composition of the air wing. Carrier Air Wing 5 will remain the forward-deployed air wing located at Naval Air Facility Atsugi. This ship rotation also does not necessitate any changes to base facilities in either San Diego or Yokosuka. In 2008, George Washington was the first nuclear-powered aircraft carrier sent to Japan as part of the FDNF. Maintaining an FDNF capability supports the United States' commitment to the defense of Japan and the security and stability of the vital Indo-Asia-Pacific.

Bollinger delivers CGC Charles Sexton

Bollinger Shipyards, Inc. has delivered the Charles Sexton, the eighth Fast Response Cutter (FRC) to the U.S. Coast Guard.

The announcement was made by Bollinger president, Chris Bollinger, "We are very pleased to announce another successful on-time and on-budget FRC delivery to the U.S. Coast Guard. The Charles Sexton was delivered to the 7th Coast Guard District in Key West, Florida, and will be stationed at USCG Sector Key West. We are all looking forward to the vessel's upcoming commissioning, as well as honoring and celebrating the heroic acts of Charles Sexton."

The 154-ft patrol craft is the eighth vessel in the Coast Guard's Sentinel-class FRC program. To build the FRC, Bollinger Shipyards 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 December 10, 2013 in Key West, Florida and is scheduled to commission the vessel in Key West, Florida during March 2014.

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, Petty Officer Charles W. Sexton, who was posthumously awarded the Coast Guard Medal for extraordinary heroism.

For more information, visit www.bollingershipyards.com.

Austal launches USNS Fall River (JHSV 4)

Austal USA successfully completed the launch process of the USNS Fall River (JHSV 4). Recently christened, this 103-m high-speed catamaran represents the U.S. Department of Defense's next generation multi-use platform. It is part of a 10-ship program, the funds for all of which have been appropriated, worth over US\$1.6 billion.

On January 16, 2014, Austal USA successfully completed the launch process of the USNS Fall River (JHSV 4). Recently christened, this 103-m high-speed catamaran represents the U.S. Department of Defense's next generation multi-use platform. It is part of a 10-ship program, the funds for all of which



have been appropriated, worth over US\$1.6 billion.

The launch of USNS Fall River was conducted in a multi-step process that involved having Berard Transportation transfer the ship from Assembly Bay 3 onto a deck barge, which was then towed to BAE Systems Southeast Shipyard. The next day, Fall River was transferred onto BAE's dry dock Alabama; it was floated, then returned to Austal's facility where it will undergo final outfitting and activation before sea trials and delivery to the Navy later this year.

JHSV 4 is now one of four Austal-built Navy ships moored in the Mobile River, joining USNS Millinocket (JHSV 3), Coronado (LCS 4), and Jackson (LCS 6).

The JHSV is a relatively new asset that will be an important Navy connector. In peacetime, JHSVs will be operating forward supporting Navy Expeditionary Combat Command and riverine forces, theater cooperating missions, Seabees, Marine Corps and Army transportation. Each JHSV also supports helicopter operations and has a slewing vehicle ramp on the starboard quarter that enables use of austere piers and quay walls, common in developing countries. A shallow draft (under 4 m) will further enhance theater port access.

For more information, visit www.austal.com.

Barrier technology to boost protection at Navy ports

Advanced technology rules the day in modern warfare – yet one very real threat to the U.S. Navy comes from a simple but deadly enemy strategy: small speed boats laden with explosives ramming into ships in harbor. Now a new maritime security barrier, developed with support from the Office of Naval Research (ONR), could provide a quantum leap in existing sea-port protection.

The new system is called the Halo Barrier, named after Halo Maritime Defense Systems, the company behind the new barrier development. Navy

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sources say these barriers offer far greater stopping capacity against speeding attack vessels, require less manpower to operate and could show significant cost avoidance over time compared to existing systems.

"There is a real need for improved security for our sailors and marines in ports around the world and here at home," said Hal Oakley, program lead at Commander, Naval Installations Command (CNIC). "Plain and simple: We need new port security barriers to better protect our sailors, marines, ships and other assets."

In many ports used by Navy vessels, experts say, there is not a lot of space between the existing barriers and ships, due to limited water space and the movement of commercial and private vessels. In one test of the current barriers, an attack craft was "caught" by the barrier lines but still got dangerously close to the target ship itself.

The Halo barrier, by contrast, can be deployed closer to ships while providing increased protection capability. And, in a series of dramatic tests late last year, speeding attack craft were stopped instantly, remaining at a safe distance from the ships.

"The effort to create an advanced port security barrier has been positively heroic, from folks well aware of the dangers posed by small attack craft in ports," said Craig Hughes, deputy director of research at ONR. "This project represents a leap ahead in applied technology to create an advanced capability that addresses a critical fleet need to balance security and cost."

The cost avoidance from using the Halo barrier come from reduced man-hours needed and lower maintenance costs. It can be operated by only one or two people, versus the current systems that require large teams, long hours and armed protection to open and close barriers for incoming vessels.

"The cost of maintenance and manpower required to operate the current port security barriers, just in opening and closing the barriers alone, is astronomical," said Oakley.

The next tests will take place in the March-April timeframe, with the goal of bringing the barriers into acquisition in fiscal year 2015.

"This is a combination of great ideas, emergent technology and meeting a critical need," Hughes added. "There's a tremendous partnership story here as well, including close coordina-

tion between ONR and CNIC – with phenomenal support from Aberdeen Proving Ground and the Combating Terrorism Technical Support Office."

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

Raytheon, L-3 demonstrate new ship protection system

Raytheon Company and L-3 Communications successfully fired Raytheon TALON laser-guided rockets from an L-3 remote weapon station using an LAU-68 launcher. The test demonstrated that the lightweight remote weapon system can provide protection for small ships by incorporating the currently fielded launcher, sensor systems and TALON missiles.



"With the increase in swarming-boat threats, navies worldwide have an urgent need to protect their smaller ships," said Rick Nelson, vice president of Raytheon's Naval and Area Mission Defense product line. "Combining our proven TALON LGR with L-3's Advanced Remote Weapon Station provides an affordable, effective and available solution. It also demonstrates our ability to reach across Raytheon's wide portfolio of products and team with companies around the globe to develop new solutions."

Designed to carry up to seven TALONS, the self-contained remote rocket weapon system incorporates an electro-optical sensor and laser designator, all weighing approximately 500 lbs. It requires only a target queue to engage on-mount target tracking and can be integrated on ships ranging in size from riverine to major surface combatants.

"L-3 and Raytheon developed a versatile, lightweight and economical solution to provide protection against asymmetrical threats," said Dave Wessing, vice president and general manager of L-3 Integrated Optical Systems' Pittsburgh facility.

TALON is a cooperative development program between Raytheon and the United Arab Emirates, which used

digital semiactive laser technology to provide precision accuracy at low cost for 2.75-in./70-mm rockets.

For more information, visit www.raytheon.com.

Indian Navy's largest ship INS Vikramaditya commissioned

Marking a new high in India-Russia strategic cooperation, the Defence Minister Shri AK Antony commissioned the completely refurbished 44,500 tonne carrier Admiral Gorshkov into the Indian Navy as INS Vikramaditya at an impressive ceremony at sub-zero temperature in the wind-swept Sevmash Shipyard in the beautiful city of Severodvinsk in Russia.

Speaking at the event, Shri Antony said INS Vikramaditya would significantly enhance the reach and capability of the Indian Navy. He said the country has a rich maritime history and the Indian Ocean has guided our fate over the centuries.

INS Vikramaditya has an overall length of about 284 m and a maximum beam of about 60 m, stretching as much as three football fields put together.

The INS Vikramaditya is capable of operations up to a range of over 7,000 nmi or 13,000 km.

To enable this 44,500 tonnes floating steel city to cut through the choppy seas with speeds of up to 30 kts, she is powered by a new generation of steam boilers generating a total output power of 180,000 SHP powering four propellers.

The power generation capacity onboard is about 18 MW, enough to cater to the lighting requirement of a mini city. An extensive revamp of sensors, including fitment of Long range Air Surveillance Radars, Advanced Electronic Warfare Suite, makes the ship capable of maintaining a surveillance bubble of over 500 km around the ship.

The ship has the ability to carry over 30 aircraft comprising an assortment of MiG 29K/Sea Harrier, Kamov 31, Kamov 28, Sea King, ALH-Dhruv and



Chetak helicopters. The MiG 29K swing role fighter is the main offensive platform and provides a quantum jump for the Indian Navy's maritime strike capability. These fourth generation air superiority fighters provide a significant fillip for the Indian Navy with a range of over 700 nm and an array of weapons including anti-ship missiles, Beyond Visual Range air-to-air missiles, guided bombs and rockets.

The ship is equipped with state of the art launch and recovery systems along with aids to enable smooth and efficient operation of ship borne aircraft. Major systems include the LUNA Landing system for MiGs, DAPS Landing system for Sea Harriers and Flight deck lighting systems.

For more information, visit indiannavy.nic.in.

Somali pirate clampdown caused drop in global piracy

Piracy at sea has reached its lowest level in 6 years, with 264 attacks recorded worldwide in 2013, a 40% drop since Somali piracy peaked in 2011, the International Chamber of Commerce (ICC) International Maritime Bureau (IMB) revealed. Fifteen incidents were reported off Somalia in 2013, down from 75 in 2012, and 237 in 2011.

IMB's annual global piracy report shows more than 300 people were taken hostage at sea last year and 21 were injured, nearly all with guns or knives. A total of 12 vessels were hijacked, 202 were boarded, 22 were fired upon and a further 28 reported attempted attacks. Nigerian pirates were particularly violent, killing one crewmember, and kidnapping 36 people to hold onshore for ransom.

"The single biggest reason for the drop in worldwide piracy is the decrease in Somali piracy off the coast of East Africa," said Pottengal Mukundan, Director of IMB, whose Piracy Reporting Centre (PRC) has monitored world piracy since 1991. IMB says Somali pirates have been deterred by a combination of factors, including the key role of international navies, the hardening of vessels, the use of private armed security teams, and the stabilizing influence of Somalia's central government.

For more information, visit www.icc-ccs.org.



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Shell Inde platform coming ashore

NEW RESEARCH PROVIDES STATE OF NATION REPORT ON DECOMMISSIONING SECTOR

By: Brian Nixon, CEO, Decom North Sea

With many UKCS assets reaching end of life and the latest estimates putting a forecast spend on decommissioning of £35 billion by 2040, it is an increasingly important sector for the supply chain. Approximately £31.5 billion of this will be to decommission existing installations and £3.5 billion to decommission new developments.

High oil and gas prices, improved recovery technologies, and fiscal uncertainty have all played their part in deferring decommissioning projects. Given that only 57 structures are reported to be either decommissioned or in the process of being decommissioned to date, the UKCS sector can still be considered to be embryonic.

However, ageing structures must inevitably reach the end of their economic lifespans; production rates will decline through time and with recently announced tax relief deeds allowing greater clarity in decommissioning decisions, a maturing of the UK sector seems imminent.

Against this backdrop, decommissioning industry forum Decom North Sea worked with Scottish Enterprise and Accenture to produce what is the most detailed assessment of the current state of the sector.

The research looked at key aspects of decommissioning activity in the coming years and made what is believed to be the first independent assessment of current industry capability. With recently announced increased investments in new capital developments, sustained levels of operational expenditure, a ramping up in offshore wind developments, and growing activity in decommissioning, the report not surprisingly highlights areas where capability is likely to be particularly tight. Examples include management and engineering staff, drilling rigs for wells P&A, and vessels (including heavy lift).

The research was designed to obtain the industry's perceptions about the state of readiness of the industry. It has identified some deviations between supplier capability and the industry desired capability with cleaning and decommissioning, disconnection, and disposal displaying the smallest gaps, while well abandonment, infrastructure removal, and continuing liability show the greatest. But as one operator commented, this level demonstrates a vast improvement on previous years.

It is estimated that the total cost of UKCS decommissioning in the next 5 years alone will be around £4.5 billion, focusing on 40 platforms and their associated wells, pipelines, and subsea structures across 80 fields. To put this figure in context, according to the report, the latest estimates for the same period show that total decommissioning costs in arguably the world's most mature petroleum province, the Gulf of Mexico, will amount to around £3 billion — considerably smaller than the UKCS figure.

Decommissioning spend across the UKCS will vary by region, with the Northern North Sea and Central North Sea having considerably higher costs per asset than the Southern North Sea. This is due to multiple factors such as heavier structure weights, greater water depths, longer distances from shore, and more hostile weather conditions. With operators generally undertaking their first decommissioning project, different strategies and contracting approaches are likely to emerge, which will also affect the costs from one decommissioning project to the next.

The different phases of the decommissioning value chain bring varying degrees of complexity and costs, with the well abandonment phase forecast to account for more than 40% of total costs, while the suspension cold phase is forecast at less than 1%.

The research suggests that there is an average gap of 35% between actual and desired capability across the supply chain, but the expectation is the impact can be reduced if action is taken to play to the strengths. The report makes some detailed recommendations in areas such as removal, disposal, well abandonment, cleaning, and decommissioning.

A major cause for concern is the demand on people resources. The North Sea supply chain is welcoming huge new development projects, such as Clair Ridge and Mariner, and future investments in offshore renewables and opportunities in other countries facing similar pressures, such as Norway. Contractors and service specialists currently enjoy a choice of market sectors to pursue. Decommissioning must be portrayed as an attractive long-term business opportunity if the industry going to build the capability, capacity, and efficiency required for this major program of activity.

One way of promoting the exciting career and business opportunities — highlighted in the research — is to stimulate better training, transferring of skills and capabilities from other sectors such as nuclear decommissioning, ex-military personnel, and marine and salvage industries. This, among other initiatives, is being explored by Decom North Sea in conjunction with partner agencies.

Bundling of services is another key. If the correct conditions can be arranged, it has been proven to reduce the overall cost of operations through achieving synergies in areas such as project management, logistics, HSSE management, and even back-office functions. Collaborating across different skill pools may also act as a catalyst for further innovation as suppliers share techniques, processes, and learnings to help further improve their operations.

It also impacts on the ease of doing business. Reducing the cost of decommissioning, encouraging innovation, and improving interface management will all help operators to move forward more confidently with their decommissioning projects, helping to increase activity and generate some much needed continuity in the sector.

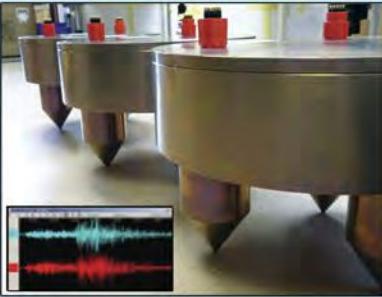
If smaller niche suppliers can be convinced of the benefits in forming alliances, they could share risks and bid for work with less exposure. There would also be scope for more innovative contracting models of interest to operators and contractors alike.

Decom North Sea was established to represent the North Sea's oil and gas decommissioning industry and has grown to have more than 230 members drawn from the full range of companies and organizations active in the sector. The industry forum facilitates the development of models, guidelines, and templates aimed at improving industry efficiency, containing costs, encouraging economic benefit, and maximizing residual value.

The body is spearheading a number of initiatives to support the decommissioning industry, including a streamlined template for the submission of decommissioning programs. The industry standard template was produced following collaboration with the Department of Energy and Climate Change (DECC) and a working group of DNS member companies (BP, Talisman, CNRI, Marathon Oil, GP Decom, and Optimus Decom), with additional input from Perenco and Wood Group PSN. It is aimed at helping industry to get its decommissioning plans authorized more quickly and easily by DECC.

Visit www.decomnorthsea.com for further information.

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OFFSHORE INDUSTRY

Oil and gas companies to spend 6% more in 2014: Barclays Bank

Oil and gas companies are expected to spend roughly \$723 billion on exploration and production (E&P) in 2014, an increase of 6.1% from 2013, Barclays Bank said in a report.

The report said North America will see a 7% increase in E&P spending, compared to a 2% increase this year. E&P spending outside North America is expected to be less, standing at about 6% for 2014. According to Barclays, that is a drop from the 10% increase seen this year.

Limited growth by major oil companies and corruption probes into Chinese companies are being blamed for the lower international growth. However, that number is positively offset by growth in the Middle East, Latin America, and Russia.

Barclays has said the growth is unexpected, as the bank had prepared for a growth slowdown in 2014. The report uses data collected via a survey of more than 300 oil and gas companies. The survey was conducted in November.

E&P companies are using existing crude prices to determine spending budgets for the year ahead, according to Reuters, with \$98 per barrel Brent crude and \$89 per barrel, West Texas Intermediate determining the 2014 budgets. Four large integrated oil companies — ExxonMobil, Chevron, BP, and Shell — will make up about 20% of 2014 spending, Barclays reported.

Keppel shipyard, with 21 offshore rigs, breaks annual delivery record

Singapore's Keppel FELS shipyard is claiming the record for the largest number of rig deliveries in a year, with a total of 21 newbuild offshore rigs delivered in 2013. The latest delivery, ARABDRILL 60, a KFELS B Class jack-up rig, was delivered in December to Arabian Drilling Co. 5 days ahead of schedule, on budget and with a stellar safety record.

"We set out to deliver 20 and ended up delivering 21 rigs on time or ahead of schedule and safely," said Wong Kok Seng, managing director (offshore), Keppel Offshore & Marine and managing director, Keppel FELS.

He noted that a KFELS B class jack-up rig involves coordination among multiple parties and over 1,000 workers, with some 45 projects going on at the same time.



ARABDRILL 60 is be ADC's third jack-up rig from Keppel FELS. First was ARABDRILL 30 pictured here

"We streamlined the building process through new technology and equipment as well as having an innovative construction methodology," he added. Keppel's previous record delivery was 13 in 2009.

The KFELS B Class jack-up design is able to operate in water depths of up to 400 ft and drill to depths of 30,000 ft, which is readily upgradeable to higher-performance capabilities.

ExxonMobil CEO says U.S. to gain energy self-sufficiency by 2020

The United States should attain energy self-sufficiency by 2020, according to Rex Tillerson, chief executive officer of supermajor ExxonMobil.

"I think it is realistic that the U.S. could be energy self-sufficient by the end of this decade," Tillerson told CNBC in January. "We're already the world's largest natural gas producer, and last year crude oil production surpassed levels not seen since the 1980s."

The United States is expected to surpass Saudi Arabia to become the world's top oil producer by 2016, the International Energy Agency (IEA) predicts, driven by increasing shale output and offshore production. Last October, U.S. domestic crude oil production exceeded imports for the first time in almost 2 decades.

According to Tillerson, China's shale reserves could be even bigger than those in the United States, but complicated geology presents challenges.

"By every geological assessment that I've ever seen, they are larger than the U.S. However there are a number of attributes in China's shale gas reserves that make them particularly challenging," Tillerson said.

in this section

Offshore Industry Headlines	41
Upstream Oil & Gas	46
Underwater Intervention	60
Maritime Communications	64
Subsea Cables	68

Prospects improving for women seeking careers in oil and gas sector

Career prospects for women in the oil and gas industry have improved in recent years, and an increasing number of women are taking advantage of those opportunities, according to the majority of energy professionals who participated in the inaugural Global Diversity and Inclusion Report.

The study, conducted by BP and media outlet Rigzone, examined female representation in the energy workplace from the perspective of 3,000 oil and gas professionals.

While nearly three-quarters of respondents (72%) believed oil and gas remains a male-dominated industry and there is still a lot of progress to be made, the majority of energy professionals said it was quite or very important for the oil and gas industry to ensure it is attractive to women. This finding is particularly relevant given nearly 9 out of 10 survey respondents were male.

The industry's progress may be most notable in respondents thoughts about the future. More than 60% said they expect the greatest increases in female representation to be among professionals just entering the industry and those early in their career.

The survey uncovered the barriers and challenges women frequently face in the oil and gas industry, as well as potential solutions for increasing female representation. Twenty percent strongly agreed gender-based discrimination occurs within the industry and respondents cited societal conditioning, a lack of qualified candidates, and family care responsibilities as most significant barriers to increasing the proportion of women in the industry.

Implementing science, technology, engineering and math (STEM) programs in schools and offering flexible working arrangements were cited as the most important ways to increase female representation.



OFFSHORE INDUSTRY HEADLINES

Research & Development • Environmental Assessment • Discovery

Recruiter says 120,000 oil jobs needed in UK over next 10 years

Some 120,000 new oil industry staff will be required in the UK in the next 10 years, according to results from oilandgaspeople.com's annual survey of oil and gas companies.

The job recruiter's survey found that 44% of the current oil and gas workforce were over 45 years of age with many due to retire in the next 5 to 10 years.

The survey also found that under investment in staff over the last 10 years was the main factor identified by respondents for the current skills shortage affecting the industry.

Of the companies surveyed, 88% said they would be increasing their workforce in the next 12 months, with many saying they would be happy to employ people from outside Aberdeen, Scotland in the Montrose and Angus area.

A separate survey of recruiters and staffing firms carried out by the website also identified a desperate shortage of skilled workers. With such a limited pool of candidates, 71% of recruiters said they had recruited staff via social media sites such as LinkedIn and Facebook.

"The oil and gas industry has always been very innovative so it comes as no surprise that so many recruiters turn to social media when looking for staff," Kevin Forbes, managing director of oilandgaspeople.com, said, noting that the website is heavily integrated with social media and its own social media networks are some of the largest online with direct reach to 1.5 million people in the industry.

Oilandgaspeople.com was set up by people who work in the oil industry to offer a live snapshot of the current oil and gas workforce and its availability.

Helicopter safety petition goes to Oil and Gas UK following crash

More than 3,000 offshore workers have signed a petition calling for safer helicopter transfers to and from North Sea installations.

The Unite union said the petition was submitted to industry body Oil and Gas UK, as part of the Back Home Safe campaign. It calls for improvements to offshore helicopter design and survival contingencies and training.

Four people died when a Super Puma crashed off Shetland last August.

"The views of over 3,000 offshore workers cannot be ignored, and their collective voice is loud and clear: they want safer helicopter transfers to and from installations," Unite regional industrial officer Tommy Campbell said.

"Confidence has clearly been shat-



Three men and a woman died when a Super Puma crashed off Shetland last summer

tered, and the industry now needs to demonstrate that it is prepared to evolve and improve the safety of its offshore helicopter fleet and its survival training so that we can minimize the chances of future fatalities."

The investigation into the August crash is ongoing.

Alaska Senator Lisa Murkowski urges end to crude export ban

The top Republican on the Senate Energy Committee has urged President Barack Obama to end a 39-year ban on exports of U.S. crude oil.

"We need to act before the crude oil export ban causes problems in the U.S. oil production, which will raise prices and therefore hurt American jobs," Senator Lisa Murkowski of Alaska said in recent remarks at the Brookings Institution.

Most exports of U.S. crude oil are prohibited under a 1975 law meant to counter surging gasoline prices after an Arab oil embargo. *Lisa Murkowski* However, advances in drilling techniques have led to increased production, and the Paris-based International Energy Agency now projects that the United States will surpass Russia and Saudi Arabia as the world's largest oil producer by 2015.

Murkowski, who vowed to introduce legislation in the absence of administration action, said she wants to settle the issue before a surge in production of lighter sweet crude in North Dakota's Bakken shale creates a market imbalance. Many U.S. refineries are geared to processing a heavier grade of the oil.

Opponents have said lifting the ban will increase gasoline prices for U.S. consumers as oil companies seek the highest prices, either at home or abroad.

Murkowski rejected such claims: "If we want to bring down gasoline prices, we should be opening up federal lands to energy production, not closing them off."

Nearly \$154B spent on drilling 46,736 U.S. wells in 2012: API

An estimated \$153.7 billion was invested in drilling about 46,736 oil and natural gas wells in 2012, according to American Petroleum Institute's (API's) 2012 Joint Association Survey on Drilling Costs. The investment represents a 23.1% increase over 2011 levels.

"The U.S. oil and natural gas revolution is gathering momentum, as companies invest more into domestic production and expand our ability to supply America's energy needs," said API statistics director Hazem Arafa.

He added: "Companies are opening more oil and gas wells, with a rising share of new investment devoted to exploration and production of oil, both onshore and offshore."

The total number of new wells increased by 5.8% from 2011 levels. Expenditures on oil represented 61.1% of all drilling costs in 2012, up from 49.3% in 2011. Gas expenditures accounted for 30.7% of costs, down from 44.2% in 2011.

"Natural gas production remains at historic highs, but we're seeing that new production is following the market, where the demand for oil is driving growth," said Arafa. "Each dollar spent means more jobs, more production, and more abundant energy to fuel America's manufacturing and economic renaissance."

Foreign investment in Russia oil and gas said to be constrained

Foreign investment in Russia's oil and gas sector will be constrained by onerous taxes and the risk of unpredictable government actions and interference, according to Moody's Investors Service.

Julia Pribytkova, vice president and senior analyst in Moody's corporate finance group, said in a new report that "although Russia is less reliant on oil and gas revenues than Azerbaijan and to a similar extent as Kazakhstan and is taking steps to ease taxation to stimulate investment upstream, it still imposes stricter controls and a heavier tax burden on companies operating in its oil and gas sector."

Moody's said foreign direct investment is important because Russia needs to develop resources in remote areas as its traditional oil and gas production areas are maturing.

"To maintain, if not grow, production levels, Russia will need to explore significantly harder-to-extract reserves than those in its traditional basins," Pribytkova said. "This will require a step-up in capital expenditure and technical expertise, supported by a sustainedly favorable tax regime and risk-sharing mechanisms with global partners."

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U.S. energy CFOs bullish, with some concerns, BDO survey finds

Sixty-three percent of chief financial officers feel more confident about the U.S. economy and its impact on demand for energy in 2014, a 54% increase from last year's study, according to BDO USA LLP's annual survey of 100 U.S. oil and gas CFOs. Underlying the positivity is the continuing profitability of shale exploration and production.

Thirty-two percent of CFOs see increased oil and gas prices as the most important factor driving overall growth for the energy industry in 2014, as the United States continues to sell its inexpensively produced resources at high international prices.

Supply and demand dynamics also continue to favor the U.S. industry. CFOs predict accelerated production of U.S. resources will continue in the New Year, with 73% and 76% of CFOs expecting the domestic supply of natural gas and oil, respectively, to increase in 2014.

Accompanying this growth in supply is an attendant growth in demand. Sixty-two percent of CFOs expect domestic demand for natural gas to increase in 2014, and 66% project that domestic demand for oil will grow, as well. Meanwhile, demand overseas continues to swell, with 65% and 64% of CFOs anticipating growth in global demand for oil and natural gas, respectively.

While energy CFOs are confident that opportunities for growth will continue in 2014, they remain conscious of challenges facing the industry. Fifty-three percent of CFOs believe legislative changes will be the top factor inhibiting overall industry growth in 2014, a modest 6% increase from last year's study.

Additionally, CFOs worry about the impact of international events on oil prices: 46% of CFOs cite ongoing turmoil in the Middle East as having the greatest impact on oil price volatility in

the coming year as conflicts continue in the region and Iran plans to ramp up its oil production once sanctions ease.

CFOs also express concern that economic growth in Asian countries will cause price fluctuations, with one-quarter of CFOs citing it as a top factor, more than a three-fold increase over last year's study.

"Non-conventional resources remain lucrative and continue to expand the United States' share of the international energy market," said Charles Dewhurst,



Charles Dewhurst

A modern compass offers drillers a 'magnetic' solution

Oil and gas drilling companies are using the Earth's magnetic field, along with modern technology, to reduce the cost and decrease the environmental impact while increasing production. The technology being used was discussed in the 2013 fall issue of Schlumberger's Oilfield Review. It also emphasizes on the public-private partnership between the U.S. Geological Survey (USGS) and partners to employ this technology and its uses around the world.

Oil and gas companies can now access multiple reservoirs from one drilling platform. They first drill vertically, then horizontally, but the operators must know where their bits are at all times to avoid collisions with other wells. One way this can be prevented is by installing a magnetometer in the drill-string instrument package that follows the drill bit. This device is like a compass, using the Earth's magnetic field to guide the drill bit in the proper direction.

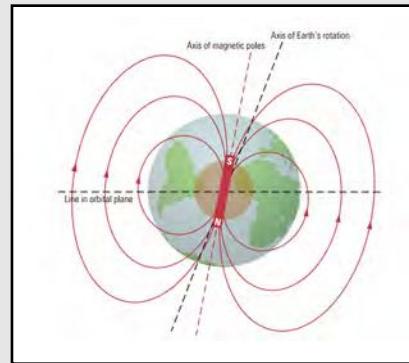
The USGS has magnetic observatories throughout the country that monitor the geomagnetic field every second. Drilling companies use geomagnetic referencing, which is a process that simultaneously measures the magnetic field in the drill hole and corresponds it with the information from the magnetic observatories. This process produces a highly accurate estimate for the drill bit's position and direction.

Factors like geomagnetic storms, daily tides, and higher latitudes cause the magnetic field to constantly change. So it is critical on knowing the exact position of the drill bit at all times.

"A drill-bit positioning requires directional accuracy of a fraction of a degree, and this can be accomplished with advanced technology and expert understanding of the Earth's dynamic magnetic field," a USGS spokesperson said. "USGS operational systems measure the magnetic field on a continuous basis. These data are provided as a service to research scientists, civilian and defense government agencies, and to customers in the private sector, including the oil and gas drilling industry."

There are 14 ground-based magnetic observatories around the United States that monitor the magnetic field through the USGS Geomagnetism Program. They gather geomagnetism data and distribute the data to their many customers. Changing conditions of space weather can interfere with radio communications, GPS systems, electric power grids, and satellite operations. High altitude pilots and astronauts may be subjected to enhanced levels of radiation, so monitoring the magnetic field is imperative.

The USGS magnetic observatory network works globally as well as domestically. The program partners with the U.S. National Space Weather program, NOAA, and the Air Force Weather Agency, along with private companies that are affected by geomagnetic activity and space weather.



A simplified geomagnetic field

partner and leader of the natural resources practice at BDO. "But energy executives also know that this highly volatile industry is vulnerable to global events, and are therefore thinking carefully about their contingency plans should the price environment take a turn for the worse."

Thirty-six percent of CFOs cite regulatory changes as a top political concern for 2014, followed closely by energy industry-targeted tax proposals (26%). CFOs are particularly concerned about the potential loss of the tax deduction for intangible drilling costs: more than half (53%) cite it as their leading tax concern

in the new year, down six percentage points from last year.

"The IDC deduction is one of the largest tax breaks available to these companies, and as budget debates continue on the Hill, energy executives are concerned that it might end up on the chopping block," said Clark Sackschewsky, partner with BDO's natural resources practice.



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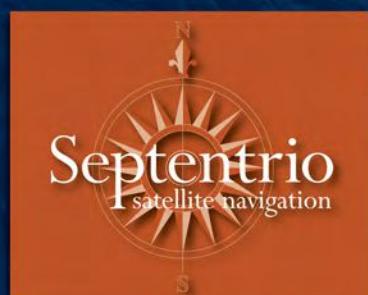
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Dolphin lands \$245.4M Chevron UK drilling contract

Chevron North Sea Ltd. awarded a new \$245.4 million contract to Dolphin Drilling Ltd., a subsidiary of Fred. Olsen Energy ASA, for a 20-month multi-well drilling and completion program across several of Chevron's operations in the UK sector of the North Sea. The contract is to provide drilling and completion operations using the semi-submersible rig, the Blackford Dolphin, and includes a rig refurbishment to upgrade the unit for North Sea activity work. The drilling program is expected to commence in 2015 for an initial period of 572 days. Chevron said it has an option to extend the drilling program for a further 1 to 2 years.

McDermott wins Middle East field expansion contract

McDermott International won an EPCI contract valued at around \$200 million for an offshore project in the Middle East. The scope includes fabrication, transportation, and installation of two production deck modules and 10 observation platforms, two subsea pipeline installations, three submarine power cables, and two fiber optic cables. Stewart Mitchell, McDermott's senior vice president and general manager, Middle East and Atlantic, said engineering would be conducted at the company's offices in Dubai and Al Khobar, with construction and transportation handled by its Jebel Ali fabrication yard. "This project is a continuation of work we have previously completed for the same client in the same field," he noted. "Knowledge and experience gained over the years will give us a greater insight into the field characteristics and project execution requirements." McDermott vessels should mobilize for the installations toward mid-2014. Project completion, including hookup and commissioning, is scheduled for the first quarter of 2015.

New Industries completes work on deepwater pipeline

New Industries, Inc., based in Morgan City, Louisiana, recently completed fabrication, inspection and testing of in-line valve (ILV) and sled (ILS) structures for a large diameter deepwater pipeline in the Gulf of Mexico. The company completed 48 welds, which included 16 welds on the ILV structures and 32 welds on the ILS structures. The materials that were welded

included ASTM A707, ASTM F65, and API 5L X65 material. Additionally, the piping ranged from 20-in. OD to 25.494-in. OD with wall thickness ranging from 1.30 in. to 1.969 in. "This project was successful due to great teamwork from all parties involved, including New Industries,

the installation contactor, and the end user," said Chad Paradee, New Industries' project manager. Structural fabrication included cradles, yokes, support frames, and lifting devices for both the ILV and ILS structures. Pressure containing piping was completed with GTAW, FCAW, SAW, and GMAW processes. FAT activities included hydrostatic testing and gauging. New Industries also completed EFAT activities to stimulate installation on the deepwater vessel. "This project is the first of three jobs for the deepwater Gulf of Mexico for one of the world's largest pipeline installation contractors," company president Bill New said. "I am especially proud of the outstanding quality and safety performance of our employees and subcontractors on this challenging project." New Industries was founded in 1986. For more information, visit the website at www.newindustries.com.



Historic energy reform opens Mexico's oilpatch

For the first time in seven decades, private companies such as ExxonMobil and Chevron will be permitted to drill for oil and gas in Mexico under sweeping reforms passed by both houses of Congress and signed by Mexican President Enrique Pena Nieto. In fewer than 3 days, the bill received the backing of a majority of Mexico's states legislatures, a condition needed for any constitutional changes.

Pena Nieto said the new energy laws and other reforms have strengthened confidence in Mexico, citing them as the reason Standard & Poor's raised the country's credit rating one step to BBB+. Proponents hope the overhaul will reverse 8 years of oil output declines for state-owned Pemex and increase production to as much as 4 mmbbl/d by 2025.

"We, Mexicans, have decided to set aside myths and taboos, to take a big step forward," said Pena Nieto, who argues that Mexico needs the foreign companies' expertise and technology to exploit its vast reserves.

He called the energy bill "a fundamental, historic reform" needed for Mexico to speed up the lagging pace of its economic growth.

The laws will allow private contracts for profit- and production-sharing with private companies to explore and drill for oil and gas that Mexico hasn't been able to tap. Mexico's Energy Department will also be able to auction oil and gas licenses, mostly for deepwater projects, and then collect taxes and royalties from companies for the amount extracted.

Congress still must draft, within 3 months, enabling legislation that will specify how the government awards contracts and how the new profit is managed. Private contracts had been banned since the oil industry was nationalized by president Lazaro Cardenas in 1938.

Mexico, U.S. settle Gulf of Mexico boundary conflict

The U.S. Congress approved an agreement between the United States and Mexico allowing joint energy development projects along their shared maritime border in the Gulf of Mexico, as part of the final approval of Congress' budget deal.

"The energy production made possible by this agreement will put Americans to work and raise more revenue for the government," said Erik Milito, director of upstream and industry operations for the American Petroleum Institute (API). "American companies will now have the certainty they need to invest confidently along our maritime border with Mexico."

The Transboundary Hydrocarbon Agreement specifically establishes a cooperative process for managing oil and gas reservoirs along the boundary region in the Gulf of Mexico, for years a source of conflict between the two countries.

"Offshore oil and natural gas development in the U.S. is largely limited to the Western and Central Gulf of Mexico," Milito noted. "Opening up new areas in the Atlantic, Arctic, Pacific, and Eastern Gulf of Mexico could produce even more energy, job creation and money for the government."

Offshore energy development in the Atlantic could create 280,000 new American jobs and generate \$51 billion in new revenue for the government, according to a recent report.



President Enrique Pena Nieto

BP makes 'significant' oil discovery at Gila in deepwater Gulf of Mexico

BP said it made a "significant" oil discovery at its Gila prospect, which it co-owns with ConocoPhillips, in the deepwater U.S. Gulf of Mexico. This is BP's third discovery in recent years in the Gulf's emerging Paleogene trend.

BP previously announced two other Paleogene discoveries in the Gulf of Mexico — Kaskida in 2006 and Tiber in 2009. The Gila discovery was made by an exploration well on Keathley Canyon Block 93, about 300 mi southwest of New Orleans, in about 4,900 ft of water.

The well, which penetrated multiple Paleogene-aged reservoir sands, was drilled to a total depth of 29,221 ft. Appraisal drilling, including completion of drilling through the Paleocene section, will be required to determine the size and potential commerciality of the discovery, BP said.

The Gila discovery is a further sign that momentum is returning to BP's drilling operations and well execution in the Gulf of Mexico following the 2010 Horizon drillship explosion and subsequent oil spill from the Macondo exploration well.

"Gila continues our successful drill



West Capricorn drilling at Gila prospect

out of the prolific Paleogene play system in the deepwater Gulf of Mexico," said Mike Daly, BP's global head of exploration. "Subject to successful appraisal, Gila, Tiber and Kaskida together offer the potential for significant future oil developments in the Keathley Canyon area."

BP operates and owns a majority interest (80%) in the Gila discovery, which is located about 25 mi west of Tiber, also located in the Keathley Canyon area. The lease for Keathley Canyon Block 93 was acquired in the Western Gulf of Mexico Lease OCS Sale 187 in 2003. Over the past 5 years, BP has invested more than \$55 billion in the United States, more than any other energy company.

ConocoPhillips holds the remaining 20% interest in the Gila prospect.

Moneypenny, Thunderball prospects hold 2.74 mmboe, Saratoga confirms

Saratoga Resources, Inc. said it received independent, third-party audited reserve estimates from DeGolyer and MacNaughton on two of its shallow Gulf of Mexico leases, awarded in 2013.

Combined proved undeveloped reserves for the Moneypenny prospect in Ship Shoal Block 78 and the Thunderball prospect in Vermilion Block 153 totals 2.74 mmboe, 46% of which is oil, with estimated present worth values using a discount rate of 10% of \$37.2 million, Saratoga said, noting that the reserves are supplemental to the existing proved reserves associated with the company's state and parish leases.

In addition to the Moneypenny and Thunderball prospects that included proved undeveloped reserves, Saratoga's new Gulf of Mexico leases included the Goldfinger prospect in Vermilion Block 152 and the Solitaire prospect in Ship Shoals Block 110.

"DeGolyer and MacNaughton's reserve report affirms our excitement regarding the potential of our new Gulf of Mexico prospects," said Thomas Cooke, Saratoga's chairman and chief executive officer.

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Keppel FELS to build new-design drillship featuring more deck space

Keppel FELS has decided to proceed with building a drillship using a new design dubbed the CAN DO. Jointly developed by Keppel Offshore & Marine Technology Centre (KOMtech), the research and development arm of Keppel O&M, and partner GustoMSC, Keppel's CAN DO drillship is designed to overcome the constraints of limited deck space found in many drillships.

Apart from incorporating exploration drilling requirements, the design has a large functional deck space to allow installation of third-party equipment for development and completion drilling. In addition, the drillship has a double blowout preventer stack integrated into the design and has a riser hold capacity meeting 12,000 ft water depth with the flexibility of storing either 75-ft or 90-ft risers. The vessel is scheduled for completion in 2016.

"While most modern drillships currently in operation were designed and built for exploration drilling, industry feedback has revealed the need for vessels capable of performing development and completion drilling in addition to



Drillship design dubbed the CAN DO

exploration drilling," said Chow Yew Yuen, chief operating officer and chief executive officer designate of Keppel Offshore & Marine Ltd.

Bumi Armada ice-class vessels to service V.Filanovsky platforms

Lukoil-Nizhnevolzhskneft has contracted Bumi Armada Berhad for three ice-class vessels to service platforms on the V.Filanovsky field in the Russian sector of the Caspian Sea. All the contracts are for 10 years, extendable by up to 20 additional years. Total value for the fixed 10-year charters is \$262 million.

The two parties also signed an interim contract valued at \$18 million for provision of two support vessels and one multi-purpose duty-rescue vessel. These will be delivered in November 2014 for deployment pending delivery of the ice-class vessels. The new ice-class support and duty-rescue vessels will start operating in November 2015, providing year-round services, including delivery of cargo and personnel, salvage, search and rescue, fire-fighting, towing, and tanker mooring operations.

The two 5,280-brake horsepower support vessels will be 262 ft long, 54 ft wide, with a draft of 12.5 ft, and will be diesel direct drive, ice-class, and Volga Don Canal compliant, with FiFi1 and DP-2 capabilities. They will each be able to handle a crew of 24.

The multi-purpose duty-rescue vessel will have around 6,000 horsepower and will be 262 ft long, 54 ft wide, with a draft of 13.8 ft, and the same technical specifications. Additionally, it will be equipped for oil spill collection and storage, with cabins for 24 persons and temporary accommodation for 125 rescued persons.

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Ensenco plc takes delivery of newbuild ENSCO 121 rig

Contract driller Ensenco plc has taken delivery of ENSCO 121, the second of four ultra-premium harsh environment jack-up rigs in its ENSCO 120 series. The rig is contracted to work in the North Sea beginning in the second quarter of 2014 at a day rate of around \$230,000, the company said.

ENSCO 121 was constructed at the Keppel FELS yard in Singapore and was scheduled to depart for Rotterdam for final load out and crew familiarization.

The first rig in the series, ENSCO 120 is under contract in the North Sea. ENSCO 122 will be delivered in the third quarter of 2014 and is contracted for North Sea work as well. In November, based on strong customer demand, Ensenco ordered ENSCO 123, the fourth rig in the series, for delivery in the second quarter of 2016.

These new jack-up rigs are enhanced versions of the KFELS Super A design. Capable of operating in water depths up to 400 ft, ENSCO 120 series rigs are designed for the most demanding large multi-well platform programs, ultra-deep gas programs or ultra-long reach wells up to 40,000 ft total drilling depth.

The rigs have a significantly improved cantilever envelope, 18 3/4-in. 15k 4-ram BOP, 2.5 mm-pound quad derrick, enhanced rig floor layout, fully automated hands-free offline pipe handling systems, ultra-high-capacity jacking and fixation systems, 150-person quarters and strict noise and ergonomic standards. These features were previously found only in the largest ultra-harsh environment jack-up rigs.



ENSCO 120 series



Gibdock completes upgrade work on CGG vessel

Gibdock has completed an overhaul of the seismic survey vessel Viking Vanquish, which is operated by CGG and owned by Eidesvik. Main scope of work involved a tailshaft withdrawal and full overhaul of the shaft, couplings, liners, and related equipment. This was a complex process, Gibdock explained, as removing the shaft required cutting away a section of the stern tube to gain access. The yard in Gibraltar additionally performed tests on the vessel's winches, along with pipe works, propeller blade-seal renewal, and blasting-painting of the vessel's exterior areas. For this project, the yard used a new cleaning product from Ultraclean, a combination of gel and chemicals, to remove corrosion on Viking Vanquish's gun-deck and cranes. The material was then washed away with water to prepare surfaces for coating.

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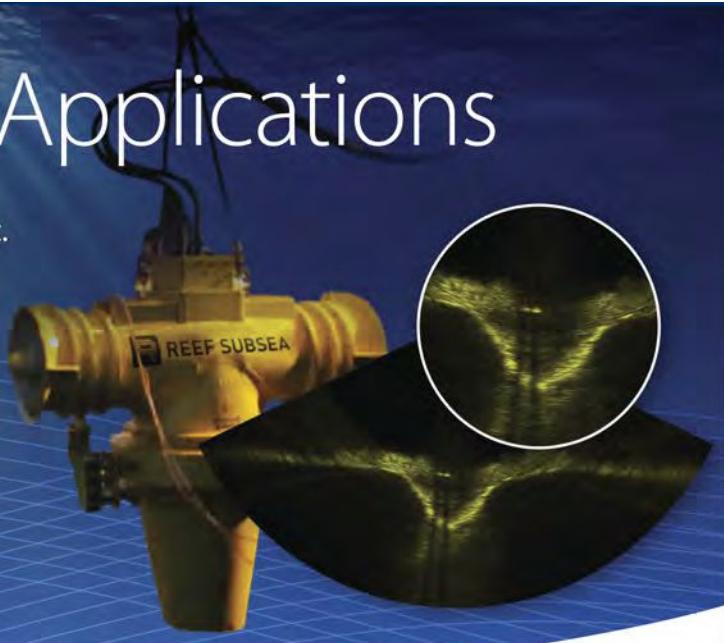
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Gazprom says first oil flowing from Arctic field Prirazlomnoye

Russia's first Arctic offshore field Prirazlomnoye has started producing oil, operator Gazprom said. The project, almost a decade behind its initial schedule, had long been delayed due to various challenges, including aging equipment and a change in shareholders structure. Difficulties obtaining official clearances and technical problems also are said to have hampered the project.

"We became the pioneers of Russia's Arctic development," Gazprom chief executive officer Alexei Miller claimed in a statement.

President Vladimir Putin has said Russia's Arctic offshore riches are of a strategic importance for the country, which now is pumping an average of 10.6 mmbbl of oil per day, close to its current capacity. Global majors including ExxonMobil, Eni and Statoil are clinching deals to enter the Russian Arctic.

Gazprom Neft had expected initial production at Prirazlomnoye at 12,000 bbl/d in 2014 with a plateau of 120,000 bbl/d 2021. Oil will be extracted from the deposit, where winter temperatures often plunge below -50°C, and then pumped to tankers bound for Europe.



Production oil platform Prirazlomnoye

Gazprom Neft sees overall investments into the project at about 200 billion rubles (\$6 billion), of which half had already been spent with the bulk accounting for a special ice-proof platform.

Petrobras declares commerciality in offshore presalt fields in Brazil

Petrobras has submitted its declaration of commerciality of the oil and gas accumulations of Franco and Sul de Tupi to Brazil's National Petroleum, Natural Gas and Biofuels Agency (ANP). These areas are part of the transfer of rights agreement and are located in the Santos basin presalt area. In the proposal sent to the

ANP, the names suggested for the new fields were Búzios and Sul de Lula (South of Lula) for Franco and Sul de Tupi, respectively.

The volume contracted through the transfer of rights agreement for Franco area of 3.058 Bboe was confirmed in the exploratory phase. The presalt reservoirs in this field contain good-quality oil (26 to 28 degrees API). During the execution of the Franco Mandatory Exploratory Plan, Petrobras acquired 3D seismic data for the entire area, drilled two mandatory wells and six additional ones, with the objective of delimiting and characterizing reservoirs. An extended formation test also was performed.

Búzios field is nearly 124 mi off the coast of Rio de Janeiro state, with water depths from 5,249 ft to 6,890 ft. The volume contracted through the transfer of rights agreement for the Sul de Tupi area of 128 mmboe was confirmed during the exploratory phase. The presalt reservoirs in this field contain good quality oil (27 degrees API).

Sul de Tupi is located nearly 187 mi off the coast of Rio de Janeiro state, at a water depth of approximately 7,218 ft, according to Petrobras.

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Energy XXI discovers oil at its Stricker well in Gulf of Mexico

Energy XXI said it discovered oil at its Stricker well on West Delta 30 field in the U.S. Gulf of Mexico. The well was drilled to 5,897 ft measured depth, or 5,168 ft total vertical depth, and logged 79 net ft of oil pay in six different reservoirs, five of which were previously untested and are new discoveries.

The well is currently being sidetracked down dip to delineate the size of the new discoveries in anticipation of finding incremental net pay. Energy XXI said that additional development wells may be needed to accelerate recovery of reserves due to discovery of several pay sands in the Stricker well, which marks the company's first well drilled after its acquisition in December 2010.

John Schiller, Energy XXI chairman and chief executive officer, said that the company intends to run production logs on all its producing horizontal completions on the D platform after the movement of the rig.

"We believe the knowledge acquired from this logging program will give us additional data to further enhance the superior results we are seeing from our

horizontal campaign," he said. "We believe the knowledge acquired from this logging program will give us additional data to further enhance the superior results we are seeing from our horizontal campaign."

Located 21 mi off Grand Isle, Louisiana, in 45 ft of water, the West Delta 30 saw its first discovery in 1948 by Humble Oil.

Chevron to pursue development of Alder field in Central North Sea

Chevron Corp. said it reached a final investment decision and received approval from the U.K. government to proceed with the development of the Alder field in the Central North Sea. The project has a planned design capacity of 110 mmcft of natural gas and 14,000 bbl of condensate per day. First production is expected in 2016.

Discovered in 1975, development was recently enabled by innovative technologies to manage the high-pressure high-temperature gas condensate field located in Block 15/29a, in a water depth of 492 ft about 100 mi from the Scottish coastline and 37 mi from the U.K./Norway median line.

Statoil, partners strike oil and gas on Skavl prospect in Barents Sea

Norway's Statoil said it made two major oil discoveries and a gas discovery in the Skavl prospect close to Johan Castberg in the Barents Sea, which is located north of Norway and Russia.

Statoil is drilling the area together with partners Eni Norge AS and Petoro AS. They discovered a 22-m gas column and a 23-m oil column in the Jurassic Tubaen formation and a 133-m oil column in the Triassic Fruholmen formation.

According to Statoil, there could be as many as 5 mmbbl worth of recoverable oil in the area.

"Statoil puts a lot of effort into providing additional oil resources in the Johan Castberg area in order to make the field development project more robust. We are pleased to see that our efforts are now paying off," Gro G. Haatvedt, Statoil's senior vice president for exploration on the Norwegian continental shelf, said in a statement.

Skavl was the third of the four wells in the Johan Castberg area Statoil had on its drilling plan this year. The first two wells, Nunatak and Iskrystall, proved only gas.

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Seismic vessel Ramford Vanguard

Statoil, partners to conduct Barents seismic acquisition

Statoil, along with a group of 16 oil and gas companies, has undertaken a project for joint seismic acquisition in the south-eastern Barents Sea. Norwegian Oil and Gas Association, which established the project on the request of the Norwegian Ministry of Petroleum and Energy (MPE), will jointly acquire seismic 3D data from the blocks in the region.

The blocks represent the first new area to be opened on the Norwegian Continental Shelf (NCS) since 1994 and are scheduled to be announced in the 23rd licensing round for the area in 2014. According to Statoil, the coordinated seismic acquisition offers good data quality with the usage of the companies' collective professional expertise within geological understanding and seismic acquisition and processing.

About 30 companies have shown interest in participating in

the project, and more are expected to engage after the authorities circulate the 23rd round nominated blocks for public consultation. The companies are planning to start the seismic surveys in April 2014 and conclude them in the autumn of the same year.

Statoil operates the project with partners BP, Chevron, ConocoPhillips, Det norske oljeselskap, Eni, GDF Suez, Idemitsu, Lukoil, Lundin, Norske Shell, PGNiG, Repsol, Spike, Suncor, VNG, and Wintershall.

Sasol to explore offshore eastern South Africa

Petroleum Agency South Africa (PADA) has awarded Sasol Petroleum International an exploration right permit offshore KwaZulu-Natal province. The concession, which has an initial 3-year term, involves exploration in the Durban and Zululand basins off the country's eastern coast. Both are at the southern end of the Mozambique Channel, which has brought large gas discoveries for Anadarko Petroleum and Eni, mainly in the deepwater Rovuma basin.

This is Sasol's first operated exploration right license in South Africa for at least a decade, said Ebbie Haan, managing director of Sasol Petroleum International. In 2011, the company was granted a technical cooperation permit (TCP 032) to study and investigate the potential for hydrocarbons, over an area covering 32,046 sq. mi.

The 100% interest in the exploration right follows submission of a work program in September 2012, followed by an environmental impact assessment and environmental management plan, which was completed in February 2013.

Sasol has already acquired 2,485 mi of a 2D seismic survey on the new permit out of total planned area of 3,697 mi. The remainder will be acquired, followed by interpretation.

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Gas needs driving deepwater exploration in Black Sea: analyst

Up to 10 deepwater exploratory wells could be drilled in the Black Sea by 2018 estimates analyst Wood Mackenzie. Interest in the region has grown following ExxonMobil-OMV Petrom's deepwater Domino gas discovery in the Romanian sector.

"There's no doubt that Domino had been transformative for the region, stimulating interest in the Black Sea," said Chris Mereith, upstream research analyst for Wood Mackenzie. "While the field has yet to be fully appraised, we forecast that production could come onstream by 2019."

He said the size of the discovery is a strong indication of the potential for further significant gas discoveries in the region.

"Deepwater exploration spending by ExxonMobil and Petrom in Romania through to 2015 could reach \$1 billion," he added.

Although there is no existing deepwater infrastructure or supporting service sector in the region, Wood Mackenzie said new players such as ExxonMobil, Total, Shell, OMV Petrom, and Repsol have the expertise, resources, capability, and credibility to surmount these issues.

Increasingly strict European environmental legislation also is likely to support new gas-fired power generation at the expense of coal and gas demand.

IPB wins approval for Pryderi-1 oil exploration well in Australia

IPB Petroleum has been granted environmental plan approval by the Australian National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) for the Pryderi-1 oil exploration well, off the coast of northwest Australia. Following the approval, the company has moved a step closer to starting drilling at the Pryderi-1 oil exploration well in WA-424-P.

The companies expect to discover best estimate prospective resources of 32 mmbbl of oil, which IPB has a 75% interest in and its partner has CalEnergy holds 25%. The authorities have also permitted the company to form a joint venture with CalEnergy for activities related to drilling the well.

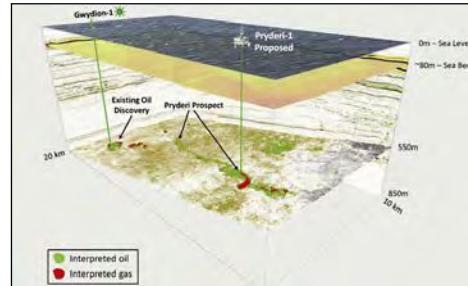
Both companies are expected to undertake rig selection and negotiation activities, finalize and order items includ-

ing such items as wellheads, as well as conduct geophysical site survey.

The Pryderi well is located at a distance of about 5 km away from Gwydion-1, which encountered a 14.5-m gas column in glauconitic sand above a 10-m oil column in clean sand.

The well is expected to have 75% chance of hydrocarbon discovery with 60% chance of this being oil, or an overall 45% chance of an oil discovery.

The company said it expected to spud the Pryderi-1 well within about 2 weeks.



3D seismic image of top reservoir at Gwydion discovery and neighboring Pryderi prospect



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Construction under way on North Sea Gina Krog jacket

Heerema Fabrication Group (HFG) has cut first steel for Statoil's Gina Krog platform jacket in the central Norwegian North Sea.

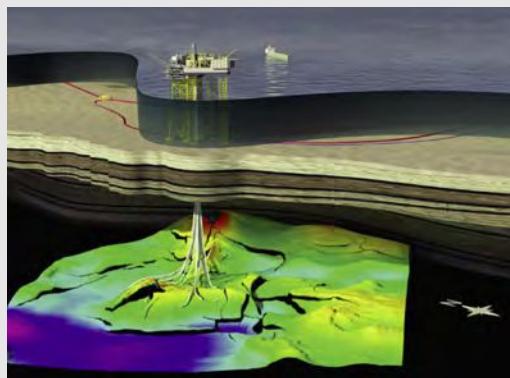
This will be the largest launch-designed jacket HFG has built for Statoil. It will be around 466 ft tall, with a footprint of 196 ft by 64 ft and a top section of 139 ft by 86 ft. HFG Engineering is responsible for detailed design.

The 250-ton pre-drilling well-head module, measuring 52 ft by 56 ft by 13 ft, will be integrated into the topsides cellar deck. This and the jacket are due to leave Vlissingen in April 2015.

Koos-Jan van Brouwershaven, chief executive officer of HFG, said the company has invested in heavy-duty skid beams at the yard for this project.

Offshore installation is planned to start in summer 2015, with drilling through the jacket due to start soon afterward.

Gina Krog (ex-Dagny) is a gas, condensate and oil field, 18.6 mi northwest of Sleipner. It is being developed with a fixed platform in 380 ft of water and will be connected to the Sleipner facilities for gas export, with oil transported by tankers.



Artist impression of the Gina Krog (formerly Dagny) platform and field development

Shah Deniz gas export project gets okay for next development stage

The BP-led Shah Deniz consortium has taken a final investment decision for the Stage 2 development of the gas field offshore Azerbaijan.

This involves expanding the existing overland South Caucasus pipeline through Azerbaijan and Georgia and constructing the Trans-Anatolian Gas Pipeline (TANAP) across Turkey and the connecting Trans-Adriatic Pipeline (TAP) through Greece, Albania, and into Italy.

These projects, along with gas transmission infrastructure to Bulgaria, will create a new Southern Gas Corridor to Europe.

Investments at Shah Deniz will include drilling and completion of 26 new subsea wells and construction of two bridge-linked platforms. Onshore there will be new processing and compression facilities at Sangachal.

BP estimates the total cost of Shah Deniz Stage 2 and the various pipeline projects at around \$28 billion. These will transport 565 bcf per year of gas from the giant offshore field around 2,175 mi to consumers in Georgia, Turkey, Greece, Bulgaria, and Italy.

The consortium is targeting first gas

for late 2018, starting with sales to Georgia and Turkey. Deliveries to Europe will follow a year later.

Condensate production from Shah Deniz should increase from the current level of 55,000 bbl/d to 120,000 bbl/d.

In the short term, the consortium has agreed with the Azeri state oil company Socar to expand gas production through the existing facilities by 49 bcf per year. The new level is likely to be attained by the end of 2014.

Socar has additionally agreed on terms for extending the Shah Deniz production-sharing agreement (PSA) up to 2048. The partners have agreed to perform exploration and appraisal on prospects within the PSA area.

Rolls-Royce to power new United Arab Emirates offshore complex

Rolls-Royce will supply power generation equipment and related services for ADMA-OPCO's Satah Al-Razboot (SARB) development offshore the United Arab Emirates.

Main contractor Hyundai Engineering and Construction (HDEC) has ordered five Rolls-Royce aero-derivative Trent 60 gas turbine generator sets to power offshore production platforms and oil and

gas processing facilities on Zirku Island. Each Trent 60 system can generate up to 66 MW of power.

Rolls-Royce will manufacture the equipment at its plants in Montreal, Canada and Mount Vernon, Ohio.

SARB involves construction of facilities on two artificial islands to export oil from 86 wells on the SARB oil field, 75 mi northwest of Abu Dhabi. Additionally, HDEC will build a complex on Zirku Island to separate gas from crude produced from the SARB and Umm Al Lulu oil fields. The complex will be equipped to process 200,000 bbl/d of oil and 35 mmcf/d of gas for domestic use.

Oman gives go-ahead for Khazzan project with BP as field operator

The government of the Sultanate of Oman and BP have signed a gas sales agreement and an amended production sharing agreement for the development of the Khazzan field, with BP as operator.

The full field development will involve a drilling program of around 300 wells over 15 years to deliver plateau production of 1 bcf of gas per day and 25,000 bbl of oil per day of gas condensate. This volume is equivalent to around a third of Oman's total daily domestic gas supply and will make a significant contribution to ensuring continuing stable supplies from domestic sources.

The total investment in the full field development is around \$16 billion, which includes the investment made to date in the appraisal of the resource and early well test program.

The Khazzan project represents the first phase in the development of one of the Middle East region's largest unconventional tight gas accumulations, which has the potential to be a major new source of gas supply for Oman over many decades.

Construction work for the Khazzan project, located in the south of Block 61, will begin in 2014, and first gas is expected in late 2017. Gas production is expected to ramp up to plateau in 2018, and in total the project is expected to develop around 7 tcf of gas, which will require BP to successfully deploy new technologies.

The amended exploration and production sharing agreement and a gas sales agreement extend for an initial 30 years and also provide for the additional appraisal of further gas resources within Block 61, which are expected to be developed in subsequent project phases. The full field development involves a 15-year drilling program, with production tied back to a new central processing facility in Block 61.

Vallourec expands subsea scope for CLOV project offshore Angola

Vallourec is to provide a range of connection devices for Total's CLOV deepwater oil and gas development offshore Angola. CLOV comprises the oil and gas fields Cravo, Lirio, Orquidea, and Violeta in Block 17, in water depths ranging from 3,609 to 4,593 ft. Production is due to start in the second quarter of 2014.

Vallourec will equip the 34 subsea wells with around 15,000 tons of OCTG products featuring VAM premium connections. Two of the rigs drilling CLOV's development wells are also using Vallourec drillstrings and connections. The subsea wells will be tied back to the new CLOV FPSO, which arrived at the Paenal Yard in Porto Amboim, Angola, in late November.

To secure transportation of hydrocarbons to the FPSO, Vallourec has delivered 28,500 tons of coated seamless line pipe and bends to installation contractor Subsea 7. The company supplied an additional 2,400 tons of seamless pipe for construction of the riser towers.

Vallourec is also supplying around 93 mi of anticorrosion coating on the pipes and roughly 700 hot induction bends. The production flowlines, which include a pipe-in-pipe solution, will be assembled in Angola. Serimax, Vallourec's welding specialist, operated its Saturnax 09 welding equipment during 7 months on board Subsea 7's pipelay vessel Seven Borealis. It delivered around 5,500 welds on pipes, including corrosion-and fatigue-sensitive sections.

Platform P-55 begins operation in Campos Basin's Roncador field

The Petrobras' P-55 platform, one of the company's strategic projects in the 2013-2017 business and management plan, has begun producing in Campos Basin's Roncador field.

P-55 is part of Roncador's field Module 3 project and will be connected to 17 wells, 11 of which are oil and gas production and 6 water injection. Oil and natural gas will be transported from the platform via submarine pipelines.

P-55 is a semi-submersible unit installed at a water depth of 1,800 m, with a per day capacity for processing 180,000 bbl of oil, compressing 6,000,000 m³ of natural gas and injecting 290,000 bbl of water.

Weighing 52,000 tons and with an area of 10,000 m², P-55 is the biggest semi-submersible platform ever built in Brazil and one of the biggest of its kind worldwide.

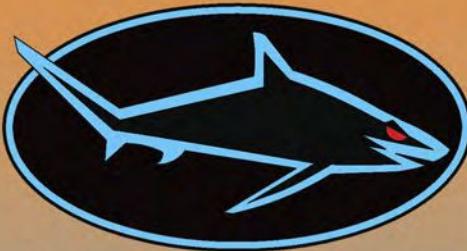
Construction work on P-55 is part of the Brazilian Government's Growth Acceleration Plan (PAC). The construc-

tion and integration of platform modules were carried out entirely in Brazil, boosting the local content rate to 79%. Construction work generated 5,000 direct and 15,000 indirect jobs.

The new unit will operate alongside platforms P-52 and P-54, already installed in Roncador field, and with platform P-62, that left the Atlântico Sul Shipyard, in Ipojuca, state of Pernambuco, in late December, and is moving toward its location in Module IV of the field.



The P-55 is the largest semi-submersible platform built in Brazil



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*Sentinel Intruder
Detection System*

naval end users. It is said to be the world's most widely deployed intruder detection sonar.

The system has the capability to detect, track and classify divers as well as small underwater vehicles approaching a protected asset from any direction.

Upon tracking, the system alerts secu-

rity personnel to the potential threat.

The autonomous monitoring capabilities, long range detection and low false alarm rates of Sentinel are said to provide a rapidly deployable, 360° underwater security solution for any application. The applications include protecting a critical infrastructure facility, offshore platform, sea port or superyacht at anchor.

"We're seeing an increasing requirement for our diver detection technology to be deployed to protect these vulnerable facilities," said Nick Swift, Sonardyne Maritime Security's business manager.

"Each one faces different security threats depending on the region in which they are operating, and we work closely with customers and users to ensure the systems we deliver fulfil their requirements for underwater surveillance."

The company expects further orders from its customer for additional systems for vessel operations in the same vicinity.

The latest installations will enable the company to increase its presence in the market and also help maintain its position as the supplier of diver detection systems, the company said.

For more information, visit the company website at www.sonardyne.com.

E&P supercomputer is among most powerful in the world: Eni

Eni has started using a new petaflop class supercomputer at its Ferrera Erbognone data center in Pavia. The new system's computing capacity of over three petaflops is expected to improve the accuracy and resolution of Eni's geo-physical and geological studies for exploration and development purposes. That performance, the company said, is comparable to the most powerful computing centers worldwide.

The supercomputer is based on a cluster architecture and features 1,500 dual-CPU nodes (24,000 cores), enhanced by 1,300 general purpose graphics processing units, that are used as computational accelerators equivalent to 20,800 additional cores.

Cluster nodes are connected via a high-speed internal network, with a high-bandwidth parallel storage system providing five petabyte disk capacity.

Eni plans to maintain the capacity at the level required to match its business needs, with half the nodes replaced each year to keep pace with the technology development cycle. The system will support execution of Eni 3D seismic imaging packages.

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Atwood Oceanics takes delivery of new ultra-deepwater drillship

Atwood Oceanics has taken delivery of the Atwood Advantage, the first in a series of four ultra-deepwater drillships the company is building at Daewoo Shipbuilding & Marine Engineering in South Korea. The new drillship, under contract with Noble Energy for 3 years, has been mobilized to the U.S. Gulf of Mexico.

The next vessel in the series, Atwood Achiever, is slated for delivery by the end of June 2014. Both rigs are capable of drilling in water depths up to 12,000 ft.

Last June, Atwood Oceanics also exercised an option with Daewoo Shipbuilding and Marine Engineering for a fourth ultra-deepwater drillship, to be named the Atwood Archer. Another ultra-deepwater rig, the Atwood Admiral, is under construction at the Daewoo yard.

The Atwood Archer is scheduled to be delivered by the end of 2015 at a cost of approximately \$635 million. It also is a DP-3 dynamically positioned, dual-derrick rig capable of operating in 12,000-ft water depths and will have the same design as the Atwood Advantage, Atwood Achiever and Atwood Admiral. The Houston-based driller has an option



Artist's impression of Quad 204 FPSO
with DSME for a fifth ultra-deepwater drillship that must be exercised by 31 March 2014.

Tritech to provide monitoring technology for Quad 204 FPSO

Single Buoy Moorings Inc. has contracted Tritech International to supply mooring line and riser monitoring technology for the BP Quad 204 development newbuild FPSO.

The RAMS technology will provide 24/7 real-time simultaneous monitoring of all subsea targets beneath the FPSO. Tritech is to supply a full hardware and software solution. In addition to the software's ability to assign user-defined alarms for early warning failure detections, data gathered from the RAMS system's continuous real-time monitoring

will be analyzed for asset fatigue studies.

The RAMS system will be deployed through deployment chutes in the FPSO turret, following its anchoring about 100 mi off the west coast of Shetland, in a water depth of 1,148 to 1,476 ft.

Tritech has contracted Subsea 7 IAS team to design, develop, and supply the deployment system.

Saipem board approves sale of Firenze FPSO business line to Eni

Saipem's board of directors has approved an agreement with Eni for the sale of the Firenze FPSO business line for \$462.3 million. Eni will purchase the Firenze FPSO, which is currently deployed in the Eni-operated Aquila field off the coast of Puglia, together with its onboard processing plant. The sale also includes existing related contracts, including those in place with production and vessel operations personnel.

The contract, signed with Eni in 2009, provided for the option to purchase the Firenze subsequent to conversion and commissioning, which was completed at the end of last year. The agreement provides for the transfer of the Firenze FPSO business line to a newly established company, Floater SpA.

February 2014

57

Ocean News & Technology

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BP technology boosts oil recovery, adding to potential energy supplies

BP and its co-venturers are deploying for the first time a new technology that could significantly increase the amount of oil that can be recovered from the UK's largest hydrocarbon resource. The Clair Ridge development, west of Shetland, is the first sanctioned large-scale offshore enhanced oil recovery (EOR) scheme using reduced salinity water injection (LoSal® EOR). The intention is to extract a higher proportion of oil over the life of the field from the rocks deep below the seabed than has previously been possible.

The multi-billion dollar development at Clair Ridge includes around \$120 million for the desalination facilities to create low-salinity water for waterflooding from seawater. BP estimates this will enable the production of around 42 mmbbl of additional oil compared to waterflooding with conventional seawater, making a significant contribution to the estimated 640 mmbbl of recoverable oil from the development.

The Mad Dog Phase 2 project in the Gulf of Mexico is the second offshore project that plans to include a low salini-



BP first tested reduced salinity water injection technology to boost enhanced oil recovery (EOR) rates at the Endicott oil field on Alaska's North Slope

ty waterflood to support increased oil recovery from the field. The facility will have a low salinity waterflood injection capacity of more than 250,000 bbl of water per day.

The technology already has been successfully tested in a field trial in the Endicott field on Alaska's North Slope, between 2008 and 2009, where low salinity water was injected in one well and the incremental oil production observed in another. Endicott proved up the laboratory trials at full scale, BP said.

Waterflooding sweeps oil toward the producing wells, but even then, much is often left behind. Globally, only about

35% of the oil in place is extracted, leaving huge natural resources and energy supplies untapped.

"LoSal® EOR has immense potential for increasing the amount of oil recovered from the ground. If it can be successfully applied to similar fields around the world, it would increase the world's recoverable oil by billions of barrels," said Bob Fryar, BP's executive vice president for production.

BP has decided to deploy LoSal® EOR technology in all appropriate oil field developments from now on and is assessing whether retrofitting some existing fields is commercially viable and technically feasible. As a result BP has at least five new and retrofit projects under active evaluation following on behind Clair Ridge.

Around 60% of BP's oil is produced using traditional waterflooding to help extract oil from reservoirs. Full implementation of potential low-salinity projects across BP's portfolio alone could increase net recovery by up to 700 mmboe, the company noted.

LoSal® EOR was developed by BP's enhanced recovery technology team, known as Pushing Reservoir Limits, following a decade of laboratory tests.

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DEEP OCEAN ENGINEERING, INC.:

Providing Integrated ROV Solutions for over 32 years

By A.J. Cecchettini, Deep Ocean Engineering, Inc.

With recent upgrades to Remotely Operated Vehicle (ROV) systems, their new line of Unmanned Surface Vehicles (USV), and their commitment to existing customers, they have and will continue to provide a diverse and reliable product offering.

Deep Ocean Engineering, Inc. has delivered more than 500 ROV's to more than 250 customers in more than 40 countries since 1982. Deep Ocean was most famous for their "Phantom" line of ROV's, which spanned multiple disciplines from 1980 to the late 2000s. Many of these ROVs are still being used today and it's a testament to their design and reliability.

For 35 years, President Bob Sabo held manufacturing, engineering, marketing, and senior management positions in the semiconductor, defense electronics, geo-physical instrument, and marine electronics sectors in Silicon Valley's technology scene. His background and accomplishments in a wide array of industries mirrors Deep Ocean's goals of providing integrated ROV and USV solutions.

Deep Ocean has offered their Needlefish Firefly and P-150 to the nuclear and still water tank inspection industry for over 25 years. Their design and reliability is unsurpassed in an environment where the ROVs work for decades while being exposed to radiation on a regular basis. The Triggerfish T4H is the successor to Deep Ocean's famous "Phantom" line. It utilizes the same reliable analog technology that the "Phantom" line did for nearly 30 years. Search and recovery, police force, military, the FBI, scientific research groups, or any other discipline where video/sonar inspection is needed, have all had success with the Triggerfish T4H.

Deep Ocean's digital vehicles are composed of the Swordfish S5N, Lionfish L4N and the Triggerfish T4N. They all utilize the same topside so that multiple vehicles can be interchanged and operated via one control console. All of our digital vehicles utilize the Deep Ocean Fiber-Net umbilical cable and our vehicle control software.

The Triggerfish T4N is the digital version of the T4H. Being our smallest vehicle within our digital line, it provides multiple high bandwidth third-party sensor options in a compact package. Deep Ocean also offers a bare bones T3N model that is used for interior tunnel inspections with its 2500m umbilical cable.



open water inspections where large, heavy sensors too big for the T4N may be needed. The S5N is Deep Ocean's deepest and largest vehicle, going to 1000m which gives the end user even more options for sensors and tooling.

In late 2013, this modularization of our digital ROV line has carried over into our Unmanned Surface Vehicle (USV) line which consists of the H-1750 and I-1650. Our H-1750 is a catamaran style vessel and its length, 1750cm, makes it so that it can still fit in the back of a truck bed or utility van for easy transport. It's more commonly utilized with 3rd party multi-beam sensors. The I-1650 is a mono hull vessel that is commonly used for river surveys with an ADCP. Both vehicles have a payload of 100kg and a range of 2km wireless control and data transmission and are scalable to a bigger or smaller size depending on user applications.

Deep Ocean Engineering, Inc. strives to provide their customers with a vehicle solution integrated with the sensors they require and 24/7 customer service and support. For more information visit: www.deepocean.com.

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The Triggerfish T4N is easily lowered and recovered off the stern of a ship or any other land based structure. Utilizing a sonar mounted to its tilting camera mount, it can be used for search and recovery for evidence or missing persons, port security, hull inspection etc



The I-1650 provides a massive amount of thrust to move a large payload of sensors or to combat swift currents but it also has the versatility to conduct surveys at low cruising speeds. Its dual thruster control has less moving parts (no rudders, servos or gears) and it provides better handling in tighter, shallower spaces which is more reliable than other methods of steering or vehicle control

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SAAB Leopard — all claws and bite

With 11 thrusters, unrivalled payload, and a host of advanced technology features, the new Saab Seaeye Leopard is the most powerful ROV of its size in the world. Aimed at the compact work-class market, the Leopard can handle more tooling, cameras, and survey equipment than any other ROV in its class. The minimal deck footprint of the Seaeye range is maintained with the combination of a 20 x 8 ft single lift, A-frame & winch LARS and a 20-ft control cabin for easy transport and rapid mobilization. Its pack of eight horizontal thrusters and three vertical thrusters gives the Leopard exceptional thrust, powering the vehicle forward at over 4 kts, and enabling it to hold steady in strong cross-currents. For the pilot, the vehicle's iCON intelligent control system gives clear and enhanced information while independently managing each device on the vehicle, including auto redundancy that will keep the ROV working even with multiple equipment damage. The pilot will also find that iCON delivers better handling characteristics — including pitch and roll stabilization for the best quality survey data and to allow stable flight even with large tools and sensors deployed. Designed with the pilot in mind, the Leopard has other inventive features to make life easy for the operator in the field. For instance the networked design of the iCON control system has refined the main electronics pod into an intelligent power distribution and data hub, and re-located the brains of the system into sensors and actuators around the vehicle. This provides greater information for the user and makes maintenance far simpler and quicker. This innovation also avoids the need to partially dismantle the ROV to reach its electronic heart. And it offers building-block simplicity for equipment changes along with remote internet access for upgrades and support. The chassis has been designed with rapid reconfiguration and



easy maintenance in mind. A large open payload bay within the vehicle allows for ample tooling and survey sensors to be installed rapidly on sliding trays. Its 1-ton through-frame-lift capability and four-point docking system for tooling skids allows more demanding payloads to be added. The combination of new chassis design, iCON building-block concept and exceptional power means that more interchangeable equipment can be fitted than ever before in a vehicle of this size. First to order the Leopard is Australian-based Dive Works Subsea Solutions.

Surveying the archaeological site off Methoni, Greece

Researchers from Plymouth University (UK) conducted a marine geoarchaeological survey off Methoni, Greece. The Kongsberg GeoAcoustics Dual Frequency Side Scan Sonar and the GeoPulse Pinger Sub-Bottom Profiler were used for visualization of underwater antiquities over the local underwater archaeological site, within the GE.N.ESIS project. There is archaeological evidence supporting that the human presence in the Methoni Bay, Greece dates back to the Bronze Age. In the summer of 2012 a survey as a joint venture with the Hellenic Ephorate of Underwater Antiquities in an attempt to visualize the nowadays submerged ruins of the prehistoric settlement, artifacts and historic shipwrecks in the site area, as well as the ancient harbor and its submerged breakwater. The research team carried out the survey at the very shallow water environment of Methoni Bay onboard inflatable boat. The Kongsberg GeoAcoustics Dual Frequency Side Scan Sonar Transceiver installed in a portable canopy and combined with the Model 159D towfish was used for artifact detection and seabed features' mapping. The Kongsberg GeoAcoustics GeoPulse Pinger Sub-Bottom Profiler mounted flexibly over the side of the inflatable boat was used for investigation of sub-seabed artifacts, investigation of geological evidence for the prehistoric settlement submersion and for mapping the settlement extent. The survey results from the side scan survey present digital sonograph records and geo-referenced mosaics of the submerged prehistoric settlement ruins, the ancient harbor and its submerged breakwater, as well as records of historic shipwrecks, cannons and artifacts over the site. The results from the shallow seismic survey highlight profiles of semi-buried historic shipwrecks, numerous sub-seabed features of potential archaeological interest and the existence of a dip slip fault along the bay approaches that potentially poses evidence of the geological process that caused the settlement submersion.

SeaRobotics "collapsible" USV aids in Arctic survey



SeaRobotics Corporation, a leader in development of remote controlled and autonomous ocean and marine surface vehicles, announced the successful deployment of a "collapsible" unmanned surface vehicle (USV) in support of important Arctic fisheries research conducted by Florida International University (FIU). The collapsible, 4-m USV was used to provide a broad range of survey data regarding the seabed off the shores of Point Barrow, Alaska, the northernmost point in the U.S.

At the request of FIU, SeaRobotics outfitted the USV with an array of sensors that included a Kongsberg EK-60 split-beam echo sounder, M3 multi-beam sonar, 1.8 MHz DIDSON imaging sonar, and a low-cost side-scan sonar system. This equipment enabled researchers from FIU to perform a bathymetric survey of the seabed and collect other data regarding the health of fisheries located in the coastal waters of the Chukchi and Beaufort Seas.

"We generated some very exciting data using the USV while keeping our research personnel safely on shore. Safety and efficiency are always major concerns when working in the Arctic and having a programmable, stable, and robust platform allowed us to collect novel data in challenging conditions," stated Kevin Boswell, Marine Sciences Professor in the Biology Department at FIU. "We also benefitted from the considerable amount of support given to us by residents of the Alaskan native community in the Barrow area. Their assistance will continue to be important to our future research efforts in the area, including our return trips to the Arctic with the USV," added Boswell.

"SeaRobotics' USVs are durable and well-suited to handle the rugged conditions such as those found in the Arctic. In addition, our "collapsible" model can be converted to a relatively compact form for shipment, reducing the cost and logistical challenges of mobilizing to a remote location like the Alaskan North Slope," commented Don Darling, president of SeaRobotics.

"When conditions make safety and efficiency a major problem, our vehicles have proven themselves time and time again to be the right solution," noted Darling.

Applications for SeaRobotics include bathymetric and hydrographic surveys; coastal, harbor, and riverine surveillance; and target and destructive test boats. SeaRobotics surface vehicles range from small, modular, man-portable systems to large, long-endurance workhorse vehicles that provide survey and surveillance systems.

For more information, visit www.searobotics.com.

SeeTrack Neptune software successfully integrated into the OceanServer Iver2 vehicle

SeeByte, the global leader in creating smart software for unmanned maritime systems, has successfully integrated SeeTrack Neptune with the OceanServer Iver2 Autonomous Underwater Vehicle (AUV) for the use of Defence Research and Development Canada (DRDC).

The SeeTrack Neptune software provided DRDC with a platform to design its own autonomous routines for the Iver2 vehicle and to perform collaborative multi-vehicle operations with other Allied nations. The capability was demonstrated in Halifax to the Royal Canadian Navy in early October.



SeeTrack Neptune is an adaptive planning tool for optimizing the execution of AUV operations. It supports high-level goal-based mission descriptions and allows the matching of mission requirements against vehicle(s) capabilities. SeeTrack Neptune also includes behaviors capable of adapting the mission based on changes in the environment, assets and mission objectives, benefits that will be useful for future Navy AUV operations.

SeeTrack Neptune can be run through SeeTrack Military, the leading technology used by Explosive Ordnance Disposal (EOD) and clearance divers around the world, to achieve success in managing their off-board assets during dangerous and demanding missions.

For more information, visit www.seebyte.com.

Mass spectrometer from SRI International successfully integrates with Bluefin AUV

SRI International has successfully demonstrated unprecedented capabilities for conducting underwater chemical surveys with its in situ membrane introduction mass spectrometry (MIMS) device integrated into a Bluefin-12 autonomous underwater vehicle (AUV) developed and manufactured by Bluefin Robotics.

Advanced underwater surveys are in demand by researchers and companies involved in monitoring and protecting ocean resources and oil and gas infra-

structure, conducting oil and gas exploration, and analyzing the impact of operations on marine environments. The sensitivity, specificity, and versatility of mass spectrometry enable in-water identification and analysis of a wide range of chemicals. Most underwater analytical equipment is tethered to a surface vessel, restricting the ability for continuous monitoring and testing, while at the same time increasing the costs, complexities and risks associated with advanced hydrocarbon monitoring.

The unique capabilities of the SRI MIMS device integrated into the Bluefin-12 AUV platform addresses complex survey and data collection challenges associated with ocean monitoring and exploration, including an enhanced ability to differentiate hydrocarbon sources (e.g., biogenic versus thermogenic) and high-fidelity baseline measurements to understand with greater accuracy the impact of drilling in specific areas.

For more information, visit www.sri.com.

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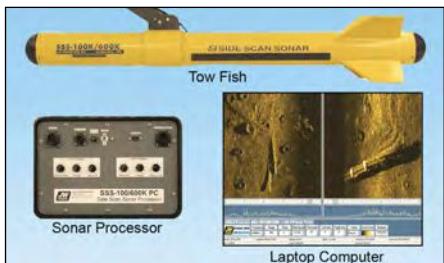

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U.N. and marine companies helped by side scan sonars

The almost 20-year-long Somali civil war devastated the capitol Mogadishu and left the city devoid of basic urban services and infrastructure. In an effort to rebuild and modernize the port, the Somalia Transitional Federal Government (TFG) launched the Mogadishu Port Rehabilitation Project. Assisting in this work is Washington-based Bancroft Global Development, an organization that receives some funding from the United Nations and the U.S. State Department.



Bancroft is helping African Union peacekeepers protect the Somalia government and eliminate obstacles to redevelopment. One of the jobs they have been tasked with is demining the harbor before

reconstruction can get underway. To assist in this project Bancroft is using JW Fishers side-scan sonars. Sonar is the ideal tool for this operation because it can search large areas quickly and produces detailed images of any objects on the bottom, regardless of water clarity. Side-scan allows the operator to see everything on the harbor floor: abandoned fishing nets, scattered debris, sunken vessels, and mines. A member of Bancroft's team, Emmanuel Hlongwane, came to Fishers factory to gain a better understanding of how to utilize the side-scan and learn the various ways to optimize its performance for their application. After completing the training, Hlongwane said, "I'm confident I can locate anything on the harbor bottom and know that Fishers staff is there to help and provide any needed technical support."

For more information, visit www.jwfishers.com.

Shark Marine Technologies delivers newly enhanced Sea-Wolf 3 ROV to China

Shark Marine Technologies Inc., a leading manufacturer of underwater technologies since 1984, announces the



recent delivery of the newly enhanced Sea-Wolf 3 ROV system to The State Oceanic Administration (SOA) of China. The SOA will use the Sea-Wolf 3 to perform marine scientific surveys and research activities. The SOA is responsible for overseeing marine construction projects, submarine engineering projects, and routine coastal surveillance.

The Sea-Wolf 3 system is loaded with extras and software capabilities just recently introduced into the light work/inspection class of ROVs. The system was designed for increased modularity and ease of maintenance and configurations. The Sea-Wolf 3 has an increased payload, an external pan/tilt platform and an open frame design to allow more flow to the thrusters and less drag in currents.

Setting this ROV apart from the rest, not including the quality and experience in the underwater industry that Shark

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Marine has become known for, is the powerful DiveLog software.

Field proven for target mapping, route surveys, and target reacquisition on the "Navigator" Diver Hand-held Sonar System, DiveLog is now taking control of the ROVs. DiveLog adds a new level of autonomy for the ROV pilot. New capabilities include Route Following, Go To, and Station Keeping. DiveLog has also simplified the data inputs from multiple sensors onto one screen, while recording all the data into convenient project folders.

For more information, visit www.sharkmarine.com.

ASV C-Enduro has begun sea trials in Portchester UK

The trials, organized by the National Oceanography Centre (NOC), were attended by the potential users from NOC and Royal Navy personnel who saw the C-Enduro operate autonomously and follow various courses set out by ASV's control system. The highlight of the 2-day event came when the vehicle followed a course spelling out "ASV."

The C-Enduro brings a step change in oceanographic data collection; with an endurance of up to 3 months enabled by its environmentally friendly power struc-



ture, the vehicle can support up to 500 W of payload power. The applications for the vehicle are vast, ranging from marine environmental surveying to security and defence roles.

The C-Enduro vehicle centers on a "three pillar" energy system providing a flexible and fault tolerant solution to energy supply. Having researched and trialled various energy sources the team selected solar panels, a wind generator, and a lightweight diesel generator. Detailed calculations and tests show that this selection, combined with efficient power management and command and control systems packaged in a rugged self-righting vehicle, provides the greatest likelihood of meeting the performance requirements.

For more information, visit www.asvglobal.com.

Delta SubSea LLC — ROV has inked agreement with TE Connectivity to provide 3,500 m HD umbilicals

Delta SubSea has chosen industry leader TE Connectivity (TE) as its manufacturer of choice for main lift ROV umbilicals. With this agreement, TE will be Delta SubSea's preferred vendor for umbilicals, which will support Delta SubSea's growing fleet of ROVs. DSS will use the TE umbilicals on DSS's Schilling Robotics HD 150 HP, UHD 200 HP, and UHD3 250 HP ROV to maximize the quality of service provided to clients. The first system to be manufactured and take advantage of this agreement is scheduled to start build in February 2014. "I'm thrilled to announce our partnership with TE Connectivity," said Scott Dingman, DSS's CEO. "This is one of many frame agreements that Delta SubSea plans on executing with key vendors to reinforce our commitment to providing our clients with a quality ROV service. This is important to keep with the DSS vision of expedited delivery time on DSS fleet growth without sacrificing quality of DSS systems to our clients."

For more information, visit www.deltasubsea-rov.com.

February 2014

63

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Inmarsat completes acquisition of Globe Wireless

The \$45 million deal to buy Globe Wireless, the Florida-based leading provider of value-added maritime communications services to the shipping market, has been finalized. Inmarsat has confirmed that it has completed regulatory and other approvals in relation to its purchase of Globe Wireless. As a consequence, Inmarsat has now completed its acquisition, which included the business and substantially all of the assets of Globe Wireless. In the 12 months ended 30 June 2013, Globe Wireless generated revenues of \$91 million and currently has an installed customer base of over 6,000 ships. The deal will bring an unrivalled suite of products and value-added services to Inmarsat's existing maritime customers and offers "a highly compelling transaction for Inmarsat," said Rupert Pearce, CEO of Inmarsat. The integration of Globe Wireless with Inmarsat's maritime business unit is expected to deliver improvement in profitability within the first year.

Marlink to deliver fleet communication services to Neste Oil

Neste Oil, an oil refining and marketing company, has extended its VSAT services with Marlink while upgrading its network and on-board satellite hardware. As part of the contract extension, Marlink is installing new VSAT antennas on all eight Neste Oil vessels while migrating the fleet to the established iDirect platform. The delivery, based on Marlink's customized Sealink VSAT services, also features multi-bearer support and the @SEAoptimizer solution, which is designed to enhance the efficiency of satellite data communications, optimize bandwidth utilization, and enhance the performance of web browsing and file transfers. The move to the iDirect shared platform ensures sufficient bandwidth for vessel operations and crew welfare, while providing competitive airtime rates and link stability. Four Neste Oils vessels will have a dual antenna set-up on board, to ensure uninterrupted communication during complex maneuvers, where superstructure on board may block line of sight to the satellite. This approach provides uninterrupted connectivity that can support safety and efficiency during operations where continuous communication with the shore office is required.

February 2014

64

Ocean News & Technology

Cobham SATCOM, Comtech EF Data enter strategic partnership

Cobham SATCOM and Comtech EF Data Corporation have started a strategic partnership that will include the integration and productization of Comtech EF Data's RF products across a range of Cobham SATCOM maritime antenna systems. The new strategic partnership strengthens the existing working relationship between Cobham SATCOM and Comtech EF Data. Maritime satcoms service providers and end-users are set to benefit from the further integration of equipment and technology between the two companies. Cobham SATCOM develops, manufactures, sells and supports satellite and radio communication terminals and earth stations for land, marine, and airborne applications. With the ever increasing demand for communication, our products and services are used to satisfy the needs of a wide variety of commercial, governmental and recreational applications. Cobham SATCOM uses state-of-the-art technologies to design affordable, highly-reliable high-performance systems that have decreased over time in terms of size, weight, and power consumption. Our products enable people to stay in touch under the most challenging and demanding conditions. When traditional communication technologies fail, Cobham SATCOM's products will keep providing our customers with high-quality voice, data, and multimedia communications. Cobham's product designs have evolved tremendously during their decades in service in use around the world in a variety of domains and environments. The company markets under the AVIATOR, EXPLORER, SAILOR® and Sea Tel brands.



BW selects KVH mini-VSAT Broadband for LNG and LPG fleet



Credit: BW Maritime Pte Ltd.

KVH Industries, Inc. has been chosen by BW, a worldwide leader in maritime energy transportation, as the satellite communications solution for its Liquefied Natural Gas (LNG) and Liquefied Petroleum Gas (LPG) fleet.

BW's vessels will use KVH's advanced, dual-mode TracPhone® V11-IP onboard satellite communications system and mini-VSAT Broadband service for the "always-on" broadband connectivity that is essential for today's commercial maritime operations. BW recently completed field trials of the TracPhone® V11-IP system and expects to have 20 vessels equipped by the end of 2013, with rollout continuing through 2014.

With more than 3,000 onboard terminals sold, mini-VSAT Broadband is the world's most popular maritime VSAT solution, according to independent industry reports published in 2012 by Euroconsult, NSR, and Comsys. The network uses ArcLight® spread spectrum technology, which was developed by KVH's partner, ViaSat, Inc., specifically for mobile use. ArcLight® is unique due to its efficient reuse of satellite channels, fast speed, low latency, and its ability to support very small antennas that provide reliable service, even in poor weather conditions.

The TracPhone® V11-IP uses a single, compact antenna to seamlessly access both the C- and Ku-band satellites of the mini-VSAT Broadband network. The three-axis, gyro-stabilized antenna system delivers premium quality multimegabit connectivity worldwide and is the world's only dual-mode, 1.1-m (42.5-in.) diameter VSAT antenna. TracPhone® V11-IP features KVH's new Integrated CommBox™ Modem, a streamlined belowdecks unit that includes an IP-enabled antenna control unit, CommBox™ Network Manager, ArcLight® spread spectrum modem, Voice over IP (VoIP), Ethernet switch, and Wi-Fi capabilities. KVH manufactures two additional V-IP series antenna systems for the mini-VSAT Broadband service: TracPhone® V7-IP, a 60-cm (24-in.) diameter Ku-band VSAT antenna, and the ultra-compact TracPhone® V3-IP, a 37-cm



(14.5-in.) diameter Ku-band VSAT antenna.

KVH, a recognized innovator in maritime satellite communications, recently announced IP-MobileCast™ content delivery service, which is designed to use advanced multicasting and error correction technologies to deliver large multimedia files via the mini-VSAT Broadband network to subscribing vessels. The IP-MobileCast™ service, which is expected to be available by the end of the year, will deliver such licensed content as premium movies, television programs, news, and sports to subscribing vessels, whose operators must adhere to stringent copyright regulations and provide crew welfare benefits as outlined in the recently implemented MLC-2006 maritime regulations.

For more information, visit www.kvh.com.

Astrium and Inmarsat sign strategic agreement on Global Xpress®

Astrium and Inmarsat have reached a strategic distribution partnership agreement that will see Global Xpress® services made available to Astrium Services' large partner and customer base.

Astrium Services will deliver Global Xpress® high-speed broadband services through its worldwide distribution channels. The strategic agreement will cover key vertical markets, including the maritime as well as the government and defense sector, initially in Europe. In due course the Astrium Services Global Xpress® offering will encompass all service types — packaged services, bandwidth capacity, as well as commercial and military Ka-band.

Inmarsat's Global Xpress® Ka-band satellite network will provide a seamless worldwide broadband service. The first Global Xpress® satellite was successfully launched on 8 December 2013 and is on schedule to achieve global coverage by the end of 2014. Astrium Services customers will benefit not only from the world's first globally available mobile broadband network, but also from a comprehensive range of global connectivity services designed for commercial and government markets.

The agreement is the natural continuity of a long-standing partnership between Astrium Services and Inmarsat. Astrium Services has been Inmarsat's number one distribution partner since acquisition of Vizada in December 2011.

By adding Global Xpress® to its portfolio, Astrium Services will also enable its partners and customers to further enhance their business capabilities and growth.

Astrium Services meets specific customer requirements for every sector by combining a complete range of satellite connectivity services with the largest range of innovative solutions. In the maritime industry, Astrium Services covers transportation, leisure and fishing, cruise and ferry, as well as offshore. In the enterprise sector, Astrium Services provides high-quality telecom services to land-based customers, including oil and gas, mining, large-scale events, non-governmental organizations, and large corporate entities worldwide. In the government sector, Astrium Services is the world's primary private sector military satcom service supplier. Some of the most modern armed forces in the world figure among Astrium Services customers, including UK, France, Germany, U.S., and NATO.

For more information, visit www.astrium.eads.net or www.inmarsat.com.

Caldwell

Marine International, LLC

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

Caldwell Marine International, LLC is seeking applicants for the following positions:

SUBSEA ENGINEERING MANAGER (FULL TIME)

The Subsea Engineering Manager will be responsible for maintaining, repairing, and operating subsea and cable installation equipment including:

- Subsea Jet Sleds and Plows
- Hydraulic Machinery - Hydraulic, Electrical, and Mechanical Control Systems
- Linear Cable Engines
- Dynamic Positioning System Controls
- Various Tension Measurement Systems
- Cable Coiling Arms

The applicant shall have experience in both electrical and hydraulic machinery maintenance and repair, and experience working with high voltage and low voltage control interfaces.

The applicant should show a high level of proficiency in working with hydraulic and electrical schematics and block diagrams with a working level proficiency in AutoCAD applications, and have the ability to assist in system design. Ideally, the candidate for this position should have an engineering background with marine experience.

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

For a confidential evaluation, please email resume along with salary requirements to: marc.dodeman@caldwellmarine.com

FIELD ENGINEER / PROJECT COORDINATOR FOR THE MARINE CONSTRUCTION INDUSTRY

Caldwell Marine International, a leader in the submarine cable installation industry is currently seeking a field engineer / project coordinator.

Primary duties include set up and operation of surface and subsurface navigation equipment, specialized plow monitoring systems, computer systems, and management of our Dynamic Positioning system. Additional duties include report and as-built drawing preparation, proposal writing, and hydrographic surveys. Special consideration for submarine cable laying experience, software development, electronic systems development, hydrographic surveying, cable route engineering, and project management. Candidates should have a minimum of an Associate's Degree in Engineering along with 3+ years of marine related experience.

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

For a confidential evaluation, please email or mail resume along with salary requirements to:

CALDWELL MARINE INTERNATIONAL, LLC
1433 Highway 34, South
Farmingdale, New Jersey 07727
marc.dodeman@caldwellmarine.com

KVH mini-VSAT Broadband installed on more than 100 U.S. Coast Guard vessels

KVH Industries, Inc. has surpassed the 100-vessel mark in its 10-year contract to supply the next-generation satellite communications solution for the U.S. Coast Guard's fleet of small cutters. To date, KVH's TracPhone® V7 systems have been deployed on 105 USCG vessels across eight different classes of cutters, and KVH's mini-VSAT Broadband service has provided 29.2 terabytes of data and more than 835,000 Voice over Internet Protocol (VoIP) minutes. The contract for hardware, airtime, and support was first announced in September 2010.

KVH systems are now in use on cutters in all U.S. Coast Guard districts in the continental U.S., as well as overseas in the Persian Gulf, Guam, and Puerto Rico. A cutter is a USCG designation for any vessel over 65 ft in length, including coastal patrol boats, seagoing buoy tenders, and fast-response cutters.

This diverse range of platforms supports a variety of critical USCG opera-

tions, including drug interdiction, maritime border security, anti-piracy tasks, search and rescue operations, and humanitarian efforts. The low latency of the KVH service is particularly important to the fast and efficient processing of biometric information from vessel to shore, a key to immigration and law enforcement activities. The 24/7 nature of USCG operations and the extreme sea and weather conditions in which these relatively small vessels operate are proof of the durability and reliability of the TracPhone® V7 and mini-VSAT Broadband service.

In announcing the 10-year Indefinite Delivery/Indefinite Quantity (IDIQ) contract, valued at approximately \$42 million, in September 2010, the U.S. Coast Guard Telecommunications and Information Systems Command (TIS-COM) named KVH's TracPhone® V7 and mini-VSAT Broadband service as the U.S. Coast Guard's Small Cutter Connectivity (SCC) Ku-band System and Air Time Support Services solution.

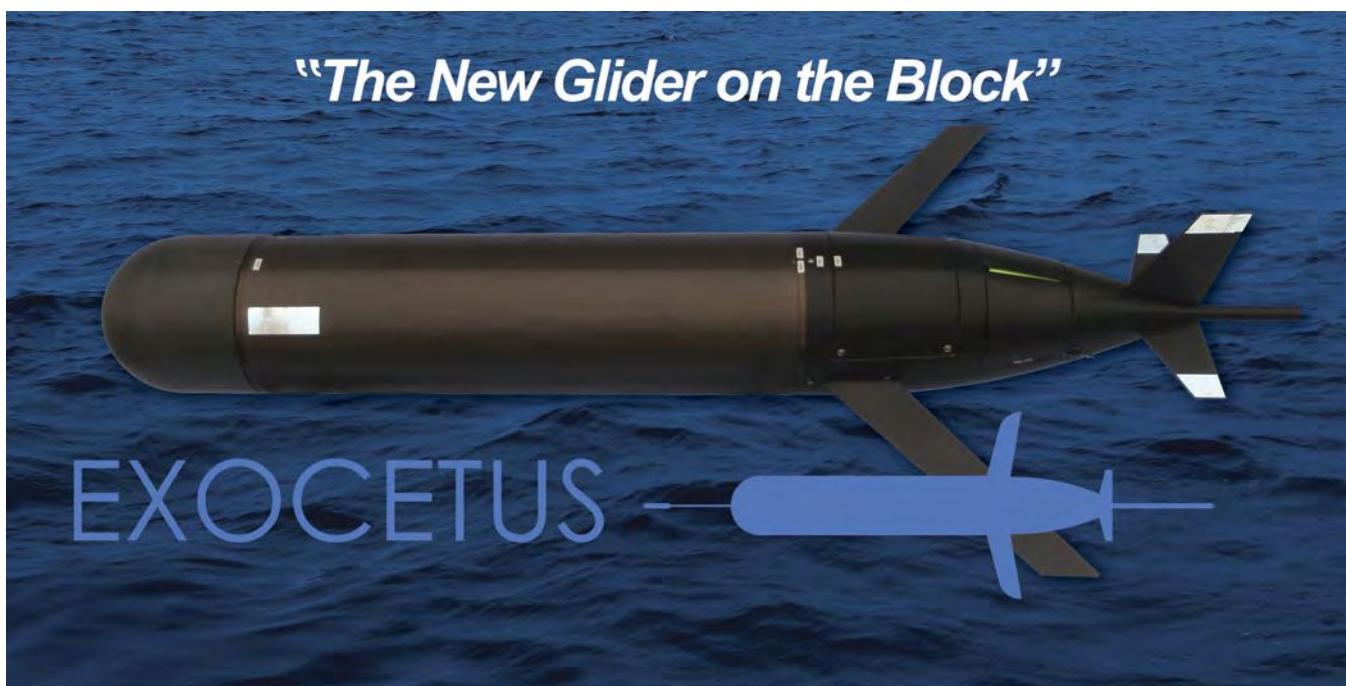
For more information, visit www.kvh.com.

Norwegian Cruise Line, MTN pioneer iDirect X7 on a cruise ship

MTN Communications (MTN) announces its partner, Norwegian Cruise Line, is pioneering the new iDirect X7 high-performance satellite modem on its Norwegian Breakaway ship. MTN installed the X7 after a 6-month test process in its Miramar, Florida engineering lab. The modem has dramatically improved the efficiency and throughput of the vessel's communications system, enabling the most cutting-edge Internet service at sea.

"Norwegian strives to deliver an unparalleled connectivity experience to passengers and crew," said Vincent Cirel, senior vice president and CIO, Norwegian Cruise Line. "We are excited to partner with MTN to leverage the industry's newest technology. We were thrilled to be the testbed for the X7. It has performed extremely well and will be a cornerstone to support the insatiable demand for the high-throughput Internet, TV, voice, and app services on our ships."

"MTN knew it could turn to



Design Features

- Designed for high coastal currents
- Automatically handles large variations in water densities
- Adaptive ballast control system
- Operates up to 60 days with primary lithium batteries
- Easily integrates additional sensors

Applications

- Hypoxia & Ocean Acidification monitoring
- PAM [Passive Acoustic Monitoring] of mammals and tagged fish
- Oil Detection [methane sensor]
- Wave Height estimation
- WOTAN [Wind Observation Through Ambient Noise]

Exocetus Development LLC

1444 East 9th Avenue
Anchorage, AK 99501 USA
Tel: 907-222-1173
Sales@exocetus.com

Norwegian Cruise Line, an early technology adopter, for validation of X7 performance," said Dave Bettinger, CTO, iDirect. "This leading cruise operator drives some of the most demanding broadband requirements for ships at sea, pushing MTN's robust network to the limit. The X7 is the most advanced satellite modem we have ever developed. We were very excited to put it to the ultimate test — on a cruise ship with upwards of 6,000 passengers and crew, with thousands of mobile devices."

The X7 is a key component of MTN's strategy to transform communications at sea because it:

- Enables dramatically more throughput, with speeds up to 100 Mbps;
- Delivers unprecedented availability and efficiency through advanced adaptive modulation techniques;
- Enhanced beam switching through faster network acquisition; and
- Is optimized for MTN's high-throughput multi spotbeam (HTMS) satellite platform starting in 2015.

For more information, visit www.mtnsat.com.

Harris CapRock secures deal with Daewoo for Mafumeira Sul project

Harris CapRock Communications has signed a multi-year contract with Daewoo Shipbuilding & Marine Engineering Co., Ltd (DSME) to provide an integrated telecommunications solution supporting the Mafumeira Sul project off the coast of Angola. DSME is a leading global oil platform and ship builder based in Seoul and Geoje, South Korea.

Harris CapRock will provide equipment and design, integrate and test all telecommunication systems before deployment; install cable at multiple construction sites around the globe; and provide commissioning support off the coast of Angola.

The Mafumeira Sul project is operated by a global, major exploration and production operator, consisting of multiple production assets located 15 mi off the coast of the Cabinda province in 200 ft of water. Currently in the second stage of development, it is expected to reach its first oil in 2015 and build toward peak total daily production of 110,000 bbl of crude oil and 10,000 bbl of liquefied petroleum gas.

DSME required a comprehensive communications solution onboard our new assets to support the complete package delivered to the exploration and production operator. Considering the scope of the Mafumeira Sul project, it is important for these platforms to be fully outfitted with a robust-engineered solution of telecommunication and security elements to support oil production goals for the next several years.

Harris CapRock Communications is a premier global provider of managed satellite and terrestrial communications solutions specifically for remote and harsh environments, including the energy, government and maritime markets. Harris CapRock owns and operates a robust global infrastructure that includes teleport stations on six continents, five 24/7 customer support centers, local presence in 23 countries and more than 275 global field service personnel supporting customer locations across North America, Central and South America, Europe, West Africa, and Asia Pacific.

For more information, visit www.harriscaprock.com.

February 2014

67

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Emerald Networks announces fiber agreement with Geo Networks

Emerald Networks Limited and Geo Networks Limited announced a long-term agreement for Geo to provide physically diverse optical fiber routes from Dublin to London across Geo's new East-West subsea system linking Ireland and the United Kingdom and onwards over Geo's UK mainland network, collectively the newest and most advanced high-performance fiber network between Dublin and London. This agreement will enable Emerald Networks to extend its new low latency transatlantic submarine cable system, "Emerald Express," from the major North American markets through to the most important data centers in the UK and onwards to mainland Europe. Geo's new fiber infrastructure will enable Emerald Networks to utilize the most innovative optical technologies and provide the most advanced undersea telecommunications system constructed to date. The Emerald Express system will take advantage of Geo's market-leading position in UK data center connectivity to facilitate connectivity to all the UK's major exchanges, Internet hubs, and colocation data centers, as well as providing the critical interconnect points for accessing markets in mainland Europe.

Mermaid awarded diving and cable lay projects

Mermaid Maritime Public Company Limited announced that its business units serving the Middle East have recently been awarded a suite of subsea services contracts for air diving services, including air diving for pipeline free-span correction and a subsea cable lay contract. All contract awards were secured through Mermaid's wholly owned subsidiary Subtech Ltd. (Seychelles) and Mermaid's joint venture entity Zamil Mermaid Offshore Services LLC and are scheduled for commencement in December 2013 for an estimated duration of up to 6 months. The combined value of these contract awards is estimated at \$30 million. The subsea cable lay contract will utilize a chartered-in DP2 construction barge Mubarak Supporter. This construction barge is the latest addition to Mermaid's fleet to serve its expanding customer base and requirements in the Middle East. The construction barge is on an initial 6-month charter to Subtech Ltd. (Seychelles) with possibility of further extensions.

FORCE lays fiber cable as part of research project

After months of planning, mobilization and trials, the Fundy Ocean Research Center for Energy (FORCE) has successfully installed a data cable designed to connect to a recoverable underwater research platform — the first subsea cable ever installed in the Minas Passage. Over 30 personnel were directly involved in planning, mobilizing, surveying, and installing the cable. FORCE led a team that included Antigonish-based R.J. MacIsaac Construction (lead contractor for marine and onshore activity), the Halifax team of International Telecom (cable lay), and Dartmouth-based Seaforth Geosurveys (survey support). The cable installation is part of a \$10 million research project to build the Fundy Advanced Sensor Technology (FAST) Platform — a recoverable instrument platform designed to monitor and characterize the FORCE site. The data cable will allow continuous, real-time data transmission from the platform to shore. Additionally, the cable installation provides valuable knowledge and experience in planning the deployment of four subsea power cables in 2014, which will connect tidal turbines to the FORCE shore facility and on to the power grid.

Fingrid and Elering become the new owners of Estlink 1



Courtesy FinGrid Oy

A sales contract was concluded for the first Estonia–Finland submarine cable Estlink 1, making the Finnish grid network company Fingrid and Estonian grid network company Elering the new owners of the transmission cable as of 30 December 2013. The total cost of the sales transaction was €77.6 million.

Previously, the Finnish and Estonian transmission system operators have rented the cable capacity from its owners, Nordic Energy Link (NEL) and N.E.L. Finland Oy, the shareholders of which are Eesti Energia (39.9%), Latvenergo (25%), Lietuvos Energijos Gamyba (25%), and Finestlink (10.1%).

For the sales transaction to take effect, the Estonian Competition Authority has to give its consent, after which the assets will be owned 50% by the Finnish grid network company Fingrid and 50% by Elering as of 30 December this year.

Estlink 1, active since the end of 2006, is the first connection between the networks of Baltic and Nordic countries. The Estlink 1 cable was established by Eesti Energia, Latvenergo from Latvia, Lietuvos Energijos Gamyba from Lithuania, and Finestlink (joint company of Pohjolan Voima and Helsingin Energia) from Finland.

The transmission capacity of Estlink 1 is 350 MW. The total length of the cable is 210 km (two parallel cables 105 km long), of which 148 km are under the sea and 62 km on land. The deepest section of the cable is 100 m below sea level on the seafloor.

For more information, visit www.fingrid.fi or www.elering.ee.

BT awards subsea cabling contracts

BT has awarded three firms a £26.9 million contract for an ambitious submarine fiber optic cabling project that will help deliver fast, fiber broadband to the Highlands and Islands off the Scottish coast.

Specialized cable vessels will lay 20 submarine fiber optic cables in a precise operation during May to October of 2014, providing a fiber broadband backbone that will eventually link communities from Kintyre to Orkney.

The massive engineering effort is part of the £146 million investment project launched with Highlands and Islands Enterprise (HIE) in March to bring high-speed fiber broadband to communities across the north of Scotland.

Chelmsford-based Global Marine Systems will conduct detailed marine route surveys and supply the cables; Orange Marine, which is based in France but works globally, has been contracted to lay around 400 km of subsea cables, while Hampshire-based A-2-Sea Solutions has been chosen to work onshore connecting the cables to BT's terrestrial network.

BT has a successful track record of working with all three companies, who were chosen from a competitive tendering process that featured several rival bids.

The longest cable will run for nearly 79 km under the Minch from Ullapool to Stornoway, with the Western Isles also benefitting from a second link stretching more than 57 km between Carnan on South Uist, and Dunvegan on Skye.

The subsea work will be carried out by Orange Marine's cable ship *Rene Descartes* using the ship's submersible plough and remotely operated vehicles to bury the double armored cable in the seabed where seabed sediments allow. The cable ship will be backed up by dive support vessels, tugs, and a shallow water laying vessel.



The £146 million fiber broadband scheme is being led by HIE and delivered by BT. It means that around 84% of Highlands and Islands homes and businesses will have access to fiber broadband by the end of 2016. Unlike other companies, BT offers fiber broadband access to all service providers on an open, wholesale basis, underpinning a competitive market.

The project is by far the most ambitious and challenging rural broadband roll-out BT has undertaken anywhere in the UK.

For more information, visit www.btplc.com.

Fujitsu upgrades Indonesian cable to 100 Gbps

Fujitsu has deployed its latest DWDM transmission equipment to increase the network capacity of Indonesia's JaKa2LaDeMa submarine cable system. This upgrade boosts the submarine system capacity from 10 Gbps per circuit wavelength to 100 Gbps. By ensuring

smoother communications and keeping pace with Indonesia's soaring communications demand, which has increased in line with the prevalence of smart devices, the capacity increase will contribute to Indonesia's rapid economic growth.

JaKa2LaDeMa is a submarine cable system installed in 2010 by Fujitsu and Norddeutsche Seekabelwerke GmbH, a major cable manufacturer in Germany for PT. Telekomunikasi Indonesia, Tbk, the largest telecommunications carrier in

Indonesia. JaKa2LaDeMa, with a total length of 1,800 km, is the first submarine cable system that links the five Indonesian islands of Kalimantan, Sulawesi, Java, Bali, and Lombok.

In Indonesia, which has been enjoying solid economic growth in excess of 6% in recent years, IP traffic is expected to grow by 42% between 2012 and 2017, the second-highest growth rate in the world. By expanding and enhancing Indonesia's network infrastructure,

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this project will make a significant contribution to the country's economic development.

Fujitsu installed its Fujitsu Network FLASHWAVE 9500 multiplexed optical transport platform, which is its newest DWDM system employing the latest digital coherent technology, and its monitoring system, the Fujitsu Network NETSMART 1500. This upgrade employs 100 Gbps transmission technology in a submarine cable system within Indonesia and provides for five-times greater capacity, for a total of 490 Gbps on the existing submarine system. It is also possible to further upgrade this total by a factor of five in the future.

This capacity upgrade uses the latest optical transmission technology to enable the customer to maximize the utilization of the existing system, which was constructed with a significant investment.

Fujitsu will continue to meet the demands of customers around the world who need higher-performance and highly reliable and flexible submarine cable systems.

For more information, visit www.fujitsu.com.

Digicel acquires Caribbean cable system

Digicel has reached an agreement with the Guadeloupe-based Loret Group and with Caribbean Fibre Holdings to acquire a submarine fiber optic network across the Caribbean region.

Digicel will acquire Middle Caribbean Network, Southern Caribbean Fibre, Antilles Crossings, and a number of related assets from Global Caribbean Fibre.

This deal will provide Digicel with a wholly owned submarine fiber optic cable network of approximately 2,100 km providing capacity from Trinidad to Guadeloupe.

Digicel has also entered into a transaction with Global Caribbean Fibre and Global Caribbean Network to provide submarine fiber capacity from Guadeloupe to Puerto Rico with onwards connectivity to the mainland United States.

With these new capabilities, Digicel is underpinning its commitments to delivering best network, best service and best value and will once again be at the forefront of driving competition and consumer choice in the region.

In total, Digicel has secured access to a robust network composed of 15 submarine segments with a reach of some 3,100 km across the Caribbean region. Digicel will also have extensive onwards capacity on other submarine networks connecting locations such as Miami, Paris, and New York.

The financial terms of the contract are not being disclosed and the transaction is subject to regulatory approval.

For more information, visit www.digicelgroup.com.

Hexatronic acquires Ericsson's telecom cable business

Hexatronic Scandinavia has signed a binding agreement for the acquisition of Ericsson's telecom cable business in Hudiksvall. The acquisition is completed and the business will be operated under the name of Hexatronic Cables & Interconnect Systems AB.

Hexatronic intends to continue to operate and develop the existing fiber and submarine cables business that is located in Hudiksvall. Hexatronic will also, during a transition period, continue to manufacture components and cable in the copper-based interconnect line. The



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company will continue to proudly support, develop, market and deliver the world renowned products such as Ribbonet, Micronet, Drytech and the company's line of submarine fiber communication cables.

The management team of the new company consists of a number of key people from Ericsson and the Hexatronic Group, including Gert Nordin as CEO.

The business will be operated as an independent company within Hexatronic Group with full responsibility for the entire value chain from sales to delivery and after sales.

Hexatronic will inject 20 million SEK in equity into Hexatronic Cables & Interconnect Systems AB. The capital is funded through a fully underwritten share issue in Hexatronic Scandinavia AB (publ), which is listed on the Swedish exchange Aktietorget.

CEO Nordin commented, "It is with great pleasure that I welcome Hexatronic Cables and Interconnect System to the Hexatronic group. We intend to build a profitable, world-leading fiber communication company in Hudiksvall. Based on the experience and vast know-how of the former Ericsson personnel, together with the modern plant in Hudiksvall we intend to compete with the best in the world. The Hudiksvall operation has customers all over the world. We will work extensively to keep an outstanding reputation and continue to live up to our customers' high expectations. The management team and key personnel is much the same as during the Ericsson operation, albeit a smaller number of total employees. We are focusing on the fiber-based side of the business for the future."

"I welcome all stakeholders, including customers, suppliers, vendors, and employees, to the new future in Hudiksvall and Hexatronic Cables & Interconnect Systems AB. We intend to build an excellent, profitable and long-term company here," continued Nordin.

For more information, visit www.hexatronic.com.

Reliance upgrades FA-1 North with Ciena's GeoMesh

Reliance Globalcom and Ciena® Corporation have upgraded Reliance Globalcom's FA-1 North submarine cable system with 100 G wavelengths. With Ciena®'s converged packet optical and GeoMesh solutions, Reliance Globalcom can now deliver high-speed, low latency OTN and 100 GbE client services between London and New York with greater capacity to meet soaring bandwidth demand.

With an initial total lit capacity of 400 Gbs, this upgrade complements Reliance Globalcom's deployment of Ciena®'s GeoMesh technology on its FA-1 South submarine network that links New York to Paris, allowing the provider to offer additional capacity on two diverse routes across the Atlantic.

Reliance Globalcom owns and operates one of the world's largest and most advanced private submarine networks spanning more than 73,000 km. When combined with more than 200,000 km of domestic fiber owned by its parent company, Reliance Communications, the global network connects more than 40 key business markets across India, the Middle East, Asia, Europe, and the United States.

With Ciena®'s GeoMesh solution—built on its market-leading 6500 Packet-Optical Platform powered by WaveLogic coherent optical processors, Reliance Globalcom can now support trans-Atlantic OTN-based client services from 10 Gbps to 100 Gbps across its FA-1 North network link. Additionally, under Reliance Globalcom's recently launched Optical Wave Service, 100 GbE/OTU-4 services can also be provided between continental points of presence (PoPs) in London and New York, where large Internet, financial and data center hubs reside.

This deployment is based on Ciena®'s OPn architecture approach for creating programmable network infrastructures that deliver much lower cost-at-scale and allow network operators to better monetize their networks. Ciena®'s GeoMesh features a simplified all-optical design that brings flexibility to Reliance Globalcom's submarine network architecture.

Additionally, this network leverages the programmability of Ciena®'s WaveLogic technology to meet differentiated service and latency requirements, carrying traditional SDH/DWDM as well as OTN-based applications over the same platform.

Ciena®'s OneControl Unified Management System is also providing Reliance Globalcom with multi-layer service management capabilities to enable streamlined service activation, fault management and performance monitoring. Ciena® is also providing installation, consulting, test and turn-up services via its Specialist Services portfolio.

For more information, visit www.ciena.com.

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Nemo Link interconnector takes another step forward

National Grid Nemo Link Ltd has been granted planning permission from Thanet and Dover District Councils to go ahead with developments at the former Richborough power station site.

The application for an electricity substation, a converter station and underground cables between Richborough and Pegwell Bay was approved on Wednesday night. These developments are the onshore part of a subsea interconnector link to Belgium — known as Nemo Link. This is being developed jointly by National Grid Nemo Link Ltd and Elia who are the Belgian transmission company.

This would be a first electricity link between the two countries and would enable 1,000 MW of electricity to be traded between UK and Europe. The subsea cables would run approximately 130 km from Richborough to Zeebrugge in Belgium.

Mark Pearce, project director for National Grid, said, "We are delighted that Thanet and Dover District Councils have granted us planning permission as the Richborough site is ideally suited for the development. Interconnectors will have an important role in diversifying the sources of electricity for this country and helping to keep our supplies secure. It will also help create a competitive European market."

Kent already has two interconnectors with Europe. The Interconnexion France Angleterre runs between France and Selinge and the BritNed interconnector runs between the Netherlands and the Isle of Grain. It's proposed that the Nemo interconnector could go into operation by 2018.

For more information, visit www.nemo-link.com.

Groundbreaking ceremony for the Phu Quoc cable project

On 17 November 2013, in Phu Quoc Island, a groundbreaking ceremony took place for the strategic submarine power cable link connecting Phu Quoc to the national power grid in Vietnam.

The event officially celebrated the commencement of operations of the first-ever submarine interconnection installed by a utility company in Vietnam, at the presence of Prysmian Group project team, EVNSPC (Southern Power Corporation under Vietnam Electricity) executives and dignitaries of the Kien Giang province.

The Vietnamese Minister of Industry and Trade Vu Huy Hoang, the Italian

Vice Ambassador to Vietnam Natalia Sanginini and the general director of EVNSPC Nguyen Thanh Duy attended the event, besides 250 guests and media representatives, highlighting the importance that this contract has for Prysmian and the willingness to support the customer, the country and its population.

The project refers to a contract awarded in May 2012 by the Vietnamese utility EVNSPC worth a total of €67 million for the design, supply, installation and commissioning of the submarine interconnection linking Ha Tien town and the home of some of the most beautiful beaches in Vietnam that will play a major role in developing Phu Quoc Island as a tourist paradise.

In these days, the first cable end is being pulled in Phu Quoc and straight after the installation activities will proceed in open sea thanks to Prysmian highly specialized personnel and equipment. In a couple of months' time the other cable end will be pulled on the mainland in Ha Tien, and within February the entire project is expected to be completed.

Also the Italian Vice Ambassador to Vietnam Natalia Sanginini, in her speech during the ceremony, highlighted the strategic value of this project, occurred on the occasion of the 40th anniversary of diplomatic relations between Italy and Vietnam. "The recent strengthening of Prysmian Group's portfolio of connections to mainland grids make indeed Prysmian a top-level partner and give the company the best assets to establish a longstanding cooperation with the Vietnamese authorities," the Vice Ambassador said.

For more information, visit www.prysmian.com.

EIB finances expansion of energy networks

The European Investment Bank (EIB) is providing a €500 million corporate loan to TenneT. The funds are being made available in connection with the construction and operation of three offshore high-voltage direct current (HVDC) lines that will connect wind farms in the North Sea with the German onshore electricity network. The loan agreement was signed in Arnhem.

In implementing its energy transition (Energiewende), Germany is focusing on the expansion of offshore wind energy with the aim of the new German coalition partners to reach installed generation capacity of 6.5 GW in 2020. A total of 6.2 GW connection capacity is already installed by TenneT or currently

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under construction. This makes TenneT one of the main drivers of the German energy transition. Connecting far offshore wind farms in the German North Sea to the onshore grid requires a high-degree of research and development. The fact that TenneT is able to provide such worldwide unique projects is a great achievement.

The project planned by TenneT and now being co-financed by the EIB comprises the high-voltage DC lines HelWin1, SylWin1, and DolWin1 connecting offshore wind turbines with a capacity of up to 2.2 GW to the grid. Due to this high-capacity and the great distance of the wind farms from the coast, transmission using high-voltage alternating current is not efficient. Instead TenneT is building and will operate HVDC converter stations of this size for the transmission of high-voltage direct current at sea. Because of its dimension and technical requirements, these projects will be of an exemplary nature not only in Germany but worldwide. Construction has already begun and is expected to be completed in 2014 and 2015.

For more information, visit www.tennet.eu or www.eib.org.

Nalcor receives release from environmental assessment

Nalcor Energy was advised that the Government of Canada has released the Labrador Island Transmission Link from environmental assessment. Nalcor is currently reviewing the federal government's response.

The approximately 1,100-km Labrador Island Transmission Link will deliver electricity produced at the Muskrat Falls hydroelectric generating facility to the island of Newfoundland. The high-voltage direct current system is the first of its kind in the province and includes 400 km of transmission line in Labrador, with 700 km on the island, as well as 35 km of underwater cable that will cross the Strait of Belle Isle from Forteau, Labrador, to Shoal Cove, on the island.

The review process for the transmission project was initiated in January 2009, when Nalcor registered the project with provincial and federal environmental regulatory agencies. Nalcor has conducted extensive environmental studies, including significant consultation with Aboriginal, regulatory and public stakeholders, to identify and mitigate potential



environmental impacts of the transmission project.

Federal release of the Labrador Island Transmission Link from this process represents the conclusion of the environmental assessment process for the Lower Churchill Project. The transmission project was released from environmental assessment by the provincial government in June 2013. The generation project also underwent an environmental assessment and was released in March 2012.

For more information, visit www.nalcorenergy.com.

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73

Ocean News & Technology

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Installation of Malta Interconnector begins

Enemalta has reached a milestone with its electricity interconnector project with Sicily, with the start of the installation process for the first 50 km (5,000 tons of cable) of the cable.

The cable ship Nexans Skagerrak, which is conducting the installation, began pulling the cable towards the Maghtab terminal station. The cable is first passed through a 220-m underwater micro tunnel starting from the middle of Qalet Markus bay, and then passed underneath the Coast Road, ending in an 850-m culvert that then leads to the Maghtab station.

As soon as the cable is pulled all the way to the terminal station and secured, the Nexans Skagerrak will start laying the cable towards Sicily. The underwater cable will be protected from the entrance to the micro tunnel up to 2 km offshore with cast iron shells. This is done for ecologically sensitive reasons to minimize damage to the posidonia meadows. These cast iron shells will also serve as extra protection in the case of ships' anchors and trawlers.

After the first 2 km of cable are laid the ship will then continue its journey towards Sicily while laying the cable, and then the ship will go over the cable once again to carry out the jetting of the cable which will bury it in the seabed.

When the whole operation will be complete it will then go back to Norway to load on the next 50 km of the cable to continue the operation towards Sicily. The ship will then continue where it had left off, joining the second half of the cable and making its way towards Sicily. This operation will start in the beginning of the coming weeks and will be completed at the Marina in Ragusa.

For more information, visit www.enemalta.com.mt.

Xodus to provide marine services energy connections

Independent international energy consultancy Xodus Group has agreed a four-year Consultancy Support Framework Agreement to provide marine services for Interconnector Services Limited (ISL), a wholly owned subsidiary of Mutual Energy.

Xodus will manage the procurement of a survey contractor in order to perform survey investigations on the power cable and pipeline networks connecting Scotland and Northern Ireland. The aim is to assess and maximize the asset integrity of the two systems and refine inspection techniques and emergency response procedures as appropriate and dependent upon survey findings.

The Moyle Interconnector is a 250 kV (500 MW) two cable HVDC system linking the electricity grids of Northern Ireland and Scotland. The submarine section of the cable system comprises of two corridors each of 55 km in length, with an overall length of 63 km.

The Scotland to Northern Ireland Pipeline (SNIP) is a 135 km gas pipeline from Twynholm in Scotland to Ballylumford, Northern Ireland and its subsea section runs 40 km and links with the Belfast Gas Transmission Pipeline (BGTP) which includes the gas pipeline crossings within Larne and Belfast Loughs.

The scope of work is to provide marine services covering major aspects of maintenance activities for these assets. This will include survey procurement and management of the survey operations, results analysis and developing the O&M strategy, including the management and assessment of emergency response requirements. Xodus will also provide on-call emergency response and marine advice services.

The work began in early November and is contracted to end in August 2017. The deal includes a possible extension for a further two years' work.

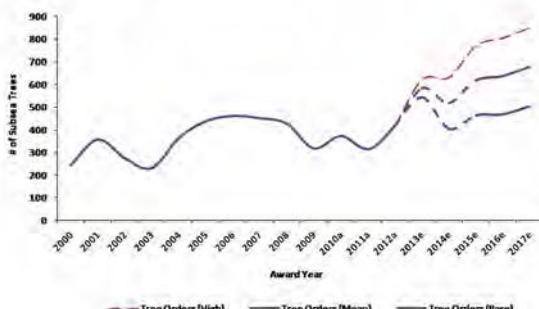
For more information, visit www.xodusgroup.com.

Offshore At-A-Glance

Quest Offshore Activity Report

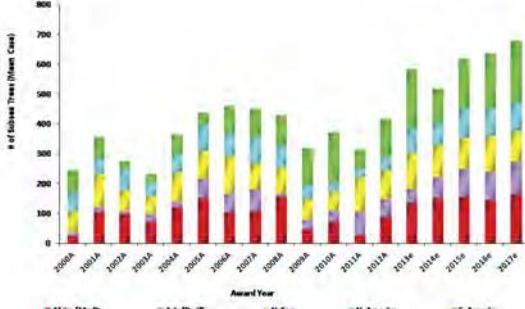
Global Subsea Tree Awards

Momentum Builds



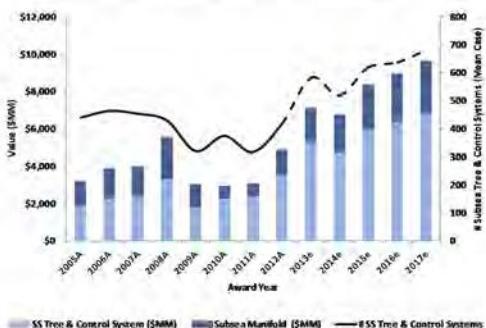
Quest Global Subsea Tree Forecast Awards Mean Case

2000A to 2017e



Global Subsea Tree, Control & Manifold CAPEX

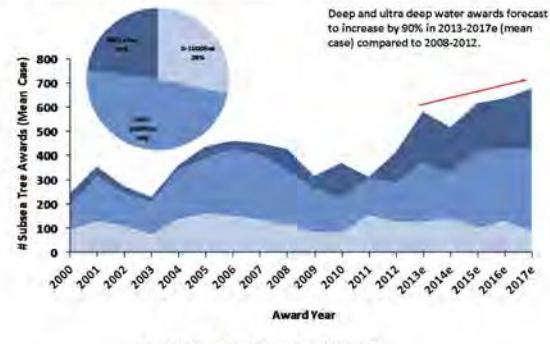
2000-2017e Mean Case Awards (\$40.8bn Forecast)



Includes hardware costs for subsea tree, subsea control system and manifold only – does not represent total contract value for system.

Global Subsea Tree Awards by Water Depth

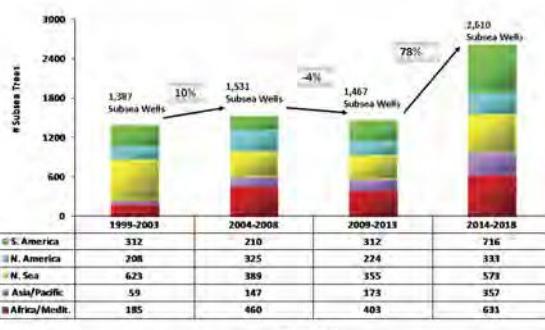
2000-2017e (Forecast = Mean Case)



Deep and ultra deep water awards forecast to increase by 30% in 2013-2017e (mean case) compared to 2008-2012.

Global Subsea Wells Onstream

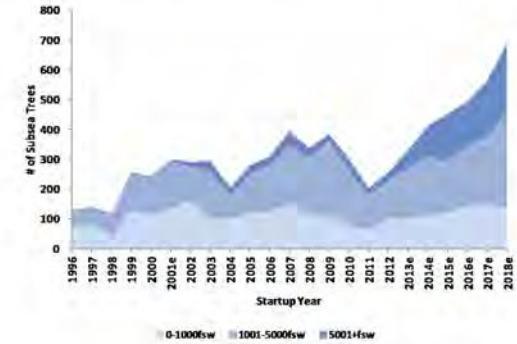
6,995 Wells 1999-2018e*



* 2013-2018 unconfirmed

Global Subsea Tree Startups by Water Depth

1996-2018e Startups – Normalized Case



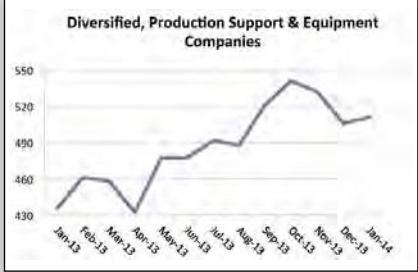
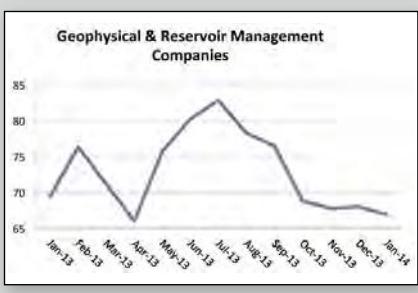
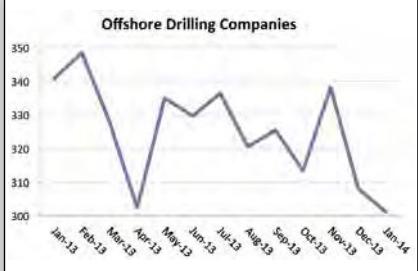
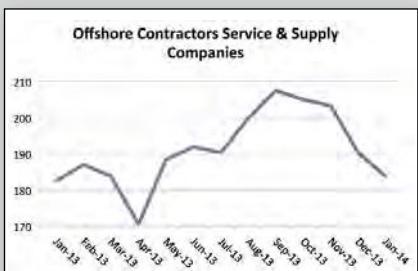
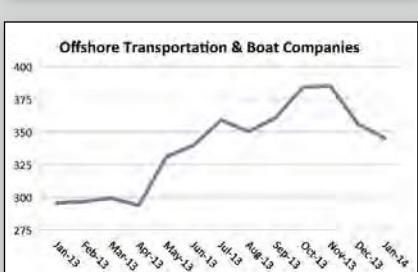
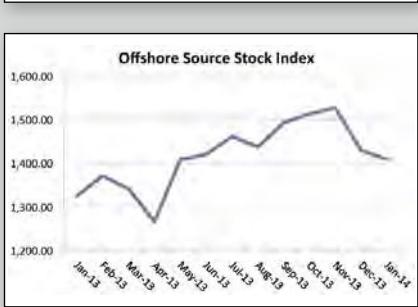
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Monthly Stock Figures & Composite Index

Industry Company Name	Symbol	Close(Mid) January	Close(Mid) December	Change	Change %	High	Low
						52 week	
Diversified, Production Support and Equipment Companies							
Baker Hughes, Inc.	BHI	53.73	53.03	0.70	1.3%	58.83	42.60
Cameron Intl. Corp.	CAM	58.77	57.48	1.29	2.2%	67.42	52.50
Drill-Quip, Inc.	DRQ	107.41	108.81	-1.40	-1.3%	121.07	76.44
Halliburton Company	HAL	50.81	49.90	0.91	1.8%	56.52	36.46
Tenaris SA	TS	44.29	43.39	0.90	2.1%	49.87	38.47
Newpark Resources, Inc.	NR	12.10	12.27	-0.17	-1.4%	13.64	7.92
Schlumberger Ltd.	SLB	89.99	86.54	3.45	4.0%	94.91	69.08
Superior Energy Services, Inc.	SPN	26.14	25.03	1.11	4.4%	29.22	22.89
Weatherford International, Inc.	WFT	14.68	14.74	-0.06	-0.4%	17.38	11.11
Deep Down, Inc.	DPDW	1.99	2.03	(0.04)	-2.0%	2.70	1.17
FMC Technologies	FTI	51.00	52.77	(1.77)	-3.4%	59.79	45.47
Total Diversified, Production, Support and Equipment.....	510.91	505.99	4.92	1.0%	571.35	404.11	
Geophysical / Reservoir Management							
Dawson Geophysical Company	DWSN	33.57	31.54	2.03	6.4%	40.86	23.67
Mitcham Industries, Inc.	MIND	16.78	16.56	0.22	1.3%	18.41	13.81
Compagnie Gnrale de Gophysique-Veritas	CGV	16.52	19.86	-3.34	4.5%	30.11	15.77
Total Geophysical / Reservoir Management.....	66.87	67.96	-1.09	-1.6%	89.38	53.25	
Offshore Drilling Companies							
Atwood Oceanics, Inc.	ATW	50.06	51.70	-1.64	-3.2%	59.49	43.91
Diamond Offshore Drilling, Inc.	DO	54.25	55.94	-1.69	-3.0%	76.85	53.30
ENSCO International, Inc.	ESV	54.80	58.08	-3.28	-5.6%	65.82	51.01
Nabors Industries, Inc.	NBR	17.35	15.81	1.54	9.7%	18.33	14.34
Noble Drilling Corp.	NE	36.61	36.61	0.00	0.0%	42.34	33.68
Parker Drilling Company	PKD	8.06	7.81	0.25	3.2%	8.67	3.75
Rowan Companies, Inc.	RDC	32.94	33.90	-0.96	-2.8%	38.65	30.21
Transocean Offshore, Inc.	RIG	46.93	48.10	-1.17	-2.4%	59.50	44.19
Total Offshore Drilling.....	301.00	307.95	-6.95	-2.3%	369.65	274.39	
Offshore Contractors, Services, and Support Companies							
Helix Energy Solutions Group, Inc.	HLX	22.10	23.31	-1.21	-5.2%	27.58	20.33
Gulf Island Fabrication	GIFI	22.79	23.23	-0.44	-1.9%	26.82	18.76
McDermott International, Inc.	MDR	9.10	8.18	0.92	11.2%	13.48	6.68
Oceaneering International	OII	74.61	78.99	-4.38	-5.5%	87.64	58.08
Subsea 7 SA	SUBCY.PK	19.30	18.81	0.49	2.6%	25.48	17.05
Technip ADS	TKPPY.PK	22.68	24.11	-1.43	-5.9%	31.32	21.08
Tetra Technologies, Inc.	TTI	11.36	11.98	-0.62	-5.2%	13.41	8.08
Cal Dive International, Inc.	DVR	1.83	1.69	0.17	10.1%	1.51	2.38
Total Offshore Contractors, Service, and Support.....	183.80	190.30	-6.50	-3.4%	227.24	152.44	
Offshore Transportation and Boat Companies							
Seacor Holdings, Inc.	CKH	87.80	91.10	-3.30	-3.6%	99.00	66.96
Gulfmark Offshore, Inc.	GLF	44.23	46.32	-2.09	-4.5%	53.89	34.14
Bristow Group	BRS	73.49	76.08	-2.59	-3.4%	85.70	55.49
PHI, Inc.	PHII	36.97	37.21	-0.24	-0.6%	40.57	23.43
Tidewater, Inc.	TDW	56.60	56.01	0.59	1.1%	63.22	45.19
Trico Marine Services, Inc.	TRMAQ.PK	0.04	0.04	0.00	0.0%	0.11	0.01
Hornbeck Offshore	HOS	45.95	49.06	-3.11	-6.3%	59.93	33.45
Total Offshore Transportation and Boat	345.08	355.82	-10.74	-3.0%	402.42	258.67	

Monthly Stock Figures & Composite Index

Industry	Close(Mid) January	Close(Mid) December	Change January	Change % January	High 52 week	Low 52 week	
	Total Diversified, Production, Support and Equipment	510.91	505.99	4.92	1.0%	571.35	404.11
	Total Geophysical / Reservoir Management	66.87	67.96	-1.09	-1.6%	89.38	53.25
	Total Offshore Drilling	301.00	307.95	-6.95	-2.3%	369.65	274.39
	Total Offshore Contractors, Service and Support	18380	190.30	-6.50	-3.4%	227.24	152.44
	Total Offshore Transportation and Boat	345.08	355.82	-10.74	-3.0%	402.42	258.67
	Total Offshore Source Index	1,407.66	1,428.02	-20.36	-1.4%	1,660.04	1,142.86
DISCLAIMER							
The information on this page is provided for information and comparison purposes only and should not be used to make financial and business decisions and is accurate to the best of our knowledge for the period indicated.							

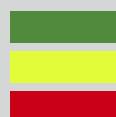
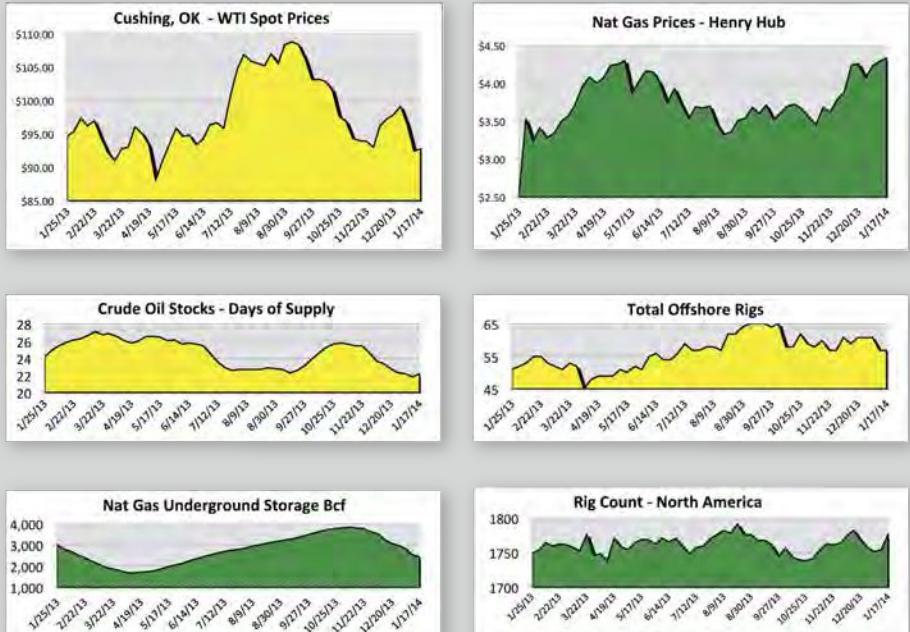
Oil & Gas Industry Trends

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

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Ocean News & Technology



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

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developic custom buoy designs cover applications such as deep sea moored telemetry and relay buoys, dry falling data buoys for shallow waters like the North Sea, wave riding buoys or spar buoys that provide stable platforms for oceanographic instrumentation even in heavy seas.

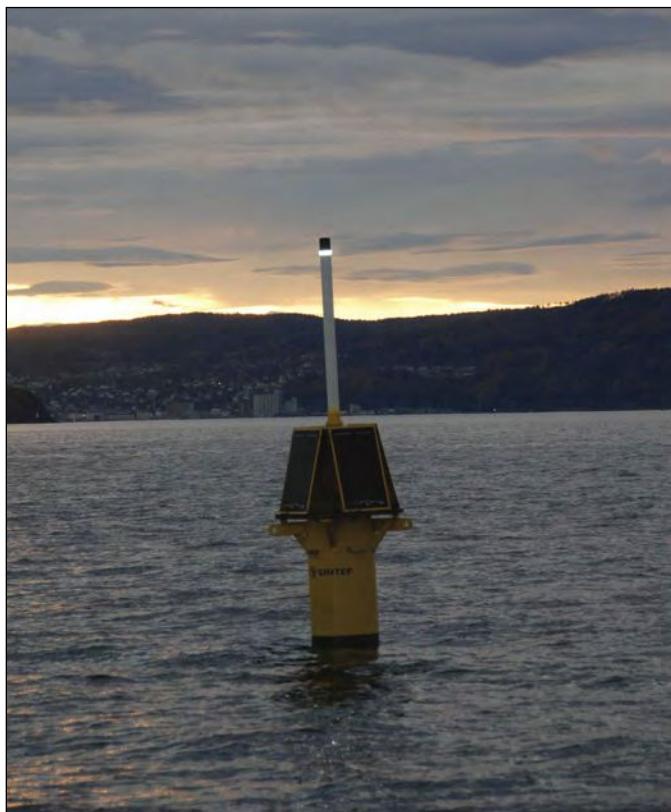
Besides delivering the bare buoy structure, developic also offers fully equipped buoys. For example, acoustic telemetry, GPS receivers, AIS transponders, active radar reflectors or satellite or RF telemetry can be integrated. For powering buoy-mounted sensors, developic offers complete solutions based on solar power or methanol fuel cells including the necessary rechargeable buffer battery packages and safety components that are essential for long-term reliable and safe operation.

As one of the first buoy manufacturers, we equip all buoys that feature power supply subsystems based on rechargeable lead acid chemistry with redundant safety systems that not only control the charging process so that the voltage is always below the gassing threshold but also monitor and actively remove eventually generated hydrogen.

For buoy moorings, all required components such as anchors, mooring rope, shackles, acoustic releases, swivels (also conductive) and flotation elements are available. Mooring concepts are tailored to the specific application and expected environmental conditions. Besides delivering buoys and equipment, developic also offers deployment support.

developic surface telemetry systems and system components are in use by leading marine research institutes such as SINTEF, NIOZ, GEOMAR, NOC.

For more information, visit www.develogic.de.



Lankhorst mooring ropes for Western Isles development FPSO

Leading offshore rope manufacturer, Lankhorst Ropes has been awarded a contract by Aberdeen based Dana Petroleum to provide Gama 98 polyester mooring lines for the Western Isles Development FPSO vessel (Floating Production Storage and Offloading).



Given the weather conditions in the North Sea and relatively shallow water depth, the cylindrically shaped FPSO will use a semi-taut leg mooring system. It will be moored with 14 polyester mooring lines in three clusters of 4, 4 and 6 lines at 250 m water depth. Two clusters will have longer lines to the prevailing weather that, together with seabed chain, will provide the lateral restoring force needed to keep the production vessel on station.

The Gama 98 polyester rope tethers are made from high efficiency, parallel laid sub-rope cores within an outer braided jacket. During manufacture, all of the sub-ropes are monitored to ensure they all have equal tension and length, ensuring a 100% torque free rope.

The Western Isles Project (Dana 77% and Cieco 23%) will develop two discovered oil fields called Harris and Barra in the Northern North Sea, 160 km east of the Shetlands and 12 km west of Tern field. It involves a subsea development of at least five production and four water injection wells plus two exploration wells tied back to a new build floating production, storage and offloading vessel (FPSO) with oil export using shuttle tankers.

For more information, visit www.lankhorstropes.com.

iXBlue to supply gyrocompass systems to Royal Fleet Auxiliary Tide Class Tankers

iXBlue is proud to announce they are to supply QUADRANS fiber-optic gyrocompass systems for installation aboard the four new Tide Class tankers of the UK Royal Fleet Auxiliary (RFA).



The systems to be supplied to Kelvin Hughes Limited will be integrated as a sub-system of the Integrated Bridge Systems for delivery to Daewoo Shipbuilding and Marine Engineering (DSME) in South Korea where the vessels are under construction.

The deliveries will comprise twin QUADRANS gyrocompass units, control and display and data distribution units (DDU) plus a comprehensive network of ancillary repeaters from UK-based Marine Data Limited. The QUADRANS will deliver heading, rate-of-turn data for navigation sensors along with vessel motion data to support helicopter operations that represent one activity of the multi-function vessels.

The FOG technology within all iXBlue gyros represents the only solid state gyro technology available today. As with other iXBlue gyros, the QUADRANS gyrocompass requires zero maintenance bringing distinct advantages in reduced cost and operational impact of support in both naval and critical commercial applications. The compass is type approved for high-speed craft and is available as a stand-alone sensor or as a system with peripheral components tailored to any requirement.

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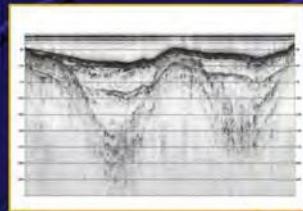
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PRODUCT NEWS

Yale Cordage teams up with the National Data Buoy Center and the Oklahoma Aquarium

Yale Cordage, a custom and specialty rope manufacturer, announced it is developing versions of rope to withstand the damage that fish and shark bites can do to the worldwide tsunami warning system. Partnering with the National Data Buoy Center and the Oklahoma Aquarium, research proved that aggressive bull sharks could bite through the mooring lines of critical warning buoys, rendering them and the data they collect useless in the event of severe weather and tsunami activity. As a result of the study's findings, Yale Cordage developed a shark-proof resistant rope that fits the requirements of the U.S. government to secure these important pieces of equipment.

"We're proud to be apart of a project that will lead to a more stable buoy system, and by extension, help America as well as the world better prepare for devastating natural disasters," stated Bill Putnam, president of Yale Cordage.

"The Oklahoma Aquarium is a science and education-based facility, so it is extremely gratifying to see that our unique bull shark collection can contribute to such a worthy and worldly cause," said Kenny Alexopoulos, Oklahoma Aquarium Deputy Director.

"The National Data Buoy Center has been very pleased with the performance of the first generation of fish bite resistant rope and is looking forward to evaluating the performance of the second iteration of the product," said Craig Kohler, NDBC chief of engineering.

The Oklahoma Aquarium is the only location in the country with a large population of bull sharks in captivity. Representatives from the Oklahoma Aquarium and Yale Cordage cooperated on a National Data Buoy Center-designed experiment to collect data in order to both confirm the damaging effects of sharks on mooring lines and assess the properties of rope necessary to effectively tether the buoys and protect them from damage — all at a cost within the government's design parameters. While Yale Cordage already produces Shark Byte™, an incredibly strong rope that is used around the world to withstand extreme abrasion, a new product is now in development to meet the government's requirements. After final testing, the release of the new rope is slated for launch in early 2014.

For more information, visit www.yalecordage.com.

Fugro's Cable Analyst II advances cable route design and data management

Fugro Pelagos is pleased to introduce Cable Analyst II, a smart and robust software solution for designing, engineering and managing submarine cable routes. Cable Analyst II is an extension to Esri's ArcGIS for Desktop and takes advantage of its rich geospatial functionalities. With a logical data model and intuitive, process-oriented tools, Cable Analyst II streamlines the workflow for performing analysis and providing the information needed for designing a submarine cable route. It is equipped with capabilities to efficiently populate, manage and track cable databases.

The ArcGIS platform opens the door to numerous possibilities for implementing design criteria such as creating custom models and scripts and assessing various layers to study risk, cost and environment. Satellite imagery, electronic nautical charts, web mapping services and marine data obtained from public and private sources are also readily accessible.

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Fugro Pelagos is offering Cable Analyst II in three tiers to allow customers to match functionality to their needs. Each successive tier includes the previous tier(s): Tier 1 provides wizards for importing and exporting Route Position Lists and Straight Line Diagrams; Tier 2 provides functionalities for creating, populating and managing cable databases; and Tier 3 provides essential analytical tools to help with the design and engineering of submarine cable routes.

For more information, visit www.fugro.com.

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Tracerline® Dye-Lite® All-In-One™ full-spectrum fluorescent dye easily pinpoints leaks in all oil-based fluid systems on marine vessels, including engine oil, fuel and hydraulic fluid.

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All-In-One dye is highly concentrated, requiring only half the dosage of most competitive dyes. To use it, just add the dye and allow it to circulate through the marine vessel's fluid system. The dye escapes with the host fluid through even the tiniest leaks. When the system is scanned with a high-intensity UV or blue light inspection lamp, the dye fluoresces a bright yellow-green, revealing the exact location of every leak.

For more information, visit www.tracerline.com.

Broco® Underwater introduces the new Ultrathermic Cutting Rod PLUS

Broco® Underwater announces the latest advancement in underwater cutting—the new advanced design Broco Underwater Ultrathermic Cutting Rod PLUS. Based on a new patent pending design, this new cutting rod delivers 20% more cutting and burn time than the same size standard Broco underwater cutting rod and burns more evenly than any rod on the market.

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New Broco Ultrathermic Cutting Rod PLUS rods increase burn time 20% on average, for a 3/8 in. diameter by 18 in. long rod. The extra seconds allow for longer burn time and more cutting, delivering more Broco quality with

increased performance and value to our customers.

Broco Underwater Ultrathermic Cutting Rod PLUS rods are now available in 3/8 in. diameter by 18 in. length, and will

be available in 3/8 in. diameter by 36 in. length later in 2014.

For more information, visit www.brocoinc.com.

ABS Acoustic Bubble Spectrometer[®]

DYNAFLOW, INC. is pleased to announce the release of Generation II of the ABS Acoustic Bubble Spectrometer[®] (ABS) for the measurement of bubble size distributions and void fractions in gas/liquid mixtures. The ABS can be used in a wide variety of applications requiring the monitoring of the bubble population such as aeration, bioreactor, oceanography, chemical engineering, cavitation studies, biological media, food processing, etc.

The Generation II ABS incorporates many improvements. The data sampling rate has been increased nearly five folds, which expands the bubble detection limit below 10 microns radius. In this new generation, all the hardware external to the processing computer has been integrated in one box. Additionally, a laptop configuration is now available using an Express Card port.

The software processing of the Generation II ABS incorporates the latest developments stemming from the past few years of research. In addition to tests in water media, R&D efforts for acoustic bubble detection have been conducted for other media such as biological tissue, mercury, and food (whipped cream and syrup). The resulting improvements in the signal processing have increased the accuracy of the ABS and allows for the processing of

noisy signals that would have been discarded by the previous ABS generation. All improvements were subjected to rigorous testing and validation against optical measurements (high-speed photography and laser scattering) for a range of conditions and bubble sizes.

DYNAFLOW can provide a turn-key system, including the ABS instrument, amplifiers, transducers of different sizes, and if needed, transducers embedded in flow pipes or other fixtures. A software-only version of the ABS incorporating the latest developments is also available.

For more information, visit www.dynaflow-inc.com.

J+S Ltd launch NarcineArray™

J+S Ltd are launching their next-generation, small diameter, passive acoustic line array product family at Oceanology International, ExCel, London in March this year. Called after the small electric ray of this name, NarcineArray™ is a product family of low-profile miniaturized acoustic arrays, suitable for static or towed applications that can be configured to suit the desired application. J+S have made use of their knowledge and experience of larger diameter arrays to develop this highly adaptable product that is uniquely suited to today's underwater environment.

When compared with a conventional towed array, NarcineArray™ provides a significant reduction in power consumption, diameter (down to 16 mm), weight and drag. This means that the array can be deployed and recovered far more easily, often without any specialist handling equipment. Because of the reduced weight, drag and power consumption NarcineArray™ can also be deployed from a much greater range of vessels, from conventional surface ves-



sels to Unmanned Surface Vessels (USVs) and Unmanned Underwater Vehicle (UUVs).

J+S Ltd are also announcing their joint collaboration with AutoNaut®, a revolutionary new wave propelled vessel for ocean research built by MOST (Autonomous Vessels) Ltd for very long endurance autonomous data gathering. The AutoNaut® harvests solar energy at sea to power her state of the art electronics. Successful trials as part of the NOC and DSTL-funded Phase 2 Long Endurance Marine Unmanned Surface Vessel (LEMUSV) project took place in November 2013 and proved a successful combination for both of these new groundbreaking technologies. AutoNaut® are on STAND D445 at Oceanology International 2014.

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

PT-500 submersible pressure transducers

PT-500 Submersible Pressure Transducers from Automation Products Group, Inc. (APG) are now available with additional output, cabling, cage, vent cap and installation options. The result is highly robust and reliable performance to suit specific application needs in the most challenging environments.

"Submersible pressure transducer users need two things—a sensor that provides reliable performance and enough options to handle application specifics," says Doug Moore, Inside Sales Manager. "The PT-500 is field-proven technology that delivers on both accounts, and we've worked hard to incorporate additional functionality and options to make this a truly superior submersible sensing solution in environments where conventional options simply don't cut it."

In addition to a 4-20 mA output, the PT-500 is now available with Modbus, as well as 0-5 VDC and mV/V. This enables users to select the output that fits their need rather than being forced into a choice that may not be ideal. Additionally, a new Hytrel® cable option gives users the ability to use a submersible pressure sensor in the most challenging environments such as diesel tanks. With the PT-500, users can also choose between a traditional cage or a patented removable cage that can be reused on a new sensor if the need should arise.

For more information, visit www.apgsensors.com.

WASSP goes wireless with new remote mapping system

WASSP-Wireless has been designed to address one of super yacht captains biggest concerns: underwater obstacle avoidance where hull damage or grounding the vessel is to be avoided at all costs.

Ideally suited to use when navigating in unknown waters or where marine charts lack sufficient detail, WASSP-Wireless takes the risk out of the equation for the captains of these very large and very expensive vessels.

Installed in the tender or support vessel of a super yacht, the WASSP-Wireless system uses a WiFi radio link to send a real-time seafloor map back to the super yachts bridge system and display on a MaxSea navigation plotting platform—all in real-time.

Using a wide-angle, multi-beam transducer, WASSP-Wireless quickly and accurately covers the seafloor. With one pass at a depth of 20 m, WASSP-Wireless will map a swath over 60 m wide using 112 sonar beams and renders an information-rich 2D or 3D real-time image on the bridge.

For more information, visit www.wassp.com.



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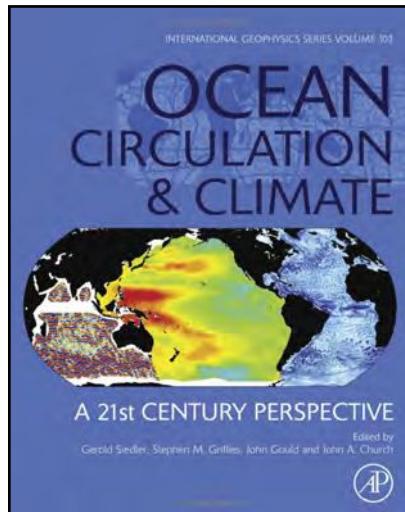
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Ocean Circulation and Climate A 21st century perspective (second edition)

Siedler, G., Griffies, S., Gould, J. and Church, J. – Editors



The ocean is one of the most important components of the climate system. It contributes large reservoirs for heat and carbon and is thus a major player in controlling climate change. The current state of knowledge is summarized in a new book, written by 76 authors from 15 countries. It was edited by four experts, including Prof. Gerold Siedler from the GEOMAR Helmholtz Centre for Ocean Research Kiel in Germany, and three other scientists from England, the USA, and Australia.

“Ocean Circulation and Climate – A 21st Century Perspective” is the second edition of a highly successful book on the circulation of water masses in the ocean and the role of the ocean in the climate system, published in 2001. It had quickly become a standard reference on the topic. The editors decided to prepare a major and extended update. Many well-known scientists from all over the world contributed to the new edition. Gerold Siedler, Emeritus Professor at GEOMAR Kiel, was joined by John Gould from Southampton/UK, Stephen Griffies from Princeton/USA, and John Church from Hobart/Australia as editors.

Academic Press; ISBN-10: 0123918510
Hardcover, 904 pages, December 2013



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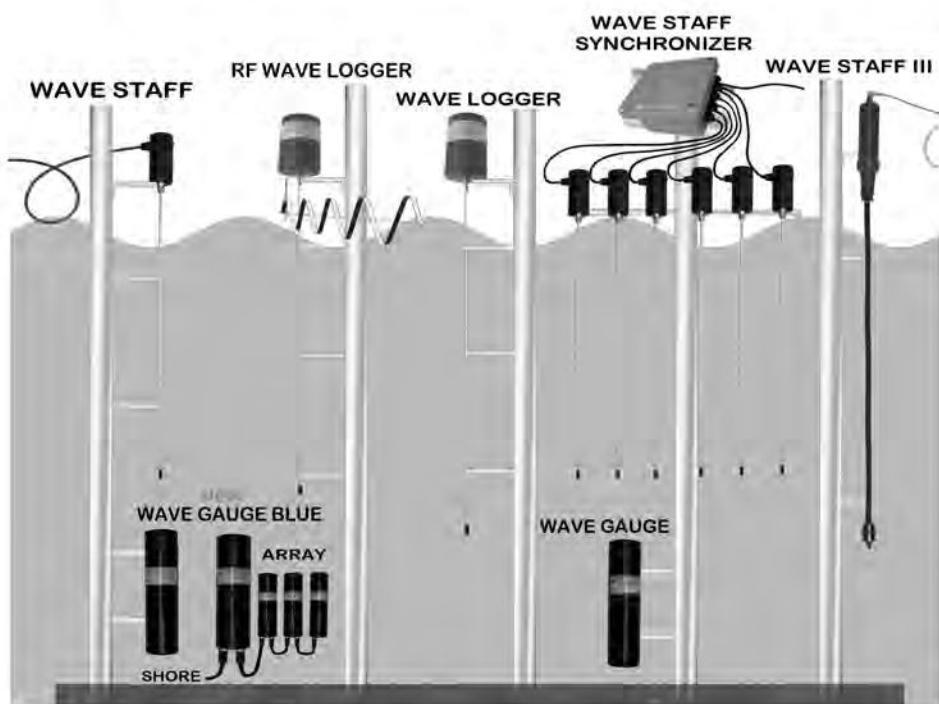
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Cobalt International Energy, Inc. elected former U.S. Senator **Kay Bailey Hutchison** to Cobalt's board of directors. Hutchison's election brings the number of directors to 11. Her initial term as a director was effective immediately and will expire at Cobalt's 2015 annual meeting of stockholders, at which time she will be up for re-election. Hutchison has over 40 years of experience in the public and private sectors. Currently, she serves as senior counsel in Bracewell & Giuliani, LLP's Dallas, Texas office. From 1993 to 2013, she served as a U.S. senator and was the first woman to represent Texas in the U.S. Senate. Prior to her senate service, Hutchison was elected Texas state treasurer in 1990 and to the Texas House of Representatives in 1972, representing the first Republican woman elected to that body. In addition to her political career, Hutchison is also a former bank executive, journalist and small business owner.

KBR, Inc. said **William P. (Bill) Utt** was to retire as chairman, president and chief executive officer in 2014. The board of directors formed a search committee to identify his successor. To ensure a smooth transition, Utt was to continue to lead KBR until a new CEO was

appointed and would support the board's search process. The board retained Russell Reynolds Associates, an executive search firm to assist in the process. "Under his leadership, KBR has built a strong foundation for growth and navigated many unique challenges of our industry," KBR lead director Loren Carroll said. "We believe we are well positioned for the future and look forward to identifying a new leader who will leverage the company's broad geographic footprint, extensive capabilities and strong customer relationships to drive results."

Conductor Installation Services Ltd., which provides pile- and conductor-driving services to the marine construction and oil and gas industries, appointed **Paul G. Adams** to the newly created position of regional technical sales manager for the Americas region. In addition to managing operations in the region, Adams will be instrumental in driving new business development in North and South America, especially the continued growth of the company's conductor-driving services and recently launched sub-



Utt

sea piling services. During his 30 years in the oil and gas industry, Adams has worked in a variety of engineering and project management roles all over the world. Before joining CIS, Adams served as global hammer operations manager for Baker Hughes in Woodlands, Texas, where he was responsible for overseeing its global hammer operations, as well as plug and abandonment activities. Adams launched his career in 1982 with Louisiana-based PetroDrive.

Tidewater Inc. elected **Robert L. Potter** to its board of directors for a term beginning December 1, 2013 and expiring in July 2014. Potter recently announced that he would retire from his position as president of FMC Technologies, Inc. on November 30, 2013, a position he held since August 2012, following 40 years of service with the company. Potter joined FMC in 1973 after his graduation from Rice University. He served in a number of sales management and operations management roles prior to his appointment in 2001 as vice president of energy processing. He was appointed senior vice president of energy processing and global surface wellhead in 2007 and executive vice president of energy systems in 2010.

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Elisabeth Tørstad is appointed CEO in DNV GL — Oil and Gas. She took on the role in January 2014, operating from the company's Oil and Gas headquarter in Oslo. Tørstad has significant industry and management experience at legacy DNV and comes from the role of chief technology officer for DNV GL and prior to that as chief operating officer for DNV's maritime and oil and gas operations in division

Americas and Sub-Saharan Africa. In previous management positions she was the director of operations for cleaner energy and utilities, head of department for pipelines and materials technology, head of department for deepwater technology and technology qualification. Her academic background is Master of Science at the University of Oslo and Business Administration at the University of Bergen. She is succeeding Pekka Paasivaara, who decided to leave the company for personal reasons.

Chelsea Technologies strengthens the sales team with the appointment of **Katie Davage**. Davage has a BSc (Hons) in Environmental Science (University of Sussex) and previously worked for Scientifica, specialists in electrophysiology & imaging. Davage will focus on promoting Chelsea's FastOcean FRR fluorometers for in situ and in vitro estimation of gross primary productivity. She will also champion the sales of FastBallast — a sensor to monitor the effectiveness of ballast water treatment monitoring systems. Davage will also take over the promotion of the well established Lux range of multi-wavelength fluorometers for the monitoring of chlorophyll, phycoerythrin, phycocyanin and turbidity monitoring.

Carol M. Browner, former head of the U.S. Environmental Protection Agency (EPA), has joined the Global Ocean Commission, an independent high-level panel aiming to restore the ocean to ecological health and sustainable productivity. Ms. Browner replaces John Podesta, founder of the Center for American Progress (CAP), who was recently appointed Counselor to U.S. President Barack Obama. Ms. Browner served as EPA Administrator in both of President Bill Clinton's terms in office (1993-2001), and later as Director of the White House Office of Energy and Climate Change Policy under President Barack Obama.



Tørstad



Davage

New Industries, Inc. announced the completion of the expansion of its Morgan City piping fabrication shop. The expansion adds an additional 10,000 sq. ft of useable space, two additional overhead cranes, and a new automatic submerged arc welding system. The piping fabrication shop is used for manufacturing subsea piping components and assemblies. The expansion doubles the company's available capacity for piping fabrication and is the response of New Industries to a growing volume of customer orders for subsea piping components. Founded in 1986, New Industries, Inc. is a Morgan City, Louisiana-based specialty steel fabricator serving the offshore oil and gas and marine industries. The company specializes in large diameter ASME pressure vessels; subsea production hardware such as suction piles, jumpers, PLETs, PLEMs, and manifolds; and DNV type-approved portable buildings including blast resistant design and pressurization for hazardous locations.

Subsea Americas recently opened a new facility in Berwick, Louisiana. The new offices, tooling shop, and outdoor storage area is set upon 50,000 sq. ft of property. The new location and facility will allow for the continued expansion of its core business of ROV tooling rentals and will afford its subsea clients the space for long-term storage or temporary staging of subsea hardware for eventual mobilization to its final destination or host vessel. Subsea Americas was formed in 2008 and continues to provide rental ROV tooling to a broad customer base of the deep water ROV markets in the Gulf of Mexico, Canada, and West Africa. The company's consistent growth in expanding its tooling rental fleet and services over the years is a testament to its continued commitment at providing its customers quality service and reliable ROV tooling rental equipment in the present and well into the future.

Following a major expansion that saw new **MacArtney** offices open in every coastal corner of the North America and added several new faces to the team, MacArtney is looking to experience record breaking growth within North American markets for underwater technology. This marks a key contribution to the overall strategic ambition of the MacArtney Group to double turnover between 2010 and 2015.

Subsea Innovation, one of the world's leading subsea equipment suppliers, has officially started work on its new headquarters, which will potentially help secure larger contracts and create more jobs in the northeast of England. The Darlington based company is building a new factory and office space after its expanding opera-

tions outgrew the capacity of its existing Faverdale North site. The new development will be double the size of Subsea's current base and opens up the potential to double its workforce to more than 70. It will also enable the company to handle larger demands from the oil, gas, and renewable energy industries. Once finished, the Darlington headquarters will cover 40,000 sq. ft and is expected to be completed in August. Subsea Innovation's annual turnover exceeded £10 million for the first time in its history in 2013, up from £7.5 million in 2012. The company designs and manufactures offshore equipment handling systems, pipeline repair systems, and subsea sealing systems.

Motive Offshore, which is headquartered in Boyndie, near Banff, has launched a new office in Aberdeen and invested in a fully operational base in Stavanger, Norway to service its increasing customer base. Both investments were in the five-figure region and will support the business as it expands globally. The organization manufactures and hires modern marine deck equipment, including winches, hydraulic power units, and associated wire spooling equipment and sheaves, to the highest standards in line with industry demand.

Tru-Marine to expand global service coverage to the U.S. offering complete turbocharger repairs services to vessels calling Houston ports and meeting growing demand for prompt and quality service. Turbocharger specialist Tru-Marine opens in Houston, in a move to align its global service coverage with its customers' increasing expectations for integrated fleetwide maintenance, repair, and overhaul solutions. Located in Deer Park, Texas and supported by Tru-Marine's extensive global service network and inventory, Tru-Marine Houston is now one of the largest turbocharger service stations in the area providing full range services for turbochargers in ocean-going vessels and offshore oil and gas installations. The group operates from seven full-facility service stations, including Singapore, Shanghai, Tianjin, Guangzhou, Sharjah, Rotterdam, and Houston, representing renowned turbocharger makers including Mitsubishi Heavy Industries, Mitsui Engineering and Shipbuilding, Kawasaki Heavy Industries, KBB, and Napier.

Deep Trekker is pleased to announce their newest partnership with SALT, a UK company specializing in marine solutions for defense and many other market sectors. Deep Trekker manufactures the world's only fully portable, affordable and easy to use underwater ROV.

CALENDAR & EVENTS

February 10-12, 2014
OTC Arctic Technology Conference
Houston, TX
www.arctictechnologyconference.org

February 11-13, 2014
Underwater Intervention
New Orleans, LA
www.underwaterintervention.com

February 23-28, 2014
Ocean Sciences Meeting
Honolulu, HI
www.aslo.org/meetings/sessions

March 3-6, 2014
10th ONR/MTS Buoy Workshop
San Diego, CA
jrizoli@whoi.edu

March 5-7, 2014
Subsea Tieback
San Antonio, TX
www.subseatielbackforum.com

March 9-13, 2014
NACE Corrosion
San Antonio, TX
www.nace.org

March 10-12, 2014
Decommissioning & Abandonment Summit
Houston, TX
www.decomworld.com

March 11-13, 2014
Oceanology International
London, UK
www.oceanologyinternational.com

March 25-28, 2014
OTC Asia
Kuala Lumpur, Malaysia
www.otcasia.org

March 29-May 1, 2014
IDGA Maritime Homeland Security
Baltimore, MD
www.maritimehssummit.com

April 7-10, 2014
Oceans '14 Taipei
Taipei, Taiwan
www.oceans14mtsieetaipei.org

April 8-10, 2014
European Offshore & Energy
Birmingham, UK
www.europeanoffshoreenergy-expo.com

April 15-16, 2014
Offshore Well Intervention Conference
Aberdeen, UK
interventioneu.offsnetevents.com/

April 15-17, 2014
GMREC
Seattle, WA
www.globalmarinerenewable.com

April 28-30, 2014
National Hydropower Association
Washington, D.C.
www.nationalhydroconference.com

May 5-8, 2014
Offshore Technology Conference
Houston, TX
www.otcnet.org

May 12-15, 2014
AUVSI's Unmanned Systems N.A.
Orlando, FL
www.auvsi.org

May 15-16, 2014
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Distribution: GOM Oil Spill & Ecosystem; Subsea EXPO;

Product & Services Focus: Multibeam & Side Scan Sonars; Research & Development Services

FEBRUARY

Editorial: Oceanology & Meteorology; Decom & Abandonment
Distribution: NACE Corrosion; Decommissioning and Abandonment Summit; Oceanology International

Product & Services Focus: Buoys & Monitoring Instrumentation; Environmental Monitoring/Testing Services

MARCH

Editorial: Subsea Fiber Optic Networks; Maritime Security

Distribution: GMREC; Offshore Well Intervention Conference

Product & Services Focus: Connectors, Cables & Umbilicals; Diver Detection Systems

APRIL

Editorial: Offshore Technology; Ocean Mapping & Survey

Distribution: OTC; AUVSI; Well Control and Containment Conference

Product & Services Focus: Subsea Tools & Manipulators; Offshore Risk Assessment; Training/Safety

MAY

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JUNE

Editorial: AUVs & Gliders; Defense & Naval Systems; *Industry in Action*

Distribution: TBD

Product & Services Focus: Tracking & Positioning Systems; Seismic Monitoring Equipment Leasing/Rental Services

JULY

Editorial: Workclass ROVs; Deepwater Pipeline/Repair/Maintenance

Distribution: Offshore Northern Seas

Product & Services Focus: Cameras, Lights & Imaging Sonars; Oil Spill Clean-Up Services

AUGUST

Editorial: Ocean Observing Systems; Subsea Telecom

Distribution: Oceans'14 MTS/IEEE

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SEPTEMBER

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Distribution: SPE ATCE; AWEA Offshore Windpower; Sea Tech Week; MTS Dynamic Positioning

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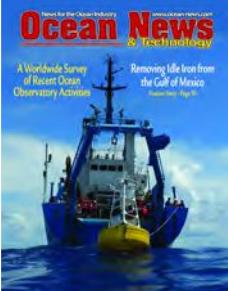
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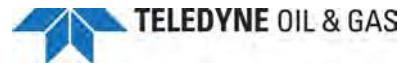


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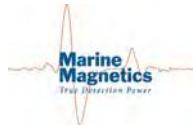
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Subsea Americas

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Berwick, LA 70342
Tel: +1 985 714 1767 or 985 518-0055
E-mail: charles@subseamericas.com
Website: www.subseamericas.com
Contact: Charles Mayea



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Contact Ray Mahr
Email: sales@exocetus.com
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Website: www.iver-auv.com
Contact: Jim Kirk



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UNDERWATER VEHICLES/ROVs

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96

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Deep Ocean Engineering Inc.

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



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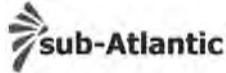
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February 2014

98

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Septentrio Satellite Navigation	45	www.septentrio.com
Quest Offshore Resources, Inc.	70	www.questoffshore.com
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SeaRobotics	81	www.searobotics.com
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Shark Marine Technologies, Inc.	30	www.sharkmarine.com
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Soundnine, Inc.	36	www.soundnine.com
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Teledyne Blueview	33	www.blueview.com
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Teledyne RESON	33	www.teledyne-reson.com
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Vaisala Oyj	48	www.vaisala.com
Valeport Limited	24	www.valeport.co.uk
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- accuracy: up to 0.04 degrees

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