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& TECHNOLOGY

December 2014

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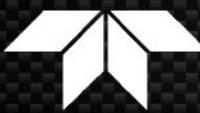
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Ocean News & Technology

Ocean Industry



Offshore Industry



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Divers training at The Underwater Centre, Fort William Scotland

OCEAN NEWS & TECHNOLOGY

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- Research & Development Services



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DELTA SUBSEA

Cultural Changes in Diving

By Travis Detke, MBA, Vice President of Operations, Aqueos Corporation
ADCI Gulf Coast Chapter Chairman

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Over 37 years ago, I stepped off the helicopter onto the semi-submersible Bredford Dolphin to begin my career in the diving industry. I was a member of Sub Sea's dive team ramping up for the season's surface and saturation diving campaign on the Piper Alpha structure in the North Sea. A wide-eyed kid from the Dakota oilfields, I was convinced the saturation and surface diving systems we worked were nothing less than "state-of-the-art," my team members were completely competent, thoroughly trained and proficient in their craft, and our procedures were foolproof. We all looked up to and aspired to be that rare individual, the "super-duper-do-anything-you-can't-bend-'em-deep-sea-diver," the stuff of legends.

However, after working in a high-risk industry for any period of time, one is certain to be exposed to the human cost: broken bones, lost fingers, career-ending decompression sickness, and more than a few fatalities. About a decade ago, I experienced a defining moment during the course of delivering a fatality presentation to a client. The client asked all the right questions we had expected and prepared for: How did the fatality occur? What was the root cause? What corrective actions were taken to prevent re-occurrence? How were we sharing these lessons industry wide? And then he asked the presentation team, most of whom were ex-divers, a question we hadn't anticipated. "What frightened you as a diver and does it still apply to today's divers?"

My unrehearsed reply was from the heart and to the point: As a diver, I was scared of screwing up, failing to complete my task, letting my team down, and being thought of as the weak link on the team. I took risks that I would never tolerate in today's industry, but at that time, they were tolerated, accepted, and...even expected. And yes, that fear absolutely still applied to divers of that day a decade ago.

The profession of diving has a steady influx of new talent drawn by the allure of adventure, travel, and high pay for the coolest job ever. No one enters the profession anticipating an early departure, but there's a heavy turnover of disillusioned individuals who were not prepared for the hard work, family separation, adverse working environment, and peer pressure.

The physics of diving haven't changed over the decades, the physiology hasn't changed (although we may understand it better), and the equipment, despite numerous incremental changes, remains basically the same. The major changes in diving have occurred in the field of safety culture, with much of this transpiring in the past 10 years.

Recognition of their shared responsibility for the safety of divers working on their projects by several major operators has been a significant factor in this culture

shift. While some operators continue to conduct their business as usual, believing the diving contractor is solely responsible for their activities as experts in their field, the majors have deliberatively moved forward with their agenda by engaging subject matter experts to develop recommended or general diving practices based upon and often exceeding those of the Association of Diving Contractors International (ADCI) Consensus Standards or International Marine Contractor's Association (IMCA) guidelines. Requiring audited standards for the equipment, personnel fitness for duty, competency, training standards, and certifications for dive crew members, they have raised the bar on professionalism for their contractors. Organizations such as the International Association of Oil & Gas Producers (IOGP) and the U.S. Gulf of Mexico Diving Safety Work Group (DSWG) are actively evaluating high-risk diving activities and releasing the output as industry best practices or guidelines to be followed. Most of these are readily available on their websites for interested parties to review.

Likewise, ADCI and IMCA have been raising the bar with their standards and guidelines. ADCI released their vastly improved Rev. 6 in 2011, and then improved it with Rev. 6.1 in 2014. IMCA guidance documents are constantly being reviewed and updated to account for changes in the industry. Again, these documents are readily available for review on their respective websites.

The current federal diving regulations governing offshore operations were, for the most part, written before many of the current divers were born. 46 CFR 197 is being reviewed for a rewrite, and the National Offshore Safety Advisory Committee (NOSAC) focus groups are actively engaged in drafting suggested verbiage and recommendations for the USCG to include in the rewrite. Expectations are high that this rewrite will be released for public review and comment in 2015. In addition, Safety and Environmental Management System (SEMS-1 & SEMS-2) requirements for the operators and contractors were imposed following the Macondo disaster. Most of these, such as Management of Change, Stop Work Authority, Job Safety Analysis, and others, were already adhered to by our industry; however, others had to ante up to continue to play.

While the industry's safety culture has significantly improved since I started diving, there's still progress to be made. There will always be the pressure to perform and succeed that I felt 37 years ago, but I'm encouraged that the young divers of today recognize that the pressure for superior performance includes safety awareness and involvement at the forefront.



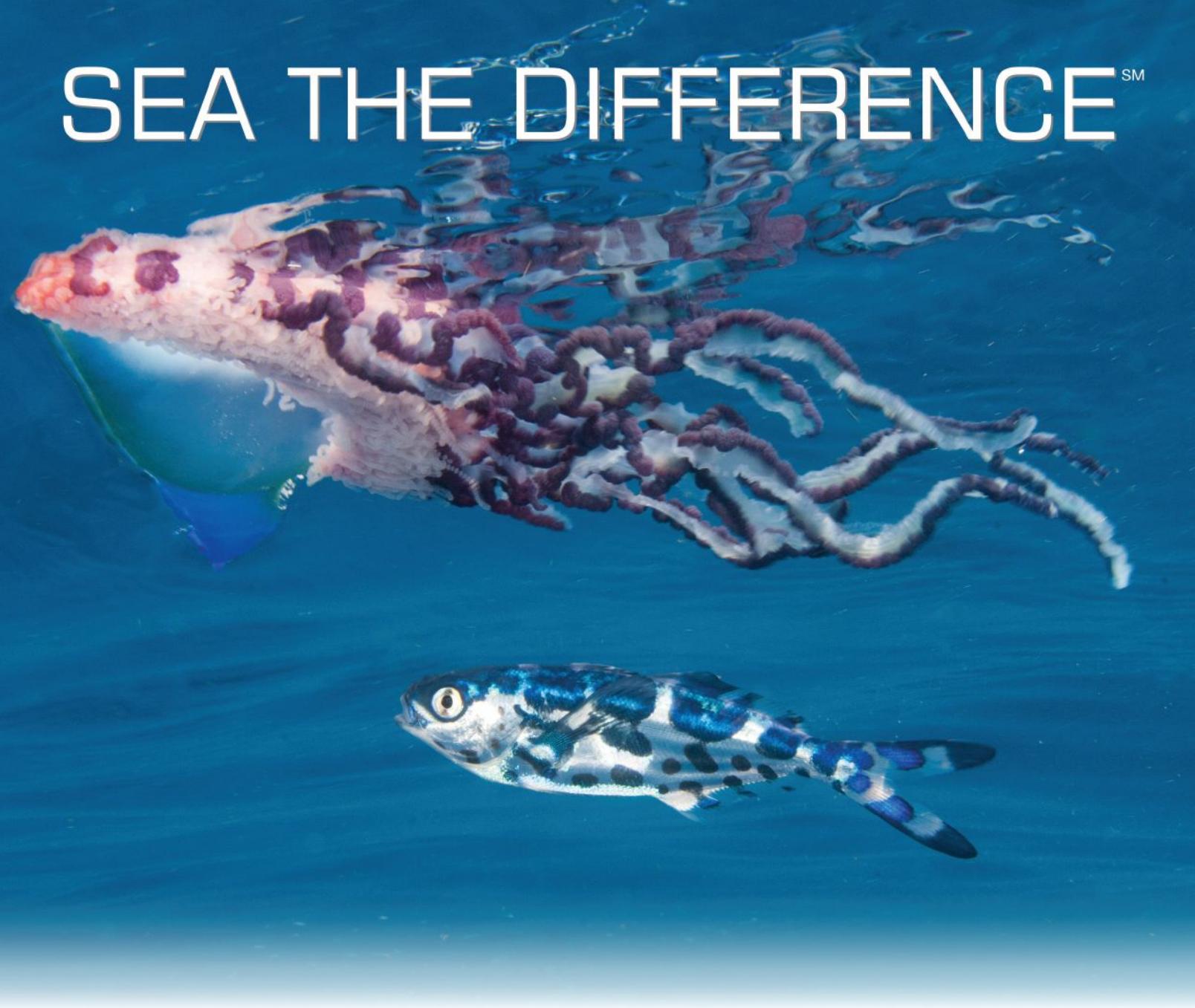
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Photo By: David Snyder: Senior Scientist, Marine Biologist, CSA Ocean Sciences Inc

OCEAN INDUSTRY

German U-boat 576 and freighter Bluefields found off North Carolina

A team of researchers led by NOAA's Office of National Marine Sanctuaries have discovered two significant vessels from World War II's Battle of the Atlantic. The German U-boat 576 and the freighter Bluefields were found approximately 30 mi off the coast of North Carolina. Lost for more than 70 years, the discovery of the two vessels, in an area known as the Graveyard of the Atlantic, is a rare window into a historic military battle and the underwater battlefield landscape of WWII.

"This is not just the discovery of a single shipwreck," said Joe Hoyt, a NOAA sanctuary scientist and chief scientist for the expedition. "We have discovered an important battle site that is part of the Battle of the Atlantic. These two ships rest only a few hundred yards apart and together help us interpret and share their forgotten stories."

On July 15, 1942, Convoy KS-520, a group of 19 merchant ships escorted by the U.S. Navy and Coast Guard, was en route to Key West, Florida from Norfolk, Virginia to deliver cargo to aid the war effort when it was attacked off Cape Hatteras. The U-576 sank the Nicaraguan flagged freighter Bluefields and severely damaged two other ships. In response, U.S. Navy Kingfisher aircraft, which provided the convoy's air cover, bombed U-576 while the merchant ship Unicoi attacked it with its deck gun. Bluefields and U-576 were lost within minutes and now rest on the seabed less than 240 yards apart.

"Most people associate the Battle of the Atlantic with the cold, icy waters of the North Atlantic," said David Alberg, superintendent of NOAA's Monitor National Marine Sanctuary. "But few people realize how close the war actually came to America's shores. As we learn more about the underwater battlefield, Bluefields and U-576 will provide additional insight into a relatively little-known chapter in American history."

The discovery of U-576 and Bluefields is a result of a 2008 partnership between NOAA and the Bureau of Ocean Energy Management (BOEM) to survey and document vessels lost during WWII off the North Carolina coast. Earlier this year, in coordination with Monitor National Marine Sanctuary, NOAA Ship Okeanos Explorer conducted an initial survey based on archival research. In August, archaeologists aboard NOAA research vessel SRVX Sand Tiger located and confirmed the ships' identities.

The newly identified wrecks are protected under international law. Although Bluefields did not suffer any casualties during the sinking, the wreck site is a war grave for the crew of U-576.

For more information, visit www.noaa.gov.



The German U-576 departing Saint-Nazaire, France, circa 1940-1942. The submarine was sunk in 1942 by aircraft fire after attacking and sinking the Nicaraguan freighter Bluefields and two other ships off North Carolina.

(Credit: With permission from Ed Caram).

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Nominations open for 2015 Gulf Guardians

The U.S. EPA Gulf of Mexico Program is now accepting nominations for the 2015 Gulf Guardians Awards. The awards are a way to recognize and honor the businesses, community groups, individuals, and organizations that are taking extraordinary steps to keep the Gulf healthy, beautiful and productive. Recipients exemplify what the Gulf of Mexico Program partnership is all about; innovative solutions that come about when we pool resources and look for creative ways to positively impact our quality of life and economic well-being on the Gulf of Mexico. Complete an application and email your nomination to GulfGuardian@epa.gov by 15 January 2015.

For more information, visit www.epa.gov/gmpo.

Greenpeace names 20 culprits in global overfishing

Greenpeace released a list of 20 "monster boats", examples of the most destructive and oversized fishing vessels operating under European flags, ownership or management. Overfishing is a global problem with alarming and indisputable consequences: 90% of fish stocks are either fully or overexploited. Greenpeace calls on governments to urgently start removing monster boats like those named on the list from oversized industrial fishing fleets around the world. Monster boats like the ones on the list contribute most to the depletion and destruction of our oceans and affect coastal fishing communities around the world. Greenpeace used a set of criteria to identify monster boats, including:

- the vessels' fish catching and holding capacity;
- the destructiveness of the vessels' fishing gear;
- operational characteristics of the vessels and companies concerned;
- the environmental and socio-economic impact of fishing activities; and
- involvement in illegal, unreported and unregulated (IUU) fishing or other dodgy activities.

Various United Nations bodies have repeatedly warned of the dire situation of fish stocks and have identified excess fishing capacity as a critical driver of overfishing. Parts of the EU fleet are considered to be able to fish two to three times the sustainable level. Greenpeace has also released a website calling on people to sign up in support of low impact fishers and help ensure fair fishing. It can be found at <http://www.greenpeace.org/fishfairly>.

Fukushima radioactivity detected off west coast

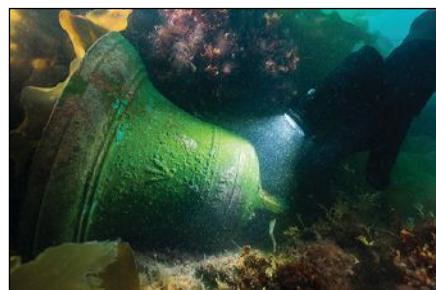
Monitoring efforts along the Pacific Coast of the U.S. and Canada have detected the presence of small amounts of radioactivity 100 mi (150 km) due west of Eureka, California from the 2011 Fukushima Dai-ichi Nuclear Power Plant accident. Scientists at the Woods Hole Oceanographic Institution found the trace amounts of telltale radioactive compounds as part of their ongoing monitoring of natural and human sources of radioactivity in the ocean.

The amount of cesium-134 reported in these new offshore data is less than 2 Becquerels per cubic meter (the number of decay events per second per 260 gallons of water). This Fukushima-derived cesium is far below where one might expect any measurable risk to human health or marine life, according to international health agencies. And it is more than 1,000 times lower than acceptable limits in drinking water set by U.S. EPA.

The results of samples collected from Alaska to San Diego and on the North Shore of Hawaii are posted on the website www.ourradioactiveocean.org.

Parks Canada recovers ship's bell from HMS Erebus

Parks Canada has unveiled the ship's bell from the recently discovered Franklin Expedition shipwreck, HMS Erebus.



The ship's bell was recovered during dives and archaeological investigation by Parks Canada's underwater archaeology team in September. Since then, the bell has been undergoing conservation stabilization and additional research.

The bell is intact and generally in very good condition. There are two embossed markings on the artifact: a Royal Navy "broad arrow" indicating property of the British Government, as well as the date "1845."

For more information, visit www.pc.gc.ca.

NW Marine Technology Summit bolsters maritime growth in the Pacific Northwest

The Marine Technology Society gathered over 100 leaders from the field of marine science and technology during the NW Marine Technology Summit to strategize about next steps for moving their industry forward. A series of panels organized around the themes of "marine economy" and "marine technology" highlighted industry updates and encouraged coalition building for the purpose of growing a marine technology, or "BlueTech," cluster in the Pacific Northwest. Just over half of the conference's attendees came from outside of Oregon – representing seven states and provinces in total – while one-third arrived from within Lincoln County.

The Northwest region has a localized advantage in terms of its ability to cultivate a BlueTech sector; its abundant ocean resources and related businesses and infrastructure serve as a natural incubator for maritime-related industry and talent.

For more information, visit www.mtsociety.org.

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No structure is stronger than its weakest part. To avoid disasters in offshore oil and gas field operations, it is essential that the strength analysis is done before the structures are put into operation.

Ole Jan Nekstad, product director at DNV GL, holds a vital part of those analyses. Through DNV GL developed software, he enables the industry to calculate the risk from wind, wave and fatigue impact, something that will determine the safety, lifetime and profitability of the total operation. The software is called

Sesam, and is a complete and user-friendly tool for designing and analyzing offshore and maritime structures.

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Injunction to halt PortMiami dredging dropped

Environmental groups suing the U.S. Army Corps of Engineers agreed to drop their request for an injunction to halt the dredging at PortMiami after the Corps committed to reducing sediment and turbidity at the project site to protect threatened staghorn coral. After argument and testimony before U.S. Magistrate Judge John J. O'Sullivan, the groups — Miami-Dade Reef Guard Association, Tropical Audubon Society, Biscayne Bay Waterkeeper and local resident Dan Kipnis — said they would drop the request for the injunction once the Corps committed to getting its contractor, Great Lakes Dredge & Dock Company LLC, to reduce sediment on nearby colonies of staghorn coral, according to Rachel Silverstein of Biscayne Bay Waterkeeper. The groups did not, however, agree to drop their lawsuit against the Corps and Great Lakes over alleged violations of the Endangered Species Act, according to Silverstein. The plaintiffs had asked for a preliminary injunction to halt the dredging to deepen and widen the Miami harbor channel to accommodate the larger ships expected soon after the Panama Canal expansion project is completed. The groups claimed that the Corps had refused to implement emergency remediation recommendations from the National Marine Fisheries Services after finding more colonies of staghorn coral than expected in the affected area. Since dredging began in November 2013, the nearby reefs have been heavily covered with dredge-related sediments that are killing corals, the plaintiffs said. Mark Brown of the U.S. Department of Justice, who argued on behalf of the Corps, said that the Corps and NMFS, through informal consultation, have made a plan to relocate and transplant 300 corals. Both the NMFS and the Corps agreed that this could be done without suspending dredging, according to the Corps.

IMO completes Polar Code environmental rules

A key step on the way to a mandatory Polar Code for ships operating in Arctic and Antarctic waters has been reached with the approval by the Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO) of the environmental provisions in the draft International Code for Ships Operating in Polar Waters (the Polar Code), together with associated draft amendments to the International Convention for the Prevention of Pollution from Ships (MARPOL), to make the Code mandatory. Following this approval, the MEPC will consider the Code and the draft amendments for adoption at its next session in May 2015. Once adopted, the Polar Code and MARPOL amendments could enter into force on 1 January 2017. The draft Polar Code covers the full range of design, construction, equipment, operational, training, search and rescue and environmental protection matters relevant to ships operating in waters surrounding the two poles. The environmental provisions add additional requirements to those already contained in MARPOL to be applied to ships operating in the polar waters. As the Antarctic area is already established as a Special Area under MARPOL Annexes I and V, with stringent restrictions on discharges, the Polar Code aims to replicate many of those provisions in the Arctic area.

Maritime Administration announces extension of the Voluntary Intermodal Sealift Agreement (VISA)

The Maritime Administration (MARAD) has announced the extension of the Voluntary Intermodal Sealift Agreement (VISA) program until 1 October 2019. The VISA program creates a partnership between the U.S. government and the maritime industry to provide commercial sealift and intermodal shipping services and systems necessary to meet military mobilization requirements. Through the VISA program, transportation solutions are developed in peacetime to anticipate Department of Defense requirements. The VISA program enables a seamless, time-phased transition from peacetime to wartime operations. More than 90% of the U.S. flag fleet vessels that the military can use to carry supplies are committed to the VISA program.

Kongsberg launches K-Sim Navigation bridge simulator



Kongsberg Maritime has unveiled its latest generation ship's bridge simulator, K-Sim Navigation, which meets the requirements of the most demanding navigation training for merchant, offshore and naval vessels. Designed for the future of advanced and integrated simulation training, K-Sim Navigation is based on a new cutting-edge technology platform enabling more realistic training scenarios and enhanced user benefits for both instructors and students.

K-Sim Navigation features an advanced physical engine and state-of-the-art hydrodynamic modeling, allowing vessels, objects and equipment to behave and interact as in real life. To enhance the realism further, a sophisticated new visual system is included, bringing vessels and objects in all possible weather conditions to life.

The result of these improvements is, according to Terje Heierstad, global product manager, Kongsberg Maritime Simulation: "A fully immersive and optimum quality simulation experience. It's a step change in maritime simulation. The shipping sector doesn't stand still, and neither do we. Using our 40 years of simulation experience, it was our goal to take ship's bridge simulation to the next level."

K-Sim Navigation has been developed with the user experience firmly in focus. In addition to the realistic environment for students, instructors benefit from an award-winning instructor system designed to facilitate ease of use. It features an intuitive and modern educational tool utilizing a modified ECDIS chart as a starting point with drag & drop function for creating exercises. The instructor system also includes automatic recording and an advanced assessment system for ensuring optimal training and feedback standards.

K-Sim Navigation's flexibility extends to hardware, with a fully scalable range of options available—from a PC-based desktop system, through to a full mission bridge simulator. The system, built on the same core technology platform as the market-leading K-Sim Offshore simulator, can easily be integrated with other Kongsberg Maritime simulators (including crane, offshore, engine, cargo, ballast and DP) to enable a comprehensive range of training scenarios.

Already approved to DNV GL Class-A standards, K-Sim Navigation allows maritime schools and academies to extend their available portfolio of courses, while in addition, providing them with the controlled environment necessary for undertaking valuable research projects.

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

AIS data use in environmental ship emissions research

Since 2001, Automated Identification Systems (AIS) have been required for most commercial marine vessels – international transit ships with a gross tonnage of 300 or more and all passenger ships. Ship tracking with AIS not only provides continuous detailed location information, but also other factors are captured, such as vessel speed, navigation status, heading, name, type of cargo, ship size and draught, VHF call signs, and destination. Currently, more than 40,000 vessels worldwide are equipped with AIS.

A recent report by Eastern Research Group Inc. and the Texas Commission on Environmental Quality employed this archived ship tracking data to study marine vessel emissions. The report looked at coastal Texas vessel traffic patterns (with the exception of the Houston/Galveston/Brazoria port area). The coastline of Texas is over 600 mi long and vessel emissions information is important to proactive marine planning by the State of Texas.

The collected historical data was supplied by AIRSIS and developed

from PortVision data. PortVision processes more than one million records a day along the Sabine-Neches ship channel alone, just one of the locations in the study. PortVision, an operating unit of AIRSIS, tracks and retains 64 data elements for each vessel transmission; 17 were used for the emission report.

The vessel tracking report analyzed individual vessel movements as well as general traffic patterns within 9 nmi of the Texas tidewater coastline. About 132 Points of Interest (POI) were identified where AIRSIS maintains vessel monitoring stations in Texas state waters. Each POI covers a radius of 40 mi, and, depending upon conditions, may include reliable coverage up to 60 mi. The total data included more than 80,000 ship transits in 2007-8 for every vessel type. All departures, arrivals and passings in the target area were included in the study.

ERG linked this AIS data to vessel and engine characteristics (e.g., vessel speed, cylinder displacement, and power rating) from the Lloyd's Register of Ships, the American Bureau of Shipping, and Bureau Veritas. Using

this cross-referenced data, quantifiable emissions estimates were possible. Emissions of interest included carbon monoxide, volatile organic compounds, nitrogen oxides, sulfur oxides as well as inorganic compounds such as metals, ammonia, biphenyls and hexachlorobenzene. These were evaluated by quantity, county, and vessel type.

One conclusion of the report indicates that being able to access historical AIS data, like that supplied by PortVision, is promising when studies such as these are necessary. Being automatic and electronic, reporting consistency and ease of manipulation are maximized – far easier and more accurately than manual logs. However, a lack of POIs in some areas as well as the fact that AIS equipment is not required of some vessels, such as tugs and fishing boats, makes any data collection for studies such as this challenging.

The report will be utilized by Texas to determine where adjustments are needed in refining their ship channel and port vessel emission requirements.

For more information, visit www.portvision.com.



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EXHIBITING AT SUBSEA TIEBACK FORUM 2015

EXHIBITING AT US HYDRO 2015

- FEBRUARY 10TH - 12TH
- NEW ORLEANS, LOUISIANA, USA

- MARCH 3RD - 5TH
- SAN ANTONIO, TEXAS, USA

- MARCH 16TH - 19TH
- NATIONAL HARBOR, MARYLAND, USA

- BOOTH #705
- BOOTH #803
- BOOTH #2

Pacific NorthWest LNG installs metocean monitoring equipment near Lelu Island

Pacific NorthWest LNG has recently added an Automatic Information System (AIS) transmitter to its Ocean Data Acquisition System (ODAS) buoy, which has been positioned in Prince Rupert Harbour since January 2014.

The buoy, located on Agnew Bank, is now capable of sharing its data with any vessels equipped with an Automatic Information System (AIS) receiver or through the AIS mobile app. The buoy, manufactured by AXYS Technologies Inc. based in Sidney, BC, is collecting a wide variety of meteorological data. This data includes wind speed and direction, air temperature and air pressure, as well as oceanographic measurements including, but not limited to, water level (tide), surface current speed and direction, and water temperature.

"This data is helping Pacific NorthWest LNG learn more about the complex marine and weather environment on the north coast. We are making use of the information to assist in the design of our marine terminal and to determine operating procedures for LNG carriers that would be calling on the facility. It only makes sense to share this information with the wider marine community" said Captain David Kyle, head of marine services, with Pacific NorthWest LNG.

In addition to contributing to Pacific NorthWest LNG's understanding of local weather, tides and currents, the data captured with the buoy are being shared with all mariners and the Prince Rupert Port Authority as a project contribution to enhance marine safety.

For more information, visit www.pacificnorthwestlng.com.

Fourth of a total five purpose-built offshore chasers enters service

Dutch offshore services company Rederij Groen has taken delivery of the 7-Waves, the second of a total three identical seismic research support vessels. Once the third of these so-called offshore chasers joins the fleet in January 2015, all of Groen's five custom built chasers will have been built by Damen yard Maaskant.

Prior to ordering the three 35-m seismic research support vessels of this current 7-class in November 2013, Rederij Groen of Scheveningen (the Netherlands) had already commissioned the Maaskant-built SRSV's Astra-G and Aquarius-G. These 40-m sister vessels were delivered early 2013.

Also called guard vessels, their



major task is to ensure that other shipping, mainly fishing ships, will keep distance from seismic survey vessels engaged in offshore exploration. So to literally chase them off, hence: chasers. The trawlers' nets might otherwise damage the costly seismic equipment being trailed.

The Astra-G and Aquarius-G were designed from scratch by Maaskant, Groen and Saltwater Engineering together. A design from Vestvaerftet in Denmark was chosen for the new series of three at the request of charterers Dolphin Geophysical. Whereas the 35-m Danish design resembles the fishing trawler more, the 40-m Dutch design offers more free deck space. The general deck arrangement is, however, similar to Groen's first two SRSVs, which has proven to be efficient.

The "7-Oceans" (delivered by Maaskant Shipyards in July 2014 as the first of the series), the "7-Waves" and the third sister vessel due in January 2015 have two Veth azimuth stern drives (ASD), each driven by a 500-kW electric motor. A 90-kW bow thruster is fitted. Power is supplied by three Caterpillar C18 generator sets of 525 kVA. The electronic system complies with an A4 service area for operations in Arctic waters.

For more information, visit www.damen.com.

Wärtsilä dual-fuel engines chosen to power Arc 7 design icebreaking LNG carriers

The Daewoo Shipbuilding and Marine Engineering (DSME) yard in South Korea has ordered a total of 54 Wärtsilä dual fuel engines to power 172,600 cbm icebreaking LNG carriers being built for use in arctic conditions to serve the Yamal LNG project in Northern Russia. The ships will be owned by one joint venture between Teekay LNG Partners of Canada and China LNG Shipping (CLNG), and another joint venture between China Shipping LNG Investment Co.,Ltd. (CSLNG) and Japan-based Mitsui O.S.K.

The Wärtsilä machinery is capable of operating on liquefied natural gas (LNG), heavy fuel oil (HFO), or low-viscosity marine diesel oil (MDO) but LNG will be the main type of fuel to be used. When operating in arctic waters the engines will be operating in ambient temperatures of as much as minus 50 °C on LNG carriers breaking through ice more than 2 m thick, in operating modes that allow dramatic variations in engine load within a limited period of time. Wärtsilä's ability to meet these demanding design criteria was a key factor in the award of this contract.

For each LNG carrier Wärtsilä will supply 12-cylinder and 9-cylinder Wärtsilä 50DF dual-fuel engines. The total power output from the Wärtsilä engines is 64,350 kW per vessel.

The Wärtsilä 50DF engine is manufactured in various configurations from a 6-cylinder in-line version to an 18-cylinder version in V-configuration, giving 950/975 kW per cylinder and a total maximum mechanical output of 17,100 kW. The engine speed is 500 or 514 rpm with 50 Hz and 60 Hz applications. The maximum thermal efficiency is higher than with any other gas engine.

When operating in gas mode, the nitrogen oxide (NOx) emissions are at least 85% below those specified in the current IMO regulations, and CO₂ emissions are some 25% less than those of a conventional marine engine running on diesel fuel. Additionally, the sulfur oxide (SOx) and particle emissions are negligible at almost 0%.

For more information, visit www.wartsila.com.

MARAD testing alternative power for vessels

The Maritime Administration (MARAD) is testing state-of-the-art, environmentally efficient technology onboard the Training Ship (TS) Kennedy. The National Defense Reserve Fleet vessel was provided to the Massachusetts Maritime Academy by MARAD for Cadet training.

This one-year undertaking is part of a MARAD initiative to test fuel cells as a source of power for shipboard electrical systems. Researchers will evaluate the performance of the fuel cell technology and how low sulfur marine diesel fuel can be used to efficiently power a fuel cell to produce auxiliary power. Unlike using low sulfur fuel in diesel engine generators to provide electrical power, the system produces no harmful air emissions.

For more information, visit www.marad.dot.gov.

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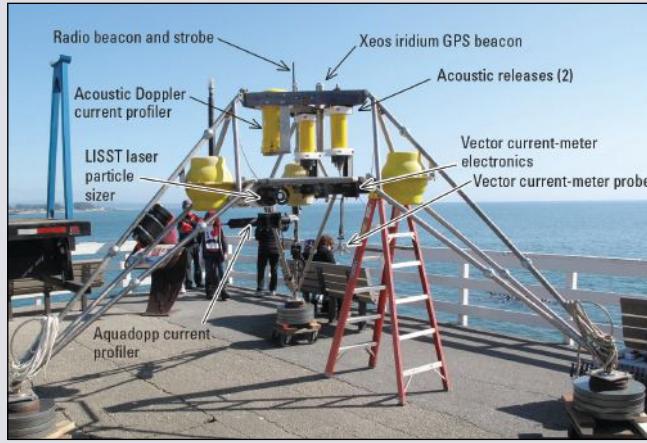
A new USGS report describes how advanced optical sensor technology is being used in the Mississippi River basin to accurately track the nitrate pulse to the Gulf of Mexico. Excessive springtime nitrate runoff from agricultural land and other sources in the Mississippi drainage flows into the Mississippi River and downstream to the Gulf of Mexico. This excess nitrate contributes to the Gulf of Mexico hypoxic zone, an area with low oxygen known commonly as the "dead zone." NOAA-supported researchers reported that the summer 2014 dead zone covered about 5,052 sq. mi, an area the size of Connecticut. The USGS is using the new sensor technology to collect nitrate concentration data every hour to improve the accuracy of nitrate load estimates to the Gulf of Mexico. The data can also be used to make it easier to detect changes in nitrate levels related to basin management and to track progress toward the goal of reducing the size of the dead zone. "High frequency data from these sensors has revealed considerable variability in nitrate concentrations in small rivers and streams," said Brian Pellerin, USGS researcher. "However, we were surprised to see nitrate concentrations vary by as much as 20% in a week in a river as large as the Mississippi River without similar changes in streamflows." These rapid changes are very easy to miss with traditional water-quality monitoring approaches. However, hourly information on nitrate levels improves the accuracy and reduces the uncertainty in estimating nitrate loads to the Gulf of Mexico, especially during drought and flood years. These high frequency data also provide new insights into timing and magnitude of nitrate flushing from soils during wet and dry conditions. For instance, the high-frequency data revealed high nitrate concentrations during the spring and early summer of both 2013 and 2014 following the drought of 2012. Nitrate sensors on small streams and large rivers throughout the Mississippi River basin are improving our ability to track where the pulses are coming from and forecast when they will arrive at the Gulf.

Bangladesh creates new marine protected area

The Government of Bangladesh has created the country's first marine protected area that will now safeguard whales, dolphins, sea turtles, sharks, and other oceanic species, according to the Wildlife Conservation Society. The Swatch of No Ground Marine Protected Area (SoNG MPA) was signed into law by the Ministry of Environment and Forest (MoEF) on 27 October 2014. Spanning some 672 sq. mi in size with a depth of more than 900 m, the SoNG MPA is larger than Cape Cod Bay and includes waters at the head of the submarine canyon from which it gets its name.

Free-ascending tripod brings data from deep

The Free Ascending Tripod (FAT) designed and built at the USGS Pacific Coastal and Marine Science Center has been recovered after spending 5 months on the floor of the South China Sea collecting data with acoustic and optical instruments. FAT was deployed in April 2014 at 1,900 m in a cooperative project with scientists from Tongji University (Shanghai, China) to better understand how and where deep-seafloor sediment moves and accumulates. Discoveries from this project, one of only a few such studies conducted outside of the oil industry, will be at the forefront of deep-water marine-geology research for the region and probably for the world.



New coral species discovered off California



This is a new species of white coral, found in an area known as The Football. Most likely it is closely related to gorgonian corals (Credit: NOAA).

A NOAA-led research team has discovered a new species of deep-sea coral and a nursery area for catsharks and skates in the underwater canyons located close to the Gulf of Farallones and Cordell Bank national marine sanctuaries off the Sonoma coast.

In the first intensive exploration of California's offshore areas north of Bodega Head, a consortium of federal and state marine scientists used small submersibles and other innovative technologies to investigate, film and photograph marine life that has adapted to survive in offshore waters reaching 1,000 ft deep.

The exploration took place in September on NOAA's R/V Fulmar and focused on two main sites: the head waters of Bodega Canyon and "the Football" – an area west of Salmon Creek and north of the canyon nicknamed for its oval shape. Prior to this expedition, scientists knew little about these areas except that they were thought to contain nutrient-rich and biologically diverse marine life.

After multiple dives, the research team made two significant discoveries – hundreds of skate egg cases on the seafloor and in bundles on the rocks surrounding a catshark nursery area.

"This is a highly unusual nursery because rarely, if ever, are shark nurseries in the same area as skate nurseries," said Peter Etnoyer, a deep-sea biologist at NOAA's National Centers for Coastal Ocean Science.

One significant discovery was made by a second team on the mission, led by California Academy of Sciences' Gary Williams, who found corals approximately 600 ft deep that are a new species of deep-sea coral from the *Leptogorgia* genus.

For more information, visit www.noaa.gov.

Scientists examine mysterious tar mounds in the West African deep ocean

More than 2,000 mounds of asphalt harboring a wealth of deep water creatures have been discovered up to 2 km deep, off the coast of Angola. In a study published in the journal Deep-Sea Research 1, scientists at the National Oceanography Centre (NOC) have been examining the images and data captured at the site to build an intriguing picture of the life and geology of this underwater area.

The naturally occurring asphalt mounds are made up of the same substance that covers our roads. They range in size from single football-sized blobs to small hills several hundred meters across. It is the first time that these seabed asphalt mounds have been found on this side of the Atlantic – until now, these features had only been seen in the Gulf of Mexico and off the coast of California. These deep-sea ‘slow tar volcanoes’ are associated with flows of oil from within the sediment and are formed from hydrocarbons migrating around subsurface salt structures.

Researchers have also discovered that the vast array of mounds is home to at least 21 types of deep water creatures, including large sponges, soft-corals, octopus and fish. Many more common deep water animals, such as the blobfish and sea cucumbers also live near the mounds. This is a greater number of species than had previously been thought and important information for scientists when predicting biodiversity levels in similar areas of ocean.

For more information, visit noc.ac.uk.

Ocean Networks Canada now hosts data from all three oceans

Ocean Networks Canada (ONC), an initiative of the University of Victoria, has expanded its footprint across Canada with the launch of a new collaboration with the Fundy Ocean Research Centre for Energy (FORCE) on the Atlantic coast.

ONC is a world-leader in ocean observing technology supported by Oceans 2.0, its comprehensive data management system developed to provide a vital link between sensors and users around the world. ONC already has advanced observatories on the Pacific coast and in the Canadian Arctic; the launch on the Atlantic coast establishes its operations from sea to sea to sea.

The collaboration, initiated by ONC’s Innovation Centre, will provide FORCE with a sophisticated data acquisition, archiving and visualization system that supports the Province of Nova Scotia’s leading-edge research and development of in-stream tidal technology.

Ocean Networks Canada gives FORCE users enhanced access to environmental sensor data over the Internet in real-time from the Bay of Fundy. A range of instrument data are provided, from current weather conditions to wave and tidal information, as well as a daily time-lapse video from the weather station at the tidal energy test site. Oceans 2.0 also streams this information live for the benefit of guests to the FORCE visitor centre at its spectacular location overlooking Minas Passage in the Bay of Fundy.

For more information, visit www.oceannetworks.ca.

Beaufort Gyre exploration update

A concerted 12-year study of a remote interior region of the Arctic Ocean – considered the flywheel of Arctic climate – has revealed significant environmental changes that could in turn cause further changes in ocean circulation and climate.

A multinational team of scientists investigated the Beaufort Gyre—a pool of cold, icy, relatively fresh waters north of Alaska corralled by prevailing winds into a circular swirl ten times the size of Lake Michigan. If the gyre weakens, vast volumes of trapped freshwater leak out, and climate conditions can shift.

Over the past 12 years, the scientists found that the extent and thickness of sea ice in the gyre has diminished, while the volume of freshwater has increased by 25% since the 1970s.



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Scientists from the United States, Canada, and Japan began their large-scale collective effort in 2003 and have returned to the region every summer since. With funding from the National Science Foundation, the team included researchers from Woods Hole Oceanographic Institution, Andrey Proshutinsky and Rick Krishfield, who deployed moorings and instruments from icebreakers to gather data on sea ice and ocean conditions.

According to Proshutinsky, "One of the most striking observations in the past decade has been a reduction in both sea-ice extent and thickness, particularly in the Beaufort Gyre region."

The big increase in freshwater is also a concern because if it is released from the gyre, it can flow out of the Arctic Ocean and form a cap of cold, less-dense freshwater atop the North Atlantic. Such a cap can alter the ocean's circulation and the heat exchange between ocean and atmosphere, cooling the North Atlantic region. A significant freshwater release in the North Atlantic in the late 1960s and early 1970s, known as a Great

Salinity Anomaly, produced such climate impacts.

For more information, visit www.whoi.edu.

Kongsberg to deliver ocean observatories

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

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

"It is the first time that research is being done on the entire methane emis-



sion system from the seabed to the atmosphere. To measure these emissions, we need a lot of instruments that are at the forefront of development," says Benedicte Ferré, team leader at CAGE responsible for the observatories.

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

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

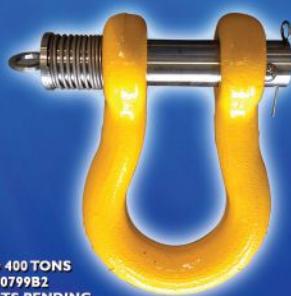
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BOEM updates renewable COP guidelines

The Bureau of Ocean Energy Management (BOEM) Office of Renewable Energy Programs has updated its Renewable Energy Construction and Operations Plan (COP) Guidelines. A developer is required to submit a COP within 5 years of receiving an offshore renewable energy lease from BOEM. The COP must provide a description of all proposed activities, planned facilities, as well as project easements that a developer intends to construct and use for a project planned under its commercial lease. BOEM developed COP guidelines to provide developers informal guidance on survey requirements, project-specific information requirements, and information to meet the requirements of the Outer Continental Shelf Lands Act, National Environmental Policy Act, and other applicable laws and regulations. The updated COP guidelines include administrative and procedural changes to reflect lessons learned since their original December 2010 publication and feedback received from the renewable energy industry.

BMT, IT Power and Ramboll to provide best practice guidelines for offshore wind farms in Taiwan

A group of three companies have secured an important project supporting the development of Taiwan's offshore wind sector. BMT Asia Pacific (BMT), a subsidiary of BMT Group Ltd, IT Power, and Ramboll will work together to provide consulting services to Taiwan's Industrial Technology Research Institute (ITRI) and devise a set of localized, best practice guidelines for the future development of offshore wind farms in Taiwan. The Taiwan government is actively promoting wind energy with a particular focus on offshore development. Although Asia's future energy demand will be met from a variety of sources, where offshore wind is viable and attractive, such as offshore Taiwan, this type of resource will form a major element of supply in the future. Current plans are to develop seven demonstration offshore wind projects, expected to be between 100 to 300 MW capacity each. By 2030 Taiwan will increase its overall wind power capacity (onshore and offshore) from 530 MW to 4,200 MW under an ambitious renewable energy plan unveiled by the Ministry of Economic Affairs (MOEA). The upcoming guidelines will directly assist developers in achieving these future targets in an efficient, cost-effective and risk aware manner. The guidelines will cover design, construction, operation and maintenance aspects, replicating best practice from the UK and around the world while reflecting Taiwan's policy, environmental conditions and industrial setting. Drawing on the related experiences of IT Power, Ramboll and BMT, the guidelines will also provide practical, real-world advice to developers including how to select the appropriate technology to suit Taiwan's environmental conditions, building on existing guidelines, practices and standards, as applicable.

Study calls for continuing need to assess impacts of offshore wind farms on marine species

In a recent paper, University of Maryland Center for Environmental Science researcher Helen Bailey and colleagues review the potential impacts of offshore wind developments on marine species and make recommendations for future monitoring and assessment as interest in offshore wind energy grows around the world. "As the number and size of offshore wind developments increases, there is a growing need to consider the consequences and cumulative impacts of these activities on marine species," said Bailey, lead author and research assistant professor at the University of Maryland Center for Environmental Science's Chesapeake Biological Laboratory. "It is essential to identify where whales, dolphins and other species occur to help avoid adverse impacts and to continue to monitor their response to the construction and operation of wind turbines." The loud sounds emitted during pile driving could potentially cause hearing damage, mask communication or disorient animals and fish as they move out of the area to avoid the noise. There is also a risk of marine animals being injured by ships or being disturbed by vessel movements associated with surveying and installation activities. On the other hand, wind turbines may act as artificial reefs and increase food sources. They could also potentially provide a de facto marine reserve thanks to restrictions on boating and fishing surrounding the wind turbines.

ORPC proves design



ORPC is pleased to announce it has concluded its highly successful OCGen® Module Mooring Project at its federally licensed Cobscook Bay, Maine project site. This first-of-its-kind project, funded partially by the U.S. Dept. of Energy and Maine Technology Institute, proved the stability of the prototype OCGen® device in reversing tidal currents and confirmed the loading and performance of its innovative tensioned mooring system.

Power generation equipment that can be located at a prescribed depth, such as the OCGen® device, has the potential to access the more energy-dense current resources typically found in the upper portions of the water column. The prototype OCGen® device consisted of a buoyancy pod attached to a chassis with two turbines placed in the water column 35 ft below mean low water. The objective of the project was to determine the stability of the OCGen® device under various loading and current conditions and the effectiveness of the tensioned mooring system. Data collected was well within expected ranges and proved the design concept of ORPC's OCGen® Power System.

Other highlights of ORPC's OCGen® Module Mooring Project included:

- Collection of significant data under various operating conditions of the OCGen® device over a 3-month period, including device movement (pitch, yaw and roll), tidal current speed and direction, turbine rotational speed, and loading on the mooring lines;
- Important contributions to the understanding of marine hydrokinetic mooring system dynamics that will help to validate and improve computational models;
- Monitoring of fisheries interactions with the device, funded by a separate Energy Department grant, which was conducted by the University of Maine and is contributing to the growing knowledge base of aquatic interactions with ORPC's power systems; and
- Scour monitoring of the mooring anchors that indicated minimal changes in vertical elevation of the seabed as well as horizontal movement of the anchors themselves.

ORPC is one of very few companies in the world to take a hydrokinetic power system project from an idea to a successful operation delivering power to the grid.

For more information, visit www.orpc.co.

Makai's OTEC turbine and heat exchangers arrive in Hawaii

Makai's Ocean Energy Research Center (OERC) in Kona, Hawaii has received several major pieces of equipment for its Ocean Thermal Energy Conversion (OTEC) demonstration plant. Two new heat exchangers (2-MW thermal duty each) and a 100-kW ammonia turbine-generator have arrived and are in various stages of installation and testing. To date, Makai has tested four condensers and three evaporators at the OERC, each made of either aluminum or titanium. The facility has been designed to easily swap out OTEC heat exchangers, and test as many as six simultaneously.



The OERC is an essential tool for the development and testing of candidate OTEC heat exchangers. Heat exchangers will be the single most expensive component in a commercial offshore OTEC plant; thus, optimizing their lifetime, performance, and cost are critical for OTEC's economic success. The OERC enables engineers to rapidly design, build, and test candidate OTEC heat exchangers using a sophisticated control and instrumentation system that includes thousands of calibrated, high precision sensors. These tests yield data that are fed into Makai's OTEC plant design software to evaluate heat exchangers for lifetime (corrosion resistance), performance (heat transfer and hydraulic efficiencies), and cost (fabrication and size/weight effects on OTEC platform), as well as to optimize the next generation of heat exchangers. Makai is in the process of scaling up a design for a novel low-cost, compact, corrosion-resistant design that may significantly reduce the capital cost of OTEC heat exchangers.

For more information, visit www.makai.com.

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Tocardo and Ekornergy to develop 28-MW tidal energy projects in South Korea

Tocardo Tidal Turbines, producer of tidal and free-flow water turbines, has reached an agreement with Ekornergy, the South Korean energy company, to install tidal turbines with a total capacity of 28 MW. The units will be installed in the coastal waters of the Mokpo Jeonnam region.

Manufacturing of the first 15 T2 kW Tocardo turbines is expected to start in late 2015 as part of a 3-MW demonstration project. In 2016, Tocardo expects to start producing its bigger T3 turbines, which are to be installed in a commercial tidal array with a total capacity of 25 MW. The Mokpo Jeonnam region has one of the strongest tidal streams on the planet, with bi-directional tidal speeds of up to 4 mps. Electricity generated will be fed into South Korea's national grid.

Tocardo is one of few companies in the world commercially manufacturing and marketing tidal turbines.

For more information, visit www.tocardo.com.

Autonomous technology could save offshore wind farm costs

ASV Ltd, in association with Planet Ocean Ltd, have received funding from the GROW:OffshoreWind initiative to investigate how the use of Autonomous Surface Vehicles (ASVs) could reduce the costs of offshore wind farm support.

The project will look at using ASVs to reduce the cost of tasks related to the construction, operation and maintenance of offshore wind farms. Together ASV and Planet Ocean will look at scour monitoring, cable position tracking, wave and meteorological monitoring, current profile monitoring and underwater noise monitoring.

ASV will be presenting two of their ASVs, the C-Enduro and C-Worker, while Planet Ocean will look at mission and sensor options.

The GROW:OffshoreWind initiative is delivered by the Manufacturing Advisory Service and supported by program partner RenewableUK. Through partnership with the Knowledge Transfer Network (KTN) and Offshore Renewable Energy Catapult, its primary

focus is to provide funding for suppliers to the offshore wind market. GROW:OffshoreWind works in close collaboration with industry leaders and the government.

For more information, visit www.asvglobal.com.

OPT to deploy PB40 PowerBuoy off New Jersey

Ocean Power Technologies, Inc. (OPT) announced that the PB40 PowerBuoy fabricated for the WavePort Project has shipped from Santander, Spain to Bayonne, New Jersey with the intent to deploy off the coast of New Jersey in the first quarter of 2015. The PowerBuoy will require re-assembly, final checkout and permits before deployment. The PowerBuoy was fabricated with partial funding and support provided under the European Commission's 7th Framework Programme and, after evaluation of several sites, New Jersey was selected as the best location for deployment.

For more information, visit www.oceanpowertechnologies.com.

CLARITY AT DEPTH - THE NEW OE15-100D

Kongsberg Maritime's all new **high resolution, monochrome CCD camera** has a deeper rated housing yet is more compact than any of its well established predecessors. A new optical design minimises spatial distortions and aberrations yet maintains an exceptionally wide angle of view in water.

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 The Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, was awarded a \$35,545,211 indefinite-delivery/indefinite-quantity, cost-plus-fixed-fee and cost-only contract for engineering and technical services to support the Navy in developing, assessing, upgrading and modernizing the Persistent Littoral Undersea Surveillance program, the Digital Acoustic Communications development program, the Remote Environmental Measuring Units (REMUS) Autonomous Undersea Vehicle program, the Explosive Ordnance Disposal "Fast Track" program, development and operational support for the REMUS Automated Submarine Launch and Recovery Capability program, and the development of new advanced ocean technologies related to these programs. These systems are essential to evaluate the evolving advanced ocean technologies, improve operational capability, support rapid prototype development, and provide technology improvement recommendations, including battery and energy systems, propulsion systems, navigation systems, control systems, sensor systems, acoustic communication systems, data acquisition systems, and the development of new functionality to shipboard systems.

Divex to supply U.S. Navy with state-of-the-art diver communications system

Divex has been awarded a contract to supply the U.S. Navy with their state-of-the-art diver communications system the HeliCom™ Matrix. Divex, a subsidiary of James Fisher and Sons plc and a world leader in commercial and defense diving products, has received the order from the Navy Experimental Diving Unit (NEDU) through American partner, Chase Supply Inc. To be used at their deep trials and training facility in Panama City, Florida, the HeliCom™ Matrix is a fully digital diver communication system that provides communications for the chamber complex and wet test chamber. The client required a system where they could communicate with all personnel from one central system and were impressed with the large, easy to use, touchscreen interface and how it could be tailored to suit their system. Launched in 2010, the HeliCom™ Matrix is the first of its type; a helium speech unscrambling communication system that retains all of the original voice pattern to ensure clear, concise and intelligible communication is provided for divers operating in extreme depths and conditions. The HeliCom™ Matrix achieves superior, crystal-clear diver helium voice communication through advanced DSP (digital signal processing) helium speech decoding techniques. The helium speech from the pressurized divers and the chamber occupants are mixed in an audio mixer before decoding to the selected gas and environmental settings by a digital signal processing circuit (DSP). This has been the key element of HeliCom™'s success—the clarity of speech irrespective of the depth the diver is working. HeliCom™ Matrix is a step forward over existing implementations because of the incorporation of precise modeling of the translations introduced by the Heliox mixture on the human voice, including both pitch and envelope distortion. It has a high speech intelligibility level score, averaging 97% during modified rhyme tests at depths of up to 350 m depth—it is unrivaled in the field.

James Fisher Defence awarded contract by the Australian Department of Defense

James Fisher Defence (JFD), the leading global subsea operations and engineering company, has been awarded a contract by the Commonwealth of Australia for the long-term provision of the Royal Australia Navy's (RAN) submarine escape and rescue capability for the next 5 years, plus options through to 2024. The James Fisher Submarine Rescue Service (JFSRS) has provided escape and rescue services to the RAN since 2008 and was recently awarded a special commendation by the RAN's Commander Submarine Force for dedication and innovation during the recent Black Carillon exercise. Building upon the existing 6 years of safe and successful operations, the new contract will incorporate the provision of Pressurized Submarine Escape Training, which will be delivered by JFD's instructors at HMAS Stirling in Western Australia. Additional enhancements to the JFSRS will include the design and manufacture of an integrated hyperbaric capability, together with a comprehensive training and exercise program that will sustain and grow the capability, further assuring the ability of the service to respond to a submarine in distress.

Textron Systems awarded contract for the Unmanned Influence Sweep System



Textron Systems Unmanned Systems announced that it has received a \$33.8 million contract to provide its Common Unmanned Surface Vessel (CUSV™) for the U.S. Navy's Unmanned Influence Sweep System (UISS) program. During the 30-month engineering, manufacturing and development period, Textron Systems will design, develop and qualify the UISS system, including both the vessel and its common command-and-control software, which is designed for seamless integration into the Littoral Combat Ship (LCS) mission module control station.

The U.S. Navy intends to use the UISS as a mine countermeasure system, designed for influence sweeping of magnetic and acoustic mines. The CUSV is compatible with both LCS configurations and has demonstrated performance during in-water trials.

The company's fourth-generation CUSV incorporates design enhancements for superior stability required for UISS mission success, even in high sea states; multi-mission performance through a large, configurable payload bay; and high maintainability and reliability. The CUSV has been demonstrated with multiple payload packages including side-scan sonar, mine neutralization, nonlethal weapons, and intelligence, surveillance and reconnaissance.

For more information, visit www.textron.com.

Thales expands sonar offering to equip small surface combatants and patrol vessels

Thales announced the launch of a new range of compact sonars for surface combatants and patrol vessels displacing 300 tonnes or more. Easy to install and operate, the new products include a hull-mounted sonar, the Thales BlueWatcher, and an associated towed array sonar, the Captas-1.

Faced with an increasing number of crisis and territorial conflicts, nations are expanding their fleets of patrol vessels and corvettes to defend their sovereign interests in territorial waters and Exclusive Economic Zones. This is driving demand for the systems these smaller vessels require to detect and deter underwater threats.

Until now, the only ships equipped with sonars have tended to be front-line warships deployed as part of a larger naval or carrier group on anti-submarine warfare missions. Thales has developed a new range of sonars that are more compact, modular and ready to deploy on low-intensity missions to provide an initial, high added-value ASW capability with high

levels of performance and dependability at lower cost.

The Thales BlueWatcher, a compact hull-mounted sonar that is easy to install (plug & play) and delivers excellent performance, is based on the same technology as the FLASH dipping sonar for helicopters, which is internationally acclaimed for its operational performance and is in service with the U.S. Navy, the UK Royal Navy and the French Navy.

The Captas-1, the latest addition to the Captas family, is a single ceramic ring configuration and uses the same technological building blocks as the Captas-2 and Captas-4. With its all-electric reeling system, the compact, lightweight Captas-1 array is easy to deploy from a smaller vessel.

For more information, visit www.thalesgroup.com.

Submarine North Dakota commissioned

The Navy commissioned its newest attack submarine North Dakota during a ceremony 25 October 2014, at Submarine Base New London in Groton, Connecticut.

North Dakota, designated SSN 784, honors the state's citizens and veterans and their strong military support and heritage from the Frontier Wars through the Cold War and currently the Global War on Terrorism. Seventeen North Dakotans have received the Medal of Honor for actions in combat.

North Dakota is the second ship named in honor of North Dakota, and will be the 11th Virginia-class submarine.

North Dakota has the capability to attack targets ashore with highly accurate Tomahawk cruise missiles and conduct covert long-term surveillance of land areas, littoral waters or other sea-based forces.

Virginia-class submarines are 7,800 tons and 377 ft in length, have a beam of 34 ft, and can operate at more than 25 kts submerged. They are built with a reactor plant that will not require refueling during the planned life of the ship reducing lifecycle costs while increasing underway time.



Willard Marine wins contract to supply U.S. Navy shipboard 7-m RIBs

The U.S. Navy has awarded Willard Marine, Inc. (WMI), a 5-year contract to provide two types of 7-m rigid inflatable boats (RIBs) that will serve as ready service lifeboats for search-and-rescue missions.

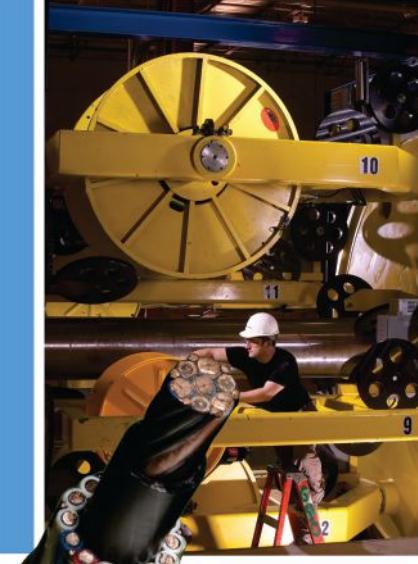
The contract includes a standard craft based on the 7-m RIB WMI has been producing for the Navy for 25 years, and

a separate version specifically for LPD-17 class ships, which WMI has also been supplying for a number of years. Twenty-four vessels have already been ordered under the contract and the first scheduled delivery begins in March 2015.

The terrorist attacks on the USS Cole in October of 2000 and multiple homeland target attacks in 2001 sparked secondary missions for these craft as identified in the contract as anti-terrorism/force protection; mar-



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itime interdiction operations; visit, board, search and seizure; safety boat/escort; and tow and recovery.

A critical operational requirement for these shipboard RIBs is that each boat must be carried aboard and deployed from a variety of U.S. Navy ship classes. Thus, the boats will be compatible with a variety of existing shipboard handling and stowage systems, including traditional davits and stowage chocks and other class-specific launch, recovery, and handling systems.

The contract specifies a 254-hp inboard Steyr diesel engine with a Bravo Two X MerCruiser sterndrive. All vessels will be delivered with a Briartek man overboard indicator system display

and antenna as well as a forward M60/M240 machine gun foundation.

For more information, visit www.willardmarine.com.

Australian Army purchases VSTEP maritime simulator classroom

The maritime wing of the Australian Army purchased and installed a VSTEP simulator classroom at its Townsville base in Queensland. The maritime simulators are used for landing craft operations and navigation training.

The simulator purchase was made following an enquiry from the Australian Defence Force (ADF) and Bohemia Interactive Simulations, a global software company providing simulation training solutions for military and civilian organizations. As a developer of certified maritime simulators, VSTEP was approached by the ADF to supply an advanced maritime simulator classroom for the Australian Army at the Townsville base.

The maritime simulator classroom delivered by VSTEP includes 12 NAUTIS Desktop Trainers and two NAUTIS Instructor Stations. The simulators use the NAUTIS Naval Task

Force software module, a training module specifically designed to meet the training requirements of the military. NAUTIS Naval Task Force includes tactical communications, landing craft operations, replenishment at sea and anti-piracy training.

To maximize familiarization during training, VSTEP has also modeled and integrated the Townsville base and surrounding waterways into the NAUTIS simulators.

Joost van Ree, VSTEP sales director: "Supplying the Australian Army with maritime simulators to realize its high end simulator classroom and fulfil its training objectives was a priority for us. The VSTEP Simulators provide the Australian Army with a very effective training tool for naval and landing craft operations due to their integrated Naval Task Force module."

The Australian Army contract is the latest in a row of military simulator contracts for VSTEP. Earlier this year, VSTEP won the contract to provide maritime simulators to the Mexican Navy.

For more information, visit www.vstepsimulation.com.



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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.

Dr. Richard W. Spinrad named NOAA's Chief Scientist

The Obama Administration named Dr. Richard W. Spinrad as NOAA's Chief Scientist. An internationally recognized scientist and executive with more than 30 years of experience, Dr. Spinrad will be the senior scientist for the agency, driving policy and program direction for science and technology priorities. Dr. Spinrad has served as vice president for research at Oregon State University (OSU) in Corvallis, Oregon, and from 2005 until 2010, was the head of NOAA's Office of Oceanic and Atmospheric Research and the head of the National Ocean Service.

Phoenix contracted to search for Malaysia Airlines flight 370

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

Fugro awarded contract for MH370 search

The Australian Transport Safety Bureau (ATSB) awarded Fugro a contract for the deployment of two specialist vessels, equipment and expertise in the deepwater search for the missing Malaysia Airlines flight 370 (MH370). Fugro mobilized its vessels Fugro Equator and Fugro Discovery, both fitted with specialist deep tow survey systems for the work. The Australian Government has allocated AUS \$60 million to the ATSB to carry out the search for MH370.

Historic shipwreck discovered

Steven Libert, president of the Great Lakes Exploration Group, announced he has located what is believed to be the remains of Le Griffon, the first European ship to have sailed the upper Great Lakes. The 45-ton barque carrying seven cannons was built by the legendary French explorer Rene-Robert Cavalier, Sieur de La Salle who was attempting to establish a Northwest Passage through Canada. On its maiden voyage, the ship sailed through uncharted waters across Lake Erie, Lake Huron, and Lake Michigan. On its return trip, Le Griffon and her crew of six disappeared.

Costa Concordia refloated

After 2 and a half years and nearly \$1 billion, the salvage team have confirmed that the Costa Concordia refloating operation has been completed successfully. Next, the 114,500-ton ship will be towed away from shore and moored before eventually being scrapped. Air was pumped into 30 tanks attached to both sides of the 290-m ship, which raised her 2 m off the artificial platform where she rested since September.

One of the ill-fated 1846 Franklin Expedition ships discovered

One of the most famous ships lost has been located in the Arctic according to an announcement by Canadian Prime Minister Stephen Harper.

"I am delighted to announce that this year's Victoria Strait Expedition has solved one of Canada's greatest mysteries, with the discovery of one of the two ships belonging to the Franklin Expedition lost in 1846."

The Parks Canada Underwater Archaeology Team used a Klein 3000 towed side-scan sonar, an Iver3 AUV, and a Saab Seaeye Falcon, all from the custom built 10-m aluminum survey vessel Investigator.

NOAA announces updated process for nominating new national marine sanctuaries

For 40 years, America's national marine sanctuaries have worked to protect sites ranging from a Civil War shipwreck to coral reefs and tiny atolls. NOAA announced that the American public can now nominate nationally significant marine and Great Lakes areas as potential new national marine sanctuaries.

The public's involvement in nominating new sanctuaries will help NOAA in identifying, designating, and protecting marine areas of special national significance and support the administration's goals of ensuring healthy coastal communities and economies.

NOAA, FWS establish critical habitat for Loggerhead sea turtles in Northwest Atlantic and Gulf of Mexico

NOAA's National Marine Fisheries Service and the Department of Interior's U.S. Fish and Wildlife Service announced two final rules to designate critical habitat for the threatened loggerhead sea turtle in the Atlantic Ocean and on coastal beach habitat along the Atlantic and Gulf coasts.

Alvin Cleared to Return to Service

After a 3-year overhaul and major upgrade, the United States' deepest-diving research submersible, Alvin, has been cleared to return to work exploring the ocean's depths. The sub has been out of service since December 2010, undergoing a major upgrade that included the replacement of its personnel sphere with a newly fabricated, larger, more capable hull.

On 8 January 2014, the Naval Sea Systems Command (NAVSEA), executive director of undersea warfare for the Department of the Navy, Steven Schulze, certified that the sub could safely operate to depths of 3,800 m, with the expectation that a certification dive to 4,500 m will be completed at a later date.



Photo by Tom Kleindinst, Woods Hole Oceanographic Institution.

NOAA commissions new fisheries survey ship

NOAA commissioned a state-of-the-art fisheries survey vessel, NOAA ship Reuben Lasker, during a ceremony at the Navy Pier in downtown San Diego. The ship will conduct fish, marine mammal and turtle surveys off the U.S. West Coast and in the eastern tropical Pacific Ocean.

Funded through the American Recovery and Reinvestment Act, Reuben Lasker is the fifth in a series of ultra-quiet, high-tech fisheries survey vessels designed to meet the NOAA Fisheries Service's specific data collection requirements. The ship was built in Wisconsin by Marinette Marine Corporation, a Fincantieri company.



NOAA lists 20 coral species as threatened under the Endangered Species Act

NOAA announced it will afford Endangered Species Act protections to 20 coral species. All 20 species will be listed as threatened, none as endangered. Fifteen of the newly listed species occur in the Indo-Pacific and five in the Caribbean.

Fugro signs multi-year hydrographic survey contract with U.S. government

Fugro is one of eight firms recently awarded a 5-year hydrographic survey contract by NOAA. Task orders under this indefinite delivery, indefinite quantity contract will support development of updated navigational charts in U.S. waters, including Alaska, Hawaii, the Territories and the Great Lakes. With a maximum value of USD \$250 million, the contracts call for both vessel and aircraft-based hydrographic survey capabilities.

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

According to a 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.

Woods Hole Group awarded multi-year operation and maintenance contract to support NOAA PORTS®

Woods Hole Group will work with the NOAA, Center for Operational Oceanographic Products and Services for the operation and maintenance of physical oceanographic real-time system (PORTS®) along the East Coast of the U.S. and along the Gulf of Mexico coast in Texas and Louisiana. NOAA PORTS® is a network of sensors in ports and harbors providing access to information, improving maritime commerce and safety.

U.S. Department of Transportation provides \$7M for maritime education

The U.S. Department of Transportation's Maritime Administration announced that America's six state maritime academies – California Maritime Academy, Great Lakes Maritime Academy, Maine Maritime Academy, Massachusetts Maritime Academy, SUNY Maritime College, and Texas Maritime Academy – and the U.S. Merchant Marine Academy (USMMA) in Kings Point, New York will each receive \$1 million from a government program that recycles obsolete vessels. The funding will help ensure well-educated and highly skilled U.S. Merchant Marine officers are available to meet our nation's national security and economic needs.

Global freight data highlight continuous dependency on Asia-led growth

The overall picture for global freight remains uncertain. Total external trade by sea (in tonnes) remains below pre-crisis levels (June 2008) in the EU-27 and the U.S. (-2% and -7%). In general, demand remains weak in developed economies. Imports by sea to the U.S. have declined throughout 2013 and were 27% below their pre-crisis levels at the end of the year. Imports by sea to the EU remain at 10% below pre-crisis levels. Asia, especially China, remains the locomotive for growth. Exports to Asia by sea increased both in the EU-27 and the USA and were 53% and 30% above their pre-crisis levels respectively. EU-27 and the U.S. exports by sea to China, measured in tonnes of goods moved, were 83% and 142% above the July 2008 levels, respectively.

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

Maersk Line announced a 10-year vessel sharing agreement (VSA) with MSC Mediterranean Shipping Company S.A. on the Asia-Europe, Transatlantic and Transpacific trades. The U.S. Federal Maritime Commission (FMC) announced that it will allow the VSA to come into effect. The U.S. was the only remaining jurisdiction where the VSA had to obtain approval. Maersk Line and MSC can now implement the VSA as planned.

Maritime Administration and the American Bureau of Shipping sign memorandum of agreement

The U.S. Department of Transportation's Maritime Administration (MARAD) and the American Bureau of Shipping (ABS) have signed a new Memorandum of Agreement (MOA) establishing policies and procedures for the survey and classification of MARAD's National Defense Reserve Fleet (NDRF). The MOA establishes a charter that improves the timelines, efficiency and cost effectiveness for surveys and updates terminology, references and regulations. The ABS is a classification society that develops and verifies standards for the design, construction and operational maintenance of marine vessels and offshore structures. The NDRF includes the Ready Reserve Force, federal and state maritime academy training ships, and other unique purpose vessels that are maintained by MARAD for national defense and national emergency purposes.

Wales' first full-scale tidal energy generator unveiled

Wales' first full-scale tidal energy generator has been unveiled at Pembroke Port by The First Minister of Wales, the Rt. Hon. Carwyn Jones AM.

The patented DeltaStream device developed by Cardiff-based tidal stream technology company Tidal Energy Ltd will be installed in Ramsey Sound, Pembrokeshire, following

its unveiling – and will be among the world's first demonstration devices to generate green, sustainable and predictable tidal power.

FAU to install world's first ocean current energy test site

Researchers at Florida Atlantic University's Southeast National Marine Renewable Energy Center (SNMREC) will install the world's first offshore test berth for small-scale ocean current turbines thanks to a recently signed 5-year lease agreement between FAU and the U.S. Department of the Interior's Bureau of Ocean Energy Management (BOEM). These test berths, each consisting of a buoy anchored to the seafloor, allow ocean current turbine prototypes (up to 100 kW generation capacity) to be deployed from vessels moored in the Gulf Stream for a few weeks at a time.

Largest offshore wind energy area available for commercial development

Secretary of the Interior Sally Jewell and BOEM Acting Director Walter Cruickshank joined Massachusetts Governor Deval Patrick to announce more than 742,000 acres offshore Massachusetts will be available for commercial wind energy leasing. The proposed area is the largest in federal waters and will nearly double the federal offshore acreage available for commercial-scale wind energy projects.

The Massachusetts Wind Energy Area is located approximately 12 mi offshore Massachusetts – from its northern boundary, the area extends 33 nmi southward and has an east/west extent of approximately 47 nmi. BOEM proposes to auction the Wind Energy Area as four leases.

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Lockheed Martin, Victorian Wave Partners to develop world's largest wave energy project

To advance the availability of alternative energy solutions, Lockheed Martin has signed a contract with Victorian Wave Partners Ltd. to begin developing the world's largest wave energy project announced to date.

The 62.5-MW peak power wave energy generation project



will be built off the coast of Victoria, Australia using the PowerBuoy® wave energy converter technology of Ocean Power Technologies (OPT). The project is scheduled to be built up in three stages, with the first stage producing approximately 2.5 MW peak power. Once completed, the project is expected to produce enough energy to meet the needs of 10,000 homes. As this project also contributes to Australia's goal of 20% renewable energy by 2020, it has received significant grant support from ARENA (Australian Renewable Energy Agency).

Adm. Paul F. Zukunft assumes command of U.S. Coast Guard

Adm. Paul F. Zukunft assumed command of the U.S. Coast Guard in a change of command ceremony at the Douglas A. Munro U.S. Coast Guard Headquarters in Washington, D.C.

As the 25th Commandant of the Coast Guard, Zukunft will lead the largest component of the Department of Homeland Security, comprising 41,700 active duty, 7,800 reserve and 8,300 civilian personnel as well as 31,000 volunteer Coast Guard auxiliarists.

Rear Admiral Brad Mooney passes away

John Bradford "Brad" Mooney, Jr., one of the first few deep ocean submersible pioneers in the world, passed away Friday, May 30, in Austin, Texas, at the age of 83 years. Mooney, a USNA graduate (1953-21st company), proudly served his Country for 34 years. After his retirement from the Navy in 1987, Mooney continued his contributions to the science of deep submergence.

A torpedo powered by a lithium-ion battery breaks speed records

Early in 2013, the first sea firings of a torpedo fitted with a Li-ion battery were completed successfully: propelled completely safely at more than 50 kts, the torpedo also benefits from an endurance that can exceed 1 hr. It took 10 years of studies, research and testing for the DCNS Saint-Tropez personnel specialized in undersea weapons, in collaboration with electro-chemists from Saft, to give practical form to this new product.

General Dynamics awarded contract for 10 Virginia-class subs

The U.S. Navy underscored its commitment to an advanced and adaptable submarine force by awarding General Dynamics Electric Boat a contract valued at \$17.6 billion for the construction of 10 additional Virginia-class submarines. The multi-year Block IV contract enables Electric Boat and its industry teammate, Newport News Shipbuilding, to proceed with the construction of two ships per year over a 5-year period. Construction of the first Block IV submarine, SSN-792, began 1 May. The 10th ship to be procured under this contract is scheduled for delivery in 2023.

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.

Ocean News & Technology

Harris wins broadband satellite terminal contract from U.S. Navy

The U.S. Navy has awarded Harris Corporation an 8-year contract valued at up to \$133 million to provide shipboard terminals that give crews access to high-bandwidth voice and data communications. Under the agreement, Harris will provide up to 120 terminals in addition to the 70 terminals already delivered since 2008 under the indefinite delivery/indefinite quantity Commercial Broadband Satellite Program (CBSP) Unit Level Variant (ULV) contract.

MTN's hybrid network transforms communications at sea

MTN Communications is supporting Norwegian Cruise Line's launch of the newly christened Norwegian Getaway with its advanced hybrid communications network. This innovative network enables satellite and terrestrial broadband connectivity for higher performance connections on large vessels both at sea and in port.

Iridium introduces the first global data broadcast service, Iridium Burst(SM)

Iridium Communications Inc. announced the first one-to-many global data broadcast service, Iridium Burst, enabling enterprises to send data to an unlimited number of devices anywhere on Earth whether inside buildings, in-vehicle, or in aircraft. Iridium Burst leverages the high power channels of the Iridium satellite network to offer a cost-efficient, customizable and low-latency broadcast data service that can provide service globally with high signal penetration capabilities superior to traditional paging and broadcast services.

17 carriers launch Asia Africa Europe cable project

PCCW Global, an international operating division of HKT, Hong Kong's premier telecommunications service provider, and 16 other prominent service providers around the world have come together to construct a new and unique high-capacity cable system, Asia Africa Europe-1 (AAE-1). AAE-1 interconnects Hong Kong, Asia, the Middle East, Africa, and Europe with a target ready for service date in 2016.

Hibernia, SubCom commence Hibernia Express

TE SubCom announced the commencement of the new Hibernia Express submarine cable system. The 4,600 km cable will provide the lowest-latency fiber-optic path between New York and London, connecting Halifax, Nova Scotia, and Brean, UK, with terrestrial fiber to extend connectivity to the major metro areas. Hibernia Express will initially launch with 100 Gbps transmission capacity using TE SubCom's C100 SLTE platform. It will be a 6-fiber-pair submarine cable, with a portion of the fibers optimized for lowest latency and a portion optimized for 100x100 Gbps design capacity.

Cruickshank appointed acting director of the Interior's BOEM

Walter Cruickshank has been elevated from deputy director to acting director of the U.S. Interior Department's Bureau of Ocean Energy Management (BOEM), which manages the conventional and renewable ocean energy and mineral resources on 1.7 billion acres of the U.S. Outer Continental Shelf (OCS). He replaces Tommy P. Beaudreau, who recently stepped down as BOEM director to become Interior Secretary Sally Jewell's new chief of staff, replacing Laura Daniel Davis, who stayed in the post after the departure of Ken Salazar, the former secretary.

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.

U.S. to spend \$890B on infrastructure through 2025

Cumulative spending on U.S. oil and gas infrastructure over the next 12 years is estimated at \$890 billion, with gathering systems and direct production support facilities receiving the largest share of the investment at 60% of the total.

The 2014 to 2025 analysis, conducted by energy consulting firm IHS Global Inc. for the American Petroleum Institute, forecasts a heavy weighting of investments toward liquids (crude oil and NGLs) over the next 5 years driven by wide oil-to-gas price spreads, but expects the investment trend to shift back toward a higher percentage of natural gas investment in the second half of the forecast horizon as natural gas prices recover.

BOEM issues programmatic EIS for offshore Atlantic G&G activity

BOEM has moved a step closer to geologic and geophysical (G&G) activity on the southern and mid-Atlantic U.S. Outer Continental Shelf as it released its long-awaited final programmatic environmental impact statement (PEIS) for the area.

The PEIS does not authorize any G&G activities itself. Rather, it establishes a framework for additional mandatory environmental reviews for site-specific actions and identifies broadly applicable measures governing any future G&G activities. BOEM estimates there are 3.3 Bbbl of oil and 31.3 Tcf of gas off the East Coast, but that assessment was done in the early 1980s using technology that is now outdated.

U.S. cuts net energy imports to lowest point in two decades: EIA

The United States cut its net energy imports in 2013 to the lowest level in more than two decades, measured by energy content, according to the U.S. Energy Information Administration.

The trend was driven partially by a surge in the domestic supply of crude oil in 2013, which marked the largest 1-year jump in production in the nation's history. With U.S. production rising, the nation cut oil imports by 12% over 2012. Meanwhile, U.S. exports of gasoline, diesel and other petroleum products also hit a record high during the year.

The paired trends led to a 19% drop in net energy exports between 2012 and 2013. Gross energy imports fell 9%, according to the federal data.

GoM lease sales draws \$872M in winning bids

Oil and gas lease sales for federal waters in the Gulf of Mexico drew \$872,143,771 million in high bids on 329 tracts covering 1,707,358 acres. The Bureau of Ocean Energy Management (BOEM) had offered almost 40 million acres in the 19 March sale in New Orleans, Louisiana.

Anadarko found not culpable in Deepwater Horizon drilling tragedy

A federal judge found that Anadarko Petroleum Corp. was not culpable in the well-drilling operations that led to the 2010 Deepwater Horizon tragedy in the Gulf of Mexico. The March ruling came after the Justice Department made the push for Anadarko to be held responsible along with BP for the 20 April 2010, drilling disaster and rig explosion. As a partial drilling partner with BP, Anadarko could potentially still be held liable though for some of the spill damages.

Report predicts surge in world subsea spending totaling \$117B

Global subsea hardware capital expenditures could total \$117 billion between 2014 and 2018, according to Douglas-Westwood's market forecast. This represents growth of more than 80% compared with the preceding 5-year period, DW said, although the global financial crisis in 2009 and the Gulf of Mexico oil spill in 2010-2011 both limited growth in subsea hardware spend during 2009-2013. Also, subsea tree installations last year were lower than expected mainly due to delays in big projects offshore Brazil and West Africa.

Schlumberger, OneSubsea, Helix, to form well intervention alliance

OneSubsea, Helix Energy Solutions Group, and Schlumberger have signed a letter of intent to form an alliance to develop subsea well intervention systems. When the final terms are agreed, the alliance will focus on expansion of applications enabled by subsea well access technology and specific solutions for deep and ultra-deepwater and high-pressure operations.

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

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

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

Murphy Oil has agreed to sell 30% of its Malaysian oil and gas assets to PT Pertamina Malaysia Eksplorasi Produksi for \$2 billion. The transaction is subject to the approval of Malaysia's state-owned oil and gas firm Petroliam Nasional Berhad (Petronas). The deal is expected to be completed in the first quarter of 2015. Murphy Oil entered the Malaysia market in 1999 and the country accounted for over 40% of the company's net production in 2013.

U.S. ahead of Saudi Arabia as largest oil producer in the world

The U.S. has grabbed the title of the world's leading crude oil producer from Saudi Arabia and is expected to remain there till 2030, according to the Bank of America. Total crude oil production in the U.S., including liquids separated from natural gas, was the highest compared to all other countries in the first quarter of this year. The U.S.'s crude oil output in the first quarter of 2014 surpassed 11 mmbbl per day, the highest volume produced by the nation in 24 years, as production from shale formations in Texas and North Dakota was ramped up.

ExxonMobil sells offshore Malaysia interests to EnQuest subsidiary

EnQuest subsidiary EQ Petroleum Production Malaysia has agreed to acquire ExxonMobil's interest in the Seligi oil field and the PM8 production-sharing contract (PSC) offshore Malaysia. The PSC was due to expire at the end of June. EnQuest will pay ExxonMobil \$67 million in cash and will enter into a transition services to ensure a smooth transfer of the assets.

Seligi is a 30.9-sq. mi oil field 149 mi off peninsular Malaysia in a water depth of 239 ft. It has been developed via the Seligi-A production platform-gas compression platform complex.

DNV GL acquires Marine Cybernetics

Marine Cybernetics was established in 2002 as a spin-off from the Norwegian University of Science and Technology (NTNU). Based in Trondheim, Norway, the company introduced the concept of Hardware-In-the-Loop (HIL) Testing to the maritime and offshore industries. To reflect its cross-industry relevance and strategic importance to DNV GL, Marine Cybernetics will become an independent business unit within the DNV GL Group.

Liquid Robotics names Gary Gysin as president and CEO

Liquid Robotics announced that Gary Gysin, a highly successful Silicon Valley executive and previously the executive vice president of global sales and marketing for Liquid Robotics, has been named as the new president and CEO of the company and will join the Liquid Robotics' Board of Directors. Mr. Gysin brings more than three decades of extensive sales, marketing and CEO leadership in delivering worldwide revenue growth for IT communications, network, energy and cloud computing companies.

Teledyne to acquire Bolt Technology Corporation, SeaBotix

Teledyne Technologies Incorporated and Bolt Technology Corporation jointly announced that they have entered into a definitive agreement that provides for the merger of Bolt with a wholly-owned subsidiary of Teledyne. Through its SeaBotix business, Bolt is a leading designer and manufacturer of miniature underwater ROVs used in maritime security, search and rescue, aquaculture, and scientific research applications.

Acteon acquires UTEC Survey

Acteon has acquired UTEC Survey, an independent survey services business with a global footprint. UTEC offers high quality and cost-effective technology solutions in order to gather, process and manage data that supports informed decision-making across the entire life of a subsea field.

TE Connectivity to acquire the SEACON group

TE Connectivity Ltd. announced that it has signed a definitive agreement to acquire the SEACON group, a leading provider of underwater connector technology and systems, for \$490 million in cash. The SEACON group serves the military marine and sub-sea sectors for remotely operated vehicles (ROVs) / autonomous underwater vehicles (AUVs), oil and gas, environmental and oceanographic applications.

Trelleborg Enhances Buoyancy Offering to Meet Growing Market Demand

In response to increased industry demand for more reliable and high performance buoyancy solutions, Trelleborg's offshore operation has streamlined its buoyancy manufacturing processes to optimize costs while increasing manufacturing performance and efficiency.

The company has consolidated two of its manufacturing facilities in Boston, Massachusetts, U.S. — where its syntactic foam with micro-balloons are manufactured — reducing its carbon footprint and bringing the material manufacture and transportation of its buoyancy all under one roof. In addition, Trelleborg has developed a new material solution that will minimize manufacturing and processing costs. Experts will be on stand at Underwater Intervention to demonstrate the new advances to visitors.

Bob Kelly, General Manager of Trelleborg's offshore operation in Boston, says, "The offshore industry is continuously developing, so it is vital that we always challenge and work to enhance our products and our processes to the highest standards."

"By consolidating two manufacturing facilities, we now offer the most complete modular process for production of buoyancy in the U.S., from raw material to finished product. We've also grown our personnel on the shop floor by approximately 15% through local labor. As a result of these developments, we increased our output levels and reduced our lead times."

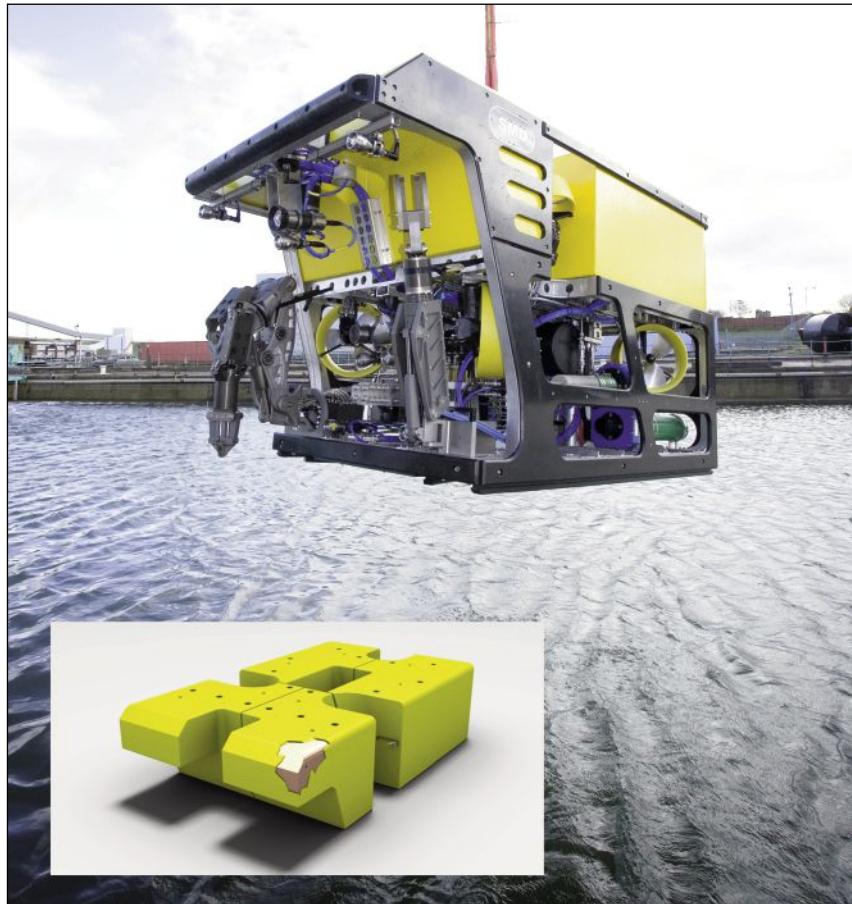
Among its subsea offerings, Trelleborg's offshore operation manufactures a range of high performance, low density syntactic foam solutions for deep sea buoyancy applications. These composite foams provide ultra-low densities through the selection of only the highest specification hollow glass microspheres. These are combined within a rigid, high strength resin system. The syntactic foam is typically cast into blocks and then used to prepare large buoyancy modules that can be readily shaped to suit specific applications.

Many high-end vehicle buoyancy packages are made by constructing small blocks, gluing them together and then machining them, which is a time-consuming and expensive process. However, Trelleborg has developed a new method that produces finished modular geometry to optimize processing costs and lead times.

Kelly continues, "We are constantly striving to advance our microsphere specifications in order to gain a higher strength-to-weight ratio within our buoyancy systems. We do this by manipulating our micro-particle manufacturing techniques to ensure that we are able to get the exact ratio required. We specialize at the raw material level by manufacturing our own glass microspheres — Ecospheres® — and put them through stringent, high pressure testing in-house."

Trelleborg's latest business developments mean that the company can deliver advanced buoyancy solutions within shorter lead times, helping to keep projects on time and budget. The company's specialist and technical experts provide guidance on choosing the best product for individual applications. Similarly, Trelleborg provides complete manufacturing transparency as it controls the construction of remotely operated vehicle (ROV) and autonomous underwater vehicle (AUV) buoyancy solutions from the raw microspheres through to the coatings of finished buoyancy solutions.

Bob Kelly will discuss the latest advancements in buoyancy technology in his presentation at Underwater Intervention. To find out more about these products, Trelleborg representatives will be at the show to answer any questions. Alternatively, visit www.trelleborg.com/aem.



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OFFSHORE INDUSTRY

Halliburton agrees to pay record \$34.6B for rival Baker Hughes

Halliburton has offered \$34.6 billion in cash and stock for smaller rival Baker Hughes in what would be the largest such transaction on record for an oilfield services provider, according to industry analysts. The proposed merger is expected to close in the second half of 2015. If the deal is terminated due to the failure to get antitrust approvals, Halliburton has agreed to pay a \$3.5 billion break-up fee.

The oil-patch marriage, which was approved unanimously by both boards, came after weeks of discussions, which were reportedly chilly at times, according to media reports. Halliburton made its first offer to Baker Hughes back on 11 October. The agreement was announced on 17 November.

By eliminating a competitor, Halliburton, already the world's second-biggest provider of oilfield services, would gain market clout that would help insulate it from a sustained market decline. A combination of No. 2 Halliburton with No. 3 Baker Hughes would be a little more than half the size of larger rival Schlumberger Ltd. The deal will probably be closely scrutinized by federal antitrust regulators, especially where the two companies' businesses overlap most in North America.

American voters overwhelmingly voted for energy, says Harris Poll

Ninety percent of voters on November 4 recognized that increased production of domestic oil and natural gas resources could lead to more U.S. jobs, and 86% recognized it stimulates the economy, according to an election night telephone poll of actual voters conducted by Harris Poll for the American Petroleum Institute.

"In race after race, voters from all regions of our nation and from both political parties voted for candidates who stood behind pro-development, all-of-the-above energy policies," API president and chief executive Jack Gerard told reporters in a conference call.

For the 2016 election, 66% of voters said they are more likely to support a candidate who supports producing more oil and natural gas, according to the poll (55% of Democrats and 82% of

Republicans). On the Renewable Fuel Standard, 79% of voters were concerned about government requirements that would increase the amount of ethanol in gasoline because of potential damage to engines. The poll also found that 72% support building the Keystone XL pipeline (58% of Democrats and 91% of Republicans).

"We hope that President Obama will take this opportunity to work with the new Congress on smart energy policies that grow our nation's still shaky economy..." Gerard said.

North Sea decommissioning may cost \$48.1B by 2040: report

Decommissioning of the North Sea oil and gas projects in the UK Continental Shelf (UKCS) could cost about \$48.1 billion by 2040, according to a new report prepared by Arup.

The report, prepared for Decom North Sea and Scottish Enterprise, disclosed that there may be a significant increase in activity, with an estimated annual investment of more than \$4 billion per annum in the next 5 to 10 years as aging assets reach the end of their life.

Attracting skilled workers and passing on knowledge is one of the considerations Arup made in the report.

The annual average decommissioning activity is expected to double in the next 10 years, suggesting a need to increase the workforce capability.

A significant proportion of the 271,000 people directly employed within the oil and gas industry through the UK, Norway and Denmark are likely to have applicable or transferrable skills to support decommissioning.

The report also noted that innovation can play a role in decommissioning in a more cost-effective manner, and procurement strategies need to become significantly distinct, as it is inherently different to that of the exploration and production market.

Arup also highlighted the need to shift procurement strategies away from focusing only on providers with long-term experience in the industry. Arup also suggested including new entrants to the supply chain who can introduce innovative methods, reduce costs, and expand the supply chain market.

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Artificial reefing project to save famed Louisiana trout hotspot

Apache Corp., Fieldwood Energy, Coastal Conservation Association (CCA) of Louisiana and the Louisiana Department of Wildlife and Fisheries are starting construction of an artificial reef system at the site of the recently removed structures in Ship Shoal 26 off the Louisiana coast, known by many anglers as "the Pickets."

The \$1.2 million project calls for the deployment of roughly 14,000 tons of 4-in. limestone over three specially engineered artificial reefs. The reefs will be designed to protect depressions in the seafloor that were created by the flowing current, enhancing these scour holes to provide additional habitat for marine life.

Located off the coast of Terrebonne Parish, the Pickets was a big draw for speckled trout, redfish and other marine life that thrived among the offshore platform's legs, pilings and wellheads.



Fishing the Pickets near old platform.

"There are many trout fishermen in this state who have fond memories of the Pickets," said David Cresson, CCA Louisiana's executive director.

Fieldwood acquired Apache's Gulf of Mexico shelf assets in 2013, including the Pickets structures and pilings at Ship Shoal 26. As part of the acquisition, Fieldwood entered into a decommissioning agreement with Apache and is responsible for making sure the removal work at Ship Shoal 26, which is required by the federal government, is completed.

Of the 2,900 or so production platforms in the Gulf of Mexico, 813 of them have been identified as fitting the criteria for use as artificial reefs. Over the last 40 years, 13% of decommissioned platforms have been placed in the Rigs to Reefs program.

OFFSHORE INDUSTRY HEADLINES

Research & Development • Environmental Assessment • Discovery

Norway's tax regime is challenging offshore investment opportunities

The high tax burden in Norway is challenging the commercial viability of Arctic oil opportunities, compared with Russian, Canadian and U.S. Arctic fiscal regimes, according to GlobalData.

"In contrast to Russia, which introduced tax incentives for offshore Arctic developments earlier this year, Norway does not provide special incentives for its oil and gas industry," Will Scargill, an analyst for the research and consulting firm, adding that states and international oil companies that are considering Arctic operations should balance the attractiveness of all regimes with other obstacles.

Norwegian fiscal terms were made even less appealing in May 2013, when the Labor-led government reduced the capital expenditure uplift, allowed over 4 years, from 30% to 22%.

Scargill noted that the change had a particularly detrimental impact on the potential economics of projects needing high capital outlay, and the effects are especially visible in the marginal commerciality of Statoil's proposed Johan Castberg project in the Barents Sea.

According to Scargill, Johan Castberg's economics indicate that without such measures, new developments are unlikely to be commercially viable further north in the Barents Sea, where costs are estimated to be higher.

The Canadian and U.S. Arctic regimes would likely allow a project with Johan Castberg's cost profile to generate a better return on investment.

However, "despite the potential for promising economics in Alaska and Canada's offshore regions, these areas are subject to stringent environmental regulations, which could frustrate operators' plans," Scargill said.

U.S. dramatically increases oil estimate for Chukchi Sea leases

The federal government is quadrupling its estimate of how much crude could be harvested from Arctic drilling leases it sold oil companies 6 years ago. The move, part of a draft environmental impact statement issued by the Bureau of Ocean Energy Management, is designed to shield that disputed 2008 auction and the Chukchi Sea oil and gas leases sold during it from further legal scrutiny.

The agency was forced to redo the analysis after the 9th Circuit Court of Appeals ruled in January that regulators wrongly relied on an arbitrary estimate about the amount of oil that could be recovered in their first environmental study of the 2008 lease sale.

At the time, regulators said up to 1



Bbl of oil was economically recoverable from the leases. In late October, the bureau proposed a new estimate of 4.3 Bbl of oil.

The agency said its new, higher estimate is based on better information about where oil companies' interests lie and a deeper understanding about geologic structures in the region. In revising its estimate, the bureau also relied on actual bidding data from the disputed 2008 lease sale, which brought in a record \$2.6 billion in high bids.

Ending 40-year U.S. oil export ban would lower fuel prices: study

Ending a 40-year ban on U.S. crude oil exports would lower domestic gasoline prices because it would put more petroleum onto global markets, where fuel prices are primarily set.

According to a recent study, as the U.S. oil boom of the last 6 years builds an excess of light crude along the Gulf Coast refining hub, calls have risen for Congress and the Obama administration to relax the ban on shipments to global customers. The restriction was put in place in the 1970s, following the Arab oil embargo.

"Given the public's sensitivity to changes in the price of gasoline, many in Congress are reluctant to support eliminating the ban on crude oil exports," said the report, entitled "Lifting the Crude Oil Export Ban: The Impact on U.S. Manufacturing."

"The oil market, however, is worldwide and prices of various grades of oil are set in world markets," it said, adding that producing more U.S. crude oil will put additional downward pressure on global prices.

Lifting the ban would put some – "if modest" – downward pressure on U.S. gasoline prices, it said.

The report was issued by the manufacturing branch of the Aspen Institute, which is supported by energy companies, including ExxonMobil Corp., ConocoPhillips and Continental Resources Inc., as well as the MAPI Foundation, the research group of the Manufacturers Alliance for Productivity and Innovation. Gasoline prices could fall between 3 to 5 cents a gallon by 2016.

Energy M&A hits 10-year high, midstream deal value surges

A new PwC survey shows oil and gas mergers and acquisitions hit a 10-year high in the third quarter with 78 deals – a minimum of \$50 million each – worth a total of \$123 billion, compared to 43 deals worth \$16.4 billion in the third quarter of 2013.

Midstream activity, along with continued interest from foreign buyers – specifically in upstream shale plays – and the overall impact of megadeals (deals with a value of more than \$1 billion), contributed to the record-breaking deal activity in the third quarter of the year.

There were 15 midstream deals, including three valued at more than \$8 billion each, that contributed \$74.1 billion in value, a 50% growth in deal volume and 517% growth in deal value compared to the second quarter of 2014. Upstream deals accounted for 54% of the deals in the third quarter of 2014 with 42 transactions representing \$29.4 billion.

"This was a break-out quarter for deal activity...due to a number of drivers coming together to bolster M&A flow, including the significant impact of \$1 billion-plus deals, foreign and private equity interest and the attractiveness of shale plays," Doug Meier, PwC's U.S. energy sector deals leader, said in a statement.

Middle class Americans own bulk of oil and natural gas companies

The owners of America's oil and natural gas companies are largely retirees and middle class Americans saving for retirement, according to a report by Sonecon, "Who Owns America's Oil and Natural Gas Companies," commissioned by the American Petroleum Institute.

"When oil and natural gas companies do well, so do millions of their owners all across America," said Kyle Isakower, API vice president of regulatory and economic policy. "The study concludes that a large proportion of the benefits of oil and gas company stock ownership goes to middle class Americans."

In 2014, public and private pension and retirement plans, including 401(k)s and IRAs, hold 46.8% of all the shares of U.S. oil and natural gas companies, according to the study. Individual investors own 18.7%, and asset management companies (including mutual funds) hold 24.7% of shares. Institutional investors like banks, insurance companies, foundations and endowments hold 6.9% of shares. Together, these groups hold 97% of oil and gas industry stock. By comparison, the officers and board members of U.S. oil and gas companies own less than 3% of total shares.

Pemex signs MOU with Exxon for upstream, downstream cooperation

Pemex and international powerhouse ExxonMobil signed a memorandum of understanding and cooperation, the Mexican state-owned company said, as the country embarks on an opening of its oil and gas sector to foreign investment. The MOU was inked "to establish the basis of dialogue and understanding in areas of upstream and downstream business," Pemex said.

The wording of the new agreement with ExxonMobil indicates a potential alliance as Mexico prepares for its first rounds of bidding since the state monopoly was established in 1938. Bids are to be invited soon for 169 blocks in Round One of Mexico, including areas of deep and shallow waters, heavy crude and non-conventional areas.

The statement said the signing of the accord "adds to other efforts being made by Pemex to attract new technologies, capital and partners that will permit to compete efficiently in the new Mexican hydrocarbons market, ensure production and generate jobs in the nation's energy sector." Pemex recently signed similar agreements with BHP Billiton and Malaysia's Petronas.

Khurais, Manifa fields have largest amount of recoverable reserves

The Khurais and Manifa projects in Saudi Arabia have the most recoverable reserves among the world's top 100 upstream developments, with approximately 19.4 Bboe, respectively, according to research and consulting firm GlobalData.

A recent company report states that these assets boast substantial recoverable crude oil reserves, with Khurais having 18.2 Bbbl and Manifa holding 13.5 Bbbl. The projects also have recoverable natural gas reserves of 6.8 Tcf and 1.4 Tcf, respectively.

Robert Stevens, GlobalData's lead upstream analyst covering the Middle East and North Africa, said that despite these impressive reserves, Saudi Aramco, which owns both fields, has encountered a number of difficulties during their development.

"The Khurais project has the distinction of being one of the largest oil development projects in the world. The most recent activity saw 12 drilling rigs running simultaneously between 2006 and 2009, creating about 300 wells, with production beginning in June 2009," Stevens explained.

"A major challenge for operations in the Khurais field is to increase the recovery rate of crude, but given the

World's largest specialty valve for Ichthys project



Wojciech Zmudzinski, chief pipeline engineer for McDermott (right) with an INPEX Ichthys project representative during a valve manufacturing inspection at a factory.

After nearly 2 years of planning, development and perseverance, a McDermott team has achieved a first of a kind in the valve industry, creating the world's largest forged body specialty valve, in collaboration with a leading valve manufacturer. The valves are destined for the INPEX-operated Ichthys LNG project.

The Ichthys project umbilical, riser and flowline infrastructure, which will be installed at the Ichthys field offshore Western Australia, requires connection of the subsea riser base to the 42-in. gas export pipeline going to the onshore LNG processing facility.

"This meant that six 42-in. valves had to be specially designed and fabricated to meet the 40-year design criteria. To our knowledge, these are the world's largest, single-piece forged, top entry ball valves," explained Jonathan Parkes, McDermott senior project director.

Each valve measures about 9 m in length and 7 m high and weighs more than 100 tons. The first valve has been successfully built and tested. The second valve was expected to be ready in September. Once all six valves have passed factory testing, two will be installed offshore in 270 m of water, while the remaining four will be installed onshore, one at the landfall block valve and three at the processing facility at Gladin Point.

"This is a great demonstration of client demand driving innovation, and through collaboration, team work and effective supply chain management, on a global scale, we have created an industry first," said Tony Duncan, executive vice president, Subsea.

field's vast size, even a 1% increase in recovery rate would result in millions of additional barrels. Security is also a problem for Khurais, despite the sustained efforts of the Saudi Arabian government and Saudi Aramco."

A different set of issues faced the Manifa field, where most drilling activities and the construction of the central processing facility for crude oil produc-

tion were undertaken on the coast.

Stevens commented: "Saudi Aramco and the contractors of the Manifa field confronted numerous environmental and economic obstacles during the development of the field.

"Environmental issues in the Arabian Gulf include earthquakes, which the contractors had to ensure the structures could withstand during construction."

JDR wins hybrid power steel umbilical for North Sea
 JDR was awarded a contract for the design and manufacture of a hybrid power steel umbilical for the Ravn field development in the North Sea, from natural gas company Wintershall Noordzee B.V. JDR's work includes the delivery of an 18.2 km umbilical, providing power and control by connecting a new platform to an existing platform for long-term well testing off the Danish coast. The composite umbilical is composed of hydraulic hoses, super duplex steel tubes, MV power cores, and fiber optic cables. Subsea hardware and life-cycle support will also be provided by JDR, through its global service division. The umbilical will be manufactured and loaded out at JDR's deepwater, quayside Hartlepool facility, and will be delivered to the Ravn field in the North Sea. Delivery is scheduled for the third quarter of 2015.

TGS gets two new ocean bottom projects in U.S. Gulf
 TGS announced the first two ocean bottom projects in the shelf region of the U.S. Gulf of Mexico under its collaboration agreement with FairfieldNodal. The Calypso Full Azimuthal Nodal (FAN) survey is in the Eugene Island protraction area and will cover 136 shelf blocks. Historical production from Upper and Lower Miocene reservoirs will be complemented by new long-offset full-azimuth nodal data that aims to identify new reserve potential in this geologically complex area. Calypso FAN is being acquired by FairfieldNodal using the Z700 ocean bottom node system, with operations continuing through 2015. The Nessie FAN survey represents 54 blocks of coverage in the South Timbalier protraction area and will cover a number of existing fields and exploratory acreage. This full-azimuth data should provide significant uplift in illumination of existing Miocene reservoirs and emerging inboard Cretaceous and Lower Tertiary opportunities. FairfieldNodal started the Nessie FAN survey in August and will, together with TGS, complete the survey in the fourth quarter of 2014.

KD consortium lands offshore Mozambique FLNG FEED
 Eni East Africa has contracted the KD consortium of KBR and Daewoo Shipbuilding & Marine Engineering for front-end engineering and design (FEED) for an FLNG facility. This will serve the proposed ultra-deepwater Coral South gas development in the Rovuma basin offshore Mozambique, 150 mi northeast of Pemba and 30 mi offshore Mozambique. The KD partners will provide the FEED for the topsides, hull, and subsea equipment for the FLNG vessel. The topsides and turret are being designed in KBR's Leatherhead office near London, and the hull and marine system are being engineered by DSME in Seoul, South Korea. The turret-moored double-hull floating vessel will house gas receiving, processing, liquefaction, and offloading facilities along with LNG and condensate storage.

OneSubsea awarded \$290M contract for Lakach project
 OneSubsea was awarded a subsea production systems contract totaling more than \$290 million for the Lakach deepwater project offshore Mexico. This is the first deepwater subsea field to be developed by Pemex. The scope of supply for the seven well system includes subsea production equipment and tooling. OneSubsea will also provide installation and commissioning services. Deliveries are expected to begin in June 2016. "The Lakach field is a significant development for Mexico, and OneSubsea looks forward to providing the best-in-class equipment and services that will help them optimize production," said Jack B. Moore said, Cameron's chief executive officer.

Guadalupe called a 'significant' oil find



Transocean's Discoverer India drilled the Guadalupe well.

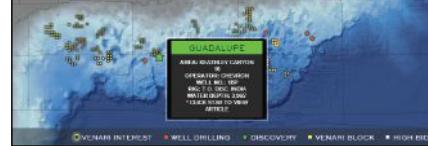
Chevron and BP have a new oil discovery at the Guadalupe prospect in the deepwater U.S. Gulf of Mexico. The majority owners said the discovery well, in the Keathley Canyon Block 10 located about 180 mi from the Louisiana coast, "encountered significant oil pay," but they did not say how much oil they estimated is in the ancient Paleogene sandstone formation.

"More tests are being conducted on the well and additional appraisal activity will be needed to determine the extent of the resource," the companies said.

The discovery well was drilled in nearly 4,000 ft of water and drilled to more than 30,000 ft deep. Chevron operates the Guadalupe prospect with a 42.5% stake. BP also has a 42.5% share, and Venari Resources has a 15% interest.

Chevron started drilling the Guadalupe well in June.

Richard Morrison, regional president of BP's Gulf of Mexico business, said in a written statement the Paleogene trend is becoming "an area of increasing importance to the future of the Gulf of Mexico and to America's energy security."



The Paleogene trend in the U.S. Gulf has yielded three other oil discoveries for BP – Gila in 2013, Tiber in 2009 and Kaskida in 2006. It's a region that will take heftier equipment than the industry has at its disposal to combat massive reservoir pressure in the deep waters. Chevron pumped about 143,000 bbl of crude and 347 Mcf of natural gas a day in the Gulf last year.

"The discovery further demonstrates Chevron's exploration capabilities," George Kirkland, Chevron's vice chairman and executive vice president for upstream, said in a statement.

Added Jay Johnson, Chevron's senior vice president for upstream: "Guadalupe builds on our already strong position in the deepwater U.S. Gulf of Mexico, a core focus area where we expected significant production growth over the next 2 years."

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Total to sell interests in several Norwegian oil fields for \$317M

France-based Total has agreed to sell stakes in various oil fields in Norway to PGNiG Upstream International for \$317 million. Total E&P Norge will sell an 8% interest in the Gina Krog field, which is under development in the North Sea.

The field, which was approved in 2013, is expected to commence production in early 2017. Upon completion, the field will produce 60,000 boe of oil per day and 9 Mcm of gas per day.

Total E&P Norge will retain a 30% interest in the Gina Krog field upon completion of the sale. Statoil and Det Norske will have 58.7% and 3.3% stakes respectively. Total will also sell its stakes of 24.2% each in the Vilje and Vale fields, as well as a 6% interest in the Morvin field.

"This sale is in line with Total's strategy of active portfolio management," said Patrice de Viviès, Total senior vice president of exploration and production for Northern Europe. "With the Ekofisk South, Eldfisk II, Martin Linge and Gina Krog developments, Total's production in Norway is set to grow between 2014 and 2017."



Venezuelan's Citgo oil refinery in Corpus Christi, Texas

Total, which has been present in Norway for about 50 years, played an important role in the development of several large fields on the Norwegian continental shelf. The company holds interests in more than 100 production licenses, of which it operates 30.

Venezuelan finance minister rules out Citgo Petroleum sale: media

Venezuela has ruled out the sale of state oil company PDVSA's U.S. refining subsidiary Citgo Petroleum, Finance Minister Rodolfo Marco said in a recent interview published in local newspaper El Universal.

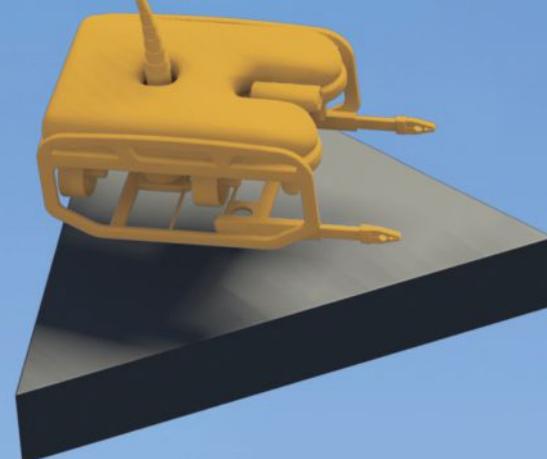
"The sale of Citgo has been ruled out and the president has affirmed it," Marco said. "Venezuela will continue with Citgo and will continue to invest in refineries."

Cash-strapped PDVSA was hoping the sale could fetch between \$8 billion and \$10 billion, welcome revenue amid falling oil prices, major debt payments and an economy widely believed to be in recession. The government had shrouded the deal in secrecy, leaving analysts and industry players scrambling to piece together a rationale for the surprise divestment, and now the apparent reversal.

However, Venezuela's reserve fund was to have \$4 billion by December, the minister said, reiterating Venezuela had enough money to continue funding its popular but costly social programs. He also said again that PDVSA's \$3 billion due in bonds on Oct. 28 would be met.

"With that guarantee of payment, (the idea) that Venezuela is falling into default collapses and we invite investors to believe in Venezuela, to invest in Venezuelan bonds," he said, adding that Venezuela is "analyzing" various aspects of a loan from Russia.

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Trelleborg AEM is a leading manufacturer and supplier of high performance low density composite buoyancy systems for use in ROV/AUV and Human Occupied Vehicles.

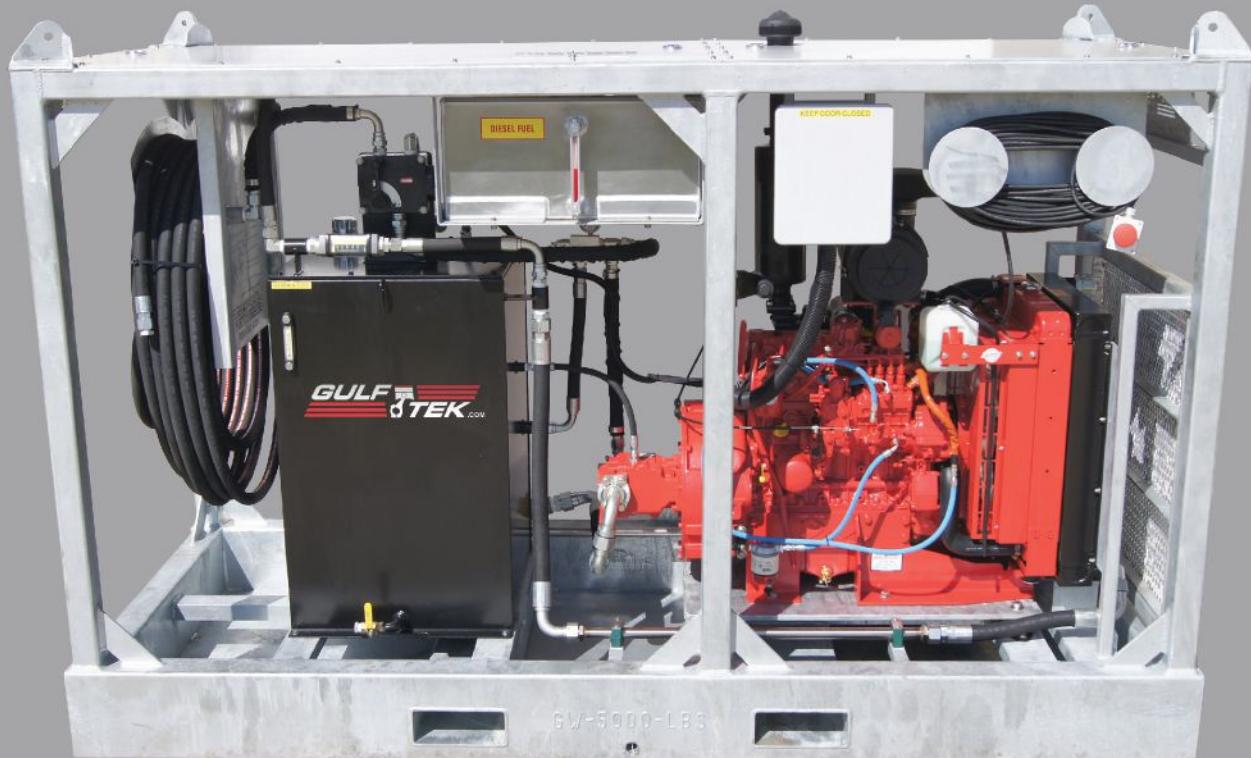
Our range of TG series materials offer class leading low densities and greatest depth capabilities of any composite buoyancy systems to full ocean depth operation.

In addition, buoyancy packs for intervention tooling and skid systems, ancillary equipment for umbilical support including Umbilical Floats, Linksyn, Linksyn SD and Linksyn HD buoyant bend control systems.

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Artist rendition of Lewek Constellation.

Lewek Constellation key to \$120M Etame project offshore West Africa

EMAS AMC, the subsea services division of EMAS, a global offshore contractor and provider of integrated offshore solutions to the oil and gas industry, recently completed a \$120 million project for VAALCO Gabon (Etame) Inc. offshore Gabon in West Africa using the new build Lewek Constellation on her inaugural installation project.

The work scope included the transportation and installation of two jackets, topsides, flare booms and living quarters for the Etame and Southeast Etame-North Tchibala (SEENT) platforms along with the installation of a new living quarters and a gas lift package onto the FPSO Nautipa.

Earlier this year, EMAS AMC also successfully installed rigid pipelines and flexibles using the Lewek Express and performed 60 days of saturation diving to complete the subsea tie-ins using two dive support vessels on VAALCO's Etame and SEENT Fields offshore Gabon.

The Lewek Constellation is now headed to the Netherlands for the installation of her multi-lay tower and ancillary equipment for pipe lay activities, after which she will proceed to the Gulf of Mexico to begin work for Noble Energy in the first quarter of 2015.

Keppel wins vessel construction contracts valued at \$153M

Keppel Offshore & Marine has won two offshore vessel construction contracts with a combined value of \$153 million.

The company's Keppel Shipyard subsidiary has started work for Bumi Armada to convert an FPSO for Eni's block 15/06 East Hub project offshore Angola, 217 mi northwest of Luanda. The yard will perform refurbishment and life extension works, upgrade the living quarters to accommodate 100 personnel, and install and integrate an external turret mooring system and topsides process modules.

The FPSO, which will have a storage capacity of 1.7 mmbbl, will be able to

handle up to 80,000 bbl of oil per day, with 120,000 bbl of water injection per day and 120 mmcf of gas per day handling capacity. Following completion in spring 2016, the vessel will sail to its offshore location.

In China, Keppel Nantong is building its third submersible barge for Smit Shipping. Giant 7, like Giant 5 and Giant 6, which are under construction, will be deployed for Chevron's Wheatstone project, 7.5 mi west of Onslow off the Pilbara coast of Western Australia.

Giants 5 and 6 are expected to be completed at end-2014 and early 2015 respectively, followed by Giant 7 in the second half of 2015.

Sembcorp Marine secures \$696M contract for FPSO conversion

Jurong Shipyard Pte Ltd., a subsidiary of Sembcorp Marine, has secured a \$696 million contract to convert a shuttle tanker into an FPSO vessel for OOGTK Libra GmbH & Co. KG, a joint venture between Brazil's Odebrecht Oil & Gas and Teekay Offshore.

The contract involves the conversion of the Navion Norvegia shuttle tanker to an FPSO and includes detailed engineering, installation, and integration of topside modules, installation of external turret and power generation, and accommodations upgrading as well as extensive piping and electrical cabling works.

Scheduled for completion in the third quarter of 2016, the FPSO will have the capacity to produce 50,000 boe per day and 141 mmcf of natural gas per day, and is expected to be chartered to Petrobras



The Navion Norvegia shuttle tanker.

for work on the Libra field in the ultra-deepwater section of Brazil's Santos basin. Operating as an early well-test unit, the FPSO will be on a 12-year charter once it begins its contract in late 2016.

Ensco supports Stone Energy deepwater program in U.S. Gulf

Ensco has secured a contract to support Stone Energy's multi-year deepwater drilling program in the Gulf of Mexico. The contract will allow Stone



The ENSCO 8503 semi-submersible rig.

Energy to use the ENSCO 8503 semi-submersible deepwater drilling rig for its program. The rig will be modified to include mooring capabilities before the start of the contract, which will initially run for 30 months.

The semi-submersible drilling rig can reach a maximum drill depth of 35,000 ft in up to 8,500 ft of water. The contract is expected to start in the second quarter of 2015 at a rate of about \$350,000 a day. Stone Energy has options to extend the contract's term for an additional year. The company may reduce the 30-month primary term contract by about 6 months, subject to notification no later than 31 March 2015.

"We are excited to execute our first Stone-operated multi-year deep-water drilling contract. Over the past 5 years, with great effort and diligence, we have developed a robust deepwater prospect inventory and the signing of the ENSCO 8503 allows us to further harvest the potential of these prospects," said David Welch, Stone Energy's chairman, president and chief executive officer.

Welch said the contract will allow Stone to better control the pace of execution of our deepwater drilling plans, which includes both development and exploration projects. "We look forward to having Ensco, a premier deep-water drilling contractor, as our partner in this multi-year program," he added.

Carl Trowell, Ensco's chief executive officer and president, said: "We are very pleased to expand our relationship with Stone Energy, a repeat customer of our ENSCO 8500 Series semi-submersibles."

A majority of Stone Energy's prospects and projects are located in the northern Mississippi Canyon and southern Viosca Knoll regions, about 100 mi southeast of New Orleans, Louisiana.

UMW takes delivery of newbuild UMW Naga 6 jack-up drilling rig

UMW Oil & Gas Corp. took delivery of UMW NAGA 6, the first of its two jack-up drilling rigs constructed by China Merchants Heavy Industries. UMW NAGA 6 is a CJ-46 class cantilevered jack-up with the capacity to operate in 375 ft of water, and to a drilling depth of 30,000 ft. It is equipped with an automatic offline pipe racking system for efficiency.

The rig will leave for Vietnam immediately after delivery to serve the recently awarded contract from PetroVietnam Drilling & Well Services Corp. for end clients PC Vietnam Ltd. and Petronas Carigali Overseas Sdn Bhd. The \$46.5 million contract is for operations in the Diamond field in offshore Vietnam, for 250 days, with options for up to additional 327 days.

Jurong to assist MODEC on FPSO serving TEN project offshore Ghana

MODEC Offshore Production Systems has contracted Jurong Shipyard for work on the FPSO that will serve the deepwater TEN project offshore Ghana. Jurong will complete the repair, life extension, and conversion of a VLCC

into the FPSO. This is the 22nd floater conversion that the two parties have worked on.

The vessel, due to be finished in late 2015, will have the capacity to produce and treat 80,000 bbl per day of crude oil, 65,000 bbl per day of produced water, and 180 mmcf per day of gas, with storage capacity of 1.7 mmbbl. It will also be able to supply 132,000 bbl per day of filtered, de-aerated seawater.

The TEN FPSO will be external turret moored in 3,281 to 5,905 ft water depth and operated by MODEC, on behalf of Tullow Ghana. The vessel will host multiple subsea tiebacks from the Tweneboa, Enyenra, and Ntomme reservoirs in the Deep Water Tano block.

Drillship 'Pacific Sharav' joins Chevron operations in U.S. Gulf

Chevron Corp. said that the Pacific Sharav, a deepwater drillship built to Chevron's specifications, has arrived in the Gulf of Mexico to work under a 5-year contract with Pacific Drilling.

The Pacific Sharav is an upgraded Dual-Load-Path, Samsung-12000-design, dynamically-positioned drillship, specially modified to accept a dual gradient

drilling system, and able to operate in moderate environments and water depths up to 12,000 ft.

"The addition of the Pacific Sharav as Chevron's fifth drillship in the deepwater Gulf of Mexico confirms our consistent exploration and development drilling program in the area," said Jeff Shellebarger, president of Chevron North America Exploration and Production Co.

He noted that Chevron subsidiaries are among the top lease holders in the Gulf of Mexico and the area continues to be a key enabler in the company's growth plans, which includes its Jack-St. Malo project, due to come online this year.

"Chevron worked with Pacific Drilling from the very early stages in the design and specifications of the drillship capabilities to ensure the right fit with our drilling program and needs, building on lessons learned and capitalizing on a long-standing business relationship," said Steve Thurston, vice president, Chevron Deepwater Exploration and Projects, Chevron North America Exploration and Production. The Pacific Sharav has commenced operations in the Keathley Canyon area.



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Alta discovery appears to extend Norway's Barents Sea oil frontier

Lundin Norway is said to have discovered a potentially large new oil and gas accumulation in the southern Norwegian Barents Sea. The semi-submersible Island Innovator drilled well 7220/11-1 on the Alta prospect, 12.4 mi northeast of the company's Gohta discovery (well 7120/1-3) and 99 mi from the Norwegian mainland.

The main aim was to prove hydrocarbons in Permo-Carboniferous and Triassic reservoir rocks. The well encountered a 187-ft gross hydrocarbon comprising 36 ft gas and 151 ft oil in good-quality carbonate rocks.

Two drillstem tests were conducted in the oil zone, producing a maximum of 3,260 bbl per day of oil and 1.7 mmcf per day of gas through a choke constrained by rig facilities. Lundin estimates the recoverable resource potential in the 125 to 400 mmboe range.

This was the first well drilled in license PL609, awarded under Norway's 21st Concession Round in 2011. Water depth was 1,273 ft. Lundin said the Neiden and Børsvær prospects farther north in the license are also drill-ready and both could contain sizeable



The semi-submersible Island Innovator.

resources. Island Innovator next heads to the North Sea to drill the Kopervik exploratory well in PL625, again for Lundin.

Spain's Repsol makes significant oil discovery in the Gulf of Mexico

Repsol said it made a discovery of high quality oil in the U.S. Gulf of Mexico. The find was made 352 km from the Louisiana coast in an ultra-deepwater well named León, located in the Keathley Canyon Block 642.

Repsol is the operator of the discovering consortium. The well found more than 150 m of net oil pay within a column

of over 400 m, the company said, adding that the well was drilled in water 1,865 m deep and reached a total depth of 9,684 m, making it one of the deepest wells operated by the company.

Repsol has a 60% participation in the license, with Colombia's Ecopetrol holding the remaining 40%.

Repsol holds 119 blocks in this prolific area together with a share in the Shenzhou field, which boasts 16 wells in production connected to two platforms.

In 2009, Repsol had already made one of its most important discoveries in this region. The Buckskin well, 50 km from León, was, like the León discovery, one of the deepest wells operated by the company. The resource potential being carried out by the current operator will lead to a development plan for this and other fields in the near future, Repsol said.

With the León discovery, Repsol continues to strengthen its position in the United States, which is one of the company's key strategic regions. With the addition of new production during 2014, the United States already represents almost 10% of the company's total output. Repsol has its second largest corporate headquarters in Houston and employs more than 600 people in the United States.

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Spectrum to reprocess 2D seismic for upcoming Peruvian bid round

Spectrum has secured a contract with Perupetro, the state-owned company and regulatory hydrocarbon agency in Peru, for the reprocessing of its existing 2D offshore seismic data to assist with the upcoming offshore bid round.

Perupetro was to formally launch an International Offshore Bid Round in the fourth quarter of 2014. To support the bid round, Spectrum is reprocessing about 13,000 km of 2D multi-client regional seismic data covering the lease sale blocks. The data is available.

The Offshore Bid Round will include between six and nine offshore blocks located along the central and southern areas of the country, covering the two types of highly prospective hydrocarbon potential sedimentary basins: extensional, pull-apart basins (e.g., Trujillo and Mollendo basin) and upper trench slope basins (e.g., Lima and Pisco basins).

The area offshore Peru is largely underexplored despite hydrocarbon discoveries along the north coast containing the highest oil production basin in the country. Seismic data and geological/geophysical evaluations have identified several prospects and leads in the region, making offshore Peru a highly attractive frontier region.

"The reprocessed data is showing great uplift compared to the original legacy data. We are confident that the newly reprocessed seismic data will draw even greater interest for Peru's upcoming bid round," said Richie Miller, president of Spectrum's North America region.

Shell's Leopard-1 well scores Gabon deepwater gas discovery

Shell said it made a frontier exploration discovery offshore Gabon, West Africa. The well Leopard-1 encountered a substantial gas column with around 200 m net gas pay in a pre-salt reservoir, according to the company.

Leopard-1 is located around 145 km

off the Gabonese coast, west of Gambia. It was drilled in water 2,110 m deep to a total vertical depth of 5,063 m. Shell and partners are planning to undertake an appraisal program to further determine the resource volumes.

"Shell has been exploring in Gabon for over 50 years. This latest deep water discovery is a testament to the innovation of our explorers in pursuing new plays, and application of our global sub-surface expertise," said Andy Brown, Shell's

upstream international director.

"We are proud to be sharing this success with CNOOC Limited, our partner in the license."

Leopard-1 was drilled in license BCD10, operated by Shell (75%). Second partner in the venture is CNOOC Limited (25%).

This frontier discovery follows recent deep water exploration successes in the heartlands for Shell Exploration in the Gulf of Mexico and Malaysia.

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BP, GDF Suez discover North Sea oil field, tests at 5,350 bbl per day

Oil firms BP and GDF Suez have discovered a new field in the UK Central North Sea. The find, which spans adjacent blocks operated separately by the two companies, has been flow-tested at a maximum rate of 5,350 bbl per day.

The discovery has been called Marconi by GDF Suez subsidiary GDF Suez E&P UK, while BP has named it Vorlich. GDF Suez E&P UK managing director Ruud Zoon described the discovery as "encouraging."

"The discovery is our third successful well this year and demonstrates a continuing commitment by GDF Suez to an active exploration and appraisal drilling programme on the UK Continental Shelf," he said.

The well was drilled by GDF SUEZ E&P UK Ltd. as operator, with the Transocean Galaxy II jack-up rig under a joint well agreement between the two license groups.

Exploration well 30/1f-13AZ encountered hydrocarbons in a Palaeocene sandstone reservoir in block 30/1c (license P363 operated by BP) and a subsequent side-track into block 30/1f (license P1588 operated by GDF SUEZ E&P UK Ltd.) confirmed the westerly extension of the discovery.

GDF Suez has already built up more than 50 licenses in the Central and Southern North Sea and west of Shetland. BP, along with co-venturers, is undertaking a \$16 billion investment program in the North Sea. It has undertaken to spend more than \$11.2 billion of that sum in the next 5 years.

Equity interests in the P1588 license are operator GDF SUEZ E&P UK Ltd. (50%) and partners RWE DEA UK SNS

Limited (27.78%) and Maersk Oil North Sea Limited (22.22%). Equity interests in the P363 license are operator BP Operating Company Ltd (50%) and partner Total E&P UK Ltd (50%).

Eni makes major oil find offshore Congo, resource pegged at 1 Bboe

Italian energy company Eni said it made a significant oil discovery at a basin off the western coast of the Congolese republic. In the Minsala Marine shallow-water prospect, the company said it found about 1 Bboe, of which 80% exists as oil.

The prospects were enough to start preparations for commercial development of the well, the company said.

"These discoveries are located in conventional waters near existing infrastructure and can therefore be brought into production in very competitive time to market and cost," said Claudio Descalzi, Eni's chief executive officer.

Eni said it has already discovered about 4 Bbbl of oil in basins off the Congolese and Gabonese coasts since it started work there more than 4 years ago. Eni has been operating in Congo since the late 1960s, producing around 100,000 bbl of oil per day.

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A standard range of floats is available to suit most control umbilicals. Comprising symmetrical half shells Balmoral floats are designed to permit flexing within specified bend radii.

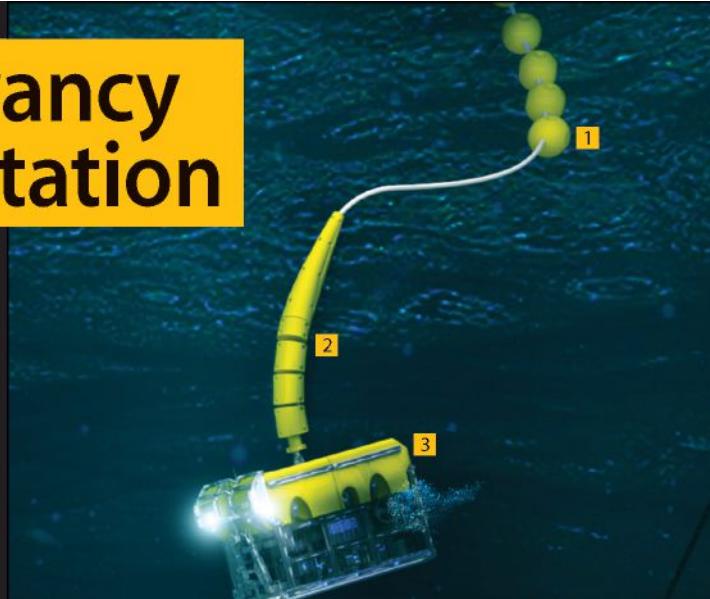
2 Flexlink™ articulated umbilical buoyancy

Designed to ensure umbilical lines remain out of the ROV work zone, Flexlink is installed onto lines of 25-75mm with uplifts of 6-12kg in operating depths to 6000msw.

3 ROV buoyancy

Offering a full in-house service Balmoral Offshore Engineering designs and creates intricate ROV/AUV buoyancy profiles with virtually no size limitation. Balmoral's unique composite and pure foam systems are designed to operate at depths of 1000-10,000msw.

The company's refurbished ROV plant incorporates an end-to-end process that includes temperature controlled curing facilities and a state-of-the-art buoyancy block boring and milling plant.



Central Gulf of Mexico Lease Sale 235 scheduled for 18 March 2015

The U.S. Interior Department's Bureau of Ocean Energy Management has issued a "notice of sale" for offshore drilling rights in the Central Gulf of Mexico. Sale 235 is scheduled for 18 March 2015, in New Orleans, Louisiana.

About 7,477 blocks spanning 43.5 million acres off the coasts of Louisiana, Mississippi and Alabama will be up for grabs in the sale, though the sealed bids oil companies give the government generally cover only a small sliver of that territory.

Some of the available blocks are located in more than 11,000 ft of water. And some of the territory that will be on the auction block is within a 3-mi buffer zone along the U.S.-Mexico boundary, with oil and gas development governed by a hydrocarbon treaty signed by both countries.

According to Interior Department estimates, the Central Gulf blocks that will be open for bidding could yield as much as 894 mmbbl of oil and 3.9 Tcf of natural gas. During the last Central Gulf of Mexico lease sale in March 2014, energy companies paid \$850.8 million in high bids for the rights to explore.

BOEM to prepare EIS for possible Cook Inlet oil and gas lease sale

The Bureau of Ocean Energy Management (BOEM) has announced that it will prepare an Environmental Impact Statement (EIS) in support of a potential oil and gas lease sale in Cook Inlet, off Alaska's southcentral coast.

The Notice of Intent to Prepare an EIS, which was published in the Federal Register on 23 October 2014, opened a public comment period extending through Monday, 8 December 2014. During this period, BOEM is holding public scoping meetings and is accepting comments through www.regulations.gov. The Notice also is available here.

The EIS analysis will focus on the potential effects of leasing, exploration, development and production of oil and natural gas in the proposed lease sale area, which BOEM identified in November 2013. That Area Identification reflected BOEM's approach of using scientific information and stakeholder feedback to proactively determine, in advance of the potential lease sale, which specific areas within a planning area offer the greatest resource potential and industry interest while reducing potential conflicts with environmental and subsistence considerations.

The area identified last year for the proposed Cook Inlet sale is closer to existing infrastructure, avoids nearly the entire area designated as critical habitat



for the beluga whale and the northern sea otter, completely avoids the critical habitat for the Stellar sea lion and the North Pacific right whale, and reduces effects

on national parks, preserves and wildlife refuges. It also excludes much of the subsistence-use area for the Native villages of Nanwalek and Port Graham that were identified during the last lease sale process in the area.

The Notice does not indicate a final decision to hold a lease sale has been made. Rather, information gathered via the scoping process will help BOEM prepare the EIS, which in turn will inform a final decision on whether to hold the sale, according to the agency.

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Ocean News & Technology

BMT to supply riser monitoring systems for pre-salt developments



BMT's riser integrity monitoring system.

BMT Scientific Marine Services (BMT), a subsidiary of BMT Group Ltd., was selected by Saipem to supply the riser integrity monitoring systems for the Lula Norte and Lula Extremo Sul developments in the Santos Basin pre-salt region, Brazil's largest sedimentary basin.

Riser integrity monitoring systems measure bending moments and tensile forces in risers in order to provide end users with an understanding of the risers' condition. Data from these systems are then used to verify riser design models, ultimately leading to long-term improvements in riser design.

The Lula Norte and Lula Extremo Sul projects will feature systems that incorporate BMT's ROV-serviceable subsea strain sensor assembly. This allows for continuous monitoring and data collection, preserving the absolute bending and tension measurement while a single sensor is removed and replaced.

BMT provides innovative integrated marine monitoring systems (IMMS) for a wide range of floating offshore oil facilities, including the associated subsea risers and mooring systems. It delivers custom-engineered products from design through procurement, assembly, installation and operational support service. In addition, BMT deploys temporary monitoring systems for performance assessment, acceptance trials and forensic investigations.

UK approves North Sea Ythan field development

EnQuest and partner Ithaca Energy have received approval from the UK government to develop the Ythan field in the UK northern North Sea. Ythan is adjacent to the producing Don Southwest field, and contained within the southern area of the Don North East license, which was awarded last March.

The partners plan a phased development involving an initial production well drilled from the Don SW field infrastructure. The semi-submersible Stena Spey is expected to start operations later this year, allowing first production to be achieved during the second quarter of 2015.

Ithaca said the well will target the same Brent reservoir sequence as in the Don SW field, in a location where an

appraisal well has previously been drilled and tested.

Elsewhere in this region, Ithaca is a partner in the Causeway Area development, where production has been shut in following the failure of an oil export pump on the TAQA-operated host North Cormorant platform. The repair could take several weeks to complete.

Yinka-led group takes FID on Aje field offshore Nigeria

A group led by Lagos-based independent Yinka Folawiyo Petroleum Co. Ltd. has taken a final investment decision (FID) to develop the \$220-million first phase of the Aje shallow-water oilfield offshore western Nigeria.

The aim for Stage 1 is to produce 10,000 bbl per day of oil from two target wells in the OML113 license area. A re-entry of Aje-4 will form the first producer, while drilling of Aje-5 is expected to be the second.

Plans include the use of Rubicon's Front Puffin FPSO, which produced oil from the Puffin field in the Timor Sea. The vessel will be brought up to specification soon, and procurement of subsea equipment and the contracting of a drilling rig are progressing. The field's Stage 1 is scheduled to be brought onstream at year-end 2015.

Yinka is operator with 25% interest in the field. Partners include Vitol, 24.05%; First Hydrocarbons Nigeria Ltd., 16.875%; Energy Equity Resources Ltd., 16.875%; Panoro Energy ASA, 12.19%; and Jacka Resources Ltd., 5%.

Hess group to pursue development of Stampede field

Hess Corp. said that together with its project co-owners it will proceed with the development of Stampede, an oil and gas project operated by Hess in the deepwater Gulf of Mexico. Discovered in 2005, the Stampede field is located approximately 115 mi south of Fourchon, Louisiana. It includes Green Canyon blocks 468, 511 and 512.

The field is located in about 3,500 ft of water, with a reservoir depth of 30,000 ft. The plan initially calls for six subsea production wells and four water injection wells from two subsea drill centers tied back to a tension leg platform, or TLP. A two-rig drilling program is planned with the first rig commencing operations in the fourth quarter of 2015. First production is expected in 2018.

Gross topsides processing capacity for the project is approximately 80,000 bbl of oil per day and 100,000 bbl of water injection capacity per day. Total estimated recoverable resources for Stampede are estimated in the range of 300 to 350 mmboe. The development is estimated to cost about \$6 billion.

Hess has a 25% working interest and is operator. Union Oil Co. of California, a Chevron subsidiary, Statoil, and Nexen Petroleum Offshore USA Inc. each has a 25% working interest.

"This investment decision confirms Chevron's commitment to strategically grow our business in the deepwater by adding long-term development opportunities that will deliver value to shareholders," said George Kirkland, Chevron's vice chairman and executive vice president, upstream.

"Moving forward on Stampede is another important milestone for Chevron in the deepwater Gulf of Mexico, where we have a solid queue of major capital projects coming onstream, including Tubular Bells and Jack-St. Malo," added Jay Johnson, Chevron's senior vice president, upstream.



PFLNG1 project reaches another milestone with topside module lift

Petronas has reached another milestone with its Petronas FLNG-1 (PFLNG1) project after successfully lifting the first topside module onto the hull at Daewoo Shipbuilding and Marine Engineering's (DSME's) shipyard in Okpo, South Korea.

The first topside module will house power generation and control function instruments and weighs 2,205 tons. There are 20 remaining modules weighing a total of 44,092 tons yet to be installed on the hull, and the lifting is scheduled to be completed in the first quarter of 2015.

The PFLNG1 vessel is 1,198 ft in length, 197 ft in width, and 108 ft in height. DSME and Technip are carrying out the EPC work for the vessel and topsides. PFLNG1 is on schedule to be the world's first floating LNG facility in operation and will be deployed on the Kanowit field, located 112 mi offshore Sarawak, Malaysia.

Petronas is the operator of the PFLNG1 project with a 60% share, partnered by Malaysia International Shipping Co. with 30% and Mustang Engineering with 10%.

Heerema to support Maersk Oil UK's Culzean project

Heerema Hartlepool has secured a contract to support Maersk Oil North Sea UK's Culzean development project. The contract requires Heerema to provide engineering, procurement and construction (EPC) of the project's well head platform (WHP) jacket.

Heerema will construct the WHP jacket and piles, as well as the well head access deck and access ways. The well head access deck and access ways will be fabricated in Hartlepool, while the WHP jacket is planned to be built in Vlissingen in the Netherlands.

Hercules Offshore is the provider of the newbuild jack-up rig for the Culzean development, which has the potential to meet around 5% of UK gas demand in 2020 and 2021.

Maersk Oil UK operates the project with a 49.99% interest, while JX Nippon and Britoil (BP) own 34.01% and 16% stakes, respectively.

Culzean is a ultra high-pressure-high-temperature (uHP/HT) field discovered in 2008 in Block 22/25 of the UK Central North Sea. The field is expected to have a peak production rate of 400 to 500 mmscf per day. The final investment decision on the project is expected to be announced in 2015, and the overall development cost of the field is estimated to be over \$4.8 billion.



Maersk's North Sea Culzean project.

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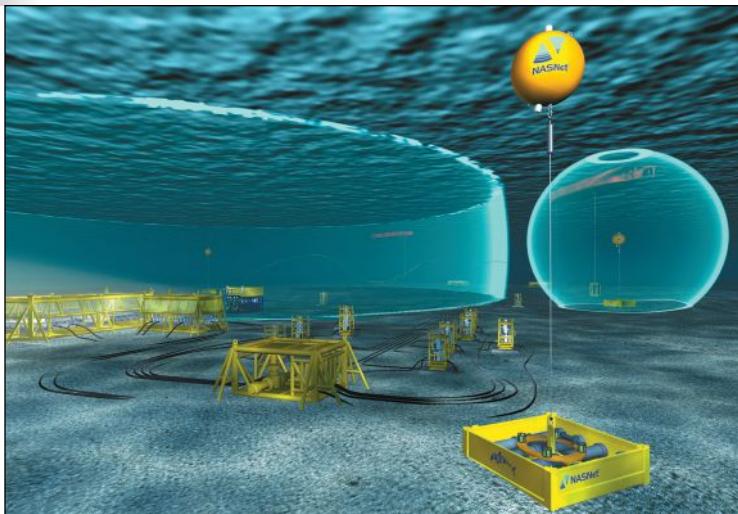


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Nautronix wins contract for NASNet positioning system

Scotland-headquartered Nautronix has secured a contract to deliver a NASNet® underwater positioning system for Subsea 7. The system will be used on the Aasta Hansteen field, which is being developed by Statoil in the northern part of the Norwegian Sea, about 300 km west of Bodø, at a water depth of 1,300 m.

Under the contract, Nautronix will deliver 16 large stations and four complete vessel systems, which will go on hire in March 2015 for about 200 days.

Nautronix said the system will be installed for the first time in Norwegian waters where the water depth is significant and weather conditions can be challenging.

NASNet combines Long Baseline and GPS concepts with the new generation of signalling technology. The system has a broadcast technique that will offer true multi-user, accurate and reliable positioning in all water depths without any acoustic interference.

"This is the first time NASNet has been in Norwegian waters and we are really excited about where this can take us," Nautronix chief executive Mark Patterson said. "We have been focusing a lot of our efforts to win a major contract for NASNet, and this award is part of our strategic development within the company."

The field is estimated to contain about 40 to 60 Bscm of gas and 5.6 mmbbl of condensate.

LQT builds subarctic accommodations for Sakhalin

LQT Industries, LLC. has built and commissioned a subarctic aluminum accommodations facility to be used by a global energy company on a drilling platform off the coast of Sakhalin Island, Russia. The facility consists of 10 aluminum modular units made up of living quarters, recreation rooms, and utility rooms to accommodate 96 personnel on a drilling platform.

The exterior stairs and walkways included with the facility are completely enclosed with aluminum barriers to protect the occupants from the harsh weather environments the subarctic region produces. The facility was designed and built to comply with Russian regulatory groups, including certifications from GOST (Russian State Union Standard) and IPEIG.

The construction of the facility was performed at LQT's facility in Abbeville, Louisiana, and then disassembled and transported by truck to the Port of Houston, Texas, where it was shipped to Sakhalin Island.

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Baker Hughes launches MultiNode all-electric intelligent well system

Baker Hughes has commercially released its MultiNode all-electric intelligent well system, allowing operators to remotely monitor and control a greater number of production zones in both cased and open-hole completions.

The system improves initial production rates and ultimate recovery by combating early water and gas breakthrough and actively balancing flow in production zones.

Primary components of the system include active flow control device (AFCD) downhole valves, tubing-enclosed



The MultiNode intelligent well system can be adjusted after the well goes on production so it remains effective as fluid properties and reservoir conditions change.

conductor (TEC) cable and a surface control unit. Up to 27 AFCD valves can be run downhole, connected by a single TEC cable and controlled from the surface.

The system can be adjusted after the well goes on production, unlike passive inflow-control devices, so the system can remain effective as fluid properties and reservoir conditions change. If water or gas breakthrough is detected in one part of the well, the AFCD in that zone can be choked back or closed completely to lock out water and gas via a single control line while the well is producing.

The surface controls can be accessed using a supervisory control and data acquisition interface to remotely monitor and control production zones from virtually anywhere and can continuously optimize production over a large number of zones without incurring unnecessary intervention costs.

For more information, visit <http://public.bakerhughes.com/multinode>.

Victaulic introduces Delta-Y assembly for offshore platforms

Victaulic, a manufacturer of mechanical pipe-joining systems, has introduced the Style DLY Delta-Y assembly, a combination of preassembled Victaulic cast grooved fittings, rigid couplings and butterfly valves. The Delta-Y assembly is designed specifically for bulk cement-barite systems on offshore oil platforms

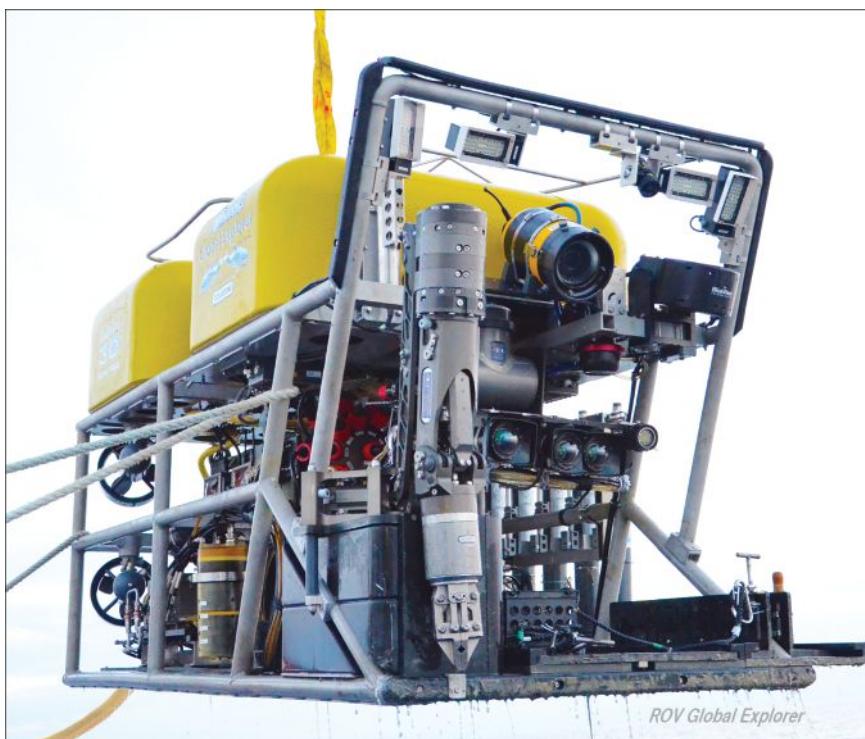
and is also ideal for drilling mud and other associated systems. The Delta-Y assembly offers quick and simple installation, space and weight savings, efficient operation and reduced maintenance downtime.

The Victaulic Delta-Y assembly speeds fitting and valve installation. Each preassembled unit is delivered complete with all fittings and valves oriented correctly as required by system design. The unit is joined to the piping system with

three Style 107 QuickVic® rigid couplings, easing installation.

The Delta-Y assembly can reduce maintenance downtime by up to 50%, as each coupling serves as a union for rapid valve and fitting replacement. The Victaulic Style DLY Delta-Y assembly is available in 5-in. and 6-in. pipe sizes (125 and 150 mm) and has a pressure rating of 300 psi (2,065 kPa).

For more information visit the company website at www.victaulic.com.



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Fugro supports Technip's largest North Sea project with Wavescan

Real-time metocean data transmitted by a Fugro SEAWATCH Wavescan buoy is enabling Technip to plan its operations more effectively for its largest UK North Sea contract to date. Located in the west of Shetland area, BP's Quad 204 project involves replacing the existing Schiehallion production facility with a new, purpose-built FPSO and installing extensive new subsea infrastructure.

"West of Shetland is known as a harsh offshore environment with big waves and strong currents—conditions that are far from ideal in a construction setting," Fugro commercial manager Jonathan Ainley said. "BP specifically required reliable real-time wave height, wind, and current data to manage its installation criteria thresholds. Access to these metocean data is also critical for vessel management and for safe and efficient operational planning."

The SEAWATCH Wavescan buoy, manufactured by Fugro in Norway, is 9.2 ft in diameter, with a counterweighted keel to prevent capsizing. It is large enough to cope with the harsh North Sea conditions. A 11.5-ft mast supports the buoy's meteorological sensors and anten-



Fugro's SEAWATCH Wavescan buoy.

nae, while a range of subsea sensors monitor oceanographic conditions.

During its 9-month deployment, sensors will collect oceanographic and meteorological data including air pressure, air temperature, current velocity/direction, and water temperature. Current profilers will be used in two locations—one just below the buoy and another further down the mooring—to build a current profile for the full water column depth. Wave data parameters to be measured include heave, surge, sway, direction, height, and wave period.

The buoy transmits the data by satellite to Fugro, where it is presented in real time on a website that uses a variety of user-friendly pages and options, including a graphic format to display current velocity-direction information for the full water column depth and tabular data.

Asset Guardian Solutions software is BP's choice for Quad 204 project

Asset Guardian Solutions Ltd. (AGSL) said its software management platform Asset Guardian was chosen by BP to manage the process control software used to operate Quad 204. Quad 204 is a field redevelopment project located West of Shetland in the UK.

The aim of the project is to construct a new floating, production, storage and offloading (FPSO) vessel to replace the existing Schiehallion FPSO. It will also feature a sizeable extension of the existing subsea system, with 15 new and replacement flow lines, and 21 new and replacement risers. Coupled with 14 new wells in addition to the 52 existing ones, it's considered to be a considerable undertaking, according to the company.

In addition to using the basic Asset Guardian toolset, BP will also benefit from AGSync, which was designed especially for use in the oil and gas industry. AGSync makes it possible for data and files to be synchronized between multiple locations. The AGSL project comprises three phases.

The FPSO and its subsea structures are to be installed in modules and be producing in late 2016.

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*-Jack Fisher,
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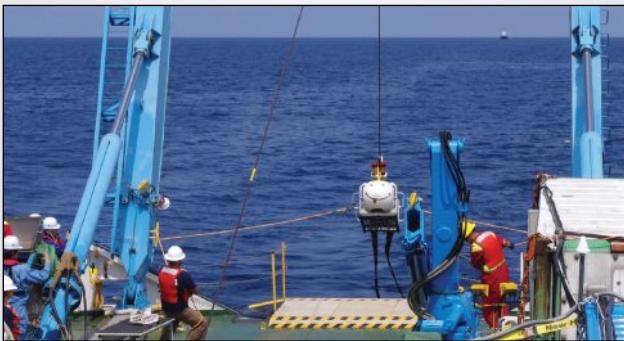
The NATO Centre for Maritime Research and Experimentation (CMRE), part of the NATO Science and Technology Organization, recently hosted maritime sea trials delivered in the context of the ICARUS (Integrated Components for Assisted Rescue and Unmanned Search operations) project, which is funded by the European Commission under the Seventh Framework Programme for Research and Innovation (FP7). ICARUS has been developing advanced robotic platforms which can support crisis intervention teams in detecting, locating and rescuing humans in danger, in maritime and land disaster scenarios, since 2012. Unmanned search and rescue (SAR) devices offer a valuable tool for saving human lives and for speeding up the SAR process. This is particularly crucial for maritime incidents, in which survival times are short and during which even SAR teams take considerable risks. For such events, Unmanned Surface Vehicles (USVs), capable of transporting SAR equipment and deploying first aid devices, can greatly improve the efficiency of operations. The integration of robotic platforms, including USVs and Unmanned Aerial Systems (UASs), was successfully tested and demonstrated at CMRE during the ICARUS 2014 sea trials. Existing technologies have been improved to strengthen resilience, and new developments include robotic vehicles that can deploy autonomous lifesaving capsules, using mission planning software, new sensors and new data acquisition capabilities to detect and track survivors. CMRE has world-leading expertise in maritime robotics and target recognition. In the framework of the ICARUS project, the Centre is collaborating with INESC (Laboratory of Microgrids and Electric Vehicles, Portugal) to enhance the autonomy of the robotic surface vehicles and is also involved in the integration of the main USV into the ICARUS Command, Control and Interface (C2I) station for collaborative operations with aerial robots.

FEMME 2015 multibeam users conference

The 32nd edition of Kongsberg Maritime's biennial Forum for Exchange of Mutual Multibeam Experiences (FEMME 2015) conference will be held in Singapore from 17-19 November 2015. All users of Kongsberg Maritime multibeam survey systems are invited to attend the event, which promises to be an essential gathering of world leaders in the survey industry. Kongsberg Maritime will offer a packed schedule of technical product and application papers, with the majority of presentation slots reserved for its multibeam user customers, so that they may share technical experience and insight with industry colleagues. Kongsberg Maritime is now accepting paper abstracts for consideration at FEMME 2015.

Ocean Floor Geophysics completes CSEM gas hydrate survey in Japan

Ocean Floor Geophysics Ltd. (OFG), in cooperation with Fukada Salvage and Marine Works Co. Ltd. (Fukada), has completed a high-resolution CSEM survey of near surface gas hydrates using the Scripps Institution of Oceanography Vulcan system for the National Institute of Advanced Industrial Science and Technology (AIST) in Japanese waters. The survey comprises over 500 line km of high-resolution data collected using the Fukada vessel Shin Nichi Maru. Water depths were from 400 to 1,100 m. A 3D inversion of the EM data for an area of interest has been completed. The contract for the 3D inversion of the data for the entire survey area has also been awarded to OFG and will be completed in November this year. Fukada Salvage and Marine Works acted as prime contractor.



UD researchers help locate lost heroes from World War II

University of Delaware, Mark Moline



Moline, director of the School of Marine Science and Policy at the University of Delaware and colleague Eric Terrill at Scripps Institution of Oceanography began working with the non-profit BentProp Project in 2013 to apply underwater robotics technologies in search of lost U.S. airmen.

Since 2010, Moline and Terrill have used sophisticated technology to study and model the complex flow of water around the coral reefs, lagoons and islands of Palau, funded by the U.S. Office of Naval Research (ONR). The researchers make annual field expeditions to examine currents, large-scale eddies and tides' impact on water movement. The hydrodynamic research also focuses on the impact of super-typhoons on beaches and coral reef environments.

During fieldwork, the researchers crossed paths with BentProp, a group of individuals dedicated to returning World War II servicemen missing in action back to the U.S. BentProp has spent the last 20 years conducting historical research, documenting firsthand accounts and launching annual land and water expeditions to search for missing aircraft.

As they compared projects, Moline and Terrill realized that the underwater robotics technology used for their scientific work could significantly improve BentProp's search efforts and established Project Recover, with support from ONR.

Using historical documentation to guide their search, the Scripps and UD teams began systematically scanning the ocean bottom in 2013, zeroing in on promising search areas.

The data collected provided scientifically valuable information and even captured footage of a Japanese Kawanishi airplane, one of only a handful produced.

Moline and his BentProp colleagues returned to the case files on particular airmen and incidents of missing aircraft, combing the documents in search of clues. Moline stumbled upon a document that named a small bay where BentProp had previously discovered the wing of a U.S. TBM Avenger nearby.

The group narrowed their search area and in March 2014, the AUVs found the remainder of the Avenger bomber, which had been missing in action for 70 years. A few days later, sonar images helped reveal the debris field of a second aircraft, an F6F Hellcat, in a second location.

The discoveries start the process of repatriating the MIAs through proper government channels. Information about the wrecks' locations has been shared with the U.S. military, which will review the cases and determine whether servicemen's remains can be returned to the U.S.

UNDERWATER INTERVENTION

"We don't disturb the wrecks at all," said Hunter Brown, who manages UD's fleet of a half-dozen underwater robots.

Brown and Megan Cimino, a UD oceanography graduate student, ran many of the AUV missions in Palau and scoured through hours of footage at the end of long days of fieldwork.

"You put so much time into doing these operations every day, and to actually find something...it was really rewarding," Cimino said.

The next search season begins in March 2015, and Moline is ready, armed with a high priority list and a sequence of 12 specific searches.

For more information, visit www.ceoe.udel.edu.

Maritime RobotX in Singapore

In a spirited collaboration of men (and women) and machines, autonomous Velodyne LiDAR-equipped boats from the Massachusetts Institute of Technology/Olin College and Embry-Riddle Aeronautical University finished first and fourth at the inaugural AUVSI Maritime RobotX Challenge in Singapore.

The competition, held 20-26 October at The Float in Singapore's Marina Bay, was jointly organized by the National University of Singapore Faculty of Engineering, Science Center Singapore, and the Association for Unmanned Vehicle Systems International Foundation (AUVSI).

Outfitted with Velodyne's HDL-32E 3D LiDAR sensor, the pilot-less M.I.T./Olin vessel from Team Athena-Nike crossed the finish line ahead of the 14 other teams participating in the event. Team Athena-Nike, a joint partnership between M.I.T. and Olin College, came in first place overall, second place in land-based judging, and first place in the best paper category. Team Minion from Embry-Riddle, finished fourth, after having captured first place overall at the 7th Annual International RoboBoat Competition held 13 July in Virginia Beach, Virginia.

Students from 15 universities representing five countries – Singapore,



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Australia, Japan, South Korea and the U.S.-participated in the competition. All teams were required to outfit an unmanned surface vehicle with sensors, computers, and software and guide the vehicle to complete a course based on various maritime missions. On the course, each team's vessel had to complete a set of tasks, including the avoidance and detection of obstacles, identifying and reporting on a specified target, and searching underwater for an acoustic source.

Global Explorer ROV completes 2014 with 100% vehicle uptime

Global Explorer, a 3,000 m-rated lightweight work class ROV, completed 2014 with 100% vehicle uptime on all projects. The vehicle performed numerous science surveys in the Northern Gulf of Mexico that included photo transects, archaeological investigation, instrument deployment/recovery, and sampling of sea life and sediment. Deep Sea Systems International attributes the reliability of the Global Explorer to its exceptionally trained crew combined with vehicle design that comes from over 20 years experience building and operating ROVs.



Global Explorer is presently in its Massachusetts facility undergoing periodic maintenance and upgrades to the system to be announced in coming weeks. The company is booking 2015 and 2016 with the ability to accommodate special projects worldwide aboard vessels as small as 95 ft.

For more information, visit www.deepseasystems.com.

SMD supply more systems to Bibby Offshore

Rapidly growing international company Bibby Offshore have taken delivery of two Quantum MkIII 250hp 3,000 m rated Work Class Remotely Operated Vehicles (ROV), increasing their ROV fleet to nine SMD vehicles - including one Atom and six Quasars. Each of the high specification Quantum Work Class ROV systems includes SMD's

Extended Tophat Tether Management System (TMS), telescopic A-Frame, umbilical winch, deck pack and fully integrated control cabin.

The Quantum Work Class ROV is the largest vehicle within SMD's Q-Series Work Class ROV range offering unparalleled in-water performance from its 350 kg payload, 1,400 kgf horizontal thrust capability, and 210LPM tooling supply. Utilizing the latest multi-platform SMD Curvetech™ components and state-of-the-art DVECS-S advanced dynamic positioning system, the Quantum is the ultimate subsea construction and survey ROV.

Both systems have been configured for installation onto the Bibby Offshore Olympic Ares subsea support and construction vessel. The ROVs are also configured to be interchangeable with the two Quasar vehicles initially mobilized on this vessel, in keeping with the vessel's multifunctional capabilities.

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

SeeByte automatic target recognition software now compatible with L-3 Klein Associates sonar

SeeByte, the global leader in creating smart software for unmanned maritime systems, has successfully demonstrated their Automatic Target Recognition (ATR) software using a L-3 Klein Associates sonar payload (L-3 Klein UUV 3500, dual frequency 455/900 kHz) on an Iver-3 vehicle.

This process involved the ATR software being tuned to the Klein sonar in order for the software to be able to identify contacts of interest in the sonar data. The tuning of the sonar was done using settings commonly applied in mine countermeasures (MCM) missions. Once the mission was completed, the data was imported into SeeTrack Military where the Mission Review Tool was used to mark and measure contacts. The geo-referencing engine was used to visualize all relevant data from that same location.

SeeByte's ATR software is available on SeeTrack Military, the leading technology used by Explosive Ordnance Disposal (EOD) and Clearance Divers to achieve success in managing their off-board assets during dangerous and demanding missions. SeeTrack Military is now being used by 20 navies around the world. SeeByte's ATR module has been developed to automatically highlight potential targets captured within the sensor data and present these to the operator. The ATR software can be tuned to recognize new targets, effec-



tively adapting to the challenges faced in MCM.

For more information, visit www.seebyte.com.

Seatrionics' Predator ROV verifies identity of lost treasure liner S.S. Connaught

Seatrionics' ROV, the Predator, has successfully verified the identity of lost treasure liner, the S.S. Connaught, off the northeast coast of the U.S. The Predator was deployed in a subsea mission organized and led by Endurance Exploration Group, Inc.

Seatrionics' Predator ROV was deployed by Endurance Group to verify the identity of the mid-19th century steamship, which carried a large cargo of gold coins, 100 mi from the shore. The S.S. Connaught, a 380-ft luxury liner carrying 592 people and 10,000 lbs of gold coins, suffered a fierce fire during a storm offshore Boston in 1860.

In the summer of 2013, Endurance Group, an exploration company specializing in using modern day subsea technology to salvage documented, valuable cargos from merchant ships, assembled an expedition team to locate and rescue the valuable gold cargo and to piece together the vessel's final moments.

The efforts to find the S.S. Connaught began with a 700-sq. mi sonar search and concluded with the deployment of Seatrionics' Predator ROV, which completed a mission in the deepwater verification project. The Predator ROV performed well at depth; overcame obstacles, including undersea currents; and was able to clearly identify the ship's iron hull, paddlewheels and artifacts within the debris field.

For more information, visit www.seatrionics-group.com.





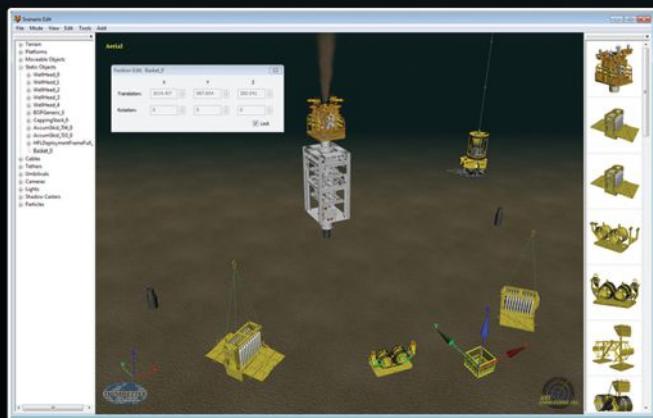
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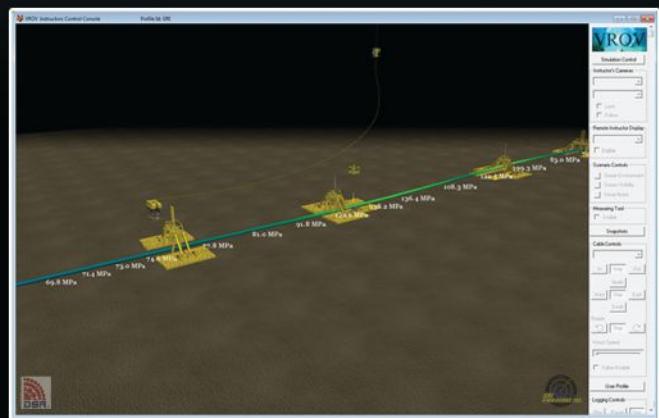
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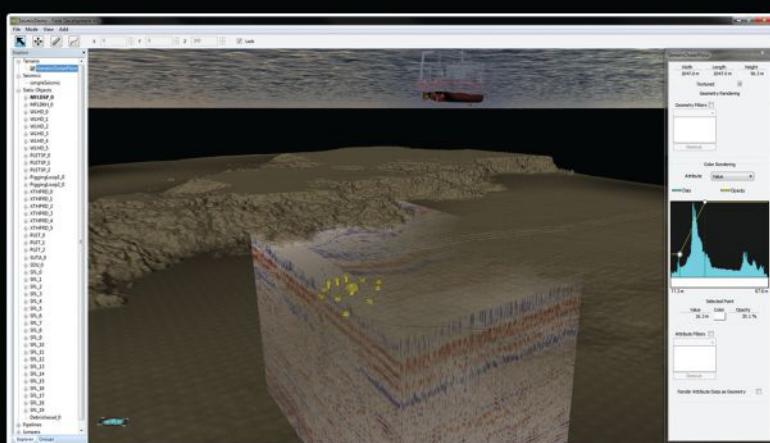


Field Construction and
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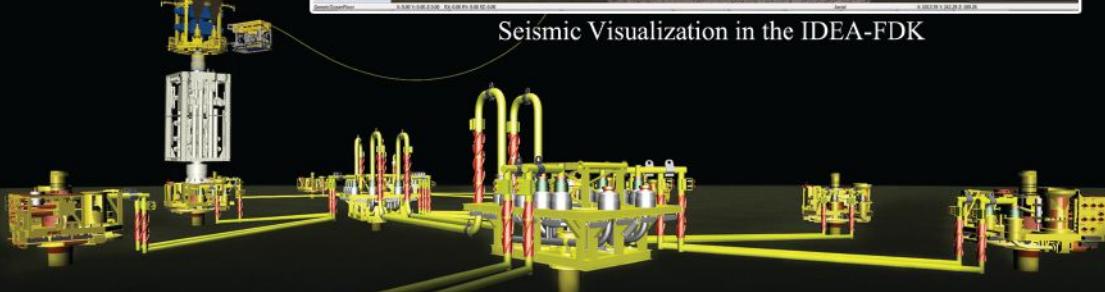


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The Seismic add-on for the IDEA-FDK offers integrated visualization of subsea equipment elements, topside vessel, bathymetry and subsurface seismic data. Enhanced integrated data visualization of bathymetry and subsurface yields improved insight into datasets.



Seismic Visualization in the IDEA-FDK



AutoNaut proves herself in Atlantic storm

A revolutionary British wave-propelled boat called AutoNaut® has arrived back in the Isles of Scilly after a 13-day autonomous mission in which she weathered a 70-mph Atlantic storm while gathering scientific data.

"This was a major test for AutoNaut," said director David Maclean of MOST (Autonomous Vessels) Ltd, which produces the AutoNaut. "To have delivered on time, on budget and to a very tight schedule; and for our USV to have gone straight out into the Atlantic and followed her program through a gale and a storm is a really solid achievement."

"We are delighted to have proved the robustness and reliability of the AutoNaut in these storm conditions in conjunction with the National Oceanography Centre (NOC) MASSMO project, which involved seven other autonomous vessels gathering scientific data."

Wave propulsion means AutoNaut can provide very long endurance. She is designed for autonomous data gathering using a wide range of off-the-shelf sensors for science, the military, and offshore gas & oil and renewables industries.

On this voyage AutoNaut 'Gordon,' built for the NOC, was towing a 25-m hydrophone array at a depth of 4 m, as well as carrying an AirMar weather station, a pyronometer to measure sunlight, two cameras for seabird and marine litter survey work, and a WetLabs Triplet Puck measuring chlorophyll and other aspects of sea water quality.

For more information, visit www.autonautusv.com.

Subsea Vision grows compact Cougar fleet

Aiming at the global FPSO market, Subsea Vision has added another Saab Seaeye Cougar XT Compact to its ROV fleet.

The compact concept is especially suited for working in strong currents and where the spread of equipment is small enough to need little deck space.

Chris Bryant, managing director of Subsea Vision, says the slim profile compact Cougar is ideal for working in constrained spaces around FPSOs and platforms and in high current areas.

He sees the exceptional inspection capability of the Cougar fleet, alongside Fendercare's diving operations, as "opening more doors around the world"



and the company taking on a more primary contractor role.

Despite its small size the Cougar XT Compact can be fitted with a wide range of equipment.

Designed especially for working in shallow waters and in tight situations, the low-profile Cougar XT Compact minimizes the effect of current with its reduced frame size, buoyancy and weight—and a thinner 17-mm tether cable that reduces the effect of drag.

The unrivalled power and maneuverability of the vehicle comes from its six thrusters: four vectored horizontal and two vertical, each with velocity feedback for precise control in all directions, and interfaced to a fast-acting control system and solid-state gyro for enhanced azimuth stability.

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



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ROPOS ROV completes successful installation of U.S. Regional-scale Nodes Cabled Observatory

The ROPOS ROV operated by the Canadian Scientific Submersible Facility (CSSF) has successfully completed the installation of the U.S. Regional Scale Nodes (RSN) Cabled Observatory, located off the coast of Washington and Oregon. The RSN is funded by the U.S. National Science Foundation as part of the Ocean Observatories Initiative. The cabled observatory will provide interactive real-time data from the seafloor and throughout the water column with state-of-the-art moorings that reach nearly 2,900 m above the seafloor. Data flowing from this system will dramatically increase students, researchers, and policy-makers discovery and understanding of oceanic behavior.



This year's 83-day deployment aboard the RV Thomas G. Thompson saw the installation and testing of secondary infrastructure including installation of over 30,000 lbs of equipment on the seafloor, 15,701 m of cable laid and tested by the ROPOS' Remotely Operated Cable Laying System (ROCLS), and ~140 diverse instruments (>98% of which are now sending data to shore).

For more information, visit www.ropos.com.

BMT and MSubs collaborate to deliver a Maritime UxV Sea Range

BMT Isis, a subsidiary of BMT Group Ltd (BMT) and a leading supplier of safety and environmental risk management across sectors, and Plymouth-based MSubs Ltd, a principal supplier of manned and unmanned underwater submersibles for both mili-

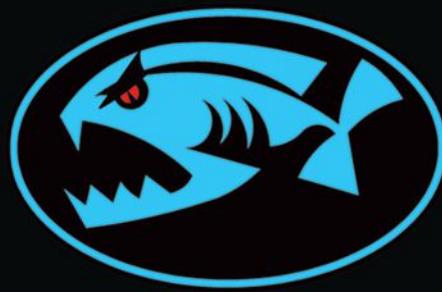
tary and commercial users, are collaborating to develop a fully instrumented Maritime Sea Range in which to test unmanned craft. A memorandum of understanding between the companies has been put in place while funding and permissions are secured.

The proposed maritime sea range will enable technology companies to test their vehicles and start to make important strides into delivering cooper-

ative behaviors to complement vehicles working in all domains be it air, surface or subsea

The range areas that have been identified are ideal due to the local environmental conditions including low shipping density and the proximity of the military bases at Devonport and surrounding areas.

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Airbus Defence and Space doubles VSAT satellite capacity over the Caribbean

Airbus Defence and Space has doubled its satellite capacity for users in the Caribbean, in time for the winter season as yachts are transiting back to the Caribbean from the summer season in the Mediterranean. Vessels sailing along the entire U.S. East Coast and the Caribbean will be able to reach speeds up to 6 Mbps using standard Pharostar VSAT. The additional bandwidth will benefit the hundreds of vessels, specifically leisure and yachting, operating in and transiting the Caribbean with Airbus Defence and Space VSAT onboard. With the recently launched AuroraGlobal portfolio, leisure owners are well prepared for future communications requirements with new HTS (high throughput satellite) satellites becoming available from next year. The enhanced satellite coverage over the Caribbean consists of multiple satellites beams. As Pharostar VSAT services dynamically switch the connection to the next available satellite, this maximizes the VSAT link availability when the vessel position changes or the VSAT antenna is blocked by external obstacles. Tore Morten Olsen, head of maritime satellite communications activities at Airbus Defence and Space, said, "More and more we see the demand for higher speeds for leisure vessels in Florida and the Caribbean, as almost every person is now coming onboard with their own personal devices wanting to stay in touch on Facebook and Skype, just as they do at home or in the office. With this step, we deliver a standardized, easy-to-install and use service, with the necessary high speed and voice quality to keep guests and the crew happy."

Marlink announces strategic partnership agreement with Palantir AS

Marlink and maritime IT specialist Palantir AS have signed a strategic partnership agreement that will improve access to sophisticated IT services in the maritime industry. Palantir's IT products complement Marlink parent company Airbus Defence and Space's extensive AuroraGlobal multi-band (Ka-, Ku-, C and L-band) connectivity portfolio and value added solutions, which enable shipping companies to optimise communications and operations. Through the agreement, Palantir, a leading supplier of managed maritime IT products and services will support Marlink in taking increased responsibility for its customers' IT systems on board. Marlink will provide customers with access to Palantir's portfolio of services. Palantir's KeepUp@Sea managed IT service monitors all hardware and software on board a vessel and across a fleet, allowing IT staff on shore to detect and address issues remotely. Combined with AuroraGlobal, Palantir's IT solutions enable shipowners and operators to significantly improve fleet efficiency while reducing maintenance costs through standardization and remote management. KeepUp@Sea gives fleet-wide control of IT network changes and upgrades from shore, ensuring more stability of PCs and equipment on board vessels.

MCN Beijing launches fisherman chat application

Fishermen on board Chinese coastal fishing vessels can now keep in constant contact with friends, family and colleagues thanks to a brand new application developed exclusively for Inmarsat's Fleet One service. Created by Beijing Marine Communication and Navigation Co. (MCN Beijing), Inmarsat's largest distribution partner in the People's Republic of China have launched a bespoke chat application for fishermen called Fish Chat. Fish Chat is the first Fleet One application for the Asian fishing market that has been tested and certified by Inmarsat. The application fits the particular communications requirements of crew on board Chinese coastal fishing vessels, providing texting and picture exchange capabilities, and push-to-talk voice services. The application is available for both Android and iOS devices, enabling fishermen to chat with their friends and family or colleagues using their own smartphones via WiFi. Fleet One has already been installed on fishing vessels globally since August; feedback from captains and crews continues to be very positive. Chinese fisherman can order Fleet One plus Fish Chat now via MCN Beijing and its local distribution partners in fishery ports.

MCP to transform mobile communication on Norwegian continental shelf



Maritime Communication Partner (MCP) has announced plans to rollout a LTE (4G) network on the Norwegian Continental Shelf (NCS). The move will create a high-speed, reliable and fully integrated communications environment, providing offshore workers and businesses with levels of connectivity comparable to those they enjoy on land.

MCP, an established leader in delivering mobile communication solutions at sea, already operates on the NCS with a GSM service, providing seamless phone and Internet access for offshore companies such as DeepOcean, Subsea7 and Gulf Offshore. The move to LTE, enabled by the firm's successful acquisition of the Norwegian Post and Telecommunications Authority's 800 Mhz license on August 18th, will greatly enhance speed and reach, connecting platforms, rigs and vessels on the NCS with advanced 4G services.

MCP will begin LTE rollout in 2015, giving it a portfolio of proprietary high-speed networks on 800 Mhz and 900 Mhz frequencies and consolidating its position as the only full-service mobile solutions provider covering the NCS. It is currently planning the installation of 4G base stations across the territory, facilitating high capacity networks close to installations and activity hubs, while reaching further afield with quality, real-time broadband services.

MCP has a 12-year history of delivering advanced mobile solutions to maritime customers, with a leading position in the cruise and ferry markets and a growing share of the emerging offshore segment. The firm's CellAtSea network offers unbeatable global coverage within the industry (with more than 330 international roaming agreements in place), connecting some 16 million users last year and supporting explosive growth in data traffic (up 105% year-on-year in 2013). This expertise, is key to providing customers with the services they want.

For more information, visit www.mcp.com.

KVH wins two NMEA product awards

KVH Industries, Inc., has been recognized for outstanding marine electronics products in two satellite antenna categories. KVH's TracPhone V3-IP received the National Marine Electronics Association's (NMEA) 2014 Product



Award in the satellite communications antenna category, and the TracVision TV1 received the NMEA 2014 Product Award in the satellite TV antenna category. This is the 17th consecutive year that KVH has achieved the NMEA distinction for its satellite communications or television systems and, in most years, as is the case this year, has been recognized for both. NMEA is an industry group made up of more than 600 companies, including manufacturers, dealers, and boat builders.

The 37-cm (14.5-in.) diameter TracPhone V3-IP is an extremely compact Ku-band VSAT antenna that operates on KVH's worldwide mini-VSAT Broadband(sm) network. KVH's network utilizes spread spectrum technology and it is this underlying technology that economically enables data connections up to 2 Mbps while utilizing the TracPhone V3-IP on boats as small as 30 ft. The compact size of the TracPhone V3-IP is a factor that customers cite in their choice of the system and is a contributing factor to the overall success of the TracPhone V-IP series and mini-VSAT Broadband service. According to a recent industry report by Euroconsult, the mini-VSAT Broadband service is the market-share leader in maritime VSAT.

The TracVision TV1, which was introduced earlier this year, is an ultra-compact marine satellite TV system ideal for smaller boats and coastal cruising. With a 32-cm (12.5-in.) antenna, the TV1 makes it possible for boaters to enjoy their favorite high-definition television programming while spending time on the water. The TV1 system includes an IP-enabled TV-Hub that enables easy setup and operation and makes it possible to access system information from a smartphone, tablet, or computer.

For more information, visit www.kvh.com.

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Speedcast selected by EMAS AMC for fleet of offshore construction vessels

SpeedCast International Limited has been awarded a multi-year contract from EMAS AMC, EMAS' subsea construction services division. The EMAS Group is a leading global contracting group providing offshore/subsea construction, marine, production and well intervention services, and is Singapore listed under the Ezra Holdings Limited's operating brand.

The new satellite service provides high-performance broadband connectivity for mission critical data and voice applications on EMAS AMC vessels and client platforms. SpeedCast will provide satellite network connectivity for a total of 12 of EMAS AMC's vessels, which perform a wide variety of missions including offshore pipe lay, installation and subsea construction.

EMAS AMC's vessels are built and outfitted to execute complex projects in any environment, anywhere in the world. SpeedCast designed the communications solution from the ground-up, leveraging both Ku-band and C-band frequencies, to meet the unique require-

ments of EMAS AMC, which include office and ship management applications, voice telephony, and crew communications. SpeedCast is technology and frequency agnostic and operates the largest suite of solutions, enabling it to develop such customized satellite communication solutions based on its customers' exact needs.

As a leading global offshore contractor, with a modern and versatile fleet of offshore support and construction vessels, and an extensive track record of offshore engineering solutions for the entire oilfield lifecycle, EMAS AMC understands communications are a critical component of their fleet's mission. SpeedCast's strong global network and support capabilities will support EMAS AMC's ability to execute a full spectrum of seabed-to-surface engineering, construction, marine and production services throughout the world.

The contract is for an initial 3-year period, with options to extend for an additional 2 years. The service has the option to be extended to additional vessels, as and when required.

For more information, visit www.speedcast.com.

SES enhances presence in Middle East

Global satellite operator SES has announced that it reaffirms its long-term commitment to the region through the opening of its Middle East office in Dubai, United Arab Emirates.

The Dubai office comprises an initial core team of highly skilled employees in the fields of engineering, sales and business development, who in turn are supported on an international level through SES's offices around the world.

SES began operating in the Middle East in 2001 and, since then, the company has grown its investment on the ground and in space, and has nine satellites serving the region's ever-increasing demand for connectivity.

In addition to a growing local presence, SES launched the inaugural SES Technical Academy in Dubai in 2014, a platform for knowledge transfer, bringing the latest industry developments from the U.S. and Europe to customers in the Middle East.

SES is a global satellite operator with a fleet of over 50 satellites covering 99% of the world's population. Together with its worldwide network of



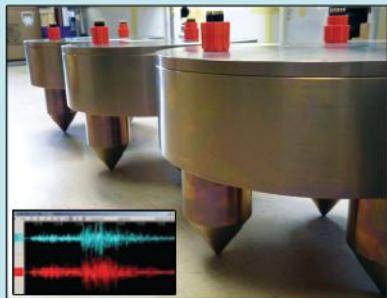
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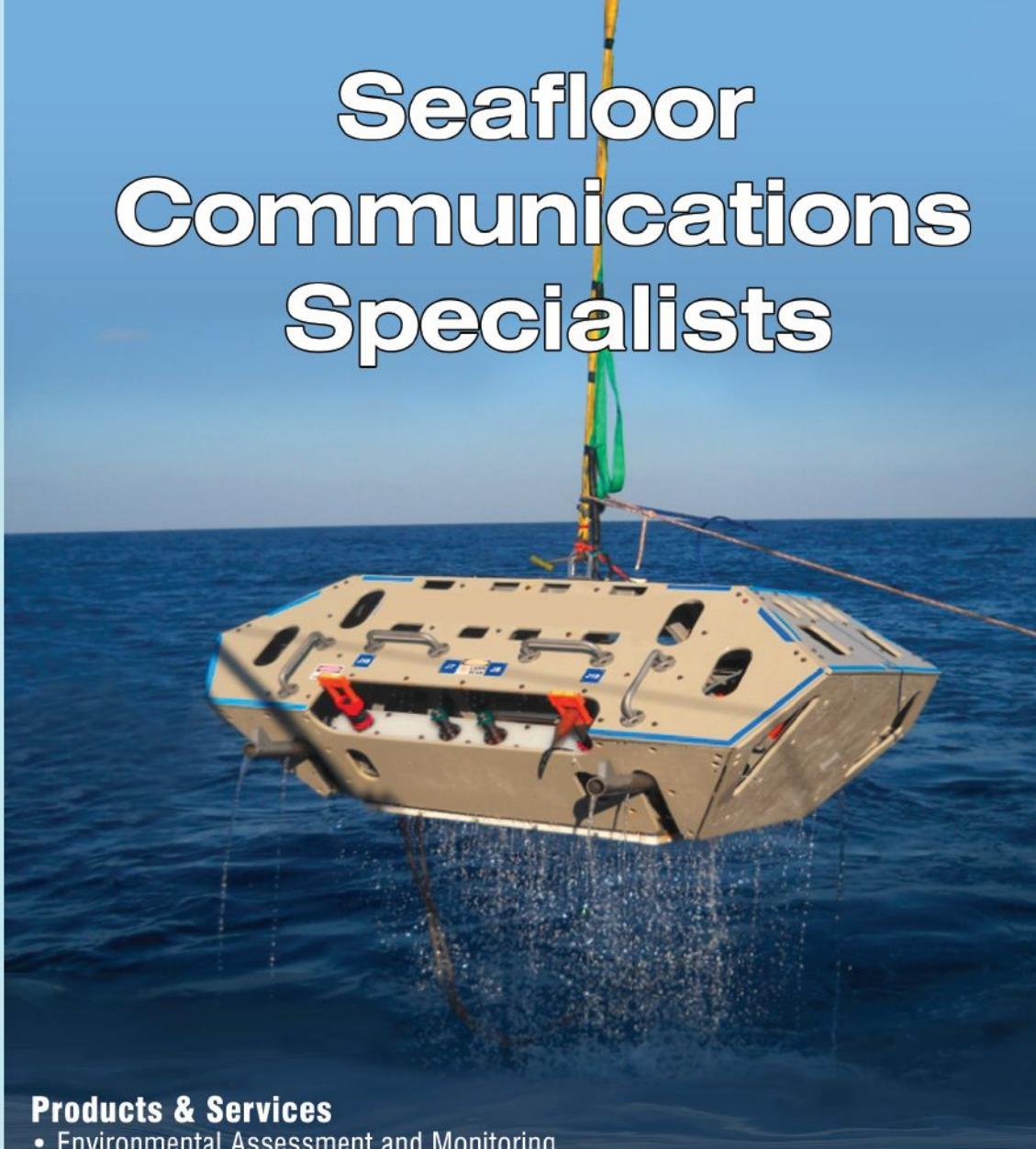


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Offshore Communications Backbone

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

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teleports, the operator provides satellite communication services to enable enterprises to deliver services such as point-of-sale transactions, maritime and aeronautical communications, mobile banking, mobile backhaul, e-learning and telemedicine. SES can also provide a portfolio of satellite-related services, which includes high-speed satellite broadband services and ground infrastructure services.

For more information, visit www.ses.com.

Intellian launches matching 1M communications package

At the recent Monaco Yacht Show 2014, Intellian launched the new t100W WorldView™ TVRO antenna system, which matches the popular v100 VSAT radome. With great TV coverage, programming and functionality, the t100W provides yacht owners with a proven antenna package all within a sleek dome design.

Ideal for larger yachts, luxury vessels and where symmetry and aesthetics are important on board, the new t100W is a 1.05 m t110W antenna within a v100 dome. It is a complementary system for the v100 3-Axis VSAT antenna, which provides unparalleled performance for current Ku-band services and can easily be adapted for Inmarsat's upcoming Global Xpress™ service.

The t100W 3-Axis antenna package features the Intellian WorldView LNB (Low Noise Block-Down Converter) and decoder for DVB-S2 digital TV reception, delivering a virtually limitless selection of free and pay standard definition and high definition programming all over the world.

The t100W is easy to install, operate and maintain. It contains minimal cables and accessories, has built-in GPS and an automatic Skew-Angle Control System. With future technology requirements for users in mind, the 19-in. rack mount control unit allows free system upgrades, when required.

All Intellian t Series Antenna Control Units (ACUs) come standard equipped with an Intellian LAN (Local Area Network) Port, which enables remote access over the air to the antenna's Web Interface for management and control. This means that when paired with the v100GX or any other Intellian satellite communications system, shore-based support staff can access the antenna at any time to ensure constant, reliable operation.

The new t100W is available from all of the company's logistics centers, located in Europe, North America, and Asia.

For more information, visit www.intelliantech.com.

MTN's TBN coverage triples by region and doubles in ships connected

After launching its Terrestrial Broadband Network (TBN) just more than 1 year ago, MTN Communications (MTN) announces the number of TBN-connected cruise ships has doubled and covered regions have tripled.

Since the MTN TBN kick-off in Alaska in the Summer 2013 cruise season, several MTN partners, including Norwegian Cruise Line and Princess Cruises, are leveraging this new technology to enrich their passenger and crew communications experience. Thanks in part to this new technology, the MTN hybrid network now delivers approximately 10 Terabytes of data daily. The company enabled more than 33 million Internet logins last year.

The MTN TBN optimizes the onboard bandwidth available to passengers and crew, especially when their ships enter port. TBN connectivity enables up to six times more bandwidth for communications and content sharing on the ship. Passengers and crew can now bring their daily online requirements to sea, including access to social media, infotainment, content and more.

For more information, visit www.mtnsat.com.

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FLEXIBILITY IN UNDERSEA NETWORKS

By: Edwin Muth, Director Product Line Management - TE SubCom, Bruce Nyman, Senior Director - TE SubCom, Janar Thoguluva, Product Line Manager - TE SubCom, Karen Knauf, Product Line Manager - TE SubCom

Submarine networks with multiple system endpoints utilize a trunk and branch architecture (Figure 1), with undersea branching nodes to route traffic to specific branches using optical add drop multiplexing (OADM) wavelength routing technology. Over the last decade, undersea OADM has proven to be a cost-effective method to share the capacity among several customers on a single fiber pair among multiple point-to-point connections in a trunk-and-branch undersea network.

In a fixed OADM system (in which the filters in the undersea network elements are not reconfigurable), the bandwidth allocated to each cable station is determined at the time the system is designed. In many cases, a consortium owning a submarine cable system includes multiple parties from a number of countries. As such, it is difficult to predict the capacity requirements of every cable station in a system over the typical 25-year system lifetime. Over time, the required capacity for any cable station in the system may change or new cable stations may be added to the system.

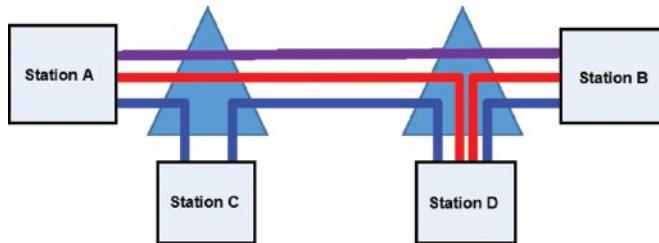


Figure 1. Typical subsea OADM network design.

Similarly, a single owner of a fiber pair on a multiple fiber pair system would find some value in addressing shifting capacity needs over the two or three decades of system life. These potential changes in the system utilization drive the desire to increase flexibility and re-configurability in the undersea plant by allowing new methods to reallocate capacity. Content provider networks and large cloud networks are examples that could benefit from this increased flexibility. The ability to control the allocation of the available bandwidth will become more desirable over time as bandwidth on demand services and Software Defined Networks are implemented by operators.

Finally, an important requirement of undersea networks is the ability to recover from cable cuts and protect traffic that is not expected to be directly affected by a cable cut (e.g., recover trunk traffic after a branch cut). The ability to flexibly reconfigure undersea networks greatly helps improve traffic continuity after a fault occurs. Below, we discuss some of the tools needed to achieve the flexibility described above.

The submarine network elements that enable flexibility are similar in function to those used today in terrestrial networks. Due to the very high reliability demands of submarine networks, not all of the technologies available in terrestrial networks can meet the stringent qualifications required for undersea use. Broadband splitters and fixed filters have been qualified for fixed OADM undersea networks since the mid-2000s. Active components for switching and reconfigurable OADMs have been qualified for undersea in more recent years. End-to-end agile undersea networks require both undersea and land-based agile network elements.

An evolution of the undersea branching network element is shown in Figure 2. Undersea branching network elements combining broadband optical switches with fixed filters allow operators to remotely select among a limited number of bands, thus adding great flexibility to their network. Undersea ROADM provide the

ultimate flexibility as arbitrary pass-through and band rejection are made possible in the optical band for the trunk and the branch, thus allowing more or less traffic on the branch as needed.

The flexibility in the undersea network elements must be matched with complementary capability shore side. Coherent 100 Gb/s transponders are already flexible as they can be tuned to different wavelengths and adapt automatically to different fiber path lengths by compensating dispersion electronically. Since undersea repeaters require the equivalent of full capacity across the available band, Initial Loading Equipment (ILE) (i.e., power added across the amplifier bandwidth to simulate traffic) based on Wavelength Selective Switch (WSS) technology is required to dynamically match the desired network configuration. Similarly, coastal ROADMs are tuned to allow the desired wavelengths to pass through to the submarine system. The Network Management System (NMS) controls all the network elements (land-based ROADM, undersea ROADM, WSS-based ILE, transponders, etc.) as capacity is reallocated to meet the operators' needs and ensure system performance under normal operation. The NMS also orchestrates fault recovery to protect the system traffic from trunk or branch cable cuts resulting, for example, from external aggression. The recovery action may consist of changes in optical loading tones, reconfiguration of undersea network elements, or both.

Cable cuts due to external aggression are one of the most common causes of faults. When an outage occurs, OADM technology can reroute or bypass optical paths to maintain system operation. In a submarine system, it may take many days for a repair, so it is important to maintain as much of the system capacity as possible during a fault.

In conclusion, there are a number of reasons to create a dynamic undersea network. Bandwidth on demand, data center capacity variations over time of day or long term, and economic growth being unequal in different countries all demand some level of network flexibility. Peak traffic events may require increased capacity in a given country or region for a limited period of time. Regardless of the reasons for the need for submarine network re-configurability, technologies exist to match the operations flexibility currently enjoyed by the terrestrial networks.

Because of the limited margins in submarine systems, however, special measures unique to submarine systems need to be taken to ensure continued performance in the reconfigured state. Additionally, cable faults caused by events such as ship dragging or earthquakes are more easily managed with a re-configurable network. The control mechanism and the network elements will work hand-in-hand to help maximize network utilization. In short, the technical solutions are available today to globally interconnect flexible terrestrial networks through an equally flexible submarine network and create a truly dynamic global network.



Figure 2. Evolution of the undersea OADM.

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Global Marine signs contract for Tampnet extension

Global Marine has been awarded a third contract to extend the Tampnet offshore fiber optic network with a new cable linking offshore platforms in the Southern North Sea. This latest signing follows Global Marine's successful installation of the previous phases of the North Sea project, using cable ship Innovator. The work is scheduled to take place in the spring of 2015. Tampnet is the provider of the largest offshore high capacity communication network in the world and has selected Global Marine to provide subsea engineering services that will further extend the system. The solution requires Global Marine to provide an end-to-end range of services encompassing all elements leading to installation, including marine survey & route engineering, marine permits, route clearance, pre-lay grapple runs, mattress installation over pipeline crossings, cable installation including plough burial, post-lay inspection and burial in addition to providing detailed post-installation information. Anders Tysdal, technical director of Tampnet, added, "We were very pleased with the quality of delivery of the earlier phases of the project by Global Marine; this project marks another key milestone in the development of our offshore network. Tampnet is very confident in Global Marine's subsea cable capabilities, as has been demonstrated by the good service provided to date and that has resulted in them being awarded this next key contract with us."

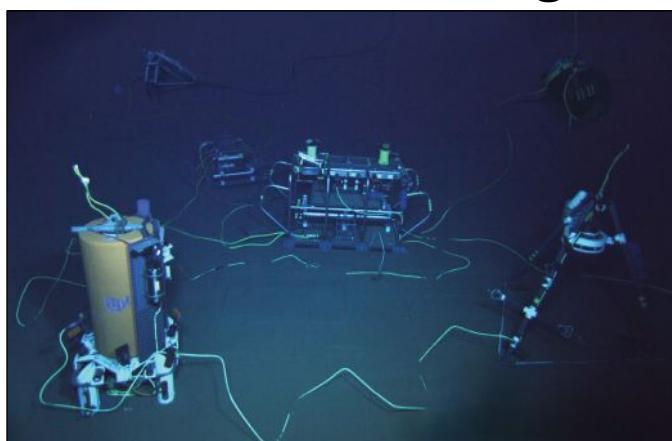
Environmental study begins for Canary Island cable

Red Eléctrica de España has begun environmental and geo-physical research in the Bocaina Strait, between the islands of Lanzarote and Fuerteventura, for a new submarine electricity interconnection between the towns of Playa Blanca and Corralejo. There is currently a 66-kV submarine cable between Lanzarote and Fuerteventura, which was put into service in 2005. It is 14.5 km in length and transports electricity in alternating current at a voltage of 66 kV. The strengthening of the interconnection with a new 132 kV link was approved by the Council of Ministers on 6 June and is essential for achieving a more stable and robust electricity system, moreover it promotes the sustainability of the electricity system that connects the islands. The aim of these environmental and geophysical survey works is to study a section of coastline that is approximately 90 sq. km in area, the equivalent of 9,000 football pitches, as well as the corresponding land areas up to the connecting substations, to detect areas of greater environmental quality and thus design a cable route that minimizes the effects on the terrestrial and marine environment. This new link will also favor the integration of renewable energy into the electricity system of the islands. Considering the remarkable richness in biodiversity that exists on both islands, among which noteworthy is the abundance of marine mammals, the planned geophysical research works are ambitious. Different types of seabed will be mapped; a high accuracy bathymetric mapping will be performed to determine the depths of the area; the currents, water quality and sediment will be studied along with the biological status of the existing flora and fauna communities, and a study of underwater acoustics will be performed to determine the possible effects on cetacean populations.

ABB to upgrade HVDC link between Germany and Denmark

ABB has won an order worth about \$16 million from Energinet.dk, the transmission system operator in Denmark and 50 Hz, the transmission system operator responsible for the eastern part of Germany, to upgrade the 600-MW Kontek high-voltage direct current (HVDC) transmission link. The order was booked in the third quarter. The project scope includes installation of ABB's state-of-the-art MACH control and protection system, remote operator work stations, training and spare parts. The link was originally delivered by ABB in 1995 and the modernization will help enhance the operational reliability of the link and reduce maintenance needs. The upgraded link is scheduled to go into full operation in 2016. ABB has built up significant experience in upgrading HVDC links around the world and is working on many such projects as several installations are coming of age. This is the 23rd major HVDC modernization project for ABB since 1990, including 17 control system upgrades. ABB's MACH system is the world's most extensively deployed control solution for HVDC and Flexible Alternating Current Transmission Systems (FACTS) installations, with over 1,100 such systems in operation throughout the world.

U.N. task force says new ocean telecom cables should be "green"



The global system of submarine telecommunications cables that supports our connected world is deaf, dumb and blind to the external ocean environment – and represents a major missed opportunity for tsunami warning and global climate monitoring, according to UH scientists and a United Nations task force.

"For an additional 5% to 10% of the total cost of any new cable system deployment, we could be saving lives from tsunamis and effectively monitoring global change," said UH Mānoa's Rhett Butler, director of the Hawai'i Institute of Geophysics and Planetology and chair of an international committee tasked to evaluate the cable opportunity.

Submarine telecommunication cables are the backbone of the Internet. More than half a million miles of this remarkable fiber-optic cable already criss-cross the deep ocean, linking more than 2.7 billion users and supporting global business, finance, social media, entertainment and political expression.

Now researchers are making a scientific and societal case for "greening" any new cables proposed to be built in the future. The new report, published in October 2014 by a joint task force of three UN agencies, parallels an engineering feasibility study and analyzes of strategy and legal challenges.

By adding a relatively straightforward set of instrumentation—accelerometers, high-resolution pressure gauges, and thermometers integrated into the cables' optical repeaters—the enhanced telecom cables could answer many basic science needs, as well as help monitor of the physical state-of-health of the cable system itself, researchers say.

For example, a cable-based worldwide network of seafloor sensors could enable the monitoring of the pressure of a tsunami as it passes over the seafloor, allowing the measurement in real-time of the actual tsunami generated to assess its potential coastal threat and corroborate the necessity of a warning.

Likewise, global earthquake monitoring is hamstrung by the fact that nearly all of the world's seismic stations are located on land. A smarter undersea cable system could significantly improve the resolution at which researchers can describe the earthquake process itself, including how, where and how much the earthquake moves over its fault surface, details that are fundamental to understanding its tsunami-generating potential.

On the climate side, readily available sensor technology could be deployed to improve our understanding of ocean circulation, sea level rise, and the exchange of heat through the ocean depths and with the atmosphere—essential elements for global monitoring. All this new data could be transmitted at a negligible data rate (<20 kb/s), when considered in the context of the telecommunication cable capacity.

For more information, visit www.hawaii.edu.

Installation of cable across Solent completed

The 132-kV subsea electrical cable installation under the Solent has now finished its final phase, connecting the new cable to the network in the Isle of Wight and Hampshire. The £13 million project to replace one of three subsea cables supplying the Isle of Wight with electricity was delivered by a joint venture between VolkerInfra and VMBS and was awarded by Southern Electric Power Distribution (SEPD).

The project saw the first subsea electrical installation under the Solent for 18 years. It will replace the third cable, which was the only cable not to be buried under the seabed and so was more susceptible to damage from anchors or marine debris. The first phase was completed in November 2013, where a 930-m horizontal directional drill was installed successfully from Thorness Bay on the Isle of Wight out into the seabed of the Solent. The second phase was completed this June, which saw the installation of a single length of bespoke cable between the coast of Hampshire and the Isle of Wight.

The final phase saw the connection of the new cable onto SEPD's 132-kV network at Thorness Bay on the Isle of Wight. To be able to connect the cable, the cable termination compound was refurbished, sea defenses were reinstated over the new cable at the foreshore and new groynes were installed on the beach on the mainland to enhance the existing sea defenses. Finally a thorough process of pre-commissioning testing were carried out on the new cable system before handing over the new circuit to the SEPD, ready for energization.

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

Norway grants licenses for NordLink, NSN

The Norwegian Ministry of Petroleum and Energy has granted Statnett licenses to construct interconnectors to Germany and the UK. These projects, known as NordLink and NSN, respectively, have thus taken an important step closer to realization.

The decision means that both projects have been licensed for facilitation of power exchange with Germany and the UK. In addition, NordLink has been granted planning approval for its work on the Norwegian side. NSN already has a planning approval.

"We will proceed with the planning of these projects. Negotiations are being conducted with suppliers, and

work is being done to clarify issues concerning regulations and remaining licenses on the German and UK sides," said Håkon Borgen.

NordLink is scheduled for completion within 2018. This interconnector will be developed and owned 50% by Statnett and 50% by a constellation consisting of the grid company TenneT and the German investment bank KfW. The subsea cable will have a capacity of 1,400 MW and will run between Kvilldal in Norway and Blyth in the UK.

Tonstad in Norway and Schleswig-Holstein in Germany.

NSN is scheduled for completion within 2020. This interconnector will be developed and owned 50% by Statnett and 50% by the British energy company National Grid. The subsea cable will have a capacity of 1,400 MW and will run between Kvilldal in Norway and Blyth in the UK.

For more information, visit www.regjeringen.no.

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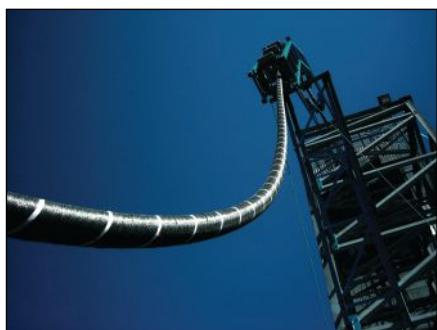
Ocean News & Technology

ABB to provide cable solution for German wind farm

ABB has won a significant order from the Dutch-German transmission grid operator TenneT to design, engineer, supply and install an Alternating Current (AC) power transmission cable system that will connect Butendiek, an offshore wind farm in the German North Sea, to the HVDC (high voltage direct current) converter platform SylWin alpha.

The cable will link the AC platform of the Butendiek offshore wind farm to the HVDC converter platform SylWin alpha. The Butendiek wind farm is situated around 30 km off the island of Sylt. The cable system to be supplied is a 3-core 155 kV AC submarine cable, approximately 38 km long. It is scheduled to be installed and commissioned in 2015. The high voltage cable originally destined for this project was lost in an incident in the Mediterranean Sea in July, and ABB was requested to step in and help to support the project schedule.

The cable system will have a capacity to transmit 144 MW of wind power—enough to meet the electricity needs of approximately 150,000 German households.



holds. The use of clean, renewable wind energy as an alternate source is equivalent to the abatement of almost 750,000 tons of carbon dioxide emissions per year that could have resulted from fossil-fueled generation.

ABB has successfully commissioned more than 10 AC cable projects around the world for offshore wind projects and others are under execution. Butendiek is the sixth offshore wind connection project in Germany awarded to ABB by TenneT. ABB is presently executing the Sandbank AC cable link, which also connects an offshore wind farm to the SylWin alpha HVDC converter platform.

For more information, visit www.abb.com.

NEC to supply South Atlantic Cable System

Angola Cables S.A. has signed a contract to build the world's first submarine cable system across the South Atlantic with NEC Corporation as the system supplier. The South Atlantic Cable System (SACS) will connect Angola and Brazil, directly linking the African continent to Latin America for the first time, to enable high speed and high capacity international data transmissions, spurring trade and economic growth.

In order to meet growing demand from broadband, mobile, broadcasting and enterprise traffic crossing the South Atlantic, SACS will feature the latest high quality 4-fiber-pair cable and optical transmission technologies with an initial design capacity of 40 Tbps (100 Gbps x 100 wavelengths x 4 fiber-pairs).

The cable system will land at Sangano cable landing station in Angola, near the capital city of Luanda, and in a data center in Fortaleza, Brazil, which will be built for the cable systems that are under construction by Angola Cables. The Operator recently announced the construction of another cable system, COTA (Cable Of The Americas) connecting Santos and

ENGINEERING OPPORTUNITIES

Ocean Power Technologies Inc., a pioneer in wave energy technology has immediate engineering opportunities available at its corporate headquarters, located in Pennington, New Jersey.

SR. SYSTEMS ENGINEER

The senior systems engineer will work on multi-disciplined systems engineering projects from concept to product completion focused on the hydrodynamics and controls of floating bodies. Will be responsible for developing product design specifications and performance requirements for complex controls and electro-mechanical systems deployed in ocean environments. Qualified candidates will have a BS (Masters preferred) in Electrical, Mechanical or Controls Engineering, along with 7-10 years of hands-on design engineering experience. Previous experience with hydrodynamic modeling and/or power systems, heavy electro-mechanical equipment and marine operations is preferred.

SR. MECHANICAL ENGINEER

The senior mechanical engineer will be responsible for completing detailed designs of large mechanical components, modules and systems which will be deployed in an ocean environment. Will ensure that products designed will achieve all performance and reliability requirements and are capable of being manufactured within budget. Will assist in developing product performance requirements, selecting materials, and conducting structural and corrosion analysis. Qualified candidates will have a BS (Masters preferred) in Mechanical or Structural Engineering, along with 5-10 years of hands on engineering design experience, preferably in a power or marine industry.

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Ocean Power Technologies offers an excellent compensation and benefits package, along with a casual working environment. Qualified candidates, looking for an exciting engineering career, in an emerging clean energy industry should submit their resume and salary history to Ocean Power Technologies Inc., 1590 Reed Road, Pennington, NJ 08534, Attention Human Resources – Engineering, or email this information to hr@oceancowertech.com.

Fortaleza in Brazil to Miami in the U.S. This way, Angola Cables will connect Angola and Africa directly to Brazil and the U.S. through SACS and COTA, adding to today's existing connectivity from Africa to Europe through the existing WACS (West Africa Cable System).

Construction of SACS is expected to begin before the end of the year. The system is targeted to be ready-for-service during the fourth quarter of 2016. The cable will enable Africa to take advantage of close cultural and business ties with Brazil. It will also improve onward connectivity to the financial markets in South and North America.

For more information, visit www.nec.com.

Alcatel-Lucent Submarine Networks acquires Optoplan

Alcatel-Lucent has announced that its subsidiary, Alcatel-Lucent Submarine Networks (ASN), signed a binding agreement with Sercel, part of the CGG Group, for the acquisition of Optoplan, a leading provider of 4D permanent reservoir monitoring solutions used in offshore oil and gas production. The closing of the transaction occurred in November.

4D Permanent Reservoir Monitoring (4D PRM) requires the permanent installation of seabed sensors to carry out frequent 4D seismic surveys of oil or gas reservoirs, collecting data that can be used by operators to monitor how oil, water and gas move in a reservoir over time. Once processed, the data helps produce detailed maps of underground geological structures, where wells should be drilled and how reservoirs can be drained to recover as much fuel as possible.

Optoplan, which is based in Trondheim, Norway, is the company behind Optowave, a leading, field-proven 4D PRM technology for such seismic surveys. In acquiring the company, ASN will combine this expertise with its own leadership in submarine cable systems, including its world-class manufacturing capabilities and marine installation fleet.

ASN and Optoplan's combined expertise will bring to the market a fully integrated 4D PRM solution, including design, manufacturing, assembly and marine installation, which will allow oil and gas companies to boost their oil recovery ratio, extend the life of their oil fields and improve the safety of their operations.

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

Huawei Marine begins manufacturing phase of Far East system

Huawei Marine Networks Co. Ltd. has commenced manufacturing the cable for the Far East submarine system and will also shortly start manufacturing other wet plant for this system. This is a direct result of the turnkey system design and development contract Huawei Marine and Rostelecom, Russia's national telecommunications operator, signed in June 2014. This multi-million dollar investment will enhance communications for the Far East region of Russia and provide high-capacity connectivity across the Sea of Okhotsk.

The innovative slimline repeatered system will be deployed in two segments, linking Okha in Sakhalin Island with Ola in Magadan and Ust-Bolsheretsk in Kamchatka, which currently relies on satellite infrastructure. The combined system length exceeds 1,900 km. Utilizing Huawei Marine's 100 Gbps technology, which features 2nd Soft-Decision Forward Error Correction (SD-FEC), each segment of the Far East Submarine Cable System will have an initial 2-fiber pairs lit, designed to have a capacity of 16 Tbps. The project is due for completion in the fourth quarter of 2015. At this point, traffic will be migrated from the existing satellite infrastructure to provide reliable low-latency connectivity to service the region's growing traffic demands.

For more information, visit www.huaweinetworks.com.

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Chunghwa joins NCP consortium

Chunghwa Telecom (CHT) has signed a landmark agreement together with leading Asia telecommunication carriers to build the New Cross Pacific (NCP) cable network, a multi-terabit submarine fiber optic cable system providing direct fiber connectivity to five countries across the pacific.

Participants in the NCP consortium include Chunghwa Telecom, KT Corporation, a US based company, and the major carriers from China, signed both the Construction and Maintenance Agreement along with the supply contract in Busan, Korea, on 21 October 2014 for the construction of NCP, which is to begin in November of 2014 and is scheduled to be completed in the second half of 2017.

The NCP system is estimated to cost several hundred million US dollars and measures a total length of about 14,000 km. It will directly connect Mainland China, Japan, South Korea, Taiwan and North America, using Dense Wavelength Division Multiplexing (DWDM) technologies and state-of-the art transmission systems, including Optical Add/Drop Multiplexer

(OADM), to provide a design capacity of up to 80 Tbps. This will allow the system to be future-proofed for more than 100 Gbps technology upgrades to meet dynamic traffic requirements.

To meet the exploding demand for Internet bandwidth in the region, Chunghwa Telecom has invested in submarine cable networks Asia-Pacific Gateway (APG) and Southeast Japan Cable (SJC) connecting intra-Asia area. Now CHT is investing in the NCP transpacific cable in order to establish and provide a strong global network infrastructure and innovative solution services.

For more information, visit www.cht.com.tw.

APTelecom “State of Subsea” Bangkok receives strong reviews

APTelecom completed the latest in its series of “State of Subsea” expert events at the world-renowned ToT Academy in Bangkok, Thailand.

The event was the third in the ‘State of Subsea’ expert event series that APTelecom, and marked the first time that a ‘State of Subsea’ event was hosted outside of the United States. Co-

hosted alongside exclusive ‘State of Subsea’ partners Pacific Telecommunications Council (PTC), Telecom Review North America, as well as SubTel Forum, ‘State of Subsea’ Bangkok drew hundreds of people from over 30 countries that attended either in-person or via streaming video at the official ‘State of Subsea’ website.

Similar to previous ‘State of Subsea’ events, the Bangkok event brought together an eclectic mix of executives, influencers, and leaders from all walks of the submarine cable and telecom industry to address the latest trends, and share expert insights and knowledge on the future of the industry. The event was emceed by Telecom Review North America Editor-in-Chief Jeff Seal, and was highlighted by special breakout panels with industry experts, moderated Q&A sessions, informational exchanges, roundtable discussions on emerging global economic market trends, and more.

For more information, visit www.aptelecom.com.

MainOne urges protection of submarine cables

MainOne has joined government agencies, maritime bodies and other stakeholders with responsibilities in seabed use to call for the protection of submarine cables and other critical IT infrastructure at the 2nd Cable Protection and Awareness workshop, which held at the Harbour Point, Victoria Island recently.

The workshop, which sought to promote awareness of the strategic, economic and social benefits of submarine cables, especially to all stakeholders involved in seabed use, reiterated the significance of cables as critical information infrastructures whose availability, reliability and resilience are essential to the functioning of a modern economy, security, and other essential social values systems. As convener of the annual workshop, MainOne hosted submarine cable companies, oil and gas companies, cable maintenance bodies and regulatory agencies tasked with maritime safety and protection, and environment responsibilities, such as the Nigerian Ports Authority, Nigerian Maritime Administration and Safety Agency, and the Nigerian Institute for Oceanography and Marine Research, among others.

For more information, visit www.mainone.net.



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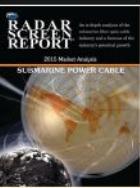


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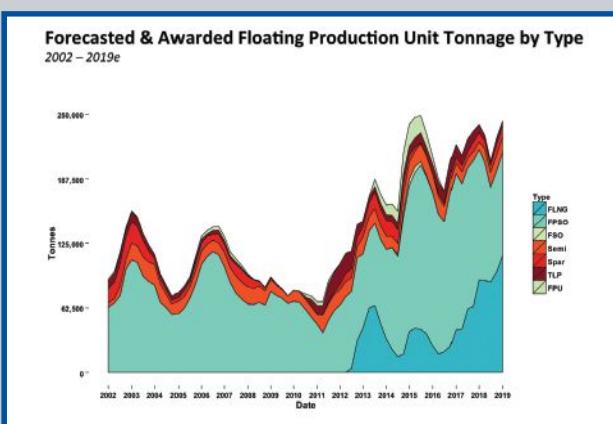
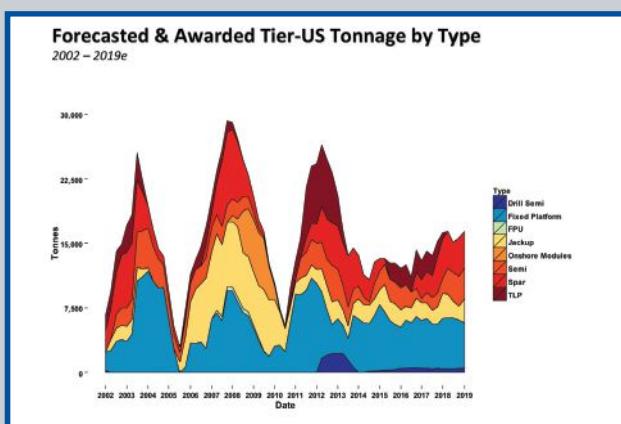
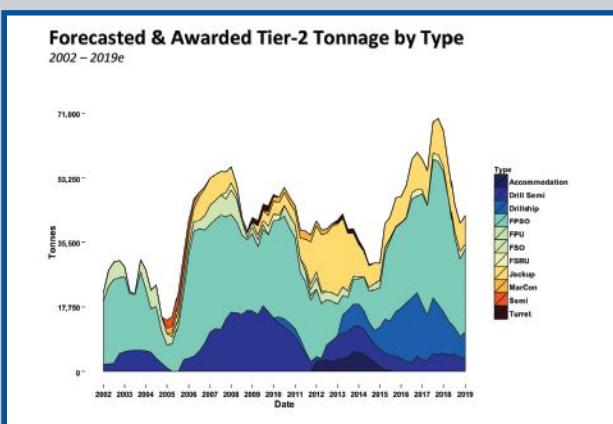
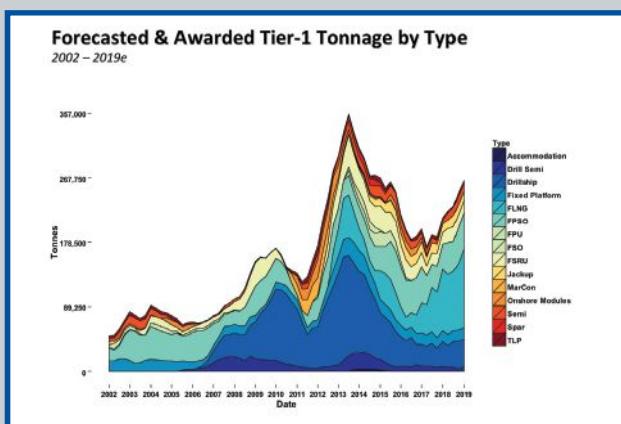
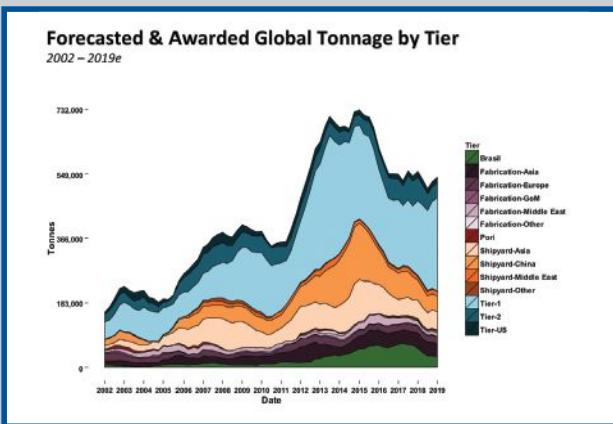
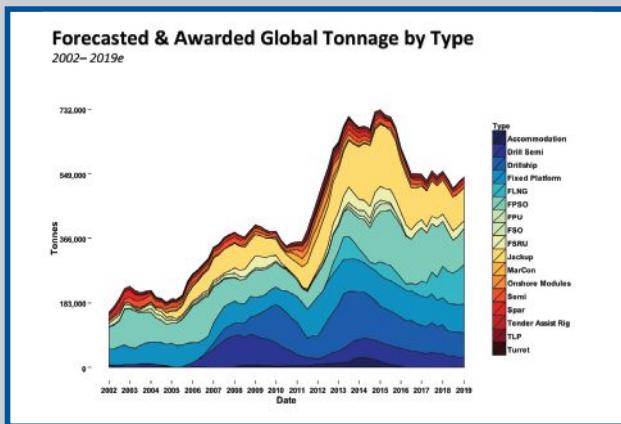
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Monthly Stock Figures & Composite Index

Industry Company Name	Symbol	Close(Mid) November	Close(Mid) October	Change	Change %	High	52 week	Low
Diversified, Production Support and Equipment Companies								
Baker Hughes, Inc.	BHI	66.25	52.34	13.91	26.6%	75.64	47.51	
Cameron Intl. Corp.	CAM	57.87	55.95	1.92	3.4%	74.89	54.13	
Drill-Quip, Inc.	DRQ	86.45	83.21	3.24	3.9%	116.53	78.41	
Halliburton Company	HAL	49.78	49.27	0.51	1.0%	74.33	47.60	
Tenaris SA	TS	36.37	39.17	-2.80	-7.1%	48.45	36.03	
Newpark Resources, Inc.	NR	11.95	10.41	1.54	14.8%	13.60	10.04	
Schlumberger Ltd.	SLB	96.34	87.56	8.78	10.0%	118.76	84.91	
Superior Energy Services, Inc.	SPN	24.01	23.13	0.88	3.8%	37.05	22.33	
Weatherford International, Inc.	WFT	16.38	15.61	0.77	4.9%	24.88	13.07	
Deep Down, Inc.	DPDW	1.05	1.00	0.05	5.0%	2.25	0.92	
FMC Technologies	FTI	54.60	56.12	(1.52)	-2.7%	63.92	47.58	
Total Diversified, Production, Support and Equipment.....	501.05	473.77	27.28	5.8%	650.30	442.53		
Geophysical / Reservoir Management								
Dawson Geophysical Company	DWSN	15.89	18.08	-2.19	-12.1%	34.90	15.53	
Mitcham Industries, Inc.	MIND	9.50	11.12	-1.62	-14.6%	17.82	9.28	
Compagnie Gnrale de Gophysique-Veritas	CGV	8.52	7.86	0.66	4.50%	21.49	5.50	
Total Geophysical / Reservoir Management.....	33.91	37.06	-3.15	-8.5%	74.21	30.31		
Offshore Drilling Companies								
Atwood Oceanics, Inc.	ATW	36.50	38.30	-1.80	-4.7%	57.95	34.23	
Diamond Offshore Drilling, Inc.	DO	36.35	37.70	-1.35	-3.6%	61.67	32.71	
ENSCO International, Inc.	ESV	39.08	37.66	1.42	3.8%	62.08	35.96	
Nabors Industries, Inc.	NBR	16.55	16.54	0.01	0.1%	30.24	15.32	
Noble Drilling Corp.	NE	20.67	18.33	2.34	12.8%	34.83	17.93	
Parker Drilling Company	PKD	3.98	4.11	-0.13	-3.2%	8.67	3.80	
Rowan Companies, Inc.	RDC	23.76	21.71	2.05	9.4%	37.41	21.19	
Transocean Offshore, Inc.	RIG	26.00	28.79	-2.79	-9.7%	55.13	25.49	
Total Offshore Drilling.....	202.89	203.14	-0.25	-0.1%	347.98	186.63		
Offshore Contractors, Services, and Support Companies								
Helix Energy Solutions Group, Inc.	HLX	26.91	21.78	5.13	23.6%	28.00	19.44	
Gulf Island Fabrication	GIFI	22.23	17.57	4.66	26.5%	26.52	16.43	
McDermott International, Inc.	MDR	4.23	3.75	0.48	12.8%	9.36	3.60	
Oceaneering International	OII	68.82	60.8	8.02	13.2%	84.44	58.54	
Subsea 7 SA	SUBCY.PK	11.74	11.86	-0.12	-1.0%	21.10	10.36	
Technip ADS	TKPPY.PK	18.92	18.11	0.81	4.5%	28.75	17.30	
Tetra Technologies, Inc.	TTI	8.14	9.21	-1.07	-11.6%	13.43	7.53	
Cal Dive International, Inc.	DVR	0.06	0.33	-0.27	-81.8%	2.05	0.05	
Total Offshore Contractors, Service, and Support.....	161.05	143.41	17.64	12.3%	213.65	133.25		
Offshore Transportation and Boat Companies								
Seacor Holdings, Inc.	CKH	74.90	75.43	-0.53	-0.7%	98.55	73.14	
Gulfmark Offshore, Inc.	GLF	29.61	29.74	-0.13	-0.4%	52.03	27.05	
Bristow Group	BRS	70.20	66.87	3.33	5.0%	84.37	64.10	
PHI, Inc.	PHII	40.70	39.78	0.92	2.3%	52.98	33.50	
Tidewater, Inc.	TDW	37.52	35.93	1.59	4.4%	62.01	33.43	
Trico Marine Services, Inc.	TRMAQ.PK	13.50	13.42	0.08	0.6%	10.39	13.73	
Hornbeck Offshore	HOS	30.63	25.88	4.75	18.4%	53.51	24.93	
Total Offshore Transportation and Boat	297.06	287.05	10.01	3.5%	413.84	269.88		

December 2014

Ocean News & Technology

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Monthly Stock Figures & Composite Index

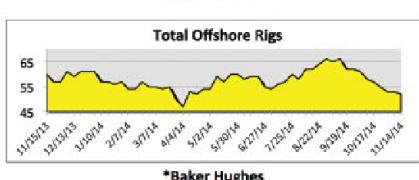
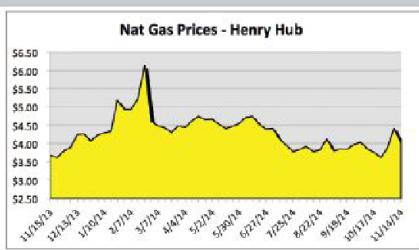
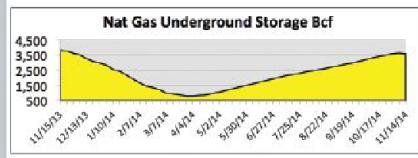
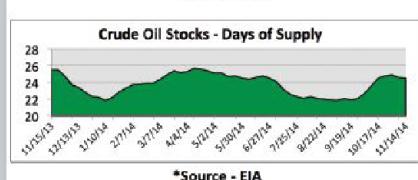
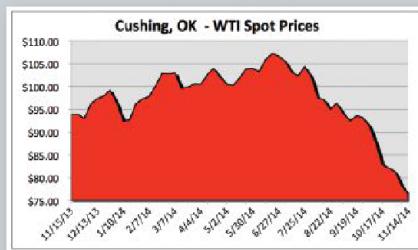
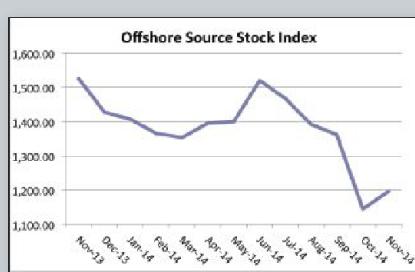
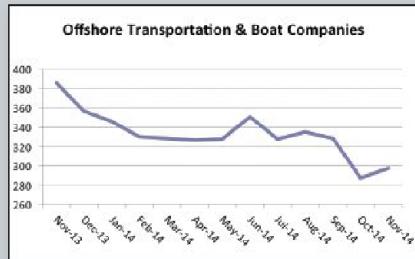
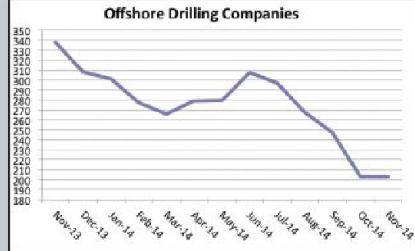
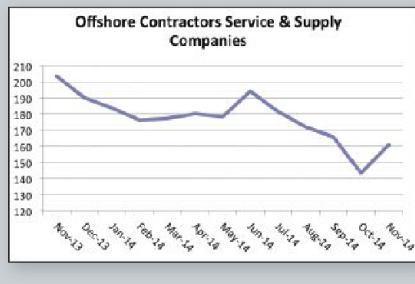
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Diversified, Production Support & Equipment Companies							
	Total Diversified, Production, Support and Equipment	501.05	473.77	27.28	5.8%	650.30	442.53
Geophysical & Reservoir Management Companies							
	Total Geophysical / Reservoir Management	33.91	37.06	-3.15	-8.5%	74.21	30.31
Offshore Contractors Service & Supply Companies							
	Total Offshore Drilling	202.89	203.14	-0.25	-0.1%	347.98	186.63
Offshore Transportation & Boat Companies							
	Total Offshore Contractors, Service and Support	161.05	143.41	17.64	12.3%	213.65	133.25
Offshore Source Stock Index							
	Total Offshore Transportation and Boat	297.06	287.05	10.01	3.5%	413.84	269.88
	Total Offshore Source Index	1,195.96	1,144.43	51.53	4.5%	1,699.98	1,062.60

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



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

EvoLogics modems provide acoustic link for a real-time tsunami monitoring system in Japan

In 2014, tsunami waves, originating off the coast of Chile, were successfully detected near Japan, where EvoLogics modems enabled acoustic communication between JAMSTEC's Vector Tsunameter on the seafloor and the autonomous Wave Glider vehicle on the ocean surface, transmitting real-time data to the shore over satellite.

Japan Agency for MarineEarth Science Technology (JAMSTEC) has developed and successfully tested the new ocean bottom Tsunameter (The Vector TsunaMeter VTM), which estimates the tsunami propagation vector based on the ocean dynamo effects.

As a step towards building a VTM network for real-time observation, a trial monitoring station was deployed about 200 km east of the Oshika peninsula, Japan ($38^{\circ}14.0\text{ N}$, $143^{\circ}35.13\text{ E}$) in 2013-2014. The Vector Tsunameter was deployed on the seafloor 3,420 m deep. Data, collected by the VTM, were transmitted acoustically to surfacecruising Wave Glider and then over satellite transferred to the shore.

The application required fast and reliable data transfers between the VTM and the Wave Glider to transmit critical information in real time. The long-term deployment of the instruments demanded low power-consuming solutions. Moreover, reducing drag was important for the Wave Glider vehicle on the ocean surface.

Fulfilling these requirements, EvoLogics S2C R12/24 underwater acoustic modems were integrated on both the VTM and the Wave Glider. During the long-term deployment of the system in 2013-2014, the modems provided bi-directional communication between the VTM and the Wave

Glider/shore control station. In normal operation mode, 1,457 bytes were transmitted to the Wave Glider every 1 hour, containing 60 sets of 1 minute-long measurement data samples from the VTM. In Tsunamimode, the downside modem was transmitting 161 bytes every minute with six sets of 10 second-long measurement data samples.

On the early morning of 3 April, the system successfully caught the tsunami waves propagating towards the Japanese coasts after an 8.0 magnitude earthquake hit 83 km northwest of Iquique, Chile.

For more information, visit www.evologics.de.



Fugro offers high resolution subsea laser scanning

Fugro, the world's largest integrator of geotechnical, survey, subsea and geoscience services, has expanded its services for the offshore oil and gas sector with the addition of high-resolution subsea laser scanning. This specialist technology can be applied to a wide range of subsea services including metrology, field mapping, structure mapping, change detection and integrity management.

Fugro's Marine Construction Survey group based in Houston, Texas recently used subsea laser scanning in a number of successful projects in the Gulf of Mexico, including metrology and asset mapping. These projects delivered datasets that are un-matched by existing subsea technology. With subsea laser scanning, clients have an opportunity to gather high-resolution 3D point clouds of subsea assets that are used to obtain accurate point-to-point measurements and create highly detailed models to use in 3D GIS environments for asset management and operational simulations.

For more information, visit www.fugro.com.

Valeport launches the smallest and most accurate SVP

Production is now underway on Valeport's latest innovation - the new UV-SVP - a small and compact direct reading package aimed primarily at AUV and ROV users, which delivers high-accuracy data to complement survey work.

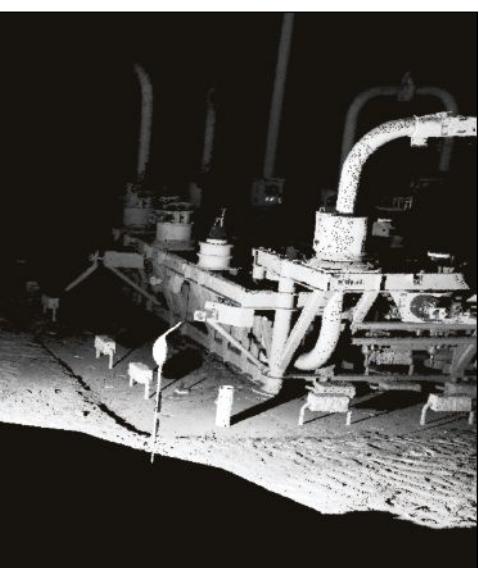


Valeport's UV-SVP (Underwater Vehicle – Sound Velocity Profiler) is based on the company's miniSVS and offers a form factor designed for underwater vehicles where space is at a premium.

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

Developed in response to a specific customer requirement, the UV-SVP has already been adopted by Bluefin Robotics for integration into the Bluefin 9 AUV.

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



PRODUCT NEWS

Engineered Syntactic Systems designs mission critical buoyancy solutions for Bluefin Robotics

Engineered Syntactic Systems (ESS), a global supplier of syntactic solutions, is trusted to equip Bluefin Robotics' state-of-the-art subsea vehicles. ESS provides Bluefin Robotics with syntactic buoyancy systems for their family of AUVs, including the 4,500 m Artemis 21 used in the ongoing search for missing Malaysian Airline's Flight 370.



The Bluefin 21 was designed for extended remote operations in the hostile conditions of the deep sea. At just 21 in. in diameter, space for uplift (buoyancy) is limited, but critical. ESS worked closely with Bluefin to engineer a buoyancy solution that would meet their design specifications, providing a syntactic material with the lowest density available for that depth, thereby the most lift.

The unique capabilities of ESS' high-performance syntactics allow manned and unmanned vehicles like the Bluefin 21 AUV to operate for long periods of time at the deepest ocean depths. ESS syntactic materials deliver high hydrostatic strength and the best buoyancy-to-depth ratio available today.

For more information, visit www.esyntactic.com.

New compact high-resolution monochrome camera

Kongsberg Maritime, a leading developer of underwater imaging products, has launched an all new high-resolution monochrome CCD camera. The OE15-100D camera is smaller yet has a deeper rated housing and wider Angle of View (AOV) in water than any of its predecessors, while maintaining Kongsberg's exceptionally high standard of build and image quality.

With near SIT (Silicon Intensifier Target) performance in low light level conditions, an exceptionally wide AOV (102° in water) and a water corrected optical arrangement that minimizes distortions and aberrations, the OE15-100D is ideally suited to mid-water navigation tasks, general observation and situational awareness as well as tether monitoring applications.



Moisture in your housing
have you in a fog?



Marine air is full of moisture when it's sealed inside your housing. Cold temperatures at depth can condense that moisture on your electronics, cameras, or other payload.

The Deck Purge Box from Global Ocean Design is lightweight, with a universal power supply, and easily replaceable/rechargeable cartridges. It's ready to go when you land in a foreign port. Use the Deck Purge Box with optional self-sealing purge ports on spheres or cylinders, including Vitrovex®. Optional adapters work with Edgetech® releases and other common housings with purge ports.

GLOBALOCEANDESIGN.com • Global Ocean Design LLC, San Diego, CA USA

December 2014

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The OE15-100D camera is available in both CCIR (PAL - 625 line, 50 Hz) and EIA RS170A (NTSC - 525 line, 60 Hz) output formats. The highly advanced internal electronic assembly is protected from the harshest of environments by a titanium alloy housing, depth rated to 4,500 m.

The OE15-100D camera measures only 86 mm in diameter at the widest point and 211 mm in length (excluding connector). The compact dimensions combined with a weight of just 1.3 kg in water make it suitable for use on all classes of remotely operated vehicles. The camera will accept a wideband input voltage range between 16 and 30 VDC, with a maximum current draw of 220 mA.

The OE15-100D further enhances Kongsberg Maritime's market leading range of low light monochrome cameras by improving on an already hugely successful platform.

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

Deep Trekker proves instrumental in remote fish farm installation

AgriMarine Technologies Inc. (ATI) is completing the installation of its proprietary tank technology for fish farming in a remote lake on the Sunshine Coast of British Columbia. The four semi-closed containment, 3,000-cu. m tanks are designed to float in water bodies and manage the rearing environment for thousands of fish. The installation of these massive structures is challenging from logistical and operational perspectives. The Deep Trekker DTG2 ROV has been used to alleviate many of the difficulties of quickly and reliably performing underwater inspections.

Sending in divers to monitor the systems would be extremely costly and also difficult for divers in many of the situations with tight areas and obstacles. ATI required a solution that could be

easily deployed anywhere from the docks and easy enough to pilot so that anyone in the crew could quickly take a look at something underwater without delaying the project. The Deep Trekker DTG2 ROV was the obvious choice for ATI as a robust and maneuverable ROV that was an affordable solution. The DTG2 ROV could easily be transported to any of the tank docks and deployed within seconds.

ATI has now implemented inspections with the Deep Trekker DTG2 ROV both inside the new rearing tanks as well as around their surrounding lake environment. Within the tanks, ATI can easily monitor the fish without human contact to ensure that they are schooling and feeding properly, as well as determine that the drains are working as modeled for the new technology. In the lake environment, the Deep Trekker is used to check the anchoring system and in infrastructure inspections.

For more information, visit www.deptrekker.com.

Outland Technology introduces LED laser light

Outland Technology announced a new underwater LED laser, model UWL-810. With uses ranging from ROVs, dive cameras, fixed installations and more, the UWL-810 gives the operator the opportunity to scale its subject on a 2D screen using underwater video.



"We saw a need in the market for a simple scaling laser," remarked Outland president Buddy Mayfield. "The UWL-810 boasts a sleek, nimble design and is unique in that it is a single, self-contained unit. Our competitors sell two lasers and a precision mount to do the same job, which can be costly and unwieldy."

The UWL-810 runs on any power source from 5-30 Volts, AC or DC. It features a 50,000 hour life and an LED spread of 100 mm. Just 1 in. dia. x 6.8 in. long, this unit has a depth rating of 800 m with an optional 2,000 m available. Materials include anodized aluminum and acrylic.

For more information, visit www.outlandtech.com.

New HPX-1 portable computed radiographic system

Kodex, Inc. announces its new HPX-1 Pro portable computed radiographic system that, with its choice of battery powered x-ray sources of 150 kVp or 270 kVp, provides near-instant high-



resolution digital x-ray images up to six in. in width and any length in seconds.

Designed for rugged field and ship-board conditions, the HPX-1 Pro and x-ray source weigh only 35 lbs and are battery operated for hundreds of images on a single charge. Ideal for cable splice and weld inspection applications. A notebook computer is included with a wide range of image processing software routines, including DICOND storage to ASTM requirements. All images are automatically time/date stamped and stored for analysis or remote site transmission.

For more information, visit www.kodexray.com.

SGB 2000 gyrocompass certified for IMO vessel carriage

The SGB 2000 gyrocompass manufactured by Teledyne TSS has been certified by Det Norske Veritas as meeting the standard required for use aboard IMO (International Maritime Organisation) registered ships. This means that ship owners can now use a compass from one of the most respected brand names in bridge equipment and benefit from the latest gyro technology and advances in design. The certification confirms that the SGB 2000 meets all of the performance standards required by the IMO and enables flag states to authorize its use on any ship required to carry one.

The SGB 2000 is a high performance, solid state gyrocompass that meets the needs of customers requiring a cost-effective source of primary heading data. It incorporates maintenance free ring laser gyros and accelerometers that have an MTBF in excess of 300,000 hrs. With no moving parts and no requirement for regular maintenance, the SGB 2000 offers the owners of every type of ship a real cost saving alternative to mechanical gyrocompasses. By using high grade inertial sensing elements with their exceptionally high MTBF, the designers of the SGB2000 have created a rugged, high performance gyrocompass that sets new standards for the industry.

The extremely accurate and stable headings are provided by the gyro, which has a dynamic accuracy <0.25°



COMPANY SPOTLIGHT

GRI SIMULATIONS INC. WWW.GRISIM.COM



GRI Simulations Inc. (GRI) is a software development company focused on real-time simulation, modeling, and visualization for critical marine activities. In 1997, GRI began development of an Remotely Operated Vehicle (ROV) Pilot Training simulator and, in 1999, released the VROV (Virtual ROV) System: Pilot Training. Due to its innovation in interactive tether collision and dynamics, the system became the leading technology in its field. A few years later, the release of VROV Mission Planning and Rehearsal was another watershed in simulation with the introduction of complex manipulator interaction to complement the unrivaled tether dynamics. Over time, VROV was integrated with the leading ROV systems and subsystems, while advanced capabilities such as multiple-ROV missions, cable cutting, complex rigging, and installation missions kept VROV on the leading edge. GRI's commitment to optimization and continuous improvement has enabled it to build the most advanced, realistic, and functional simulator system to make true high-fidelity mission planning and rehearsal not only possible but efficient.

Research and development at GRI has followed two general paths: advanced development of the simulation capabilities, including our proprietary dynamics engine, and the addition and integration of other high-fidelity applications to both the real-time simulation capabilities and offline project design, planning, and analysis.

Making a Splash

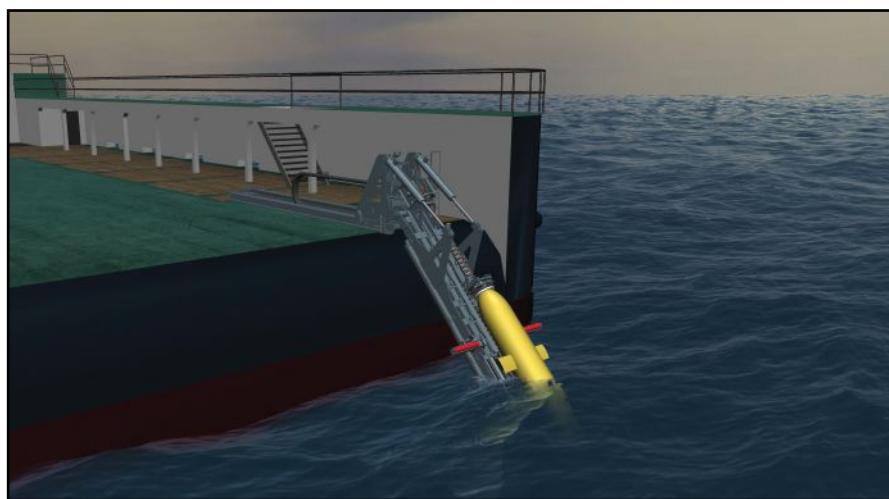
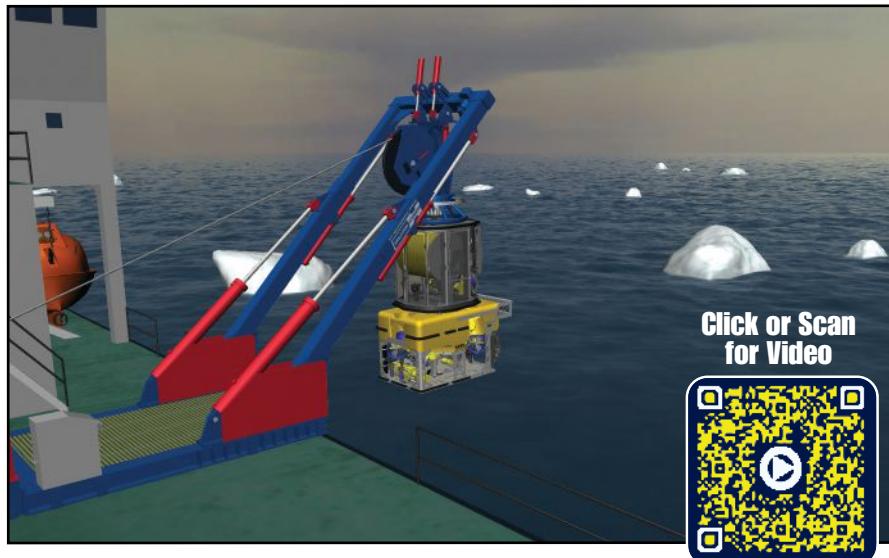
Recent R&D projects with customers and partners indicated the immediate need for high-fidelity hydrodynamics in the upper water column or splash zone. The project involved two ROVs with hull crawling capability and a range of specialty equipment that had to operate effectively in the high dynamic zone near the surface under variable conditions.

The success of this project demonstrated the potential for serious simulation of Autonomous Underwater Vehicle (AUV) and ROV Launch and Recovery Systems (LARS) for design testing and operations training. This culminated in the commercial release of stand-alone Hawboldt Industries LARS simulation systems at the Launch and Recovery 2014 conference in Linthicum, MD on 19-20 November 2014; and GRI's LARS and ROV simulators integrated with Ships Bridge and DP simulators from Transas Marine at The Workboat Show in New Orleans 3-5 December 2014. If you didn't make it by to say hello, check our Twitter feed and website news links to take a look.

In an earlier spotlight, GRI made an appeal for technologies and projects to integrate and demonstrate with the enhanced VROV dynamics and Interactive Design and Engineering Analysis Field Development Kit (IDEA FDK). This was received very well and resulted in many successful collaborations over the past year. There were numerous Electronic System Integration Test (ESIT) projects whereby the equipment and procedures of engineering solutions were demonstrated and verified using the high-fidelity VROV simulation platform.

Well control and Sim-Ops content, as well as seismic data visualization, highlight the new advances in the global commercial release of the IDEA FDK in Q1 2015. The IDEA FDK is also being used to support career development of new subsea engineers and those studying subsea engineering at the university level.

GRI is building on its previous success in Brazil with the help of Underwater ROV Training (andre@underwater-rovtraining.com.br). Starting in 2015, they will demonstrate and support a range of GRI products and services for the oil and gas sector. Other innovative enterprises and agencies are encouraged to consider VROV and the IDEA FDK as a way to further develop their maritime or subsea technologies. For more information, visit www.grisim.com.



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Two massive, 20,000-pound buoys made of a special material in meteorological and oceanographic equipment have been able to make predictions of the power-producing potential of winds well below off U.S. shores. The bright-yellow buoys, each worth \$1.3 million, are being deployed by the National Renewable Energy Laboratory in Washington state's Puget Sound. More>>

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PRODUCT NEWS

RMS secant latitude that can be maintained during turns of up to 200° per sec. With a fast settling time and low power consumption, the SGB 2000 is suitable for use on fast survey craft operating in rough, confined waters or for integration within the bridge of the largest ocean-going vessels.

Integration is aided by the SGB 2000's flexible interface that allows easy connectivity to existing ships' systems. Teledyne TSS also produces a comprehensive range of repeaters designed to complement the SGB 2000. The gyro is also available in a subsea housing that enables the unit to be used in a variety of configurations at depths down to 3,000 m from where it can support a wide range of subsea activities.

For more information, visit www.teledyne-tss.com.

Pulse motion and strain monitoring system validates new riser design

Pulse, an Acteon company, has designed, manufactured and installed a powerful motion and strain monitoring system to verify the design of the first lazy-wave steel riser system to be installed in the Gulf of Mexico.

The monitoring program at Anadarko's Constitution spar in the Green Canyon area of the Gulf of Mexico started in 2012 and has enabled validation of the riser design against analytical models and verified riser system integrity during a hurricane event. Pulse was selected because of its understanding of the technical challenges and ability to meet a very tight deadline: the entire monitoring system was designed, manufactured and delivered in less than six weeks.

The system relies on Pulse's proprietary INTEGRITM sensors, which are located in clusters in the two most critical locations of the riser: the hang-off and touchdown zones. INTEGRIPod motion sensors record three-axis acceleration and two-plane angular rate. Data are recorded locally and downloaded for post-processing after sensor retrieval. INTEGRISTick stand-alone strain sensors measure the change in riser curvature in two planes.

For more information, visit www.pulse-monitoring.com.

MacArtney introduces TrustLink

Inspired by an ongoing increase in demand for its subsea connector products and advanced connectivity solutions, MacArtney has opted to formally unify its vast spectrum of offerings and competencies within this area under the wings of the new 'TrustLink' connectivity brand. Common to all TrustLink solutions is the combination of rugged design, advanced technology, reliable performance and effectiveness.

With a legacy spanning decades of connectivity solution development, testing and operational deployment under some of the harshest conditions our planet has to offer, the MacArtney TrustLink range of critical subsea connectivity solutions is set to provide and sustain a dependable link between and interface for vital offshore and subsea applications and systems.

At the heart of the TrustLink range is a broad selection of subsea dry-mate connectors designed and tested for prolonged deployment at depths up to 4,000 m. With pin counts spanning 4 to 24 electric contacts, TrustLink connectors offer excellent flexibility to operators of subsea systems.

On top of the TrustLink connector range, MacArtney supplies a complete series of API connectors designed and tested in compliance with American Petroleum Industry (API) standards 16D and 17E for deployment in critical and strictly regulated environments. Today, TrustLink API connectors are



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widely used for interfacing subsea systems such as flexible riser umbilicals and acoustic releases for blowout preventer (BOP) systems from leading manufacturers across the world.

As an industry unique feature and testimony to the level of dependability and quality sought, full API standard compliance (design and testing) of all TrustLink API connectors is third party (DNV) certified. Standard TrustLink API connector versions include 4, 12 and 24 electric pin configurations as well as a fiber optic connector solution.

For more information, visit www.macartney.com.

Sonardyne acoustic releases chosen for Scandinavian water monitoring studies

Luode Consulting, a Finnish-based environmental monitoring company, has chosen acoustic release transponders supplied by Sonardyne International Ltd. to support its water and ice quality research in Scandinavia. Using its Sonardyne Lightweight Release Transponders (LRTs) to deploy and recover specialist recording instruments, Luode Consulting has now completed over 350 studies across the region, including under-ice profiling and water cooling monitoring close to nuclear power stations, without a single failure or instrument loss.

During winter, sea ice plays a crucial environmental and economic role for many Scandinavian countries, affecting everything from fishing, walking and skiing to the ice roads that connect remote communities. Continuous year-round water quality monitoring ensures that the impact from offshore and nuclear energy industry activities upon ice formation, together with naturally occurring phenomena, can be closely observed.

To collect data for its research, Luode Consulting uses instruments such as Acoustic Doppler Current Profilers (ADCPs) moored on the seabed using Sonardyne LRTs. At the end of the study period, the instruments and their valuable data are recovered by transmit-



ting an acoustic signal from the surface to the LRT to activate its release mechanism, thereby allowing all the equipment to float back up to the surface.

Many of the deployments carried out by Luode Consulting last weeks or months, however the LRT's long battery life provides its researchers with the option to deploy instruments for several years if required to do so. In one example for a long-term environmental monitoring study in the Baltic Sea, LRTs were deployed at over 30 locations along the route of a new pipeline, some close to where pipelay barges and support vessels were operating and some during the ice cover season.

For more information, visit www.sonardyne.com.

Chesapeake Technology, Inc. releases 3D PDF export feature

Chesapeake Technology, Inc. (CTI) is pleased to announce a new capability for its flagship product SonarWiz that allows users to easily share 3D views of their datasets with clients and the public.

The new 3D PDF exporting feature enables users to harness the capabilities of the PDF standard to help visualize the extents of their dataset. No longer will simple screenshots suffice when a client can zoom in, out and navigate through an interesting sonar feature simply by interacting with a PDF—and without needing a software key. Subbottom, side-scan, and bathymetry data can all be visualized in the 3D PDF. This feature is available on SonarWiz past version 05.06.0064. An in-depth tutorial about the new feature is available through Chesapeake Technology's website.

For more information, visit www.chesapeaketech.com.

Cygnus DIVE underwater thickness gauge

Cygnus DIVE is a wrist-mountable underwater thickness gauge providing an invaluable free-hand while performing remaining metal thickness measurements. Originally launched 2 years ago, the DIVE now has a number of key new features:

- Twin-crystal probe option to assist in taking measurements on uncoated material (e.g., anchor chain links, extremely corroded steel and plastic outfall and dredge pipes);

- Measurement Stability Indicator (MSI) exclusive to Cygnus thickness gauges that shows when a reading in single-echo mode is stable by turning the reading from red to yellow;

- A super bright AMOLED display, easily viewable by both the diver and his camera, in the poorest visibility; and



- Updated topside and reporting software allowing measurements and A-Scans to be displayed on the surface and data logged topside.

The ability of the diver to wear Cygnus DIVE on his arm or wrist is a big advantage says Graham Haines, sales director for Cygnus. Having a free-hand when diving offers obvious advantages and, together with the AMOLED display, makes viewing so much easier by both the diver and support engineers on the surface via the diver's camera. The AMOLED display not only gives much better viewing, especially in poor visibility, it also offers an A-Scan display that helps verify true back wall readings in difficult measuring applications. In data-logging mode, Cygnus DIVE can store up to 5,000 measurements together with each measurement A-Scan for future analysis, should the need arise.

For more information, visit www.cygnus-instruments.com.

Global buoy sales increasing

UK-based marine environmental solutions company, Ocean Scientific International Ltd (OSIL), has imparted details of recent global buoy sales, which has seen installations of buoy systems in South America, the Mediterranean, the North Sea and the Far East, in the last few months alone.

OSIL specializes in providing customized monitoring systems for all applications, and their range of instrumented data buoys are extremely robust. The buoy hulls are constructed from rotationally molded polyethylene, which is foam filled for added security, with a galvanized steel central structure, allowing the passage of instrumentation and cables through the water column while offering protection for the instrumentation during deployment and operation.

OSIL's buoys provide the ideal monitoring platform for a wide assortment of instrumentation and their highly stable and adaptable designs make them suitable for any location or application including metocean, dredge, coastal and environmental monitoring. Diameters range from 0.4 m to 3.0 m, with a wide range of secure top frame designs available.

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

New subsea tool trials at the Underwater Centre

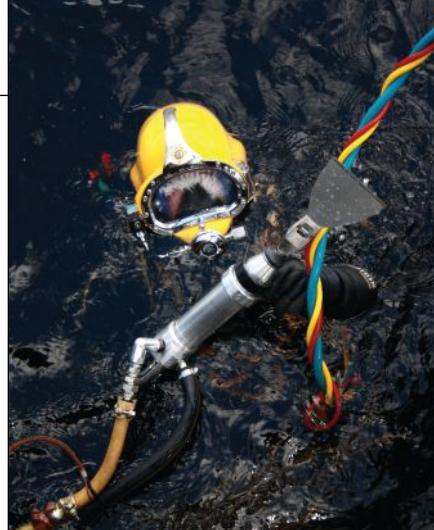
A simple yet innovative new tool is set to make waves in the oil and gas industry after successfully undergoing a commercial trial at award-winning subsea training and trials facility, The Underwater Centre.

Commercial divers and ROV pilot technicians recently trialed the Waveblade while working in Loch Linnhe, simulating a realistic operational environment.

Waveblade, a lightweight, hand-held submersible power tool, is designed to remove marine growth through vibration, without harming underlying surfaces.

The tool has been developed to be used as a hand tool for divers and also as a separate tool to be fitted to the arm of an ROV.

Waveblade's patented technology delivers high-frequency resonance through its oscillating head, sending multi-directional vibration through the blade into the unwanted marine growth. The wave power has been shown to remove organic growth more thoroughly in a fraction of the time without damaging surfaces compared to current



methods such as scrapers and high-pressure water jetting.

For more information, visit www.theunderwatercentre.com.

Highly distributed oil & gas workforces see benefit of online distance learning

MTCS (UK) Ltd, has devised a highly portable, virtual learning environment where the online system has been built to aid companies whose individuals spend a lot of time offshore on vessels or rigs. Indeed, many subsea industry executives now realize that knowledge and the application of knowledge is key to business success.

Gail Bartolf, global sales coordinator for MTCS (UK) Ltd explains: "While we do send trainers when possible to company employees; their being all over the world or on changing shift patterns means extra issues with the training and getting trainees together. A major issue is cost to the company, which can include flights, accommodation and perhaps day rates. MTCS Online is a distance-learning program designed for instant accessibility and optimum portability. It makes our products available anywhere, anytime, allowing companies to use one system to track and monitor learners' progress throughout their offshore career."

All competence certificates are IMCA graded and the program is compatible with Apple Mac, Windows 7/8, Android, and iOS tablets and mobiles.

Courses available via MTCS Online include High Voltage, ROV Hydraulics and Skills Assessor with Fibre Optics coming shortly. Additionally, the system is host to competence programs for all IMCA grades, including marine back-deck, diving, survey, and in fact all offshore IMCA competence grades.

For more information, visit www.mtcs.info.

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Chevron Corp. named **Mary A. Francis** corporate secretary and chief governance officer effective 1 May 2015. In her new role, Francis, 50, will counsel the board of directors and senior management of Chevron on corporate governance matters, manage the corporate governance department and serve on the law function executive committee. She succeeds **Lydia I. Beebe**, who is retiring from Chevron on 30 April after 37 years with the company. Francis joined Chevron in 2002 as a trademark senior counsel in the corporation law department. In 2005, she was appointed to the position of lead senior counsel in Chevron Shipping Co. In 2007, she was appointed to the position of managing counsel, pipeline and shipping in global gas. In 2009, she was appointed general counsel, Chevron Asia Pacific, Exploration and Production Co. She has held her current position as chief corporate counsel since 2012.

BG Group appointed **Helge Lund** chief executive and executive director of the company, effective 2 March 2015. Helge is currently the chief executive officer of international energy company Statoil. His decision to step down from Statoil to join BG Group was announced

in October. Prior to his 10 years as Statoil's chief executive, Lund served as chief executive of Aker Kvaerner. He previously also served in the roles of deputy chief executive and chief financial officer at the pharmaceutical division of Hafslund Nycomed. "Lund is ideally suited to lead BG Group in the next phase of its growth, and to accelerate the creation and delivery of value for our shareholders, while delivering the Group's business plans," said Andrew Gould, chairman of BG Group.

Nautronix appointed **Thomas McCudden** the company's global sales manager for NASNet® and will be responsible for developing awareness and worldwide sales of NASNet® positioning technology. Prior to joining Nautronix, McCudden gained experience within the oil and gas, telecommunications and finance industries through previous positions at IET, FreeAgent, BT and Coda Octopus. **Donald Thomson**, vice president of sales, global commercial acoustics will continue to be responsible for sales in the global marketplace



Lund

for Nautronix' product lines NASCoM, NASDrill and NASDive, according to the company.

Noble Energy, Inc. said the board of directors elected **David L. Stover** as president and chief executive officer, succeeding **Charles D. Davidson** as CEO. Stover's election is consistent with the management succession plan disclosed in April when it was announced that Davidson would be retiring on 1 May 2015. Stover has previously been serving as the company's president and chief operating officer. Davidson will continue to serve as the company's chairman until the 2015 Annual Meeting at which time he will be leaving the board. The board also announced that it intends to elect Stover as chairman of the board immediately following the annual meeting. The company also announced that **Susan M. Cunningham** was elected executive vice president responsible for Noble Energy's global exploration, new ventures, frontier, environmental, health, safety, regulatory and business innovation activities. In addition, **Gary W. Willingham** was elected executive vice president responsible for global production, drilling, major projects and supply chain activities. Both will report to Stover.

EdgeTech, the leader in high-resolution sonar imaging systems and underwater technology, is excited to announce that **Marc Parent** has joined its team. Parent is an industry professional who comes to EdgeTech with over 20 years of hands-on engineering and managerial experience associated with the design, development and production of underwater acoustic systems for commercial and government applications. His extensive experience in underwater acoustics, sonar systems design, new product development, engineering management and staff development will be a great fit with the growing EdgeTech team.

BMT Group Ltd (BMT), the leading international design, engineering and risk management consultancy, has announced the appointment of **Ray McGlynn** as sales manager for offshore oil and gas. He will be responsible for European and African regional sales support and assisting Louise Ledgard, offshore oil and gas business development Lead in supporting the co-ordination of ocean engineering sales across the BMT Group. McGlynn has extensive experience within the oil and gas industry including marketing and sales activities, strategic planning and business development, as well as extensive project management skills from initial tendering through to project completion.

Subsea products and equipment manufacturer Ennsub has appointed a new sales and marketing manager to drive sales activities within the company's expanding commercial function. **Peter Farthing** joins Ennsub from Cortland, where he was international ROV/defense business development manager for 3 years in addition to having extensive sales, marketing and commercial experience gained over a 15-year career in the international offshore oil and gas markets. The role aims to facilitate sales of Ennsub's products and equipment, and initiate, build and maintain relationships with the company's customer base worldwide. He will also be responsible for managing the sales function and providing input to Ennsub's business strategy and global development activities.

Ocean Installer has recently hired **Bijan K. Mahapatra** to lead the office in Australia. Mahapatra has more than 30 years of experience in the offshore sub-



Parent

sea engineering and construction industry where he has held senior leadership positions working for companies like McDermott, Bouygues Offshore, Clough Offshore, Riise Underwater Engineering and more recently with SapuraKencana.

Bibby Offshore's Houston-based division, **Bibby Subsea**, has announced the investment in a custom-built office and key appointment as a result of continued growth in the region. The new premises, due for completion in November 2014, consist of a 6,300 sq. ft. office space and 2,000 sq. ft. warehouse and workshop area, which will allow for further team expansion. A recruitment drive is planned to increase the number of Bibby Subsea staff in the region by more than 70, both onshore and offshore, throughout 2015. **Robert Richmond** has been appointed as vessel operations/project manager to help facilitate this growth, bringing to the business 33 years of experience within the marine and subsea industries. For the last 6 years, he has been working for a major international subsea company based in Houston, where laterally he was subsea operations director. With a career that has seen him work across the world, Richmond will help manage and develop Bibby Subsea's operational capability.

MTN Communications (MTN) announced that it is building a business development and technical team in Houston in response to 20% year-over-year growth in Oil & Gas vessels served. MTN serves the most demanding and bandwidth-intensive customers, delivering high-quality communications and content solutions to the oil & gas sector for 10+ years. The company's unmatched network, experienced team, value-driven innovation and high bandwidth-level commitments are paying off. Commercial oil & gas organizations represent 32% of MTN's customer base. **Santos Venegas**, general manager, and **Keith Morgan**, senior sales engineer, have joined the MTN oil & gas business unit from Harris CapRock. **Ty Garner**, business development executive, has joined from Telemar.

HB Rentals, a superior energy services company specializing in onsite accommodation services, has announced the official opening of its new service location in Ciudad del Carmen, Mexico. The new location supports HB's full range of service offerings that include accommodation modules and operating essentials such as water, sewage, power, lighting and communications systems. The addition of this facility allows the company to respond more quickly to the needs of its Mexico-based clients while

reducing project expenses by eliminating importation and transportation costs.

CTruk, a leading UK innovator in composite vessel design, recently signed the lease on a 6,400 sq. m site on the Colne Estuary, a few miles upriver from its current Brightlingsea base. The company plans to use the Fieldgates site in Haven Road, The Hythe, East Colchester to build the larger vessels required for offshore wind farm projects further out to sea. CTruk is pressing on with refurbishment of the existing building on Fieldgates in order to move some production activity over early next year. However, the company also has ambitious plans to build a brand new production facility, offices and training center on the currently derelict site.

Subsea specialist **ROVOP** has marked a major milestone in its business growth success after revealing that it is investing more than £4 million in a new purpose-built headquarters including training facilities, a full ROV underwater test facility and an internal 40-tonne overhead crane. The next generation facility at Aberdeenshire's Westhill area –known as the subsea industry's SURF City–will also bring the company's extensive fleet of ROVs and its ROV Academy under one roof.

Aberdeen headquartered company, **Ashtead Technology**, has invested almost £500,000 in a first-of-its-kind subsea training academy being launched in Aberdeen in the world-renowned subsea center of excellence at Westhill. The subsea technology training academy will meet global demand for improved competency in the configuration, operation and maintenance of increasingly sophisticated equipment required in more complex subsea oil and gas projects in deeper waters and hostile locations around the world.

The **Oceanscience Group** has been acquired by **Teledyne Technologies Inc.** in a move to further strengthen the position of the company in sensor deployment platforms and remote vehicles. The first question we will hear from our customers will almost certainly be "what will change?". The answer right now is "nothing." As time moves on, access to greater customer support resources and manufacturing expertise will start to provide benefits to end users and suppliers of Teledyne Oceanscience products. We will continue to make platforms and systems for the same range of equipment that we currently do, with no change in our outlook as a result of the acquisition. We work with a wide variety of instrument manufacturers and will continue to do so.



Farthing

CALENDAR & EVENTS

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December 2-4, 2014
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San Antonio, TX
www.cleangulf.org

December 3-5, 2014
International Workboat
New Orleans, LA
www.workboatshow.com

December 9-11, 2014
Renewable Energy World Conference
Orlando, FL
www.renewableenergyworld-events.com

February 3-5, 2015
Euromaritime
Paris, France
www.euromaritime.fr

February 4-5, 2015
Naval Future Forces
Washington, D.C.
www.navalengineers.org/events

February 10-11, 2015
Deepwater Decommissioning Workshop
Houston, TX
decommissioninggom.offsnetevents.com

February 10-12, 2015
Underwater Intervention
New Orleans, LA
www.underwaterintervention.com

February 11-13, 2015
Subsea Expo 2015
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www.subseaexpo.com

February 16-19, 2015
GOM Oil Spill & Ecosystem Science
Houston, TX
www.gulfofmexicoconference.org

February 22-27, 2015
ASLO Ocean Sciences Meeting
Grenada, Spain
www.aslo.org/meetings

March 2-6, 2015
IEE/OES CWTM Workshop
St. Petersburg, FL
www.cwtmc2015.org

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March 15-19, 2015
NACE Corrosion
Dallas, TX
www.nace.org

March 16-19, 2015
U.S. Hydro
National Harbor, MD
www.hypack.com/ushydro/2015

March 17-19, 2015
DECOM Summit
Houston, TX
www.decomworld.com

April 14-16, 2015
Ocean Business
Southampton, UK
www.oceanbusiness.com

May 4-7, 2015
AUVSI
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www.auvshow.org

May 31 - June 5, 2015
OMAE
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www.asmeconferences.org/omae2015

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Ocean News & Technology

The advertisement features a night photograph of the Genova port area, showing palm trees, historic buildings, and a large modern bridge with a blue-lit canopy. Overlaid text includes the event logo "MTS|IEEE oceans15 Genova", the tagline "Don't miss the chance to attend OCEAN'15 MTS/IEEE Conference and Exhibit", and a call to action "ABSTRACT SUBMISSION EXTENDED DEADLINE: DECEMBER 19TH 2014". Logos for MTS, IEEE, and OES are at the bottom right, along with the website www.oceans15mtsieeegenova.org.

JANUARY

Editorial: Forecast: 2015 and Beyond; Underwater Navigation; Manned Submersibles
Distribution: Euromaritime; Naval Future Forces; Deepwater Decommissioning Workshop; GOM Oil Spill & Ecosystem
Product & Services Focus: Multibeam & Side Scan Sonars; Research & Development Services

FEBRUARY

Editorial: Subsea Fiber Optic Networks; Decom & Abandonment
Distribution: IEEE/Current, Waves, Turbulence Measurement Wkshp; NACE Corrosion; Decommissioning and Abandonment Summit; U.S. Hydro Product & Services Focus: Connectors, Cables & Umbilicals; Diver Detection Systems

MARCH

Editorial: Oceanology & Meteorology; Maritime Security
Distribution: Ocean Business; Offshore Well Intervention Conf. North Sea
Product & Services Focus: Buoys & Monitoring Instrumentation; Environmental Monitoring/Testing Services

APRIL

Editorial: Offshore Technology; Ocean Mapping & Survey
Distribution: OTC; AUVSI; Oceans '15 MTS/IEEE Genova, Italy
Product & Services Focus: Subsea Tools & Manipulators; Offshore Risk Assessment; Training/Safety

MAY

Editorial: UW Imaging & Processing; Marine Salvage/UW Archeology
Distribution: OMAE – Ocean/Offsh/Arctic Eng; Energy Ocean; Seawork Intl; UDT
Product & Services Focus: Magnetometers; Water Dredges & Airlifts; Diving Services

JUNE

Editorial: Autonomous Unmanned Vehicles; Defense & Naval Systems;
Distribution: Clean Pacific
Product & Services Focus: Tracking & Positioning Systems; Seismic Monitoring; Equipment Leasing/Rental Services

JULY

Editorial: Ocean Engineering; Marine Construction; Special Focus Section: Products & Services Case Studies
Distribution: TBA
Product & Services Focus: Navigation, Mapping & Signal Processing; Data Processing Services

AUGUST

Editorial: Workclass ROVs; Deepwater Pipeline/Repair/Maintenance
Distribution: Offshore Europe
Product & Services Focus: Cameras, Lights & Imaging Sonars; Oil Spill Clean-Up Services

SEPTEMBER

Editorial: Ocean Observing Systems; Subsea Telecom; Offshore Wind Installation & Maintenance
Distribution: SPE ATCE; AWEA Offshore Windpower; Oceans '15 MTS/IEEE Washington DC; Offshore Well Intervention Conf., GOM
Product & Services Focus: Water Sampling Equipment; Cable Installation Services

OCTOBER

Editorial: Offshore Communications; Subsea Inspection, Monitoring, Repair and Maintenance
Distribution: LAGCOE; OilComm; Clean Gulf; Offshore Asset Retirement Conference
Product & Services Focus: Acoustic Modems, Releases & Transponders; Marine Communications; Survey & Exploration Services

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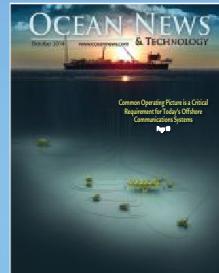
Editorial: Offshore Support, Supply & Emergency Vessels; Deep Sea Mining
Distribution: International Workboat
Product & Services Focus: Ship Protection Systems; Cranes, Winches & Control Systems; Vessel Charter/Leasing Services

DECEMBER

Editorial: Light Workclass ROVs; Commercial Diving; Year in Review
Distribution: TBA
Product & Services Focus: Diving Equipment & Services; Buoyancy Materials; Construction & Repair Services

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UNDERWATER COMMUNICATION AND POSITIONING SOLUTIONS

Evo Logics®



S2C TECHNOLOGY: COMMUNICATION AND TRACKING COMBINED

- time, space and cost-saving solutions
- low power consumption for autonomous operations
- advanced data delivery algorithms, addressing and networking, remotely configurable settings
- extendable platform with multiple configuration options: power-saving Wake Up module, acoustic releaser, additional sensors, custom solutions, OEM versions available

USBL POSITIONING SYSTEMS

simultaneous positioning and communication - no need to switch between positioning mode and modem mode

- flexible SiNAPS positioning software
- reliable data transmissions
- range: up to 8000 m
- accuracy: up to 0.04 degrees

UNDERWATER ACOUSTIC MODEMS

reliable data transmissions even in adverse conditions, customizable standard modems or **new M-series "mini" modems** in a light and compact design, special editions for developers, S2C communication and positioning emulator for free with every purchase

- range: up to 8000 m
- depth: up to 6000 m
- data rate: up to 31.2 kbps

LBL POSITIONING SYSTEMS

highly accurate, precise and stable performance, simultaneous positioning and data transmissions

- flexible SiNAPS positioning software
- reliable data transmissions
- range: up to 8000 m
- accuracy: better than 0.01 m





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