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April 2013

GoM Subsea
Infrastructure Inspections
– the Marlin® at Work

Feature Story – Page 10





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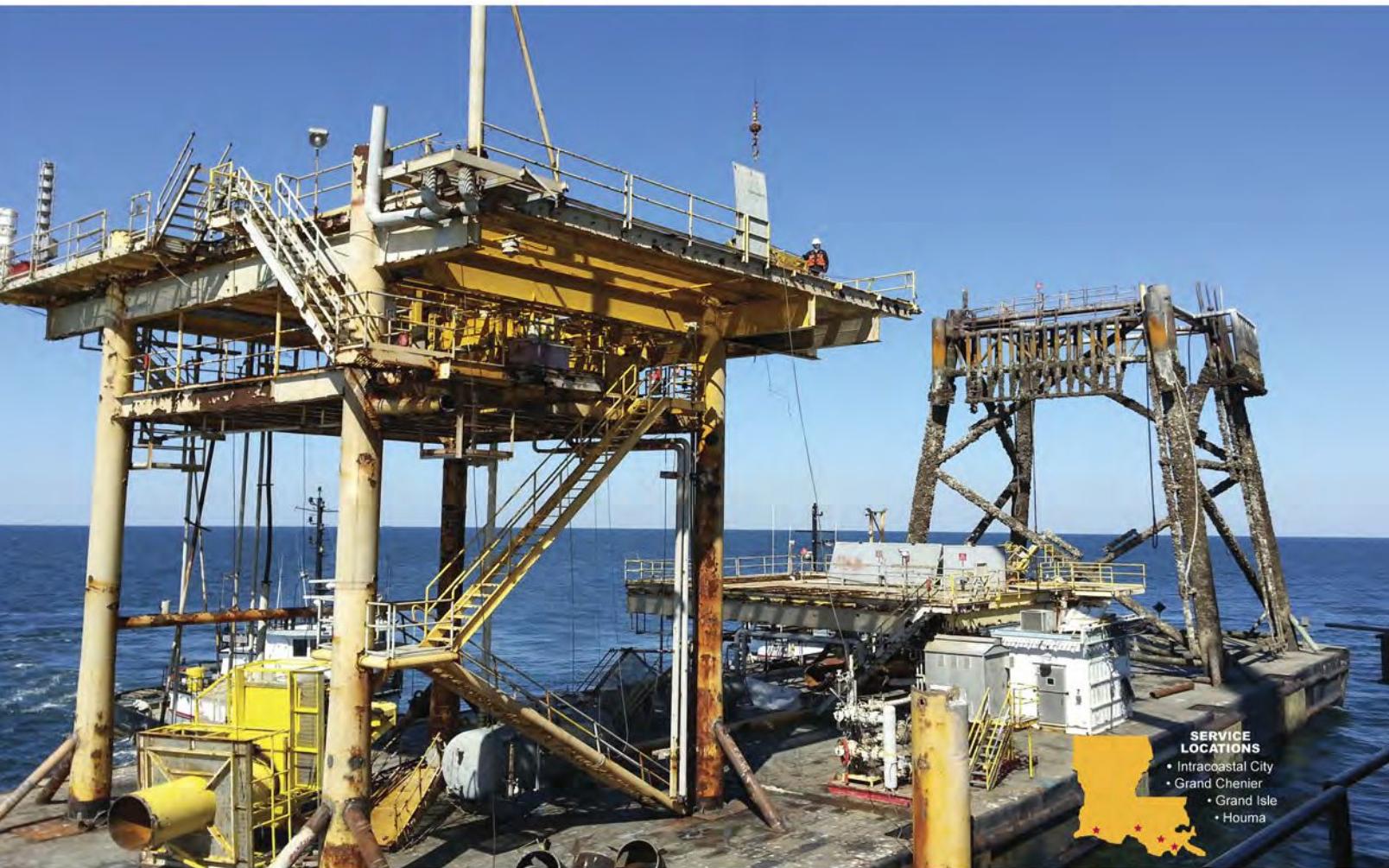
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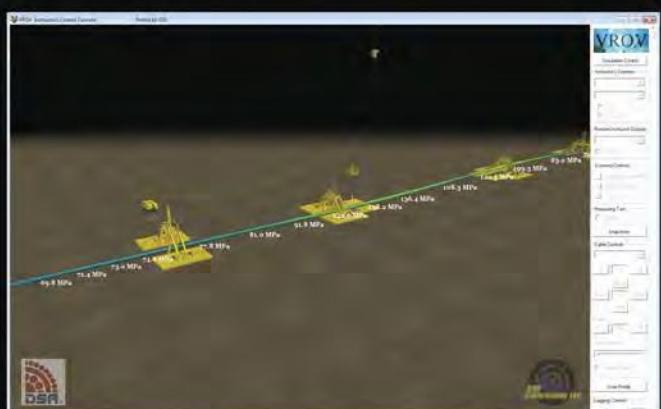
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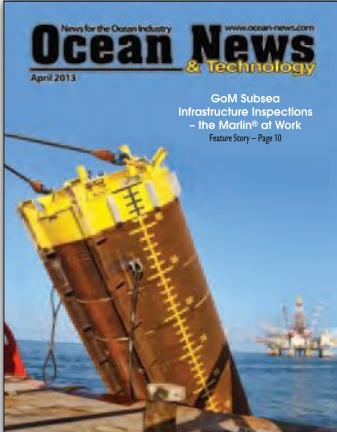
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Technology Systems Corp.

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Editorial

By Ray Tyson

Ocean News & Technology

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Obama Continues to Mislead on Oil and Gas Production

Now and then I feel compelled to use this editorial space to challenge the Obama administration's exaggerated claims and misuse of facts regarding the U.S. oil and gas industry. I simply get to the point where I can no longer absorb the misrepresentations and political rhetoric. So, here we go again.

It was a year ago April when this journalist, along with other writers, saw fit to criticize the administration for manipulating rising U.S. production numbers to improve his standing with a public that had grown leary of his energy policies.

The President, with an election around the corner, often touted his administration's supposed progress and "historic achievements" toward making America more energy independent. His people waved U.S. Energy Information Administration (EIA) statistics before the media, claiming the numbers proved Obama was on the right track and suggesting that he alone was responsible for the resurgence in U.S. production.

The president's claims not only drew quick criticism from Republicans and pro-industry groups, as might have been

expected, but also from some members of his own party. While it was true that U.S. production was increasing

on State and private lands, it was actually declining on Federal lands, or the properties under Obama's direct management. And not a whisper of this fact was heard from Obama or his administration.

Well, here it is a year later and not much has changed. U.S. production happily continues to rise, and Obama sadly continues to mislead. For example, among the many self-serving comments the U.S. Interior Department continues to include in its energy-related press releases is this gem:

"Domestic oil and gas production has grown each year the President has been in office, with domestic oil production currently higher than any time in nearly a decade and natural gas production at its highest level ever."

Another irritating comment, which leads just about every energy press release issued by the department, states: "As part of President Obama's all-of-the-

above energy strategy to continue to expand safe and responsible domestic energy production," blah, blah, blah.

I'm not exactly sure what Obama's "all-of-the-above energy strategy" means, but what it clearly does not demonstrate is any concerted effort by the administration to lessen restrictions and increase production on Federal acreage. This fact is brought into sharp focus in a study released in March by the non-partisan Congressional Research Service (CRS). It examined oil and natural gas production data for Federal and non-Federal areas (onshore and offshore) with an emphasis on the past 6 years of production.

The study, based on data gleaned from the government's records, found that while overall U.S. production has increased since 2007, it has declined considerably on Federal property.

Specifically, the CRS study said that U.S. oil development on federal acreage dropped 7% between fiscal 2007-2012, even though total output rose by about 1.1 million bbl/d. For natural gas, overall production increased 20% between fiscal 2008-2012, despite falling by one-third on Federal acreage, according to the report.

The study further supports opponents' contention that Obama energy policies have actually handicapped industry. The study noted that in 2011 it took on average 307 days to get a drilling permit on Federal lands. That was a 41% increase compared with 2006, it said.

"A more efficient permitting process may be an added incentive for the industry to invest in developing Federal resources, which may allow for some oil and gas to come onstream sooner, but, in general, the regulatory framework for developing resources on Federal lands will likely remain more involved and time-consuming than that on private land," the report concluded.

Meanwhile, EIA estimates short-term show oil production continuing to decline in Federal offshore areas, while longer-term estimates show only a slight increase, despite a resurgence in the Gulf of Mexico rig count following the end of Obama's moratorium on drilling post-Macondo.

"A web of red tape and a backlog of delayed permits are blocking important energy production opportunities on Federal lands," Rep. Ed Whitfield (R-Kentucky), who chairs the House Energy and Commerce Subcommittee on Energy and Power, said in a statement following release of the CRS study.





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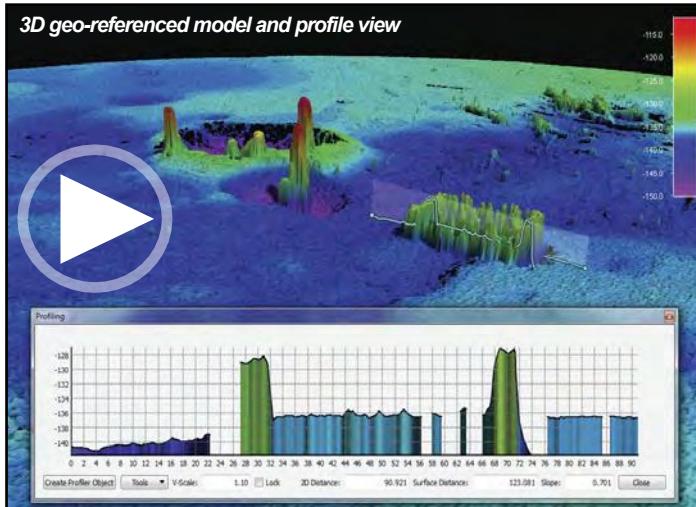
MARLIN® AUTONOMOUS INSPECTION SYSTEM

By: Lou Dennis, Lockheed Martin

Marlin System Completed First Commercial Autonomous Subsea Infrastructure Inspections in Gulf of Mexico

A New Reality to Integrity Management Inspections

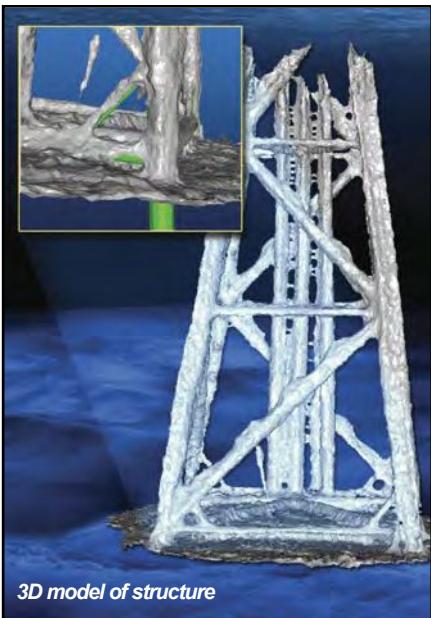
Offering a faster, safer, economical, and more efficient alternative to traditional subsea inspections, Lockheed Martin's Marlin® Autonomous Underwater Vehicle (AUV) is changing the oil and gas industry's expectations for operational performance and post-inspection presentation of collected data 3D models.



Proven Advanced Technology, Available Today

The Marlin® structural inspection system recently completed the first commercial autonomous offshore structural and bottom site survey inspections in the Gulf of Mexico. The AUV successfully inspected 11 fixed platforms and their surrounding seabed along with three partially decommissioned work sites actively undergoing the final stages of clearance activities.

Operating from a small utility-class vessel, the 10-ft unmanned submersible logged more than 62 hrs of submerged operations over the 2-week survey period, covering 72 mi in waters up to 125-ft deep. While at sea, the Marlin® generated and delivered real-time, 3D georeferenced models of the platforms and the surrounding seabed areas, providing the Client with an accurate, full view of each scene. This output



allowed the operating company to make accurate operating plans for an upcoming subsea recovery operation within days of deploying the salvage vessel.

The Marlin® survey model essentially creates a window below the surface of the water that allows operators to identify, localize, measure, and catalog debris in a single scene point of view. The data collected by the Marlin® surveys is used to verify, validate, and, in many cases, update and refresh as-built documentation of operating facilities. The success of AUV inspections in the Gulf of Mexico validates the ability of autonomous inspections by AUVs to provide faster, smarter, and more frequent subsea inspections for the oil and gas industry.

How Marlin® AUV Works

Marlin® is equipped with the appropriate sensors and robust autonomy to conduct structural surveys, pipeline inspections, bottom debris surveys, and subsea facility inspections. Unhindered by a surface vessel with attached umbilical and a large footprint of shipboard equipment, the Marlin® AUV can be employed across large areas and remain submerged for multiple shifts. Operators on the surface are monitoring the range and bearing and vehicle health and status along with mission progress, which greatly reduces crew tasking and results in fewer personnel at sea.

Once the support vessel is on station, the Marlin® vehicle is launched and begins its pre-programmed mission. During its first mission around a platform, the Marlin® builds a 3D model of the subsea structure constructed from 3D sonar data. This 3D constructed model becomes a reference for navigating using its feature-based navigation capability that allows the AUV to execute an optimized inspection route to maximize sensor coverage and calculate the most efficient survey plan. The vehicle is also equipped with obstacle detection and avoidance capability, which allows the vehicle to automatically and safely classify the obstacles and avoid any unforeseen obstruction or hazards detected. Once the obstacle type and location is determined, the Marlin® will modify its route plan to avoid the obstacle and then plan an alternate route to reacquire the structure and resume the survey inspection and complete its mission.

Using the real-time, geo-referenced 3D sonar data and precise feature-based navigation allows for autonomous change detection against the benchmarked reference condi-

tion, an extremely beneficial time-saving feature compared to the visual examination currently required by inspection engineers.

The Marlin® patent-pending autonomous underwater homing capture and lift feature provides a robust and simple approach to vehicle recovery. Upon mission completion, the vehicle autonomously returns to a predetermined waypoint awaiting acoustic command to rendezvous with the ship. The operators initiate an auto-homing sequence that results in the vehicle homing to the lift line where it will automatically latch and indicate that it is ready for recovery. Once on board, the vehicle is stowed in its shipboard cradle and readied for the next mission.

Today, the Marlin® AUV system has validated advances in autonomy that enable a game-changing subsea facility inspection capability for oil and gas operating companies. By using advanced autonomy, true 3D sonar, and, in the future, underwater 3D laser imaging sensors, inspections are no longer limited by water turbidity or motion of the sensing platform. The 3D models generated in situ offer field operators with unprecedented ability to safely and accurately monitor the integrity of their subsea facilities with lower costs, fewer people at sea, and greatly reduced operational risk.

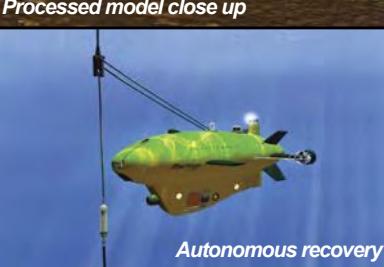
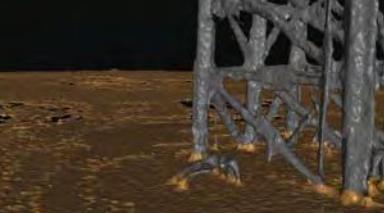
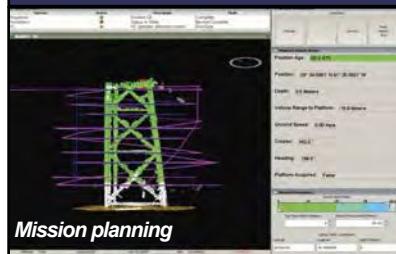
Marlin® AUV System Advantages

- Provides safer, faster, more economical, and effective subsea inspection process compared to using divers and tethered remotely operated vehicles.
- Completes inspections in hours and generates high-quality data sets that are geo-referenced and with significant accuracy in real-time.
- 3D models are readily exportable to engineering programs for metrology, baseline surveys, and integrity analysis management.
- Allows for a smaller vessel size and crew requirements and enables rapid equipment mobilization for emergency response.
- Inspection operations are not constrained by visibility conditions and provide automated fault detection and change management reporting capability during the operation.
- Post-hurricane inspections can be completed faster with a more detailed status reporting delivered, allowing offshore facilities to return to production activities more quickly.

For additional information, visit www.lockheedmartin.com/us/products/marlin.html.

Marlin® Structural Inspection System

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OCEAN INDUSTRY

Dr. Kathryn Sullivan named new NOAA acting administrator

Dr. Kathryn Sullivan assumed the role of acting under secretary of commerce for oceans and atmosphere and acting National Oceanic and Atmospheric Administration (NOAA) administrator on 28 February 2013, where she had been serving as assistant secretary of commerce for environmental observation and prediction and deputy administrator for NOAA, as well as performing the duties of NOAA's Chief Scientist, a vacant position. She is a distinguished scientist, renowned astronaut, and intrepid explorer.

As assistant secretary, Dr. Sullivan played a central role in directing Administration and NOAA priority work in the areas of weather and water services, climate science and services, integrated mapping services, and Earth-observing capabilities. She provided agency-wide direction with regard to satellites, space weather, water, and ocean observations and forecasts to best serve American communities and businesses. As Deputy Administrator, she oversaw the smooth operation of the agency.

Dr. Sullivan's impressive expertise spans the frontiers of space and sea. An accomplished oceanographer, she was appointed NOAA's chief scientist in 1993, where she oversaw a research and technology portfolio that included fisheries biology, climate change, satellite instrumentation, and marine biodiversity.

Dr. Sullivan was the inaugural director of the Battelle Center for Mathematics and Science Education Policy in the John Glenn School of Public Affairs at Ohio State University. Prior to joining Ohio State, she served a decade as President and CEO of the Center of Science and Industry (COSI) in Columbus, Ohio, one of the nation's leading science museums. Dr. Sullivan joined COSI after 3 years of service as chief scientist.

Dr. Sullivan was one of the first six women selected to join the NASA astronaut corps in 1978 and holds the distinction of being the first American woman to walk in space. She flew on three shuttle missions during her 15-year tenure, including the mission that deployed the Hubble Space Telescope. Dr. Sullivan has also served on the National Science Board (2004-2010) and as an oceanographer in the U.S. Navy Reserve (1988-2006).

Dr. Sullivan holds a bachelor's degree in earth sciences from the University of California at Santa Cruz and a doctorate in geology from Dalhousie University in Canada.

Dr. Bamford named new assistant administrator for NOAA's National Ocean Service

Holly A. Bamford, Ph.D., has been named the new assistant NOAA administrator for the agency's National Ocean Service (NOS), succeeding David M. Kennedy who was named the new NOAA deputy under secretary for operations. Prior to her appointment, Dr. Bamford served as deputy assistant administrator for NOS.

As assistant administrator, Dr. Bamford oversees NOS, which serves as the lead Federal agency providing science-based solutions to address economic, environmental, and social pressures on our oceans and coasts. NOS observes, measures, assesses, and manages the nation's coastal, ocean, and Great Lakes areas; provides critical navigation products and services, which contribute \$729 billion annually to the gross domestic product; and conducts response and restoration activities to protect vital coastal resources.

As deputy assistant administrator, beginning in 2011, Dr. Bamford managed the



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Oceanographer of the Navy to address global ocean business community at SOS 2013

Rear Admiral Jonathan White will speak at the conference dinner of the World Ocean Council (WOC) Sustainable Ocean Summit (SOS), 22-24 April 2013 in Washington, D.C. Admiral White, oceanographer of the U.S. Navy, will address the challenges to maritime security and naval readiness of a changing marine environment and an increasingly crowded ocean—and the important opportunities this presents for collaboration with Federal, industry, and international partners. He will highlight issues of common interest and importance shared by the Navy and ocean industries, including ocean observing and prediction, the changing climate, the opening of the Arctic, and adaptation to sea level rise. Admiral White stated, "Good science, observations, risk assessment, and preparedness are fundamental to safe and sustainable operations at sea for all ocean users." he added, "Scaling-up observations from industry vessels and platforms through efforts such as the WOC Smart Ocean/Smart Industries program has a particularly important potential to improve the modeling and forecasting of ocean, weather and climate conditions." The Admiral further noted that expanding and improving observations will be especially valuable in areas of limited data where industry is increasingly present, such as the Arctic.

Remains of USS Monitor sailors interred at Arlington National Cemetery

The remains of two unknown USS Monitor sailors, recovered by NOAA and the U.S. Navy in 2002 from the ship's gun turret, were buried with full military honors at Arlington National Cemetery. USS Monitor sank in a New Year's Eve storm just over 150 years ago, carrying 16 crew members to their deaths. For more than a quarter of a century, NOAA has forged and maintained an enduring bond to the legacy of USS Monitor and its crew. In addition to trying to identify the two sailors, NOAA has carried out numerous research expeditions at the site, including working with the Navy and other partners to recover important artifacts. "This interment honors the sacrifice of a courageous crew and commemorates an important battle fought 151 years ago when, for the first time, iron-clad ships clashed in naval warfare, signaling the end of the era for wooden ships," said Secretary of the Navy Ray Mabus.

financial and business operations while improving the agency's performance to meet its ocean science and service missions. During that tenure, she also led a comprehensive review of headquarters' functions that identified efficiencies and oversaw implementation of the recommended changes that resulted in enhanced operations and program coordination.

Chevron announces final plans to invest in Congo deepwater projects

As part of the company's latest deep-water developments, U.S. oil giant Chevron Corporation has announced plans for its subsidiary Chevron Overseas (Congo) Limited to proceed with development of the Moho Bilondo and Moho Nord offshore projects.

Chevron is developing the Moho Bilondo and Moho Nord projects through a joint venture with the Congolese government and Total, which holds a majority interest. The Moho Bilondo project, which began in 2008, includes wells tied back to an existing floating production unit with a processing capacity of 40,000 bbl/d. The Moho Nord project involves a tension leg platform, a floating production unit with a processing capacity of 100,000 bbl/d, and a new 50-mi (80 km) pipeline to the onshore Djeno terminal.

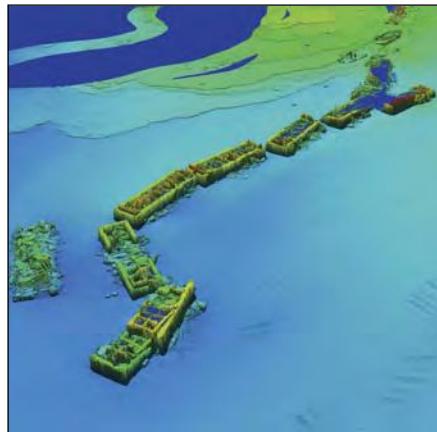
The Moho Nord project is located approximately 46 mi offshore Pointe-Noire, Republic of the Congo, in water ranging from 1,500 to 4,000 ft deep. According to Chevron, it is the largest-ever oil and gas project in the Republic of the Congo. Chevron estimates that deepwater projects off the coast of the Republic of the Congo will produce 140,000 bbl by 2017.

According to the U.S. Energy Department's Energy Information Administration (EIA), as of 2011, the Republic of the Congo ranked fifth in terms of oil reserves in Sub-Saharan Africa. The EIA estimates the country has around 1.6 Bbbl of proven oil reserves.

UKHO releases spectacular images of WWII D-Day harbor

The UK Hydrographic Office (UKHO) has released stunning images from a survey of the underwater remains of an artificial harbor used in World War II (WWII) that was used to facilitate rapid offloading of cargo onto the beaches during the Allied landings in Normandy.

The images of Mulberry B, which was one of these portable, temporary har-



bors developed and built in total secrecy by the British during WWII, have been created from a detailed 3D map that will allow archaeologists to assess the rate of deterioration of the remains.

UKHO teamed up with commercial survey company Netsurvey to trial new methods and provide staff training while gathering this detailed 3D data of the harbor. The images show the underwater remains, lying at a depth of about 5 m and previously hidden from all but divers.

Mulberry B, also known as Port Winston, saw heavy use in WWII being used over 7 months to land over 220,000 men, 50,000 vehicles, and 600,000 tonnes of supplies, providing much needed reinforcements in France.

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

ThyssenKrupp acquires Australian marine technology firm

With its technical expertise and numerous innovations, ThyssenKrupp is one of the leading global system suppliers for submarines and surface naval vessels, with a shipbuilding tradition that stretches back centuries. To strengthen the company's presence in the Asia/Pacific region, it is now acquiring the Melbourne-based Australian engineering firm Australian Marine Technologies (AMT), which has a wealth of engineering and design expertise in naval shipbuilding and currently employs 31 engineers and draftsmen. In a further step, AMT is to be combined with ThyssenKrupp Marine Systems Australia—a company of the industrial solutions business area.

Dr. Hans Christoph Atzpodien, management board chairman of the industrial solutions business area of ThyssenKrupp AG, explains the background to the acquisition: "As part of its strategic development program, ThyssenKrupp is focusing on the markets of the future. The Southeast Asia region, including Australia and New Zealand, offers numerous opportunities

for growth. With the acquisition of AMT, we will not only strengthen our presence in Australia, we will also profit from the company's regional network."

Australia is one of the traditional sales markets of the ThyssenKrupp Group in Asia/Pacific. Railway tires and rail/track systems were supplied to Australia back in 1865. With sales of around €520 million, Australia is the company's fourth biggest market in the region. ThyssenKrupp currently employs approximately 900 people in Australia, offering rolled steel and pipes/tubes, marine systems, machinery, and equipment for mining and processing ores and minerals, petrochemical plants, elevators, and escalators as well as nickel alloys.

For more information, visit www.thyssenkrupp.com.

Bezos Expeditions recovers pieces of Apollo 11 rockets

Jeff Bezos, founder and CEO of Amazon.com, recently recovered parts of the F-1 rocket engines that powered the Apollo 11 moon mission.

Last March, Bezos and his crew discovered the engines lying 14,000 ft deep using sonar.

Bezos recovered enough major components to restore and display two F-1 engines. He hopes that the hardware will inspire kids to invent and explore, just as the NASA missions inspired him.

Blogging on his website, Bezos wrote, "The technology used for the recovery is, in its own way, as otherworldly as the Apollo technology itself. The remotely operated vehicles worked at a depth of more than 14,000 ft, tethered to our ship with fiber optics for data and electric cables transmitting power at more than 4,000 volts. We on the team were often struck by poetic echoes of the lunar missions. The buoyancy of the ROVs looks every bit like microgravity: the blackness of the horizon; the gray and colorless ocean floor. Only the occasional deep-sea fish broke the illusion."

For more information, visit www.bezoexpeditions.com.



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TESTING LIFESAVING GEAR FOR HARSH ENVIRONMENTS

By: Andrew Safer

The life of mariners hinges on the performance of lifeboats, immersion suits, and other equipment relied upon in maritime emergencies. These high stakes have motivated António Simões Ré to dedicate his career to evaluating their performance in extreme conditions and making recommendations for safety improvements.

W

orking out of the National Research Council (NRC) Canada facility in St. John's, Newfoundland, Simões Ré has been leading the Marine Safety Technologies for Extreme Environments (MSTEE) initiative for the past 15 years. A senior research engineer, he and his team of six researchers and six technical staff test physical models in a tow tank, ice tank, and offshore engineering basin; conduct full-scale field trials; and translate their findings into numerical models to validate their conclusions from the field trials and simulate a full range of scenarios for various sea states and conditions. They have partnered with Dr. Brian Veitch of the Faculty of Engineering and Applied Science at Memorial University since the program began and, more recently, with Dr. Scott MacKinnon of Memorial's School of Human Kinetics and Recreation.

Whereas lifeboats and immersion suits are typically tested at low sea states and in calm conditions, Simões Ré notes that the reality of working in northern environments requires a different approach. "There's an assumption with some regulations that performance remains constant and that you can work in any conditions," he said, adding that the performance decreases as the sea state and wind increase. "It crosses over to a point where it's no longer safe."

Lifeboats have been a specialty for Simões Ré's team. In one project designed to identify the conditions that may cause struc-

tural damage to the fiberglass, they conducted lab tests followed by a field trial in which they tested a lifeboat in an ice field 10 minutes outside of St. John's. On the west section of Paddy's Pond, they pre-cut pieces of ice averaging 0.34 m in thickness into rectangular pieces measuring 1.6 x 2.2 m and 1.6 x 3.2 m. They also cut ice pieces 0.5 m long by about 0.3 m wide to perform tests to measure the ice flexural strength in kilopascals. Instrumentation on the boat recorded positioning, speed over ground, pitch, roll, and heading. A camera was installed at the water line behind an acrylic window. On the acrylic window, 10-mm grids were used as a reference to measure the actual ice thickness impacting the acrylic panel, and a 6-component dynamometer recorded the impact loads in kilonewtons (kN). Lab tests had indicated that the boat's 6.7-mm thick fiberglass would puncture at 94 kN. The lifeboat proceeded at a maximum speed of 3.2 kts, and the maximum force recorded was around 35 kN. Higher impacts were measured this winter.

IMO regulations specify a maximum speed of 6 kts in open, calm water. Currently, there are no regulations for operating a lifeboat in ice or wave conditions. Simões Ré says that going through waves can reduce the speed by up to 2 kts. His team is currently developing a system for the coxswain whereby a green light would indicate "OK," a yellow light "Be Careful," and a red light "Danger of Damaging the Lifeboat." Based on this

research, they will also be making recommendations for emergency evacuation ice management, indicating the maximum size of ice pieces that can be left behind by an icebreaker. Noting the differences between operating a lifeboat in the North and in calmer southern latitude waters, Simões Ré recommends requiring that coxswains train in navigating in ice.

Working in partnership with Memorial University, Simões Ré's team was called upon to determine the effectiveness of the Preferred Orientation and Displacement (PrOD) boom at the Terra Nova floating production storage and offloading (FPSO) unit in aiding the launch of a lifeboat. (The PrOD boom stabilizes the lifeboat as it is being deployed, directs it away from the FPSO once it hits the water, and provides additional force as it moves forward.) The MSTEE team built models of the FPSO, lifeboat, and PrOD boom and tested them in the NRC's offshore engineering basin. Their tests confirmed that the PrOD system oriented the lifeboat away from the installation and reduced the amount of setback common to conventional lifeboat deployment systems. (A rule of thumb is that a 10-m wave may push the lifeboat back up to 20 m, depending on the type of evacuation system being used.) Similar projects were performed to recommend where to locate the lifeboat station for different types of installation.

What is unique about Simões Ré's team is that it brings together thermophysiologists and engineers who address both structural/mechanical issues and human factors. In their work with immersion suits, they investigated the durability of neck and wrist seals and how ocean conditions affect their effectiveness. They found that wind and waves degrade the thermal characteristics of the suits. The human-factors study indicated that with the lifeboat hatch closed and operating for about 2 hrs with two people inside, the temperature inside the boat reached 34°. "Their core temperatures were now rising and they were sweating," explains Simões Ré. Referring to previous tests that showed that water leakage degrades the suit's effectiveness by approximately 30%, he points out that sweating due to body heat is equivalent to letting water in. He adds that since thermal instrumented manikins do not vaso-constrict the way humans do, his team is in the process of establishing correction factors that will enable drawing realistic conclusions from tests with manikins in heat conditions.

Other tests conducted with the human-factors lens examined light, noise, and air quality inside the lifeboat. "The only person who sees light is the coxswain," says Simões Ré, who recommends adding, for example, portholes. When the boat is idling, the noise level ranges from 94 to 99 decibels (db); when going through ice, it increases to 110 db. He adds that it is important for the coxswain to communicate with the crew, but at these noise levels a lot would be lost in conversation. He likens it to talking while an airplane is landing nearby. Regarding air quality, Simões Ré notes that lifeboats rely on passive ventilation via two holes in the front and on the engine to force air movement. In one test on a calm day with no wind, a lifeboat in heavy ice remained stationary, resulting in a build-up of carbon monoxide inside the boat. "With an active ventilation system, we could control the air quality," he says.

Whereas in the first few years the MSTEE program concentrated on lifeboat evacuation, the industry has shifted the focus to recovery in recent years. Because the regulations recommend that lifeboats be towed in calm water, Simões Ré's team has been investigating the consequences of towing in a variety of sea states. They have determined that fast-rescue craft are able to maintain control of a 16-person life raft, whereas maintaining



control of a 42-person life raft is considerably more challenging. And, this towing operation becomes extremely challenging with a 150-person life raft (15 m x 5 m x 3 m high, deployed from ferries and cruise ships). Simões Ré points out that the size of the fast-rescue craft that is typically installed on ships has not increased along with life raft size. He also notes that prescriptive regulations have continued to specify that all life rafts must be equipped with one-m long paddles, adding that from the perspective of a person in a 150-ft life raft, this size paddle does not reach the water. "This is why I like performance-based regulations rather than prescriptive," he says. As an example of a regulator that is keeping pace with the need to modify requirements, he cites the Canada-Newfoundland and Labrador Offshore Petroleum Board (CNLOPB). Conventional lifeboats are designed for people who weigh 75 kilograms, but he points out that the typical offshore worker weighs up to 100 kilograms. "The CNLOPB has been very proactive," says Simões Ré. "They have been taking the research we have been doing in collaboration with Memorial University and asking the operators to respond to the new findings and include them in their emergency response plans."

Another facet of MSTEE is "to develop an environment combining researchers, graduate and work term students, entrepreneurs, and industry that foster innovative application of research to the creation of new products and techniques," says Simões Ré. As an example, before he founded ExtremeOcean Innovation, Peter Gifford joined the MSTEE research team as a graduate student in Ocean and Naval Architectural Engineering. The team also interfaces with private sector firms by sharing data and providing numerical modelling and advice in support of new product development. The freefall lifeboat simulator that Virtual Marine Technology recently developed for training purposes incorporated data that Simões Ré's team had collected as well as numerical models they developed in their research. When Mad Rock Marine Solutions—recently sold to Survival Craft Inspectorate (Canada) Inc.—designed the hull for a new lifeboat designed for ice operation, the MSTEE team assessed the effect of the design on performance.

A 2-min walk separates the NRC Canada from Memorial University's Faculty of Engineering and Applied Science; their proximity facilitates collaboration. Within NRC is the Ocean Technology Enterprise Centre, an incubator for start-up companies. The centre currently houses three companies, but the number has been as high as seven. "This creates a small research park," says Simões Ré. "There seems to be a group of people here with similar interests who are making sure the right things get done. It's something very real. There's good collaboration between all the parts."

GE power conversion's technology helps make the next generation of cruise ships cleaner and greener

GE's power conversion business announced that the latest addition to the MSC Cruises' fleet, MSC Preziosa, has successfully completed sea trials that will move it closer to commissioning. The vessel is one of the newest cruise ships that is part of a growing global electrification trend that replaces mechanical equipment with electrical power generation and propulsion technology. Over the last year, passenger vessels have experienced a growth rate of 3.3% with 20.9 million passengers in 2012. The growth forecast for the next 5 years is projected to be 3% with six new ships being built per year for the next 3 years. Electrical equipment on cruise lines improves the fuel efficiency, comfort, safety, and reliability of the ships' operations. Electrical technology helps cruise line owners operate cleaner and greener fleets around the globe. Cruise shipping globally has seen steady growth over the last 5 years. As operational costs rise and new environmental legislation is implemented, there is a growing demand for innovative technology. One new trend in the industry is an increase in the number of cruise ships utilizing pod propulsion technology, helping to ensure that cruise ships can meet stringent environmental standards and operate at high efficiency. In addition, the need to reduce emissions and fuel consumption is driving ship owners and operators to specify propulsion systems that can deliver significant savings. By using GE's power solutions and propulsion systems, they are benefiting from more space, less weight, improved hull efficiency, lower vibration and noise, and reduced service costs and down time.

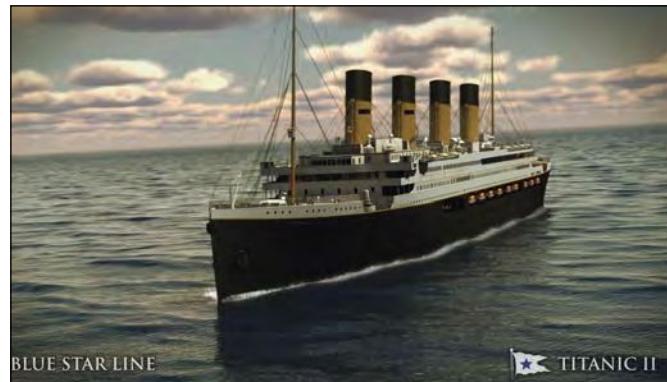
ABS releases dynamic positioning systems requirements

ABS, the leading provider of classification services to the global offshore industry, has released the ABS Guide for Dynamic Positioning Systems as a significant update to present classification requirements to reflect industry advancements in the use of dynamic positioning (DP) systems. "The use of DP systems has been expanded not only in terms of the number of vessels outfitted with the systems, but also in the increasing advancement of DP technologies," says vice president, energy project development, Ken Richardson, noting that the vast majority of newbuild floating mobile offshore drilling units will have DP capability. The new enhanced system (EHS) notation encourages robust designs of DP systems by providing optional requirements. The multiple levels of EHS notation—for power, control, and fire protection—provide owners with the flexibility to tailor the notation to the most important components of the system for the unit's intended operations.

Arctic Marine Transportation System: Overview and Priorities for Action

The draft report, entitled "Arctic Marine Transportation System: Overview and Priorities for Action," is now available for review and comment until April 22, 2013. The CMTS is particularly interested in your views on the importance of the proposed recommendations, including improvements to MTS informational infrastructure and response services and to ensure that information in the draft report is correct and complete. To view the report, visit www.cmts.gov/Bulletin.aspx?id=63.

Plan launched to build Titanic II



Australian mining magnate Clive Palmer announced his plan to build Titanic II in New York during a Hollywood style promotion spectacle.

The cost to build a full-size replica of the original Titanic was not given, but estimates are in the \$200 million range.

Construction of the Titanic II is expected to take place in China at CSC Jinling Shipyard and be completed in the second half of 2016.

Mr. Palmer is building the Titanic II as an exact replica of the original Titanic, including the decor inside. However, it will have some modern amenities such as air conditioning, a theater, a casino, and, most importantly, enough modern lifeboats for everyone. In addition, it is expected that the crew will be especially vigilante for ice bergs, lest it faithfully reenact the ill-fated inaugural cruise of the original.

Like the original, passengers can buy first, second, or third class tickets, although not at 1912 prices, and they will not be allowed to move between classes. Some enthusiasts have been reported to have offered \$1 million to be able to sail on the maiden trip from Southampton, UK to New York.

Mr. Palmer is an Australian businessman, most widely known as owner of Mineralogy and for his investments in other natural resource companies. According to Forbes magazine, his net worth is estimated to be \$795 million as of January 2012.

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

Damen introduces new ASD Tug

Damen Shipyards Group is launching a new vessel type in its ASD Tug series. The ASD Tug 2913 has been designed primarily as a highly maneuverable, powerful tug, ideally suited for busy harbors where space is limited. The new tug is planned to be delivered at the end 2014.

The new type answers market demand for more powerful tugs as vessels continue to get larger and for more spacious accommodation.

Damen Shipyards is proud to announce that it already has a launching customer for the new tug, the highly esteemed German towage operator Petersen & Alpers, which is one of the oldest maritime companies in Germany.

Frank de Lange, Damen sales director South, North and West Europe, explains why Damen decided to introduce a new tug type in the ASD series: "Vessel sizes are increasingly growing, while ports are still restricted to their physical size. Customers were requesting more powerful tugs,

but they still have to be compact so they can operate in harbors which are lacking space."

This new tug Standard slots in between the Damen ASD Tug 2810 with a 60 tonnes bollard pull and the highly powerful offshore terminal ASD Tug 3212, which was recently introduced. Developing a new compact type with a bollard pull of 75 to 80 tonnes was really a logical step for the Damen series, he adds. "For the ASD Tug 2913, we adopted a similar design philosophy as for the new ASD Tug 3212 and, although the vessel is primarily a harbour tug, it also has very good seakeeping capabilities."

At 13 m wide, the vessel is very stable and comfortable for the crew. The new type has push/pull capabilities and can be fitted with an aft winch as an option. The tug is also the first Damen tug to have a double hull to comply with the latest safety regulations and answer customer demand.

For more information, visit www.damen.com.

Caribbean Maritime Institute orders VSTEP simulators for its high-tech Simulation Center

The Caribbean Maritime Institute (CMI) has ordered multiple VSTEP simulators for its new high-tech simulation center at the campus in Kingston, Jamaica. VSTEP will deliver all simulator solutions for the facility, including a NAUTIS full mission bridge simulator and a class C engine room simulator. CMI also ordered full classroom setups for both NAUTIS desktop trainers and NAUTIS engine room desktop trainers.

The new simulation center of CMI will serve as one of the most innovative hubs for maritime training and education in the Caribbean region and will provide high quality training of maritime students and professionals alike in ship-handling, collision avoidance, and engine room procedures and operations as well as ECDIS, Radar/ARPA, AIS, and other navigational aids.

After a thorough evaluation of the available maritime simulator solutions in the market, CMI selected VSTEP's NAUTIS maritime simulators because of their high quality, cost effectiveness and compliance to the latest IMO

STCW regulations.

The NAUTIS simulators for the CMI center include a NAUTIS full mission bridge simulator and class C engine room simulator. Included in the order are NAUTIS classroom setups for engine room training, which include multiple engine room desktop stations, and an additional classroom of NAUTIS part task desktop trainers, maximizing training accessibility and effectiveness at the facility. The facility will also include additional VSTEP RescueSim virtual incident management simulators for realistic training of maritime incidents.

For more information, visit www.cmi.edu.jm.

MHI and Hakata Shipbuilding agree on collaboration

Mitsubishi Heavy Industries, Ltd. (MHI) and Hakata Shipbuilding Co., Ltd., of Imabari, Ehime Prefecture, have agreed to collaborate in the joint development of a 1,000 TEU (20-ft equivalent unit) container carrier. On 18 March 2013, the two companies received the first order for the carrier, for two vessels to be used for time chartering by Korea Marine Transport Co.,

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Ltd. (KMTC) of Korea. The collaboration between MHI and Hakata Shipbuilding targets the development of a new fuel-efficient, high-performance, high-quality, low-cost vessel. Going forward, the two companies intend to establish a framework advantageous for competing in the international feeder container ship market as a way of expanding their businesses.

Under the collaborative agreement, MHI will be responsible for hull form development and conceptual design of the container carrier, while Hakata Shipbuilding will undertake aspects from the basic and detailed design through actual ship construction. The first two ships are slated to go into service sequentially from October 2014.

For more information, visit www.mhi.co.jp.

Jotun introduces the world's first resilient antifouling

Recognized as the industry's market leader in antifoulings, Jotun is pleased to announce the launch of SeaLion Resilient, a high-performance marine coating based on epoxy-polysiloxane technology.

Following extensive research and

testing, Jotun has introduced the industry's first antifouling coating—SeaLion Resilient—that includes epoxy-polysiloxane, a compound of resins and hardeners that provides highly resilient hull protection. When combined with Jotun's proven fouling release coatings (FRC) technology, the epoxy-polysiloxane in SeaLion Resilient prevents the settling of organisms on the hull and produces a glossy, smooth surface optimized for owners seeking to reduce costs related to dry docking and maintenance.

SeaLion Resilient has been specifically formulated for owners and managers seeking improved maintenance and docking efficiency. The properties of SeaLion Resilient significantly reduce the risk of mechanical damage and maintain hull condition throughout the service period. By simplifying maintenance and reducing need for repair, SeaLion Resilient can contribute to a significant reduction in off-hire time and docking and labor costs, while keeping paint consumption to a minimum.

For more information, visit www.jotun.com.

BAE Systems starts construction on platform supply vessel

Construction has begun on the first of two platform supply vessels for Jackson Offshore Operators, LLC. Employees and executives from both companies gathered last week at BAE Systems' Jacksonville, Florida shipyard for a ceremony as construction commenced on the first module, which will weigh approximately 87 tons.

Construction on the second vessel is scheduled to begin later this year. When complete, the entire first vessel will weigh about 3,500 tons deadweight and measure 252 ft long and 60 ft wide, with a draft of 25 ft. Both vessels will be used to support offshore drilling operations.

The GPA 675J platform supply vessel design was provided by Guido Perla & Associates, Inc. of Seattle, Washington. The vessels will include an integrated Rolls-Royce ship systems package inclusive of low-voltage, active front-end diesel electric systems and a complete Rolls-Royce propulsion package with Azipull propulsion thrusters.

For more information, visit www.baesystems.com.

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Investigation of Miami's Artificial Reefs by Manned Submersible

By: Erika Montague, Ph.D., Director of Science and Technology,
Brad Wells, and Chris Harris, OceanGate Inc.

In January 2012, Seattle-based OceanGate Inc. began a year-long expedition to Miami, Florida, the primary focus of which was to conduct research in conjunction with the Miami-Dade Artificial Reefs Program. The three objectives of the expedition were to 1) dive on the artificial reefs aboard OceanGate's manned submersible Antipodes; 2) gather electronic and observational data for local government environmental agencies; and 3) test and evaluate emerging technologies. Using a manned submersible to dive the reefs offered both performance and operational advantages. Not only are submersibles like Antipodes an essential alternative to human divers, especially at depth, but improvements in submersible technology have led to tools that gather a wide range of data as well as the ability to transport multiple investigators to a site where they can work collaboratively.

Antipodes, the flagship of OceanGate Inc., is a manned, American Bureau of Shipping (ABS)-certified submersible utilized for deep-water expeditions, enabling commercial and scientific applications for researchers, scientists, and filmmakers on target sites at depths of 305 m. Antipodes accommodates a crew of four, plus a pilot and boasts twin 147-cm hemispherical acrylic domes, which provide exceptional views for direct observation and filming.

Part of the appeal of exploring the artificial reefs off Miami was rooted in their history. Their construction began in the 1920s and, over the next half century, dozens of vessels and artificial reef materials were sunk off the coast, leading Miami-Dade County to organize reef restoration and enhancement over a 35-nmi coastline in the late 1980s. Since that time, the County has overseen the development of 11 inshore and 17 offshore

reefs, incorporating the deployment of almost 50 additional large vessels, two retired oil platforms, cast concrete materials and limestone, an airplane, and several surplus Army tanks. Today, the artificial reef program, which is administered by the County's Department of Regulatory and Economic Resources (RER), is the largest in the nation (Figure 1). Local scientists admit they still know very little about these deep-water habitats, primarily due to the inability of investigators to reach them at depth.

Antipodes proved to be an ideal operational platform from which to explore these artificial reefs. She cruises at 1 kt and has a maximum speed of 3 kts. She is highly maneuverable, powered by six 5-hp thrusters vectored for 3-axis propulsion, which allows her to operate around complex structures. She is capable of enhanced dive times that make extended, direct observation possible, allowing a full crew to work for 8 hrs with no decompression time required. Her superstructure allows for mounting a customizable array of sonars developed by technology partner Teledyne BlueView Technologies. During the artificial reef dives, Antipodes was equipped with BlueView's 2D sonar head, the P900-130, as well as its 3D microbathymetry sonar system, the BV5000-1350, on a scanning pan and tilt, which provided a highly effective means of mapping large areas of the seafloor

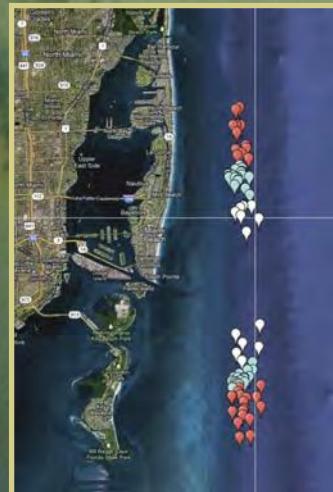
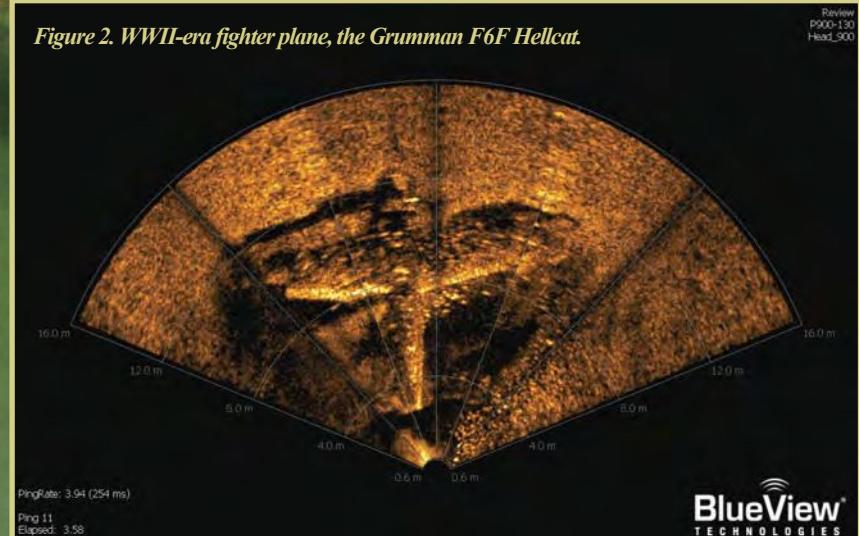


Figure 1. Miami-Dade County artificial reef sites administered by the County's Department of Regulatory and Economic Resources (RER).



and creating bathymetric models. Combining the 2D sonar system for navigation and the 3D head for meteorological data allowed for the investigation of wreck sites in a wide range of conditions, primarily in regions of low water clarity. These high-resolution systems also aided in detecting marine life. Antipodes was also equipped during the dives with both LED and halogen lighting systems along with video and still imaging systems, which were likewise critical components for enabling on-site investigation.

In late March 2012, OceanGate's team dove on the first of numerous sites that RER identified as warranting exploration and evaluation. Since then, Antipodes has conducted 19 dives on nine artificial reefs, with the average dive lasting 2 hrs 21 min and reaching an average depth of 85 m. The deepest dive, done in conjunction with an Explorers Club Flag Expedition in September, was to 244 m. OceanGate crew members logged a total of almost 3,400 man-hours on these dives, which carried 21 non-OceanGate personnel to the reefs, including guest scientists and researchers.

Because the RER program has focused on habitat restoration and enhancement, as well as managing the development of benthic organisms and fish, OceanGate's primary objective in diving the reefs was to provide a visual assessment of the health of the habitats. OceanGate documented visual evidence of habitat quality through the extensive production of still and video images taken in more than 44 hrs of diving on the reefs. During this time, sonar images were also recorded. Initially, 2D scans were performed while flying over new wreck sites to determine their scale and identify any potential obstacles. Once the 2D scans and videos were reviewed topside, a plan for 3D scan locations was developed and bathymetric models were created. On an ongoing basis, OceanGate provided to RER a full range of still and video images as well as extensive sonar imaging records.

The nine sites visited by Antipodes and her crew included several known wrecks, including the Spirit of Hemingway and Mary Star of the Sea, though some of the dives yielded surprises. One site, explored because it had shown up as an unknown anomaly on the National Oceanic and Atmospheric Administration (NOAA) side-scan sonar survey of the seafloor

off Key Biscayne, yielded the wreck of a WWII-era fighter plane, which the U.S. Navy subsequently identified as a Grumman F6F Hellcat (Figure 2). Initial sonar scans of the plane site had displayed a 30-m long target, which led the OceanGate team to assume it was a sunken vessel. However, during the initial dive to the site on 29 June, the sonar technology on Antipodes produced the first-ever, close-range, underwater scans of the distinctive Hellcat at depth of more than 70 m. The OceanGate team has returned for additional observation and data collection on nine more missions, including a long-duration dive of eight hrs. OceanGate has since donated its collection of photographs, videos, and technical scans of the Hellcat to the Naval History & Heritage Command in Washington, D.C. The files will be used in the preservation of this federally protected site and in possible future research on the plane.

Locating the Hellcat was only one of several discoveries that have perfectly illustrated the value of manned submersible exploration. For example, while marine researchers were aware that the lionfish, *Pterois volitans*, was an increasingly invasive species in South Florida waters, the extensive prevalence of the fish as noted during OceanGate dives, even at depths as great as 70 m, has pointed to the need for an ongoing investigation of the species and its effects on the local marine habitat (Figure 3 - background photo).

Considered together, the Hellcat and lionfish discoveries offer evidence of the value of a submersible like Antipodes, which is well suited for investigating at depths of 45 to 150 m, the so-called "forgotten zone," which is beyond the reach of recreational and even most commercial divers. Antipodes offers crew members from multiple disciplines to collaborate in real time, so that those with differing expertise and perspectives can determine how to best integrate photographic and video data, take scientific measurements, and collect samples. This method, which allows the integration of technology with collaborative human observation and control, adds a critically valuable element to exploration—the ability to adapt and improvise.

Figure 3. Large congregation of invasive lionfish, *Pterois volitans*, around the Hellcat artificial reef site.

Interpol launches major global initiative to fight illegal fishing

Interpol's Environmental Crime Programme, with support from The Pew Charitable Trusts, the Norwegian Ministry of Foreign Affairs, and the Norwegian Agency for Development Cooperation, announced the launch of a major global effort to stem illegal fishing and its associated crimes. This initiative, called Project SCALE, was launched at the 1st INTERPOL International Fisheries Enforcement Conference held at the Interpol General Secretariat in Lyon, France. Illegal, unregulated, and unreported fishing costs the global economy up to \$23 billion a year, according to a landmark study published in 2009 in the peer-reviewed journal PLoS One, and harms coastal communities, legal commercial fishing interests, and the marine environment. Illegal fishers exploit—and profit from—weak laws, poor information sharing across jurisdictions, and a shortage of monitoring and enforcement resources, particularly in developing countries. "Project SCALE is an important component of a proposed global system to stop fisheries crime," said Joshua Reichert, an executive vice president at Pew who leads the organization's environmental work. "Illegal fishing threatens the interests of legitimate fishermen worldwide and undermines the ability of the global community to properly manage fisheries in ways that will ensure a healthy future for this vitally important resource. In addition, efforts by pirate fishermen to keep their profits hidden spawn a host of other illegal activity, including money laundering, tax evasion, and fraud. With its global reach and history of tackling environmental crime, INTERPOL is ideally positioned to help bring these criminals to justice."

Robots track sharks

Underwater robots are now tracking sharks and transmitting data to marine scientists, thanks to a team of researchers led by Harvey Mudd College engineering Professor Christopher Clark; California State University, Long Beach biological science Professor Christopher Lowe; and University of Delaware biological science Professor Mark Moline. More than 10 student researchers have contributed to the project, including HMC physics major Chris Gage, 2013. The new shark tracking technology allows scientists to follow sharks across longer distances and for longer periods of time, as well as report on the sharks' environment, providing information about the factors that may influence their migration patterns. The tracking system uses multiple autonomous underwater vehicles (AUVs) equipped with sensors designed to receive signals from an acoustic-emitter tag attached to the shark. Based on the tag's time of arrival and signal strength data, the AUV can estimate and follow the shark's location. The AUVs, which resemble small torpedoes, are programmed to continuously circle the shark. The AUVs follow opposite sides of the circular paths to provide opposing sensor vantage points of the shark. Notably, Gage, 2013, wrote code for an acoustic communication-based command and control system that allows the researchers to run and monitor the system from a dock or boat. Successful multi-AUV tracking and following of a leopard shark was accomplished this past summer in Big Fisherman's Cove, Catalina Island, California.

Fluorescent light revealed as gauge of coral health



Coral reefs not only provide the world with rich, productive ecosystems and photogenic undersea settings, they also contribute an economic boost valued at hundreds of billions of dollars. But their decline in recent years due to a variety of threats—from pollution to climate warming—has lent urgency to the search for new ways to evaluate their health.

A new study by Scripps Institution of Oceanography, at UC San Diego scientists has revealed that fluorescence, the dazzling but poorly understood light produced by corals, can be an effective tool for gauging their health.

As described in *Scientific Reports* (a publication of the Nature Publishing Group), marine biologists Melissa Roth and Dimitri Deheyn describe groundbreaking research using fluorescence to test coral stress prompted from cold and heat exposures.

In experimental studies conducted at Scripps, Roth and Deheyn tested the common Indo-Pacific reef-building branching coral *Acropora yongei* under various temperatures. Branching corals are susceptible to temperature stress and are often one of the first to show signs of distress on a reef. Roth and Deheyn found, at the induction of both cold and heat stress, corals rapidly display a decline in fluorescence levels. If the corals are able to adapt to the new conditions, such as to the cold settings in the experiment, then the fluorescence returns to normal levels upon acclimation.

While the corals recovered from cold stress, the heat-treated corals eventually bleached and remained so until the conclusion of the experiment. Coral bleaching, the loss of tiny symbiotic algae that are critical for coral survival, is a primary threat to coral reefs and has been increasing in severity and scale due to climate change. In this study, the very onset of bleaching caused fluorescence to spike to levels that remained high until the end of the experiment. The researchers noted that the initial spike was caused by the loss of "shading" from the symbiotic algae.

"This is the first study to quantify fluorescence before, during, and after stress," said Deheyn. "Through these results, we have demonstrated that changes in coral fluorescence can be a good proxy for coral health."

Deheyn said the new method improves upon current technologies for testing coral health, which include conducting molecular analyses in which coral must be collected from their habitat, as opposed to fluorescence that can be tested non-invasively directly in the field.

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

Glaciers contribute significant iron to North Atlantic ocean

All living organisms rely on iron as an essential nutrient. In the ocean, iron's abundance or scarcity means all the difference as it fuels the growth of plankton, the base of the ocean's food web.

A new study by biogeochemists and glaciologists at Woods Hole Oceanographic Institution (WHOI) identifies an unexpectedly large source of iron to the North Atlantic—meltwater from glaciers and ice sheets, which may stimulate plankton growth during spring and summer. This source is likely to increase as melting of the Greenland ice sheet escalates under a warming climate.

The study was published online in *Nature Geoscience* on 10 March 2013.

"There's only been one other study looking at the amount of iron that's being released in meltwater runoff itself," says Maya Bhatia, a graduate of the MIT/WHOI Joint Program in Oceanography and Applied Ocean Sciences and Engineering and the study's lead author, "and that had reported high nanomolar concentrations. So, to find iron in concentrations several orders



of magnitude higher—in the micromolar range—was very surprising."

Iron from wind-blown dust and river runoff fuels annual plankton blooms in the world's ocean. Ice sheets and glaciers are now also thought to contribute iron from sediments on the bottom of calved icebergs and glacially derived dust. Until now, meltwater runoff from glaciers and ice sheets was considered too diluted to carry much iron, although previous research has shown a strong correlation between the plankton blooms and the runoff from Greenland ice sheet.

During the course of two expeditions to the Greenland ice sheet in May and July 2008, Bhatia and her colleagues collected samples from sites at several land-terminating glaciers on the western side of the Greenland ice sheet. The glaciers' meltwater empties into a large lake, which eventually drains into an estuary system before reaching the open

ocean. Their study reports levels of dissolved iron orders of magnitude higher than previously found for Greenland glacial runoff rivers. When the WHOI team extrapolated their findings to calculate the contribution of iron from the entire ice sheet, they estimated its value to be within the range of that from dust deposition in the North Atlantic, which is believed to be the primary source of bioavailable iron to this ocean. This value is only an order of magnitude lower than the estimated annual contribution of iron from rivers worldwide.

For more information, visit www.whoi.edu.

Jellyfish blooms pulse cyclically through time

A surge in jellyfish blooms over the past decade has spawned similar blooms of public fascination with these sea drifters and their apparent saturation of our oceans. Images of fish nets and nuclear-plant intake pipes clogged with gelatinous sacks of tentacles have flared concerns for fisheries and public safety. But recent work from an international team of marine scientists, including



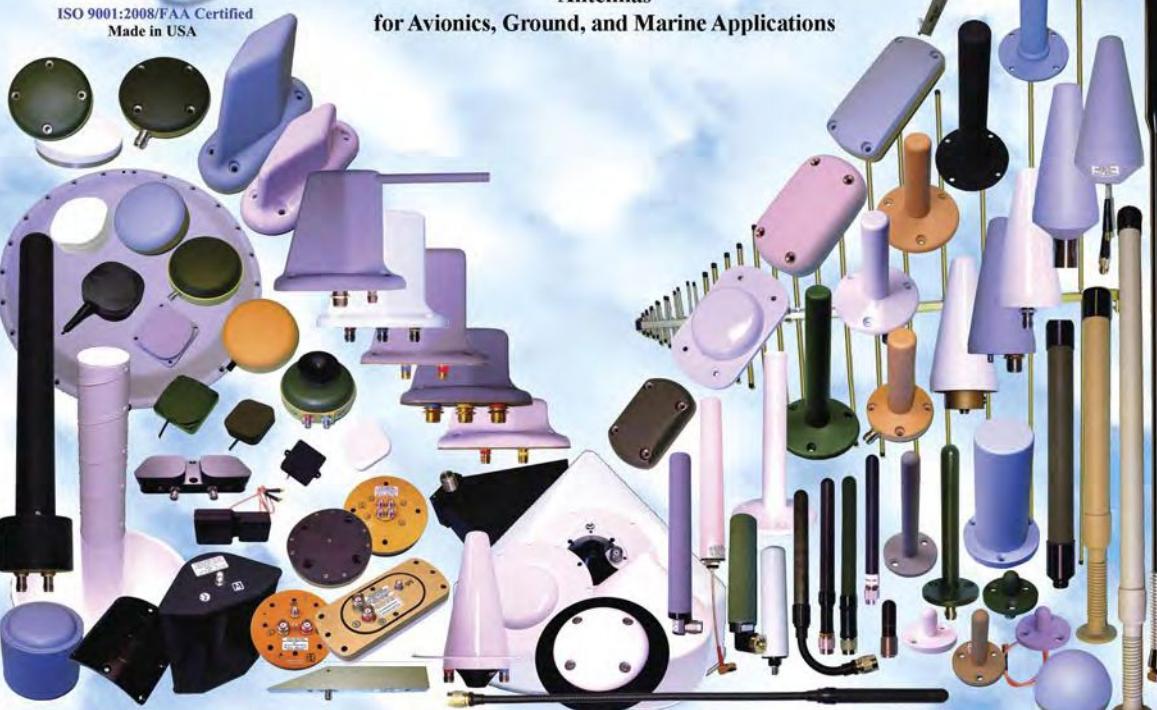
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MBARI biologist Steve Haddock, suggests that this recent population explosion might only reflect half of the jellyfish story.

In the largest-scale jellyfish study to date, the scientists reviewed records of jelly sightings from 37 regions around the world dating from 1874 to 2011. Through a series of statistical tests, the researchers discovered a cyclic pattern to the jellyfish blooms, with peaks roughly every 20 years. The recent jellyfish pulse might, thus, be a snapshot within a long series of natural cycles, the team notes in the December Proceedings of the National Academy of Sciences.

For more information, visit www.mbari.org.

New study to predict future shape of coastline

A new experiment involving scientists and engineers from the National Oceanography Centre (NOC) is under way that will help forecast the shape of the Dutch coastline under changing climate conditions.

The “STRAINS” (STRAtification

Impacts on Nearshore Sediment) experiment is an international study designed to understand how the presence of the River Rhine plume—a buoyant mass of freshwater formed as the river meets the denser seawater at its mouth—affects sediment transport along the Dutch coastline. NOC will provide the scientific underwater platforms that will measure turbulence and sediment transport in the nearshore area off the coast of the Netherlands. NOC staff will also help in the design and planning of the overall experiment.

This information will contribute to coastal management strategies dealing with future coastal hazards and their impact on the natural and built environment in coastal zones—predicted to be exacerbated in the coming decades as a result of climate change.

Large rivers, such as the Rhine, are important transporters of sediment from terrestrial sources to the oceans. The Rhine flows through Germany, Austria, Switzerland, France, and the Netherlands before it meets the North Sea at the Hook of Holland where the Rhine plume forms. The plume is laden

with the river’s sediment load, and how this load is dispersed by the plume can have a significant impact on the shape of the coastline.

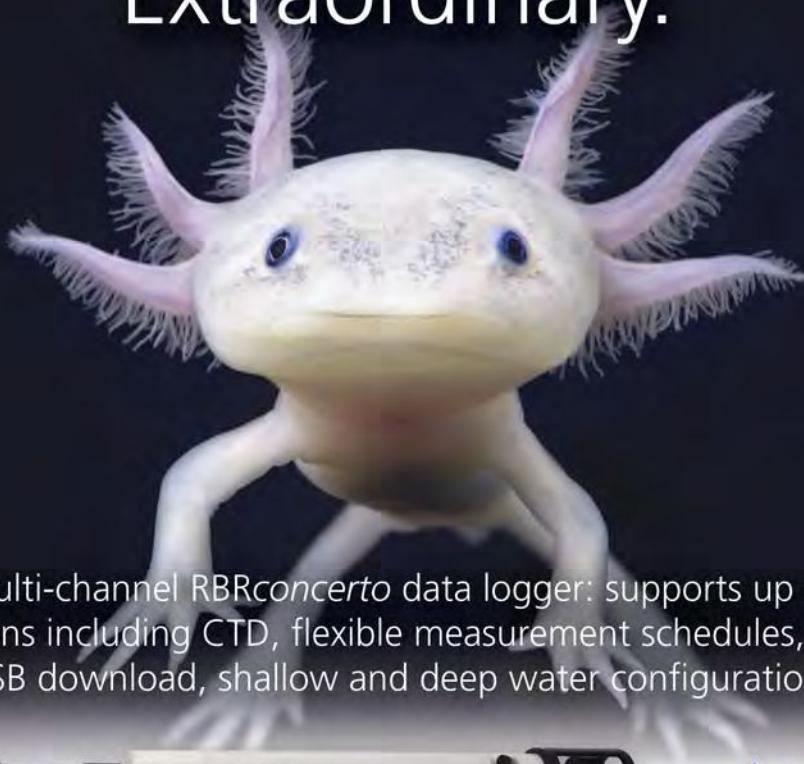
The STRAINS experiment, in support of the Dutch NEMO project (Nearshore Monitoring and Modelling), involves NOC, the University of Washington, and the Technical University of Delft. NEMO is a research project that aims to make significant advances in our ability to forecast the shape of coastlines in the coming decades. The project is lead by Delft University of Technology, under the supervision of Professor Marcel Stive.

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

Ocean plankton sponge up nearly twice the carbon assumed

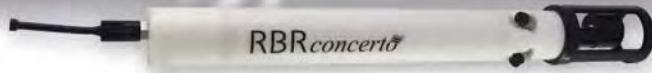
Models of carbon dioxide in the world’s oceans need to be revised, according to new work by UC Irvine and other scientists published online in *Nature Geoscience*. Trillions of plankton near the surface of warm waters are far more carbon-rich than has long been thought, they found. Global marine tem-

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perature fluctuations could mean that tiny Prochlorococcus and other microbes digest double the carbon previously calculated. Carbon dioxide is the leading driver of disruptive climate change.

In making their findings, the researchers have upended a decades-old core principle of marine science known as the Redfield ratio, named for famed oceanographer Alfred Redfield. He concluded in 1934 that from the top of the world's oceans to their cool, dark depths, both plankton and the materials they excrete contain the same ratio (106:16:1) of carbon, nitrogen, and phosphorous.

The new study's authors found dramatically different ratios at a variety of marine locations. What matters more than depth, they concluded, is latitude. In particular, the researchers detected far higher levels of carbon in warm, nutrient-starved areas (195:28:1) near the equator than in cold, nutrient-rich polar zones (78:13:1).

"The Redfield concept remains a central tenet in ocean biology and chemistry. However, we clearly show that the nutrient content ratio in plankton is not constant and, thus, reject this long-standing central theory for ocean

science," said lead author Adam Martiny, associate professor of Earth system science and ecology & evolutionary biology at UC Irvine. "Instead, we show that plankton follow a strong latitudinal pattern."

He and fellow investigators made seven expeditions to gather big jars of water from the frigid Bering Sea, the North Atlantic near Denmark, mild Caribbean waters, and elsewhere. They used a sophisticated \$1 million cell sorter aboard the research vessel to analyze samples at the molecular level. They also compared their data to published results from 18 other marine voyages.

Martiny noted that since Redfield first announced his findings, "there have been people over time putting out a flag, saying, 'Hey, wait a minute.'" But for the most part, Redfield's ratio of constant elements is a staple of textbooks and research. In recent years, Martiny said, "a couple of models have suggested otherwise, but they were purely models. This is really the first time it's been shown with observation. That's why it's so important."

For more information, visit www.news.uci.edu.

New study reveals how sensitive U.S. East Coast regions may be to ocean acidification

A continental-scale chemical survey in the waters of the eastern U.S. and Gulf of Mexico is helping researchers determine how distinct bodies of water will resist changes in acidity. The study, which measures varying levels of carbon dioxide (CO_2) and other forms of carbon in the ocean, was conducted by scientists from 11 institutions across the U.S. and was published in the journal *Limnology and Oceanography*.

"Before now, we haven't had a very clear picture of acidification status on the east coast of the U.S.," says Zhaohui "Aleck" Wang, the study's lead author and a chemical oceanographer at WHOI. "It's important that we start to understand it because increase in ocean acidity could deeply affect marine life along the coast and has important implications for people who rely on aquaculture and fisheries, both commercially and recreationally."

For more information, visit www.whoi.edu.

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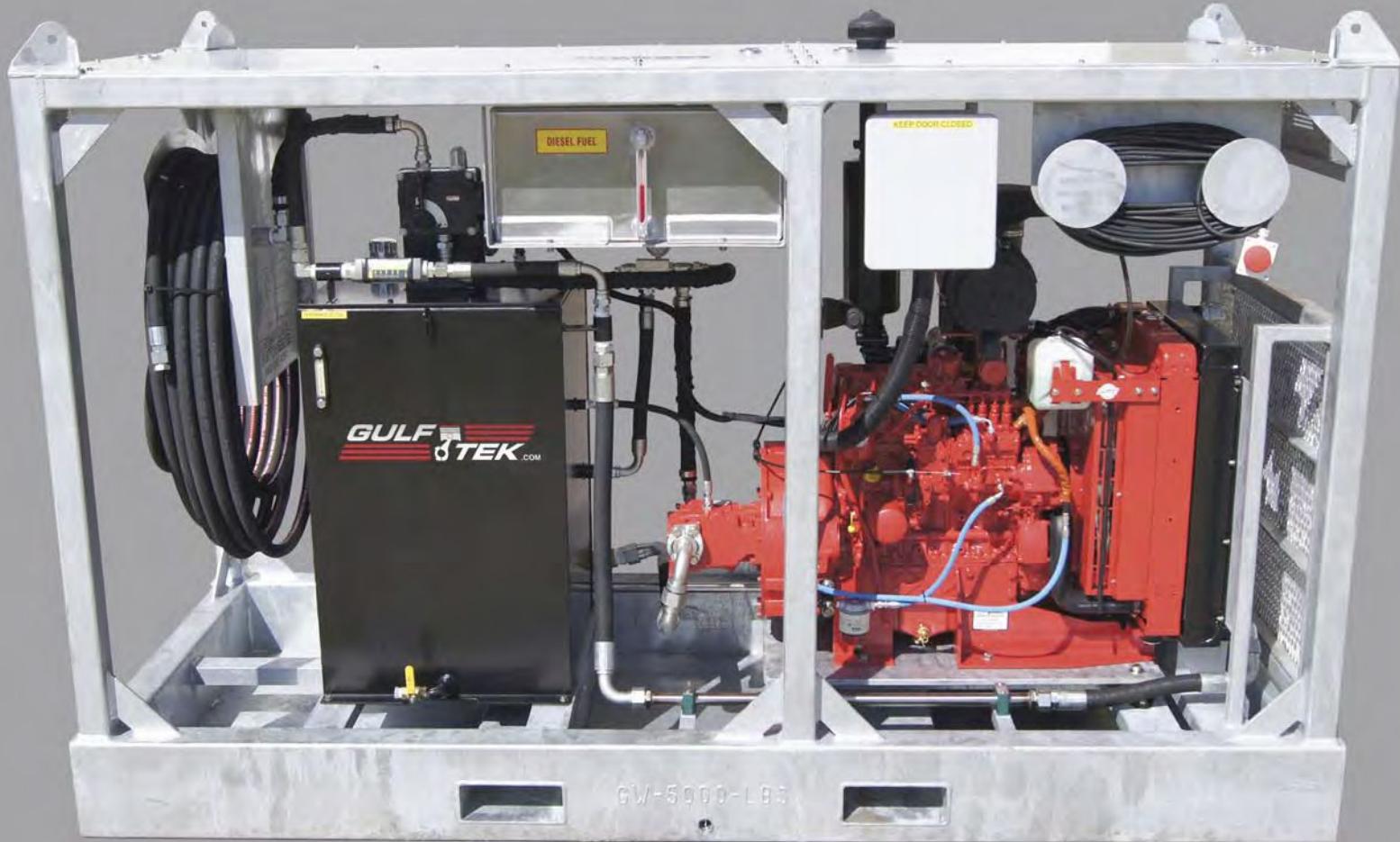
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FERC, U.S. Coast Guard sign agreement to coordinate development of hydrokinetic projects
 The Federal Energy Regulatory Commission (FERC) and the U.S. Coast Guard within the U.S. Department of Homeland Security have signed a Memorandum of Understanding (MOU) to cooperate with each other on the development of hydrokinetic projects. These projects generate power from waves, tides, ocean currents, and the flow of rivers. The MOU will advance interagency cooperation in protecting navigation safety, maritime security, and environmental resources when considering license proposals for hydrokinetic energy development. "Hydrokinetic development is an up-and-coming resource, and this MOU provides valuable coordination between FERC and the Coast Guard to ensure an efficient process while protecting valuable environmental resources," commented FERC Chairman Jon Wellinghoff. "I want to thank the Coast Guard for their willingness to move forward with the important agreement." Specifically, the MOU will improve the ability of the agencies to establish a joint timetable, identify critical issues early, acquire and share information efficiently, and collaborate on analysis.

ABB leads \$12 million investment in tidal power leader Scotrenewables

ABB, the global power and automation technology group, has led a \$12 million investment in Scotrenewables Tidal Power, a provider of tidal turbine systems, to support the rollout of a new hydrokinetic device and to expand ABB's renewable energy assets. ABB's participation was made through its venture capital unit, ABB Technology Ventures (ATV), which invests in early and growth stage companies with technologies of strategic importance to the industries it serves. The investment round included participation from existing strategic investors Total New Energies, a unit of oil major Total, and Fred. Olsen, the Norwegian maritime conglomerate, through its associated Bonheur and Ganger Rolf holding companies. The funding is being used specifically to roll out a larger and more advanced tidal energy conversion system known as the SR2000. The floating 2-MW turbine includes a number of innovations to deliver simplicity, low mass, rapid connection/disconnection, and heightened survivability. Scheduled for completion next year, it will be the first of a number of commercial units installed in the Lashy Sound tidal demonstrator project in Orkney, where Scotrenewables is based.

London Array – the world's largest operational offshore wind farm

On 7 March 2013, London Array officially became the world's largest operational offshore wind farm. In total, 141 of the 175 3.6 MW Siemens wind turbines are now able to generate 507 MW of energy for UK homes and businesses. This is a significant achievement for everyone involved in the project that generated first power in October 2012. The final turbine was installed in December 2012, and the project is expected to be fully operational in the spring. London Array is arguably the most widely known UK offshore wind farm. Its sheer scale and proximity to Greater London mean it is often referred to by politicians and in the press. When complete, it will be capable of generating enough energy to power nearly half a million homes and reduce harmful CO₂ emissions by over 900,000 tons a year.

DONG Energy on track to complete installation of 111 turbines



DONG Energy is exactly halfway in the Danish wind turbine installation project at Anholt Offshore Wind Farm and expects the erection of all 111 wind turbines to be completed and the wind turbines to be operational by summer, as planned.

Of the 55 turbines already installed, 48 have been energized and 33 have produced power.

Up to four installation vessels have worked on installation together. They are Sea Jack, Sea Installer, Sea Power, and Sea Worker.

Turbine installations are dependent on weather conditions, and the harsh weather this winter has meant that, for several periods, it has not been possible to install wind turbines.

Wind and waves have reduced installation speed due to technical limitations of the installation vessels, but all weather windows enabling installation have been used optimally.

Wind turbine installation activities commenced on 1 September 2012, and the first wind turbine was erected on 3 September. It was this very wind turbine that produced the first power generated by Anholt Offshore Wind Farm.

For more information, visit www.dongenergy.com.

GDF Suez signs an industrial partnership agreement for its tidal power project at Raz Blanchard (Lower-Normandy)

GDF Suez has signed a partnership agreement with Cofely Endel, its subsidiary that specializes in industrial maintenance; the hydro turbine equipment design company Voith Hydro; the French shipbuilder Constructions Mécaniques de Normandie (CMN); and ACE1. Through this partnership, GDF Suez reaffirms its marine energy ambitions

and its commitment, working with industrial companies with complementary expertise and local interests to develop a pilot plant at Raz Blanchard as early as 2016.

Through this industrial partnership agreement, GDF Suez and its partners will be able to combine their know-how and collaborate through the construction, assembly, and maintenance phases of the future Raz Blanchard pilot plant. The Group selected the Voith Hydro-designed "HyTide" marine technology to outfit all or part of this pilot plant.

The partnership is also made up of ACE and CMN, whose location at the port of Cherbourg is an advantage for carrying out these operations, which, for the most part, must be performed near the site of immersion of the marine turbines. Cofely Endel, also based at Cherbourg, will provide its industrial maintenance skills and technical project management expertise for this type of enterprise.

The aim of GDF SUEZ is to contribute to creating an industrial marine current sector in France and develop a project that respects the local environment. Therefore, the Group works with maritime and administrative authorities, not-for-profit organizations, and fishermen to accommodate local economic activities and the particularities of the site. During the summer of 2012, the Group also embarked on a thorough offshore campaign at Raz Blanchard of measures, enabling it to improve its knowledge of the site, particularly seabed characteristics, water depths and currents, and the makeup of marine sediments.

For more information, visit www.gdfsuez.com.

Mojo Maritime launches HiFlo-4 to unlock tidal energy

Mojo Maritime revealed plans for its patented development of the HiFlo-4 Installation Vessel (HF4) at the Renewable UK 2013 Wave and Tidal Event in London. HiFlo-4 is a high-performance vessel built around installation processes and the demanding environment experienced in tidal races such as The Pentland Firth. The launch focused on the vessel's capability; the economic model and the commercial development of the project is focused on safe, economic industrialization of tidal energy.

The vessel is designed to operate using dynamic positioning in currents up to 10 kts, allowing a high degree of accessibility and improved productivity

during the construction phases of tidal energy farms—indeed, the modeling carried out demonstrates that the vessel is capable of complete installation and hook up of 50 turbines per year, equating to 70 MW of installed capacity from a single vessel.

The vessel is a twin-hull vessel powered by four Voith Schneider propellers (VSP), with a high degree of attention on the hydrodynamics of the twin hulls

coupled with the VSPs. The vessel is capable of installing foundations, cables, subsea connectors, and turbines in a wide range of conditions. The design has been inspired by Mojo's work with Bauer on their award-winning BSD-3000 Subsea Drill and provides a safe and economic platform for installing drilled foundations.

For more information, visit www.mojomaritime.com.

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MacArtney named partner in major Pacific WindFloat project

Recently, renewable energy technology developer Principle Power was awarded a Department of Energy grant worth \$4 million and up to \$47 million in total funding to support its WindFloat Pacific Demonstration Project.

Principle Power has announced the list of official project partners, all marked to deliver an essential contribution to the WindFloat project. MacArtney Underwater Technology is proud and pleased to feature on this list and to be a part of such a promising and large-scale project.

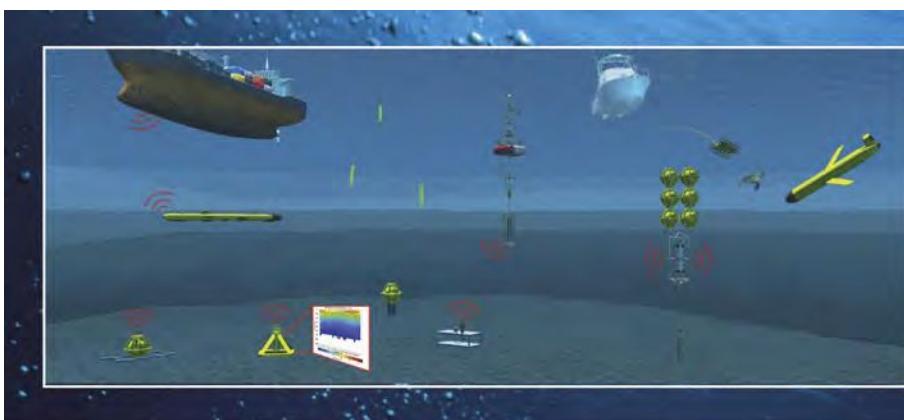
The list of project partners also include: Siemens Wind Power, Houston Offshore Engineering, the Pacific Northwest National Laboratory, the National Renewable Energy Laboratory, RPS Evan Hamilton, Forristal Ocean Engineering, the American Bureau of Shipping, and Det Norske Veritas.

The WindFloat Pacific Demonstration Project is centered around a 30-MW floating offshore wind farm, planned to be located approximately 25 km west of Oregon's Port of Coos Bay.

To date, due to technology and project economics, offshore wind farm locations have been limited to environmentally and stakeholder sensitive shallow inshore waters. However, based on a patented floating foundation for offshore wind turbines, the innovative features of the WindFloat allow turbines to be placed at deepwater locations, out of sight from shore where the wind is stronger and more consistent.

The WindFloat offers considerable economical advantages over traditional offshore wind solutions, since the entire turbine and floating foundation is built and assembled on shore and installed using conventional tug vessels. This way, the WindFloat is also a more cost-effective, simpler, and less risky approach to offshore wind development. A prototype of the WindFloat system has been operating successfully off the coast of Portugal since October 2011. This installation marks the first multi-megawatt offshore wind turbine to be installed without the use of any heavy-lift offshore vessels.

For more information, visit www.macartney.com/renewable-energy.



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Oceaneering and General Dynamics awarded contracts worth \$397 million

Oceaneering International and General Dynamics Electric Boat Corporation are each being awarded indefinite-delivery/indefinite-quantity, cost-plus-fixed-fee contracts with an estimated ceiling of \$181,831,426 for Oceaneering International and an estimated ceiling of \$215,518,065 for Electric Boat Corp. for services to support submarine safety program (SUBSAFE) and intermediate level work. This contract will provide technical management, administrative and technical services, materials, tools, equipment, facilities, and required support to accomplish installation, troubleshooting, repair, and maintenance of main and auxiliary, weapons, hull, mechanical, and electrical equipment. The Naval Surface Warfare Center, Carderock Division, Ship System Engineering Station, Philadelphia, Pennsylvania, is the contracting agency.

DSIT receives another order from an undisclosed Navy for its AquaShield™ Underwater Security Systems

DSIT Solutions Ltd., an Acorn Energy company, announced the receipt of multiple orders from an undisclosed Navy for a number of AquaShield™ Underwater Security systems. The orders totaling \$3.2 million are for immediate production and delivery. The customer has been using the DSIT AquaShield™ Diver Detection Sonar and PointShield™ Portable Diver Detection Sonar systems for protection of the country's critical assets for a number of years. This round of orders is designed to further broaden their already existing tight maritime security. The AquaShield™ underwater surveillance solution includes automatic detection, tracking, and classification for both SCUBA and closed-circuit divers. The main customers for the systems are navies, homeland security agencies, oil and gas (O&G) companies, nuclear power facilities, and port authorities as well as yachts and coastal homes of the mega-rich. DSIT is currently in the process of deploying what is considered by many to be one of the world's largest O&G underwater security projects. The additional units will be supplied throughout 2013 for deployment at various coastal sites and offshore installations.

ATLAS ELEKTRONIK and Thales Deutschland to modernize combat system of F124 frigate
ATLAS ELEKTRONIK and Thales Deutschland have been jointly commissioned to modernize the combat system of the German Class F124 frigates. The CEOs of both enterprises recently signed the contract at the Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support (BAAINBw) in Koblenz. With completion scheduled for 2017, the HW Regeneration CDS F124 consortium formed by the two companies will refurbish the hardware of the Combat Direction System (CDS) and also adapt and update the software. The regeneration process is driven by the sweeping implementation of commercial hardware and software because technological development in this field is progressing at a rapid pace. Here, it will be possible to build up on the know-how and experience gained during the F124 construction and service phase in which both companies were involved. The order comprises the three frigates, "Sachsen," "Hamburg," and "Hessen," as well as the Test and Training Centre (EZ/AZ) in Wilhelmshaven and the Reference Maintainer and Training Site (RMTS) in Den Helder. The work is to be organized and managed in such a way that the vessels will not need to be taken out of service.

U.S. Navy funds four additional Littoral Combat Ships



USS Independence (LCS 2) arrives at Mole Pier at Naval Air Station Key West. U.S. Navy photo by Naval Air Crewman 2nd Class Nicholas Kontodiakos/Released

The U.S. Navy has awarded contracts to Austal and Lockheed Martin for the construction of four additional Littoral Combat Ships (LCS). The award gives \$696 million to Lockheed Martin for two Freedom-class monohull ships and \$682 million for two Independence-class aluminum trimarans.

Austal USA's order backlog has grown by approximately US\$681.7 million as a result of two additional Littoral Combat Ship (LCS) contract options being exercised by the U.S. Navy.

The contract options fund construction of the LCS 14 and LCS 16, the fifth and sixth ships in the 10-ship block buy award made to an Austal-led team in December 2010. That 10-ship program is potentially worth over US\$3.5 billion.

Austal chief executive officer Andrew Bellamy said the company's U.S. Navy programs provide revenue and workload for years to come.

Work will be performed in Mobile, Alabama (51%); Pittsfield, Massachusetts (13%); Cincinnati, Ohio (4%); Baltimore, Maryland (2%); Burlington, Vermont (2%); New Orleans, Louisiana (2%); and various locations of less than 2% each totaling 26%. Work is expected to be completed by June 2018.

Lockheed Martin is being provided funding under previously awarded contract (N00024-11-C-2300). Work will be performed in Marinette, Wisconsin (56%); Walpole, Massachusetts (14%); Washington, D.C. (12%); Oldsmar, Florida (4%); Beloit, Wisconsin (3%); Moorestown, New Jersey (2%); Minneapolis, Minnesota (2%); and various locations of less than 1% each totaling 7% and is expected to be completed by July 2018.

The Navy's first littoral combat ship USS Freedom (LCS 1) departed her homeport of San Diego to venture out to the Asia-Pacific region on its maiden deployment 1 March.

For more information, visit www.navy.mil.

Raytheon's 5th generation hull-mounted sonar to enable anti-submarine, undersea warfare

Raytheon Company has been awarded a sub-contract from Science Applications International Corporation (SAIC) to deliver its first 5th generation, medium-frequency, hull-mounted sonar system as part of the Defense Advanced Research Projects Agency (DARPA) Anti-Submarine Warfare Continuous Trail Unmanned Vessel (ACTUV) program.

According to the U.S. Navy, 43 nations operate more than 600 submarines; the steady increase in undersea vessels makes tracking a challenge. Raytheon's Modular Scalable Sonar System (MS3) will integrate into SAIC's prototype trimaran vessel as the primary search and detection sonar. The system is designed to provide search, detection, passive-threat filtering, localization, and tracking capabilities without requiring human operation.

MS3 enables anti-submarine warfare (ASW) and undersea warfare with capabilities such as active and passive search, torpedo detection and alertment,



and small object avoidance. Data from multiple sonars may be fed to a central command and control node, providing a common operating picture as part of the ASW mission. By integrating a host of capabilities in a single sonar system, Raytheon delivers an affordable solution that addresses critical naval challenges.

For more information, visit www.raytheon.com.

UK Navy commissions submarine

HMS Ambush was commissioned into the Royal Navy to become "Her Majesty's Ship" during a ceremony overseen by the submarine's crew, Naval Base, workers, and around 500 invited guests.

Launched on 5 January 2011 at BAE Systems shipyard at Barrow-in-Furness, HMS Ambush arrived at her home port of HM Naval Base Clyde on 19 September last year.

Since then, she has undergone extensive sea trials to ensure she is ready to

become part of the Fleet with the White Ensign being raised for the first time on 18 January after the signing of the Certificate of Acceptance transferring the submarine from her builders to the Ministry of Defence.

For more information, visit www.royalnavy.mod.uk.

NATO Centre for Maritime Research and Experimentation tests Wave Glider technology

The Antisubmarine Warfare (ASW) Exercise Proud Manta '13 (POMA '13), which includes participating ships and aircraft from 10 NATO nations, will be held from 23 February to 6 March off the coast of Sicily.

As in 2012, the 2013 Proud Manta includes major scientific tests during the exercise: scientists from the NATO Centre for Maritime Research and Experimentation (CMRE) are testing technologies and software that they have been developed for detection and tracking of submarines in the marine environment. In particular CMRE performs experimentation with an

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autonomous ASW barrier to protect a shoreline asset using autonomous underwater and surface vehicles (AUVs and ASVs), with the Ocean Explorer AUV performing detections as in POMA '12, and the Wave Glider, a new wave-powered unmanned surface vehicle debuting here for the first time in a NATO ASW exercise, acting as a communications gateway.

This large-scale exercise is a valuable opportunity for CMRE to test cutting-edge ASW systems in a realistic scenario. It is also an occasion to see how new advances in research and technology, such as autonomous underwater vehicles (AUVs), can be applied to NATO missions in the future.

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

OceanServer Technology announces full compatibility with SeeByte's SeeTrack military

SeeByte, the global leader in creating smart software for unmanned maritime systems, and OceanServer Technology, a leading provider of



unique product solutions in the fields of sensor technologies and robotics, have announced the compatibility of the OceanServer Autonomous Underwater Vehicle (AUV) Iver2 with SeeByte's SeeTrack Military software.

OceanServer Technology has chosen to release their newly developed advanced plug-ins, created for the SeeTrack Military software, so that current users of the Iver2 AUV systems may operate and benefit from SeeByte's smart solutions and additional modules such as seafloor classification, Automatic Target Recognition (ATR) and the Performance Analysis and Training Tool. SeeTrack Military users will now be able to plan and coordinate Iver2 missions with other unmanned vehicles and diver handheld navigation

systems and will still be able to process large amounts of sensor data, including side-scan, imaging sonar, and video in one common package.

For more information, visit www.seebyte.com.

General Dynamics awarded submarine safety and maintenance contract

The U.S. Navy has awarded General Dynamics Electric Boat a contract to perform submarine safety program (SUBSAFE) and intermediate submarine maintenance work for submarines. This 5-year, indefinite delivery, indefinite quantity contract has a potential value of \$215.5 million. Electric Boat is a wholly owned subsidiary of General Dynamics.

Electric Boat will provide technical management; administrative and technical services; tools, equipment, and facilities; and required support to accomplish installation, repair, and maintenance of weapons, hull, mechanical, and electrical equipment.

For more information, visit www.generaldynamics.com.

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USNS Montford Point christened in San Diego

The Navy's first mobile landing platform ship, USNS Montford Point (T-MLP 1), was christened at the General Dynamics NASSCO shipyard in San Diego.

Owned and operated by Military Sealift Command, Montford Point was christened by its sponsor, Alexis "Jackie" Bolden, the wife of current NASA administrator Charles Bolden. Gen. James F. Amos, Commandant of the Marine Corps, delivered the ceremony's principal address, and Rear Adm. Mark H. Buzby, commander of MSC, also spoke on behalf of the ship and crew.



The first of three MLPs being built for MSC by NASSCO, Montford Point will join MSC's Maritime Prepositioning Force as a seagoing pier in the event that accessibility to onshore bases is denied.

Montford Point is named in honor of the 20,000 African-American Marine Corps recruits who trained at Montford Point Camp, North Carolina, from 1942 to 1949. It is the cornerstone of the Navy's sea-base concept, serving as a transfer point for a Marine Corps amphibious landing force between large ships and ship-to-shore landing craft. The ship also provides the ability to transfer vehicles and equipment at sea while interfacing with surface connectors to deliver the vehicles and equipment ashore, improving the Navy's ability to deliver equipment and cargo from offshore to an amphibious objective.

For more information, visit www.navy.mil.

Shark Marine Inc. builds a LARS for the Canadian Navy

The Royal Canadian Navy has taken acceptance of a Shark Marine Launch and Recovery System (LARS). Shark Marine Technologies Inc. designed and manufactured the LARS for use with the Navy's survey operations division, Klein 5000 side-scan sonar.

The system incorporates the use of a

standard ISO platform layout, allowing the system to be transferred or transported with ease. The LARS can deploy its A-frame in a matter of seconds from the stowed position to fully deployed, with no need for extra equipment or personnel. The tether is handled with a hydraulic-powered reel and kept uniform by a robust hydraulic level wind. The LARS can be controlled from three points of operation, allowing the user to effectively and safely keep an eye on all aspects of deployment and retrieval.

The LARS was also outfitted with the Shark Marine Inc. Smart Sheave. This new sheave system interprets data from a series of sensors and displays the information on a digital display or multiple displays. The system outputs line tension, angle of deployment, cable payout, and rate of payout. Also included are user settings allowing for alarms to be activated at preset cable payout and tension on the sheave.

For more information, visit www.sharkmarine.com.

First Cape Class patrol boat officially named

Austal is pleased to announce the first-in-series Cape Class Patrol Boat has been officially named the Cape St George during a ceremony held at Austal's Henderson shipyard in Western Australia.

Cape St George is the first of eight new boats being built by Austal for the Australian Customs and Border Protection Service under a design, construct, and in-service support contract valued at approximately A\$330 million.

The vessel was launched at Austal's Henderson shipyard in January 2013. It has since undergone final fit out and sea trials, with some other testing to be completed prior to final delivery to the customer.

The naming ceremony was attended by the Australian Special Minister for State, the Hon. Gary Gray AO, and former President of the Australian Senate Margaret Reid AO, who officially named the vessel.

For more information, visit www.austal.com.



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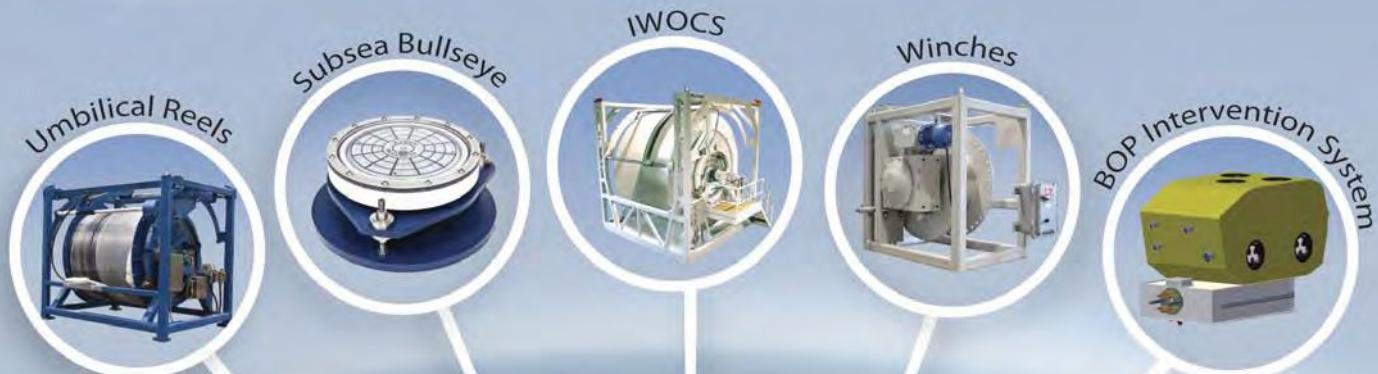
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OFFSHORE INDUSTRY

European oil, gas sector will face difficulty in 2013: S&P Capital report

The European oil and gas sector will face difficulty in 2013 as a result of weak earnings in the upcoming quarters and increased capital expenditure, according to a new report published by S&P Capital IQ Equity Research.

In the European Review report, the U.S.-based financial information provider said the fourth quarter of 2012 reporting season was weak, with the revenue and earnings level of oil and gas companies being one of the weakest. The study also noted that there has been a rise in enthusiasm among the integrated oil companies for exploration activities.

S&P Capital IQ Equity Research chief European equity strategist Robert Quinn said that the oil and gas sector had a poor track record on cost inflation, while new growth opportunities have become ever more expensive after the U.S. Gulf Macondo well disaster.

"A key theme across sectors in recent months has been dividend growth, with banks having the clearest plans to increase payout ratios which have re-rated the most strongly of late," Quinn added. "With increased capital expenditure intentions, this will clearly be to the detriment of free cash flow and dividend growth."

Legislation introduced to open South Carolina to offshore drilling

U.S. Rep. Jeff Duncan has introduced the South Carolina Offshore Drilling Act, which he said would add the state to the nation's 5-year plan for offshore exploration and production. It would be a crucial step in safely developing the state's natural resources, he said.

Last July, Duncan, a Republican who represents the 3rd Congressional District, introduced the legislation as an amendment in the House Natural Resources Committee that passed the House, but was never taken up by the Senate.

"Safely developing our natural resources not only creates jobs, but is also a step towards reaching the goal of North American energy independence," Duncan said. "South Carolina is already a national leader in nuclear power. Developing our resources along the coast can help make South Carolina a model

for an all-the-above approach to energy."

Last week, Gov. Nikki Haley and the governors of North Carolina and Virginia sent a letter to Interior Secretary-Designate Sally Jewell, encouraging her to abandon federal opposition to drilling off the Atlantic Coast, where production has been blocked for decades. Duncan said a 2009 study commissioned by the American Petroleum Institute estimated that there could be as much as 3.5 tcf of natural gas off the South Carolina coast.

A separate study calculated that oil and natural gas production could create over 7,500 new jobs in South Carolina, have a statewide economic impact of over \$2.2 billion annually, and generate around \$87.5 million in new state revenue, Duncan said.

Annual offshore drilling spending in Middle East, Africa to top \$17B

An increase in offshore discoveries is prompting a surge in exploration activity across the Middle East and Africa and driving up the amount spent on drilling, according to a report published by business intelligence firm GBI Research.

The company's latest oil and gas report forecasts offshore drilling expenditure across the region to climb steadily from \$13.56 billion in 2012 to \$17.03 billion in 2016. Total expected expenditures for the 5 year period is \$77.3 billion, which represents an increase of approximately 22% over the 2007-2011 total of \$63.5 billion, GBI reported.

Drilling outlay is expected to grow across all major nations in the region, with those in West Africa leading in terms of exploration activity. Escalating activity in countries relatively new to the offshore drilling industry, such as Sierra Leone and Liberia, may prove to be future competition for the more established nations of West Africa.

Ghana is expected to emerge as one of the most prominent countries in West Africa for the exploration of oil and gas, with 16 offshore discoveries made between 2008 and 2012.



Jeff Duncan

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Japan completes first ever gas extraction from seabed deposits

Japan's state-run company, Japan Oil, Gas and Metals National, has become the first company in the world to extract gas from offshore methane hydrate deposits, using depressurization technology.

The company said the gas was extracted from deposits of methane hydrate, which is a frozen gas, also known as "flammable ice," near the country's central coast.

The trade ministry of Japan announced that production tests will be carried out for up to 2 weeks, which will be followed by tests on how much gas has been produced, reported Reuters news service.

The country, which has been importing most of its energy to meet domestic demand since 2001, has invested several hundred million dollars to develop technology to tap methane hydrate reserves off its coast.



Sample methane hydrate deposit

According to a Japanese study, it is estimated that about 40 tcf of methane hydrates can be found in the eastern Nankai Trough, off the country's Pacific coast. Methane hydrate is developed from a mixture of methane and water applying certain pressure and conditions.

Since methane is an important component of natural gas, governments of several countries, including Canada, the United States, Norway and China, are exploring possibilities to harness hydrate deposits as an alternate energy form. The company said the first offshore production test is planned for the next 2 years, which would be purely an experimental operation, rather than a commercial one.

Investment by UK oil and gas sector to reach \$19.4B in 2013

Investment by the UK oil and gas sector is anticipated to hit at least US\$19.4 billion this year, according to new research. Oil & Gas UK's activity survey revealed a total investment of \$17 billion in 2012, the highest for more than 30 years. And it said investments totaling nearly \$150 billion are now in companies' plans.

More oil and gas reserves have become commercially viable for development thanks to recent improvements in both the tax regime and technology, according to the research.

The number of projects submitted to the Department of Energy and Climate Change (DECC) and given development approval almost doubled between 2011 and 2012, with projects approved since January 2012 involving investment of nearly \$20 billion.

However, as reserves moved into production, they have not been fully replaced with new discoveries. While sanctioned reserves rose at the start of 2013 to 7.4 billion boe, the highest level for 6 years, total reserves in companies' plans fell by a half-billion boe. Only 21 exploration wells per year, on average, were drilled over the last 3 years.

While production may dip this year to 1.45 to 1.5 million boe/d, Oil & Gas UK predicts the recent surge in investment will lead to a significant upturn over the next 3 to 4 years, rising to approximately 2 million boe/d by 2017.

Transocean Inc. sets deepwater record off India's eastern coast

Transocean Inc. recently set a record for the deepest water depth by an offshore rig off the eastern coast of India. The company said its drillship Dhirubhai Deepwater KG1 passed its own 2011 record by 191 ft by drilling in water depths of 10,385 ft. The record was set while the company was working with Oil and Natural Gas Corp. Ltd.

Transocean holds most of the world records for drilling in the deepest waters. Other records include the first oil and gas exploration well ever drilled in more than 10,000 ft of water, constructed by the Discoverer Deep Seas; the world's deepest subsea wells completed in about 9,000 ft of water by the Deepwater Millennium; and the world water depth record for a moored rig in 8,951 ft of water by the Deepwater Nautilus.

Last year, the Transocean jack-up GSF Rig 127 set a world record for the longest extended-reach well ever drilled at 40,320 ft measured depth with a 35,770 ft



The drillship Dhirubhai Deepwater

horizontal section. The well was drilled offshore Qatar in 36 days and incident-free. The new record of 7.6 mi is also the first well in the history of offshore drilling that exceeds 40,000 ft. The well surpasses by about 2,000 ft the prior extended-reach record of 38,322 ft measured depth set by another drilling contractor with a land rig drilling at Sakhalin Island.

White paper addresses acute skills gap in oil and gas industry

GSE Systems, Inc. has published a new white paper, titled "The Case for Simulation-Based Training in the Oil and Gas Industry, Upstream and Downstream." The document examines the need for efficient and effective workforce development in the oil and gas industry worldwide to combat the acute shortage of skilled workers both upstream and downstream.

"Statistics show that U.S. universities are producing only about 20% of the engineering graduates they did 20 years ago," said Jim Eberle, chief executive officer of GSE Systems. "Thus, the petroleum industry needs to train its recruits better and faster on systems that are more complex than ever before. They also need to make sure that they retain those recruits over the long term."

GSE Systems said the white paper examines the causes and characteristics of the skills gap in the oil and gas industry, including size and scope. It also provides an overview of the market for simulation-based training, including learning approaches, assessments of effectiveness, and operating and financial benefits to companies.

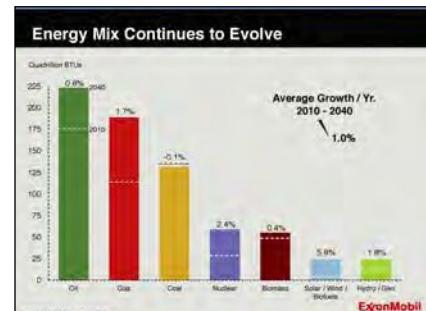
Readers will learn why simulation-based training, prefaced with traditional classroom training methods on process fundamentals, is the most efficient and cost-effective way to educate new employees and prepare them for their work in a refinery or on an exploration and production (E&P) platform. The white paper can be downloaded at www.gses.com/resources/white-papers.

U.S. oil and gas production to climb as energy consumption declines

U.S. oil and gas production will continue to rise through 2040 from 2010 levels as unconventional oil and gas resources and production from the deep-water Gulf of Mexico come online, while U.S. energy consumption is forecast to decline during the same time period, ExxonMobil Corp. reported in its 2013 energy outlook.

U.S. oil and gas production has grown to its highest level in three decades because of technological advances that have allowed the oil and gas industry to access deepwater resources as well as unlock unconventional oil and gas resources such as the Bakken oil play in North Dakota, according to ExxonMobil's energy outlook.

The projected 6% decline between 2010 and 2040, or an average 0.2% decline per year, in U.S. energy consumption will occur even as the population grows an average of 0.7% a year from 2000 through 2040, or 20% more people by 2040, and the nation's gross domestic product grows an average 2.3% a year during that time period, basically doubling the economic output of the United States.



The findings of ExxonMobil's first U.S.-focused edition of its energy outlook are "pretty startling," said William Colton, vice president of corporate strategic planning at ExxonMobil, and indicate a more efficient use of energy across the board, from transportation to office buildings to industrial applications.

"This is an incredible achievement... and good for the economy," Colton said.

Energy demand in countries outside of the United States is forecast to grow 35% through 2040, mostly driven by population and economic growth in developing countries such as China and India as well as fast-developing countries in Asia Pacific, Africa, the Middle East, and Latin America, Colton noted. During the 2010 to 2040 timeframe, the world population will grow to 9 billion and the global economy will double.

ASCO to work with LLX on Brazil's 'Superport' project

The ASCO Group, an international oil and gas services company, has entered a cooperation agreement with Brazilian logistics company LLX to support the development of Brazil's new port, Acu Superport, located just North of Rio de Janeiro.

The Superport is estimated to be a \$2.5 billion investment, was designed to handle 350 million tons a year of exports and imports, particularly oil and gas, and will rank among the three largest port complexes in the world.

ASCO has been invited to design and operate facilities at the port that will support oil and gas exploration and production. The port is located in São João da Barra, close to the area responsible for 85% of Brazil's oil and gas production.

With the port due to be operational in the first half of 2014, it is expected that ASCO will also develop other businesses within the complex directly linked to the oil and gas logistics sector.

"This is a tremendously exciting opportunity for ASCO, said Derek Smith, ASCO's chief operating officer. "I believe the Acu Superport will become the most important oil and gas enclave in Brazil over the coming years. This is a huge opportunity in the development of our global business, and the development of the Superport in Brazil has to be one of the most exciting projects we have ever been involved with."

LLX president Marcus Berto said, "this agreement will add immense value and O&G logistics experience to the infrastructure offered by LLX. As a result, this offering will greatly strengthen the Acu Superport as an excellent solution to oil and gas companies in Brazil."

"ASCO and LLX will work together to set up a new standard of service quality that will include high standard of safety, environment protection, and operational performance," said Eduardo Valle, ASCO Brazil managing director.

It is expected the ASCO supply bases at the Superport will create around 1,400 new jobs when fully operational. In addition, it is expected that the port could create a further 50,000 jobs for the wider economy.

ASCO operates globally out of bases in Australia, Canada, the Caspian, Holland, India, Norway, Oman, Singapore, Trinidad, the UK, and the United States.



Artist rendering of Acu Superport in Brazil

Norway increases undiscovered oil and gas estimates by 15%

Norway has raised its estimate of undiscovered oil and gas by 15%, most of it in the waters of the Barents Sea once disputed by Russia. The additional resources, most of which are natural gas, amount to around 2.5 billion boe, according to the Norwegian Petroleum Directorate.

The increased reserve estimates follow the 2011 signing of an agreement between Norway and Russia on their maritime border in the Barents Sea after a 40-year dispute, granting the Scandinavian country an area covering some 44,000 sq km. A seismic survey carried out since then estimated the resources in the once disputed part of the

Barents at 1.9 billion boe, of which 15% could be oil, the agency said.

The new estimates also included the waters around the Jan Mayen island, 500 km east of Greenland, but uncertainty was higher there due to less detailed knowledge of the area, it said. The Norwegian Petroleum Directorate said the Jan Mayen area could hold 566 million boe, substantially more, or nothing at all.

Norway is one of the world's biggest exporters of oil and gas. In January, it produced 1.473 million boe/d and sold 10.5 billion cm of natural gas. The Norwegian Petroleum Directorate is responsible for the regulation of the petroleum resources on the Norwegian continental shelf.

BP, Maersk join for next generation deepwater drilling technology

Maersk Drilling and BP have partnered to develop conceptual engineering designs for a new breed of advanced technology deepwater offshore drilling rigs. Specifically, the partners will work on concepts for 20,000 psi and 350°F reservoirs.

The agreement is part of BP's Project 20K multi-year initiative to develop next-generation exploration and production equipment.

The multi-year partnership will focus on evaluating rig concepts applicable to BP's deepwater portfolio. A jointly staffed engineering team will be located in Houston, Texas, with support from Maersk Drilling's headquarters in Copenhagen, Denmark. The team will perform engineering studies to select the optimal design of the 20K drilling rigs, riser, and blowout preventer (BOP) equipment. BP then will decide how best to proceed to construction.

Maersk said some of the technologies to be developed and deployed on the new rigs will include advanced operating systems to aid the situational awareness of the rig crew and inform decision making; real-time BOP monitoring to continuously verify functionality; and enhanced mechanical capabilities of the BOP, rig structures, and piping systems.

BP's Project 20K sets out its intention to develop technologies over the next decade in four key areas: well design and completions; drilling rigs, riser, and BOP equipment; subsea production systems; and well intervention and containment.

Shell says no Alaska Beaufort and Chukchi seas drilling in 2013

Shell has paused its planned drilling in 2013 in Alaska's Beaufort and Chukchi Seas while the company prepares its equipment and plans for a resumption of its drilling program "at a later stage," said Marvin Odum, president of Shell Oil Co.

Since completing the top-hole drilling of two wells in the Alaska Arctic during the 2012 open water season, Shell ran into problems with its drilling vessels. Its floating drilling platform, the Kulluk, ran aground during a severe storm, and the drillship Noble Discoverer has experienced engine problems.

"We've made progress in Alaska, but this is a long-term program that we are pursuing in a safe and measured way," Odum said. "Our decision to pause in 2013 will give us time to ensure the readiness of all our equipment and people following the drilling season in 2012."

Subsea 7 awarded \$160M contract off Norway
 Subsea 7 S.A. was awarded a pipelay and subsea installation contract valued at about \$160 million from Statoil at the Oseberg Delta 2 field, located roughly 130 km west of Bergen in the North Sea. The contract includes the design, fabrication, and installation of two insulated rigid production pipelines totaling 10 km; the engineering, procurement, construction, and installation of two flexible gas injection lines totaling 9 km; the installation of two umbilicals totaling 16 km; and manifolds installation and tie-in work. The pipeline production will take place at Subsea 7's spoolbase at Vigra, Norway. Project management and engineering was to commence immediately at Subsea 7's Oslo office, with offshore operations commencing in early 2014.

Palfinger to supply cranes to Sembcorp, Technip
 Austria-based Palfinger Dreggen has received contracts worth \$121 million to supply cranes for offshore operations. As part of the first contract, the company will supply 28 cranes to Jurong Shipyard, a subsidiary of Singapore's Sembcorp Marine. The contract includes the delivery of cranes for a total of seven drillships to Brazil-based, semi-submersible drilling rig manufacturer Sete Brasil between 2014 and 2017. Palfinger will supply its two DKF2000 pedestal knuckle boom cranes and two DKW2000 pedestal wireluffing cranes for installation on each of the vessels. The knuckle boom cranes have a capacity of 85 t, while the wireluffing cranes have 63-t capacities. As part of the second contract with French engineering and construction company Technip, Palfinger Dreggen will supply two complex offshore cranes to a new platform, which will be delivered to DONG for the Danish Hejre field.

Saipem wins multiple contracts

Saudi Aramco has awarded Saipem a lump-sum contract for work offshore Saudi Arabia. It involves extra work on installation of trunklines for development of the Arabyah and Hasbah fields, the scope of which was set originally in 2011. In the North Sea, Saipem has won various transport and installation contracts from Statoil concerning deployment of the Saipem 7000 construction vessel in the Norwegian and UK sectors. Finally, Eni has extended its charters of Saipem's drilling rigs Saipem 10000 by 5 years, starting in October 2014, and of the Scarabeo 4 by 1 year until August 2014. Total value is \$1.2 billion.

Shell awards John Crane 5-year agreement

John Crane said that Shell awarded it a 5-year enterprise framework agreement (EFA) to supply products and services for Shell's upstream, mid-stream, and downstream oil and gas operations worldwide. Under the global agreement, John Crane will be a key supplier of mechanical seals and seal support systems used for new projects and associated aftermarket services in existing facilities. Additional products that may come under the agreement include couplings, bearings, and specialty filters. The company said that "fulfilling this agreement will accelerate John Crane's growth across all market segments."

Independents come on strong in GoM lease sale

Central Gulf of Mexico Lease Sale 227, which attracted \$1.21 billion in apparent high bids, counted seven exploration and production independents among its top 10 winners based on the sum of total high bids submitted. Three of the E&P companies—BHP Billiton, Plains Exploration & Production Co., and newcomer Venari Offshore LLC—placed in the top five.

However, the biggest spenders, ranking first and second in the 20 March lease sale, were supermajors ExxonMobil and Shell. Exxon doled out \$220.25 million for just seven tracts, while Shell captured 38 tracts with high bids totaling \$139.82 million.

The top 10 spenders accounted for nearly \$636 million, or roughly half of the \$1.21 billion in apparent high bids. The 10 individual tracts receiving the highest bids totaled about \$483 million, or just over 40% of all the high bids.

Central Gulf of Mexico Lease Sale 227

Top 10 companies based on total number of high bids

Company	Total High Bids	Sum of High Bids
ExxonMobil	7	\$220,254,445
Shell Offshore	38	\$139,825,720
BHP Billiton	24	\$107,160,248
Venari Offshore	15	\$86,796,442
Plains E&P	11	\$82,575,000
Statoil	15	\$73,925,410
LLOG	11	\$62,440,168
Ridgewood Energy	8	\$45,305,907
Anadarko	30	\$42,365,196
Stone Energy	11	\$39,368,812

But it was Norway's Statoil and yet another E&P independent, Samson Offshore, that teamed up to pay the most for a single tract in the entire sale—a whopping \$81.78 million for Walker Ridge Block 271. Among the top 10, Statoil placed sixth, taking 15 tracts with total high bids of \$73.92 million.

"Walker Ridge 271 was our number one priority lease, and we are very pleased to have placed the highest bid on this impact prospect that we call Monument," said Erik Finnstrom, Statoil's senior vice president of exploration in North America. "Our strategy involves acquiring prospects across a range of plays and technical maturity."

Fifty-two companies participated in Sale 227, placing 407 bids on 320 tracts. In last June's Central Gulf lease sale, 56 companies submitted 593 bids on 454 tracts. Last year's \$1.26 billion in apparent high bids was slightly more than this year's \$1.21 billion, with slightly more players submitting a lot more bids on a lot more tracts.

Sale 227 was a deepwater and ultra-deepwater event, with \$1.18 billion or 98% of total high bids submitted on tracts in waters depths greater than 1,200 ft. Tracts located in water depths greater than 5,250 ft alone drew \$703.4 million, or nearly 60% of total high bids.

In addition to BHP, Plains, and Venari, other E&P independents that made the top 10 list in total spending are LLOG Bluewater Holdings, Ridgewood Energy, Anadarko U.S. Offshore, and Stone Energy Offshore (see chart above).

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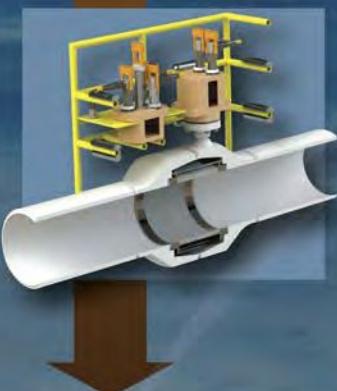
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Rigs & Vessels



The Stena Drillmax drillship

Hess Corp. completes drilling of seventh well offshore Ghana

Hess Corp. has completed drilling of its seventh consecutive successful exploratory well on the Deepwater Tano-Cape Three Points block offshore Ghana, the company said. It added that the Pecan North-1 well, located about 7 mi northeast of the Pecan-1 well, encountered approximately 40 ft of net oil pay in the Turonian-aged reservoir.

The wells were drilled by the Stena Drillmax drillship in a range of water depths between 5,623 and 8,245 ft. Hess achieved outstanding drilling performance in terms of drilling time and cost per foot, with gross costs averaging \$40 million per well for the last three wells, including success case logging.

Based on the results of these wells and Hess' extensive experience in Equatorial Guinea, where the geology is quite similar, the company now plans to submit appraisal plans for the various discoveries to the Ghanaian government for approval by 2 June 2013. In parallel, Hess has begun pre-development studies on the block. Hess holds a 90% working interest in the block and is the operator. GNPC is a 10% equity interest partner.

Harvey Gulf to 'stretch' five OSVs for Bollinger Shipyards

Harvey Gulf International Marine said it signed an agreement with Bollinger Shipyard to stretch five of its recently acquired OSVs from 230 to 270 ft in length, increasing their deck space to 10,000 sq ft and cargo capacities to 10,000 bbls of liquid mud plus 10,000 cf of dry bulk.

"With the new contracts, Harvey Gulf will have vessels under construction at four different shipyards—two in Louisiana, one in Florida, and one in Mississippi," noted Shane Guidry, company founder and chief executive officer.

Harvey Gulf said it also agreed to sell one of its two Dry-Docks Bollinger Shipyards.

Rigs & Vessels

Friede & Goldman signs license agreements for two jack-ups

Friede & Goldman, Ltd. has entered into a license agreement with Dalian Shipbuilding Industry Offshore Inc. (DSIC) for the basic design of two JU-2000E high-specification jack-up drilling rigs to be constructed for Seadrill Ltd.

The new units are scheduled for delivery in the first and second quarters of 2015. The contract also contains options for two additional units that would be scheduled for delivery in the third and fourth quarters of 2015. The contract marks the 14th and 15th JU-2000E delivered by or under construction at DSIC and the fifth and sixth JU-2000E drilling rig constructed for Seadrill.

Friede & Goldman said that the JU-2000E design represents the latest generation of high-specification jack-up drilling rigs with greater capacities and capabilities than most existing units. The rigs will have the capability to operate in water depths up to 400 ft and drill to depths of 30,000 ft. Friede & Goldman has also signed contracts with DSIC to supply its patented Rack Chock leg fixation system.

Brazil's Petrobras contracts gas turbines from GE for four FPSOs

Petrobras has contracted GE Oil & Gas to provide \$500 million in gas turbine equipment and services for four newbuild FPSOs destined for the Cessão Onerose region presalt production in the Santos basin offshore São Paulo state. GE will supply the main turbomachinery to the P-74, P-75, P-76, and P-77 FPSOs.

The equipment will provide primary energy for the vessels and includes 16 PGT25+ gas turbines and electric generators, eight turbocompression trains driven by LM2500+ gas turbines, and 32 electric-motor driven compressors for gas export and CO₂ reinjection. Technical assistance extends to installation and commissioning start-up, repairs, and training.

Polarcus makes offshore crew arrangements for Turkish vessel

Polarcus has agreed to an offshore crewing contract with V. Ships Turkey for the eight-streamer 3D seismic acquisition vessel Polarcus Samur. Recently, Polarcus sold the vessel to Turkish Petroleum Corp. (TPAO). It will be renamed Barbaros Hayreddin Pasa after the Ottoman admiral, with Polarcus providing technical and crew management services to TPAO under a 3-year contract.

V. Ships will support Polarcus by supplying experienced Turkish maritime crew

to meet the flag requirements of the Turkish International Ship Registry, under which the vessel will be flagged.

"This is our fourth back-to-back offshore marine services contract in the last 3 years," said Harun Duzgoren, managing director of V. Ships Turkey. "The vast majority of our crew have been with us in other similar projects in the Black Sea and other parts of the world as well, so we are confident that they will integrate quickly with the Polarcus crew onboard."



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Statoil, Exxon makes 3rd Tanzania gas discovery over 250 mmboe

Statoil and partner ExxonMobil Corp. have made the third natural gas discovery above 250 mmboe in a year in Block 2 off Tanzania. The company said it and Exxon had discovered between 4 and 6 tcf of natural gas in the Tangawizi-1 well.

A range of discoveries in Mozambique, Tanzania, and Kenya has transformed East Africa into one of the most-promising energy provinces in the world, potentially rivaling Qatar and Australia in supplying gas to Asian markets.

"The success in Block 2 is the result of an ambitious and successful drilling campaign," said Tim Dodson, Statoil's executive vice president for Exploration, noting that so far the partners have completed five wells within 15 months and will continue with further wells later this year.

Statoil estimated the total volumes of the discoveries in Block 2 at between 15 and 17 tcf. Recoverable gas volumes of 10 to 13 tcf "brings further robustness to a future decision on a potential liquefied natural gas project," he said.

The Tangawizi-1 discovery is about 10 km from the previous Block 2 discoveries Zafarani and Lavani, and was

drilled at a water depth of 2,300 m.

Statoil has been the operator of the Block 2 license on behalf of Tanzania Petroleum Development Corp. since 2007 and has a 65% working interest. Exxon has a 35% stake.

NPD: DONG E&P makes new oil and gas discovery in North Sea

DONG Exploration & Production Norge has discovered oil and gas around 1.5 mi south of the Trym field in the southern North Sea, the Norwegian Petroleum Directorate (NPD) reported. Preliminary estimates suggest the size of the discovery is between 8.4 and 16.8 mmboe.

The primary exploration target for wildcat well 3/7-8S on production license 147 was to prove petroleum in Middle Jurassic reservoir rocks (the Sandnes and Bryne formations). The secondary target was to prove petroleum in the Maureen formation in the Palaeocene zone.

While both oil and gas were proved in a gross column of 520 ft in the Sandnes and Bryne, the Maureen formation was found to be dry. The well was drilled by the Maersk Giant rig, which the NPD said will now proceed to neighboring

license 289 to drill another wildcat well for DONG.

Harvest finds 65 ft of presalt pay off Gabon in Dentale reservoir

A sidetrack well at the Harvest Natural Resources-operated Dussafu license offshore Gabon has encountered 65 ft of oil pay in the presalt Dentale reservoir. The Dussafu Tortue Marin-1ST1 appraisal well was drilled to a total depth of 11,385 ft in 380 ft water depths about 1,800 ft from the DTM-1 discovery well.

Samples from the sidetrack well indicated "better reservoir character and an apparent similar fluid level to that encountered in the (DTM-1) well," Harvest said.

A stuck downhole tool forced the company to terminate logging operations before it could collect the pressure data needed to confirm connectivity with the previously announced Dentale discovery.

The Houston-based company holds a 66.667% interest in the Dussafu license; Panoro Energy owns the remaining interest. The partners are evaluating development options for the block.

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Fairfield Energy says Darwin area wells prove oil in North Sea

Fairfield Energy has confirmed an oil discovery on the Darwin structure in the UK northern North Sea.

The semi-submersible Ocean Nomad drilled two exploration wells on block 211/27e, one of which was a sidetrack. Well 211/27e-13Z encountered an oil column of 154 ft true vertical thickness within the primary upper Brent sequence reservoir target.

Currently, this well is being abandoned. Fairfield said it has obtained extensive reservoir data of sufficient quality for the discovery to be included, without the need for further appraisal, as part of a development.

The Darwin area includes the southern end of block 211/27a, adjacent to the abandoned NW Hutton field, and an extension into blocks 211/27c and 211/27e. The location is 81 mi northeast of the Shetland Islands.

TAQA Bratani, which will assume operatorship of all three blocks at the end of March following a farm-in deal last year, also engaged the semi-sub John Shaw to drill the 211/23a-14 appraisal



The semi-submersible Ocean Nomad drilled two wells on Darwin structure, encountering a 154 ft thick oil column

well in the same region.

This led to another oil discovery, with the well now suspended for a future test. The oil column of 193 ft true vertical thickness came within the primary upper Brent sequence target.

Drilling follows a multi-year program comprising new 3D seismic and static-dynamic modeling that led to identification of potentially significant oil volumes.

Bahamas reconsiders offshore exploration to reduce debt burden

The Bahamas is reconsidering oil exploration in its offshore waters, with an objective to raise revenues and reduce the debt burden. The latest move suggests an end to government reluctance shown earlier to the initiative, amid concerns expressed by citizens that a spill could destroy the country's fishing and tourism industries.

Bahamas Environmental Minister Kenred Dorsett was quoted by The Associated Press as saying the government will first assess if the island chain has commercially viable reserves before holding a voter referendum to decide on whether to proceed with full production.

Dorsett said any decision based on the information from the exploratory drilling is unlikely to be made before 2014, and a referendum would likely be held in 2015. The minister noted that the government cannot overlook potential economic advantages of oil.

"The discovery of oil in the Bahamas would almost certainly prove to be economically transformative for our nation for many generations to come," he said.

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Exploration

Fastnet to probe deeper potential of Deep Kinsale offshore Ireland

Fastnet Oil and Gas has executed an exclusive option agreement with Petronas subsidiary Kinsale Energy to farm into the Deep Kinsale prospect offshore southern Ireland.

This applies to geological formations from a depth of 4,000 ft subsea below the producing Kinsale Head gas field, defined by a sub-area of Petroleum Lease No. 1. The sub-area covers parts of blocks 48/20, 48/25, 49/16, and 49/21.

Fastnet has agreed to acquire new seismic data by year-end and to complete geological and engineering studies. In addition, it will have an exclusive option exercisable before 30 September 2014 to drill a well on or before 30 November 2015 to test the Purbecko-Wealden reservoirs, which are productive in the nearby Providence Resources-operated Barryroe field.

The farm-in well will be drilled to a provisional depth of 8,000 ft subsea. On completion, Fastnet can earn a 60% interest in the Deep Kinsale sub-area by funding a well test. However, if a commercial development results, Kinsale Energy has the option to lift its interest by 5% once production exceeds 100 mmboe, by a fur-

ther 5% once production exceeds 150 mmboe, and a further 5% past 200 mmboe. Fastnet plans to shoot a minimum of 193 sq mi of 3D seismic over the Kinsale Head area during the first half of 2013, with CGG as its preferred seismic contractor. This will be the first 3D survey over Kinsale Head to target the deeper oil and gas potential. Fastnet aims to de-risk the deep structure through better seismic imaging of both the structure and potential variations in reservoir thickness and quality.

More oil recoverable from Asha offshore Norway: Bridge Energy

Bridge Energy reserves have been upgraded for the recent Asha discovery in the Norwegian North Sea. The company is a 20% partner in surrounding license PL457 that is operated by Wintershall.

An oil find was first announced in December, involving one well followed by a sidetrack. These encountered good quality oil in Mid-Jurassic Hugin and Triassic Skagerrak reservoirs. Earlier analysis suggested 25 to 35 mmboe recoverable within the license, but Wintershall's recent mapping indicates that the discovery is in direct communi-

cation with a large upside volume east of the main structure. As a result, Bridge assesses Asha's potential in the 30 to 100 mmboe range, with potential additional volumes of a similar size in neighboring licenses. Further appraisal drilling could follow.

Karoon confirms oil discovery in Kangaroo-1 well offshore Brazil

Karoon Gas Australia Ltd. has confirmed an oil discovery offshore Brazil at the Kangaroo-1 well. The well is in blocks S-M-1101 and S-M-1165. Kangaroo-1 was drilled to 10,000 ft and found 82 ft gross oil column in an Eocene reservoir 984 ft downdip from the seismic defined trap crest. Wireline testing is ongoing, and a drillstem test is under consideration. Karoon plans wells two and three, Emu 1 and Bilby 1, for its Santos basin drilling program. These wells will be in blocks S-M-1102, S-M-1137, and S-M-1166. The blocks are 70 mi off the Santa Catarina region of Brazil south of Rio de Janeiro in 1,312 ft water depth. While Karoon holds 100% interest in the blocks, it has an agreement with Pacific Rubiales Energy Corp. to divest 35% interest in blocks S-M-1101, S-M-1102, S-M-1037, AND S-M-1165.

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Strong performance from latest Bualuang wells offshore Thailand

Four wells are onstream under a new phase of development drilling on the Bualuang oilfield in the Gulf of Thailand, according to operator Salamander Energy. The jack-up Atwood Mako is scheduled to drill 16 development wells from the new Bualuang Bravo platform. It is on hire to Salamander through September 2014.

Wells BB-01H, BB-04H, BB-06H, and BB-10H are performing above expectations, the company said. They are drilled horizontally into the T4 Miocene sandstone reservoir, encountering 1,624 to 1,739 ft of pay, with 27 to 33 reservoir porosities and 85 to 99% net-to-gross ratios.

The wells are completed using stand-alone screens and electric submersible pumps, with drilling, completion, and production handover typically taking 21 days per well. Production from the field this year has averaged 10,531 bbl/d of oil, up from 7,200 bbl/d last year, with a full-year forecast in the 11,000 to 14,000 bbl/d range.

Five wells are scheduled to be drilled and completed in the East Terrace, and at least two of the main field wells will be slant drilled into two unexploited reservoirs to assess the potential. Thai Nippon Steel is assembling the processing and utility modules for Bualuang Bravo in Bangpakong, Thailand, which should be installed early next year.

Teekay Nordic Holdings has a letter of intent to provide a floating storage and offtake vessel due to be operational in the field by July 2014.

AMEC secures \$101.4M contract for Clair Ridge field, North Sea

UK-based engineering and project management company AMEC has received a \$101.4 million contract from BP and its partners, Shell, ConocoPhillips, and Chevron to provide hook up and commissioning services (HUC) for two new Clair Ridge platforms in the North Sea.

The current work, which is expected to continue until March 2016, follows the completion of the engineering and project management services for the Clair Ridge project. It will also involve new production, accommodation, and drilling facilities alongside linking subsea pipelines into the existing export systems.

AMEC will commission both platforms with advanced technology and processes to improve their efficiency and cut down environmental impact. The company will reduce offshore commissioning activity in the harsh cold of the

Contract issued for complete mooring spreads for first Barents Sea oilfield



Worker handling spooling wire at yard in Monstad, Norway

IOS InterMoor AS, an Acteon company, has secured a contract from Eni Norge to provide two complete mooring spreads for developmental drilling in the Goliat oilfield in the Barents Sea, offshore Norway. Under the terms of this 3-year contract, IOS InterMoor will provide the rig moorings with associated equipment and services.

The contract is for the provision of general mooring equipment services, including equipment rental, service and repair, and personnel for mooring operations. To meet these contract requirements, IOS InterMoor AS will make a considerable investment in new equipment, personnel, and facilities in Hammerfest, Norway during spring 2013. With more than 27 years of experience operating on Norwegian offshore bases in Stavanger, Mongstad, and Kristiansund, IOS InterMoor will apply its expertise with polar base in Hammerfest to ensure safe and effective mobilization and demobilization of mooring equipment on and off dedicated anchor-handling vessels.

IOS InterMoor AS's work scope will be to provide two complete moorings spreads for pre-laying in the contract period. This method has provided enhanced safety and integrity as well as providing significant cost savings, particularly in rig moves, as it eliminates the dead time a rig spends not drilling. Ultimately, the reservoir drainage strategy will include water and gas injection, employing a total of eight well templates with 22 wells. Recoverable reserves for the Goliat oilfield are estimated at 174 mmbbl, and production is expected to plateau at 100,000 bbl/d.

"Goliat field is the first oilfield to be developed in the Barents Sea," said IOS InterMoor AS managing director David Smith. "Our involvement underlines our position as the preferred provider in the region and extends our reputation for operating on the principles of safety, quality, and delivery."

Shetland area by increasing the amount of onshore commissioning process, which will further increase production and reduce flaring. The two new platforms, which are scheduled to be installed in 2015, will commence production in 2016.

Talisman Energy scraps troubled Yme MOPU project in North Sea

Canada-based Talisman Energy Norge has secured a contract from SBM Offshore to scrap the Yme MOPU project in the Norwegian sector of the North Sea. Talisman said in a statement that it will also scrap the existing above-surface

structure and end all joint activity for an agreed cost. As per the deal, SBM Offshore will make an upfront payment of \$470 million to Talisman for removing the Mobile Offshore Production Unit from the Yme field.

"Recent analysis has concluded that a new topsides solution is needed in order to develop the Yme field. Our first priority will be to remove the existing platform, safely and expeditiously," said Paul Warwick, Talisman Europe-Atlantic executive vice president.

The Yme platform has been unmanned since July 2012.

Field Development

Swiber completes floatover oil and gas platform for ONGC

Singapore-based Swiber Holdings has completed the first floatover platform for Oil and Natural Gas Corp.'s (ONGC) B-193 field development project in India. As part of the project, Swiber carried out floatover installation of a 13,000-mt AP process platform and an 8,000-mt AQ living quarter platform as well as installing bridges and flares.

A consortium partner undertook fabrication of the topsides, jackets, and other structures at their yard in Malaysia. For the project, Swiber deployed its Derrick Pipelay barge Swiber PJW3000 and two floatover barges, Holmen Atlantic and Holmen Pacific, backed up by other support vessels located offshore of Mumbai.

Swiber said that floatover installation is a reliable and cost-effective alternative to topside weights, which increasingly exceed floating crane lifting capacities. Swiber executive chairman Raymond Goh said the completion of the work on the B-193 field development project is a significant milestone for the company.

"The successful execution and completion of B-193, which marks the first time that any company has used floatover methods for offshore field development in India, is a testament to Swiber's excellent engineering capabilities and asset strength," Goh added.

The B-193 cluster field, which is expected to be completed in 2013, will add 28,000 bbl/d to peak oil production.

DNO aiming to begin reviving ailing field offshore UAE

DNO said this spring it plans to start re-development of the Saleh field 28 mi offshore Ras al Khaimah, UAE. Saleh was developed by a previous operator in the 1980s. The production complex comprises six platforms with seven wells and interconnected pipelines. At peak, it produced 70 mmcf/d of gas and 13,000 bbl/d of condensate, although output has tumbled due to pressure depletion and water breakthrough.

Last year, DNO reported plans to re-enter four to five of the wells and to upgrade four platforms, with production to be sent to the onshore RAK gas processing plant via an existing pipeline. In Block 8 offshore Oman, production has declined from record rates last November to around 17,000 bbl/d of oil and condensate and 50 mmcf/d of gas. Drilling of the third and final development well in the current campaign, Bukha-4, started in early December.

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Production

Total gets UK permission to restart Elgin natural gas field in North Sea

The Health and Safety Executive (HSE) in the UK has given its clearance to France-based major oil group Total to restart its Elgin gas field in the North Sea, which was closed in March 2012 following a major gas leak.



Elgin-Franklin gas field, North Sea

The HSE accepted the revised safety case, which was submitted by Total, and has allowed the oil company to restart production at one of the world's deepest and most highly pressurized wells.

In a press statement, HSE said: "The company undertook to demonstrate that it had re-evaluated the risks associated with operating the installation by resubmitting the safety case required by HSE to permit production."

A Total spokeswoman was quoted by Reuters as saying that subsequent to the HSE's decision, the company will restart operations at Elgin as early as possible. In January, Total said that the field could not start full production for several months or even years, as the company needed to redesign the installation. About 3% of Britain's total gas output is produced from Elgin gas field, and its shutdown has affected the UK's stagnating economy.

Located 240 km off the coast of eastern Scotland, the Elgin gas field spewed gas for more than 7 weeks in 2012 after pipework that was weakened by corrosion exploded due to unusually high pressure.

Noble Energy increases Leviathan field natural gas estimate to 18 tcf

Noble Energy Inc. updated its reserve estimate in the Leviathan natural gas field off the Israeli coast to 18 tcf after encountering more than 450 net ft of pay while drilling an appraisal well in the field. The company said that is

the thickest net pay to date for wells drilled in the play.

"The successful Leviathan No. 4 well has provided us with additional information to improve our knowledge of this enormous resource," Noble Chairman Charles Davidson said in a statement. "Our teams are working with our partners and the Israeli government toward sanction of a domestic project at Leviathan this year."

Noble Energy expects initial production for the Israeli market by 2016.

Brazil's Petrobras starts offshore oil production from Baúna field

Petrobras has initiated operations of the FPSO Cidade de Itajaí to start oil production at Baúna field in block BMS-40 offshore Brazil in the southern Santos basin. At present, the FPSO is connected to well 9-SPS-88, which can produce as much as 12,000 bbl/d of oil. Five more production wells are scheduled for connection in the coming months. There also are four water injection wells and one gas injection well. The FPSO can process 80,000 bbl/d of 34 degrees API oil and 70.6 mmcf/d of natural gas. It is in 902 ft of water 131 mi offshore.

China says ConocoPhillips can resume offshore oil production

The Chinese subsidiary of ConocoPhillips can resume operations at an oilfield off the coast of northeastern China that was closed in 2011 after two oil spills. The State Oceanic Administration said in a statement that conditions at the Penglai 19-3 oilfield had returned to normal after a series of rectification measures, and that ConocoPhillips could gradually resume production there.

Combined, the two spills reportedly released more than 30,300 gallons of oil, or 723 barrels, and more than 110,000 gallons of mineral oil-based drilling mud, which is used as a lubricant for drilling.

Statoil begins production at Hyme field in Norwegian Sea

Statoil, along with its partners, has commenced production at the Hyme oilfield, the second of its 12 fast-track projects located in the southern part of the Norwegian Sea. The company said the fast-track projects, which are the discoveries made near the existing fields, will be transformed from discovery to

first oil within 30 months.

Statoil Development and Production Norway (DPN) head of the "fast-track" portfolio, Halfdan Knudsen, said the field began production 1 month earlier than it was expected in the plan for development and operation (PDO).

The time from when Statoil decided to use Njord A as a tie-in platform to the first oil being produced was "2 years, which we are very pleased with," Knudsen added. "This development will revitalize the entire area, open for further expansion and increase the production life of Njord."

In June 2009, the Hyme field was discovered at Haltenbanken, about 19 km northeast of the Njord A platform. The field, tied into existing infrastructure on Njord A, is expected to extend production life of the Njord field from 2015 to 2020. At an investment of about US\$788 million, Statoil and its partners will develop a production well and a water injection well drilled through a subsea template with four well slots in the field.

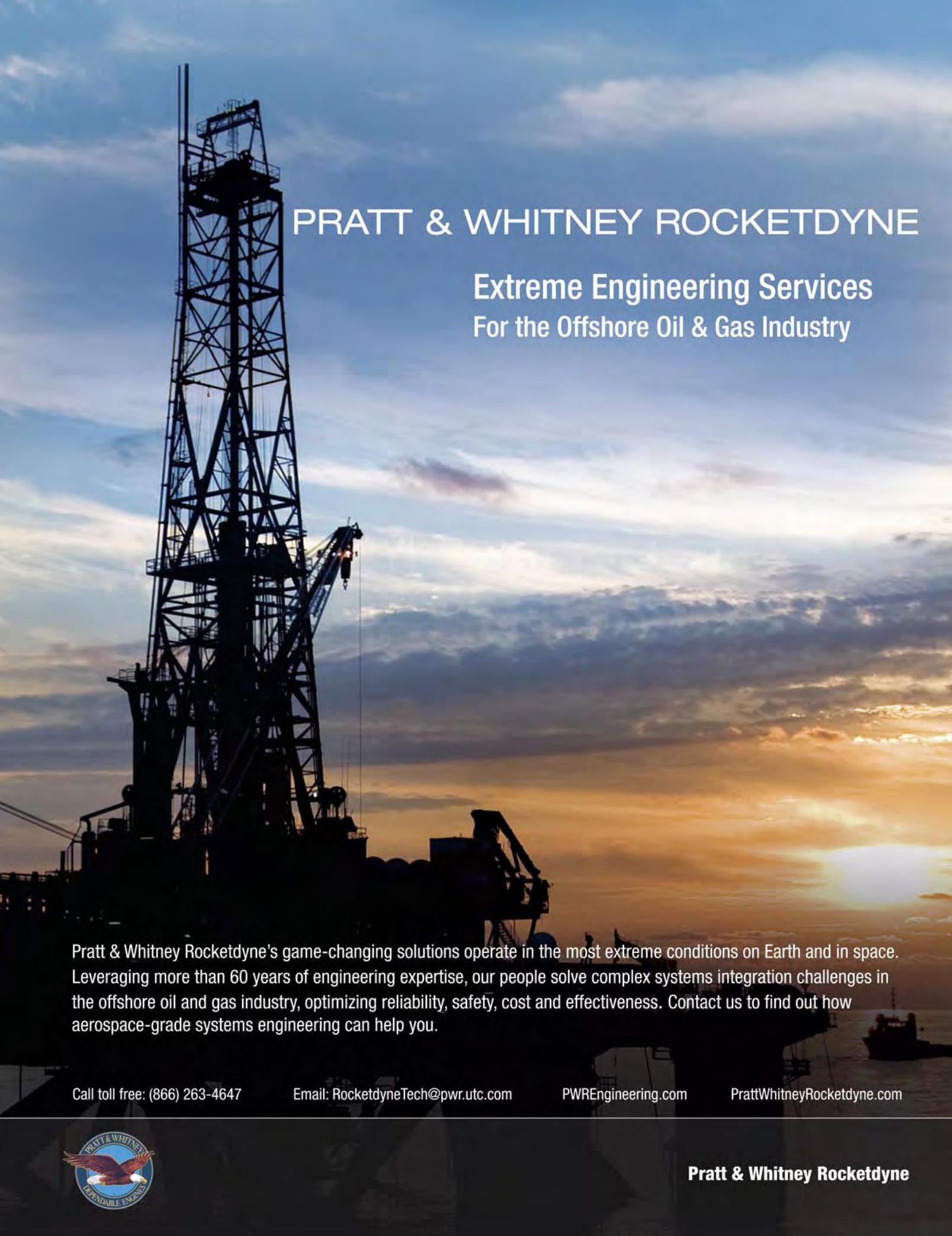


Hyme field is built with a subsea template tied into existing infrastructure on the Njord A platform

The project will also include installation of five new risers and Njord A modifications to receive Hyme production. An unconventional well solution, which involves the use of a multilateral well for optimal drainage of the reservoir, has been selected for Hyme due to high reservoir complexity.

According to recent estimates, Hyme contains some 30 mmbbl of recoverable reserves. With the field's life expected to last beyond 2020, further volume increases may be expected at Njord.

Statoil holds 35% interest in the field, while other partners in the joint venture, namely Core Energy, VNG, Faroe Petroleum, E.ON E&P, and GDF Suez, hold 17.5%, 2.5%, 7.5%, 17.5%, and 20% stakes, respectively.

A large, dark silhouette of an offshore oil rig stands prominently against a vibrant sunset sky. The sky is filled with streaks of orange, yellow, and blue light, with wispy clouds scattered across it. The rig's complex steel lattice structure is clearly visible, reaching high into the air. In the foreground, the dark silhouette of a ship or platform extends from the left side of the frame.

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Damen helps launch project to test anti-fouling film Thorn-D®

Damen Shipyards of Gorinchem, Netherlands and the Port of Amsterdam have launched a pilot project to test Thorn-D®, a relatively new anti-fouling film that is applied to ships' hulls below the water line. The film has an expected lifetime of 5 years. That is much longer than conventional anti-fouling coatings, which need to be replaced every 6 months on average.

Rik Breur, the founder of supplier Micanti, developed the film and tested it extensively on trial surfaces and work vessels. That attracted the attention of the Port of Amsterdam, which is concerned about the safety and sustainability of its vessels.

"The film is an excellent additional application," he said.

"We're using two boats in the pilot project: one with the film and the other with a conventional anti-fouling coating," added Willem Spoelstra of the Port of Amsterdam's nautical division. "The pilot will run for a year, and we've agreed with Micanti that the film has to remain problem-free for at least 2 years."

He added: "they've given us certain guarantees concerning durability and so on, in any event. We can now assume that the film will not come off. The great thing about this test is that the two vessels will be operating in precisely the same area. That's ideal for a pilot project."

Two vessels —one a tug belonging to Dutch company BMS Towing and another located in Florida—have already been operating for some time after application of the anti-fouling film. The film has so far been tested up to 30 kts.



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For more information about the V-Cone Flow Meter, visit www.mccrometer.com.

DrillASSURE designed to ensure integrity of riser, wellhead system

Pulse Structural Monitoring said its DrillASSURE system is designed to ensure the structural integrity of the drilling riser and wellhead system. The system measures riser and riser stack motion response to accurately track structural integrity of the riser and wellhead system, offers real-time direct access to the riser response data without



needing to recover the instruments, and enables operators to view and analyze information instantly.

The DrillASSURE real-time monitoring and data acquisition tool offers several significant benefits, according to the company. It mitigates risk of damage to the riser and wellhead during riser installation and retrieval and tracks fatigue loading on the wellhead and conductor, thereby extending asset life.

The system also improves understanding of the relationship between riser response and environmental loading, thus increasing confidence and assurance to maximize drilling uptime.

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

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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 ROV Pilot Training simulator and, in 1999, released the VROV (Virtual Remotely Operated Vehicle) System: Pilot Training. Due to its innovation in interactive tether collision and dynamics, the system almost instantly 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, and more 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; assemble an experienced and knowledgeable team; and create a range of software tools (file importers, exporters, viewer applications, model libraries, and interfaces) to make true high-fidelity mission planning and rehearsal not only possible but efficient.

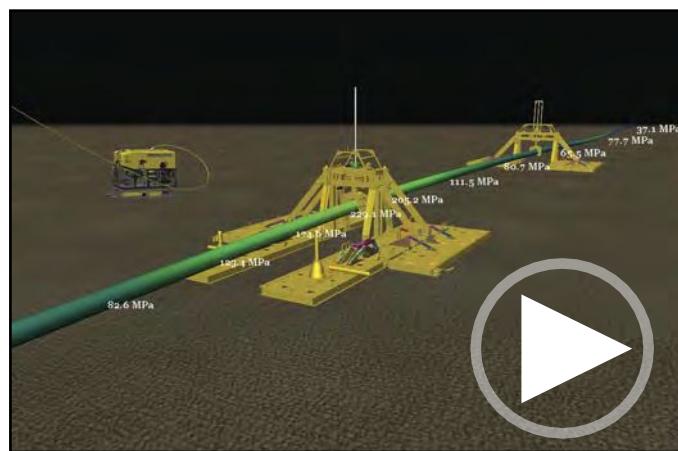
The customer-driven quest for fidelity and efficiency culminated in the integration of GRI's VROV with ESRI's ArcGIS to facilitate the accurate geo-referenced positioning of offshore components and features in the virtual interactive environment as well as the integration with ProteusDS, a finite-element analysis (FEA) application from Dynamic Systems Analysis Limited (www.dsa-ltd.ca). The seamless combination of real-time interactive operations with FEA displacement and stresses of critical systems created a tool that facilitates design and testing of equipment, mission layout and procedures, and training of operations personnel. Over the past couple of years, it was successfully employed in riser pull-in operations and multiple pipeline repair systems.

What a great IDEA

It became apparent that these myriad additions to the VROV simulator system had created something beyond that which was envisioned and even considered possible until it was done. The implementation of the VROV mission creation technologies in a field layout design application created an Interactive Design, Engineering and Analysis Field Development Kit (IDEA-FDK), of which ROV accessibility testing was only a small, albeit critical, component.

The process

Interactivity is key to enabling project teams' ability to develop the best solutions quickly through the sharing of key precise and accurate information from various sources in an intuitive and accessible 3D visual and dynamic virtual environment.



Source models and operations procedures provide the basis for the components that comprise the FDK menus. Each system, structure, or tool is composed of a visual and collision model, including mechanism and connector logic. Terrain features, flowlines, flying leads, and jumpers are imported through GIS or CAD files or can be easily and intuitively created and edited by the FDK user.

The FEA Edit Function provides a ProteusDS analysis of the orientation of linear systems like pipelines, flowlines, and flying leads based on user-input dynamic properties and that of the terrain. Such lines now become three dimensional and interactive and can remain static or be converted to a dynamic system. The user can simply drag and

drop a pre-loaded ROV from the menu, check accessibility and valve operability, or try installation or retrieval.

Similarly, the rigid jumper creation facility allows the import of pre-designed geo-referenced jumpers or the creation of a rigid system by choosing a connector from the jumper menu and clicking on compatible connectors on structures. The size, shape, and slope of the vertical and horizontal members of the jumper are controllable by the user through a text or mouse interface. If the designer has a few minutes, she can choose to run a ProteusDS FE analysis on the jumper and the connectors and test for ROV accessibility.

Current development programs & technology partnerships

While it remains the top of its class as the most advanced, stable, and functional underwater vehicle simulator, VROV is now just a part of the IDEA-FDK, and GRI is seeking other top technologies to integrate with and offer in real-time through the IDEA-FDK portal.

A major in-house effort is underway to improve real-time visualization of large datasets, beginning initially with seismic datasets and soil modeling for the FDK as well as in VROV for Arctic trenching simulation. GRI is conducting final testing of its new in-house dynamics engine using open-source software to maintain IDEA-FDK's high level of stability and fidelity as it moves to more real-time interactive engineering analysis capabilities of more complex systems and operations.

GRI is seeking oil and gas projects in various phases for the implementation and verification of the functionality of the IDEA-FDK and is installing the components of the various pipeline repair and well response toolkits it has simulated for the use of authorized projects in environmental response planning, permitting, and training.

Contact

Steve Dodd, VP Operations, GRI Simulations Inc. • steve.dodd@grisim.com
Phone: 709 747 5599 • www.grisim.com

Oceaneering® ROV sets new deepwater drill support record

An Oceaneering® Magnum® Plus work-class ROV has set a new ROV ultra deepwater drill support depth record offshore India while working at 10,385 ft water depth (3,165 m). Magnum® 169 is supporting drilling operations onboard rig Dhirubhai Deepwater KG1 (DDKG1) for ONGC and has been in service since Q3 2009. The ROV is a 4,000-m rated system that has logged over 8,309 hours and 961 total dives so far.

The previous 2011 record of operating at 10,194 ft (3,107 m) water depth was also set in India by Oceaneering® Millennium® 77 while working onboard rig Dhirubhai Deepwater KG2 (DDKG2) for Reliance Industries Limited (RIL).

For more information, visit www.oceaneering.com.



Hydroid littoral battlespace sensing AUVs enter full rate production

Hydroid, Inc., a subsidiary of Kongsberg Maritime and the leading manufacturer of Autonomous Underwater Vehicles (AUVs), announces that its contract to provide Littoral Battlespace Sensing (LBS) AUVs to the U.S. Navy's Space and Naval Warfare Systems Command (SPAWAR) has moved directly from the Engineering Development Model (EDM) phase to full rate production (FRP).

The decision to make the rare move from the EDM phase directly to FRP was made by the U.S. Navy's Milestone Decision Authority (MDA), the Navy's Program Executive Office for Command, Control, Communications, Computers and Intelligence (PEO C4I) after more than a year of extensive testing and evaluation determined that Hydroid's LBS-AUV systems were ready for deployment. In response to the MDA's approval, SPAWAR has ordered the immediate production of three LBS AUVs (REMUS 600s) and one Shipset, including a launch and recovery system (LARS), a LARS flat rack, a mission van, a maintenance van, and vehicle support equipment.

The AUVs ordered by SPAWAR will be equipped with advanced technologies for the collection of oceanographic and meteorological data as well as technologies for processing and dissemination of these data. This technology will enable superior decision-

making based on information collected by a system of networked sensors and shared through a network of interoperable Naval and Joint networks information systems. These onboard instruments will accurately catalogue a wide variety of environmental parameters, and provide environmental data that will play a critical role in supporting worldwide Navy requirements.

The ultimate end user of these AUVs is the Naval Oceanographic Office (NAVOCEANO), which acquires and analyzes global ocean and littoral data to provide operationally significant products and services to all elements within the Department of Defense.

Hydroid's REMUS AUVs are modular and may be fitted with a large number of different types of sensors. They have been used to aid in hydrographic surveys, harbor security operations, debris field mapping, and scientific sampling and mapping as well as many basic and applied research programs funded by ONR, DARPA, and the United Kingdom Ministry of Defense. With over 200 vehicles in the field, Hydroid is currently the AUV market leader with systems in use by 13 NATO and other navies around the world.

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



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Underwater Intervention

Forum Energy Technologies announces sale of contracts to Helix Energy



Forum Energy Technologies, Inc. announced the signing of sale contracts with Helix Energy Solutions Group's Canyon Offshore subsea robotics business unit. Under the contracts, Forum will supply to Canyon Offshore a Perry™ XT1500 Trenching system and two Perry™ XLX 200HP ROV systems.

The XT1500 is based on proven technology from previous trenching systems, particularly Forum's T750 and, most recently, the T1200 that Forum supplied to Canyon Offshore in 2012. The XT1500 has extra electro-hydraulic

power enabling a wider array of burial configurations and more tooling packages (including a precutting tool) to provide higher burial performance. The vehicle will be capable of accepting a pipeline burial package and dredge eductor for burying product in stiff soil and compacted sands. The XT1500 is a culmination of Forum's research initiatives and close working relationship with Canyon Offshore. Forum will also provide support during the mobilization onboard Canyon's vessel and during the sea trials to ensure seamless delivery to market in the same manner as the T1200. The XT1500 Trenching system is scheduled for delivery in early 2014 and will support Canyon Offshore's subsea burial operations in both oil & gas and renewable energy operations.

The Perry™ XLX Generation 2 (G2) 200 HP ROV systems will be supplied complete with Forum's Dynacon Launch & Recovery Systems and with tooling packages. Both XLX ROV systems are scheduled for delivery in 2013.

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

The Institute of Oceanology, China takes delivery of towed oceanographic vehicle system



The Institute of Oceanology Chinese Academy of Sciences (IOCAS), Qingdao, has just taken delivery of a Chelsea SeaSoar towed oceanographic system. The sale has been facilitated through Chelsea's agents China ORES Co Ltd.

The purchase of the SeaSoar system satisfies the requirement of the IOCAS for a large payload towed oceanographic vehicle capable of undulating down to depths of 500 m at tow speeds of up to 12 kts. The Chelsea SeaSoar was chosen for its proven track record in providing this performance as well as providing a flexible payload.

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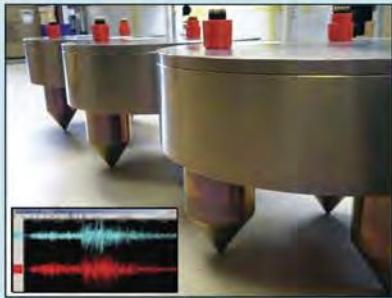
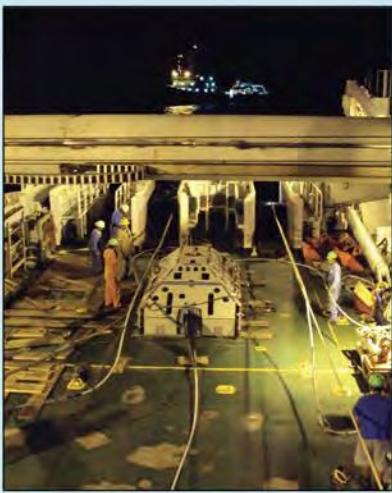
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Experts in Seafloor Communications Network

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

Offshore Communications Backbone

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

The SeaSoar System is fitted with a Chelsea MiniPack to measure conductivity, temperature, depth, and fluorescence plus sensors to monitor turbidity and PAR. A Chelsea Plankton Sampler with flow meter has also been integrated as well as third-party instrumentation. The Chelsea data and flight analysis software will enable the operator to have real-time control over the vehicle's flight profile together with storage and display of the flight parameters. Data obtained from the sensors mounted in the SeaSoar will be transmitted to the towing vessel for processing, display, and storage via a multi-core tow cable. The SeaSoar system is to be on permanent deployment from IOCAS's new Research Vessel, the Kexue Hao.

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

Contracts awarded for ocean robot project

A project to develop ocean-going robotic vehicles that will carry out sustained marine research over long periods has awarded contracts to five leading-

edge technology companies under the government-backed Small Business Research Initiative (SBRI).

The SBRI competition has awarded the five 3-month, first-phase contracts to assess the viability of rugged, robust, and reliable long-endurance marine unmanned surface vehicles. The vehicles, which are similar to marine gliders but do not operate at depth, will gather data from the ocean over periods of several months in support of UK marine scientific research.

The project brief highlights the fact that a wide range of sensors now exists to take measurements on the ocean surface, that satellite navigation tools and communications for command and control and for data transfer to shore are readily available, and that there are a number of feasible technologies available to provide the energy necessary for long deployment.

The successful companies are MOST Ltd, Blue Bear Ltd, the University of Aberystwyth, Intrepid Minds Limited, and ASV Ltd.

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

Teledyne Webb Research's APEX® Deep reaches 6,000 m

Teledyne Webb Research announced that their Autonomous Profiling Explorer (APEX®) Deep set a record, diving to a depth in excess of 6,000 m in the Puerto Rico trench on 26 February 2013, making APEX® Deep the deepest diving commercially available profiling float. The 6,000 m dive was launched from the R/V Kruger B out of San Juan, starting its dive the afternoon of 25 February 2013. Approximately 22 hrs later, the float surfaced and transmitted its data over the Iridium satellite network.

APEX® floats are based on a buoyancy engine and have been commercially available since founder Douglas Webb opened Webb Research in 1982. APEX® floats descend to a programmed depth where they become neutrally buoyant and drift. After some interval, usually 5 to 10 days, the buoyancy engine makes the float positively buoyant and it rises to the surface, where it transmits collected data, such as temperature and salinity, back to researchers via satellite communications.

For more information, visit www.webbresearch.com.

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MTN securing contract with largest South American ferry

MTN Satellite Communications (MTN) announces a new contract with Buquebus, the largest ferry operator in South America. MTN will provide Buquebus with very small aperture terminal (VSAT) satellite communications services, as well as Internet and Wi-Fi connectivity, throughout its expanding fleet. The demand around the world is growing for passengers and crew to be able to stay connected and entertained while commuting. MTN has been the leading communications provider in the cruise, yacht, and government vessel markets. Now, thanks to MTN's history of service excellence, the ferry market is taking notice and benefiting from the value MTN delivers through its services as well as its innovative approach to introducing new connectivity options that are ahead of customers' expectations. Buquebus is a tourism transportation company in Uruguay, connecting more than 2 million passengers between Argentina and Uruguay every year by boat and bus. After a satisfying test period, Buquebus selected MTN to provide VSAT services to their fleet traveling between Buenos Aires, Montevideo, and Colonia.

MTN announces contracts to luxury segment of the cruise market

MTN Satellite Communications (MTN) announced new contracts and activities with luxury cruise operators around the world. The continued relationships with these exclusive brands further solidify MTN's position as the leading communication provider delivering on value, innovation, and service excellence. For more than 30 years, the company has provided maritime customers with VSAT satellite network solutions as well as voice, data, Internet, news, entertainment, and financial services. These solutions enable MTN's customers to enhance their overall business operations as well as ensure passenger satisfaction and crew welfare initiatives. Recent contract wins and activities in the cruise market include the following brands that look to MTN for VSAT services, television and special events, and Internet and calling solutions for passengers and crew: Windstar Cruises, a sailing luxury small ship cruise line based in Seattle, Wash.; Paul Gauguin Cruises, owned by Pacific Beachcomber S.C.; French Polynesia's leading luxury hotel and cruise operator; The World, the only residential ship at sea that continuously navigates the globe; and Freewinds, a 440-ft chartered ship based in the Caribbean, with the home port of Curaçao.

Ancylus, Net1 offer hybrid broadband solution

Ancylus AB and Net1 have introduced a new highly cost-effective hybrid broadband solution to the Scandinavian and Nordic maritime market. The solution is tailor-made for the shipping industry operating in Nordic waters. With the Net1's wireless broadband, the vessels can get connected with true high-speed Internet while they are close to shore (50 to 60 nmi) or in port, without any roaming issues. Once the vessels leave the shore, the communications service seamlessly switches over to satellite. This service is optimal for short sea trade, the fishing industry, offshore projects, ferries, yachts, and other marine activities in the region. Close to shore, the service can offer up to 9 Mbps at a cost of €35 flat-rate airtime. Further out, the service offers 2 Mbps for €500 a month.



KVH TracVision M1 brings satellite TV to small boat owners



Satellite TV is a luxury that more boaters can now take to the water thanks to KVH Industries, Inc. Long considered an amenity only found on superyachts and cruise ships, satellite TV is now a benefit every boat owner can add to their investment, enjoying access to news, sports, weather, and favorite television shows just like at home—even while the boat is in motion. KVH is making it simple and affordable to bring satellite TV onboard by significantly reducing the price of its 12.5-in TracVision® M1 marine satellite TV antenna by 20%.

Weighing just 7.5 lbs., the in-motion TracVision® M1 is the world's smallest and lightest satellite TV system for boats, bringing satellite TV programming to the water throughout the U.S. and its coastal waters. The system offers open water tracking and in-motion performance typical of larger antennas while fitting the sleek exterior design of vessels as small as 20 ft. The TracVision® M1's small size, easy setup, Whisper Drive™ motor technology, and versatile mounting options allow for convenient installation on nearly any vessel.

The versatile TracVision® M1 comes in two configurations to meet boaters' preferences. The TracVision® M1 includes an exclusive, integrated 12V DIRECTV® receiver/controller—just add a TV and your DIRECTV® service subscription to bring the DIRECTV® standard-definition programming onboard. For boaters who prefer DISH Network® or want the freedom to easily switch among satellite TV service providers, the TracVision® M1DX offers outstanding flexibility with a 12V multiservice interface box/controller that supports virtually all home receivers from DISH Network® and DIRECTV®.

For more information, visit www.kvh.com.

KVH ships 3,000th TracPhone® System for mini-VSAT Broadband network

KVH Industries, Inc. recently shipped its 3,000th TracPhone® terminal for the mini-VSAT Broadband network, extending the company's lead as the provider of the world's most widely used maritime VSAT service. Launched in 2007, KVH's maritime broadband service was the first to use spread spectrum technology that enabled small, easy-to-install onboard terminals to receive fast, affordable VSAT quality data connections offshore. KVH grew its service to become the world's largest maritime VSAT network through a geographic coverage rollout that is now complete and covers all the world's oceans.

The mini-VSAT Broadband network is unique in that it is



the only complete, end-to-end solution for offshore connectivity. KVH designs and manufactures the onboard TracPhone® terminals and antennas, owns the Earth station equipment, leases the satellite capacity, manages the network, and provides 24/7/365 after-sale support. By leveraging spread spectrum modem technology from ViaSat (Nasdaq: VSAT), KVH can offer terminals with antennas that are 85% smaller than competing VSAT solutions. Because KVH manufactures the onboard hardware, the company can integrate the full rack of discrete belowdecks equipment typically used on traditional VSAT systems into a single, streamlined unit that is significantly easier to deploy and inherently more reliable than competing VSAT solutions.

KVH's mini-VSAT Broadband network uses a combination of 14 Ku-band transponders to provide coverage throughout the northern hemisphere and all of the major continents in the southern hemisphere. This creates one of the industry's widest Ku-band VSAT networks, which is available only to owners of KVH's TracPhone® V-series systems. The compact TracPhone® V3, with its 37 cm (14.5 in.) antenna and affordable rate plans (starting at only \$49 per month for 50 MB of service), is the perfect solution for smaller vessels.

The enterprise-grade TracPhone® V7-IP offers a range of airtime service plans, including low-priced metered plans, traditional speed-based, fixed-rate plans, and the company's new unrestricted rate plans with Business Class Service. Unrestricted plans allow customers to stream audio or video content to or from their vessels or use popular VoIP services like Skype™, protocols often blocked on other VSAT plans due to the large amount of bandwidth they consume.

In 2012, KVH completed its rollout of a major upgrade to the mini-VSAT Broadband network, adding three global C-band transponders to deliver a fully global overlay to the Ku-band service. The dual-mode TracPhone® V11 antenna seamlessly tracks both C- and Ku-band satellites, making it the only 1-m maritime VSAT antenna to deliver seamless, fully global coverage.

The maritime customer base for

KVH's mini-VSAT Broadband service is diverse, including the U.S. Coast Guard, U.S. Navy, ship management leaders like Vroon and V.Ships, commercial fishing companies, offshore service vessels, and yacht owners. To support these mariners, KVH operates a 24/7/365 customer support center in its Middletown, Rhode Island headquarters as well as sales support offices in Singapore, Japan, Denmark, and Norway and a technical

support network that services the 125 largest ports worldwide.

For more information, visit www.kvh.com.

Globe Wireless, Arimar join to serve Italian market

Globe Wireless and Arimar have entered into a long-term cooperation agreement to provide Globe Wireless products and services to Italian flagged

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vessels. As part of this agreement, Arimar will act as the billing agent for Globe Wireless' Italian-flagged vessels. This collaboration will significantly enhance Globe Wireless' offering of communication services to Italian and Mediterranean maritime customers and industry. The agreement combines the strengths of both companies and gives Globe Wireless a partner with an in-depth knowledge of the Italian and Mediterranean maritime markets. Meanwhile, customers will benefit in terms of better service and more innovative solutions.

For more information, visit www.globewireless.com.

Beam wins contract from Chinese company

Beam Communications Pty Ltd, a wholly owned subsidiary of World Reach Limited, has entered into an agreement with Beijing Marine Communications & Navigation Company (MCN) for the supply of an initial \$1 million of Beam Inmarsat marine satellite terminals.

This initial order follows the successful trial and now acceptance of the Beam

terminals after MCN committed in July 2012 to undertake a trial deploying 200 Beam Oceana 400 and Oceana 800 marine communications terminals on fishing vessels in China using the Inmarsat FleetPhone Service. At the time, for commercial and competitive reasons, the customer's details could not be disclosed.

The terminals were specifically designed and manufactured by Beam to support the voice, data, and tracking communications that take place over the Inmarsat satellite network via its "Fleetphone" maritime service. These terminals were launched to the global market in late 2011 to specifically target high-volume deployments in emerging satellite markets.

Beam has been actively addressing new market opportunities in Asia, including China and Japan, for the past 2 years and is therefore, extremely pleased to have secured this strategic agreement and commitment from MCN, a leading strategic Inmarsat partner in China. This further reinforces Beam's position as a leading global provider of satellite communication solutions for both the Inmarsat and



Iridium satellite networks.

Delivery of the initial order, valued at \$1.0 million, will commence this quarter and be completed by 31 May 2013. At that time, MCN will be required to make further commitments to Beam in order to maintain its exclusive right for distribution of the Beam product in China.

For more information, visit www.beamcommunications.com.

MTN announces exclusive Partnership with BATS

MTN Satellite Communications (MTN) announces BATS has entered into an exclusive partnership with MTN to market the Broadband Antenna Tracking and Stabilization (BATS) sys-

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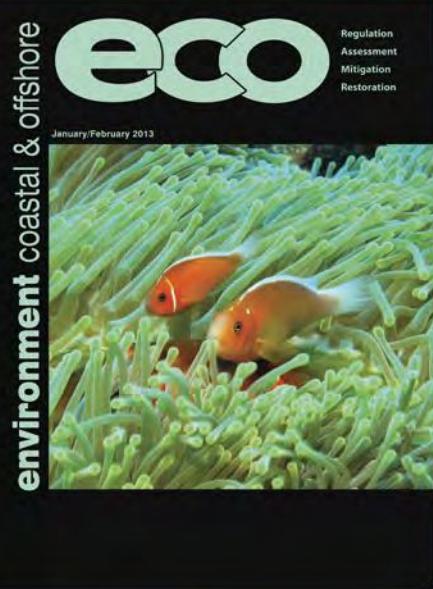
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tem to the cruise, ferry, and large yacht markets. This end solution is a hybrid network service, leveraging both satellite and terrestrial broadband, which BATS has already proven in the public safety, energy, military, and ferry markets.

The BATS system delivers high-capacity throughput, enhanced optimization, and a stronger, more stable connection at many miles range with dynamic system mobility. The system delivers a reliable, automated connection and optimization capability to communications antennas, ideal for vessels around the world that are entering and leaving ports with obstructed terrain and buildings.

"As we deliver on the promise of our next-generation MTN Nexus™ network, it is imperative that we provide the industry's best terrestrial connectivity in and near ports," said Bob Wise, chief innovation officer, MTN. "The BATS solution is one that proved to not only meet, but exceed, our customer requirements as well as address the unique make-up of each port around the world. This capability, the first of its kind for the cruise, ferry, and large yacht markets, is just one component of the next-generation network and products MTN will deliver in 2013."

For more information, visit www.mtnsat.com or www.batswireless.com.

Imtech upgrades coverage of global network

Imtech Marine has upgraded and extended the coverage of its Global VSAT Network. In addition to its already extensive network, Imtech Marine can now offer VSAT coverage in the South Atlantic Ocean, between South America and Africa, an important area for the international maritime industry. Imtech Marine offers a reliable, cost-effective, and always-on broadband communication solution that utilizes the proven iDirect Evolution platform. This global solution covers all major shipping routes and provides guaranteed quality of service, Service Level Agreements, 24/7 support, and worldwide VSAT coverage, including automatic beam switching.

At the same time as expanding the network, Imtech Marine, together with its partner ITC Global, seamlessly upgraded to the latest iDirect Evolution software version 3.1. This new software offers customers on Imtech Marine's Global VSAT Network many advantages, such as improved IP throughput and efficiency on their Ku-band VSAT Network as well as improved beam switching for mar-

itime terminals, which is now both easier and faster. It also supports each application on board with the most efficient transport technology and offers more efficient multicasting, making video applications much faster.

In 2012, Imtech Marine and ITC Global formed a strategic alliance, cementing an already well-established relationship in order to bring complete connectivity packages to the maritime industry. The alliance means that cus-

tomers get the benefits of having automatic beam switching and seamless connectivity for their vessels across the globe. The companies originally began working together in 2007 and since have jointly developed the Imtech Marine Global Ku-band VSAT Network. ITC is based in St. Petersburg, Florida and is the world's leading corporate network and communications solutions provider.

For more information, visit www.imtech.eu/marine.

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Batelco acquires CWC's units

Batelco Group announced the acquisition of various companies from Cable & Wireless Communications (CWC), which comprise its Monaco and Islands Division. Batelco will acquire the entire CWC interest in the Maldives, Channel Islands and Isle of Man, the Seychelles, South Atlantic, and Diego Garcia as well as a 25% shareholding in Compagnie Monégasque de Communications SAM (CMC), which holds CWC's 55% interest in Monaco Telecom, for a consideration of \$680 million. This represents a multiple of 5.6 times proportionate EBITDA for the 12 months ending 30 September 2012. The acquisition is subject to Batelco and CWC shareholder approval, and respective consents and approvals in each market as applicable. The acquisition will include CWC's interests in submarine fiber optic cables landing in the Maldives, Seychelles, Channel Islands, and Isle of Man.

Emerald executes landing party agreement

Emerald Networks, a new-build network submarine cable system that will connect North America to Europe and Iceland, announced the signing of a Landing Party Agreement (LPA) with multinational telecommunications provider AT&T. Under this agreement, AT&T will provide facilities and operational support for terminating the Emerald Express subsea cable at the former TAT12/13 cable station in Shirley, New York. This infrastructure will enable Emerald Express to utilize the most innovative optical technologies and provide the most advanced undersea telecommunications system constructed to date.

TE SubCom demonstrates 100G upgrade capability

TE SubCom, a TE Connectivity Ltd. company, has successfully demonstrated 100 Gbps per wavelength coherent transmission over transatlantic distances in field experiments. Capacity on a single fiber was determined to reach 4.4 Tbps, a result of SubCom's submarine optimized modulation format at 100 Gbps. SubCom's next generation C100 transceiver is designed to optimize DP-QPSK coherent transmission in ultra-long haul submarine cable systems. The benefits of the C100 technology apply to new systems based on +D fibers as well as upgrades to existing systems with dispersion-managed fiber. Leading the industry with a number of ultra-long haul distance solutions, TE SubCom has long embraced the movement toward 100G. It has developed a very unique product with ultra-long reach up to 11,000 km and capabilities of up to 15 Tbps demonstrated on beta hardware prototypes. Particularly well-suited for new builds, a number of SubCom customers have already begun to take advantage of this capability by building future-proofed systems at 100G.

Reef Subsea completes on cable work at wind farm

Reef Subsea Dredging & Excavation (RSD&E) completed their multi-million pound project over a period of 2 years (2010-2012) where they performed the excavation of approximately 100 monopiles around the j-tube approach to enable cable entry, remedial lowering of inter-array cables, and burial of circa 80 cable approaches to the monopiles using their non-contact excavation tools. RSD&E was selected for its range of non-contact controlled flow excavation tools providing high levels of safety for sensitive subsea structures combined with their ancillary jetting system, which enables them to work on site in a wide range of soil conditions, ranging from sand to hard clays measured at a strength of 172 kPa.

Alcatel-Lucent upgrades transpacific cable system

Alcatel-Lucent is carrying out a major upgrade of a 9,600-km transpacific digital submarine cable system using advanced coherent technology.

The cable, owned by five major carriers, provides direct connectivity from the Japanese east coast to California. The upgrade will deliver multi-terabit capability to cope with the explosion of data traffic driven by ownership of smartphones and tablets as well as the increase in video applications and the shift of enterprise activities to the cloud. The first phase of the upgrade will increase the system capacity by 1 Tbps.

With the system originally designed for an ultimate capacity of 960 Gbps per fiber pair, the upgrade will quadruple its original design capacity by use of Alcatel-Lucent's advanced coherent technology, delivering an ultimate capacity of up to 4 Tbps per fiber pair—an equivalent to approximately 500,000 HDTV channels simultaneously broadcasting a live major sporting event.

Regional and international operators are moving to the most advanced ultra-long reach technology with the highest spectral efficiency ever offered over a transpacific distance. This upgrade, using state-of-the-art and field-proven submarine technology from Alcatel-Lucent, is a strategic move to expand the overall capabilities of transpacific communication infrastructures to benefit from a time-to-market advantage, improved performance, and better scalability.

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

TE SubCom begins production of Big Foot network

TE SubCom, a TE Connectivity Ltd. company, announced that work is underway for Chevron U.S.A. Inc.'s Big Foot offshore facility undersea fiber optic communications system in the deepwater U.S. Gulf of Mexico. Under terms of a contract awarded to TE SubCom in April 2012, the cable system is slated for completion in December 2013.

Subsea Telecom

Big Foot is a tension-leg platform located approximately 225 mi south of New Orleans, Louisiana in water depths of 1,600 m (5,200 ft). Approximately 61 km of submarine cable, along with a dynamic riser and various subsea equipment, will connect to a branching unit of an existing network using SubCom's proprietary OADM branching unit technology. The Big Foot transmission requirements will be met by SubCom's leading submarine line terminating equipment installed on the facility and in landing stations located in Mississippi and Texas. SubCom will be responsible for the installation, testing, and commissioning of the cable system and will be manufacturing all equipment needed for the project in its Newington, New Hampshire facilities.

The Big Foot cable system will connect to the backbone of a larger system commissioned by SubCom in 2006 that was designed to support 64 platforms. Big Foot will be Chevron's third facility connected to the deepwater fiber network in the Gulf of Mexico.

For more information, visit www.subcom.com.

NEC performs successful trial of real-time, 1-Tbps superchannel transmission

NEC Corporation recently performed the world's first successful trial of real-time, 1-Tbps superchannel transmission using 100 GbE subcarriers over a trans-oceanic distance.

In recent years, the international demand for bandwidth is growing at a remarkable pace, thanks in part to the globalization of resource-hungry applications such as VoD, High Definition videoconferencing, and cloud computing. As a result, efforts are continuously being made to increase the bit-rate capacity and transmission reach of submarine cable systems, which support more than 99% of trans-oceanic data traffic.

With 100 Gbps technologies now commercially deployed, the focus of recent development is turning to high capacity channels, beyond 100 Gbps, with more efficient bandwidth utilization. As part of this movement, NEC has proposed optical superchannels to increase fiber capacity in both terrestrial and submarine networks. Optical superchannels are based on advanced technologies such as parallel high-speed transceivers, advanced modulation formats, and advanced pulse shaping. Superchannels constitute a practical platform for next-generation submarine

Subsea Cables

systems specifically designed to help carriers to significantly increase transmission capacity in a cost-efficient, scalable, and flexible manner.

As a result of these proposals, NEC successfully tested a 1-Tbps superchannel for submarine ultra-long haul systems that uses the latest optical and digital technologies to provide traffic management flexibility and improve transmission performance over ultra-long haul transmission distances. Results from this real-time operation with error-free performance were presented at the Asia Communications and Photonics Conference in Shanghai in November 2012.

Key technologies of the 1 Tbps superchannel are described below

NEC combined a software-defined pulse shaper together with flexible-grid, real-time 100-Gbps subcarriers to create a 1-Tbps superchannel. The pulse-shaper is designed to mitigate transmission impairments and to offer flexible bandwidth allocation capabilities. NEC achieved error-free transmission over a 5,400-km link consisting of commercially available optical fiber and cost-effective repeater spacing. This technology provides a 43% improvement over the bandwidth utilization of current commercial systems.

NEC also implemented a 1-Tbps superchannel composed of full-digital 100-Gbps subcarriers. Each subcarrier is equipped with a digital signal processor at the transmitter, which can potentially extend the re-configurability to a variable modulation format and/or for variable error-correction capabilities. This cutting-edge digital-transmitter technology enables the 1-Tbps superchannel to successfully transmit beyond 7,200 km.

NEC's strength in ultra-long-haul transmission technologies is supported by its achievements providing the world's first transmission of Optical-OFDM over 10,000 km and the world's first trans-pacific transmission of 16QAM signals. Now, NEC has reinforced its position by demonstrating the first real-time, 1-Tbps superchannel transmission designed for ultra-long haul communications.

For more information, visit www.nec.com.

Xtera announces 100-G for long-haul systems

Xtera Communications, Inc. announced the availability of 100-G technology for long-haul subsea cable

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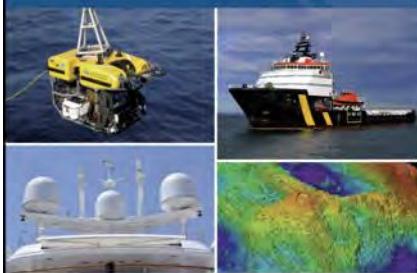
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systems. Xtera is the first supplier to have installed 100-G Submarine Line Terminal Equipment (SLTE) on a repeatered subsea cable system: this project was awarded by Gulf Bridge International (GBI) for a submarine cable system connecting Egypt to Italy and put into service in the first quarter of 2012. The GBI cable system is the first and only 100-G repeatered subsea system in commercial operation today. Developing further its 100-G technology that has included soft-decision FEC since 2011, Xtera has carried out numerous 100-G field trials in the past quarters on various types of cable systems with many operators in order to increase the performance of 100-G reach on ultra-long distances.

Xtera's 100 G field trials were conducted on multiple subsea cable systems of different generations, made of various fiber types of different lengths. Regional, trans-atlantic, and trans-pacific cable systems have been tested by Xtera's testing teams. Accurate analysis of system performance is key for understanding Xtera's 100-G capabilities to further improve our 100-G technology for both upgrades and new builds.

Another variant of 100-G field trials consist of Optical Transmission Surveys (OTS) whose main purpose is to determine the maximum system capacity that existing subsea cable systems can support when upgraded with Xtera's 100-G technologies.

Because of the variety of fiber types and repeater generations that have been used for the past 20 years in different system designs and configurations, OTS is necessary to improve simulation tools as well as make the capacity commitments reliable for upgrade projects.

Xtera has been working on the upgrade of submarine cable systems since 2001 and carried out its first commercial upgrade project in the first quarter of 2006. Since then, Xtera has been developing a unique experience and expertise to better understand the behavior of cable systems when fed by higher and higher channel rates. Today, Xtera offers advanced 100-G technology for both upgrade and new builds.

For more information, visit www.xtera.com.

WIOCC wins Best Pan-African Initiative Award at Africa Com 2012

WIOCC won the Best Pan-African Initiative Award at Africa Com 2012 for building an unrivaled, high-capacity network that seamlessly integrates more

than 50,000 km of African terrestrial fiber with 40,000 km of international submarine cable—giving carriers diversity-rich, high-speed international connectivity to and from over 400 locations in 30 African countries.

The Best Pan-African Initiative Award recognizes an initiative taken to improve telecommunications services at a regional or continental level across Africa and was presented to WIOCC CEO Chris Wood at the Africa Com 2012 awards dinner—which took place in Cape Town, South Africa on 14 November 2012.

The award recognizes WIOCC's unique achievement in bringing together the networks of its 14 African telco shareholders and selected partners, together with strategic investments in submarine cables (including EIG, WACS and EASSy) to create an unparalleled African network footprint and capability.

As well as serving Africa's coastal regions, WIOCC's network is increasingly enabling businesses and individuals in landlocked countries—such as Botswana, Burundi, Lesotho, Malawi, Uganda, and Zimbabwe—to benefit from reliable and affordable international connectivity.

For more information, visit www.wiocc.net.

Offshore wind transmission project selects Bechtel, Alstom

The Atlantic Wind Connection (AWC), developer of the New Jersey Energy Link, the first offshore backbone electricity transmission system proposed in the United States, announced that it has selected major construction and design firm Bechtel as its Engineering, Procurement, and Construction (EPC) contractor and international power equipment supplier Alstom as its HVDC technical advisor for this first phase of the historic AWC project.

The New Jersey Energy Link will be an offshore electrical transmission cable buried under the ocean, linking energy resources and users in northern, central, and southern New Jersey. The cable will span the length of New Jersey and when complete, could carry 3,000 MW of electricity.

The New Jersey Energy Link is expected to be built in three phases over a decade. It is expected to begin construction in 2016 and the first phase to be in service in 2019. Bechtel will serve as EPC contractor for the first phase of the New Jersey Energy Link and will engineer, design, and install onshore transmission lines and substations—two onshore con-



verter stations and one offshore converter station that will make up the New Jersey Energy Link backbone. Bechtel will also oversee the installation of advanced HVDC converter technology and high-voltage DC cables to bring power from the offshore wind turbines to the onshore converter stations. The project will also improve the reliability of New Jersey's power grid and help lower electricity prices by delivering both offshore wind and conventional electricity to where it is needed and when it is needed along the coast, whether that be southern, central, or northern New Jersey.

Alstom will serve as the HVDC technical advisor for the project. In that capacity, Alstom will provide technical advice to the project, in particular, concerning the manufacture and delivery of the 320-kV HVDC multi-terminal system components. With their HVDC MaxSine™ Voltage Source Converters (VSC), they are one of only a few firms in the world versed in technology related to multi-terminal HVDC systems, including the project's plans to provide connections with a series of 1-GW offshore converter "hubs" to onshore converters. This multi-terminal HVDC offshore network will transform the 138 kV or 230 kV alternating current output from offshore wind farm electric service platforms into DC for transmission at 320 kV DC to onshore converters that will be connected to the PJM grid.

The AWC backbone transmission project is led by well-established independent transmission company Trans-Elect, with Atlantic Grid Development as the project developer and Google, Bregal Energy, Marubeni Corporation, and Elia as sponsors. The AWC backbone transmission project is an essential foundation to establishing the offshore wind energy industry.

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

Subsea Telecom

Pacnet announces 100-G Optical Transport Network build

Pacnet announced plans to deploy an optical mesh network with 100 Gbps technology and integrated Optical Transport Network (OTN), switching utilizing its wholly owned subsea cable network EAC-C2C and giving it the ability to meet explosive future capacity needs throughout Asia.

The deployment will create the foundation for Pacnet to offer customers a seamless set of network services between its inventory of interconnected data centers throughout the region.

Enabling greater efficiency and capacity management flexibility, the new backbone integrating subsea fiber infrastructure and terrestrial backhaul links will support pure packet technology in the optical core in addition to the Dense Wavelength Division Multiplexing/Synchronous Digital Hierarchy (DWDM/SDH) technologies currently utilized by the existing core network. The upgrades are scheduled to begin in early 2013.

EAC-C2C is the leading state-of-the-art fiber optic submarine cable network in Asia, spanning 36,800 km with cable landing stations throughout Asia, including Hong Kong, Singapore, Japan, Taiwan, Korea, the Philippines, and China. With multiple landing points in most locations, EAC-C2C provides Pacnet's customers with greater route diversity.

For more information, visit www.pacnet.com.

Arctic Fibre to extend network to Alaska

Arctic Fibre Inc. will partner with Anchorage-based Quintillion Networks, LLC to provide broadband telecommunications services to more than 26,500 Alaska residents living along the Alaskan North Slope and Bering Sea coastline and

Subsea Cables

to provide a geographically diverse alternate fiber route for traffic from the United States to Europe and Asia.

This provision of virtually unlimited bandwidth will enable the government to reduce the cost of providing services to citizens and enable consumers to access faster Internet speeds now available in most urban communities in Alaska.

Arctic Fibre was established in 2009 to explore deploying a fiber optic telecommunications system through the Canadian Arctic. Arctic Fibre plans to construct a 15,167-km subsea fiber optic cable extending from Tokyo, Japan to London, England via the Bering Strait, Beaufort Sea, and Canadian Arctic with a planned in-service date of November 2014.

Arctic Fibre's backbone network will reduce the cost of wholesale bandwidth by more than 85% in the Canadian communities of Cambridge Bay, Gjoa Haven, Taloyoak, Igloolik, Hall Beach, Cape Dorset, and Iqaluit. The company successfully concluded a capacity nomination process for Canadian carriers in late 2012 and is now moving to formal contracts with a group of Canadian carriers and government agencies.

In December 2012, Arctic Fibre entered into an agreement with Quintillion Networks to serve the Alaska market as a wholesaler providing bandwidth to existing Alaska telecommunications carriers on a non-discriminatory basis.

Quintillion will act as Arctic Fibre's landing party in the United States and will own subsea spurs from underwater branching units to at least five communities along the Alaskan coastline.

Quintillion is also working closely with local telecommunication companies to assess possible extensions of the network to serve other rural Alaskan communities using high-capacity microwave links or additional new fiber optic cable builds.

For more information, visit www.articfibre.com.



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Prysmian named UK investor of the year

Prysmian Group has been conferred the prestigious Investor of the Year award, given every year by the British Government and UK Trade & Investment to prominent companies for investment and strategic projects in Great Britain.

The decision to bestow Prysmian this prestigious award is attributable to the major projects and investments that the Group has undertaken and is currently undertaking in the UK. In particular, in 2012 Prysmian Group won the contract for the Western Link submarine connection between Scotland and England, a strategically important project for the country that will provide extra capacity in the entire UK electricity transmission system.

This contract also recognizes the Group's undisputed know-how and capability for innovation as well as representing a milestone not only in terms of economic value, but also for its technological characteristics (with a record voltage of 600 kV and power rating of 2,200 MW).

Also, last year, the Group acquired Global Marine Energy (GME), a British company active in the installation of submarine energy cables and systems, with a cable

Power Cables

ship amongst its strategic assets. GME offers high-value added services, presenting itself increasingly as a partner capable of offering integrated solutions for the production and installation of cable systems with particular expertise in offshore wind farm connections.

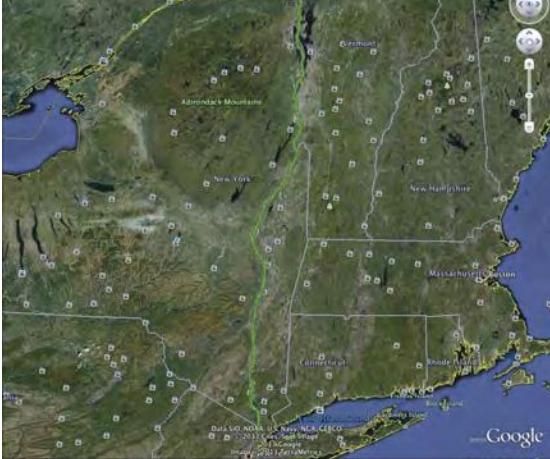
Prysmian is also heavily involved in renewable energy development program in Great Britain, where it has developed power connections for major offshore wind farms, including Walney, Ormonde, Gunfleet Sands, Thanet, and Greater Gabbard. In addition, the Group is one of the founding members of Norstec, an association supported by David Cameron, the British Prime Minister, bringing together key players in the energy sector with the goal of maximizing the benefits of the huge potential of clean energy resources in Europe's northern seas.

For more information, visit www.prysmian.com.

AECOM picked as owner's engineer for CHPE

AECOM Technology Corporation has been engaged by Transmission Developers Inc. (TDI) of Albany, New York as owner's engineer for the Champlain Hudson Power Express project (CHPE).

CHPE is a high-voltage direct current



(HVDC) buried and submarine cable transmission project that will bring 1,000 mw of clean power, primarily generated by wind and hydropower, to the New York City metropolitan area. The transmission route will travel through New York starting at the U.S.-Canada border and pass through Lake Champlain; railroad and public rights-of-way; the Hudson, Harlem, and East rivers; and end in Queens. The US\$2.2-billion merchant transmission project is being developed with private sector investment led by the Blackstone Group LP and is expected to be in service by late 2017.

As owner's engineer, AECOM will support supplier and contractor selection and negotiation, environmental and regulatory permitting and compliance, and oversight of

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all aspects of project construction on behalf of TDI.

AECOM has worked with more than 300 utilities and developers around the world. It was ranked as the world's No. 1 global design firm by Engineering News-Record magazine for the last 3 years. Its broad range of services includes turnkey engineer, procure and construct (EPC) projects to engineer of record and owner's engineer assignments, including high-voltage upland and marine transmission projects.

For more information, visit www.aecom.com or www.chpexpress.com.

JDR awarded subsea power contracts for Total Ofon phase 2 and DECC research

JDR has been awarded two new contracts. One for the design and manufacture of two submarine power cables for the Total Ofon Phase 2 project and one for new research into high-voltage array cabling that will help make offshore wind a more cost-effective and competitive source of power and support the future growth of the industry.

The Total Ofon contract was awarded by global subsea contractor Subsea 7 that is performing substantial work on a shal-

low water Nigerian project. The scope of that work includes two 5-km subsea power cables in addition to topside termination equipment and connection boxes.

JDR previously worked with Subsea 7 in the North Sea on Dana Petroleum's Medway project offshore The Netherlands. JDR supplied subsea power cables of three previous Total projects offshore West Africa. These include Libondo (Congo, 2008), Anguille (Gabon, 2011), and TEPC (Congo, 2011). For the Ofon project, the JDR engineering team developed a special cable design to ensure "on-bottom stability" in the shallow waters where the cable will operate. The pull-in equipment was then specially designed to fit the platform J-tubes.

Meanwhile, JDR's new research project will commence in 2013. Funded by the Department of Energy and Climate Change (DECC) and targeted for completion in 2015, the project represents a significant investment by JDR into new power cable technologies. The research project will benefit offshore wind developers as they look to use array cabling at higher voltages in a number of Round 3 United Kingdom wind farms. The funds

awarded by the Department of Energy and Climate Change will encompass up to 25% of the total project costs to a maximum of £1 million and have been awarded to JDR as one of the winners of the second call of the Offshore Wind Components Scheme. The project aims to drive down the cost of each megawatt of power produced by an offshore wind farm.

JDR, who won the prestigious Subsea UK Global Export Award in February 2013, previously worked on the Greater Gabbard offshore wind farm and the Wave Hub, wave energy test centre. JDR will use its extensive knowledge of inter-array cables to perform materials research, development, design of new types of power core, and produce prototype cable lengths with the aim of delivering qualified new cable designs.

It is intended that these will be designed without the need for lead extruded innovative barrier layers that not only address the environmental concerns footprint associated with the processing and use of lead materials, but reduce the cost of offshore wind.

For more information, visit www.jdrglobal.com.

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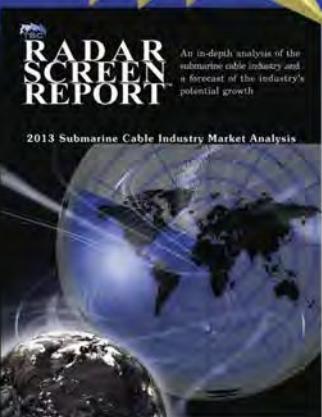
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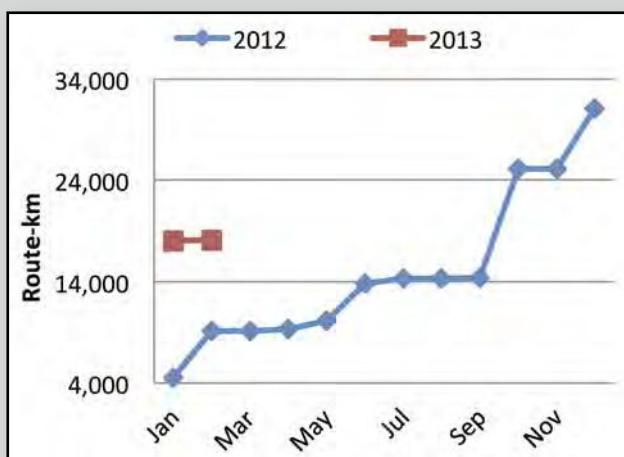
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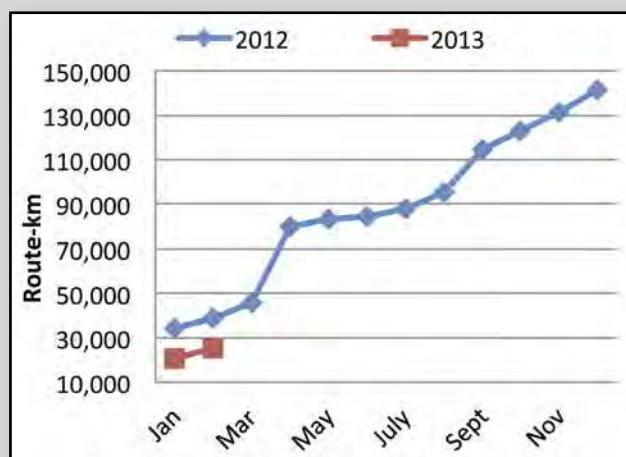



Subsea Telecom & Power Cable Data

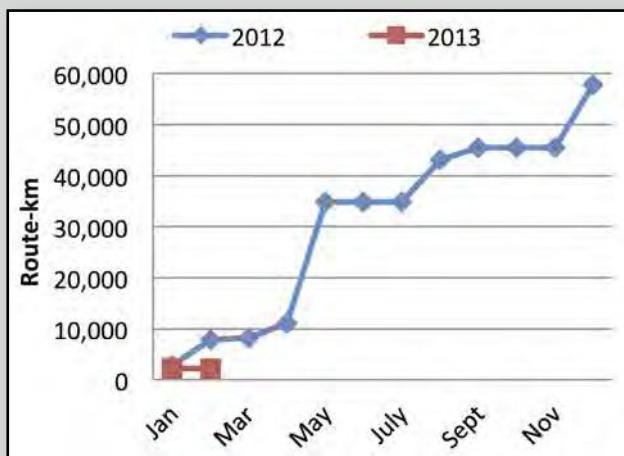
FO Cable Awards by Month



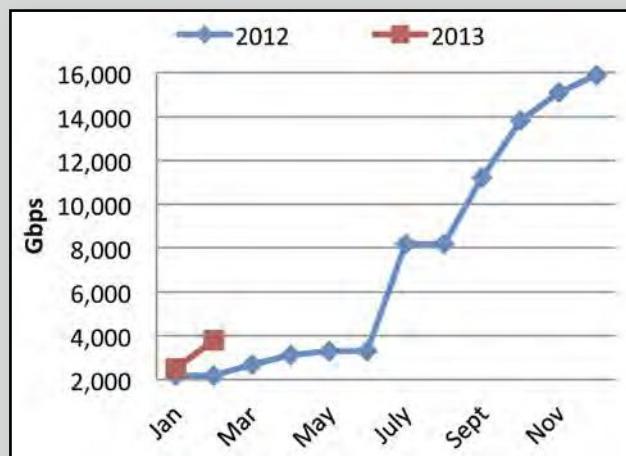
FO Cable Announcements 2013



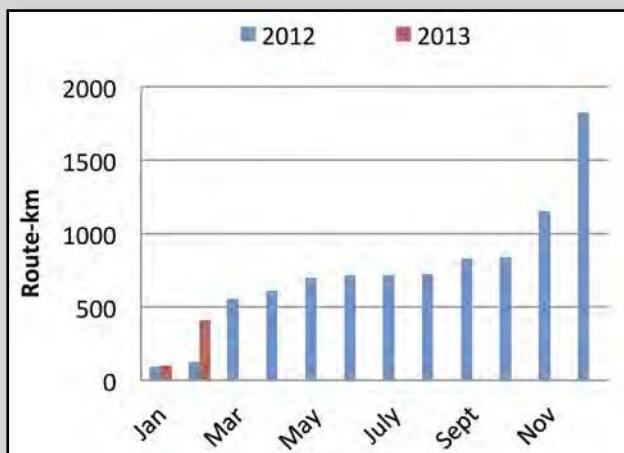
Submarine FO Cables Entering Service 2013 in Route-km



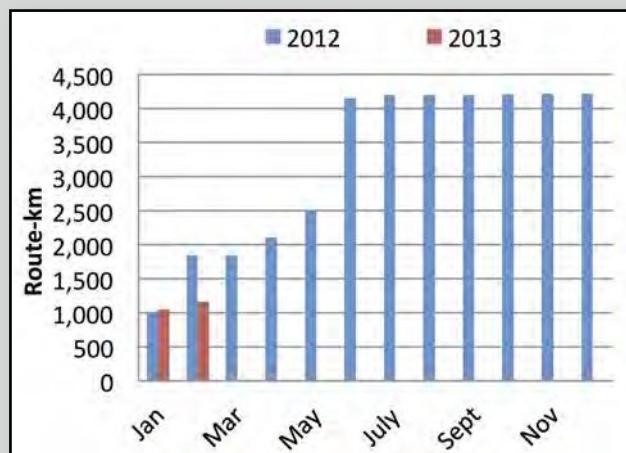
Upgrades of Existing Cable Systems in Gbps



Submarine Power Cable Awards 2013 in Route-km



Submarine Power Cable Announcements 2013 in Route-km



Gulf of Mexico Data

Current Deepwater Activity

Operator	Area	Block	OCS Lease	Rig Name	Prospect Name	Water Depth (ft)
Petrobras America, Inc.	WR	425	G16987	VANTAGE TITANIUM EXPLORER	Chinook	8,843
Anadarko Petroleum Corp.	SE	39	G27779	MAERSK DEVELOPER	Phobos	8,553
Anadarko Petroleum Corp.	DC	535	G23520	ENSCO 8506	Raptor	8,161
Petrobras America Inc.	WR	206	G16965	ENSCO DS-5	Cascade	8,147
Anadarko Petroleum Corp.	AT	37	G21826	CAL DIVE Q-4000	Merganser	7,919
Shell Offshore Inc.	AC	857	G17561	H&P 205	Great White	7,816
Shell Offshore Inc.	DC	529	G23517	NOBLE JIM DAY	Rydberg	7,639
Shell Offshore Inc.	MC	393	G26254	T.O. DEEPWATER NAUTILUS	White Ash	7,375
Union Oil Co. of California	WR	677	G18753	T.O. DEEPWATER INSPIRATION	Saint Malo	7,038
Chevron USA Inc.	WR	758	G17015	T.O. DISCOVERER CLEAR LEADER	Jack	6,965
ExxonMobil Corp.	KC	918	G32654	T.O. DEEPWATER CHAMPION	Hadrian	6,897
Anadarko Petroleum Corp.	KC	875	G21444	ENSCO 8500	Lucius	6,840
BP Exploration & Production Inc.	GC	743	G15607	T.O. DEVELOPMENT DRILLER II	Atlantis	6,834
Chevron USA Inc.	KC	736	G22367	T.O. DISCOVERER INDIA	Moccasin	6,537
BP Exploration & Production, Inc.	MC	429	G07944	ENSCO DS-3	Ariel	6,106
Noble Energy, Inc.	MC	948	G24133	ENSCO 8501	Gunflint	6,083
BP Exploration & Production, Inc.	MC	778	G14658	THUNDER HORSE PDQ	Thunder Horse South	6,040
BP Exploration & Production, Inc.	KC	292	G25792	SEADRILL WEST SIRIUS	Kaskida	6,031
Shell Offshore Inc.	WR	95	G31943	NOBLE GLOBETROTTER	Yucatan North	5,847
LLOG Exploration Offshore LLC	MC	258	G24066	ENSCO 8502	Malachite	5,843
BP Exploration & Production Inc.	MC	777	G09867	T.O. DISCOVERER ENTERPRISE	Thunder Horse South	5,613
Cobalt International Energy, LP	GC	896	G31765	ENSCO 8503	Ardennes	5,510
BP Exploration & Production, Inc.	GC	743	G15607	T.O. DEVELOPMENT DRILLER III	Atlantis	5,479
Chevron USA Inc.	WR	29	G16942	PACIFIC SANTA ANA	Big Foot	5,187
Anadarko Petroleum Corp.	GC	680	G22987	NABORS MODS RIG 150	Ticonderoga	4,970
BP Exploration & Production Inc.	KC	93	G25780	SEADRILL WEST CAPRICORN		4,853
ConocoPhillips Co.	GB	783	G11573	NABORS MODS 201	Magnolia	4,674
Hess Corp.	MC	726	G24101	STENA FORTH	Tubular Bells	4,610
Anadarko Petroleum Corp.	GC	683	G16783	T.O. DISCOVERER SPIRIT	Caesar	4,485
BHP Billiton Petroleum (GOM) Inc.	GC	653	G20084	T.O. DEVELOPMENT DRILLER I	Shenzi development	4,356
Anadarko Petroleum Corp.	GC	608	G18402	BLAKE 1007	Genghis Khan	4,320
BHP Billiton Petroleum (GOM) Inc.	GC	654	G20085	GSF C.R. LUIGS	Shenzi development	4,300
Shell Offshore Inc.	MC	940	G31534	NOBLE DANNY ADKINS	Vito	4,004
Eni US Operating Co. Inc.	GC	473	G05922	DIAMOND OCEAN VICTORY	King Kong	3,840
Shell Offshore Inc.	MC	809	G05868	H&P 204	Princess	3,800
Shell Offshore Inc.	GB	602	G11553	NOBLE DRILLER	Macaroni	3,694
Anadarko Petroleum Corp.	EB	602	G20725	NABORS POOL 140	Nansen	3,669
Shell Offshore Inc.	MC	809	G12166	NOBLE JIM THOMPSON	Princess	3,638
Murphy E&P Co.	GC	338	G21791	NABORS MODS 200	Front runner	3,330
Shell Offshore, Inc.	VK	956	G08475	NABORS 202	Ram-Powell	3,214
Shell Offshore Inc.	MC	807	G07963	NOBLE BULLY I	Mars (Ursa/Princess)	3,037
Shell Offshore, Inc.	GC	158	G07998	H&P 202	Brutus	2,985
Shell Offshore, Inc.	MC	807	G07958	H&P 201	Mars (Ursa/Princess)	2,945
LLOG Exploration Offshore, LLC	MC	503	G32334	NOBLE AMOS RUNNER	WhoDat	2,646
Hess Corp.	GB	386	G10350	ATWOOD CONDOR	Llano	2,627
Chevron USA Inc.	GC	205	G05911	NABORS 85 (MAYRONNE 162)	Genesis	2,590
BP Exploration & Production Inc.	MC	709	G06973	DIAMOND OCEAN SARATOGA	Panatella	2,488
Anadarko Petroleum Corp.	VK	826	G06888	NABORS P-10	Neptune	1,933
Hess Corp.	GB	260	G07462	NABORS S.D. XVI	Baldpate	1,648
Dynamic Offshore Resources, LLC	GC	65	G05889	H&P 206	Bullwinkle	1,353
Chevron USA Inc.	GB	189	G06358	WIRELINE UNIT (L.C.#2)	Tick	718

Deepwater prospects with drilling and workover activity: 51

Current Deepwater Activity as of Monday, 18 March 2013

Activity by Water Depth			
Water Depth (m)	Active Leases	Approved Applications	Active
0 to 200	1,723	34,864	2,714
201 to 400	115	1,113	20
401 to 800	286	855	10
801 to 1,000	387	572	9
1,000 & above	3,419	1,816	26

Rig Activity Report 22 March 2013					
Location	Week of 3/22	Week Ago	Week +/-	Year Ago	Year +/-
Land	1671	-30	1701	-228	1899
Inland Waters	23	1	22	0	23
Offshore	52	-1	53	6	46
U.S. Total	1746	-30	1776	-222	1968
Gulf of Mexico	50	-1	51	4	46
Canada	337	-166	503	-15	352
N. America	2083	-196	2279	-237	2320

Activity by Water Depth Information current as of Monday, 18 March 2013

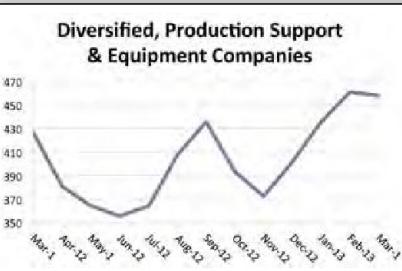
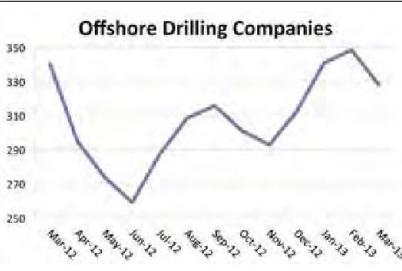
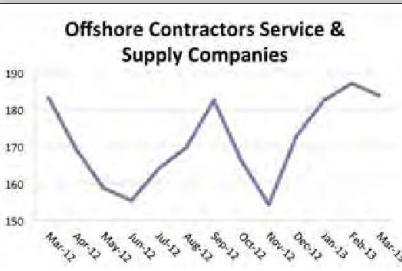
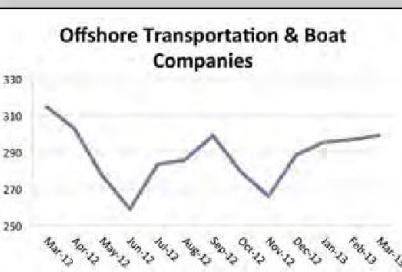
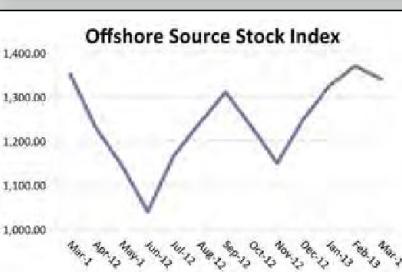
Maximum number of rigs operating in the deepwater Gulf of Mexico. The rig unit includes platform rigs operating on deepwater production facilities in addition to the MODU's. The numbers do not distinguish between rigs drilling and those in service for completion and workover operations.

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

Monthly Stock Figures & Composite Index

Industry Company Name	Symbol	Close(Mid) March	Close(Mid) February	Change	Change %	High 52 week	Low
Diversified, Production Support and Equipment Companies							
Baker Hughes, Inc.	BHI	47.02	46.58	0.44	0.9%	50.97	37.08
Cameron Intl. Corp.	CAM	65.70	64.58	1.12	1.7%	65.33	38.38
Drill-Quip, Inc.	DRQ	84.68	84.10	0.58	0.7%	85.55	57.27
Halliburton Company	HAL	41.44	42.70	-1.26	-3.0%	43.96	26.28
Tenaris SA	TS	40.17	40.75	-0.58	-1.4%	44.48	29.79
Newpark Resources, Inc.	NR	9.44	9.15	0.29	3.2%	9.69	5.19
Schlumberger Ltd.	SLB	77.09	80.03	-2.94	-3.7%	82.00	59.12
Superior Energy Services, Inc.	SPN	26.74	26.64	0.10	0.4%	29.00	17.54
Weatherford International, Inc.	WFT	12.03	12.89	-0.86	-6.7%	17.60	8.84
Deep Down, Inc.	DPDW	1.70	1.65	0.05	3.0%	1.80	0.80
FMC Technologies	FTI	52.00	51.80	0.20	0.4%	53.18	36.89
Total Diversified, Production, Support and Equipment.....	458.01	460.87	-2.86	-0.6%	483.56	317.18	
Geophysical / Reservoir Management							
Dawson Geophysical Company	DWSN	29.88	32.37	-2.49	-7.7%	35.88	20.20
Mitcham Industries, Inc.	MIND	17.51	15.80	1.71	10.8%	26.44	11.51
Compagnie Gnrale de Gophysique-Veritas	CGV	23.75	28.12	-4.37	4.5%	34.84	20.68
Total Geophysical / Reservoir Management.....	71.14	76.29	-5.15	-6.8%	97.16	52.39	
Offshore Drilling Companies							
Atwood Oceanics, Inc.	ATW	51.37	54.19	-2.82	-5.2%	55.49	34.93
Diamond Offshore Drilling, Inc.	DO	69.29	74.75	-5.46	-7.3%	76.85	55.83
ENSCO International, Inc.	ESV	59.15	64.35	-5.20	-8.1%	65.82	41.63
Nabors Industries, Inc.	NBR	16.91	17.68	-0.77	-4.4%	21.06	12.40
Noble Drilling Corp.	NE	37.45	39.11	-1.66	-4.2%	41.49	28.73
Parker Drilling Company	PKD	5.01	6.11	-1.10	-18.0%	6.52	3.61
Rowan Companies, Inc.	RDC	35.17	35.84	-0.67	-1.9%	39.40	28.62
Transocean Offshore, Inc.	RIG	53.48	56.26	-2.78	-4.9%	59.50	39.32
Total Offshore Drilling.....	327.83	348.29	-20.46	-5.9%	366.13	245.07	
Offshore Contractors, Services, and Support Companies							
Helix Energy Solutions Group, Inc.	HLX	23.54	24.15	-0.61	-2.5%	25.49	14.90
Gulf Island Fabrication	GIFI	22.15	24.39	-2.24	-9.2%	31.69	19.89
McDermott International, Inc.	MDR	11.13	12.88	-1.75	-13.6%	13.95	9.04
Oceaneering International	OII	64.12	63.54	0.58	0.9%	65.62	43.22
Subsea 7 SA	SUBCY.PK	24.39	23.59	0.80	3.4%	27.21	18.16
Technip ADS	TKPPY.PK	26.60	26.85	-0.25	-0.9%	30.21	21.88
Tetra Technologies, Inc.	TTI	9.99	9.57	0.42	4.4%	10.30	5.35
Cal Dive International, Inc.	DVR	1.90	2.09	-0.19	-9.1%	1.00	4.00
Total Offshore Contractors, Service, and Support.....	183.82	187.06	-3.24	-1.7%	205.47	136.44	
Offshore Transportation and Boat Companies							
Seacor Holdings, Inc.	CKH	71.59	71.90	-0.31	-0.4%	100.00	71.59
Gulfmark Offshore, Inc.	GLF	40.31	40.31	0.00	0.00%	50.07	27.17
Bristow Group	BRS	62.12	58.71	3.41	5.8%	62.58	37.92
PHI, Inc.	PHII	32.66	31.99	0.67	2.1%	33.75	21.09
Tidewater, Inc.	TDW	48.14	49.70	-1.56	-3.1%	56.73	42.33
Trico Marine Services, Inc.	TRMAQ.PK	0.04	0.04	0.00	0.0%	0.11	0.01
Hornbeck Offshore	HOS	44.14	44.03	0.11	0.2%	46.09	31.68
Total Offshore Transportation and Boat	299.00	296.68	2.32	0.8%	349.33	231.79	

Monthly Stock Figures & Composite Index

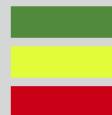
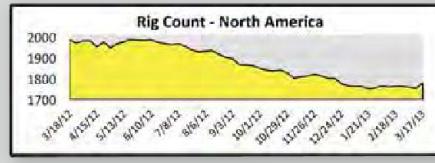
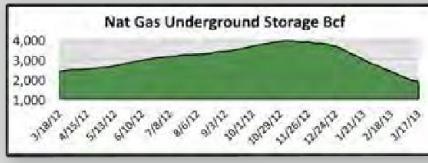
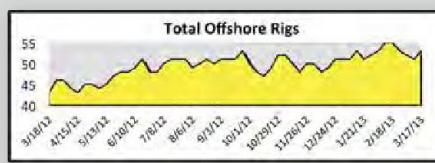
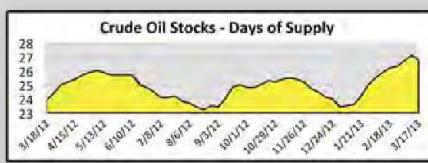
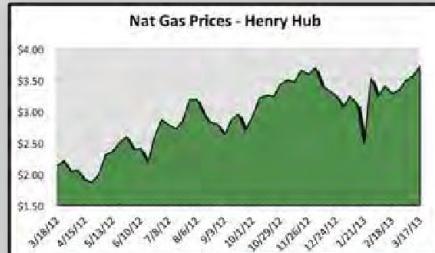
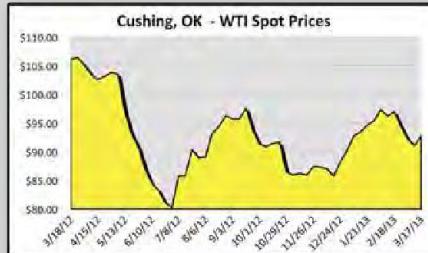
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Diversified, Production Support & Equipment Companies							
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	Total Geophysical / Reservoir Management	71.14	76.29	-5.15	-6.8%	98.16	52.39
	Total Offshore Drilling	327.83	348.29	-20.46	-5.9%	366.13	245.07
	Total Offshore Contractors, Service and Support	183.82	187.06	-3.24	-1.7%	205.47	136.44
	Total Offshore Transportation and Boat	299.00	296.68	2.32	0.8%	349.33	231.79
	Total Offshore Source Index	1,339.80	1,369.19	-29.39	-2.1%	1,501.65	982.87

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

Massive light output, minimal energy draw with new Birns General-Area Chamber Light-LED™

The robust new BIRNS General-Area Chamber Light-LED™ is an innovative, versatile fixture that safely provides brilliant lighting inside HeO₂-atmosphere PVHO chambers. It is an advanced, customizable solution perfect for submersibles, diving bells; personnel transfer capsules; and a wide range of decompression, recompression, and hyperbaric chambers.

This unique system provides brilliant white light 3500K illumination with a 50,000-hr lamp life and a low <1W power consumption. It has an electrochemically polished aluminum reflector and is vibration and shock proof—tailored to withstand the rigors of varying pressure work environments. The BIRNS General-Area Chamber Light-LED™ can mount on nearly any ceiling or structure wall and has a superior heat sink design and case ground (earth) connection for safe and seamless operation. It features a stainless steel helium release valve to prevent the risk of post-decompression explosion. This comprehensive low voltage (15-40V DC; 12-28V AC) system comes complete with a factory-installed penetrator and cable assembly for savings and convenience and meets or exceeds applicable Det Norske Veritas (DNV), Lloyd's, and UL requirements.

Crafted from rugged, hard black anodized aluminum, with a tempered borosilicate glass lens, it integrates a stainless steel cage for additional lamp protection and can be specified with an added connector and/or on/off switch.

For more information, visit www.birns.com.



Kongsberg releases new mini sonar head

Kongsberg Mesotech Ltd. announced the February 2013 release of the 1171-Series 650-m multi-frequency mini sonar head. Ideally suited for use on observation, inspection, and light work-class ROVs, the new 650-m mini head is equipped with new electronics for improved higher image quality.

The device features a compact and lightweight design, multi-frequency operation that increases range performance and delivers higher resolution images, CHIRP capability for improved range resolution and discrimination of closely spaced targets at long ranges, and reduced power consumption.

The operating frequencies on the new mini head can be selected by choosing one of four preset frequencies (625, 675, 750, or 800-kHz) or by choosing the tunable mode that allows the frequency to be changed in 5-kHz increments.

A new version of the company's MS 1000 sonar processing software has also been released. Developed to support all Kongsberg Mesotech multi-frequency sonar heads with selectable and tunable frequencies, this latest software automatically sets the time varying gain (TVG) based on the selected frequency and automatically sets the frequency based on the selected range. These combined features assist the user to generate the best possible data with a minimum amount of input required.

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



SEA CON releases PBOF manifold

SEA CON has answered the growing customer demands for a modular system that allows the user to easily replace sensors and other equipment without field terminations. SEA CON's PBOF manifold has been developed to allow users the ability to mate the interface connections at the manifold with either rubber-molded cable or oil filled hoses. It is a highly reliable junction box that allows serviceability and reconfiguration by the user. To protect the system, each connector is independently water-blocked, thus creating redundant seals and preventing collateral damage should any one component be compromised.



For more information, visit www.seaconworldwide.com.

Markey Machinery supplies compact, nearshore research winch as deep borehole logging winch

Ice core scientists have dramatically advanced our understanding of the Earth's climate and how it has changed over the last 100,000 years. An open borehole in polar glaciers provides unprecedented access to ice at a depth or age in the climate record of particular scientific interest. Using specialized instruments lowered repeatedly by means of a winch, borehole loggers obtain high-quality temperature, image, acoustic, and seismic data furthering our understanding of climates past.

The National Science Foundation-established Ice Drilling Program Office published its Long Range Science Plan 2012-2022, 30 June 2012 charting the course for science to address pressing environmental issues like climate change. The Office prioritized investing in a new 4-km deep bore hole logging winch to advance the goals of science.

Markey Machinery is pleased to be awarded a contract to supply one of its compact, nearshore research winches as a deep borehole logging winch. Markey's type COM-7EX is a single drum, all-electric-powered winch with instrumented automatic level wind. It is constructed of marine grade aluminum and stainless steel. Like all of Markey's designs, it features an enclosed oil bath transmission proven to withstand decades of "deck-duty" permanently mounted onboard vessels of the U.S. polar research fleet.

For more information, visit www.markeymachinery.com.

Cathelco ICCP systems protect offshore structures and vessels

One of the largest offshore accommodation units in the world will be installed with a Cathelco-impressed current cathodic protection system to protect its underwater surfaces against corrosion.

The Prosafe GVA3000E, currently under construction at the Jurong Shipyard in Singapore, will eventually be positioned on the North Sea Norwegian continental shelf where it will provide accommodation for up to 450 people. The semi-submersible will be equipped with DP3 dynamic positioning as well as a 12-point mooring system to operate efficiently in the harshest environmental conditions.

Cathelco will protect the pontoons, columns, and bracings of the structure using an arrangement of reference electrodes and anodes that are wired to thyristor control panels.

The system will utilize the latest C-Max disc anodes, which are diver changeable, an important factor on semi-submersibles that remain on station for up to 30 years. The thyristor control panel is equipped with a C-Nexus controller, which has numerous features to ensure that the level of corrosion protection is precisely controlled and monitored. These include comprehensive data logging and information systems that provide a complete record of the performance of the ICCP equipment.

For more information, visit www.cathelco.com.



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A yellow underwater robotic vehicle (ROV) is shown surveying a vibrant coral reef. A beam of light is projected from the front of the ROV, illuminating the surrounding water and the colorful coral structures.

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Product News

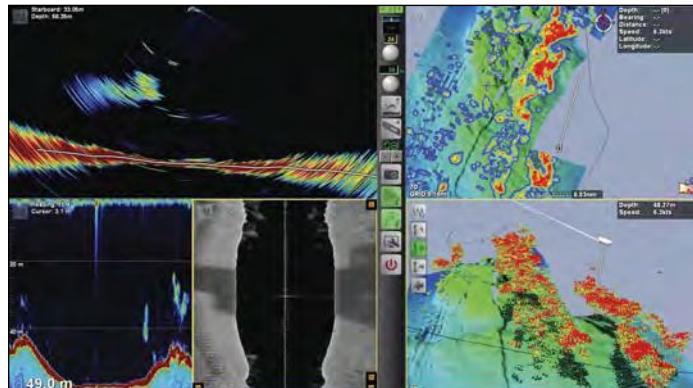
WASSP announces new generation of multibeam sonars

Multibeam sonar manufacturer WASSP Ltd. has announced details of the company's latest range of multibeam sonars, now for all commercial applications.

The company has been extremely successful in the commercial fishing sector, with more than 550 units sold. WASSP Ltd. parent company, ENL Group, has invested heavily in the new range to strengthen its number one position in the commercial fishing sector and also to build a product tailored to the survey and workboat market with new features and functions.

With ENL Group's expertise known for providing leading marine electronics in the commercial fishing sector for over 65 years, the company has continued to focus on this sector, establishing a strong customer base and world-leading distribution partners to support the product.

With a stronghold on the commercial fishing market, not only is WASSP Ltd. now offering an advanced and backward compatible WASSP solution to its existing target market, the WASSP Ltd. product management team have focused on enhancing the common functions and features also used by other marine professionals in the hydrographic survey and work boat market.



To date, most of WASSP's hydrographic sales have been to shallow-water surveyors utilizing commercial fishing systems. In 2013, the company is pleased to be in a position to offer a range of products, including its high-end product that has been designed for the surveyor with four times the ping rate and new functions and features.

With WASSP now available in 39 countries, the launch of these new world-class multi-beam sonars in 2013 is a significant milestone in the company's 65-year history.

For more information, visit www.wassp.com.

Subsea Americas adds cable cutter to its ROV tooling

Subsea Americas has added to its rental ROV tooling fleet a WebTool RCV 155 cable cutter capable of cutting cable wire over 6-in. in diameter. The tool was modified to be operated via 17H API hot stab, simplifying its subsea use via ROV. Most recently, the cable cutter was utilized to successfully cut 6-in. custom-made, high-tinsel wire used for the first time for SCR pull-in. The cutter performed numerous cuts during three phases of the project and performed its job without any issue. The tool since has been rescheduled for use in projects set for 2013.

Subsea Americas is a full service ROV rental tooling provider servicing a global subsea market.

For more information, visit www.subseaamericas.com.

Materion brush performance alloys' ToughMet® 3 just got tougher

Materion Brush Performance Alloys' has engineered two new forms of ToughMet® 3 specifically for the extreme conditions of oil and gas exploration, drilling, completion, and production. ToughMet 3 TS95 and TS120U are wrought, spinodally hardened copper alloys that provide high-impact strength and crack-propagation resistance in rugged service environments.

ToughMet® 3 TS95 and TS120U materials are copper 15 nickel 8 tin alloys processed to develop desirable combinations of strength, ductility, toughness, and corrosion resistance. High-notch strength ratios, in excess of 1.4 for stress concentration factors approaching 4, and high fracture toughness, K_{IC}, from 60(65) to in excess of 70(75) ksi/in (MPa/m) result in materials with outstanding crack-initiation resistance.

The new ToughMet® 3 alloys exhibit low, general weight loss performance in extreme chloride and high pH drilling fluids as well as resistance to moderate hydrogen sulfide environments at low pH. Magnetic transparency, elastic compliance, and low-friction characteristics add to the case for using these high toughness materials in demanding environments.

The ToughMet® 3 TS family of alloys was developed by Materion Brush Performance Alloys (a unit of Materion Corporation), utilizing lean sigma principles to targeted design minimum yield strength limits with a CpK of 1, representing 99.73% of the produced population. Materion Brush Performance Alloys, headquartered in Mayfield Heights, Ohio, is a unit of Materion Brush Inc., a wholly owned subsidiary of Materion Corporation. Through its subsidiaries, Materion supplies worldwide markets with alloy, beryllium, electronic, precious metal, and engineered material products. Around the world, the company's engineered materials can be found in technically demanding end-use products within the telecommunications and computer, automotive electronics, appliance, industrial components, plastics tooling, optical media, oil and gas, aerospace and defense, and off-highway and mining equipment markets.

For more information, visit www.materion.com.

New LED illumination option enhances performance of QuickView® Zoom pipe inspection camera

Available as an option on new systems or as an upgrade to existing ones, the new LED illumination option for QuickView® enhances short- to mid-range zoom inspection of storm and sewer pipes. It offers better diffusion for viewing near targets as well as other benefits commonly associated with LED lighting: extended life (up to 10,000 hrs), instant start-up, variable intensity, exceptional color balance, and reduced power consumption.

"For distances over 300 ft, nothing beats our original HID (high-intensity discharge) lamp," says Richard Lindner, president of EnviroSight. "However, a lot of QuickView® users spend most of their time inspecting manholes and short runs. Under these conditions, the LED lamp's diffusion, variable intensity, and color balance really boost productivity."

The LED option is available for both standard and Haloptic versions of the QuickView®.

For more information, visit www.envirosight.com.

Lamor appoints Unique System FZE as their distributor for Oil Response Kits

Unique System FZE, a Unique Maritime Group Company, which is one of the world's leading integrated turnkey subsea and offshore solution providers, is pleased to announce its appointment as an authorized distributor of Lamor for the



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Middle East region for their entire range of Oil Spill Response Kits.

Lamor (Larsen Marine Oil Recovery) Corporation offers solutions for optimal oil spill response and recovery. They provide expertise coupled with solutions that protect the environment and our ecosystems. The company develops, manufactures, and supplies best available technology (BAT) oil spill recovery equipment and services. Included in its portfolio of solutions, Lamor offers contingency planning, risk assessments, equipment maintenance, and service coupled with training.

Unique System FZE will be responsible for the sale, service, and rental of these Oil Spill Response Kits.

For more information, visit www.uniquegroup.com.

Sea Con®'s API connector series

Based on the highly successful Metal Shell Series connector range, SEA CON®'s API connectors comply with the API 6A (specification for Wellhead and Christmas Tree Equipment), API 16D (specification for Control Systems for Drilling Well Control Equipment and Control Systems for Diverter Equipment) and API 17E (specification for Subsea Umbilicals) standards. Manufactured from 316 stainless steel with glass-filled epoxy inserts and copper alloy gold plated contacts, this connector range has a voltage rating of 600 VDC and a pressure rating of 10,000 psi (approximately 22,500 ft/7,000 m).

Key features are bulkhead connectors designed to be compliant with API 6A and API 16D with bulkhead also available with reverse pressure design; cabled connectors and assemblies designed to be compliant with API 6A, API 16D, and API 17E; open-face pressure rating on bulkhead connectors; redundant sealing at all pressure barrier interfaces; test ports for infield testing between dual seals; boot sealing in cabled connectors and assemblies in the event of flooded cable conditions; elec-

trical, optical, and hybrid connectors configurable in all eight shell sizes; pressure testing mated and open-face at FAT (Factory Acceptance Testing); and custom interfaces available.

Applications include blow out prevention systems, riser monitoring systems, drilling control systems and wellhead and christmas tree equipment.

For more information, visit www.seaconworldwide.com.

Xylem launches new 'FerryBox' water quality monitor

Xylem Analytics UK and Aanderaa Data Instruments have launched a new marine water quality monitor that has been designed to enable wider deployment of water quality sensors on ferries and other marine vessels. The SOOGuard will be launched at Ocean Business 2013 in April. Xylem's David Goldsmith says: "In order to encourage the operators of ferries to allow the installation of monitoring equipment on their vessels, it is vitally important that the instrumentation is easy to maintain and reliable."

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

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Wave Glider—introduction to a new autonomous remotely piloted ocean data collection platform

The Wave Glider is a flagship product as the world's first marine vehicle that harnesses kinetic energy from wave action to produce locomotion in the ocean in an environmentally friendly manner. Fuel-free, Wave Gliders are completely self-sustaining using solar panels to power their payloads. The platform includes navigational and control systems and communication to an operations center via satellite. Control with full security can be transferred to a local set-up via a master/slave system. This game-changing technology provides persistent ocean presence and a reliable data acquisition platform that can support numerous applications in energy (oil and gas industry). Exploration & Production has environmental applications for effective SEEP surveys and METOC (metrology and oceanography). The subsea world will benefit from a cost-effective method for data harvesting (Gateway Communications). The drilling industry will benefit from magnetic survey applications for better error control.

To date, Wave Gliders have completed over 150,000 cumulative miles of operation and have demonstrated individual data collection voyages of over 3,200 m. In January 2013, a mission called PacX achieved a milestone with the first Wave Glider reaching its mission in Australia having travelled 300 day—25,000 total miles—collecting 2,250,000 data points.

Key applications available in oil and gas are:

- METOC studies: Ability to measure and continuously monitor currents, wave, and other metrology and oceanographic measurements in open waters as well as around obstruction particularly for risk management during close pass seismic.

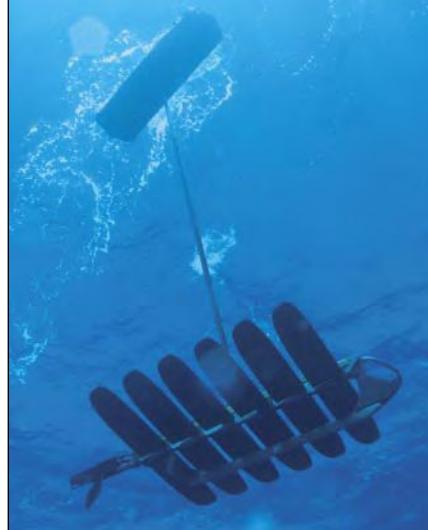
- SEEP detection: Ability to detect and analyze hydrocarbon in ocean in both proactive (natural seep detection) and conducting baseline surveys) as well as re-active (spill monitoring).

- GATEWAY communication: Subsea data harvesting from downhole instrumentation through acoustic coupling through the water column.

Key applications in oil and gas underway to be available in 2013 are:

- Passive Acoustic Monitoring (PAM): Ability to detect and monitor movements of target species of marine mammals.

- MAG: Ability to compute and



quantify total magnetic intensity on demand at designated co-ordinates in the ocean.

- OTHERS: Applications in security management (picket fencing) and data communications.

For more information, visit www.liquidr.com.

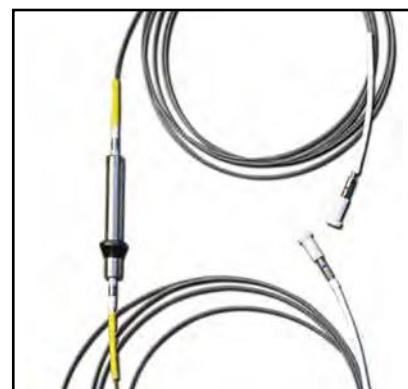
Ametek SPC introduces sealed fiber optic feed through and fully modular dry mate connector

Ametek SPC is proud to introduce a fiber optic feed through (FOFT). A true, hermetic FOFT assures dedicated down-

hole fiber optic communications as well as sensor functionality. High-performance, high-reliability electric and optic feed throughs are essential to downhole designs that increasingly use fiber as communications pathway and sensors. The FOFT has been tested successfully to 35,000 psi and 350 °C.

Ametek SPC has also introduced a clean slate design of the dry mate ocean connector. The fully modular and ISO/API-compliant design brings dry mate technology up to date.

For more information, visit www.ametekscp.com.



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The core technical tracks are: Underwater Acoustics and Acoustical Oceanography; Sonar Signal/Image Processing and Communication; Ocean Observing Platforms, Systems and Instrumentation; Remote Sensing; Ocean Data Visualization, Modeling and Information Management; Marine Environment, Oceanography and Meteorology; Optics, Imaging, Vision and E-M Systems; Marine Law, Policy, Management and Education; Offshore Structures and Technology; Ocean Vehicles and Floating Structures; and Ocean Energy.

Abstracts due May 3. Complete details: www.OCEANS13MTSIEEESanDiego.org.

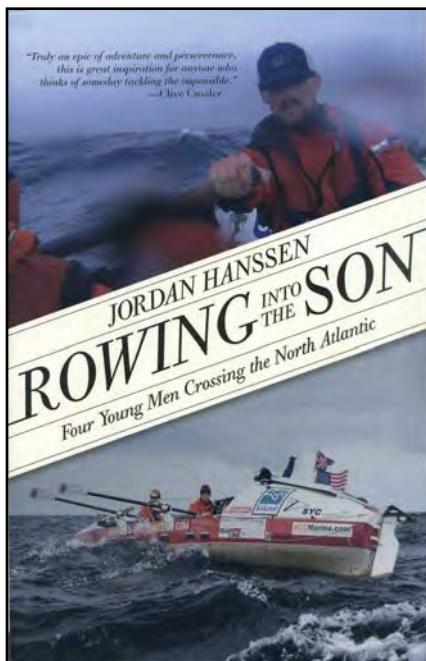
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ROWING INTO THE SON Four Young Men Crossing The North Atlantic

By Jordan Hanssen



On 10 June 2006, college friends Dylan LeValley, Greg Spooner, Brad Vickers, and Jordan Hanssen stepped into a 29-ft rowboat as the only American competitors in the first North Atlantic Rowing Race, pulling across the northern ocean.

From the first dreams of race planning to heaving through ocean waves, *Rowing Into the Son: Four Young Men Crossing the North Atlantic* takes the reader along with team Outdoor Adventure Racing (OAR) Northwest as they head out from New York Harbor, catch the Gulf Stream current, and make the final dramatic push for the finish line, a narrow 50-m wide “gate” at Bishop’s Rock Lighthouse off the coast of Cornwall. Hurricane-level winds, giant eddies, passing freighters, flying fish, and sharks are all elements of the journey, and the race comes to a tense head on day 17—with another 55 days to go—as the crew realizes their food supplies are running out and they must drastically restrict their eating.

This is lead rower Jordan Hanssen’s intimate account of team OAR Northwest’s journey, set against the backdrop of Hanssen’s reflections on the teachings of both his stepfather and his biological father, who passed away many years earlier. How Hanssen and his teammates cope within the confines of their tiny ocean rowing boat and their determination to push their limits will keep readers enthralled in this remarkable true tale of coming-of-age and adventure.

Mountaineers Books; ISBN-10: 1594856354
Softcover, 256 pages, September 26, 2012

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Sustainable Ocean Summit adds industry forum on global ocean commission

The World Ocean Council's Sustainable Ocean Summit (SOS)—22-24 April, 2013 in Washington, D.C.—has added a special plenary session to foster and facilitate industry input to the recently launched Global Ocean Commission.

This new Global Ocean Commission—Ocean Industry Forum session at SOS 2013 on 24 April will provide a key opportunity for the ocean business community to engage directly with the Commissioners and provide industry input.

Former Costa Rican President José María Figueres and South African Minister Trevor Manuel will chair the session.

President Figueres and Minister Manuel will outline the Global Ocean Commission's purpose, goals, process, and priorities and seek input from participants.

This unique opportunity for the global ocean business community to engage the Global Ocean Commission provides yet another critical and compelling reason for industry to gather at the SOS to tackle shared ocean sustainability issues and help set the agenda for ensuring continued ocean access by responsible industry operators.

Preceding the main SOS conference on 23-24 April, the business community will convene for the agenda-setting Oceans 2050 workshop on 22 April. This event will identify the drivers, trends, and scenarios affecting the future of ocean industries and determine critical pathways for its success and sustainability. With the advent of the Global Ocean Commission, the Oceans 2050 workshop now also provides an avenue for industry to develop common ocean messages to convey to the Commissioners at the SOS 2013 Global Ocean Commission - Ocean Industry Forum on 24 April and beyond.

For more information, visit www.oceancouncil.org.

Free registration open online for Oceanology International China 2013

Six months before the inaugural Oceanology International China 2013, the only event for marine science and ocean technology in the Asian region, opens at INTEX in Shanghai (3-5 September 2013), registration is now open.

Attendance at the exhibition is free of charge to all with a business/professional

interest in ocean science and marine technology in all its forms.

Organized by Reed Exhibitions, whose long running Oceanology International—the world's largest exhibition for marine science and ocean technology—is held in London every 2 years, Oceanology International China 2013 is endorsed by the Chinese Society of Oceanography (CSO) whose Ocean Technology Branch is co-event manager. The exhibition will feature exhibitors from 14 countries, including international companies, such as Reson, Sonardyne, Kongsberg Maritime, and Teledyne, and national pavilions from Atlantic Canada, UK, and The United States.

Visitors will have a rare opportunity to meet equipment manufacturers and service providers from all over the world—covering the full range of marine science and ocean technology, as well as learn first-hand about the latest technological advancements.

The Society for Underwater Technology (SUT), with its long and unbroken history of involvement with the Oceanology International series of events, is the Learned Society Patron of Oceanology International China 2013. The show is supported by UK Trade & Investment and their service delivery partner, the China-Britain Business Council (CBBC).

For more information, visit www.oichina.com.cn/en/index_en.html.

18th International Symposium on Unmanned Untethered Submersible Technology

The 18th International Symposium on Unmanned Untethered Submersible Technology (UUST 13) will be conducted on 11-14 August 2013 at the Portsmouth Sheraton Harborside Hotel. Set in the historic seacoast town of Portsmouth, the Sheraton Harborside provides the perfect atmosphere for a relaxed symposium allowing the attendees a chance to meet each other and share sea stories as well as gain insight into AUV systems and technology.

The meeting encourages a number of student activities. The major activity is a student paper competition where the winners have all of their expense paid to attend the meeting and receive a substantial cash prize for their efforts.

For more information, visit www.uust.org.

2013 EDITORIAL CALENDAR

January/February 2013

Editorial: Decommissioning & Abandonment, Subsea Fiber Optic Networks

Distribution: Decommissioning & Abandonment Summit, NACE, Offshore Mediterranean, U.S. Hydro

Product Focus: Navigation, Mapping & Signal Processing

March

Editorial: Oceanology & Meteorology, Maritime Security

Distribution: Ocean Business, SubOptic 2013

Product Focus: Ocean Instrumentation, Diver Detection Systems

April

Editorial: Offshore Technology, Ocean Mapping & Survey

Distribution: GMREC, IDGA Maritime Homeland Security, OTC

Product Focus: Connectors, Cables & Umbilicals

May

Editorial: UW Imaging & Processing, Marine Salvage

Distribution: EnergyOcean, Oceans '13 Bergen, Sea Work Intl, UDT

Product Focus: Cameras, Lights & Imaging Sonars

June

Editorial: Workclass ROVs, Deepwater Pipeline & Repair & Maintenance

Distribution: TBA

Product Focus: Subsea Tools & Manipulators

July

Editorial: AUVs & Gliders, Marine Construction

Distribution: AUVSI

Product Focus: Tracking & Positioning Systems, Seismic Monitoring

August

Editorial: Defense & Naval Systems, Corporate Showcase

Distribution: TBA

Product Focus: Multibeam & Side Scan Sonars

September

Editorial: Ocean Observing Systems, Ocean Renewables

Distribution: Oceans MTS IEEE, SPE ATCE, MREC, MTS Dynamic Positioning,

Product Focus: Buoys & Monitoring Instrumentation

October

Editorial: Offshore Vessels, Offshore Communications

Distribution: International Workboat, LAGCOE, Oil Comm, OTC Brazil, North Sea Decommissioning, AWEA/Offshore Windpower

Product Focus: Acoustic Modems, Releases & Transponders, Marine Communications

November

Editorial: Subsea Inspection, Monitoring, Maintenance, Repair; Subsea Telecom

Distribution: SUBSEA Survey IMMR, Clean Gulf

Product Focus: Handling Equipment, Winches & Control Systems, Battery Technology

December

Editorial: Light Workclass ROVs, Commercial Diving

Distribution: Subsea UK, Underwater Intervention

Product Focus: Diving Equipment & Buoyancy Materials

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People & Company News

ExxonMobil Corp. appointed **T.R. (Tom) Walters** as president of ExxonMobil Production Co. effective 1 March 2013. Walters, president of ExxonMobil Gas & Power Marketing Co. and a vice president of the corporation, succeeds **R.M. (Rich) Kruger**, who was appointed by the board of Imperial Oil Ltd. as chairman, president, and chief executive officer. Walters joined Exxon USA in 1978 and has held a variety of technical and managerial positions in production, operations, development, and global services. In 1999, he was appointed vice president, Africa, for ExxonMobil Development Co. and in 2002, vice president, United States, for ExxonMobil Production Co. He was appointed president, ExxonMobil Global Services Co. in 2005 prior to becoming executive vice president of ExxonMobil Development Co. in 2007. He was appointed president of ExxonMobil Gas & Power Marketing Co. in 2009.

Global accommodation specialist, HB Rentals, a Superior Energy Services company, promoted **John Nagel** to vice president of product development.

Based in the corporate headquarters in Broussard, Louisiana, Nagel will be responsible for the design and development of HB Rentals' fleet, including



Nagel

engineering, manufacturing, and quality control. Nagel will assume responsibility in responding to clients' changing needs and providing innovative solutions to offer the highest quality products and services in the market.

As a former U.S. Coast Guard marine safety inspector, Nagel developed and implemented a new inspector training program, supervised all field inspectors, provided annual inspection statistics to senior management and was responsible for personnel evaluations. Nagel has more than 40 years of experience in specialized equipment inspection and maintenance.

The ASCO Group, an international oil and gas services company, appointed **Mark Walker** as its chief financial officer. He is a chartered accountant and has over 17 years of experience, most

recently holding the Group finance director role with an international oil and gas drilling and engineering company. Walker replaces **Ian Ross** who has been with ASCO for over 14 years and held the role of Group finance director for the past 6 years. He remains with ASCO in a senior consultative role while he gradually scales down his workload in advance of retirement, a decision he took last year. Walker will sit on the ASCO Group board and will be responsible for all Group finance matters within ASCO as well as the Group IT function.

Pipeline Services International LLC (PSI) completes 500th job. PSI is proud to announce the successful completion of its 5th year of business and our 500th project by its staff of experienced and innovative personnel. Its people are ideally suited to accomplish the challenges from the depths of deep water offshore to the dry lands of South Texas. As PSI grows, so does its commitment to service and quality; and with that, it is moving to a larger facility in March 2013 to better accommodate its expanding market.

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SEA CON welcomes to its sales team **Michael Michulka, Leighton Mauro, and Gary Kelly.**

Michulka a graduate of the Institute of Electronic Science at Texas A&M University brings a wealth of experience that makes him a perfect addition to SEA CON's technical sales team, having previously held several positions, including sales in the subsea connector industry with MacArtnay. He is based in Texas and is a member of the Texas State guard serving as a Staff Sergeant.

Mauro, an existing member of the SEA CON team, has started his new role as Gulf Coast Sales and is also based in Texas, supporting sales in the Gulf Coast area, a task that he is really excited about. He has a great knowledge and understanding of SEA CON's products, including its fiber optic line and has worked with customers on a number of complex subseaprojects.



Michulka



Mauro

Formerly with Teledyne Impulse-PDM, Kelly joins the SEA CON sales team as UK Sales Manager and brings with him the combination of knowledge, experience, and consultative sales skills.

Based in the UK, Gary will focus his initial efforts on supporting UK sales for the wide range of SEA CON products and application engineering.

SeeByte is pleased to announce that, having been awarded an Industry Fellowship by the Royal Society, Professor **Yvan Petillot** will be joining the company for a 2 year period beginning May 2013.

Prof. Petillot of Heriot-Watt University, was one of the original founders of SeeByte in 2001 and continues to be a valuable member of the company's Board of Directors.

DeepSea Power & Light® is proud to announce that **Eric Fischer** has joined the team as its new Technical Sales Rep.



Kelly



Petillot

Fischer completes his Bachelors of Science in Mechanical Engineering with an emphasis in Machine Design at San Diego State University come this May 2013. He expanded his knowledge of sales by working for Apple Inc. while attending school and looks forward to continuing on into the technical sales field.

BIRNS, Inc. has announced **Electronic Sales of New England (ESNE)** as the company's newest sales representative. The agreement includes sales and support of BIRNS' high-performance electrical, coaxial, optical, electro-coax, electro-optical, and electro-opto-mechanical hybrid connectors. The territory for ESNE's sales efforts on behalf of BIRNS includes Connecticut, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, New York, New Jersey, and Pennsylvania. With more than 35 years of experience, ESNE is the largest and longest continuously run manufacturers' representative firm in the Northeast serving the oceanographic community.



Fischer



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Tel: (760) 471 5400, Fax: (760) 471 4970
E-mail: sales@falmat.com
Website: www.falmat.com
Contact: Shawn Amirehsani

Falmat designs and manufacturers cables for commercial and military projects ensuring performance and reliability specifically in harsh environments. Innovative cable solutions for dynamic and static applications. Ruggedized Deep-Water **XtremeNet** composite Ethernet cables, proven **XtremeGreen** video cables, miniature **XtremeLight** fiber optic cables are high performance products representing our versatile manufacturing capabilities serving the marine industry. We recently launched a new line of off-the-shelf subsea instrumentation cables. We offer installing braided armored fairings, single and multilayered steel armored cables in short lengths. Falmat is a Certified ISO9001/AS9100 company. Visit our web site www.falmat.com or contact our sales team for a prompt quotation.

CABLE & PIPELINE TRACKING



Teledyne TSS Ltd.

1 Blackmoor Lane, Croxley Business Park,
Watford, Hertfordshire WD18 8GA
Tel: +44(0)1923 216020, Fax: +44(0)1923 216061
E-mail: tssales@teledyne.com
Website: <http://www.teledyne-tss.com>
USA Office: 10801 Hammerly Blvd, Suite 128,
Houston, TX 77043, Contact: Keith Pope
Tel: (713) 461 3030, Fax: (713) 461 3099

Underwater detection systems for determining the location, relative position and burial status of offshore pipelines, umbilicals and subsea telecommunications & power cables.

CABLE PROTECTION



UNDERWATER CABLE SOLUTIONS

PMI Industries, Inc.

5300 St. Clair Avenue, Cleveland, OH 44103 USA
Tel: (216) 881 4914, Fax: (216) 881 4920
E-mail: sales@pmiind.com
Website: www.pmiind.com

Specializing in the design, manufacture & testing of highly reliable **Cable Systems & Hardware** for harsh marine environments since 1969. **PMI Industries, Inc.**, is committed to providing Engineered & Custom Designed Cable Systems for all types of applications in the marine industry including **Cable Installation, Terminations & Protection Products, Defense & Surveillance, Monitoring & Fisheries, ROVs & Ocean Equipment, Salvage, Search & Recovery Operations and Seismic & Survey Exploration**. Work directly with our **Engineering & Design** team from initial product concept to production. Our state-of-the-art **Cable Testing** facility simulates at-sea conditions and offers complete testing services from product design verification through acceptance testing. **PMI Underwater Cable Solutions: performance, reliability, peace of mind.**

CERAMICS



Ceramco, Inc.

P.O. Box 300
1467 East Main Street
Center Conway, NH 03813 USA
Tel: (603) 447-2090
Fax (603) 447-3906

E-mail: info@ceramcoceramics.com
Website: www.ceramcoceramics.com

Ceramco has been manufacturing custom technical ceramic components in the USA for 30 years. Highly configured parts are produced out of strong, dense (impervious), and high wear resistant ceramic materials. Corrosion-proof ceramic fasteners are stock items. We have experience with long term production of ceramic parts for marine applications.

CONNECTORS



AK Industries

3115 East Las Hermanas Street
Rancho Dominguez, CA 90221
Tel: (310) 762 1600
Fax: (310) 762 1616
E-mail: sales@ak-ind.com
Website: www.ak-ind.com
Contact: Allan Kidd

AK Industries is an agile high tech manufacturer of rugged low cost underwater electrical connectors. The **HydroVolt** line of connectors is the most rugged and reliable low cost connector available. AK Industries is also ideally suited to provide unique solutions engineered to customer requirements.



BIRNS, Inc.

1720 Fiske Place, Oxnard CA 93033-1863 USA
Int'l: +1-805-487-5393, Fax: +1-805-487-0427
USA: +1-888-BIRNS-88 (888-247-6788)
E-mail: service@birns.com
Website: www.birns.com
Contact: Eric Birns

BIRNS, Inc. is an ISO 9001:2008 certified global leader in the design and manufacturing of high performance connector and lighting solutions for the subsea industry. With more than half a century of expertise, BIRNS provides unmatched lead times and industry-leading exclusive features. Its world class molding facility is NAVSEA S9320-AM-PRO-020 certified, and the company specializes in sophisticated connector products and custom cable assemblies—with electrical, optical, electro-optical, electro-coax, and EOM (electro-opto-mechanical) connector lines. BIRNS leads the industry with high volume hydrostatic and helium pressure testing—its vast range of electrical penetrators is ABS Product Design Assessment (PDA) certified, with inclusive pricing and lead times for ABS/DNV witnessing. BIRNS is equally renowned for its lines of innovative LED and tungsten-halogen marine, chamber and commercial diving lights, and revolutionary MPI-NDT equipment.

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CONNECTORS

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BIRNS Aquamate

BIRNS Aquamate LLC

122 Waltham St.
Pawtucket, RI 02860 USA
Tel: 1 401-732-4242, Fax: 1 401-753-6342
E-mail: sales@birnsaquamate.com
Website: www.birnsaquamate.com
Contact: Eli Bar-Hai

Birns Aquamate design and manufacture underwater electrical connectors, cable assemblies, and cable terminations. The company produces a wide range of standard industry connectors such as the 5500 Series, SC, MC, LP, FAWL/FAWM, Rubber Molded, etc. BIRNS Aquamate is the only underwater connector producer that guarantees compatibility with other manufacturers. Birns also specializes in fast turn-around for custom design of special connector solutions. Stocking dealers in the UK (Scorpion Oceanics) South Africa (Marine Solutions) Holland (Seascape) as well as dealers in Canada, Italy, Russia, China, and Brazil.



SEA CON®

1700 Gillespie Way
El Cajon, California 92020, USA
Tel: (619) 562-7071, Fax: (619) 562-9706
E-mail: seacon@seaconworldwide.com
Website: www.seaconworldwide.com

The SEA CON® Group are world leaders in underwater connector technology and provide an extensive and diverse range of electrical, optical and hybrid connector assemblies, submersible switches and cable system solutions for many applications within the Oceanographic, Defense, Oil and Gas and Environmental markets. With locations in California, Texas and Rhode Island in the USA, Mexico, Brazil, the United Kingdom and Norway and a worldwide network of agencies and representatives, SEA CON® is able to supply very quick solutions to any requirements across the globe.



International
MacArtney A/S (Headquarters)
Esbjerg, Denmark
Tel: +45 7613 2000
info@macartney.com
www.macartney.com

For over 30 years, SubConn® wet mateable connectors have been the first choice of the underwater industry. The range features standard circular, micro, low profile, metal shell, power and ethernet connectors, penetrators and custom connectors for special applications. Worldwide SubConn® sales and support is provided exclusively by the MacArtney Group.



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MacArtney Inc.
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TELEDYNE ODI

A Teledyne Technologies Company

Teledyne ODI - A Teledyne Technologies Company

1026 North Williamson Boulevard,
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E-mail: ODI_marketing@teledyne.com
Website: www.odi.com

A leader in subsea electrical & fiber optic interconnect systems. Wet-mateable connectors include signal & high-power electrical, optical, and hybrid products. All based on patented PBOF technology. These rugged components are designed for use at any ocean depth, in the harshest environments. ODI also provides top quality custom engineered solutions for any subsea networking challenge.



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Teledyne Oil & Gas

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Delivering engineered solutions for subsea & topside monitoring, sensing and interconnection applications. Technology-focused capabilities include corrosion & erosion monitoring networks, data acquisition/evaluation/reporting systems and turnkey systems integration, power & data interconnection systems and subsea engineering. Teledyne Oil & Gas is Teledyne ODI, Teledyne Impulse, Teledyne Cormor & Teledyne DG O'Brien.

DIVING & MEDICAL TRAINING COURSES



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Website: www.interdive.co.uk
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OCEANOGRAPHIC INSTRUMENTS



ASL Environmental Sciences, Inc.
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Email: asl@aslenv.com
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ASL provides physical oceanographic consulting services and instruments. Services: flow measurement, ice studies, wave measurement and analysis, numerical modeling, and remote sensing. Products: Ice Profiler- measures ice-keel depths; Acoustic Zooplankton Fish Profiler- monitors the presence and location of zooplankton, fish or sediments; and the WERA NorthernRadar- measures surface currents and waves from shore up to 200km. ASL has a large lease pool of oceanographic instruments.



NKE Instrumentation
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- Drifting surface buoys with temperature and GPS receiver for Surface velocity project.
- Carioca drifting buoy: sea water dissolved pCO₂, chlorophyll, wind speed and salinity.



RBR
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RBR designs and manufactures rugged submersible data loggers, recorders, sondes, controllers, and sensors for water quality measurement. Our standard data logging instruments range from one to 24 channels, configured as a CTD, or multi-parameter (sensor) recorders. Specialty loggers are available with specific sensors for harsh environments or unique applications like measuring tides and waves.



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Website: http://www.seabird.com
Contact: Calvin Lwin, Applications Engineering

Sea-Bird is the leader in accurate, stable ocean instruments for measuring conductivity, temperature, pressure (salinity); oxygen; and related variables. Our CTD profilers, water samplers, moored CT recorders, wave/tide recorders, and DO sensors are used by research institutes, ocean observing programs, government agencies, and navies globally. Investments in engineering, metrology, calibration, software, and analysis make our products the best choice.



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Contact: Balduur Sigurgeirsson

A manufacturer of miniature data loggers with sensors as temperature, depth/pressure, salinity, tilt/acceleration, compass direction/magnetometer, light levels, acoustic receiving/transmitting. The loggers are used for various researches, including oceanography, fishing gear studies, equipment behavioral monitoring and fish tagging. Data is presented in the application software with a time-stamp for each measurement.

OFFSHORE EQUIPMENT



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Tel: O(+1) 713 783 1771
E-mail: larry.bobbit@oegoffshore.com
Website: www.oegoffshore.com
Skype: larrybobbit

OEG Offshore LLC is the industry's first choice in supplying DNV 2.7-1 equipment on a worldwide basis, either for rental or purchase. The equipment supplied is all types and sizes of DNV 2.7-1 containers, baskets, skips, gas bottle racks, refrigerated units, workshops and hazardous area modules. Our specialty is ATEX, which includes pressurization, air conditioning, fire & gas systems. If we don't have the type and size you need, call us for a custom build. OEG's corporate office is located in Aberdeen, Scotland with operational offices in Houston, Perth and Singapore.



Unique System LLC (USA)
A Unique Maritime Group Company

Unique System, L.L.C.
(Survey & Hydrographic)
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Unique System, L.L.C.
(Diving Equipment)
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Unique System, L.L.C. (USA), Unique Maritime Group's operating entity in the United States, provides Survey and Hydrographic rentals and sales support for products such as Kongsberg C Node Maxi/Mini and Sonardyne G6 Series products. Also in inventory are IXSEA, CDL, Edgetech, Tritech, Blueview, Hypack, Valeport and Teledyne products at our Houston, TX office. These products along with the rest of the inventory allow our client's acoustic, positioning, ROV, navigation and hydrographic needs to be served. The New Iberia, LA office provides diving rentals and sales for DNV and ABS classed Saturation Diving Systems, Hyperbaric Rescue Facilities, LARS and surface diving equipment.

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Contact: Jim Byous



Ocean Specialists, Inc (OSI) provides a broad range of capabilities and services to the Offshore Oil & Gas, Submarine Telecom, Government and Scientific markets, including: Market analysis, project consulting, submarine fiber cable systems, subsea technology development, & corporate services.

ROV COMPONENTS



ROVSCO, Inc.
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Website: www.rovscoco.com
Contact: Jessica McKenney

Rovsco provides support and solutions to the offshore subsea and marine industries; work-class ROV and Commercial Diving operations. We manufacture a number of tools/equipment and subsea video items. We have an excellent reputation worldwide based on our product knowledge, dependability, commitment to customer service and speed of response.

SONAR SYSTEMS

Imagenex Technology Corp.
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E-mail: imagenex@shaw.ca
Website: www.imagenex.com
Contact: Steve Curnew

Imagenex is an innovative company specializing in advanced acoustic underwater sensors. The company's products include multibeam, mechanical scanning, and sidescan sonars. The Delta T is a compact, cost-effective multibeam sonar, small enough to fit on most underwater vehicles for obstacle avoidance, navigation and profiling applications. The profiling versions feature an output for real-time 3D plotting and are compatible with third party post-processing software. The Model 881A is a small multi-frequency sonar for imaging or profiling applications. There is an Azimuth Drive available for the 837B Delta T and the 881A for profiling applications from stationary platforms. The Model 881L features improved performance via Ethernet communications. Two sidescan sonars, the SportScan and the YellowFin, feature a revolutionary price/performance ratio. For more information please visit www.imagenex.com.

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iXBlue provides a range of fine, high-technology equipment, systems and turn-key solutions in the areas of navigation and surveillance, underwater positioning and communication, seabed imaging and surveying.

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Inertial Products – Integrated Solutions – Marine Works
Motion Systems – Sea Operations – Sonar Systems



Marine Sonic Technology, Ltd.
P.O. Box 730
White Marsh, VA 23183-0730
Toll Free: (800) 447-4804
E-mail: jdmille@marinesonic.com
Website: www.marinesonic.us

Marine Sonic Technology, Ltd. builds high quality, high resolution side scan sonar systems. Located in Gloucester, Virginia, Marine Sonic has been in business for more than 20 years. Our towed systems are rugged, easy to deploy and easy to operate. We also offer highly efficient embedded side scan systems for use in AUVs which occupy minimal space in the vessel and operate with minimal power consumption.



Teledyne BlueView, Inc.
2515 N. Northlake Way, Suite 214
Seattle, WA 98103, USA
Tel: (206) 545-7260, Fax: (206) 545-7261
E-mail: sva_info@teledyne.com
Website: www.blueview.com

Teledyne BlueView delivers state-of-the-art, compact acoustic imaging, measurement, and automation solutions for defense, energy, civil engineering, transportation, and port security applications worldwide. Teledyne BlueView's advanced acoustic systems support underwater operations from a wide variety of platforms, including ROVs, AUVs, surface vessels, fixed mounts, manned submersibles, portable tripods, and diver handheld systems.

SOUND VELOCITY PROBES/CTDS

SAIV A/S

Nygårdsveien 1, 5164 Laksevag, Norway
Tel: +47 56 11 30 66, Fax: +47 56 11 30 69
E-mail: info@saivas.no
Website: www.saivas.no
Contact: Gunnar Sagstad

- STD/CTD, Sound Velocity probes/recorder with optional multi-parameter facilities; Turbidity, Fluorescence, Oxygen etc.
- Precision pressure/depth (0.01% accuracy) and temperature sensors/recorders. Applications: hydrographic profilers, installation on ROVs and towed systems, etc. Robust and compact designs are combined with accuracy and "plugged play" compatibility. Output format for sonar equipment, e.g. EM1002, EM3000, SSP, HiPAP and Reson 8125.



SUB-BOTTOM PROFILES



iXBlue

Tel: +33 (0)1 30 08 88 88, Fax: +33 (0)1 30 08 88 01
Website: www.ixblue.com

ECHOES

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- from 500 Hz to 15 kHz
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iXBlue provides a range of fine, high-technology equipment, systems and turn-key solutions in the areas of navigation and surveillance, underwater positioning and communication, seabed imaging and surveying.

Acoustic Products – Advanced Components
Inertial Products – Integrated Solutions – Marine Works
Motion Systems – Sea Operations – Sonar Systems

SUBSEA FABRICATION



NEW Industries

6032 Railroad Avenue
Morgan City, LA
Tel: 985-385-6789
E-mail: bill.new@newindustries.com
Website: www.newindustries.com
Contact: Bill New

New Industries (NI) provides quality fabrication services to the offshore oil & gas and marine industries. NI focuses on large diameter, pressure vessels and deepwater subsea equipment such as jumpers, PLETs, PLEM, suction piles and ROV components.

SUBSEA TOOLING



Seanic Ocean Systems
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E-mail: contact@seanicusa.com
Website: www.seanicusa.com
Contact: Karen North

Seanic Ocean Systems is an industry leader in providing simple, rugged and reliable subsea tooling for remote intervention.

SWITCHES



SEACON Advanced Products, LLC.
1321 Nellis Road, P.O. Box 767
Bellville, Texas 77418, USA.
Tel: (979) 865-8846, Fax: (979) 865-8859
E-mail: sales@seacon-ap.com
Website: www.seacon-ap.com

SEACON Advanced Products, LLC., manufactures a wide variety of versatile and robust switches to suit a number of applications. These include Limit, Positive Action and Proximity switches in a range of materials including Titanium, Plastic and Stainless Steel which can be supplied in varying load capacities up to 7 amps and pressure rated to 10,000 psi. To further aid simplicity, our proven range of Modular Proximity Switches have been integrated with the Micro WET-CON electrical wet-mate connector making this switch a very modular component that is easily installed and replaced in the field, but without compromising reliability.



UNDERWATER VEHICLES

AUVs



Exocetus Development LLC

1444 East 9th Avenue, Anchorage, AK, 99501
Tel: 858-864-7775, Fax: 907-569-0268
E-mail: sales@exocetus.com
Website: www.exocetus.com
Contact: Ray Mahr, VP Sales & Marketing

The new Exocetus Coastal Glider is specifically designed for use in coastal waters where high currents and large variations in water densities occur. A larger buoyancy engine than legacy gliders designed for open-ocean operation enables the Exocetus Coastal Glider to easily operate in up to 2 knots of current, handle densities from 7 ppt to 37 ppt, operate up to 60 days with a lithium battery pack and easily integrate additional sensors.



A KONGSBERG COMPANY

Hydroid, Inc., a subsidiary of Kongsberg Maritime
6 Benjamin Nye Circle, Pocasset, MA 02559-4900, USA
Tel: 508-563-6565, Fax: 508-563-3445
E-mail: glester@hydroid.com
Website: www.hydroid.com
Contact: Graham Lester

Hydroid, a subsidiary of Kongsberg Maritime, is the world leader in manufacturing advanced Autonomous Underwater Vehicles (AUVs). REMUS AUVs provide innovative and reliable systems for the marine research, defense, hydrographic and offshore/energy markets. Hydroid vehicles represent the most advanced, diversified and field-proven family of AUVs and support systems in the world.

ROVs



SUBSEA TECHNOLOGIES

Perry Slingsby
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Houston, TX 77041
Tel: 713-329-8230, Fax: 713-329-8299
E-mail: perry.sales@f-e-t.com
Website: www.f-e-t.com/Subsea



Forum Energy Technologies' Perry Slingsby brand supplies deepwater work class ROVs, tooling solutions, burial systems, and control-system-based products to the oil, gas, and telecommunications industries. Providing the most advanced, robust and dependable ROVs and subsea products in the world, Forum's Subsea group has facilities in the US and UK and sales offices and agents around the world.



SeaBotix Inc.
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Website: www.SeaBotix.com

SeaBotix Inc. is the world leading manufacturer of capable MiniROV systems. The Little Benthic Vehicle range of systems have become the benchmark in compact ROVs around the world. All systems perform a multitude of tasks including maritime security, body rescue, sensor deployment, object recovery, hazardous environment intervention, and hull inspection.

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ROVs



SUBSEA TECHNOLOGIES
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Tel: +1 713 329 8730, Fax: +1 713 329 8299
E-mail: sub-atlantic.slaes@f-e-t.com
Website: www.f-e-t.com/Subsea

Forum Energy Technologies' sub-Atlantic brand manufactures world class ROVs ranging from portable units to light work class systems. Sub-Atlantic also supplies thrusters, hydraulic power units, valve packs, compensators and pan and tilt systems to other ROV manufacturers. Sub-Atlantic is part of the FET subsea group and has facilities in the US and UK and sales offices and agents around the world.



VideoRay

580 Wall Street, Phoenixville, PA 19460
Tel: (610) 458 3000, Fax: (610) 458 3010
E-mail: info@videoray.com
Website: www.videoray.com
Contact: Brian Luzzi

With more than 1,900 Remotely Operated Vehicles (ROVs) in service around the world, VideoRay has clearly become the global leader in Observation ROV technology. VideoRay is an extremely versatile, portable, affordable, and reliable solution for underwater operations including surveys, offshore inspections, search & recovery, homeland & port security, science & research, fish farming, and other unique applications in underwater environments. VideoRay is available on the General Services Administration.

UNDERWATER VIDEO EQUIPMENT

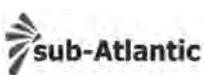


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KONGSBERG

Email: km.camsales.uk@kongsberg.com
Website: www.km.kongsberg.com/cameras
Contact: Mark Esslemont

Kongsberg Maritime Ltd is a world leader in providing harsh environment underwater camera & imaging technology and marine CCTV systems to the Offshore Oil Field & Renewable Energy, Power Generation, Scientific, Maritime and Military sectors.



SIDUS Solutions, Inc.

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Fax: (619) 275 5544
Houston, TX Office:
Tel: (281) 658-2555
E-mail: info@sidus-solutions.com
Website: www.sidus-solutions.com

SIDUS Solutions LLC is an integrated systems provider for security and video surveillance systems specializing in customization. Our products are operational to sub-sea depths of 6,500m, serving industries worldwide. We are a full service provider, offering end-to-end solutions from concept design, product selection, engineering, manufacturing, technical and customer support. Industries we serve are Oil and Gas, Scientific, Military and Academic.

WINCHES, HANDLING & CONTROL SYSTEMS



Hawboldt Industries

220 Windsor Road
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Tel: 902 275 3591
Fax: 902 275 5014
E-mail: paul.phillips@hawboldt.ca
Website: www.hawboldt.ca
Contact: Paul Phillips

Hawboldt Industries has built robust commercial and scientific deck machinery for over a century, focusing on custom winch solutions and satisfying project requirements from engineering to commissioning. ROV winches, A frames, and electro-hydraulic power packs are available to satisfy the offshore and subsea markets. Our scientific winches, preferred by universities and governments worldwide, are renowned for their durability and performance particularly in harsh environments.



Markey Machinery Company

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E-mail: info@markeymachinery.com
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Preferred by the US fleet, Markey's advanced oceanographic winch systems provide ultimate dependability, reliability and precise performance when and where you want it. Operating within critical windows of opportunity you can count on our custom winches, capstans, windlasses and auxiliary machinery for the successful execution and completion of your research.



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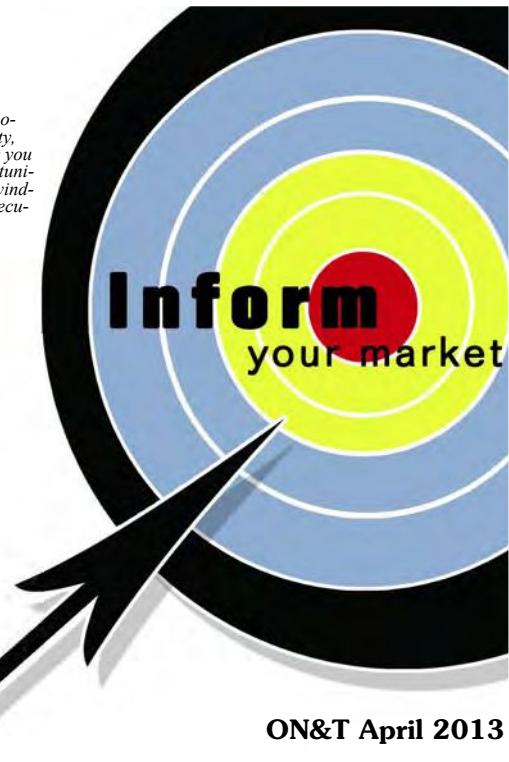
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- 3** Which categories best describes your business?

(Indicate the primary activity of your organization by placing a 1 next to the category. Place 2, 3 and 4 next to other markets served.)

- | | |
|---|---|
| A. <input type="checkbox"/> SHIPS, CONSTRUCTION, SALVAGE | O. <input type="checkbox"/> DIVING EQUIPMENT / SERVICES |
| B. <input type="checkbox"/> U/W VEHICLES / COMPONENTS | P. <input type="checkbox"/> CONSULTING, DATA SERVICES |
| C. <input type="checkbox"/> NAVIGATION / POSITIONING | Q. <input type="checkbox"/> MARINE ELECTRICAL / ELECTRONICS |
| D. <input type="checkbox"/> RESEARCH & DEVELOPMENT | R. <input type="checkbox"/> COMPUTER SERVICES / SOFTWARE |
| E. <input type="checkbox"/> OCEAN INSTRUMENTATION | S. <input type="checkbox"/> OCEAN RENEWABLES |
| F. <input type="checkbox"/> OFFSHORE OIL & GAS | T. <input type="checkbox"/> SUBSEA IRM |
| G. <input type="checkbox"/> COMMUNICATIONS / UTILITIES | U. <input type="checkbox"/> OCEAN OBSERVING |
| H. <input type="checkbox"/> SCIENCE, ENVIRONMENTAL | V. <input type="checkbox"/> SHIPPING / TRANSPORTATION |
| I. <input type="checkbox"/> EDUCATIONAL INSTITUTION / LIBRARY | W. <input type="checkbox"/> SUBMARINE TELECOM |
| J. <input type="checkbox"/> GOVERNMENT MILITARY | X. <input type="checkbox"/> EQUIPMENT RENTAL |
| K. <input type="checkbox"/> GOVERNMENT CIVILIAN | Y. <input type="checkbox"/> MANUFACTURERS' REPRESENTATIVE |
| L. <input type="checkbox"/> MARINE HARDWARE / DECK EQUIP. | Z. <input type="checkbox"/> OTHER (Please specify below) |
| M. <input type="checkbox"/> FISHING INDUSTRY, AQUACULTURE | |
| N. <input type="checkbox"/> SURVEY, MAPPING, EXPLORATION | |

- 4** Which category best describes your job function? (check only one)

- | | |
|--|--|
| 1. <input type="checkbox"/> OWNER / EXECUTIVE | 5. <input type="checkbox"/> BUYER |
| 2. <input type="checkbox"/> MANAGEMENT / PROFESSOR | 6. <input type="checkbox"/> SALES |
| 3. <input type="checkbox"/> ENGINEER / SCIENTIST | 7. <input type="checkbox"/> OTHER (Please specify below) |
| 4. <input type="checkbox"/> TECHNICIAN / OPERATOR | |

- 5** How many other people will read your issue of ON&T at this location? _____



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