

# Ocean

News for the Ocean Industry

# News

& Technology

March 2014

**Pushing Limits:**

**Innovative Solutions for High Bandwidth,  
Long Distance Subsea Data Transmission**

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**Deepwater Power Point Provides a Power  
Point and Fibre Optics to the Seabed**

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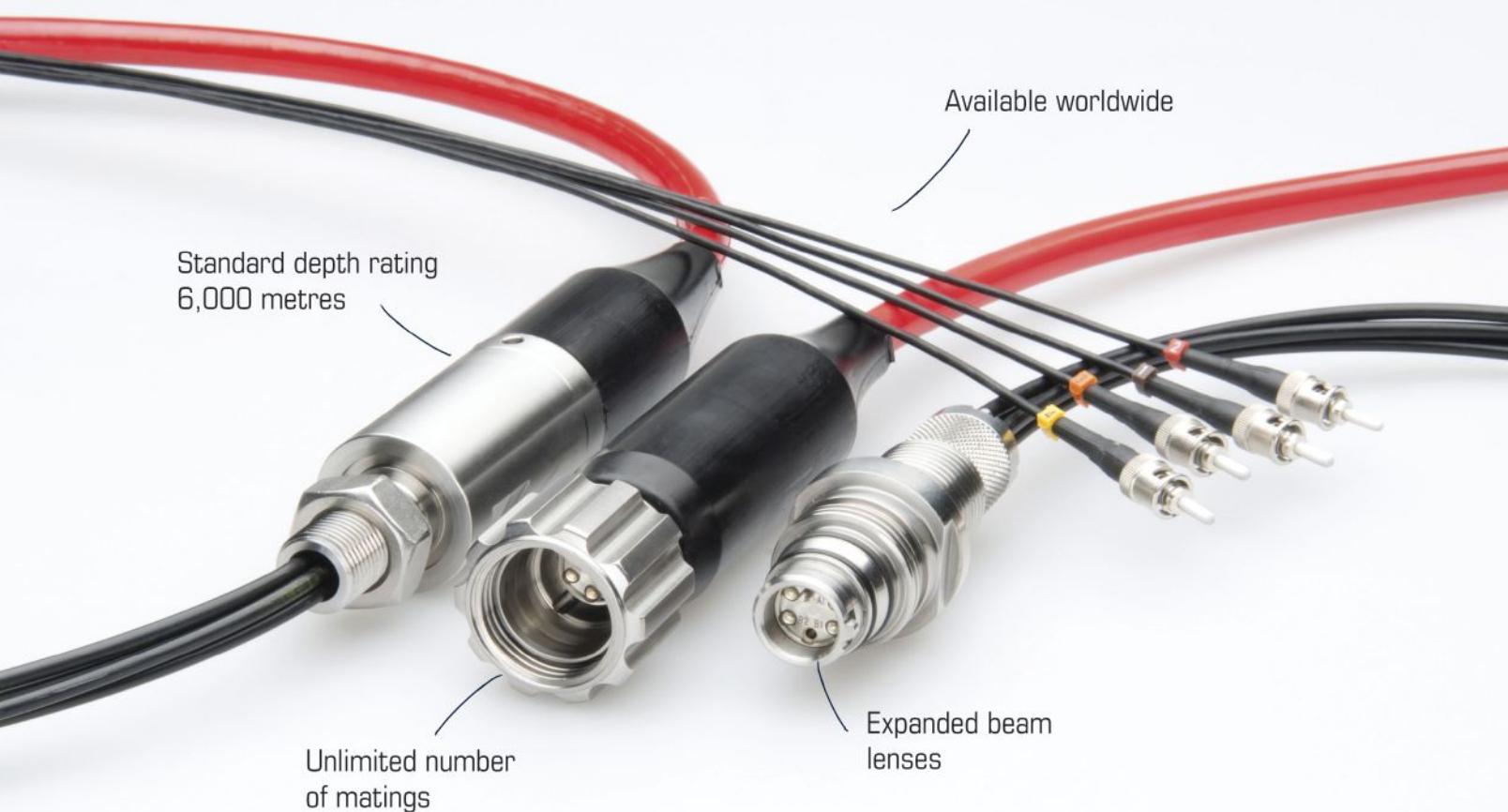


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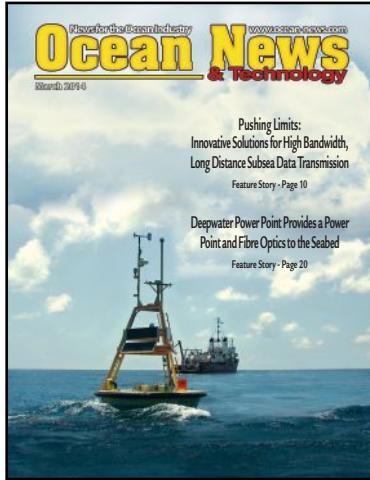
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3m buoy deployed as part of the Texas Automated Buoy System (TABS) at site H in the Gulf of Mexico. Photo credit: Geochemical and Environmental Research Group (GERG), Texas A&M University

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By Bill Vass,  
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## A CEO's View: The Impact of Autonomous Systems on Ocean Science

Everyone who reads Ocean News and Technology shares a common understanding of the ocean, as well as its importance to the economy and ecology of the world. We have strived throughout time to measure and understand it. Our understanding has evolved with our technology and scientific capability, from measuring current speeds with drifters and using weights for seafloor depth to more advanced weather ships and later automated moorings. Satellites brought new and exciting information from hundreds of miles over the ocean surface, and continue to be a primary method of observing the vastness of the world's oceans. Now, energy harvesting, long duration autonomous systems opens a new way to observe, manage, and operate in the ocean.

People engaged in ocean operations can be involved in scientific discovery, exploration for resources, moving freight, or military operations. They all share the following common goals: reduce risk and costs; faster scheduling and deployment; reliable operations through all weather; reduce impact on the environment & increase safety; gather more dense data and information; operate for longer durations over larger cover areas; and augment or extend current assets.

It's important that the development of new autonomous systems be focused on delivering on these goals and scale in order to solve some of the ocean's biggest challenges such as climate change, ocean acidification, resource management, severe weather, deeper water exploration, maritime border management, and political conflicts.

### **Long Duration Matters**

When operating these new autonomous systems, long duration will be key to ocean data collection and large area coverage. Why? You need a year of operation to measure seasonal changes accurately overcoming the seasonal gaps that you see with short duration systems. This provides both spatial and time series data as the system navigates very exact patterns within coverage areas. Unlike a satellite that is providing its best guess from 250 mi up and is only over a specific area for short durations, these long duration systems are in-situ measuring the biochemistry, oceanographic, and metrological data directly. For missions designed to patrol and protect large areas, long duration and coverage are the key to success. Would you consider protecting your border on land with a fence that only stays up a few months? No. You want and need continuous, year round coverage over large areas to ensure protection.

### **Fleet Operation Matters**

To get real situational awareness, the ability to deploy and manage large num-

bers of autonomous systems or fleet operations will be the key to success. You want systems that can self-form into grids and are aware of each other's data and location while networking together locally to reduce communications costs and speed navigation. You need fleets engineered for safety with the intelligence to identify, detect and avoid obstacles. Again, numbers matter. You don't protect a border with two or three law enforcement agents. How can you protect your coastal assets without a fleet of synchronized autonomous systems?

### **In-Situ Processing Matters**

Processing in-situ at sea and the ability to run many applications on the same platform will allow multi-use/multi-mission of fleets of systems that all work together. It's important to be able to not just collect data but also process at point of collection due to the increasing volume of data involved in acoustics, video, and RF collection. Systems need to send back processed answers in real time rather than just raw data. Real-time local processing and autonomous reaction are required for everything from border protection and target identification to tracking algae blooms or oil in the water. This processing may also allow ocean and weather models to have sampling rates much greater than currently possible. The availability of this capability will impact how large-scale models operate bringing a new level of accuracy to forecasts.

### **Software Matters**

Bringing cloud and web services technology to the ocean will change how autonomous systems scale and integrate with sensors as well as each other. Cloud processing not only provides more reliable and scalable systems, it allows fleets of systems to share processing and data, enabling them to act as a single virtual unit. Software will be the most important feature of these systems as advanced sensors and the data they provide become more robust. The software needs to provide the flexibility and security so systems can be re-tasked and re-missioned in real time as the needs of their customers on shore change.

As our fleet of Wave Gliders nears the combined 400,000-mi milestone, Liquid Robotics is now delivering the new Wave Glider SV3 to our customers. We believe that these systems form the foundation for long duration fleet operations with scalable on-board processing and the flexible software that will enable a new phase in exploration of the ocean.

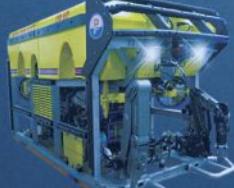
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# PUSHING LIMITS: Innovative Solutions for High Bandwidth, Long Distance Subsea Data Transmission

*By: Michael Greene, New Product Development Engineer, and  
Gregory Eskridge, New Product Development Engineer  
Teledyne Oil and Gas*

As the sensors used in the subsea environment increase in number and capability, the amount of data transmitted by these sensors continue to increase. Some of the approaches to provide data transfer bandwidth include electrical modems, electrical DSL, electrical CAN bus, electrical Ethernet, and optical Ethernet. Conventional electrical modems can transmit data over long distances. This technology is by far the most mature for subsea use. However, the maximum data transfer rates achievable are insufficient for technologies that demand data transfer rates in excess of 20 kbps.

Electrical DSL offers higher bandwidth than modem technology at reasonably long distances, but the available bandwidth decreases as a function of length and still does not provide enough bandwidth for many data rich technologies (200 to 3000 kb/sec, up to 15 km). Electrical Ethernet has proven to be reliable and high bandwidth, but is limited to short step out distances (<100 m). Electrical Ethernet is extensively used for short distance subsea communications in the Oil & Gas market.

nectors are mated. In order to meet the future demands, two new technology fronts have been conceived. On the first front, advancements in optical wet-mate connector design now enable higher bandwidth transmission and sensing. On the second front, Active Flying Leads build on the solid reliability of Electrical Flying Leads (EFL) to add functionality to a standard piece of subsea hardware.

Optical Flying Leads (OFLs) have been used successfully in the field for about two decades. Optical wet-mate connectors come in several varieties: all-optical, such as Teledyne's RS (Rolling Seal) connector, or as a "hybrid" with a combination of fiber connections and electrical connections with capacity of connections up to 30 amps, such as Teledyne's NRH (Nautilus Rolling Seal) Connector.

Standard optical and hybrid connectors use an Ultra Physical Contact (UPC) polish for the optical end face, resulting in a connector-level return loss of >30 dB. However, in order to reduce Fresnel reflections at the optical interface, Angled Physical Contact (APC) polished end faces have been introduced in both RS and NRH connectors.

The APC end face geometry has a polish angle of 8° compared to the 0°angle used by the UPC end face. The change in the contact angle between the two optical end faces results in a return loss typically >45 dB. Widely deployed in the terrestrial optic fiber industry, APC

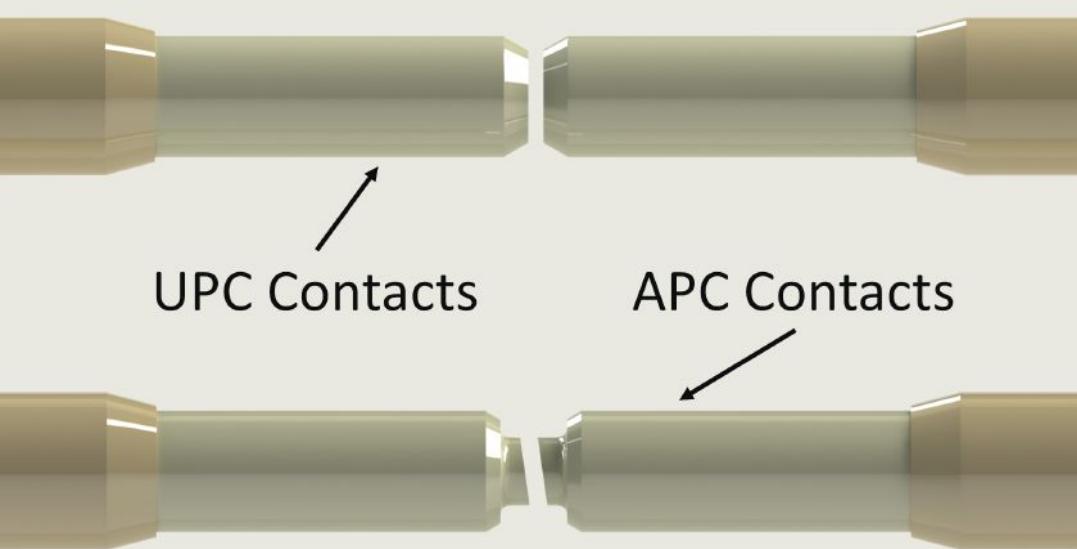
connectors are used when very little reflection is desired. Applications for these improved back reflection connectors include high speed communication systems with low noise requirements, all-optical sensing systems for Life of Field Seismic monitoring, or systems using higher than standard optical power. As larger data transfers and longer distances are required, this technology enables greater possibilities.

The newest entry into long step out data transfer is the introduction of Active Flying Leads (AFLs). AFLs are made active through the addition of electronic components. The



*A 12-way Nautilus™ Ethernet flying lead transmits Ethernet signals over custom cabling sealed to seawater ingress by two independent barriers*

Additionally, CAN bus is used subsea for many safety systems. However, system capacitance limits the distance between the CAN bus controller and its sensors. In cases where step out distances are too long or bandwidth requirements are too great, optical Ethernet is utilized. Optical Ethernet easily accommodates higher bandwidth data and is not limited to short lengths, but comes with a higher cost of implementation. This cost is not limited to the optical wet-mate connectors, but also includes the optical infrastructure required in the electronics module to which the optical con-



*For optical wet-mate connectors, return loss at the optical interface is improved from >30 dB to >45 dB as a result of the use of Angled Physical Contact (APC) polished end faces*

first example of this is the addition of an Ethernet repeater to a standard Ethernet flying lead, referred to as the Extended Ethernet Flying Lead (E<sup>2</sup>FL). Custom Ethernet cables were developed for use in Pressure Balanced Oil-filled (PBOF) jumpers, which allowed for Ethernet transmission to reach up to 100 m as allowed by ISO standards. The new cable was then combined with custom ruggedized Ethernet repeater boards that are placed inside an atmospheric chamber. The chambers were designed to be no larger in diameter than the hose bend restrictors currently used for a stream-lined integration to the flying lead. By placing a slim canister every 100 m on an Ethernet jumper, it is now possible to transmit Ethernet data up to 300 m subsea or beyond without an SEM or SCU in between. The Ethernet repeaters require 5 to 48 V to operate and are also capable of handling and retransmitting power over Ethernet, if required.



*The Extended Ethernet Flying Lead (E<sup>2</sup>FL) incorporates a repeater board into the PBOF hose to extend the reach of Ethernet transmission beyond 100 m*

The next ongoing phase of development for the Ethernet AFLs is the introduction of a ruggedized and high reliability media converter. This media converter will convert electrical Ethernet signal in the back of a flying lead to optical and transmit for up to 10 km, then convert back to electrical on the other end with a second media converter.

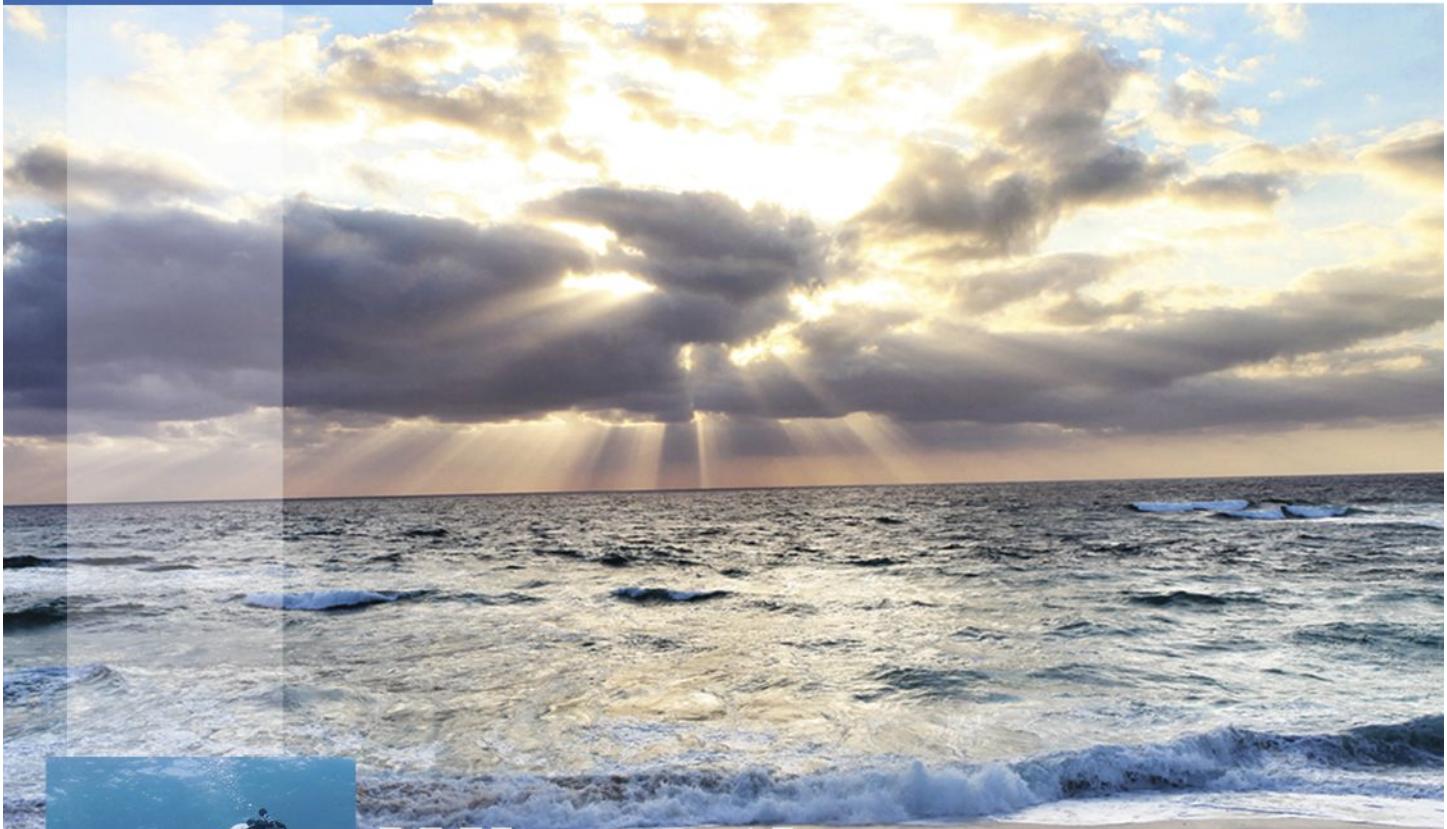
Two versions are being qualified to handle multiple optical wavelengths, and this technology has several possible applications. One of the most promising is the ability to connect electrical Ethernet systems to fiber optic systems in brownfield applications where connection points may be limited. Using either the E<sup>2</sup>FL or the Media Converter, length restriction for subsea projects is minimized or eliminated. In addition, optical media conversion

does not have to be added to the existing electrical modules as it is incorporated into the flying lead.

Continuing this trend to add additional functionality into flying leads, the latest AFL development incorporates a CAN bus repeater system. The first CAN bus system to be available will allow full transparency and does not require any special communication by the user. With the addition of these circuit boards, CAN bus flying leads can reach distances of 1,500 m or longer. This technology can assist in asset monitoring of long lengths of pipe that may be isolated from monitoring equipment.

Modern and emerging sensors and systems now demand greater data transmission capability in networking options. This trend will continue to grow as sensors and systems develop further. Subsea networks will, in turn, require modular connectivity using interconnect systems capable of sup-

porting this high bandwidth availability. Just as sensors have become more reliable over time, interconnect systems have also evolved. The need for enhanced reliability and the ability to collect complete data and confidently measure reliability is ever increasing. The introduction of AFLs and the evolution of subsea fiber optic connectors provide a platform to solve future challenges in subsea data communication.



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# OCEAN INDUSTRY

## Alvin Cleared to Return to Service



*Photo by Tom Kleindinst, Woods Hole Oceanographic Institution*

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

The Woods Hole Oceanographic Institution (WHOI) operates the Navy-owned sub for the National Deep Submergence Facility (NDSF) on behalf of a consortium of universities and research organizations conducting deep ocean research (UNOLS).

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

"There has been tremendous coordination between the Navy, Woods Hole Oceanographic Institution, and the National Science Foundation to ensure Alvin's safety and integrity," said the Navy's Director of Advanced Undersea Integration, Don Hoffer. "Alvin is a national asset and the Navy is pleased to be a part of the team that returned the vehicle to service."

Certification was the final step in Stage I of the Alvin upgrade project, funded by the National Science Foundation and WHOI. The project included upgrades to major components to the increased depth rating of 6,500 m, including installation of a new, larger personnel sphere with improved interior ergonomics; five viewports (instead of the previous three) to improve visibility and provide overlapping fields of view; new lighting and high-definition imaging systems; new syntactic foam providing buoyancy; and an improved command-and-control system. Upgrades also included improvements to Alvin's launch system and storage hangar on board its support vessel, the R/V Atlantis.

The Navy certified Alvin using its Deep Submergence Scope of Certification (DSSOC) process, reviewing the design, construction, and materials used to ensure the vehicle performs as expected. The Navy uses the same processes to certify manned undersea systems for submarine rescue and submarine-based Special Operation Forces delivery systems.

For more information, visit [www.whoi.edu](http://www.whoi.edu).

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### Team registration open for \$2M

**Wendy Schmidt Ocean Health XPRIZE**  
XPRIZE announced that team registration is open for the \$2 million Wendy Schmidt Ocean Health XPRIZE, a competition to incentivize breakthroughs in ocean pH sensor technology that will radically transform our understanding of ocean acidification. Teams interested in competing can register by visiting <http://oceanhealth.xprize.org>. Early registration is open through 31 March at a cost of \$1,000. On 1 April 2014, registration fees will increase to \$2,500 per team. Registration will close on 30 June 2014. In addition to lower fees, teams that register early can benefit from a range of support services, including public relations efforts, venture capital partnerships, team member recruitment and more.

### Triton Submarines retains renowned deep submersible designer Ron Allum

Triton Submarines, LLC announced that Ron Allum will be joining the design and engineering team tasked with completing the materials testing, systems integration, and pressure testing for the Triton 36000/3 Full Ocean Depth Submersible. Triton's president, Patrick Lahey sees this as a big step forward for Triton's most ambitious project, "Ron's experience with the engineering and technical challenges faced when building a manned submersible designed to carry humans to the deepest and most inhospitable reaches of the ocean is unique in the world. Triton is honored to have him on the team and looks forward to working with him to build the most capable manned submersible in the world."

### DNV GL takes 24% ownership in expanded StormGeo

StormGeo, a global provider of weather and asset risk management for the offshore, shipping, renewable, aviation and media sectors, has acquired Applied Weather Technology (AWT). This acquisition gives StormGeo a world-leading position within decision support for weather-sensitive operations in the shipping and offshore industries. DNV GL has converted loans and invested an additional NOK 50 million to secure 24% ownership in the new company. AWT, headquartered in Silicon Valley, California, has 11 offices in seven countries. It has been a leader in marine forecasting for more than 15 years, supporting some 5,000 ships per day with routing guidance and operational efficiency. The main focus of the combined group is a broad approach to safeguarding weather-sensitive operations with tailored software and decision support systems.

## CSA Ocean Sciences Inc. project wins prestigious U.S. Department of Interior award

CSA Ocean Sciences Inc.'s (CSA's) project Atlantic Canyons – Pathways to the Abyss won the Department of Interior's Partners in Conservation Award for work performed in conjunction with 16 other institutions to study mid-Atlantic deepwater canyons over the last 4 years. Presented to the firm by Secretary of the Interior Sally Jewell, the award recognizes and celebrates collaborative research involving numerous partners whose work produces outstanding conservation results. These partnerships often consist of diverse entities such as Federal, state, and local governments combined with private for-profit and nonprofit institutions, other non-governmental entities, and individuals.

In order to conduct this research, CSA and its partners utilized robotic underwater vehicles with high-definition video and still imagery cameras, benthic landers, and instrumented mooring, along with traditional sampling methods such as box corers, water samplers, and benthic trawls. Included among the major results was the discovery of an expansive deepwater coral habitat near the mid-Atlantic outer continental shelf. Also of considerable scientific value, the partnership located one of the largest deep-sea mussel communities known to feed on the methane gas seeps found among the canyons. In addition to this biological research, the partnership located and investigated numerous historic shipwrecks, including several of the "Billy Mitchell Fleet," a group of decommissioned German and American naval vessels that were used in 1921 to test the effectiveness of aircraft against naval vessels.

CSA helped to gather and assemble unprecedented data for the region with the knowledge that the research will guide the decisions made by offshore energy management teams. Alan Hart, Ph.D., CSA's Executive Vice-President, Science, commented, "This is a tremendous honor for our project team and CSA. The information gained through this project will serve as an important part of the knowledge base that will be used in determining the way forward for energy development of the Atlantic coast. Results from deep-sea communities and historical shipwreck studies off the mid-Atlantic coast will strengthen the protection and conservation of these habitats from potential impacts related to energy development."

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

## 2014 Peter Benchley Ocean Award winners named

The seventh annual Peter Benchley Ocean Awards will take place the evening of Friday 30 May 2014 at the California Academy of Sciences in San Francisco. This is the world's preeminent ocean award and the only major awards program dedicated to recognizing excellence in marine conservation solutions across a wide range of categories, including science, policy, media, youth, exploration, and citizen activism.

Named for the author of Jaws, the awards celebrate the life and legacy of Peter Benchley who dedicated much of his life to the protection of sharks and their ocean habitat. The awards, presented by the non-profit Blue Frontier and marine conservationist Wendy Benchley, celebrate exceptional efforts leading to the protection of our ocean.

This year's winners were nominated by the conservation community and selected by a committee that includes Wendy Benchley, Ocean Activist; Dr. Sylvia Earle, Mission Blue; Sylvia Earle Alliance; David Helvarg, Blue Frontier; Dr. Nancy Knowlton, Smithsonian Institution; Dr. Jane Lubchenco, Marine Ecologist former Director NOAA; Dr. Enric Sala, National Geographic; Dr. Greg Stone, Conservation International; Jim Toomey, creator Sherman's Lagoon. The winners are:

- For Excellence in National Stewardship – EU Commissioner Maria Damanaki
- For Excellence in Science – Dr. Steve Gaines
- For Excellence in Policy – Leon Panetta
- For Excellence in Media – Gabriela Cowperthwaite
- For Excellence in Exploration – Prince Khaled bin Sultan & The Khaled bin Sultan Living Oceans Foundation
- Christopher Benchley Youth Award – Casey Sokolovic
- Hero of the Seas – Captain Charles Moore

For more information, visit [www.bluefront.org](http://www.bluefront.org).

## Underwater Intervention 2014

The annual Underwater Intervention (UI) conference and exhibition was held at the Ernest N. Morial Convention Center in New Orleans 11-13 February 2014. Underwater Intervention is a non-profit conference and exhibition that is co-owned by the ROV Committee of the Marine Technology Society and the Association of Diving Contractors International.



Highlights during the technical program included a commemoration and presentation of the 50-year achievement to Woods Hole Oceanographic Institution and the Alvin manned submersible. Several presentations were also given on details of James Cameron's Deepsea Challenger vehicle as well as tracks on the latest ROV, AUV and diving developments.

A notable highlight on the exhibit floor was the Demonstration Tank where several vendors were able to showcase their products and services underwater and in view of spectators.

Docked just down from the convention center behind the Audubon Aquarium of the Americas was the WHOI R/V Atlantis with the newly refurbished Alvin on deck for inspection by UI attendees.

The next Underwater Intervention will be held in New Orleans on 9-12 February 2015.

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

## Decadal survey of Ocean Sciences

The World Ocean Council (WOC) has been requested to help ensure ocean industry input to the Decadal Survey of the U.S. National Science Foundation (NSF) Ocean Sciences Program.

The U.S. National Research Council (NRC) is conducting the survey of the NSF Ocean Sciences Program, which includes many programs of critical importance to industry, such as the International Ocean Drilling Program (IODP) and the Ocean Observatories Initiative (OOI).

The purpose of the 10-year study is to review the current state of ocean science knowledge in order to identify compelling scientific questions for the next decade, analyze infrastructure needed to address these questions vs. the current NSF portfolio, and identify opportunities to maximize the value of NSF investments.

The NRC is soliciting input through a Virtual Town Hall at [www.nas-sites.org/dsos2015/](http://www.nas-sites.org/dsos2015/).



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

The U.S. Department of Transportation's Maritime Administration announced that America's six state maritime academies—California Maritime Academy, Great Lakes Maritime Academy, Maine Maritime Academy, Massachusetts Maritime Academy, SUNY Maritime College, and Texas Maritime Academy—and the U.S. Merchant Marine Academy (USMMA) in Kings Point, New York will each receive \$1 million from a government program that recycles obsolete vessels. The funding will help ensure well-educated and highly skilled U.S. Merchant Marine officers are available to meet our nation's national security and economic needs. "The most important element in our U.S. Merchant Marine fleet is our people," said U.S. Transportation Secretary Anthony Foxx. "This funding will help ensure that dedicated men and women of our maritime academies continue to have the resources that make them the best educated and most highly trained mariners anywhere." The money for this round of funding came from the sale of obsolete vessels from the Maritime Administration's National Defense Reserve Fleet, which were purchased for recycling. As required by the National Maritime Heritage Act, 25% of the funds from sales is distributed to maritime academies for facility and training ship maintenance, repair, and modernization and for the purchase of simulators and fuel; 25% is used for maritime heritage activities; and 50% funds the acquisition, maintenance, and repair of vessels in the National Defense Reserve Fleet.

## ABS to class its first Japan-flagged vessel

ABS, the leading provider of classification services to the global marine and offshore industries, has been selected by Offshore Japan Corporation (OJC) to class its newly-ordered Anchor Handling Tug Supply (AHTS) vessel, the first Japan-flag ship built to ABS class. The vessel, featuring bollard pull of 150 tons and Dynamic Positioning-2 certification, will be built by Japan Marine United Corporation (JMU) for delivery in February 2016. Construction will comply with 2013 ABS Rules for Building and Classing Offshore Support Vessels and also take account of requirements applicable to all vessels flying the Japanese flag. Having worked closely with the country's leading shipyards for many years, ABS was authorized as a Recognized Organization of the Japanese Government in December 2012, expanding the role ABS has in serving the Japanese maritime industry.

## Imtech Marine to refit bridge systems of three Holland America Line cruise ships

Holland America Line commissioned Imtech Marine USA to refit the bridges of three Holland America Line cruise ships—ms Westerdam, ms Noordam, and ms Oosterdam. The equipment consists of FCR-28x9 X-band radars, FAR-2837 S-band radars, FMD 3300 ECDIS, FAP 2000/3000 Track control and GP150D GPS systems, all Furuno equipment. Imtech Marine represents Furuno in the U.S. Holland America Line has partnered with Imtech Marine on this series of refits to provide engineering, installation, training, and service through Imtech's worldwide service network. The first of the three ships will be refit during a 10-day dry dock period in April 2014.

## Port of Ardersier takes step closer to becoming manufacturing 'super-hub' for offshore wind

The Port of Ardersier has been given the full backing of Highland Council for plans to turn the former oil fabrication yard on the Moray Firth into a manufacturing "super-hub" for offshore wind. The council has granted onshore planning consent—giving a thumbs-up to ambitious plans to transform the 160 hectare (400 acres) vacant site into a manufacturing, assembly and operations and maintenance base for new offshore wind fields off Scotland's east coast. The site owners are now awaiting the green light from the government and its regulators Marine Scotland and Transport Scotland for the offshore elements of the site. It is anticipated these consents—a marine licence and a harbor revision order—could be in place soon, paving the way for a potential jobs boom for the Highlands. With a large vacant site and a 1km deepwater quay, the purpose-built yard—located 15 mi east of Inverness—is ideally placed to take a slice of the estimated £70-80 billion UK offshore wind construction market.

## Gulf Coast Shipyard Group launches first Harvey Gulf LNG OSV



Gulf Coast Shipyard Group (GCSG), Inc.—a manufacturer of a variety of ocean-going and inland marine vessels for commercial and military markets—announced the launch of the first of six Harvey Gulf International Marine 302 ft x 64 ft Dual Fuel Offshore Supply Vessels. Incorporating breakthrough clean-burning LNG technology, these vessels position Harvey Gulf as the leader in the environmental application of liquefied natural gas and demonstrate GCSG's ability to meet marketplace demand.

John Dane III, Gulf Coast Shipyard Group's president and CEO, states, "The launch of the first vessel of its kind in the United States, with another five to follow, demonstrates the commitment both Gulf Coast Shipyard Group and Harvey Gulf have to providing engineering solutions to advance environmental technologies."

Harvey Gulf CEO, Shane J. Guidry, comments, "Certification of these vessels will be made by the American Bureau of Shipping to achieve 'ENVIRO+', Green Passport' status. To meet the criteria, GSCG has met the requirements that the vessel be constructed with environmentally friendly materials and feature advanced alarm systems. Ultimately, the vessel will also be continuously manned by a certified Environmental Officer."

The first of these GCSG-built Harvey Gulf OSVs will be moved to GCSG's newly commissioned space at the Port of Gulfport in mid-March for final completion and testing. The vessel will be christened and pressed into service a few months later.

For more information on Harvey Gulf, please visit [www.harveygulf.com](http://www.harveygulf.com).

## Sonardyne Ranger 2 Pro chosen for Russian salvage vessel operations

Sonardyne International Ltd.'s Ranger 2 acoustic positioning technology has been selected by leading marine navigation systems group, Transas, for use on two new-build ice-class multi-purpose salvage vessels (MPSVs, the project is developed by Marine Engineering Bureau) commissioned by the Russian Ministry of Transport. The vessels are currently under construction at Nordic Yards in Germany and will each be fitted with dual Ranger 2 Pro systems, the highest specification available, in order to support complex underwater positioning and critical DP station keeping tasks.

In conventional Ultra-Short BaseLine (USBL) operating

mode, Ranger 2 calculates the position of a subsea target, such an ROV or tow-fish, by measuring the range and bearing from a vessel-mounted transceiver to an acoustic transponder fitted to the target. By interfacing it to a dynamic positioning system, Ranger 2 can be used to simultaneously help maintain the vessel's own position.

In Pro configuration, Ranger 2 adds support for Long and Ultra-Short BaseLine (LUSBL) acoustic positioning. The technique utilizes a network of transponders deployed on the seabed to offer the highest levels of precision and repeatability and is widely used for applications where maintaining a reliable vessel position is a critical operational requirement. In this respect, Transas has additionally specified that each vessel be equipped with dual redundant Ranger equipment. All vessel-mounted hardware is duplicated and interconnected so that failure in one any element will not affect the system's ability to provide a continuous position output to the DP system.

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

## Metal Shark acquires shipyard and announces expansion plans

Louisiana-based boat manufacturer Metal Shark Aluminum Boats is significantly expanding its operations and has acquired a large waterfront parcel to accommodate the production of larger vessels, the company announced.

The builder has signaled its entry into the shipbuilding sector with the purchase of a 25-acre waterfront tract located in South Louisiana's St. Mary Parish. Plans for the new facility call for over 60,000 sq. ft of manufacturing space, with approximately 100 new employees expected to be hired within the next few years. Infrastructure improvements have commenced at the site, which Metal Shark is transforming into a shipyard capable of supporting aluminum and steel shipbuilding operations for vessels up to and exceeding 250 ft in length.

Construction of Metal Shark's 45-ft, 55-ft, and 75-ft vessels currently on order and in various stages of assembly at the company's headquarters in Jeanerette, Louisiana will be transferred to the new yard, where production volume will increase as new, larger off-



shore vessels are added to the company's expanding lineup.

Metal Shark vessels 40 ft and under, including several models being built under multi-year contracts for the U.S. Coast Guard and U.S. Navy, will continue to be produced at the company's existing facility in Jeanerette. This facility, which was expanded in 2011 and again in 2012, will be enlarged once more to accommodate present and future growth.

All told, these moves represent an investment of more than \$10 million by the company.

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

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## DNV GL to class new methanol-fuelled tankers

The first three vessels to use DNV GL's rules for low flashpoint fuels will be a series of 50,000 dwt tankers ordered by the owners Marinvest and Westfal-Larsen. The vessels are the very first to be fuelled by methanol—a fuel that significantly reduces local air emissions.

These product carriers that also are prepared for methanol will be built at Hyundai Mipo Dockyards and are scheduled for delivery in 2016. Methanol is a low flashpoint liquid (LFL) fuel that is gaining interest in the market because it does not contain sulphur and is, therefore, suitable for meeting the upcoming 0.1% SOx Emission Control Area requirements.

Methanol has a flashpoint of about 12°C, and the new vessels will be assigned the additional notation LFL FUELLED to demonstrate their compliance with the safety requirements set out in the industry-first rules published by DNV GL in June 2013.

DNV GL was the first classification society to publish LFL rules and sees methanol as part of the future energy

mix for shipping. As well as having low SOx and NOx emissions, a methanol fuel system is easy to retrofit on a ship.

DNV GL has been involved in the newbuilding project from the early design stage, working together with the ship owner, engine maker and yard to ensure an equivalent level of safety to that of a conventional fuel oil system. DNV GL has made use of its long experience with LFL cargo handling on chemical tankers and offshore supply vessels designed to transport low flashpoint cargo and its experience with alternative fuels from 15 years of working with gas-fuelled ship installations.

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

## Tailored Damen Shoalbuster SD for Smit Lamnalco

The recently delivered SL Mbissi will be the next Damen-built vessel in fleet of Smit Lamnalco. Nonetheless, the 25-m shallow water workship is special in more ways than one. Firstly, it's the first-ever Damen Shoalbuster for Smit Lamnalco.

Although Smit Lamnalco, leading provider of integrated marine services,



already deploys a lot of Damen-built vessels—six of which having been delivered in the past 15 months alone—it had yet to order a Damen Shoalbuster SD. The series' name is a poetic licence to shallow draught (SD).

The SL Mbissi was built by Damen Shipyards Hardinxveld (The Netherlands) which also designs all Damen Multi Cat and Shoalbuster 'jack of all trades' workshops series. The SBU 2508 SD is also special in that it is a standard design turned tailor-made vessel.

Smit Lamnalco will mainly deploy the versatile Shoalbuster for marine support services for offshore oil facilities. This will include buoy maintenance and hose handling.

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

A collage of various ECA Hytec ROVs and a control room. The collage includes several yellow and white ROVs of different sizes, some with arms and cameras, and a large blue and white ROV labeled 'H2000'. In the background, there is a blurred image of a control room with multiple computer monitors displaying video feeds and data. The overall theme is marine robotics and subsea operations.

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# DEEPWATER POWER POINT PROVIDES A POWER POINT AND FIBRE OPTICS TO THE SEABED

By: Peter Mellor – Manager Ports Terminals and Marine Sciences, Worley Parsons

Industrial enterprises, scientific associations, and government organizations need to collect marine data to support critical missions for the digital oilfield, coastal security, and safety or at-risk environmental areas. Often, data needs to be collected from remote, isolated areas of the ocean. Users need a fully managed solution that enables the real-time delivery of collected data, while being portable for re-deployment in subsequent locations — saving operational costs and reducing deployment timelines.

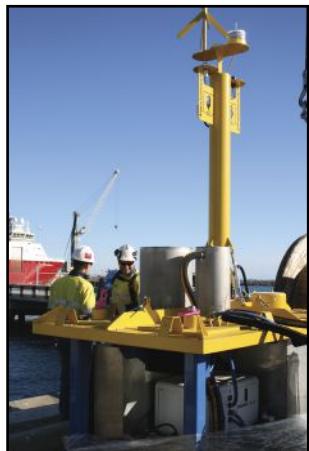
The Deepwater Power Point (DPP) from WorleyParsons was developed to act as a surface node for sub-sea fiber optic capability (Figure 1). The DPP comprises a buoy with a high-bandwidth data connection to a network of sensors and seafloor nodes. The buoys provide power and communications to the network of seafloor nodes, allowing real-time delivery of collected data to facilities anywhere around the globe.



Figure 1. DPP deployed in the ocean powering WorleyParsons' subsea robot (seen extending out of water)



**Figure 2.** The DPP outer buoy that the skid is aligned into.



**Figure 3.** The skid that sits within the outer skin of the DPP



**Figure 4.** The two parts of the DPP being aligned (can be deployed as one or two parts depending on vessel)

Delivered as a fully managed, turnkey solution, users are able to focus on analyzing the data collected and thus gain deeper insights into remote operations. The solution supports data-intensive collection, so bandwidth limitations are less likely to constrain the user's data collection ability. The DPP could lead to potential discoveries or collaboration between many different disciplines in the marine environment. The buoy can be deployed in marine or other aquatic environments to support ocean observatories, portable subsea mining equipment, or other subsea equipment with a large power load.

The buoy comes as two parts; Part 1 is the outer skin and railing (Figure 2). Completely foam-filled, this part is almost unsinkable. Part 2 is the inner skid (Figures 3 and 4). The inner skid houses the fuel, generator, and electronics board (including industrial PC, various PLCs, and other requirements applicable to the subsea asset). The industrial PC runs Windows-based software, and, as such, most software is easily configurable, reducing the requirement for custom code development. To date, telecommunications to the buoy are via Wi-Fi, 3G, and satellite. WorleyParsons is investigating WiMAX or 4G LTE to increase the DPP functionality.

The DPP measures metocean conditions using in-built accelerometers, monitors its fuel status, and can be configured to record data from a variety of other sensors according to the end user application. The buoy can be configured to wake on demand, on a schedule, or stay on permanently depending on the user's requirements.

Using in-built PLCs, the buoy wakes at set times and starts a marine-grade generator. The generator provides 120 to 240V at 4.8 kW (continuous). The buoy has a battery bank that is charged simultaneously but also stays permanently awake, providing power to vital components. The generator works to an angle of 30° incline. An in-built accelerometer prevents it from starting in rough sea states. A fuel reservoir within the buoy has 250-L diesel capacity and is triple banded.

Railings and anti-skid surfaces mean the buoys can be boarded and worked on offshore. Additionally, the buoy has two access points, enabling access from the operationally preferable side.

The DPP can be refuelled through the lid of the skid in situ, or the skid can be removed for servicing, upgrades, and refuelling without affecting the mooring or its position. Hardware upgrades or modification are easily switched out offshore rather than returning to shore or recovering the mooring.

While mooring configurations are unique for each site, the team has currently deployed in 12 m LAT with a sea range of an additional 20 m, if you allow for tide, swell, and storm surge — making it a particularly challenging site. Mooring configurations for deeper depths become easier due to more favourable catenary action of the mooring lines (Figure 5).



**Figure 5.** The mooring equipment



**Figure 6.** Logistically, the DPP fits on an unescorted load.



**Figure 7.** The triple-armoured umbilical of choice providing fiber optics, 240V, and lifting capabilities.

The DPP currently relies on hybrid cables for electricity and fiber optic communications as well as retrieval and deployment of the subsea asset, having triple armouring and a 440 kN breaking load. The buoy's standard umbilical provides fiber optic and 240/120V to the seabed and telemetry to the shore (Figure 7). All external cables subsea are isolated and wet mateable. The umbilical can be disconnected without affecting the skid seal. In fact, the umbilical can be removed and dropped to the seabed and the buoy moved to a different asset as required (Figure 6). Data can be downloaded remotely anywhere in the world.

Among the different offshore activities related to remote control of subsea assets, one of the most active is subsea optics as developed in the DPP. The superior solution of the DPP is its ability to be left on site for the life of the asset, whether for a short drilling campaign or a full field deployment on an isolated control node.

For more information, email peter.mellor@worleyparsons.com.

### **Teledyne RD Instruments academic grant provides free use of ADCPs and CTDs for oceanographic research projects**

Teledyne RD Instruments, a leading manufacturer of Acoustic Doppler Current Profilers (ADCPs) and Conductivity, Temperature, and Depth (CTD) sensors, has announced the official opening of their 2014 Academic Grant program. Teledyne RDI will once again provide the academic oceanographic community with the opportunity to utilize these products free of charge for a near-term deployment via Teledyne RDI's Academic Product Grant. Members of academic institutions worldwide are encouraged to submit applications detailing their proposed utilization of Teledyne RDI's new Sentinel V ADCP, Citadel CTD, or a combination of the two technologies to enhance their oceanographic research. Full grant detail and an online application can be found at [www.rdinstruments.com/academic\\_grant.aspx](http://www.rdinstruments.com/academic_grant.aspx). Applications are due by April 15, 2014; awardees will be announced on May 15, 2014.

### **QinetiQ North America awarded key oceanography contract with Naval Research Laboratory**

QinetiQ North America (QNA) announced that it was awarded a 3-year strategic contract for ocean modeling, remote sensing, and physical oceanography programs to support the Naval Research Laboratory (NRL) at Stennis Space Center, Mississippi. Ocean circulation patterns, temperatures, and depths are constantly changing. Mapping and prediction models are critical to naval strategy, informing fleet and special mission deployment decisions, military planning exercises, satellite calibration, and fleet design for ships, submarines and other maritime vessels. "QNA is honored to be part of the NRL team and we look forward to continuing our support to critical naval programs under this new contract," said Dave Shrum, executive vice president and general manager, Defense Solutions, QinetiQ North America. "We have over 25 years of expertise in ocean modeling and related support, and we appreciate the opportunity to help NRL achieve mission success." One of the primary projects included in this contract is to continue developing the Hybrid Coordinate Ocean Model (HYCOM). HYCOM is a new global, high-resolution ocean prediction system that dramatically improves situational awareness and the ability to predict future ocean environments. Another key project is the HYCOM 20-Year Reanalysis Project, which will generate full-resolution historical ocean records from 1992 to the present. The goal is to obtain a consistent, virtual ocean over a 15-year period that will be used for mission planning, training and research. Additional projects include predicting Arctic ice parameters, improving sea surface temperature measurements from space, running high-resolution models for expeditionary warfare exercises and satellite calibration. The contract is valued at \$12 million over 3 years.

### **U.S. Commerce Secretary declares fishery disaster for Fraser River Sockeye Salmon Fishery in Washington**

U.S. Secretary of Commerce Penny Pritzker determined a commercial fishery failure for the Fraser River sockeye salmon fishery in Washington State. The fishery resource disaster was caused by the low return of sockeye salmon to the Fraser River, which resulted in subsequent closure of the fishery for the 2013 fishing season. The closure resulted in significant revenue losses for tribal and non-tribal fishermen. Under the Magnuson-Stevens Fishery Conservation and Management Act, the Commerce Secretary can declare a fishery disaster, which makes it possible for Congress to appropriate funds to provide economic assistance to fishing businesses and communities, including fishermen, affected by the disaster and to support other activities addressing the disaster. If Congress appropriates funds to address the Fraser River disaster, the Commerce Department's National Oceanic and Atmospheric Administration (NOAA) will work closely with members of Congress, affected tribes, and the state of Washington to develop a spending plan and distribute the funds. The spending plan would support activities that would restore the fishery or prevent a similar failure, and assist the affected fishing communities.

## **Killing whales by design and default**



*Only about 500 North Atlantic Right whales are in existence today. This image of an entangled Right whale was taken by CCS under NOAA permit 932-1489. (Photo courtesy of the Provincetown Center for Coastal Studies)*

While countries such as Japan, Norway, and Iceland are often criticized for their commercial whaling practices, Woods Hole Oceanographic Institution (WHOI) marine biologist Michael Moore points out how the majority of nations are also complicit in killing whales by deploying commercial fishing gear.

Moore cites scientific literature, necropsy reports, and individual case studies in an editorial essay addressing the ethics of whale entanglement and commercial whaling published in ICES Journal of Marine Science.

Moore, a veterinarian and the Director of the WHOI Marine Mammal Center, has studied large whale mortality throughout his career, first as an observer for the International Whaling Commission on an Icelandic whaling vessel and currently as one of the few experts called to respond to whale strandings and entanglements along the East Coast of the U.S.

He has responded to and performed necropsies on numerous large stranded whales. Many of these animals had died from months of starvation and fatigue after being entangled in rope, line, and nets from fishing and lobster gear.

"I've spent over 15 years examining these animals and feel pretty frustrated in terms of the fact that our consumption of seafood is driving these cases to exist," said Moore.

"The threat of commercial whaling is widely known, but many thousands of whales, dolphins, and porpoises die each year through unintentional entanglement in commercial fishing gear," said Sharon B. Young, marine issues field director for the Humane Society of the U.S.

Death by fishing gear entanglement is the most commonly diagnosed cause of death among eight large whale species on the eastern North American Continental shelf.

One solution Michael Moore proposes is the creation of Marine Protected Areas where marine mammals are known to frequent.

For more information, visit [www.whoi.edu/website/mmc/home/](http://www.whoi.edu/website/mmc/home/).

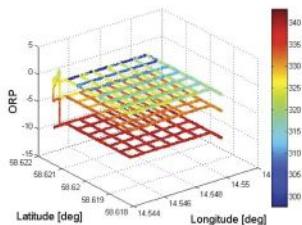
## Breakthrough in asset and environmental scrutiny

Benefits to asset integrity and environmental monitoring of oil and gas installations will come from a project developed by Eni Norge and Tecnomare called Clean Sea (continuous long-term environmental and asset integrity monitoring at sea).

The Clean Sea team have found answers to key issues, like the early warning of spills and leakages, with imaginative technological solutions using a Sabertooth hybrid AUV/ROV from Saab Seaeye.

They sought to overcome the current shortcomings of environmental monitoring and inspection of oil and gas infrastructures. Usually such work is restricted to an annual undertaking and typically involves supply vessels and various underwater systems.

They recognized that the industry is moving into more challenging development areas—possibly in remote, hostile or environmentally sensitive places—where conventional methods may be unsafe or unsustainable.



The resulting autonomous vehicle can accept interchangeable modules and has the 360° maneuverability and hovering characteristics necessary to operate in the proximity of structures while undertaking inspection and monitoring tasks.

Fitting the concept of interchangeable modules that the Clean Sea team called E-PODs is made possible through the open interface architecture of the Sabertooth.

Each E-POD module is dedicated to a particular task that can include automatic water sampling, hydrocarbon leakage detection, chemical analysis, visual inspection and acoustic surveying.

For more information, visit [www.tecnomare.it](http://www.tecnomare.it).

## Bio robots make a splash in the Indian Ocean

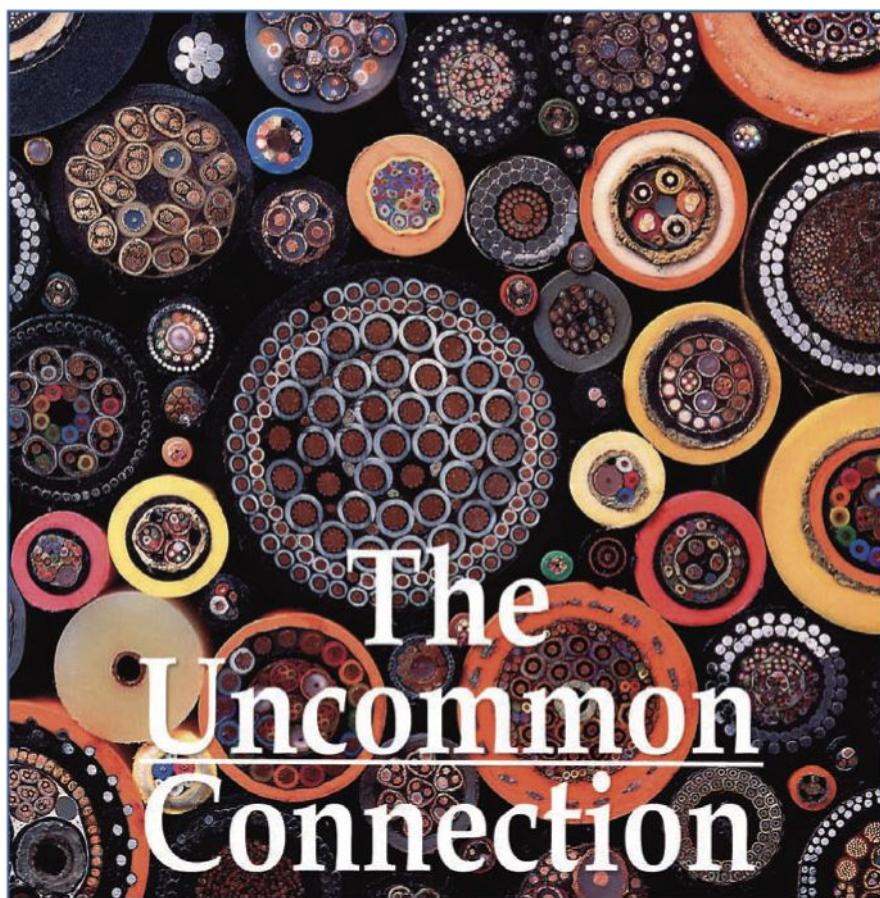
Robotic floats armed with revolutionary new sensors will be launched in the Indian Ocean as part of a new India-Australia research partnership to find out what makes the world's third largest ocean tick—and how both nations can benefit from it.

The Indian Ocean contains vast fisheries and mineral resources that are of strategic importance to both Australia and India. It also plays a direct role in driving the climates of its surrounding regions—home to more than 16% of the world's population.

The new Bio Argo floats, to be launched in mid 2014, will enhance the already successful Argo float technology to measure large-scale changes in the chemistry and biology of marine ecosystems below the Indian Ocean's surface.

The Argo floats are a network of 3,600 free-floating sensors operating in open ocean areas and provide real-time data on ocean temperature and salinity.

The Bio Argo floats will include additional sensors for dissolved oxygen, nitrate, chlorophyll, dissolved organic matter, and particle scattering. They will target specific gaps in our understanding of Indian Ocean ecosystems of immediate concern to India and Australia, such as the Bay of Bengal and the waters of north Western Australia.



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CSIRO's Dr. Nick Hardman-Mountford said the pilot project, led by CSIRO in collaboration with the Indian National Institute of Oceanography (CSIR-NIO) and the Indian National Centre for Ocean Information Services, will improve our understanding of cause and effect in the Indian Ocean's climate and ecosystems.

The \$1 million project was funded in part by the Australian Government under the Australia-India Strategic Research Fund.

For more information, visit [www.csiro.au](http://www.csiro.au).

### Satellite data reveal the rapid darkening of the Arctic

The retreat of sea ice in the Arctic Ocean is diminishing Earth's albedo, or reflectivity, by an amount considerably larger than previously estimated, according to researchers at Scripps Institution of Oceanography, UC San Diego.

As the sea ice melts, its white reflective surface is replaced by a relatively dark ocean surface. This diminishes the amount of sunlight being reflected back to space, causing the Earth to absorb an increasing amount of solar energy.

The Arctic has warmed by 2°C (3.6°F) since the 1970s. The summer minimum Arctic sea ice extent has decreased by 40% during the same time period. These factors have decreased the region's albedo.

Scripps graduate student Kristina Pistone and climate scientists Ian Eisenman and Veerabhadran Ramanathan used satellite measurements to calculate changes in the albedo of the Arctic region associated with the changing sea ice cover. Albedo is measured as a percentage. A perfectly black surface has an albedo of 0% and a perfectly white surface has an albedo of 100%. The albedo of fresh snow is typically between 80% and 90% whereas the albedo of the ocean surface is less than 20%. Clouds and other factors also influence the albedo of the Earth.

The researchers calculated that the albedo of the Arctic region fell from

52% to 48% between 1979 and 2011.

"It's fairly intuitive to expect that replacing white, reflective sea ice with a dark ocean surface would increase the amount of solar heating," said Kristina Pistone. "We used actual satellite measurements of both albedo and sea ice in the region to verify this and to quantify how much extra heat the region has absorbed due to the ice loss. It was quite encouraging to see how well the two datasets – which come from two independent satellite instruments – agreed with each other."

The National Science Foundation-funded study appears in the journal *Proceedings of the National Academy of Sciences* 45 years after atmospheric scientists Mikhail Budyko and William Sellers hypothesized that the Arctic would amplify global warming as sea ice melted.

The Scripps study is the first to use direct satellite measurements to assess the changes in albedo associated with retreating sea ice. Previous studies have relied on computer models. The Scripps team used NASA's CERES satellite instruments as well as observations of sea ice cover made with other satellites.

For more information, visit [www.scripps.ucsd.edu](http://www.scripps.ucsd.edu).

### Meeting the eye witnesses of ocean change

Members of the German research network BIOACID (Biological Impacts of Ocean Acidification) are developing a model that links ecosystem changes triggered by ocean acidification and climate change with their economic and societal consequences. Through workshops and interviews with stakeholders from the Norwegian fishing industry and tourism sector, the government and environmental organizations help them to identify key aspects for their assessment.

During the past 10 years, scientists have learned a lot about the effects of ocean acidification on marine ecosystems. It has become obvious that with rising carbon dioxide emissions from human activities, oceans absorb larger amounts of this greenhouse gas and become more acidic. The increase of acidity, rising water temperatures and other stressors may alter marine ecosystems dramatically – with consequences for economy and society.

Do stakeholders of the economic sectors that depend on the sea already observe signs of ocean change? Which are their most urgent questions towards science? Within the framework of the German research network BIOACID (Biological Impacts of Ocean Acidification), scientists from the

University of Bremen investigated stakeholders' state of knowledge and identified focal points for further research. Between March and November 2013, they held workshops and interviewed more than 30 Norwegian fishers, representatives from fishing associations, aquaculture, tourism, environmental organizations and governmental agencies. They aim to develop a model that yields insights into the overall impacts of ocean change for ecosystems and the services they provide to human societies.

Obvious effects of climate change are already perceived by the stakeholders in the northward range shifts of cod and mackerel stocks and the immigration of sardines into Norwegian waters. Fishers also noticed variations of timing and location of spawning.

For more information, visit [www.bioacid.de](http://www.bioacid.de).

### New Bedford Harbor pollution prompts PCB-resistance in Atlantic killifish

For four decades, waste from nearby manufacturing plants flowed into the waters of New Bedford Harbor – an 18,000-acre estuary and busy seaport. The harbor, which is contaminated with polychlorinated biphenyls (PCBs) and heavy metals, is one of the EPA's largest Superfund cleanup sites.

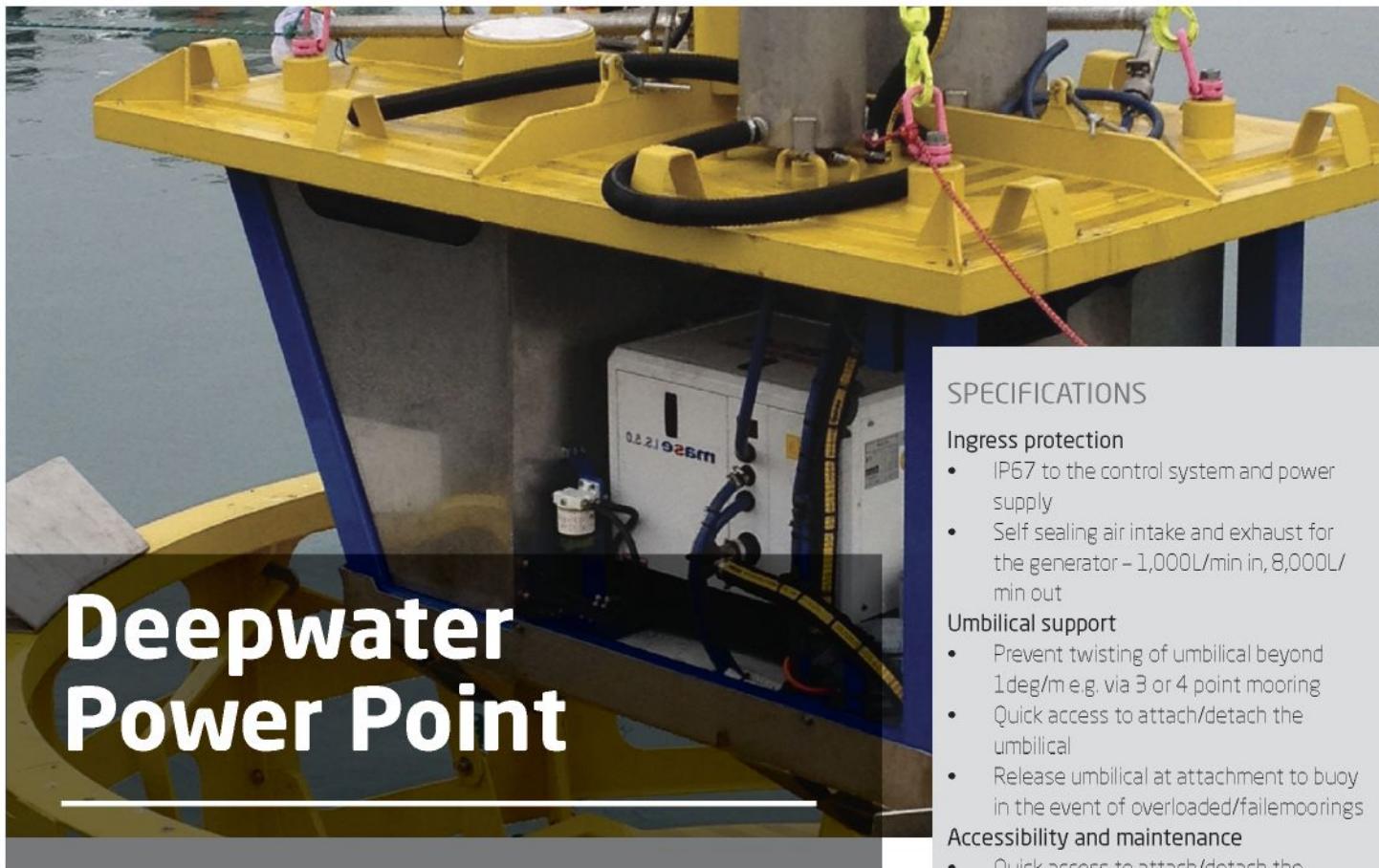
It's also the site of an evolutionary puzzle that researchers at Woods Hole Oceanographic Institution (WHOI) and their colleagues have been working to solve.

Atlantic killifish – common estuarine fishes about 3 in. long – are not only tolerating the toxic conditions in the harbor, they seem to be thriving there. How have they been able to adapt and live in such a highly contaminated environment?

In a new paper published in *BMC Evolutionary Biology*, researchers found that changes in a receptor protein, called the aryl hydrocarbon receptor 2 (AHR2), may explain how killifish in New Bedford Harbor evolved genetic resistance to PCBs.

Normally when fish are exposed to harmful chemicals, the body steps up production of enzymes that break down the pollutants, a process controlled by the AHR2 protein. Some of the PCBs are not broken down in this way and their continued stimulation of AHR2 disrupts cellular functions, leading to toxicity. In the New Bedford Harbor killifish, the AHR2 system has become resistant to this effect.

For more information, visit [www.whoi.edu](http://www.whoi.edu).



## Deepwater Power Point

### TECHNOLOGY AND APPLICATION

WorleyParsons have developed a buoy which can be deployed in the ocean to support ocean observatories, or other subsea equipment with a large power load.

The buoys standard umbilical provides fibre optic and 240v to the seabed and telemetry to the shore. Data can be downloaded remotely from anywhere in the world.

Using in built PLC's, the buoy wakes at set times and starts a marine grade generator. The generator provides 120-240v at 4.8kW (continuous) to the seabed. The generator works to an angle of 45 degrees incline. An inbuilt velocimeter prevents it from starting in rough sea states.

For more information contact:  
Peter Mellor - Technology Manager  
Mobile +61 421 151 814  
[peter.mellor@WorleyParsons.com](mailto:peter.mellor@WorleyParsons.com)

[www.worleyparsons.com](http://www.worleyparsons.com)

### SPECIFICATIONS

#### Ingress protection

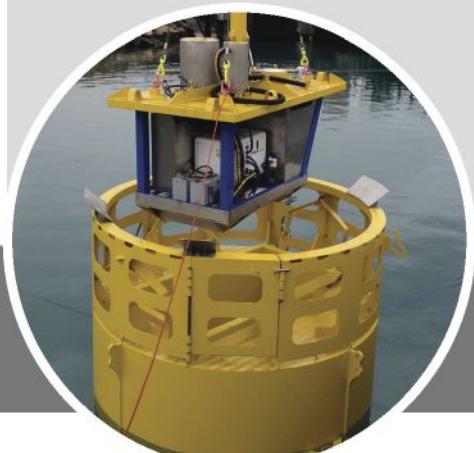
- IP67 to the control system and power supply
- Self sealing air intake and exhaust for the generator – 1,000L/min in, 8,000L/min out

#### Umbilical support

- Prevent twisting of umbilical beyond 1deg/m e.g. via 3 or 4 point mooring
- Quick access to attach/detach the umbilical
- Release umbilical at attachment to buoy in the event of overloaded/fail moorings

#### Accessibility and maintenance

- Quick access to attach/detach the umbilical
- Access to fuel filler without having to board the buoy
- Grip surface for standing areas, and hand rails where required
- Quick access to any regular maintenance work e.g. clean/flush sea water cooling system
- All equipment removable from buoy in fewest steps e.g. removable sub-frame



## Record offshore figures conceal slow-down in new projects

418 offshore turbines came online in 2013 in Europe, making a record 1,567 MW of new capacity. This is one-third more than the capacity installed in 2012. This makes a new total of 6,562 MW of offshore wind power—enough to provide 0.7% of the EU's electricity. However a closer look at what happened reveals a slow-down during the year: two-thirds of the new capacity came online in the first 6 months. With 11 projects now under construction, down from 14 this time last year, market and regulatory stability is critical to bringing forward the 22,000 MW of consented projects across Europe. "The unclear political support for offshore wind energy—especially in key offshore wind markets like the UK and Germany—has led to delays to planned projects and fewer new projects being launched. This means installations are likely to plateau until 2015, followed by a decline as from 2016", said Justin Wilkes, deputy CEO at the European Wind Energy Association (EWEA). "An ambitious decision on a 2030 renewable energy target by the Heads of State in March would be the right signal to send to the offshore wind sector that Europe will develop its massive offshore wind potential for green growth, jobs, industrialization, technological leadership and CO<sub>2</sub> reductions", Wilkes added. In 2013 Siemens was the leading turbine supplier (69%), DONG Energy the leading developer (48%), and Bladt the leading substructure supplier (37%), as they were in 2012.

## Chinese build-up in offshore wind gains momentum

As per a new report by Quartz+Co and MEC Intelligence, the recent developments on policy front, local stakeholder ambitions, and project development indicate a shift towards growth in China's offshore wind market. However, the local industry is still young and European companies should be ready to take advantage of their experience and the capabilities to explore the opportunity. In the past 5 years, offshore wind has grown to become the fastest growing Cleantech technology in Northern Europe. Expectations for growth in the industry far exceed anything ever experienced before in the Cleantech sector. The industry, though traditionally concentrated in Northern Europe and around the North Sea, is now anticipating a major shift in its center of gravity. A roundup of recent trends and developments in the industry indicates that China is expected to be a front-runner in terms of installed capacity of offshore wind. The Chinese government in 2010 set a target of 30 GW installed offshore wind capacity by 2020. Comparatively, the global offshore wind installed capacity itself stood at 5,480 MW at the end of 2012; Europe and China accounted for 90% and 9% of the market share, respectively. Europe is expected to have an installed capacity of ~30 GW itself by 2020. The target is widely considered to be ambitious considering that the offshore wind industry is at a nascent stage, with only a few projects having been installed so far. And there is a lack of clear plan and approval mechanism. Activities over the last 1 year, however, show that the industry is beginning to enter into growth phase. Offshore wind has recently been given priority status and it augurs well for the development of the industry. The government has taken the first step towards rectifying the problem of low tariffs ranging between Eur 0.08-0.09 kWh in first concession bidding by trying to discover benchmark prices through direct approvals. It is expected that competitive benchmark prices will be introduced to upsurge the pace of development. Furthermore, the government has extended its learning from onshore wind and has introduced a grid connection approval mandate before construction begins to avoid curtailment due to lack of grid connection. Most importantly, long standing projects have been granted approval and 628 MW projects are already under construction, and about 3.4 GW of projects being consented in Hebei, Jiangsu, Shanghai, Zhejiang Fujian & Guangdong.

## SNMREC turbine tow test

Southeast National Marine Renewable Energy Center researchers performed the first ever tow test of a small-scale research turbine designed and built at FAU. Although this test did not include a generator to convert the rotor's motion into electrical energy, very valuable hydrodynamic motion data were collected. Electrical systems are separately being prepared in a laboratory setting for future integration and towed turbine experiments. This turbine, which can generate up to 20 kW with its 3-m diameter rotor in a 2.5-m/s flow, is intended as a research platform to investigate and optimize components for commercial ocean current turbines.

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



To advance the availability of alternative energy solutions, Lockheed Martin has signed a contract with Victorian Wave Partners Ltd. to begin developing the world's largest wave energy project announced to date. This is a significant step toward making ocean energy commercially available.

The 62.5-MW peak power wave energy generation project will be built off the coast of Victoria, Australia using the PowerBuoy® wave energy converter technology of Ocean Power Technologies (OPT). The project is scheduled to be built up in three stages, with the first stage producing approximately 2.5 MW peak power. Once completed, the project is expected to produce enough energy to meet the needs of 10,000 homes. As this project also contributes to Australia's goal of 20% renewable energy by 2020, it has received significant grant support from ARENA (Australian Renewable Energy Agency).

Wave power devices extract energy from the surface motion of ocean waves. Unlike wind and solar sources, energy from ocean waves is very predictable and can generate electricity for more hours in the year than wind and solar. In addition, wave power devices are typically quieter and much less visually obtrusive as compared to wind turbines, which typically run more than 130 ft in height. In contrast, a PowerBuoy is only 30 ft in height above the waterline and is barely visible, as it is typically 3 mi offshore.

In this project, Lockheed Martin will provide overall project management, assist with the design for manufacturing of the PowerBuoy technology, lead the production of selected PowerBuoy components, and perform system integration of the wave energy converters.

Victorian Wave Partners Ltd. is an Australian special purpose company owned by Ocean Power Technologies Australasia Pty Ltd. OPT is a leader in wave energy technology development. The company's PowerBuoy wave generation technology uses a "smart," ocean-going buoy to convert wave energy into low-cost, clean electricity. The buoy moves up and down with the rising and falling of waves. This mechanical energy drives an electrical generator, which transmits power to shore via an under-water cable. The system is electrically tuned on a wave-by-wave basis to maximize the amount of electricity produced.

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

#### **Alstom signs contract with Deepwater Wind to supply offshore wind turbine**

Alstom announced a contract to supply 5 Haliade™ 150-6 MW offshore wind turbines for Deepwater Wind's 30-MW Block Island pilot Wind Farm located off the coast of Rhode Island, USA. The project will be one of the first offshore wind farms in the U.S. and will

be the first to feature Alstom's Haliade™ 150-6 MW – the largest turbine installed in offshore waters today. The five turbines will produce approximately 125,000 MWh of electricity a year, enough to power over 17,000 homes.

The company will manufacture the Haliade™ 150-6 MW direct drive wind turbines and provide 15 years of operation and maintenance support for the Block Island Wind Farm, owned and operated by Deepwater Wind, a leading developer of offshore wind in the United States. The Haliade™ 150-6 MW wind turbine features Alstom's Pure Torque® design for optimum efficiency and reliability, and its 150-m diameter rotor provides an energy yield that is 15% better than existing offshore turbines, supporting the effort to drive down the cost of energy from offshore wind.

The Block Island project could lead to a larger utility-scale offshore wind farm of more than 1 GW supported by a regional transmission system linking Long Island, New York and South-eastern New England. The project is aligned with The Bureau of Ocean Energy Management's "Smart from the Start"



offshore wind program, which aims to accelerate the development of clean, renewable offshore wind along the eastern seaboard of the U.S.

In 2012, Alstom was part of Dominion Virginia Power's Virginia Offshore Wind Technology Advancement Project that was selected as one of the seven U.S. Department of Energy (DoE) advanced technology demonstration projects. Dominion Virginia Power is planning to submit a funding proposal to the DoE for the second phase of the project that will help

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NOV image courtesy of National Wind Energy Program (NWEPA)

validate the next generation of hurricane-resilient offshore turbine, foundation designs, and advanced controls technologies along with the new processes involved in installation and operation of such equipment.

In late 2013, Alstom successfully installed its 6 MW Haliade™, which at the time was world's largest offshore wind turbine, off the coast of Belgium. Alstom is part of a consortium led by EDF Energies Nouvelles that was awarded three projects in the first tender launched by the French government to install offshore wind turbines generating 3 GW of wind power off the coast of France. The successful bid included a total of 240 Haliade™ 150-6 MW turbines.

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

### Tidal project would supply 10% of UK's electricity by 2023

Tidal Lagoon Power Ltd (TLP) took a major step towards realizing one of the UK's most game-changing infrastructure projects: the world's first tidal lagoon power plant.

After 3 years of feasibility work and



impact assessments, TLP submitted its application—which runs to 5000 pages—for a Development Consent Order (DCO) under the Planning Act 2008. Swansea Bay Tidal Lagoon would be the largest tidal power plant in the world. As a project of national significance, the application, which has been developed through extensive consultation in Swansea Bay, will now be reviewed by the Planning Inspectorate before public examination, and then determination by the Secretary of State for Energy & Climate Change.

The project would see a 9.5 km long sea wall built to capture enough renewable energy from incoming and outgoing tides to power over 120,000 homes for 120 years. It aims to source at least 65% of content in the UK, kick-starting

a new manufacturing industry and future export market.

Mark Shorrock, CEO of Tidal Lagoon Power, said that the submission of the application marks a turning point in the development of the UK's tidal resource.

"Until now, tidal energy has been heavily promoted by governments and environmentalists as an intuitive source of clean and reliable energy for our island nation, but the business response has focused on relatively small-scale tidal stream devices. The UK has the second highest tidal range in the world, and today we are submitting an application for a development that will prove that this resource can be harnessed in a way that makes economic, environmental and social sense. Tidal lagoons offer renewable energy at nuclear scale and, thus, the investment of hundreds of millions of pounds in UK industries and coastal communities."

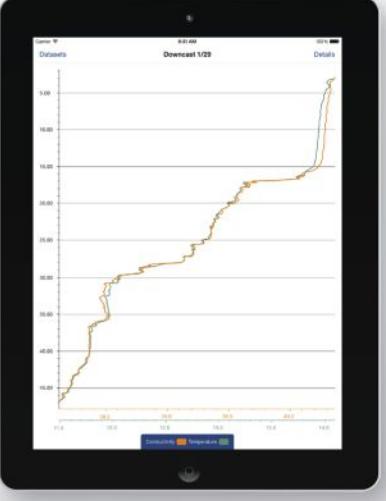
"Our intention is to supply 10% of the UK's domestic electricity by building at least five full-scale tidal lagoons in UK waters by 2023, before the UK sees any generation from new nuclear. Economies of scale bring immediate advantage. A second lagoon will require

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a lower level of support than offshore wind, for a renewable power supply that is both long-lived and certain. A third lagoon will be competitive with the support received by new nuclear, but comes without the decommissioning costs and safety concerns. Had we invested in tidal lagoons in the 1980s, by now and into the next century, we would be generating cheaper power than any other form of supply."

The 2,400 questionnaires returned during statutory consultation with the local community found that 86% of Swansea Bay residents are in favor of the project, which will provide an amenity for the local community and a unique venue for local, national and international sports, education and arts. Highlights include the creation of a 10 km sea reef, the reintroduction of the native oyster into Swansea Bay, an offshore building including visitor and education facilities, and a national triathlon and watersports center.

If given the go-ahead, construction of the Swansea Bay lagoon will begin in the first half of 2015, with first power being generated in 2018.

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

### West of Duddon Sands generates first electricity

Electricity has been generated for the first time from the West of Duddon Sands Offshore Wind Farm, a major renewable energy project being developed by ScottishPower Renewables and DONG Energy in the Irish Sea.

Located approximately 20 km off the Barrow-in-Furness coastline in northwest England, engineers have now installed 42 of the 108 turbines that will make up the overall project. The commissioning process is underway, and power from four turbines is now being exported to the national grid.

Once fully completed later this year, the wind farm will be capable of generating up to 389 MW of electricity—enough capacity to meet the annual electricity demands of approximately 300,000 homes.

Site work on the project has been underway for 2 years. In this time, engineers have installed over 200 km of cables and all 108 foundation sections have been completed. The total area covered by the wind farm is 67 km<sup>2</sup>, and each individual Siemens turbine has a capacity of 3.6 MW.

The electricity generated initially connects in to a specially designed offshore substation. The voltage from the turbines is increased and two export cables then take the electricity ashore to the onshore substation at Heysham, where the wind farm is connected to the UK national grid.

The project utilizes a new £50 m offshore wind terminal at Belfast Harbour. The terminal is the first purpose-built offshore wind installation and pre-assembly harbor in the UK and Ireland and supports up to 300 jobs, ranging from welders to electricians and engineers.

The project also benefits from using two of the world's most advanced installation vessels. Offshore work is being carried out by the Pacific Orca and the Sea Installer. Working in tandem, the vessels have been used to install the foundations and the turbine components. The size and scale of the purpose-built vessels have driven efficiencies in the installation process. The Pacific Orca is the world largest wind farm installation vessel with a length of 161 m, a breadth of 49 m, and a depth of 10.4 m.

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

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# FLYING LEADS: The How

By: Fernando Hernandez, Reaching Ultra

**T**he previous article Flying Leads and Production Schemes served as a starting point for oil and gas professionals to further understand the manner by which flying leads provide and distribute power and communication to a subsea production scheme. In short, said article answered the “what” of Flying Leads — what they are and what they do — when bridging a path of continuity in open water. The intent of this follow up article is to expand on the previous article by intimately detailing — the less-covered facet of Flying Leads, the “how” — which applies to their deployment, handling, and mating via specific tools and methods and, more importantly, how formidable obstacles are addressed and countered during their installation. But to further understand the how of this technology, single conduit and bundled conduit Flying Leads must be defined and comparatively analyzed.

## Single Conduits

When electrical and/or fiber optic lines are run in a single conduit Flying Lead, Pressure Balanced Oil Filled (PBOF) hoses are required, giving way to Electric, Optical, and Electrical Optical (Hybrid) Flying Leads (EFL, OFL, EOFL, respectively). A key feature of PBOF hoses is that all lines are housed within a single hose, making it the sole protective barrier for these lines (See Figure 1) via its Kevlar properties, for example. Conversely, bundled conduits contain and house multiple independent steel tubes or thermoplastic hoses (for hydraulics, chemicals) within an outer jacket/sleeve.

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Ocean News & Technology



Figure 1: (Left) Running of fiber within a PBOF hose. (Right) Fiber prior to being run within hose, thinness/fragility shown.

In spite of PBOF hoses having protective qualities, it is not difficult for a technician to bend/kink a hose by hand; this is further compounded when a Remotely Operated Vehicle’s (ROV’s) manipulator incorrectly handles a hose (handling sensitivity increases when an OFL is engaged due to the fragility of fibers). For this reason, ROV connectors with grab handles are

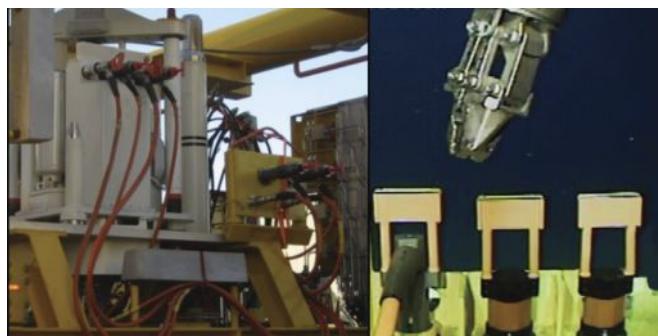


Figure 2: (Right) ROV engaging hybrid connector. (Left) Different handles on different styled connectors on an asset, with PBOF hoses shown (Source: Connect Subsea).

terminated at each end (see Figure 2). However, when a hose itself needs to be handled/maneuvered — independent of the connectors’ handles — monkey fists attached on surface are employed (Figure 3). Moreover, single conduits differ from bundle conduits on two additional fronts. Firstly, PBOF hoses with multiple fiber and electric lines weigh substantially less. Secondly, ROV tools are not utilized for their handling and installation.

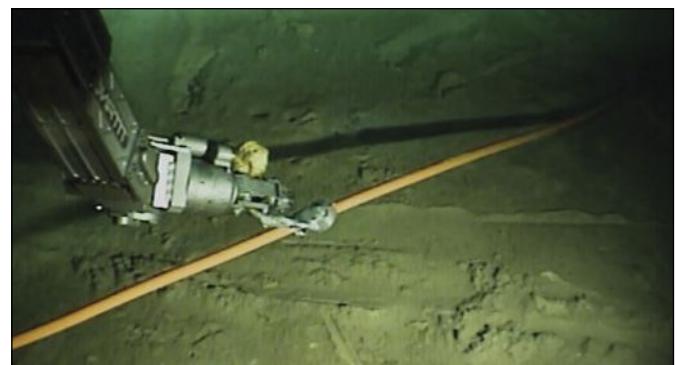


Figure 3: Monkey fist on a PBOF being engaged to strategically move hose

## Mating Sequence: Single Conduits

Once a single conduit is landed on the mudline by way of a Figure 8 deployment frame (Figure 4), the most common method, an ROV’s foremost task is to create slack by unspooling the lead one end at a time as engaging both ends simultaneously can lead to entanglement. Failing to create sufficient slack can have severe consequences, should the lead’s unspooled distance fall short of the installation point, causing it to be tugged on and adversely impacting the hose and its internals.

Conversely, excessive spooling can cause a single conduit to become snagged on an asset as the ROV travels to its destination point, splitting the hose open and flooding it. Moreover, in an obstruction-free scenario, it is imperative that the connector’s mating face not fall onto the mud line. Should this occur, the mud’s removal is critical (Figure 5 illustrates an ROV attempting to remove lodged mud; topside cleansing is the preferred option) — failing to do so can cause the connector and the mating point on asset to become damaged when mated. Should an asset not have backup/redundant ports, it can force an operator to recover said asset, a cost-intensive task.



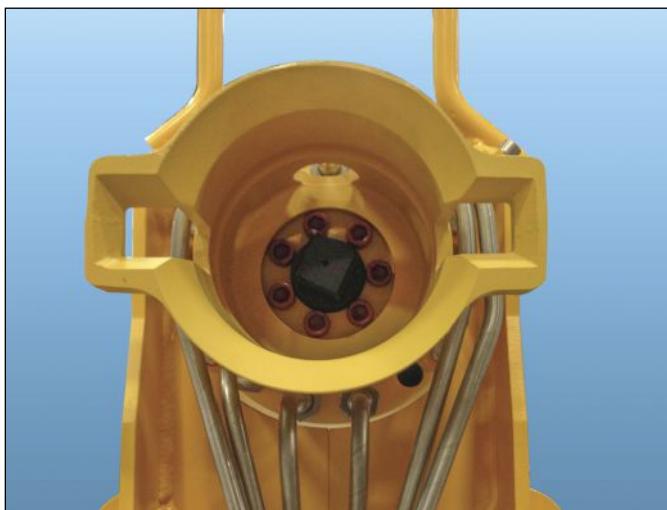
**Figure 4:** (Left) Hybrid Flying Lead configured in Figure 8 position. (Right) Figure 8 Flying Lead deployment landed on seafloor.



**Figure 5:** ROV attempting to remove mud from a connector's faceplate.

### Bundled Conduits

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

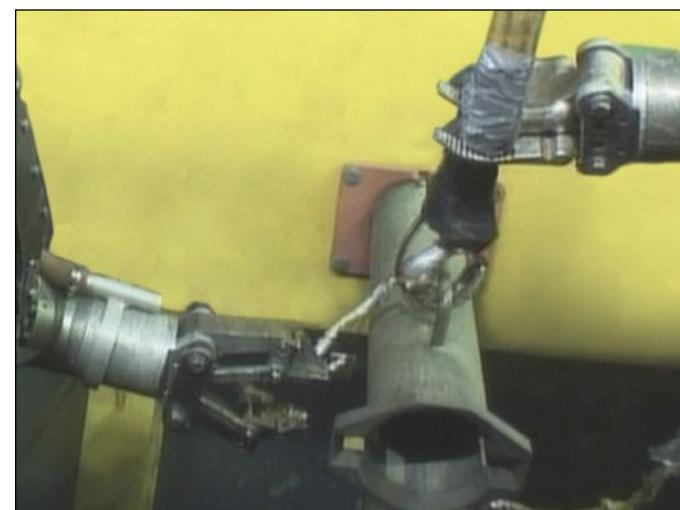


**Figure 6:** ROV bucket with stem at center.

Termination wise, each end of a bundled conduit has a mechanical mating plate and an ROV bucket; both are key for mating and unmating an HFL and CFL's couplings onto an asset's receiving plate (said couplings facilitate the independent routing of chemicals and hydraulics) by way of a stem located in the bucket's center (Figure 6). Because bundled

conduits run multiple mediums, this greatly increases their weight, requiring a crane to offset their weight via lift points on the leads termination points. These points are of benefit for two reasons: they assist an ROV in unspooling a lead and ensure that the vehicle's buoyancy is not impacted, affecting/preventing it from handling and installing a bundled lead.

With regard to a bundle's unspooling, because of their weight, the following methods are typically employed (and all require ROV and crane to work in unison, as shown in Figure 7): the use of a Figure 8 subsea deployment frame where an ROV undoes a lead in an overlapping manner, a topside carrousel that overboards a single end of a lead at a time, or by way of a subsea helical frame — here the Flying Lead is unspooled upward and in a helical fashion from a subsea deployment frame.



**Figure 7:** ROV maneuvering Flying Lead via strap attached to crane wire.



**Figure 8:** (Left) Flying Lead spooled on carrousel frame. (Right) Flying Lead unspooled from carrousel and being pressure tested.

Installation wise, here too, only one end of the lead is handled at a time. However, once the Flying Lead is at a good stopping point, an ROV will engage the lead's ROV bucket via ROV tooling consisting of an ROV Torque Tool (RTT) and a Flying Lead Orientation Tool (FLOT). Both tools perform distinct functions when employed independently but are used singularly and installed on an ROV's porch for bundled lead installation (Figure 9). Functionally, RTTs methodically rotate the bucket's stem via the RTT's end-effector/socket, but for this to occur this requires that both the socket and stem be of the same class — class denotes the stem size and socket to be used and the torque to be applied, as detailed in the American Petroleum Institute's 17H document.

# EDITORIAL FOCUS

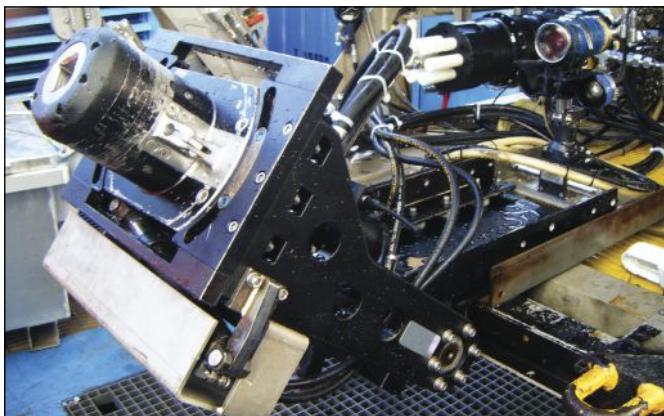


Figure 9: ROV and FLOT attached to ROV's porch; end effector shown on RTT on left side of image.



Figure 10: ROV without any tooling attached to porch

Should the classes not match when subsea, an ROV will have trip to surface — in the absence of a universal end effector —to adjust the RTT's socket, resulting in downtime. However, when both components properly interface, latches on an RTT secure the bundle to an ROV via a FLOT, creating a stationary point for the lead. This, in turn, prevents the following: dropping a lead onto an asset and damaging it and from the lead being dropped on the mud line, lodging mud on the mating plate. The mud's removal is imperative; the introduction of mud particulates is detrimental to a control system when mating an HFL.

## Mating Sequence: Bundled Conduits

Because bundled leads are typically installed at a nominal 90° angle on an asset, FLOT's are equipped with two specific mechanical devices consisting of cylinders, rotary devices, etc. Said devices are critical as they properly orientate and center a bundled conduit's mating plate at the required angle; the inability to orientate a bundle conduit via ROV tooling can prevent its installation.

The first of these devices allows the pitching of the lead, offsetting an ROV's tilt. The second device — a rolling apparatus — is used when an ROV is not centered on its longitudinal axis; both devices ensure the lead successfully interfaces with the receiving end on an asset. Next, the RTT will begin rotating its end effector to mate a bundle (the RTT will continue to remain latched to the lead until installation is completed). It is at this juncture that two important features of RTTs must be diligently monitored: the turns and torque applied to the stem. Neglecting either can negatively impact



Figure 11: RTT being tested and calibrated on ROV deck.

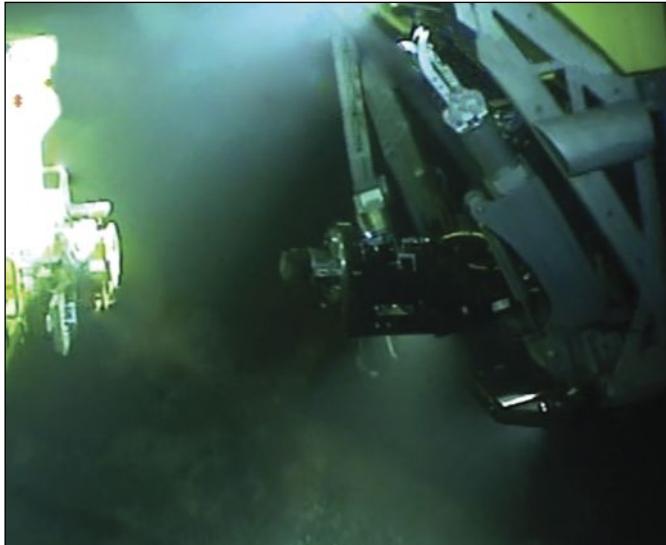


Figure 12: ROV positioning itself with FLOT and RTT to interface with an asset.

both mating ends (depending on the extent of damage, the asset may have to be recovered). Because of this, deck testing and calibration is imperative to verifying an RTT is fit for service, ensuring the successful installation of a bundled conduit.

## Conclusion

As subsea production continues to see an uptick, so will the need to continue installing Flying Leads — both single and bundled. For this reason, familiarization and the understanding of the “how” of Flying Lead technology is key. Furthermore, the technological insights shared herein equally serve as a refresher for field personnel and as a data resource for the oil and gas community at large.

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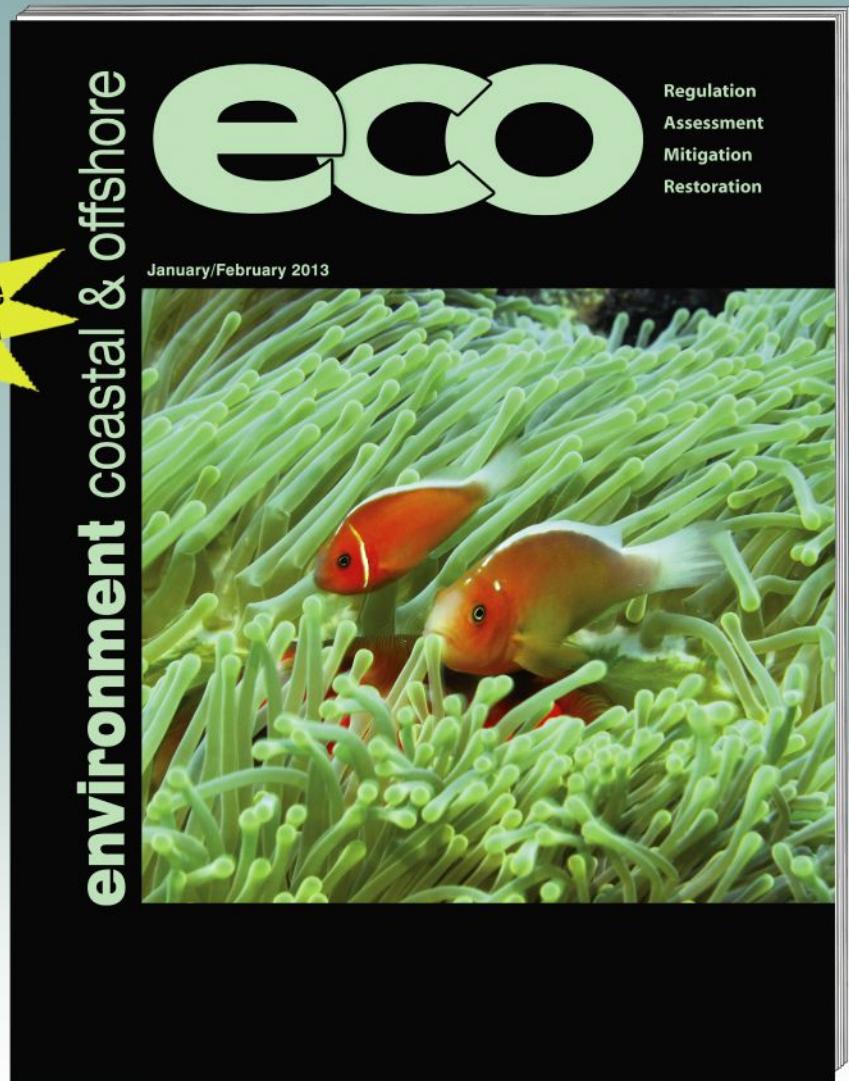
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**A torpedo powered by a lithium-ion battery breaks speed records**

Early in 2013, the first sea firings of a torpedo fitted with a Li-ion battery were completed successfully: propelled completely safely at more than 50 kts, the torpedo also benefits from an endurance that can exceed 1 hr. It took 10 years of studies, research and testing for the DCNS Saint-Tropez personnel specialised in undersea weapons, in collaboration with electrochemists from Saft, to give practical form to this new product. Li-ion technology is capable of supplying the high electrical power level needed to propel a torpedo and allows battery recharging. Thanks to this technology, DCNS now has a product meeting the operational performance criteria required by navies, but also the robustness and safety criteria indispensable for embarkation on onboard submarines. This world premiere illustrates the determination of DCNS to provide navies with a suitable answer to their anti-submarine warfare training needs. The rechargeable lithium-ion battery offers a real alternative to the silver oxide-zinc technology used for 50 years in exercise torpedoes. Proven but obsolescent, this old technology no longer provides performance matching that of new-generation combat torpedoes, making training too unrealistic.

**General Dynamics awarded \$520M for Virginia-Class submarine procurement**

The U.S. Navy has awarded General Dynamics Electric Boat a \$520 million contract modification to buy long lead-time material for four Virginia-class submarines, SSN-794, SSN-795, SSN-796 and SSN-797. Electric Boat is a wholly owned subsidiary of General Dynamics. The contract provides funding for steam and electrical-plant components, main propulsion unit and ship-service turbine generator sets, as well as miscellaneous hull, mechanical and electrical-systems components to support construction of the submarines. With this modification, the contract has a value of \$1.2 billion. It was awarded initially in April 2012. The contract continues to support the submarine industrial base in California, Pennsylvania, New Jersey, Connecticut, Virginia, Arizona, New York, New Hampshire, Wisconsin, Illinois, Massachusetts and other states throughout the U.S. Recognized as a model defense-acquisition program for its technical excellence and schedule performance, the Virginia-class submarine program provides the Navy with the capabilities required to dominate both the open ocean and the littorals. In partnership with the Navy, Electric Boat is successfully pursuing its goal to reduce ship costs without decreasing capabilities through overall efficiency improvements, decreased ship-construction labor costs and shortened ship-construction cycle times.

**Industrial Suppliers urge Congress to support amphibious warship construction**

Expressing concern for the future of the U.S. Navy's amphibious warship programs, a newly formed nationwide coalition of large and small businesses, the Amphibious Warship Industrial Base Coalition (AWIBC), urged Congress to provide sustained funding for the construction of amphibious warships. Since October 2011, the nation has called on U.S. Navy amphibious warships more than 80 times to respond to military and humanitarian crises around the globe. In a letter to the chairs of the Congressional Shipbuilding Caucus, Representatives Rob Wittman (R-VA-01) and Joe Courtney (D-CT-02), Brian Schires of Rolls-Royce North America and chair of AWIBC wrote, "It is critical to national security that these combat warships and their U.S. Navy-Marine Corps teams be available and in position around the globe to respond to threats and to protect U.S. citizens. It is also critical to national security that the U.S. industrial base that provides parts and products for amphibious warships remain strong. Building these warships on a regular schedule ensures stability in construction, keeps production lines active and allows second- and third-tier suppliers to allocate their resources and manpower to support the cost-effective and fiscally efficient production of amphibious warships. "AWIBC requests that Congress provide incremental funding in fiscal year 2015 for the next San Antonio-class amphibious warship, LPD 28, to allow suppliers across the country to begin manufacturing parts and products for its construction."

**USS America successfully completes acceptance sea trials**

The amphibious assault ship America (LHA 6) returned to Huntington Ingalls Industries' Ingalls Shipbuilding division following successful acceptance sea trials in the Gulf of Mexico. Ingalls' test and trials team successfully demonstrated more than 220 test events to the U.S. Navy's board of inspection and survey (INSURV).

"It was a proud 3 days at sea, and America proved she is a quality ship," said LHA 6 program manager George Jones. "The LHA 6 team's tireless and diligent effort paid off as our scores from INSURV indicated. We will continue this effort over the next several weeks to have LHA 6 ready for the sailors and Marines who will man her as part of the U.S. Navy fleet."

During acceptance trials, America performed all required sea trial evolutions, including the operation of the hybrid gas turbine/electric-drive propulsion system. Other tests included anchor handling, steering demonstration, flight deck operations, and combat systems' evaluations.

When America enters the fleet, she will be the flagship of an Expeditionary Strike Group, strategically positioning Marine Expeditionary Units ashore across a full spectrum of missions, including humanitarian, disaster relief, maritime security, antipiracy and other operations while providing air support for ground forces.

America-class ships are 844 ft long and 106 ft wide and displace 44,971 long tons. The gas-turbine propulsion system will drive the ships in excess of 20 kts. They will accommodate a crew of 1,059 (65 officers) and 1,687 troops. The America-class will be capable of carrying a Marine Expeditionary Unit, including Marine helicopters, MV-22 Osprey tiltrotor aircraft, and F-35B Joint Strike Fighter aircraft.

**Polish Armed Forces take delivery of two Teledyne Gavia AUVs**

Teledyne Gavia announced that it has completed a contract with the Armament Department of the Polish Ministry of Defence for the delivery of two Gavia Defence AUV systems for mine countermeasures (MCM). The provision includes all required topside equipment and AUV operation & maintenance training. Teledyne Gavia completed a competitive tender process for delivery of the first MCM AUVs into Poland, winning the contract on the basis of best value with conformance to the required functional and technical parameters.

The Gavia vehicles delivered are equipped with the latest EdgeTech 2205 side-scan sonars (Edgetech, West Wareham, MA). The simultaneous dual frequency 600/1600 kHz EdgeTech 2205 side-scan sonar and the Kefratt T24 inertial navigation system (INS) allow the Gavia to gather high-resolution, accurately navigated sonar images while remaining submerged for several hours of continuous operation at survey speeds up to five kts. The addition of a high accuracy GPS and the augmentation of the INS by Long Base Line (LBL) beacons ensures precise navigation during even longer duration and deeper missions. This combination of sensors make it ideal for mine countermeasures (MCM) and search and salvage operations, in continental-shelf waters and beyond.

The Polish Armed Forces also purchased SeeTrack Military software from SeeByte Ltd. (Edinburgh, Scotland). The SeeTrack Military MCM Evaluator software package includes all core MCM options: PMA Automatic Target Recognition; Seafloor Classification; Change Detection; and SeeByte's Performance Analysis & Training Tool. The software provides a solution for rapid on-site analysis and fusion of sensor data for the fleet of Gavia AUVs, rapidly generating targeted information from the AUV data.

For more information, visit [www.teledyne-gavia.com](http://www.teledyne-gavia.com).

#### **USNS John Glenn christened**

General Dynamics NASSCO, a wholly owned subsidiary of General Dynamics, christened the U.S. Navy's newest ship, USNS John Glenn (MLP-2). Named in honor of the famed Marine Corps pilot, Congressional Space Medal of Honor recipient and four-term U.S. senator, the USNS John Glenn is the second ship of three Mobile Landing Platform (MLP) vessels designed and built by NASSCO.

The Saturday morning christening ceremony took place at NASSCO's San Diego shipyard. Chief of Naval Operations Admiral Jonathan W. Greenert was the ceremony's principal speaker. Lyn Glenn, daughter of Senator Glenn, served as the ship's sponsor. She christened the ship by breaking the traditional bottle of champagne against the vessel's hull.

The MLP is a flexible platform that will provide capability for large-scale logistics movements such as the transfer of vehicles and equipment from sea to shore. It will significantly reduce dependency on foreign ports and provide support in the absence of any port, making it especially useful during disaster response and for supporting Marines once they are ashore.

USNS John Glenn will be delivered to the Navy in the first quarter of 2014.

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



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## Bollinger advances in U.S. Coast Guard \$10B OPC program

Bollinger Shipyards, Inc. was notified by the U.S. Coast Guard (USCG) that Bollinger is one of three companies selected for award of Phase I for the Offshore Patrol Cutter (OPC) program.

Under the OPC solicitation, the Coast Guard has selected three ship-builders for the first phase of the program, consisting of the preliminary and contract design (P&CD). After P&CD, the Government plans to select a single shipbuilder that best balances affordability with Coast Guard requirements. The Phase II detailed design and construction (DD&C) contract is planned for award in 2016, consisting of the lead OPC with potential options to build up to 10 additional cutters. The Coast Guard has stated a need for up to 25 total OPCs.

The OPC will bridge the capability gap between the Fast Response Cutter (FRC) that are presently being built by Bollinger and the National Security Cutter (NSC). This new cutter is a next-generation ship that will complement the Coast Guard's current and future fleet to extend the service's operational capabilities. It will feature increased range and endurance, a larger flight deck, and improved interoperability. The OPC will accommodate rotary wing aircraft and small boat operations in all weather. The OPC will be designed to carry out the congressionally mandated missions of the Medium Endurance Cutters (WMEC).

During Phase I of the OPC program, Bollinger will support the development of the Preliminary and Contract Design, which will include Naval Architecture, Design, Engineering, Production Planning, and Facility Improvement Planning. Bollinger is partnered with Gibbs & Cox Maritime Solutions, L3 Communications, and Damen Shipyards Group. The Phase I contract will employ over 250 naval architects, engineers, designers and planners in support of developing Bollinger's preliminary and contract design along with Bollinger's Phase II proposal for detailed design and construction. If Bollinger is successful in their bid for the Phase II construction contract for OPC, it will bring thousands of jobs to South Louisiana and the Gulf Coast.

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

## U.S. Navy and Houston CSTEM host underwater robotics competition

High school students from across southeast Texas, Louisiana, Alabama, Mississippi, and the Florida panhandle battled for underwater superiority at the Houston Regional SeaPerch Challenge at the Pearland Recreation Center in Pearland, Texas.

The Navy City Outreach office, in collaboration with Houston Communication, Science, Technology, Engineering and Mathematics (CSTEM) organization hosted more than 350 students in the three-part event including a heist deepwater transfer, a speed-course obstacle course, and a display/panel interview.

SeaPerch, an Office of Naval Research-sponsored program, is an innovative underwater robotics program that equips teachers and students with the resources they need to build an underwater remotely operated vehicle (ROV) in an in-school or out-of-school setting to promote interest in STEM-related fields.

SeaPerch rollout is a primary effort of the Navy's city outreach program, which falls under the Navy Recruiting Command's diversity division, located in Millington, Tennessee.

SeaPerch could not be possible without the continued support and collaboration from Houston CSTEM, community volunteers, local schools and academic leaders, and local organizations.

Because there are no naval bases near the metropolitan area of Houston, many students are unaware of the opportunities to utilize the STEM skills they learn in the classroom and apply them in the Navy, said Cmdr. Oudrey Hervey, the commanding officer of Navy Recruiting District Houston.

In the end, only the top 10 teams were able to advance to the National SeaPerch competition in Hattiesburg, Mississippi in May. But the two big winners were the Passmore Elementary School SeaPals and the Alvin Junior High Aquabots, both from Alvin, Texas. These two teams tied for first place in the overall competition.

Because of this, each school received a fully funded trip to the finals courtesy of the TechStreet Houston organization.

For more information visit <http://www.seaperch.org/index>.

## Remontowa Shipbuilding chooses Kongsberg Hugin AUV for mine countermeasures

Remontowa Shipbuilding in Gdansk, Poland has selected Kongsberg Maritime to supply a HUGIN 1000 MR AUV and associated underwater communications and positioning equipment for mine countermeasures (MCM) applications as part of a minehunter class vessel delivery for the Polish Navy.

The HUGIN 1000 MR AUV has been selected as it is specifically designed for MCM operations and can detect, classify and identify mines in a single mission. The delivery includes the HiPAP underwater communication and positioning system, which provides USBL updates and underwater data communication with the HUGIN 1000, or other underwater vehicles.

HUGIN is currently operational with several navies around the world, including the Royal Norwegian Navy, the Finnish Navy and the Italian Navy, in addition to being used by commercial companies. It is capable of performing high-speed surveys with excellent navigation and payload data quality to a depth of 1,000, 3,000 or 4,500 m, depending on configuration. It can carry several different types of high performance survey sensors for synchronized and simultaneous operation.

The HUGIN concept allows integration of alternative sensors for geophysical, search and inspection purposes, subject to customer demands. Naval applications include MCM; Rapid Environmental Assessment (REA)/Battlespace access; and Intelligence, Surveillance, and Reconnaissance (ISR). Commercial applications include offshore oil and gas geophysical survey, inspection of pipelines and underwater engineering structures, environmental monitoring, hydrography, and marine research.

Remontowa Shipbuilding is the prime contractor for delivering the new minehunter class vessels for the Polish Navy. The HUGIN contract was negotiated in cooperation with ESCORT Ltd., Kongsberg Maritime's subsea representative in Poland.

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



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# “Work the Problem” – Applying the Apollo 13 Principle to AUV Search and Recovery Operations

By: Hunter C. Brown, Arthur C. Trembanis, Matthew J. Oliver, Carter B. DuVal, Rob Hedges, Jon Clamp, and Val E. Schmidt

The morning of 16 January 2014 dawned peacefully at the Central Caribbean Marine Institute (CCMI). Situated on the north shore of Little Cayman, CCMI serves as a base for university groups conducting research on the island. As the northerly winds on the island intensified, AUV (autonomous underwater vehicle) operations on the north shore were ruled out. The conditions on the south shore, however, looked perfect for beginning AUV missions with the University of Delaware (UD) Gavia vehicle.

The UD Gavia vehicle is a modular system configured with a GeoSwath Plus phase measuring bathymetric sonar, Marine Sonic Technology side-scan sonar, color camera from Point Grey, a Kefratt INS, Iridium satellite communications, Woods Hole Oceanographic Institute (WHOI) micro-modem for acoustic communications, Sonotronics acoustic pinger, and several water quality sensors (e.g., salinity, temperature, turbidity, and chlorophyll a). In this configuration of sensors, the AUV can completely characterize 1 km by 0.5 km of reef during a typical 3-hr mission with both optical imagery and geoaoustic mapping.

After relocating the proposed missions from the north side of Little Cayman to the southwestern coast, we anchored to a nearby mooring buoy and prepared the Gavia for its first mission of the day. A 100-m linear depth-holding mission was planned as an initial system checkout. The Gavia returned as expected and successfully sent the standard post-mission Iridium status message, and WiFi connectivity to the vehicle was achieved.

Smiles and congratulations were passed around, and we then spent several minutes queuing up the more ambitious second mission. This mission consisted of two perpendicular boustraphedon (“lawn mower”) mapping patterns anticipated to coincide over the spur-and-groove reef structure with an anticipated bottom depth of approximately 18.3 m, or so the charts on hand



Contact! The first view from the ROV of the missing AUV.

indicated. During this mission, the vehicle was instructed to fly at a constant altitude of 4 m over the seafloor while conducting normal mapping operations using the full suite of sensors described previously.

At 11:59 EST on 16 January 2014, we pressed the mission-execute button and watched as the vehicle quickly dove for the 14-m water-depth start point. After the vehicle swam out of sight, we monitored the mission simulator as the estimated vehicle position progressed normally through the planned path.

13:07 EST, the estimated surfacing time, came and went with no Iridium message from the vehicle or WiFi connectivity. Several more minutes passed and still neither Iridium message nor visual confirmation of surfacing. After 30 minutes and no contact, visual or otherwise, the tension among the group intensified. The conversation quickly shifted to search options. On hand we had an Iridium phone, hand-held GPS, 30-m depth sounder, control laptop, and an acoustic modem. As the famous movie line from the film Apollo 13 goes, it was time to “work the problem” [1].

Still moored at the northwest point of the planned mission path, we lowered the acoustic modem and attempted to communicate with the now overdue vehicle. Several minutes went by with no returns from the vehicle. After some debate, we cast off the mooring and sailed to the center of the mission plan and made further attempts to contact the vehicle. Several more minutes passed with no result. With our options, as well as our fuel, running low, we made the decision to return to shore and regroup.

Even though nerves were frayed and tension among the group was running high, the interactions of the group remained professional and laser-focused on the search and recovery. Calls were made to inform colleagues in the United States of the situation. Available mission data from the first mission were copied to all team members, and a recovery team back in the U.S. was quickly put on alert and mobilized for Little Cayman



Aerial view of the southwestern coast of Little Cayman including the AUV mission (and later search) area.



**The AUV hitches a ride on the ROV on the way back from the abyss.**

with the UD Outland ROV (remotely operated vehicle). After examining possible options, it seemed likely the AUV mission plan had inadvertently sent the vehicle over the reef crest and down along the steep karst limestone wall, potentially hanging in a submerged cave or fouled by some marine organism — all speculative scenarios at this time.

Later that evening, we began a second search now operating with the Sonotronics acoustic pinger. Ping reception was confirmed within an hour of listening. We tracked toward the pinger using directional headphones then used the WHOI micro-modem establishing acoustic ranges to the vehicle. 196 m. 204 m. 216 m. We were drifting away from the vehicle, but the range returns confirmed that the vehicle was still alive and in the vicinity. After having collected approximately 35 independent ranges with surface GPS positions, we were feeling confident that the vehicle had gone off the reef-crest and was hung on the wall in the southeast corner of the mission plan. The combined range data were used as input to solving the trilateration problem to estimate the vehicle location using a non-linear least-squares spherical distance minimization technique. The trilateration analysis suggested a relatively small focus area and an estimated depth of around 170 m. The AUV was down there. Deep.



**A case of the tail wagging the dog, the Outland ROV tows the Gavia towards the rescue vessel.**

On 20 January, equipped with our newly arrived ROV, we moored our boat near the estimated vehicle position and attempted to hold fast against a several knot current from the east-southeast intent on blowing us off the search area. At 11:35 EST, in 175 m water depth, the immense limestone wall came into view on the ROV video. The surface of the moon bears a strong resemblance to this ancient, partially dissolved limestone wall, with its pockmarks and caves. From experience, we knew the sheer wall structure would be an unlikely area to locate the vehicle. Also, 175 m was deeper than the shortest ranges to the vehicle from the surface. Armed with this information, we began to search back and forth along the wall while slowly ascending the ROV.

At 12:15 EST, the ROV pilot, Carter DuVal, asked, “Is that something?” At 154.3 m, a depth equal to the height of the observation deck of the Seattle Space Needle, his sharp eyes had spotted a barely visible linear feature that could just been seen tucked in the underside of a shallow cave. Within 2 min of further investigation, the missing AUV shone brightly in the ROV camera display. Still fighting currents, the ROV was carefully positioned and the gripper-claw opened. Timing the grab with the surge, the ROV made contact with the vehicle. Time slowed while we waited for the gripper to close around a



**The AUV returns to the surface with help from an ROV after four days in a carbonate cave.**

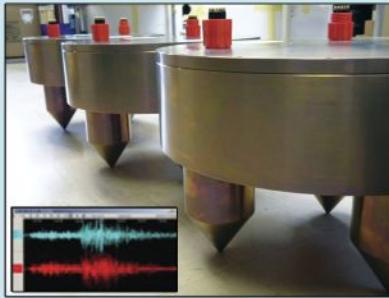
strut on the aft propulsion module. Contact! The trip to the surface was a juggling act due to the positive buoyancy of the AUV and the neutrally buoyant ROV, but as our colleague Dr. Mark Patterson is fond of saying, “A good day is the day the AUV comes home.”

Ultimately, we had a good day on the 20th, but only after several days of hard work and tough lessons. Of those lessons, the most important were to put emotions aside and work the problem without guesswork and leverage all possible resources while working quickly and safely (without hurrying) to establish early positioning constraints. The knowledge of the pre-programmed mission plans was extremely helpful, remembering that AUVs will try hard to do what we tell them.

The authors would like to thank Dr. Mark Moline (University of Delaware) for the loan of the search and recovery ROV, Buddy Mayfield (Outland Technology) for the ROV design and technical advice, Cayman Airways Express for the cargo flight transfer of the recovery equipment, and the entire staff at CCMI for their tremendous support during the search and recovery effort.

[1] <http://spectrum.ieee.org/aerospace/space-flight/apollo-13-we-have-a-solution/0>

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# OFFSHORE INDUSTRY

## Oil and gas M&A activity reaches \$143B: Evaluate Energy report

The first half of 2013 produced \$49 billion in mergers and acquisitions deals and, with a late flurry in the second half, ended with \$143 billion of global upstream deals, 39% down from 2012.

The Evaluate Energy M&A report said that the leading driver of confidence and, therefore, investment in the oil and gas E&P sector is the current and anticipated price of oil, followed to a lesser extent by the price of gas. Neither has changed much since 2012 and do not explain the fall in M&A activity in 2013.

The economic performance of key countries also does not explain the subdued level of activity, either, with China meeting all of its growth targets during the year, Europe faring better as a whole than in 2012, and the U.S. stock markets reaching record highs in December 2013.

Evaluate Energy said the drop in industry M&A is doing damage to the prosperity of E&P companies because the cost of finding, developing, and extracting oil for public oil companies is steadily increasing.

A recent study by Evaluate Energy to review historic financial and operating results of 52 large-cap companies concluded that the full-cycle cost required to sustainably produce a barrel of crude oil surpassed \$85 in 2012, which is 87% higher than the \$45 required in 2008.

## T. Boone Pickens criticizes push to lift ban on U.S. crude exports

T. Boone Pickens, one of the country's biggest cheerleaders for natural gas, is unenthusiastic about the idea of removing bans of the export of crude oil, saying that the United States should instead focus on reducing its dependence on foreign oil, especially from the Middle East.

"I am not too keen on exporting when we are importing 9 to 10 million barrels a day," Pickens said, speaking at World LNG Fuels 2014 conference in Houston, Texas on 22 January.

The United States currently uses about 18 mmbbl/d of oil and produces about 8 mmbbl/d. About 4.5 mmbbl/d are imported from the Organization of Petroleum Exporting Countries, or OPEC, which includes Iraq, Saudi Arabia, Venezuela and several other countries with whom the United States has had challenging relationships.

Pickens said the United States would be better served by reducing its imports from these countries, rather than beginning to export some of the crude that has created domestic bottlenecks.



*T. Boone Pickens*

He instead encouraged greater use of natural gas for trucks and increased oil trade with Canada and Mexico, countries he considers more reliable partners than many of those in OPEC. Mexico currently exports a little less than 1 mmbbl/d to the United States, while Canada exports more than 2.4 mmbbl/d, making it this country's largest supplier.

## North Sea field startups jump 44% in 2013 while exploration drops 28%

The number of fields that began producing oil and gas in the UK hit its highest level for 5 years in 2013, as a number of operators focused on development activity, according to Deloitte's Petroleum Services Group's (PSG's) latest survey of the sector.

The report, detailing activity across northwest Europe over the last 12 months, found the number of UK fields that started production rose by 44% in 2013, up from 9 in 2012 to 13 in 2013. This figure represents the highest number since 2008, when 16 fields were brought on-stream, PSG reported.

Of the 13 fields brought on-stream last year, 84% were eligible for tax allowances, pointing to a positive industry reaction to the government incentives in place. However, a total of only 47 exploration and appraisal wells were drilled on the UK Continental Shelf (UKCS) in 2013, compared with 65 in 2012, a decrease of 28%. During the same period, the Norwegian Continental Shelf (NCS) saw a 41% increase in drilling activity.

"We are seeing evidence that government incentives are helping to stimulate field developments," Graham Sadler, managing director of Deloitte's PSG, said, adding that more needs to be done to encourage exploration on the UKCS.

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### Replacing natural gas with solar to fuel EOR generates significant value

Deploying solar enhanced oil recovery (EOR) in Oman to reduce natural gas used for oil production will have a significant and lasting impact on the country's economic growth, according to a new report from Ernst & Young.

"There are also immediate opportunities for solar EOR in Oman's neighboring countries which are also challenged by gas scarcity and oilfield maturity, but enjoy abundant sunshine," said Rod MacGregor, chief executive officer of GlassPoint Solar.

"Solar EOR projects can enable substantial economic growth wherever they're deployed."

The report, sponsored by GlassPoint and titled Solar Enhanced Oil Recovery: An In-Country Value Assessment for Oman, found that full-scale deployment of solar EOR by the end of 2023 could save 531,000 mcf/d of gas and generate up to 212,000 jobs throughout the Sultanate.



"Using solar energy for steam production will free valuable gas resources needed to power new industries and diversify the economy," said Mark Gregory, Ernst & Young's chief economist.

"Furthermore, if Oman were to localize the supply chain for solar steam generators, solar EOR could contribute more than \$12 billion to Omani GDP over the next decade."

The gas not burned for EOR can be used for higher-value applications, such as LNG export and power generation. Additionally, gas can be redirected to the Omani private sector, where dozens of industrial projects have been cancelled or stalled in the past decade due to gas shortages.

Oil operators worldwide deploy EOR to loosen heavy oil and boost well productivity by up to 300%.

# OFFSHORE INDUSTRY HEADLINES

Research & Development • Environmental Assessment • Discovery

## Chevron, GE strive to solve critical industry needs through technology

Chevron Energy Technology Co. and GE Oil & Gas have created the Chevron GE Technology Alliance, which they said will develop and commercialize technologies to solve critical needs for the oil and gas industry.

The partnership builds upon an ongoing collaboration between Chevron and GE developing the GE Safire™ flow meter, now being tested and deployed on Chevron land-based well production lines in the western U.S. In addition to the flow metering collaboration, which is being conducted with the measurement and control business within GE Oil & Gas, the Alliance is also managing a coatings project and will be taking on additional high-value projects in the near future.

The Alliance provides a mechanism for commercializing early stage technologies from Chevron, GE or other technology partnerships. For example, GE flow meter products will be developed incorporating the Swept Frequency Acoustic Interferometry (SFAI) metering technology incubated in an alliance between Chevron and Los Alamos National Laboratory.

"GE brings its leading manufacturing capabilities, worldwide marketing, distribution, and extensive R&D capabilities not only for oil and gas, but also other business sectors to this alliance," said Paul Siegele, president of Chevron Energy Technology and chief technology officer. "Together, we hope to bring impactful new technologies to the industry."

"Chevron's deep understanding of the oil and gas industry, combined with GE's long tradition of technology development and close collaboration with strategic partners, will uniquely position this new alliance to address the industry's technology needs," added Lorenzo Simonelli, president and chief executive officer, GE Oil & Gas.

## U.S. Geological Survey model could help guide offshore oil spill cleanup

A computer modeling system could help guide cleanup efforts for oil spills like the Deepwater Horizon disaster in 2010, the U.S. Geological Survey said.

The USGS said it developed a system that can track the movement of sand and oil particles found in the Gulf of Mexico since the 2010 accident, which killed 11 rig workers and, BP estimated, caused about 2.5 mmbbl of oil to be spilled into the Gulf for nearly 3 months.

The USGS model examined the migration of what it called surface residual balls, a mix of oil and sand, during



*U.S. Gulf oil slick as seen from space by NASA's Terra satellite on 24 May 2010.*

normal wave conditions and those experienced during tropical storms.

P. Soupy Dalyander, a USGS scientist who helped guide the modeling, said examining the migration of the residual material, or SRBs, can help guide cleanup efforts in the future.

"The techniques developed here can be applied to evaluate the potential along-shore movement of SRBs in other locations or from any future spill where large quantities of oil and sand mix in the surf zone," she said in a statement.

The USGS said some SRBs continue to wash up along the southern U.S. coastline because smaller-sized balls can't be moved under normal wave conditions.

## Shell cancels 2014 drilling off Alaska in court decision's wake

Royal Dutch Shell will not resume activity on federal leases it holds offshore Alaska in 2014 because a U.S. appeals court's 22 January decision in a 2008 lawsuit against the U.S. Department of the Interior has created significant uncertainties, company officials stated.

"We took a pause in 2013 to prepare for the next drilling season, we have added additional people and resources to the venture, we have updated our plans with what we had learned from 2012, and we have worked very closely with Interior and other government agencies in the U.S.," Shell Chief Executive Ben van Beurden said in a 30 January conference call with investors.

"However, we are frustrated by the recent decision by the Ninth Circuit Court of Appeals in what is a 6-year-old lawsuit against the government," he continued. "The obstacles that were intro-

duced by that decision simply make it impossible to justify the commitments of cost, equipment, and people that are needed to drill safely in Alaska this year.

"We have to wait for the courts and the U.S. administration to resolve this legal issue," van Beurden said. "Given all of this, we will not drill in Alaska in 2014, and we are reviewing our options here."

A three-judge panel in the Ninth U.S. Circuit Appeals Court ruled a portion of the environmental impact statements prepared prior to federal oil and gas leasing off Alaska's Arctic coast in 2008 was improperly prepared and sent the matter back to the district court that heard the lawsuit for further action.

## 'Historic' agreement sets stage for 800-mi Alaska natural gas pipeline

North Slope producers ExxonMobil, BP, ConocoPhillips, along with pipeline company TransCanada, Alaska Gasline Development and Alaska's commissioners of natural resources and revenue have signed a heads of agreement (HOA) for the Alaska LNG Project, laying the commercial framework for development of an 800-mi natural gas pipeline to transport production from the North Slope to a 15 to 18 mm ton per year LNG plant on the state's southcentral coast.

Alaska Gov. Sean Parnell described the agreement as "historic," saying it would allow pipeline development "on Alaska's terms and in Alaskans' interests."

The HOA is subject to public review by the state legislature this session. It will allow pre-FEED work to begin on the LNG plant and establishes a framework for negotiating multiple other project enabling agreements, according to the state. The HOA anticipates pre-FEED work starting in this year's second quarter, with a decision on whether to move to the FEED phase expected 3 years later.

HOA parties expect the state's participating interest in each component of the project to be 20% to 25%. Preliminary project concept includes three 5 to 6 mm ton a year trains at the LNG plant and two jetties designed to load a combined 15 to 20 LNG carriers per month.

An ANS gas treatment plant would remove carbon dioxide from the gas prior to shipment on the 42 to 48-in. pipeline, operating at more than 2,000 psi to deliver 3 to 3.5 bcf/d. The pipeline will include at least five off-take points for a total of 300 to 350 mmcf/d of in-state gas delivery.

Last year, the Nikiski area of the Kenai Peninsula was picked as the leading site for the LNG plant. The HOA terminates 31 December 2015, unless extended by mutual agreement of the parties.

## Energy growth in advanced economies to slow, decline

Global energy consumption is expected to rise by 41% from 2012 to 2035 compared to 55% over the last 23 years, 52% over the last 20 years, and 30% over the last 10 years, according to the BP Energy Outlook 2035.

And 95% of that growth in demand is expected to come from the emerging economies, while energy use in the advanced economies of North America, Europe and Asia as a group is expected to grow slowly and begin to decline in the later years of the forecast period. China and India are expected to account for more than half of the growth increase.

Shares of the major fossil fuels are converging with oil, natural gas and coal each expected to make up around 27% of the total mix by 2035 and the remaining share coming from nuclear, hydroelectricity and renewables. Among fossil fuels, gas is

growing fastest, increasingly being used as a cleaner alternative to coal for power generation as well as in other sectors.

Bob Dudley, BP Group chief executive said that the Outlook "highlights the power of competition and market forces in unlocking technology and innovation to meet the world's energy needs. These factors make us optimistic for the world's energy future."

*Bob Dudley* Oil is expected to be the slowest growing of the major fuels to 2035, with demand increasing at an average of just 0.8% a year. Nonetheless, this will still result in demand for oil and other liquid fuels being nearly 19 mmbbl/d higher in 2035 than 2012, according to the report. U.S. oil imports are expected to fall nearly 75% between 2012 and 2035, due largely to the boom in shale development.

Natural gas demand is rising at an average of 1.9% a year. Non-OECD countries are expected to generate 78% of demand growth. Industry and power generation account for the largest increments to demand by sector. LNG exports are expected to grow more than twice as fast as gas consumption, at an average of 3.9% per year, and accounting for 26% of the growth in global gas supply to 2035. Shale gas supplies are expected to meet 46% of the growth in gas demand and account for 21% of world gas and 68% of U.S. gas production by 2035.

After oil, coal is expected to be the slowest growing major fuel, with demand rising on average 1.1% a year to 2035.

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

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

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

Pipelines and related investments will remain the primary mover of oil and gas production despite a near term shift toward the use of rail and marine as major modes of oil and gas production transportation. As major pipeline corridors and projects are completed, the efficiency and economics of long distance pipeline movements will shift the logistics weighting back towards its historical distribution pattern, the report said.

A significant finding of the IHS study is the staying power of capital expenditure levels throughout the 2014 to 2025 forecast period. While investment declines after the build out in the



## Liftboat use gaining in industry popularity



Liftboats are gaining in popularity in the oil and gas industry, said Douglas-Westwood analyst Calum Shaw. Since breaking out of the Gulf of Mexico, the global fleet of these self-propelled, self-elevating vessels has grown by over a third and now stands at more than 300 units worldwide.

"They are now tried and trusted in West Africa, the Persian Gulf, and the North Sea," Shaw said. "In southeast Asia, they are finally gaining a foothold with key operators. Unlike immobile jack-up barges, liftboats offer more, typically performing well intervention, maintenance, and installation workscopes. They are now being used for offshore EOR campaigns, and we would not be surprised to see a growth in such deployments."

He added: "Here at DW, we have been monitoring the oil and gas liftboat markets, and, as a conservative forecast, we expect the demand for liftboats outside the Gulf of Mexico to increase by more than 3,500 days over 2014 to 2018. A number of factors will contribute to this, the two most important being their improved specifications and the increased recognition from operators of the value that liftboats represent."

Shaw noted that, with the latest generation of liftboats offering increased water-depth capabilities, they are able to access an increasing proportion of existing fixed platforms.

"The increased deck space they offer enables them to carry more equipment, such as coiled tubing or chemicals for well intervention work," Shaw said. "Here, their value is underlined by Halliburton's decision to invest in a fleet of five for its Gulf of Mexico slickline services. But, arguably, the biggest factor behind the increase in demand will be the attitude of E&P operators who are renowned for their conservatism; their aim in the race for new approaches is usually to finish second. However, despite this, liftboats have broken through. And demand is growing."

first half of the forecast period, even by 2025 investment amounts remain at a robust \$60 billion in the base case and over \$80 billion in the high production case. This is an indication of continuing investment at fairly steady levels beyond 2025.

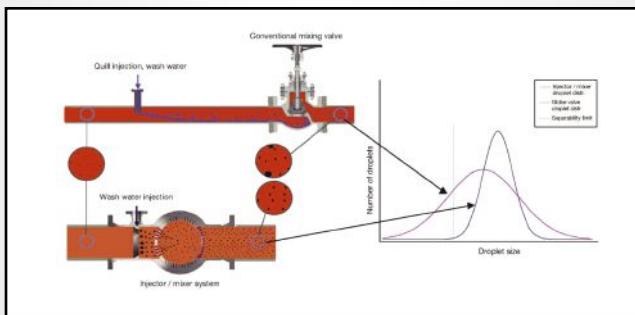
The study noted that the boom in oil and gas shale activity "has thrust the nation into an unexpected position" as the global growth leader in crude oil production capacity.

**North Atlantic Drilling to purchase BOP control systems**

Offshore contractor North Atlantic Drilling was to purchase two GE oil and gas blowout preventer (BOP) control systems. By purchasing the two SeaONYXTM systems, the company plans to upgrade control spreads on board its semi-submersible West Venture and drill ship West Navigator. According to GE, the SeaONYX BOP control system, which is built upon GE's Mark VIe architecture, incorporates multiple redundancies and hot-swappable components and extends system availability to keep operations online. SeaONYX is claimed to have an improved uptime performance compared to other controllers and is said to be a keystone of GE's predictive drilling management technology, helping drillers to address issues prior to their occurrence. Blowout preventers are used to isolate pressure in oil and gas wells during drilling or close the well entirely during emergencies.

**First Subsea to provide offshore Libya FSO connections**

EMAS AMC has contracted First Subsea for diverless bend stiffener connectors for the turret-moored Gaza FSO offshore Libya. Gaza will replace the existing Sloug FSO on Mellitah Oil and Gas' Bouri field, 74.6 mi northwest of Tripoli. Installation and hookup is scheduled for the first quarter of 2015. First Subsea will supply Type 2 bend stiffener connectors (BSCs) to connect three flexible risers (14.75-in. and 10-in. diameter) and a dynamic umbilical to the new FSO's turret. The BSC connection comprises a ball and taper connector attached to a bend stiffener, pulled into a pre-machined, compact I-tube that is built into the turret. The self-energizing, self-aligning connector features an automatic release clamp (ARC) that allows diverless and ROV-less riser and umbilical connections. First Subsea to provide offshore Libya FSO connections.

**PWA-ProSep to provide NOC with desalting technology**

*Conventional mixer versus ProSalt injector-mixer system*

PWA-ProSep was awarded a contract for the supply of one of its patented ProSalt™ units, valued at \$352,000, to a major national oil company in the Arab Gulf region. The 20-in. ProSalt wash water injection and mixing valve will be installed at an onshore facility upstream of the Desalter vessel. The ProSalt unit will replace the existing globe valve and static mixer, with delivery expected by the end of second quarter of 2014. Results from a similar existing installation with the NOC found that the ProSalt technology can save more than 10 million gallons of fresh water per year in one facility alone. Traditional mixing valves often consume large quantities of wash water and chemicals. The ProSalt unit helps to preserve valuable water supplies. PWA-ProSep offers a portfolio of patented solutions to treat oil, natural gas and produced water, a growing challenge for oil and gas operators.

# Shell launches second GoM Mars production



*Olympus facility at the fabrication yard in Ingleside, Texas*

Shell has begun production from the Mars B development through Olympus, the company's seventh and largest floating deepwater platform in the Gulf of Mexico. It is the first deepwater project in the Gulf to expand an existing oil and gas field with significant new infrastructure, which should extend the life of the greater Mars basin to 2050 or beyond.

Combined future production from Olympus and the original Mars platform is expected to deliver an estimated resource base of 1 Bboe, according to Shell.

"We safely completed construction and installation of the Olympus platform more than 6 months ahead of schedule, allowing us to begin production early from the development's first well," said John Hollowell, executive vice president for Deep Water, Shell Upstream Americas. "Olympus is the latest successful start-up of our strong portfolio of deepwater projects, which we expect to generate substantial value in the coming years. Deepwater will continue to be a core growth opportunity for Shell."

In addition to the Olympus drilling and production platform, located in Mississippi Canyon, the Shell Mars B development includes subsea wells at the West Boreas and South Deimos fields, export pipelines, and a shallow-water platform at West Delta 143. Olympus is in about 3,100 ft of water. The Mars field, located about 130 mi south of New Orleans, was discovered in 1989 and began producing in 1996.

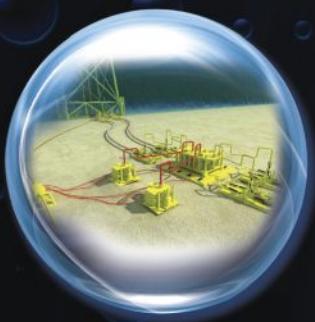
Using the Olympus platform drilling rig and a floating drill rig, additional development drilling will enable ramp up to an estimated peak of 100,000 boe/d in 2016. Mars field produced an average of over 60,000 boe/d in 2013.

Partners in the development are operator Shell, with a 71.5% stake, and BP, with a 28.5% interest.



*John Hollowell*

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*PSV 3300 design platform supply vessel*

### Promar orders platform supply vessels from Damen Shipyards

Swiss company Promar has ordered two platform supply vessels of the new PSV 3300 design from Damen Shipyards Group in a bid to further expand the offshore fleet under its management in the next 5 years.

The company, which aims to deploy the vessels in the West African market, will take delivery of the first and second vessels in February and August 2015, respectively.

"The PSV 3300 is at the forefront of technology in terms of equipment, being modern and reliable. These ships are built in line with North Sea standards," said Promar chartering supervisor Olivier Meynis de Paulin.

"Bringing the standards of the PSV 3300 to African countries will certainly be a valuable competitive edge. In addition, the design and the level of comfort proposed by these vessels are definitely an important advantage. These ships are built in line with North Sea standards."

The PSV 3300 is being tailored to meet or even exceed Promar's charterers' expectations, and its design is said to include several technical features to ensure good seakeeping behavior, which reduces downtime.

### Total E&P agrees to FSO charter for Martin Linge in North Sea

Total E&P Norge has agreed to an FSO charter for the Martin Linge project in the Norwegian North Sea.

KNOT FSO 1, a subsidiary of Knutsen NYK Offshore Tankers, will convert one of its shuttle tankers for the program.

The converted vessel will be delivered at the end of 2016 and will feature a remote-controlled system that can be operated from the Martin Linge platform and from land; connections allowing the vessel to be powered by electricity from shore; and equipment to separate water and oil.

Total has chartered the FSO for 8

years with options for 4 more. Additionally, NYK will be involved in the project's engineering, procurement, and construction phase.

### Sale of remaining cold-stacked rigs part of high-grading strategy

Enso plc has sold its two remaining cold-stacked jack-up rigs for \$33 million. The net book value of the two rigs, ENSCO 69 and Wisconsin, both built in 1976, was about \$9 million. The pre-tax gain on the sale is roughly \$24 million, which will be included in first quarter 2014 operating results.

"This sale is part of Enso's ongoing strategy of high-grading our fleet by divesting older, less-capable assets and reinvesting in advanced-technology rigs," said Jay Swent, executive vice president and chief financial officer.

"We believe our orderly process of selling rigs has generated superior value for shareholders over time and that this strategy keeps us at the forefront of industry technology with one of the newest and most capable fleets in the world."

During the past 4 years, Enso has sold 13 rigs and proceeds have been reinvested in the fleet. Over the same period,



*ENSCO 69 jack-up rig*

Enso has taken delivery of 12 high-performance rigs, including five Samsung DP3 ultra-deepwater drillships, five ENSCO 8500 Series® ultra-deepwater semi-submersibles, and two ENSCO 120 Series ultra-premium harsh environment jack-ups. In addition, Enso has six rigs under construction – three ultra-deepwater drillships and three premium jack-ups.

### Topaz buys two anchor handling towage and supply vessels

Offshore support vessel company Topaz Energy and Marine has acquired two anchor handling towage and supply vessels for \$100 million. Reportedly large and modern, the Caspian Challenger and the Caspian Endeavour sister vessels were built by Kleven Maritime in

Norway in 2008 and 2009. According to the company, the vessels are wholly capable of deepwater work anywhere in the company's existing global footprint and are equipped with dynamic positioning DP2 and automated safe anchor handling capabilities.

The vessels are operating in the Caspian basin at 17,200 bhp and 190 t bollard pull. Said to be currently serving a long-term contract with BP in Azerbaijan, the vessels have been operating as part of the company's Caspian fleet on a bareboat agreement.

By performing specialty project work, major rig moves, anchor repositioning and logistical support, the vessels are supporting operations in the Azerbaijan offshore fields of ACG and Shah Deniz.

### CIMC Raffles to build drilling rigs for Beacon and Norshore

Integrated offshore rigs builder CIMC Raffles Offshore was awarded two contracts to build harsh environment ice class semi-submersible drilling rig and a multi-purpose drillship.

The company secured the first order from Beacon and the new rig, the Beacon Atlantic, is scheduled to be delivered in the fourth quarter of 2016.

The second order is from a wholly owned subsidiary of Norshore to build one unit of multi-purpose drillship and is scheduled to be delivered in the second half of 2016.

According to CIMC Raffles, the owner also has an option to build another similar semi-submersible drilling rig with it. Beacon Atlantic can operate at water depth up to 500 m and will be built to the GM4-D design, carried out in cooperation between CIMC Raffles and designer Global Maritime.

The rig can also drill wells down to 8,000 m and is equipped with NOV drilling package, DP3 and eight-point mooring system. The rig will be designed to operate in the harsh North Sea environment and also other challenging regions such as the Arctic and Barents Sea.

CIMC Raffles said that the rig, which will be able to resist the strongest storm in the North Sea, fulfills the requirements of NMA, NORSO and PSA Standards. The second GM4-D design semi-submersible drilling rig contracted by CIMC Raffles, the Beacon Atlantic rig is classed by DNV. The first unit was the North Dragon.

North Sea Rigs is managing the projects on behalf of the owners for both rigs. Multi-Purpose Drillship is small-sized and has been designed for riser-less drilling and well intervention operations globally, including the North Sea.

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## BP starts oil production from West Chirag in Caspian Sea

Oil production has started from the new West Chirag platform in the Azeri sector of the Caspian Sea, BP said. The platform was commissioned for the \$6 billion Chirag oil project in 2010 as part of the Azeri-Chirag-Gunashli (ACG) field development.

More than \$4 billion was allocated to construction of facilities and the pre-drill program, and the remainder will be spent on platform development well drilling. The investment should help optimize recovery from the ACG field, BP said. The entire platform was fabricated in Azerbaijan using local resources.

The West Chirag facility has been installed in around 558 ft of water between the existing Chirag and Deepwater Gunashli platforms. Its oil-handling capacity is 183,000 b/d and its gas export capacity is 285 mmcf/d.

Oil produced from the J05 well will be processed onboard and then exported to the Sangachal Terminal via a new infield pipeline linked to an existing 30-in. subsea export pipeline. Production will ramp up as the other pre-drilled wells are brought online.

"West Chirag is the eighth world-



*West Chirag oil platform*

class offshore platform that we have built and operated in a safe and efficient manner in the Caspian," said Gordon Birrell, BP's regional president for Azerbaijan, Georgia, and Turkey.

"To date, the ACG field has produced over 2.3 Bbbl of oil and with future continual major investments in new technologies and facilities...it will continue to produce...for many decades."

Partners in the ACG development are BP (operator – 35.8%), SOCAR (11.6%), Chevron (11.3%), INPEX (11%), Statoil (8.6%), ExxonMobil (8%), TPAO (6.8%), ITOCHU (4.3%), and ONGC Videsh (2.7%).

## ONGC to invest \$9B in discoveries in India's Krishna-Godavari basin

Press Trust of India reports that state-owned Oil and Natural Gas Corp. (ONGC) will invest \$9 billion in bringing to production by 2017 to 2018 an array of oil and gas discoveries in Krishna-Godavari basin off the east coast of India.

ONGC has made 11 oil and gas discoveries in Block KG-DWN-98/2, which sits next to Reliance Industries Ltd.'s KG-D6 block and Gujarat State Petroleum Corp.'s Deendayal gas field. The block is divided into a Northern Discovery Area (NDA) and Southern Discovery Area (SDA).

ONGC plans to make that investment in producing from discoveries in the NDA. The company expects to produce 2.8 to 3.3 million tons of oil per year, and 9 to 10 mmcm/d of gas from the NDA, which holds an estimated 102 million tons of oil reserves and 97.6 bcm of in-place gas reserves spread over seven fields.

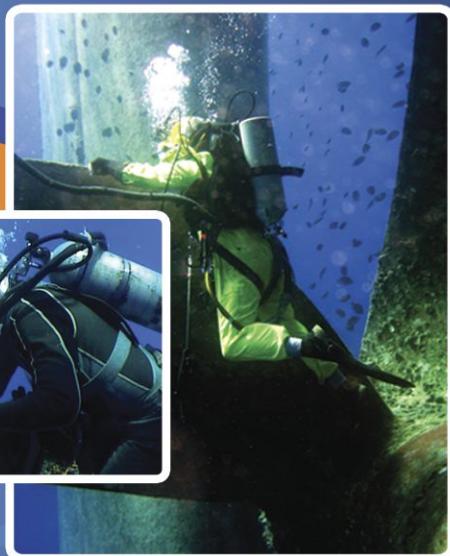
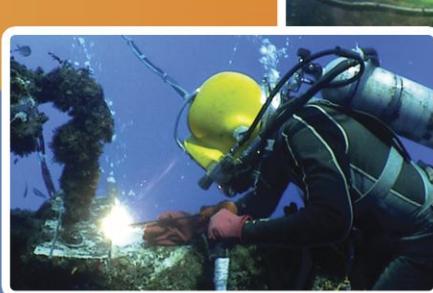
The NDA comprises discoveries such as Padmawati, Kanadurga, D, E, U, and A, while the ultra-deepwater UD find lies in the SDA. ONGC said it plans to produce oil and gas from the NDA by using an FPSO unit, but is studying the use of facilities from a neighboring block.



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## UK government invites bids to drill for oil and gas in North Sea

The UK government has opened the 28th licensing round inviting companies to apply for new licenses to drill for offshore oil and gas in the North Sea.

The government's latest initiative, which is set to give a further boost to the economy, will also support the industry's joint Oil and Gas Industrial Strategy, published in 2013, and works to secure future decades of investment and production in the North Sea.

Increasing recovery of oil and gas in the country is expected to improve energy security, support thousands of jobs

and provide billions in increased tax revenues.

The UK's oil and gas sector, which attracted US\$23 billion of capital expenditure and supplied around half of the

country's primary energy demand in 2013, is already said to support around 350,000 jobs.

UK Energy Minister Michael Fallon said the latest round of offshore oil and gas drilling will help boost growth, energy security and jobs in the UK.

"There continues to be an extremely high level of interest in North Sea oil and gas, which is unsurprising when there could be as many as 20 bbl of oil still buried deep within the seabed," Fallon said. During the previous licensing round, a record number of licenses were awarded, including 21 new entrants.

At present, more than 50 companies are at work in the North Sea. In 2013, 36 offshore projects with an associated capital expenditure of over \$14.7 billion were approved, which provide tax revenues of \$10.7 billion on production and a further \$8.2 billion through the wider supply-chain in corporate and payroll taxes.

## Record 59 companies respond to offshore Norway licensing round

Norway's government has offered 48 companies' interests in 65 new production licenses on the Norwegian continental shelf, following applications from a record total of 59 companies under the country's Awards in Pre-defined Areas (APA) 2013 license round.

Thirty-eight of the licenses are in the North Sea, 19 in the Norwegian Sea, and 8 in the Barents Sea. Seventeen are classified as additional acreage to existing production licenses, while 10 are divided stratigraphically and only apply to levels below/above a defined stratigraphic

boundary. Interest was greatest in the northern North Sea and central Norwegian Sea.

Sissel Eriksen, exploration director for the Norwegian Petroleum Directorate, said this was probably due to familiarity with the geology and the fact that several of these areas have a "time-critical" infrastructure. Exploring nearby areas is therefore a priority in order to maximize the tie-in resource potential.

Of the companies that applied, 29 have been offered operatorship. Petoro

will participate as a licensee and manage the State's Direct Financial Interest (SDFI) in 12 of the licenses.

Offers remain subject to obligations set forth by the authorities. New seismic must be acquired in 11 areas, and one firm well must be drilled in the southern North Sea. In other cases, the licensees have 1 to 3 years to decide whether to "drill or drop" to prevent the license from expiring.

Statoil was a big winner, gaining interests in 10 licenses, 7 as operator.

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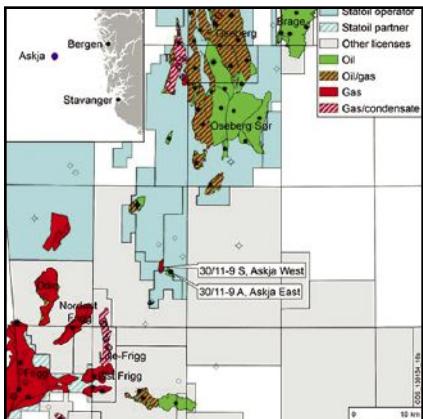
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## Statoil's Askja discovery could trigger multi-field development

Statoil has confirmed oil and gas discoveries in the Askja structure in the Norwegian North Sea.

The semi-submersible Ocean Vanguard drilled a well and side track in license PL272, finding gas in Askja West and oil in Askja East. The location is 21.7 mi south of the Oseberg Sor complex and 1.8 mi southeast of Statoil's 2011 Krafla/Krafla West discoveries.

Main wellbore 30/11-9 S proved a net gas column of 295 ft in late and mid-Jurassic rocks (lower Heather and upper

Tarbert formations), while side track 30/11-9, 0.9 mi to the southeast, encountered a net oil column of 131 ft in the same geological intervals. In both cases, reservoir properties were as expected.

Combined recoverable volumes could be in the range of 19 to 44 mmboe. Askja could be developed jointly with Krafla and Krafla West, thought to hold 50 to 80 mmboe recoverable.

## Afren to assess drilling options for Ogo discovery off Nigeria

Afren claims its Ogo discovery offshore Nigeria is one of the largest worldwide, with potential recoverable resources of 774 mmboe. Ogo is in license PL 310 in the Upper Cretaceous fairway that runs along the West African Transform Margin.

Afren said the syn-rift play that delivered a 280-ft gross hydrocarbon column in the Ogo well also exists on the company's adjacent OML 113 license. The company plans to acquire 3D seismic ahead of appraisal and additional exploration drilling.

This year, Afren and its partners will start development of three more shallow-water Nigerian discoveries, including the Okoro Further Field Development.

## Rockhopper reveals Falkland drilling targets, including Sea Lion

Rockhopper said exploration plans for offshore Falkland Islands include drilling a well on the Sea Lion discovery to determine whether a non-equilibrium gas cap is present on the west flank. If there is no gas cap, resources for Sea Lion could be upgraded by 65 mmbbl to 402 mmbbl, the company indicated, adding that if the gas cap is present, the wellbore would be retained for use as a future gas injector-producer in field development.

Another well is to be drilled on Isobel/Elaine in license PL004a in the North Falkland basin, where Rockhopper has increased its interest from 3% to 24%. This well is designed to intersect six stacked exploration objectives, all within the F3 sequence, with potential combined reserves of 1.078 Bbl.

On block PL004c (Rockhopper 24%), the Jayne East well will test the F2 sands on the east flank of the regional syncline. These include the known Beverley and Casper South fans, both oil and gas bearing on the west flank. In addition, the well will test the Zebedee fan.

There are five objectives at the Jayne East location, with combined potential of 289 mmbbl.

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## Inpex wins 15-year extension for offshore Upper Zakum field in UAE

Japan-based oil and gas exploration and production company Inpex has received approval from the government of Abu Dhabi for a 15-year extension of its concession. The company received concession for its offshore Upper Zakum oil field located in the United Arab Emirates (UAE).

The concession will be extended to the end of 2041, under the new terms. According to the company, the concession extension coincides with a visit by Japanese industry minister Toshimitsu Motegi to the UAE, which is said to be Japan's second-largest oil supplier after Saudi Arabia.

The UAE provides about 20% of all of Japan's oil demand. Abu Dhabi National Oil owns 60% of the rights to the Upper Zakum field, while ExxonMobil owns 12% and another 12% is owned by the company.

The Upper Zakum oil field, located about 50 mi offshore northwest of Abu Dhabi city, has an area of 444 sq mi. Together, ADNOC and JODCO commenced the development work in the field in 1978 with the production started in 1982.

ADNOC transferred a part of its interest to EM in March 2006, and the production capacity has continually been increased since then at the field, which has now become one of the core oil fields in Abu Dhabi. The development work on the field is currently carried out using the artificial islands, while production capacity is targeted at 750,000 bbl/d.

Inpex, which is currently involved in more than 70 projects across 28 countries, has been part of the Australian business community since 1986.

## Appraisal drilling doubles reserves at Skarfjell field offshore Norway

Wintershall has upgraded reserves at the Skarfjell field in the Norwegian North Sea following a successful appraisal well.

The semi-submersible Transocean Arctic drilled the Skarfjell South well and side tracked 35/9-10S and 35/9-10A at a location 1.2 mi southeast of the discovery well, which was drilled in 2012 on the northern part of the structure.

The company proved oil and gas in two late-Jurassic upper and lower Intra-Heather sandstones, identified the presence of a gas cap, and reduced uncertainties over reservoir quality distribution.

Wintershall now calculates potential resources at 120 to 230 mmboe, compared with its previous estimate of 60 to 120 mmboe. This comprises 10 to 23 mmcm of oil and condensate and 8 to 15 bcm of gas.

Skarfjell is 9.3 mi southwest of the GDF Suez-operated Gjøa platform and about 80.8 mi northwest of Bergen. Wintershall said further drilling was probably not needed, allowing evaluation to start for a development. This could be done jointly with other discoveries in the area, potentially as a tieback to the Gjøa platform or other nearby facility, or as a standalone development. Transocean Arctic was headed north to production license 586 in the Norwegian Sea to drill a wildcat well for VNG Norge.



*The semi-submersible Transocean Arctic drilled successful well at Skarfjell field*

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## Emerson to provide power supply systems for FLNG

Shell has selected Emerson Network Power as the main uninterruptible power supply (UPS) systems provider for the company's Prelude floating liquefied natural gas (FLNG) project. The project is under construction in Korea for deployment to the Browse basin off the coast of Western Australia.

Emerson will help provide standby power for critical process functions, such as the main automation systems, fire and gas detection systems, as well as telecommunications. Emerson has awarded a contract to Alcad to design, manufacture, and supply eight large battery systems, featuring ultra low-maintenance nickel-based technology to provide the power. The battery systems consist of Alcad cells and will be installed in four battery rooms on the floating facility to provide power for the main automation systems, fire and gas detection systems, telecommunications, and emergency lighting.

Designed to ensure total reliability in the exacting industrial applications, such as found in the offshore oil and gas industry, the batteries will provide between 60 min to 4 hrs of autonomous operation, in the event of a loss of power from the main generators. The company's chloride industrial-grade UPS systems have been designed to supply backup power in the demanding environments for a lifetime of more than 20 years.

The Alcad cells also feature an ultra low-maintenance design with controlled gas recombination and a valve regulated venting system, and feature a compact design enabling the battery systems to offer a high-power and energy capacity within a small installation footprint.



*Shell's floating LNG vessel Prelude*

### Lankhorst receives largest-ever order for deepwater mooring ropes

The HHITECH consortium (Hyundai Heavy Industries and Technip USA) has contracted Lankhorst Ropes to supply the mooring lines for Statoil's Aasta Hansteen spar platform in the Norwegian Sea. Lankhorst claims this is the largest-ever single order for deepwater mooring ropes, and possibly the largest for synthetic fiber rope.

The spar, featuring a 650-ft long hull, will be in 4,265 ft of water, 186 mi west of Bodø, mid-Norway. It will be connected to 17 polyester mooring lines in groups of 6, 5, and 6 lines.

Lankhorst will supply 36 rope lengths (more than 141,076 ft) of its Gama 98 polyester deepwater mooring rope with minimum breaking strength of 1,905 tons (4200 kips).

A cut-resistant jacket, based on Dyneema fiber, which is integral with the rope construction, has been designed to minimize potential damage from trawl wire impact. Lankhorst will manufacture the ropes at its factory in Viana do

Castelo, Portugal. Delivery is scheduled for the first quarter of 2015, according to the company.

### Tamar partners assess tieback costs for latest offshore discovery

Delek Group has issued a reserves update for last year's deepwater Tamar SW gas discovery offshore Israel, which is operated by Noble Energy. The best-case scenario is 917 bcf, compared with 540 bcf under the previous assessment. Analysis of the well suggests the quality of the reservoir is higher than forecasted pre-drill, according to the Delek.

Tamar SW's reservoir also has a gas-to-condensate ratio similar to that found in the main Tamar reservoir. Delek estimates the Tamar SW drilling, completion, and development costs at \$94 million, plus an additional \$32 million in later years if recompletion is required.

Costs of completion and connection of the well to the Tamar infrastructure will be high due to the distance of the well from the Tamar subsea manifold and the timing of drilling and development.

### Enhancement measures boost oil production from Reshadat oil field

Output from the Reshadat oil field in the Persian Gulf has increased to 15,000 bbl/d as its early-phase production enhancement scheme comes onstream.

Saeed Hafezi, managing director of Iranian Offshore Oil Co., told Iranian news service Shana that production would reach 18,000 bbl/d once electrical power generation facilities on the platforms are fully operational.

Previously, the field's aging wells had been flowing 7,000 to 8,000 bbl/d, but new wells are being drilled to lift production. Eventually, Rehadat will produce up to 75,000 bbl/d of oil. The field, 67 mi southwest of Lavan Island, started production in 1968.

### BP, Energean sign deal for Prinos oil production off northern Greece

Energean Oil & Gas has signed a 6-year offtake agreement with BP Oil International for the entire oil production from the Prinos field offshore northern Greece. Value of the agreement, based on production projections and current oil prices, is \$681 million. Previously, the oil was sold to a local refiner.

Prinos and its satellite fields in the Kavala region provide Greece's sole offshore production. Over the past 6 years, Energean has invested more than \$245 million to revive Prinos and its facilities.

The agreement with BP will allow the company to pursue investments that include drilling three new wells on Prinos and North Prinos and two more development wells on the Epsilon oil field, southeast of Kavala.

The \$204 million program is designed to double oil production in the Kavala Gulf from the current 2,500 bbl/d.

### Centrica starts up Kew gas field in southern North Sea hub area

Centrica Energy has started production from the Kew gas field in the UK southern North Sea. The company has a 100% operated interest in Kew, which was discovered in 1998, about 89 mi from the Norfolk coast.

The field has been developed as a subsea tieback to Centrica's Chiswick platform via a 1.8-mi pipeline. The facilities form part of the company's Greater Markham Area hub, which also includes the Grove, Markham, and Stamford fields. Development drilling involved the use of hydraulic fracturing to maximize flow from Kew's tight reservoirs.

At peak, Kew will produce 35 mmcfd, and over time will bring 40 bcf of gas into production at the Greater Markham Area.

## GasLog to purchase three LNG carriers from BG Group

GasLog Ltd. has signed an agreement with Methane Services Ltd., an affiliate of BG Group, to purchase three LNG carriers from MSL's fleet and to charter those ships back to MSL for 6-year initial terms. MSL will also have options to extend the term of the time charters for two of the ships for a period of either 4 or 5 years at its election.

The ships to be acquired will be nominated by MSL from an agreed group of six sister ships built in 2006 and 2007. GasLog supervised the construction of all six ships and has provided technical management for the ships since delivery. The aggregate cost to GasLog for the ships is expected to be approximately \$468 million.

Each LNG carrier to be acquired is modern, steam powered, and has a capacity of 145,000 cm. The company estimates that upon their acquisition, these ships will represent about \$426.3 million of incremental contracted revenue over their initial charter terms.

"We know these ships well, having supervised their construction and technically operated them since their delivery from Samsung Heavy Industries," said Paul Wogan, chief executive officer of GasLog.

The closing of the transaction is subject to the satisfaction of certain conditions, including the completion of definitive documentation and necessary financing. GasLog expects the transaction to close in the first or second quarter of 2014.

In connection with the transaction, GasLog has obtained commitments from Citibank, N.A. London Branch for a \$325.5 million credit facility and a bridge loan facility. However, the company may pursue one or more alternative capital-raising transactions to finance a portion of the vessel purchase price.



## New FPSO Cidade de Ilhabela arrives in Brazilian waters

The FPSO Cidade de Ilhabela has arrived at the Brasa shipyard in Brazil. The SBM Offshore vessel berthed safely at the Niteroi-Rio based yard on 12 January following a 10,625 nautical mi voyage from China. Integration of the bare hull and topsides was to begin at Brasa, a joint venture construction shipyard between SBM Offshore and Synergy, where 10 of the vessel's 18 modules have been built. This FPSO is the yard's first project with 10 modules weighing a total of about 13,779 tons. Cidade de Ilhabela is also the first FPSO to be integrated at Brasa's quay No. 2. Three additional modules were constructed and delivered by EBSE, a Rio yard that SBM works closely with as part of its development of local content. Once in operation, FPSO Cidade de Ilhabela will be SBM's largest FPSO with a total of 24,251 tons in topsides. She is the company's second vessel in the Generation 3 model, engineered to the specifications of the presalt fields offshore Brazil.

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*Dacon rescue scoop undergoing trials*

#### Ocean Safety supplies Dacon rescue scoops to BP

UK-based Ocean Safety has supplied a pair of Dacon rescue scoops to BP through ship manager Bibby Offshore. The crane-operated, man overboard recovery systems Dacon scoops are said to be fitted to the BP offshore supply vessels Caledonian Vanguard and Caledonian Vigilance.

Conscious or unconscious people in rough weather can be rescued with the help of the semi-rigid, maneuverable rescue net. Dacon created the man overboard recovery solution in collaboration with Ocean Safety's Aberdeen, Scotland's branch manager Aidan Morrissey and Bibby Offshore.

The recovery solution has been tested in rough weather out-

side Aberdeen to ensure everything works as designed.

"We carried out 10 to 15 trial rescues in seas of 3 to 4 m to satisfy the client of the Dacon scoop's suitability," Dacon sales manager Daniel Olsson said. "During this trial, we also carried out crew training in the proper use of the product and everyone had a go at operating the crane to rescue the training dummy. It's important that a ship like this is equipped with proven and efficient equipment."

The Dacon recovery net forms a scoop in the water into which the vessel maneuvers to catch the person and subsequently lift to the railing, providing a gentle recovery with full length body support. This helps in reducing the possibility of injury aggravation and allows for recovery of an unconscious person.

#### Halliburton's deepwater presalt logging technology

Halliburton has provided wireline services technology for two deepwater presalt exploratory wells in Angola for Cobalt International Energy Inc. The wireline technology enhances the understanding of the rock and fluid properties of the formation and enables the company to make informed decisions and minimize drillstem test risks.

Combined with the standard suite of petrophysical tools, Halliburton employed its RDT reservoir description tool to collect formation pressure and samples over the course of 3 to 4 days. The tool collected reservoir formation pressure gradients, mini-drillstem tests with straddle packers, and fluid samples in a single run.

In addition, Halliburton's new HRSCT-B hostile rotary sidewall coring tool was deployed on both rigs, taking samples at three times the volume of conventional core samples for better lab results.

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## Cobalt reveals first Syn-rift find in deepwater Angola presalt well

Cobalt International Energy Inc., in partnership with the National Concessionaire Sonangol and Block 21 partners, reported the first discovery in the Syn-rift interval in the Bicuar No. 1A presalt deepwater exploratory well offshore Angola.

The well was drilled to a measured depth of 18,829 ft and encountered 184 ft of net pay from multiple presalt intervals. Results of logging, coring, and fluid acquisition confirmed the existence of both oil and condensate in multiple intervals. No free gas zones or water contacts were observed. All well data was collected via openhole logging.

This is Sonangol's and Cobalt's fourth deepwater presalt discovery offshore Angola. The Bicuar No. 1A well is the first discovery of mobile hydrocarbons in the deeper presalt Syn-rift reservoir. After running production casing, the well was temporarily abandoned.

Following full processing and integration of all subsurface data collected from the well, the Block 21 partners will evaluate any additional activities necessary to assess Bicuar's commerciality.

Cobalt, as operator, owns a 40% working interest in Block 21. Partners include Sonangol Pesquisa e Produção SA, Nazaki Oil and Gaz, and Alper Oil Limitada.

## Twenty discoveries registered off Norway in 2013, up from 2012

Wells drilled offshore Norway last year led to 20 discoveries, according to the Norwegian Petroleum Directorate (NPD). This is seven more than in 2012.

Exploration activity was highest in the North Sea where seven oil and gas accumulations were proven. Elsewhere, there were eight discoveries in the Norwegian Sea and five in the Barents Sea.

NPD estimates cumulative resources in the range 50 to 106 mmcm of oil and 30 to 58 bcm of recoverable gas.

Last year, Norwegian fields produced 213.7 mmcmoe, 4.9% down from 2012. This year, NPD estimates a slight increase to 215 mmcmoe, with production continuing to rise at modest levels over the next decade.

Four Norwegian fields came onstream in 2013, and 13 currently are under development. Operators on the shelf expect to submit another 13 plans for development and operation over the next 2 years, of which 9 could be in the North Sea, 3 in the Norwegian Sea, and 1 in the Barents Sea.

Investments should reach \$28.5 billion in 2014, \$487 million more than the

preliminary figure for 2013. Following a further increase in 2015 to around \$29.2 billion in 2015, investment should stabilize at around \$27.5 billion per year up to 2018.

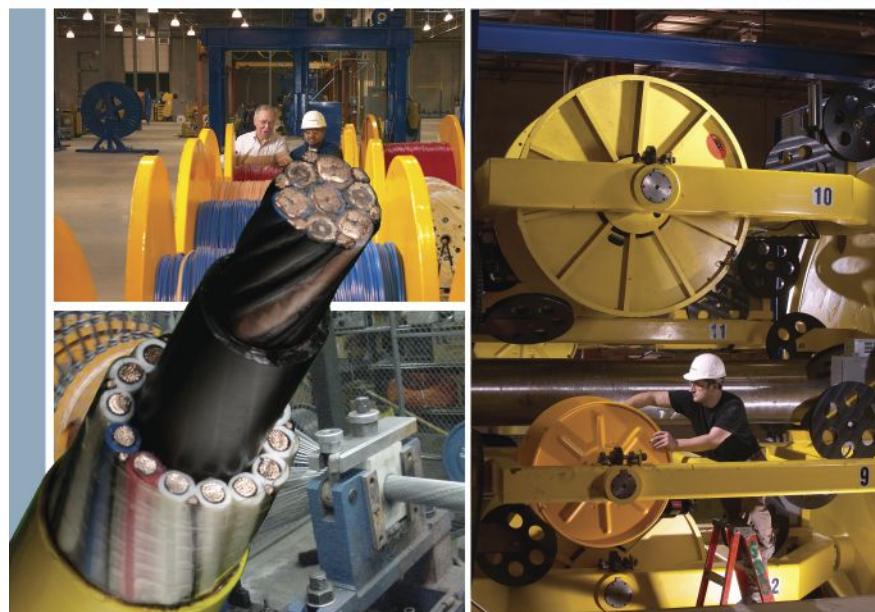
## Sri Lanka hopes to spur offshore E&P activity with leasing round

Sri Lanka is set to lease 13 blocks in the Cauvery and Mannar basins this year, along with six ultra-deepwater "joint study" blocks to the east and south of the

island nation, each ranging from 6,950 to 10,040 sq mi. The blocks in the Cauvery basin range in size from 928 sq mi in the shallow waters of the Palk Straight, between Sri Lanka and India, to 1,763 sq mi in deepwater to the northeast of Sri Lanka. The blocks in the Mannar basin are larger, ranging in size from 1,048 sq mi to 3,135 sq mi in the deep to very deep waters of the Gulf of Mannar. Under the first round in 2007, Sri Lanka leased one block in a three-block offer.

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### Aker Solutions develops Casing Stabilizer Arm for tubular handling

Aker Solutions, a leading provider of oilfield products, systems, and services for the oil and gas industry, has developed the Casing Stabilizer Arm (CSA), which eliminates the need for a person to



*Aker Solutions' Casing Stabilizer Arm*

be elevated on a derrick for tubular make-up. The CSA, which enhances Aker's existing line of tubular handling equipment, is designed for both offshore and onshore rigs. The stabilizing mechanism is stowed approximately 33 ft above the drilling floor and includes an internal hydraulic cylinder that extends and closes the padded jaws operated by a radio remote control.

The CSA uses only three hydraulic cylinders to position and mobilize the

pipe jaws, including a lifting, extension, and clamping cylinder.

Aker's unit also provides increased safety features that allow the device to interface with the rig's anti-collision zone management system. The unit is rated for Class I, Division 1 locations and has double protection for dropped objects.

A warning and alarm system is built into the CSA along with an emergency shut-off control. Additionally, a shear pin is installed on the unit as a safeguard for unexpected downward clash by hoisting equipment. The CSA is equipped in tubular capacities of 2-7/8 to 22-in. diameter without changing jaws. Additionally, it offers wireless remote control and local manual control.

For more information, contact rick.comeaux@akersolutions.com.

### Trelleborg supplies floatover mating technology to Myanmar oil platform

Trelleborg's engineered products operation supplied its floatover mating technology to one the world's largest oil platforms – the SHWE Project in the Bay of Bengal, Myanmar.

Working closely with the engineering, procurement, construction, and installation contractor, Hyundai Heavy

Industries (HHI), Trelleborg provided a number of its leg mating units (LMU), deck support units (DSU), load transfer units (LTU), and floatover fender systems to meet requirements for the heaviest load that an LMU has ever been commissioned for.

With the project's topside weighing in at a substantial 30,000t, one of the LMUs Trelleborg delivered was designed to bear a compression load of 12,450 mttons. Trelleborg engineered products operation engineering manager JP Chia said that the company's test press has a load capacity of 18,300 tons and weighs 600 tons.

"Though the specification was demanding, we were able to produce tailor-made engineering solutions that were ideal for the environment and application, as well as handle the production from end to end," Chia added.

The topside was transported from HHI's fabrication yard in Ulsan, Korea on a barge equipped with eight of Trelleborg's DSUs, which were fitted to the deck support frame to allow movement between the deck and deck support frame horizontally during and after the mating process. Four LTUs were also provided to reduce any damage to the supporting structure.

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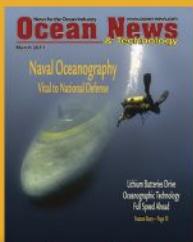
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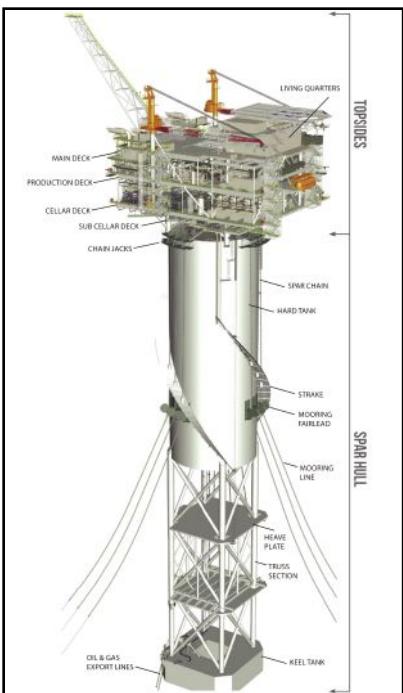
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## **Lucius spar installation complete in ultra-deepwater Gulf of Mexico**

Anadarko Petroleum has completed installation of the 80,000 bbl/d of oil capacity Lucius spar in deepwater Gulf of Mexico. The topsides are expected to be towed to location in the first quarter of 2014. Lucius is on schedule toward first oil production in the second half of 2014, said Anadarko, and construction on the Lucius-look-alike Heidelberg spar is more than 70% complete. It is on schedule for first oil production in 2016.



*Schematic design of the Lucius spar.*

Anadarko's 2013 deepwater U.S. Gulf success was highlighted by the emergence of the Shenandoah basin. Following the Anadarko-operated Shenandoah-2 appraisal well, which encountered more than 1,000 net ft of oil pay, and oil discoveries at the nearby Coronado and Yucatan prospects, Anadarko enhanced its ownership position in Coronado.

Anadarko is the only company with ownership in all three discoveries in the Shenandoah basin. In addition, Anadarko and its partners are accelerating appraisal activity in the basin with appraisal wells under way at Coronado and Yucatan and a rig committed to drill a delineation well at Shenandoah beginning in second quarter of 2014.

## **Nexans wins major Gulf of Mexico power umbilical contract for Julia**

Worldwide cable industry company Nexans has been awarded a major contract by OneSubsea to design, manufacture, and supply an integrated power umbilical solution and associated termina-

tion hardware for ExxonMobil's Julia oil-field development in the deepwater Gulf of Mexico.

A 23 km length of Nexans' power umbilical, which combines power cables and umbilicals in a single cross section, will be installed at water depths in excess of 2,000 m to tie back the Julia field subsea systems to a semi-submersible production unit. The Julia field production start-up is scheduled for 2016.

The power umbilical includes a num-

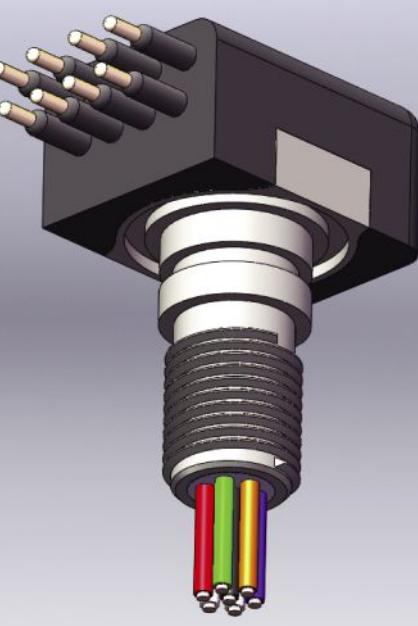
ber of steel tubes as well as fiber optic elements and signal cables for control and monitoring purposes. For the Julia project, the power umbilical will operate subsea pumps supplied by OneSubsea, a Cameron and Schlumberger company.

"This important contract for OneSubsea continues Nexans' momentum for power umbilicals in the deepwater Gulf of Mexico," said Krister Granlie, vice president, Hybrid Underwater Cables, Nexans Norway.



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## Delta SubSea LLC (DSS) signs long-term charter on VOS Sympathy

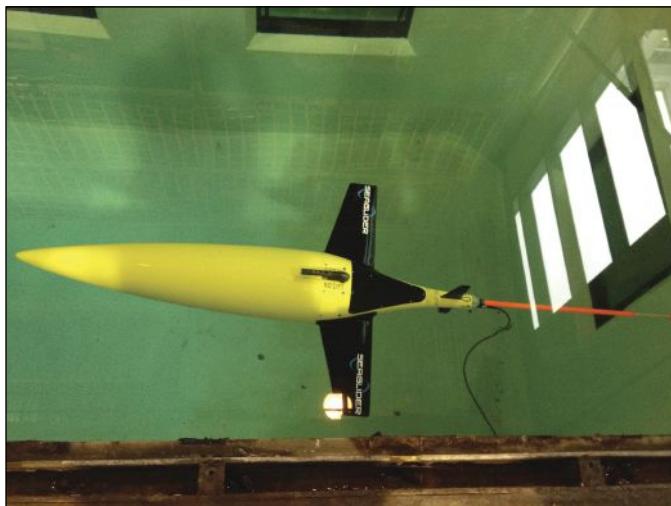
DSS signs-long term charter on DP II IMR support vessel VOS Sympathy for international scopes of work. DSS mobilized two FMC Technologies Schilling Robotics HD 150 HP systems, complete tooling, and full survey suite provided by UTEC Survey. VOS Sympathy will be based out of Trinidad & Tobago. She will operate as an ROV platform and light construction vessel for two projects, supporting the operations of a pipe layer. "I am excited about this vessel charter as it allows DSS to respond quickly to our clients' needs in remote locations that require 'Best in Class' ROV support services," said Scott Dingman, Delta SubSea's President – CEO.

## SRP awarded large contract for Rocksteady™ with Carnegie Wave Energy in Australia

Subsea Riser Products (SRP), an Acteon company, has been awarded a large contract with Carnegie Wave Energy to provide subsea foundation connectors, articulating bearings and tether assemblies for Carnegie's Perth Wave Energy Project off Western Australia. This is the first time that a variant of the SRP Rocksteady™ subsea mooring connector will be deployed on such a project, following successful qualification and fatigue testing in 2013. The Carnegie project will be the first wave power application in the world to operate with multiple wave power converters in an array and the first to produce both clean power and fresh water. The scope of the contract includes three Rocksteady™ mooring or foundation connectors, with a breaking load (MBL) rating of 2,000 tonnes. They are part of articulated bearing assemblies in a shallow water depth of 30 m, situated off the coast of Western Australia. Manufacturing and assembly work will take place in the UK and mainland Europe, and the first phase of equipment will be delivered in the first quarter of 2014. The project will require skills from a range of departments within SRP, including design, engineering, quality, and procurement. Alexandre Pichard with Carnegie said, "Carnegie selected SRP for the supply of key cylindrical energy transfer oscillating (CETO) unit components via a competitive tender process that considered proven performance in similar applications, cost, and schedule. SRP was very responsive to key selection criteria and demonstrated an appetite to provide an innovative solution to the project requirements." Mike Ridgway, head of business development, SRP, added, "This is a significant project award because of the very demanding load conditions of the application. Our Rocksteady™ connector's performance, particularly its automatic latching and resistance to bending, torsion, and compression, was a key factor in the Carnegie decision to source from SRP. The restricted space available for the connector also required some clever engineering to achieve the client's specification, including redevelopment of the locking mechanism from a mechanical system to hydraulic hot stab. This contract provides an excellent example of how SRP can overcome challenging engineering issues as well as the versatility and quality of the Rocksteady™ subsea connector."

**PORPOISE Robotics: High School nautical STEM program**  
PORPOISE Robotics was initiated with development funding from the Office of Naval research in 2011 to 2012. The goal: develop a nautical STEM robotics program to guide high school students to higher education in engineering and STEM careers. PORPOISE is now starting its third semester of daily classes at Washington Prep High School in Los Angeles. The program has become one of the school's most popular classes. The PORPOISE first semester covers basic robotic principals, the Arduino microprocessor, C++ coding, sensors and effectors. We also invite leading engineers to speak, as well as mentor students. With a goal to be affordable for underserved schools, first semester student teams receive a robotics kit containing the Land Shark robotic car, Arduino Mega microprocessor, breadboards, sensors and motors for \$200 per kit. Two students share a kit giving a per student price of about \$100.00. Compared to other programs, this is much more affordable and scalable.

## Full scale production of Kongsberg Seaglider begins



Tank testing Kongsberg Seaglider

Kongsberg Maritime subsidiary Kongsberg Underwater Technology, Inc. (KUTI) has started full-scale production of the innovative KONGSBERG Seaglider™ Autonomous Underwater Vehicle (AUV) from a new fabrication center at its facility in Lynnwood, Washington. This follows KUTI's acquisition of the exclusive license to develop, manufacture, and market the innovative Seaglider system from the University of Washington in May 2013.

Seaglider was developed at the University of Washington in Seattle with funding from the U.S. Office of Naval Research. It is an AUV, or underwater glider, developed for continuous, long-term measurement of oceanographic parameters. Rather than an electrically driven propeller, the vehicle uses small changes in buoyancy and wings to achieve forward motion. The system's pitch and roll are controlled using adjustable ballast, which is actually the vehicle's battery. This unique approach enables deployment for up to 9 months at a time.

Since obtaining the technology license, KUTI has been establishing an engineering, production, and support operation for manufacturing the KONGSBERG Seaglider, at its Lynnwood facility, which is just 12 mi north of the University of Washington. The KONGSBERG Seaglider Team has completed extensive training with the university's Seaglider Fabrication Center personnel and is pleased to announce that full-scale production of Seaglider systems has begun. In addition to manufacture of new Seaglider vehicles, the facility is also performing refurbishment or upgrade of existing systems.

"We are very happy with the progress of our underwater glider systems program," remarked Rich Patterson, General manager underwater glider systems, Kongsberg Underwater Technology Inc. "In only 6 months, we have been able to establish a top notch engineering and production group, and we are busy fulfilling orders for several systems that will ship during the first half of the year."

As the first vehicle from the new Kongsberg Maritime business unit, Underwater Glider Systems, KONGSBERG Seaglider is capable of deploying a diverse range of sensors, making it a cost-effective instrument for collecting a wide variety of ocean data. This makes it a very attractive option to the many organizations that are facing the challenge of oper-

ating on smaller budgets. Kongsberg Maritime is committed to developing additional capabilities for its new AUV while at the same time working on transition of the technology into the commercial sector.

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

### **Forum Energy Technologies awarded contract for eight ROVs from Subsea 7**

Forum Energy Technologies, Inc. announced that it received an order from Subsea 7 S.A. to supply eight work-class ROV systems. The ROVs will be delivered through late 2014 and 2015.

The order comprises two Perry™ XLX Evo 200HP ROVs for Subsea 7's new-build Heavy Construction Vessel and six Perry XLX-C 150HP ROVs for three new-build Pipe-lay Support Vessels for the Brazilian market. The Perry XLX Evo heavy work-class and XLX-C medium work-class ROVs are the latest generation of the Perry XL series. The XLX-C features enhanced performance across the full range of intervention and survey activities without compromising the reliability of the XL series.

Forum is pleased with its association with Subsea 7, a premier subsea contractor," said Bill Boyle, Forum Subsea Technologies' senior vice president. "The choice of Perry vehicles for the operationally demanding Brazilian market represents a vote of confidence in the reliability of the XLX-C system and supports Forum Subsea's strategy of providing first-class engineering and after-market support and service to Subsea 7 and our other Brazilian customers from our facilities in Rio de Janeiro and Rio das Ostras."

For more information, please visit [www.f-e-t.com](http://www.f-e-t.com).

### **Subsea Robot passes field test trials**

WorleyParsons, licensee of the Unmanned Subsea Surveyor (USS), announced it had completed sea trials and begun taking orders for its subsea robot. This achievement puts WorleyParsons in a position to remotely inspect subsea assets of the environment with precision repeatability for up to a year, all executed from the office. The robot was a vision of the company to reduce the HSE exposure of its personnel in the field, but has also provided

scientific and engineering outcomes as well as increased data capture.

This significant milestone will be marked by a 3-month deployment for Port Hedland Port Authority monitoring coral health. "Having an inspection tool which can cover 300 m<sup>2</sup>, remotely, repeatedly for such a long duration is a great milestone for the subsea asset inspection industry," said Peter Mellor, manager ports, terminals and marine sciences at WorleyParsons. "We are very

pleased that our customers have recognized the value of our solutions and our ongoing commitment to zero harm."

The core innovation enabling the USS to provide a superior monitoring outcome relates to technology that allows a remote user to capture a variety of images (or other peripherals) in a subsea environment. Specifically, the device includes a field-mounted hydraulic telescopic arm (extends 10 m) connected to a base that can rotate 360

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degrees. An advanced underwater camera is attached to the arm and can capture any subsea image from a range of aspects. The hydraulic arm and camera can be operated from the surface or remotely from any location globally.

"The sophistication of our monitoring solutions means it is now possible to obtain increased data capture and more accurate data in the marine environment in real-time. WorleyParsons' Complete Diverless Solutions are not 'off-the-shelf' products and, in many cases ,include equipment that we have exclusive use of," Mr. Mellor said.

"Our bespoke equipment has been customized through an iterative process, combining our understanding of marine science requirements, engineering know-how, and field proven trials in extreme weather conditions."

Through 36 months of development and field application, WorleyParsons now delivers more accurate and reliable data than data obtained with divers, at an increased frequency or on demand. The accuracy and regularity of this data provides a basis for more informed project decisions and maximizes productivity and schedule integrity by expediting data analysis and subsequent reporting.

"Through the implementation of exclusive innovative technology, WorleyParsons has created a step-change for the marine environment industry-improving safety risk and providing better data and environmental outcomes while creating value for our customers," Mr. Mellor said.

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

## Hydrography geospatial data management and production system for Malaysia

As the national hydrographic and charting authority in Malaysia, the Hydrographic Directorate of the Royal Malaysian Navy (HDRMN) has a man-

date to collect measurements using modern techniques, and provide adequate and timely hydrographic information to support safety of navigation, national development, defense and security, and numerous other activities related to the use of Malaysia's marine environment.

In order to achieve these goals in the most efficient manner, CARIS and local Alliance Partner OKENOS Sdn. Bhd. were selected to implement a Hydrographic Geospatial Data Management and Production System (HGDMPS) at the National Hydrographic Centre (NHC). The enterprise GIS, comprised of Bathy DataBASE and HPD, will allow NHC to increase organizational capability for the management of elevation datasets, production of multiple paper and electronic chart types from a single database source, and improve the sharing of spatial information through a Marine Spatial Data Infrastructure (MSDI).

Captain Zaharuddin Mohd Maideen RMN, director of Hydrographic & Oceanographic Centre said, "Like any other hydrographic office, RMN is facing increasing size and coverage of multibeam sonar data, increased demand for distribution of products, a desire to make use of new and historical data and to make it accessible to its clients. In mitigating the issue, and as an effort to streamline the flow of hydrographic information from acquisition through to the creation of products, RMN procured the HGDMPS in December 2013. HGDMPS is a bathymetry and hydrographic database management system inclusive of processing and production module for hydrography and cartographic product based on concept of 1 source, multiple products. This system is also able to construct a variety of products from a single source (primary data), instead of the present capability of constructing products from a product. This is a significant production switch, which may actually eliminate errors and offer an error free product."

CARIS and OKENOS are very pleased to announce that NHC has taken final acceptance of the new system. During the delivery, CARIS personnel were on site for more than 10 weeks of system training, and to assist with the migration from existing tools and workflows. "The transition to an enterprise GIS represents a technology milestone for many hydrographic offices, which allows them to optimize data flows and

use of resources. We are very proud to be a part of this significant change for NHC and their ping-to-chart processes." says Matt Holland, Deputy Marketing and Sales Manager at CARIS.

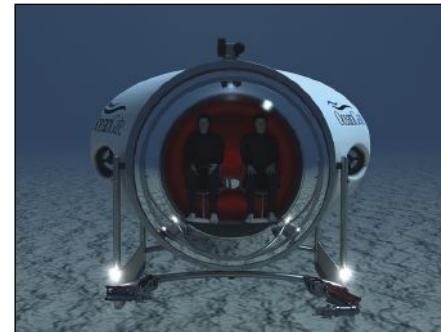
NHC originally implemented CARIS tools in the 1990s to advance nautical chart production. CARIS and OKENOS look forward to the continued cooperation with the hydrographic authority as they realize operational efficiencies with the database solution to support Malaysia's maritime community.

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

## OceanGate Inc. transforms Lula 500-m submersible to Cyclops 500 prototype

OceanGate Inc., a global provider of manned submersible solutions for commercial, research, and military applications, announced the start of a comprehensive refit of the Lula 500 submersible to transform the vessel into a fully functional Cyclops prototype with depth capabilities to 500 m. The renamed Cyclops 500 will function as a test platform for software, technology, and equipment to be deployed on the 3,000-m Cyclops submersible, scheduled for launch in 2016. OceanGate's Cyclops program was developed to meet increased demand from government and commercial clients worldwide.

Cyclops 500 new features will include an enhanced automated control system to monitor life support, power management, navigation, and other critical system diagnostics. Using a combination of Commercial Off the Shelf (COTS) technology and innovative system architecture designed by the Applied Physics Lab at the University of Washington and OceanGate's internal engineering group, the automated control system aims to revolutionize how manned submersibles operate by reducing time spent on vehicle control and increasing time on mission objectives. This control system will also



improve mission safety, reducing opportunity for user error. Other reengineered technology features include new hydrodynamic components designed to maximize the submersible's in-water speed and maneuverability and remodeled interior seating and instrument layout to enhance the client experience and increase productivity.

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

#### **Unique Seaflex facilitates underwater lift for Lundin FPSO mooring retrieval**

Unique Seaflex, a Unique Maritime Group company, which is one of the world's leading integrated turnkey sub-sea and offshore solution providers, has facilitated one of the most complex underwater lift projects. The project was carried out for Lundin Tunisia BV in approximately 300 m of water.



Lundin Tunisia BV is a 40% stakeholder in and operator of the Oudna field 80 km offshore Tunisia.

Abandoned by Shell in the mid-80s when relatively small discoveries in relatively deep water were still considered unviable due to lack of pipeline infrastructure, with the advent of the FPSO came a new way to make such fields viable. Oudna was accordingly demothballed a decade or so ago, and serviced until recently by the FPSO Ikdam.

At end of the field's viable lifecycle, the problem arose of how best to decommission the FPSO—and in particular how to take care of the delicate operation of disconnecting several hundred tons' worth of moorings without incident.

The use of Unique Seaflex ALBs allowed the deck-mounted linear winch to pull on the chafe chain so as to slacken the connection to the Ikdam deck hook. The connecting shaft was then pulled out from the wren hook and, by doing so, freed the chafe chain thus allowing the mooring system to gently be lowered on a wire, thereby de-tensioning the system.

Once released, the chafe chain was transferred to a nearby AHTV that held the de-tensioned mooring system while the Ikdam FPSO disconnected.

Along with the fleet of ALBs, Unique Seaflex also supplied all the heavy duty shackles and lifting slings as well as an air inflation/deflation system and a topside technician to oversee the operation and ensure the safest and most efficient use of the package of equipment.

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

#### **Flooded tunnel inspection record broken**

Inside Australia's Snowy Mountain hydro scheme, leading underwater service provider, Hibbard Inshore, say they have broken the record for the longest tunnel inspection by a tethered vehicle using their newest long-range vehicle, the Saab Seaeye Sabertooth. Importantly, this meant there was no need to drain the tunnel system, which saved closing down several power stations.

During a round-trip of over 24 km, Hibbard Inshore's customized Sabertooth AUV/ROV collected real-time visual data while scanning the tunnel with multibeam sonar.

The mission set out to gather high-density dimensional data, discover open cracks or holes, find debris build-up, detect lining failures, and identify any rock falls.

From the data collected, Hibbard created 3D models ready for maintenance planning and comparable inspection data to identify future trends in tunnel condition.

Hibbard Inshore has so far inspected six trans-mountain tunnels across the Snowy Hydro Scheme using this method and will return in 2014 for further inspections.

Previously, the tunnels had to be drained for examination, risking col-



lapse of the tunnel and endangering inspection personnel.

The challenges for Hibbard Inshore included entering narrow shafts, navigating tight bends, working in limited visibility, and managing within a strict schedule.

The Sabertooth can operate as either a remotely operated vehicle (ROV) with a tether to allow for real-time data and pilot control or as an autonomous underwater vehicle (AUV) to give flexibility in various tunnel inspection scenarios.

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

#### **EIVA launches ROTV solution dedicated to magnetometer surveys**

The offshore survey solution specialist EIVA a/s adds a new model to its popular product range of Remotely Operated Towed Vehicle (ROTV) solutions with the launch of the ScanFish Katria.

ScanFish Katria is specially designed for detection of sub-bottom magnetic anomalies, combining more than 30 years of experience in the offshore survey industry with high-end equipment and a design process based on customer requirements.

The intelligent platform allows for time-efficient magnetometer surveys, as it covers larger survey areas in one sweep through a horizontal setup of four magnetometers. By means of the terrain-following operation mode, the magnetometers are positioned as close to the seabed as the topography allows. This ensures less expensive operations and high-quality data with better indication of signal strength and origin.

Magnetometer quality and performance are key to successful surveys. Therefore, the magnetometer type included in the ScanFish Katria is the Geometrics G-882 Marine Magnetometer, a high-end yet low-cost solution and the most used in the industry.

As the ScanFish Katria is towed at a distance, any type of vessel can be used without risking the survey data being affected by its magnetic signature.

The ScanFish Katria standard package combined with the optional extras, including for example winch and tow cable, constitute a turn-key solution, offering all the necessary components for an optimal magnetometer survey set-up that matches your exact needs.

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

**Inmarsat appoints manufacturing partners for Fleet One**  
Inmarsat announced the appointment of Addvalue Technologies and Cobham SATCOM as manufacturing partners for Fleet One, the company's new voice and data satellite service designed specifically for the maritime leisure and fishing community. Addvalue and Cobham will each manufacture a terminal for Fleet One, which is due to enter commercial service during the second quarter of 2014. Fleet One will be the latest addition to Inmarsat's L-band portfolio. The new service has been designed to meet the particular communications needs of leisure mariners, day boaters, and sport and coastal fisherman, providing uninterrupted, nearshore voice and data connectivity.

#### Carnival, MTN sign agreement for Internet services

Carnival Corporation has signed a new agreement with MTN Communications for the provision of Internet services to its guests and crew. The agreement covers several Carnival Corporation brands, including Princess Cruises, Cunard, and P&O Cruises (UK), and will enable MTN to continue a partnership of more than 20 years in delivering crew welfare and passenger solutions to Carnival. Carnival has also extended its existing agreement for MTN broadcast television services, MTN Worldwide TV, which provides a wide range of television content, including news and entertainment to 50 of its ships across the globe. In addition, Carnival Corporation brands in Alaskan waters will continue to leverage MTN's Terrestrial Broadband Services while in port, with the opportunity to explore the possible expansion of this service.

#### Speedcast re-brands to create new global force

SpeedCast announced the latest step along its global expansion journey—a unifying of its brand to create a single new force with a top five position in the industry. With more than 15 years of experience, SpeedCast has enjoyed sustained success and growth from its base in Hong Kong and now supports customers across more than 60 countries through 16 sales and support offices, 30 teleport operations, and a network of 150 partners. Since embarking on its global expansion 2 years ago, SpeedCast has acquired other established satellite industry players, Australian Satellite Communications, Pactel International, and Elektrikom Satellite Services. SpeedCast made its announcement on the opening day of the Pacific Islands Telecommunications Association (PITA) meeting in Honolulu, Hawaii, where many of its customers were attending. The company also appeared and spoke at the Pacific Telecommunications Council (PTC) at the same venue on the following day. SpeedCast's maritime business is a new emerging force with a leadership position in Asia and growing momentum in Europe. Within the maritime sector, SpeedCast has a reputation for total service and innovation, such as when it pioneered the first global Ku-band satellite communications network with auto-beam switching. It now offers a full range of C-band and Ku-band services.

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

Iridium Communications Inc. announced the first one-to-many global data broadcast service, Iridium Burst, enabling enterprises to send data to an unlimited number of devices anywhere on Earth whether inside buildings, in-vehicle, or in aircraft. Iridium Burst leverages the high power channels of the Iridium satellite network to offer a cost-efficient, customizable and low-latency broadcast data service that can provide service globally with high signal penetration capabilities superior to traditional paging and broadcast services. From tsunami warnings to weather and traffic alerts, over-the-air updates, and other machine-to-machine (M2M) applications, Iridium Burst presents an unrivaled opportunity for businesses, government agencies, militaries, and other entities needing to broadcast data. As organizations worldwide seek ways to quickly and efficiently communicate with people and devices, Iridium Burst's groundbreaking service offers transmissions that are four times more powerful than traditional satellite data services, reaching anyplace on the planet in as little as 20 seconds. In addition to penetrating vehicles and buildings, transmissions can penetrate partial obstructions and even weather phenomenon. Users can target Iridium Burst transmissions to specific devices, within specific geographic locations like towns or states, or to broad areas such as an entire continent.

## MTN's hybrid network transforms communications at sea



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

With approximately 4,000 guests and 1,600 crew, Norwegian Getaway, the world's newest cruise ship, is the first to showcase one of the most visionary communications solutions at sea today. While sailing in the open sea is a remote experience, guests and crew members don't want to leave their "connected lives" back in port. Being able to share experiences as they are happening and staying connected to friends and family while on vacation are must-haves for consumers today.

Cruise ships traditionally have relied solely on satellite bandwidth. The new MTN Terrestrial Broadband Network delivers faster, more efficient connections, enables access to applications and content, and optimizes corporate IT data. This allows people to bring their daily online habits with them to sea—including social media, infotainment, content, and more.

Between 2008 and 2013, MTN managed a six-fold increase in satellite bandwidth requirements as a result of Internet, content, and voice usage. Internet logins on the MTN network more than doubled to almost 33 million per year. Voice communications increased approximately 50%.

To support this new hybrid network, MTN equipped Norwegian Getaway with the industry's most sophisticated software systems to maintain multiple types of connections simultaneously. It also uses the fastest data path available so it can access terrestrial broadband when near and in ports. A broadband antenna tracking and stabilization system enables the ship to "lock" onto an MTN access point in-port for terrestrial broadband connectivity with no impact to the end user during the switchover.

Key to this land-like level of service, the shipboard data center of Norwegian Getaway is also equipped with the industry's most advanced processing technologies. Leveraging these technologies, MTN is delivering improved efficiency and throughput for Internet, television, and crew calling services on the vessel.

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

## KVH ships 4,000th TracPhone system for mini-VSAT Broadband network

KVH Industries, Inc. recently shipped its 4,000th TracPhone terminal for the mini-VSAT Broadband network, adding more than 1,000 units in the past year and extending the company's market share lead in maritime VSAT service. KVH's mini-VSAT Broadband service has steadily grown in both geographic coverage and network capacity to become the world's largest Ku-band maritime VSAT network. In 2013, the network delivered 370 TB of data and 23 million voice minutes to an extensive array of vessels, such as tankers and containerships traveling the world's major shipping routes, fleets in remote fishing grounds, offshore supply vessels in major oil and gas regions, Coast Guard cutters patrolling the U.S. coastline, and luxury yachts on coastal and offshore voyages.

The mini-VSAT Broadband network's growth has been spurred in part by the increasing demand for broadband on commercial vessels, where more and more operational procedures require an Internet connection – whether it is to comply with maritime regulations, maintain communications with fleet headquarters, remotely monitor vessel systems, or access weather and navigational information. Crew members on commercial vessels and individuals on private yachts also rely on Internet access and Voice over Internet Protocol (VoIP) services to surf the web and stay in touch with friends and family on land.

KVH more than doubled the capacity of the mini-VSAT Broadband network last year by deploying Variable Coding, Spreading, and Modulation (VCSM) technology provided by ViaSat, Inc., which enables the network to handle transmissions more efficiently and increases the amount of data that can be carried over the network. The mini-VSAT Broadband network uses a combination of 19 Ku-band transponders and 3 C-band beams to provide total global coverage.

KVH's innovative approach to the antenna hardware designed for the mini-VSAT Broadband network is another factor in the service's growth, as customers have responded favorably to the small, easy-to-install TracPhone onboard terminals that are as much as 85% smaller than traditional VSAT systems. This compact design is made possible by the mini-VSAT Broadband service's use of spread spectrum technology, an advanced solution designed specifically for mobile applications and one that enables small, on-board terminals to receive fast, affordable VSAT quality data connections. This ease of installation made it possible for BW, a worldwide leader in maritime energy transportation, to install KVH's global C/Ku-band TracPhone V11-IP antenna system on board 15 of its LNG and LPG carriers within a 3-month period.

The advanced TracPhone V-IP antenna systems, which are designed and optimized by KVH for mini-VSAT Broadband service, include the TracPhone V11-IP, a 1.1-m diameter, dual-mode C/Ku-band antenna for global VSAT connectivity; the TracPhone V7-IP, a 60-cm diameter enterprise-grade antenna for Ku-band service worldwide; and the TracPhone V3-IP, a 37-cm diameter Ku-band antenna that is the world's most compact maritime VSAT antenna. All three TracPhone V-IP systems include the Integrated CommBox™ Modem (ICM), a streamlined belowdecks unit that replaces the need for a rack full of components and integrates all antenna control, onboard network management, and modem functions in one small box.

# Caldwell

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

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

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

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

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

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

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

### FIELD ENGINEER / PROJECT COORDINATOR FOR THE MARINE CONSTRUCTION INDUSTRY

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

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

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

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

CALDWELL MARINE INTERNATIONAL, LLC  
1433 Highway 34, South  
Farmingdale, New Jersey 07727  
[marc.dodeman@caldwellmarine.com](mailto:marc.dodeman@caldwellmarine.com)



The recent enhancements to the mini-VSAT Broadband network together with the on board network management capabilities of the TracPhone V-IP systems play a key role in KVH's recently announced IP-MobileCast content delivery service. This service, which is expected to be available later this year, is designed to deliver news, entertainment, sports, and training content directly to subscribing vessels over the top of the mini-VSAT Broadband connection using a separate data stream and idle network bandwidth such that the content delivery will not affect the customer's data plan or on board data speed. IP-MobileCast will also deliver operational data such as electronic chart updates and weather information.

The IP-MobileCast content will be provided by KVH Media Group, which was formed after KVH's May 2013 acquisition of Headland Media. KVH Media Group's brands include NEWSlink, which provides digital newspapers for merchant vessels and cruise ships; MOVIElink and TVlink, which provide new-release Hollywood movies and television programs; SPORTSlink, which provides sports highlights and video clips from around the world; MUSIClink, which provides a variety of music channels on board; and TRAININGlink, which provides an extensive array of maritime safety films.

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

## Thuraya unveils Orion IP Maritime Broadband terminal

Thuraya Telecommunications has launched its first dedicated maritime broadband terminal as it strengthens its focus on this growing segment. Thuraya Orion IP is a maritime-specific broadband terminal manufactured by Hughes Network Systems, LLC

(Hughes), the global leader in broadband satellite solutions.

Capable of data transfer at rates up to 444 kbps, Thuraya Orion IP leverages the company's highly reliable and uncongested network, with maritime broadband pricing packages to provide the best value for connectivity available to users in the shipping sector.

Building on Thuraya's well-established voice and narrowband maritime offerings, Thuraya Orion IP further increases the choice available to owners and operators looking to combine reliable hardware with cost-effective, flexible pricing plans.

The terminal is been designed for users who want simplicity in installation, flexible operations, and a platform that enables vessel operators to use their own value-added services as well as those from Thuraya. The Thuraya maritime broadband pricing plan, launched in 2013, has proved popular with owners and operators thanks to its flexibility: post-paid plans enable users to choose from high volume, low usage, or VSAT backup options.

The Thuraya satellite network provides high-quality L-band coverage spanning Northern Europe, Africa, the Middle East, North and South Asia and Australia. Current estimates suggest that at least 30,000 merchant maritime vessels operate under its footprint, including thousands of vessels that previously could not justify the higher CAPEX and running costs of competitor offerings.

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

## Orange extends satellite presence to corporate networks in the Americas

Orange Business Services is broadening its satellite service capabilities in the Americas, extending its presence across corporate private networks with increased capacity, new licenses, integrated services and customer implementations in the oil, gas, mining and shipping industries.

In response to market demand, Orange Business Services has recently doubled its satellite capacity in the Americas, both in terms of new satellite space capacity and the addition of two new teleports – one on the West Coast and one on the East Coast of the U.S. – to provide solutions across the entire Americas region. Independent and ubiquitous satellite connections enable enter-

prises to conduct business in more remote locations and prevent outages via an ultra-secure secondary back-up solution.

In addition, Orange received federal maritime licenses for offshore satellite operations in U.S. territorial waters. As a result, Orange can provide services anywhere its clients are operating, across North and South America or surrounding waters.

Offering live telepresence over a satellite connection, Orange Business Services can deliver high-definition video to a broader range of remote regions that were previously unreachable via fixed lines. The service is particularly vital for companies in specific sectors that are exploring highly isolated territories. Workers can use the service to access medical specialists or geology experts that would be too costly or impractical to embed on site. Customers can demo the service at Orange's recently launched integration and briefing center in Clearwater, Florida, or from any telepresence room in Orange's global network.

Particularly in the Americas, Orange has experienced an uptick in satellite engagements. Enterprises there are increasingly looking for consistent satellite service to power their business applications anytime, anywhere. Unlike other providers, Orange integrates satellite and terrestrial services for a seamless and secure unified corporate network. Available in more than 180 countries, Business VPN from Orange Business Services is the world's largest MPLS-based VPN solution. A recent customer win includes a North American mining company that is using the Orange satellite service to interconnect 18 regionally-dispersed mines within a unified worldwide network.

For more information, visit [www.orange-business.com](http://www.orange-business.com).

## MTN delivers OceanPhone Mobile

MTN Communications (MTN) announces the general availability of the first calling app for maritime crew. MTN OceanPhone Mobile leverages the Wi-Fi infrastructure on vessels, as well as the MTN network, for calling and messaging. The app runs independently of other subscribed services.

MTN OceanPhone Mobile, an extension of MTN's OceanPhone calling solution for crew, makes it possible for the crew to stay in touch using their own smartphones and tablets. This enables easier, more cost-effective

access to family and friends back home or those working on other vessels. Crew can download OceanPhone Mobile for free from the Apple or Google Play App Stores, then simply purchase an OceanPhone Mobile plan onboard their vessel. Family members and friends at home can do the same, and purchase their plans at [www.oceanphonemobile.com](http://www.oceanphonemobile.com).

Some of the key features developed specially for crew, family and friends include:

- Significantly lower-priced calling designed specifically for app-to-app calls or messages to others who have OceanPhone Mobile on the same ship, other ships, and family and friends on shore who also have OceanPhone Mobile.
- Free Text Messaging with all pricing plans.
- Ability to make and receive calls to/from any number.
- A dedicated personal telephone number for each user.
- Voicemail Features that allow callers to leave messages in a personalized mailbox.

OceanPhone Mobile is also an alternative for corporate calling from vessel-to-vessel or even to-and-from headquarters. As long as there is a Wi-Fi network on the vessel, OceanPhone Mobile can enable a valuable connection.

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

### **Maritime satellite communications market to average 7% growth over next decade**

Euroconsult, the global consulting firm specializing in space markets, forecasted that satellite capacity revenue in the global maritime market will nearly double over the next decade, with a compound annual growth rate of 7%. According to the firm's recently-published research report on Maritime Telecom Solutions by Satellite, growth is expected to be driven mainly by increasing data consumption across all major maritime segments and the adoption of new generation broadband satellite services.

"Onboard bandwidth requirements keep growing which is driving the maritime market in a direction quite benefi-

cial to satellite communications," said Wei Li, Senior Consultant at Euroconsult and Editor-in-Chief of the research report. "We have observed growth in both ARPU and installations. Over the next year, a number of High Throughput Satellite (HTS) systems will become available in the maritime market, aimed at delivering three times more capacity by the end of 2014 and six times more capacity by the end of 2016. This additional capacity will drastically change the relationship between supply and demand in the market, and enable a range of new applications for the maritime community."

Euroconsult confirmed the number of terminals used for global maritime satellite communications grew at around 4% in 2013, while revenues at the satellite operator level increased by over 10%. The total size of the market reached about 348,000 active terminals in 2013 that generated more than \$760 million in revenues at the satellite operator level. Established MSS services and the fast developing VSAT business contributed to the overall growth of the maritime satellite communications market.

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**Published every week, this electronic industry resource will keep you updated on current events, technology, and opportunities in the global oceans marketplace.**

## Alcatel-Lucent, Interchange to deliver connectivity to Pacific islands

Interchange Limited, a Vanuatu-based company, is expanding its submarine fiber optic cable infrastructure with a new cable system spanning more than 3,000 km that will link the Pacific islands of Vanuatu, the Solomons, and Papua New Guinea. The new system will use Alcatel-Lucent's submarine technology to deliver ultra-broadband access capability to underpin the creation of an enabling environment for sustainable economic and social growth. The new system will connect Port Vila, Vanuatu, to Port Moresby, PNG, with branches to Luganville, Vanuatu and Honiara in the Solomon Islands. Initially operating at 40 Gbps speeds and offering an ultimate design capacity of 1.2 Tbps, the system will increase Internet speeds for new and existing service providers to support the deployment of applications for e-healthcare, e-education, government communications, and tourism while further strengthening Vanuatu's competitive position as an e-business hub. This new system will complement the 1,259-km Vanuatu-Fiji submarine cable system, Vanuatu's first international submarine cable link between Port Vila and Suva in Fiji.

## SubCom sets transmission record

TE SubCom, a TE Connectivity Ltd. company, has successfully completed the second installation of its next generation coherent fiber optic subsea system and achieved 13 Tbps capacity over a distance of 6,500 km without any regeneration. The new system is a pan-Asian system with a longest path of over 6,500 km. This system joins TE SubCom's first coherent system, which was approximately 1,350 km. These two subsea systems demonstrate the next generation in coherent transmission that will enable both today's capacity needs while being ready for future requirements. The demonstration combined a specially designed underwater fiber plant as well as TE SubCom's commercially available coherent C100U line card that features synchronous modulation for 100 Gbps operation. The optical fiber used was optimized for coherent transmission and resulted in over 131,000 ps/nm of dispersion. TE SubCom's C100U line card utilized Nyquist channel spacing to obtain 300% spectral efficiency. The C100U line card supports electronic dispersion compensation and uses patented synchronous modulation. The electronic dispersion compensation can enable systems up to 12,000 km without any optical compensation in the wet or dry plant. This combination provides unique capabilities for the benefit of system operators.

## Omnisens monitors temperature on Sheringham Shoal cables

Long-distance power cable monitoring specialist Omnisens was selected to monitor the export cables at Sheringham Shoal wind farm. The two 132-kV cables monitored join the offshore substations to the Sheringham Shoal Salle substation, some 20 km inland, where the Omnisens DITEST interrogator is housed. Fiber optic cables integrated into the power cables are used to provide continuous temperature monitoring detecting small temperature changes to within a few meters along the whole length of the cables, both for 21 kilometers onshore and for the two offshore cables (21 and 23 km). From the cable temperature, various changes in the cable's condition can be inferred. These include changes in burial depth or sand cover as well as breakdown of insulation due to damage. The 317 MW Sheringham Shoal Offshore Wind Farm, owned equally by Statoil and Statkraft through joint venture company Scira Offshore Energy, is located about 20 km off the Norfolk, UK coast and began generating in 2011.

## 17 carriers launch Asia Africa Europe cable project



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

AAE-1 will be the first high-capacity cable system to link all of the major South East Asian nations to Africa and Europe via the Middle East. It will facilitate and provide support for the unprecedented growth of Asia-Africa trade. Providing robust, reliable, low-latency connectivity that underpins one of the highest growth and most active global trade routes, AAE-1 will also bring much needed protection and diversity to the existing heavily congested subsea cable systems connecting the various countries along the route.

PCCW Global plans to land the cable at the Cape D'Aguilar Cable Station in Hong Kong and then extend connectivity to their city data center, making Hong Kong a key telecommunications hub in addition to Singapore and Marseille in France along the AAE-1 network.

Bringing together China Unicom, Telecom Egypt, Etisalat, Omantel, Ooredoo, and many other major service providers from around the world, PCCW Global hosted a signing ceremony for the Construction and Maintenance Agreement in Hong Kong on 27 January 2014, to officially mark a new chapter of the AAE-1 Project.

This investment demonstrates PCCW Global's ongoing commitment to investing in new capacity to support its customers' needs. PCCW Global operates one of the world's most diverse, high-quality global networks, designed to serve the growing voice and data demands of both global service providers and multinational corporations. PCCW Global's advanced network underpins a portfolio of innovative network, voice, video, and cloud computing solutions designed to connect and facilitate the communications needs of global business.

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

## Nexans to provide reinforcement for BKK's network in Norway

Norway's power supply network will get a crucial boost in reliability and capacity with the installation of Nexans' state-of-the-art submarine cables as part of a major new connection for the utility BKK Nett AS. The new 420-kV connection between Mongstad and Kollsnes will cross two fjords—Hjeltefjorden and Lurefjorden—requiring Nexans to install the world's longest and deepest deployment of XLPE (cross-linked polyethylene) insulated submarine cables in a

contract worth around Euro 78 million. Nexans submarine cables to provide vital reinforcement for BKK's power supply network in NorwayBKK Net AS, one of Norway's largest utility companies, is building the new connection to reinforce the power grid in the west of the country. The new power line is essential to ensure security of supply for the forecast growth in consumption by residents, businesses, and industrial consumers in the Bergen region, which is an important growth area. It will also provide additional capacity for the grid connection of new generation resources.

The total length of the new 420-kV Mongstad to Kollsnes connection will be around 30 km. On land, overhead lines will carry the power. However, the majority of the route crosses two fjords, requiring the installation of submarine cables.

For BKK, Nexans is providing a comprehensive turnkey service for the design, manufacture, supply, and installation of a total of 90 km of single-core XLPE cable. The design is based on the same field-proven technology used in Statnett's successful Ormen Lange project, commissioned in 2006, then the world's first 420 kV XLPE submarine cable installation.

The submarine cables will be installed in the fjords in three parallel lengths to create a three-phase AC connection, rated at 420 kV. The cables will be protected by outer shells or water jetting from shore to 30 m water depth. The Lurefjorden installation will have a length of 10 km per phase and a maximum water depth of 200 m, while the Hjeltefjorden section will set a new world record for 420 kV XLPE cable covering both length—20 km per phase—and depth—a maximum 390 m.

The submarine cable will be manufactured at Nexans' specialized facility in Halden, Norway for delivery and installation between 2016/17.

**Energinet.dk has approved the business case for Cobra cable**

Danish Energinet.dk and Dutch TenneT are looking into the possibilities of establishing a shared international connection between the two countries, to be called Cobra. Energinet.dk has submitted an application to the Danish Minister for Climate, Energy and Building.

Denmark would gain financially from an international connection between Endrup near Esbjerg in Western Denmark and Eemshaven in the Netherlands. This appears from the business case that Energinet.dk has prepared for an approximately 300-km long submarine cable between the two countries. Energinet.dk's Supervisory

Board has approved the business case, and the application to build Cobra has been submitted to the Danish Minister for Climate, Energy and Building, Martin Lidegaard. Energinet.dk expects the approval in May.

Before a cable can be laid, both countries must approve and obtain environmental and planning permissions.

EU has committed to fund the connection with EUR 86.5 million, approximately DKK 645 million. The total budget for

the international connection is estimated at approximately DKK 4.5 billion.

If the Cobra cable becomes a reality, it can be in operation in 2019. The bill will be equally divided between the two countries, and in Denmark, an increase in the electricity consumers' grid tariff to Energinet.dk of DKK 0.03 per kWh will pay for the cable—based on the preliminary budgets.

For more information, visit  
[www.energinet.dk](http://www.energinet.dk).

The advertisement features a dark blue background. At the top center is the OSI logo, which consists of two stylized blue dolphins above the letters "OSI". Below the logo is the slogan "Subsea Networks connecting your business" in yellow. The middle section shows a large offshore vessel with a long crane arm working on the ocean floor. The word "Globally" is overlaid in white text. To the right, another vessel is shown. Below this image, the words "in the Field" are written in white. The bottom half of the ad shows a cross-section of the ocean floor with various subsea equipment, including a central processing unit (CPU) and a QR code. The OSI logo is also present at the bottom. The contact information at the bottom includes the company name, website, and locations: Florida - Boston - Houston - Singapore.

## NSW to supply array cables for the extension of Kentish Flats

Vattenfall Wind Power Ltd has awarded a contract for the supply of 30-km MVAC array subsea cables for the Kentish Flats Extension to NSW GmbH.

The existing offshore wind farm is operated by Vattenfall. It will be extended by an additional 15 turbines, each at 3.3 MW. Kentish Flats is currently composed of 30 3-MW turbines and is located in 5 m water depth off the north Kent coast.



NSW has been a partner to the offshore wind industry from the beginning and has been positioning itself for projects in United Kingdom. This latest contract fits perfectly into the company's market strategy.

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

## Tekmar seals deal with Van Oord on Dutch offshore wind farm

Tekmar Energy has won a contract with leading international EPC contractor Van Oord Offshore Wind Projects BV after being awarded work on the Eneco Luchterduinen offshore wind farm development in Holland.

The contract reinforces Tekmar's track record in delivering bespoke cable protection systems. Tekmar has been involved in more than 25 high profile offshore wind projects and supplied over 3,000 systems since its entry into the market.

Tekmar's latest contract win will see the company supply its cable protection systems to Van Oord, which is responsible for the construction of the Eneco Luchterduinen wind farm, located about 23 km from the Dutch coast in Block Q10 of the North Sea.

It is the third contract of its kind that Tekmar has been awarded by Van Oord. The company has also been involved in supporting Van Oord with the Eneco Luchterduinen project at an early stage by providing support on the design of the J-tubes for the Offshore High Voltage Substation and cable entry

interface on the foundations and will provide offshore support for the project during start up.

The scope of work for the latest contract will see Tekmar work with NKT Cables and LS Cable as the cable suppliers and Van Oord as the installer for a total of 87 cable protection systems, including seven bellmouths of which six are for array cables and one is for the export cable. Tekmar will also provide full engineering of its systems to protect the power cables for their 25-year service life. It will be the sixth project in which Tekmar provides protection for NKT Cables.

Eneco Luchterduinen is a joint venture between Eneco and Mitsubishi Corporation. The development, numbering 43 wind turbines, will have a combined capacity of 129 MW and generate green electricity for nearly 150,000 households. Tekmar, which provides bespoke cable protection systems to both the global oil & gas and offshore renewables industries, further underpinned its commitment to cost reduction and innovation in the offshore wind industry last month when it launched a new innovation.

For more information, visit [www.tekmar.co.uk](http://www.tekmar.co.uk).

## First Subsea supplies connectors for floating wind farm

First Subsea has supplied cable connectors to the Fukushima floating pilot wind farm project, offshore Japan. The connectors are being used to connect 66-kV and 22-kV cables to a 2MW wind turbine and floating substation. The facility's floating 66kV power substation is the first of its kind for the offshore wind energy industry.

The Fukushima floating pilot wind farm project, which is headed up by The Ministry of Economy, Trade and Industry in Japan, will lay the foundation for the world's largest offshore wind development off the coast of the Fukushima Prefecture.

Three First Subsea cable connectors have been deployed on the Fukushima wind farm. The diver-less cable connection provided significant savings in vessel time and greater installation flexibility to cope with changes in weather conditions offshore.

The First Subsea cable connector has a self-activating mechanism allowing diver-less deployment offshore. The male connectors are guided into receptacles on the wind turbine and substation and, once engaged, cannot be

released until the load has been removed. A simple disengage mechanism allows the connector to be released and recovered for re-use.

The Japanese Government has decided to accelerate the move to renewable technologies, and the Fukushima Wind Farm project is a major milestone in the switch from nuclear to renewable energy for the region. The project known as Fukushima FORWARD is part of a bigger scheme to reconstruct the area.

During the wind farm's pilot phase, engineers are conducting an experimental study of power systems, leading to development of a common platform for floating offshore wind power.

In addition to the wind turbine cable connector, First Subsea supplies a number of diver-less and ROV-less connection systems for the construction of offshore winds and wave devices that significantly reduce installation and vessel times compared with traditional subsea deployment methods. These include a Nacelle Connector for the installation for subsea turbine structures and a fiber rope Tether Connector for subsea mooring.

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

## Alcatel-Lucent to upgrade EASSy

Alcatel-Lucent is to upgrade the EASSy submarine cable system, one of the largest and most modern systems serving Africa, with the deployment of the latest 100-Gbps technology.

Alcatel-Lucent's 100G technology will enable the system to ultimately carry capacity in excess of 10 Tbps, further complementing its ability to carry high volumes of data capacity on the EASSy system, which runs 10,000 km from South Africa to Sudan in support of the continued explosion of data traffic in Africa. Alcatel-Lucent will leverage its unmatched experience of deployments around Africa to provide this upgrade within EASSy's requested timeframe.

EASSy is owned and operated by a group of 17 African and international shareholders—all telecommunications operators and service providers. The system is implemented in a protected ring configuration linking eight countries from Sudan to South Africa via Djibouti, Kenya, Tanzania, Madagascar, Comores, and Mozambique. Landings are located in Port Sudan, Djibouti (Djibouti), Mombasa (Kenya), Dar Es Salaam (Tanzania), Moroni (Comores), Tolari (Madagascar), Maputo

(Mozambique), and Mtunzini (South Africa). The system also addresses a wide range of international destinations through interconnection with multiple international submarine cable networks for diverse, seamless onward connectivity to Europe, the Americas, the Middle East, and Asia.

For more information, visit [www.alcatel-lucent.com](http://www.alcatel-lucent.com).

#### Tata brings 100G connectivity to customers from the U.S. to Asia

Tata Communications and Ciena® Corporation announced the launch of 100 Gbps upgrade along the TGN-Pacific (TGN-P) submarine cable system that connects the U.S. to Japan and three routes in the TGN-Intra-Asia (TGN-IA) market across Asia. With this latest in a series of investments, Tata Communications becomes the only private subsea cable owner that has 100G deployed across major routes around the world on its own infrastructure.

With Ciena's 6500 Converged Packet Optical platform and GeoMesh solution, Tata Communications is upgrading its TGN-P submarine cables—which is the longest segment in route kilometers and believed to be the highest capacity subsea cables deployed in the Pacific—to 100G. As a result, Tata Communications now offers 100G transport services on its TGN-P submarine cable system that links the U.S. to Japan, a distance spanning 22,300 km. The cable connects Emi, Chiba to Hillsboro, Oregon and Toyohashi as well as Aichi Prefecture to Hillsboro, Oregon. In addition, Ciena's solutions also supports Tata Communications' Intra-Asia network, which spans roughly 6,700 km.

Based on Ciena's OPn architecture for programmable network infrastructures, that deliver much lower cost-at-scale, Ciena's GeoMesh and WaveLogic solutions enable Tata Communications to better monetise its network and provide flexibility to its customers. This also allows them to handle capacity demands driven by high-bandwidth services such as cloud computing, video, and mobile communications.

With Ciena's OneControl Unified Management System, Tata Communications can also benefit from multi-layer service management, capabilities that support streamlined service activation, fault management and performance monitoring.

These upgrades complement Tata

Communications' previous GeoMesh deployment on its TGN-Atlantic (TGN-A) submarine network that links the U.S. and Europe and allows Tata Communications to meet its customers' surging bandwidth demands with lower latency and seamless scalability.

Tata Communications' global connectivity services are built on the world's largest and most advanced global subsea cable network, which enables carriers and enterprises to connect almost anywhere in the world. The Tata Communications global network (TGN) consists of 210,000 km of terrestrial and subsea network fiber, reaching countries representing 99.7% of the world's Gross Domestic Product (GDP). Its IP Transit Network (AS6453) makes up 20% of the world's Internet routes and carries 4,200 Petabits of traffic per month on its Internet backbone.

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

#### Huawei Marine successfully completes Azores link

Huawei Marine Networks Co. Ltd. has partnered with Viatel, Portugal's leading telecommunications engineering network supplier, to successfully complete construction of the 685-km Flores-Corvo Submarine Cable System. The new cable system featuring enhanced Raman technology and advanced Submarine Line Terminal Equipment of OptiX BWS 1600S will provide vital communications to not only service local demand but become an integral part of Viatel's network that includes over 100 points-of-presence (PoPs) based in 35 key cities. The cable system features three diverse segments, consisting of six landings points to provide essential links to international cable systems, such as the cross-Atlantic Columbus3 submarine cable system, to enable a broad range of services to be delivered to this region.

Prior to the completion of the Flores-Corvo Submarine Cable System, the seven islands of the Archipelago of the Azores were connected via the Azores Domestic Cable System, excluding Corvo and Flores which depended on basic satellite communications. The completed Flores-Corvo Submarine Cable System now enables all nine islands of the Archipelago of the Azores to be interconnected, with backbone connectivity to European, African, and cross-Atlantic submarine cables.

During the project, Huawei

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Marine's dedicated delivery team overcame significant operational challenges due to the islands' remote location and geographical landscape. These included protecting the cable on a 22-m cliff off the Flores shore and successfully completing the build within 10 months.

As requested by Viatel, the submarine cable is designed with a 0.96 Tbps capacity to provide speeds of 10 Gbps and has the capacity to be upgraded to 100 Gbps in the future. By enabling high-speed broadband internet connectivity, the Flores-Corvo Submarine Cable System will strengthen the communication infrastructure for the Archipelago of the Azores. Having previously relied on basic satellite communications, the new cable system will help increase Corvo and Flores' attractiveness as a tourist destination and better support the needs of its inhabitants.

The Flores-Corvo Submarine Cable System project marks another milestone for Huawei Marine. Other successful submarine cable system projects in 2013 include connecting the remote islands of Boracay and Palawan in the Philippines, and its Silphium solution which connects Darnah in Libya with Chania in Greece.

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

## Global Marine chosen by BT for survey, engineering work

Global Marine will provide engineering solutions for subsea cable installation across Highlands and Islands in BT's biggest ever subsea project in UK territorial waters.

BT has awarded Global Marine Systems the marine engineering contract for the Scottish Highlands and Islands subsea cable project. The contract includes subsea cable route design, marine survey, cable supply, and subsequent cable installation solution for an ambitious subsea fiber optic network that will deliver fast fiber broadband to the Scottish Highlands and Islands.

Global Marine will provide their engineering services to mitigate installation risks and support on-time and on-budget system delivery. Brendan Dick, director, BT Scotland, said: "The size of the task presents a massive challenge, not only because of the number of cables involved but also the fact that the work has to be completed within a single, 6-month weather window. BT has worked with Global Marine Systems on several occasions, and we have full trust in the company's capability to plan optimal cable routes that will ensure suc-

cessful installations and that will also ensure the long-term physical security and viability of this network."

Global Marine's cable route study will define core route information, detail factors along the cable route that could affect system integrity, and provide a technical reference for the design life of the project. The company's cable engineering team evaluates installation risks, considers alternative routes, and ensures timely project completion with its route selection practices. The BT project also will benefit from Global Marine's industry-leading Geographical Information System, the most comprehensive subsea cable database in the world, to enhance route planning, cable installation, maintenance, and route clearance operations.

The massive engineering effort is part of the £146 million investment project launched with Highlands and Islands Enterprise (HIE) in March to bring high-speed fiber broadband to communities across northern Scotland. The subsea network is hailed as the UK's most challenging and complex broadband project ever, and means that around 84% of Highlands and Islands homes and businesses will have access to fiber broadband by the end of 2016.

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

## PLDT links Bohol to Visayas and Mindanao network hubs

Philippines Long Distance Telephone (PLDT) has completed the installation of over 150 km of submarine fiber optic cables costing over P400 million that will link the island of Bohol with the major network centers in Visayas and Mindanao, providing a much needed boost to the earthquake-hit province.

PLDT President and CEO Napoleon Nazareno said looping in Bohol Island to the main network backbones in Cebu in the north and Cagayan de Oro in the south will support the fast growing tourism and BPO hubs as well as the thriving small and medium enterprises (SME) sector in central Philippines.

The north link stretches almost 53 km from Mactan, Cebu to Loon, Bohol while the south portion runs over 97 km from Garcia Hernandez, Bohol to Kinoguitan, Misamis Oriental. These links will be connected to PLDT's domestic fiber optic network (DFON) via inland fiber optic cables to Jones, Cebu in the north and to Cagayan De Oro in southern Philippines.

Nazareno said the Bohol fiber optic

cable project will also boost the existing 90-km fiber network in Panglao Island and Tagbilaran City for their tourism and enterprise communications requirements including the ICT upgrade projects for the proposed international airport in Panglao.

The Bohol DFON project creates a third leg within the Visayas and Mindanao loop that will assure bandwidth-heavy industries in Bohol and Cagayan De Oro a more resilient network.

The new fiber optic cable facilities will also allow PLDT provide fiber-to-the-home services and support the operations of its wireless subsidiaries Smart Communications and Sun Cellular, particularly in providing the ultra-fast LTE connection to their subscribers in the area.

PLDT's current infrastructure in Bohol – which runs along Tagbilaran, Baclayon, and Dauis – already serves more than 500,000 wireless subscribers and about 2,000 fixed wireless broadband subscribers, with more than 4,000 fixed lines that could increase to more than 5,000 in 2014 after completion of the total expansion program.

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

## Infinera picked for AJC upgrade

The Infinera DTN-X network has been deployed on the new Australia Japan Cable (AJC). The Infinera Intelligent Transport Network, featuring the DTN-X platform with SD FEC super-channels and integrated OTN switching, enables AJC to significantly expand their cable's capacity and rapidly deliver 10, 40 and 100 Gigabit Ethernet (GbE) services.

The Australia Japan Cable offers connectivity and bandwidth, serving their customers, with a 12,700km submarine fiber optic cable network from diverse landings in Australia, Guam and Japan. AJC is composed of a consortium of leading service providers including Telstra.

Infinera provides AJC with the DTN-X platform featuring long haul super-channels with SD-FEC based on the industry's most widely deployed Photonic Integrated Circuit and the Flex Coherent Processor, supporting up to 500 Gigabit per second in a single line card. The DTN-X platform is also equipped with 1 Tbps per slot to support higher capacity 1 Tbps super-channel line cards for future scaling needs.

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

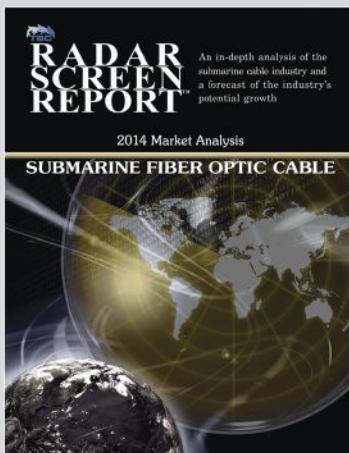
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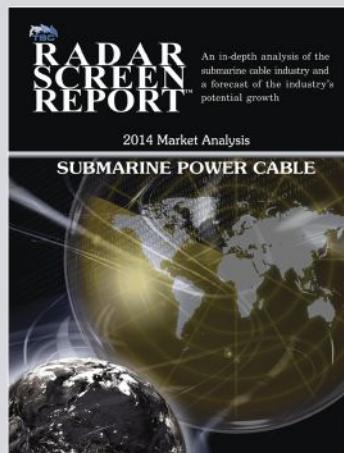
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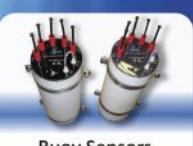
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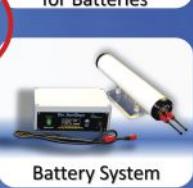
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## SUBSEA CABLES

### Southern Cross to add another Terabit using Ciena 100G

Hard on the heels of the successful implementation of Ciena's 100 Gbps solution across its 30,000 km network in July 2013, Southern Cross Cable Network will use the Ciena WaveLogic 3 platform to add an additional 500 Gbps to both cables by July 2014.

Southern Cross president and CEO, Fiona Beck, said, "The continued expansion of our network using the best 100G technology available underpins our strategy to support the development of high-speed broadband in Australia, New Zealand, Hawaii, and Fiji. ISPs and other customers continue to acquire greater amounts of capacity in larger units from Southern Cross. This latest expansion will be our largest to date, increasing our total lit capacity across the two Southern Cross cables from 2.6 Tbps to 3.6 Tbps."

The 2014 network expansion will be underpinned by Ciena's flexible grid and WaveLogic optical technologies, which will increase Southern Cross' potential capacity capability to 12 Tbps.

"The introduction of the Ciena 6500 Packet-Optical Platform to our network in 2011 allowed us to move from 10G optics, to 40G, and then to 100G in July 2013. At the same time, the implementation of a mesh-enabled submarine network architecture (GeoMesh) increased the resilience of our services significantly, reducing the risk of natural and man-made network disruptions, even under multi-failure conditions," said Ms. Beck. "The Ciena platform has allowed us to provide sector leading high-capacity submarine capacity services such as 10G and 40G OTN along with the introduction of 40G Ethernet and 100G OTN interfacing. In 2014, we will introduce 100GbE services along with the seamless integration of our key internet data center access points such as Equinix in Sydney, CoreSite in San Jose, and the Westin Building in Seattle. These developments cement the Southern Cross position as the only single system provider of highly resilient international capacity solutions between key data locations in Australia, New Zealand, and the USA."

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

### IFC invests in Seaborn Networks

The International Finance Corporation (IFC), a member of the World Bank Group, and Seaborn Networks Holdings, LLC announced that IFC is now an investor in Seaborn Networks. Seaborn's recent financing round, which was led by Seaborn's existing investor group, also included IFC. Funds raised by Seaborn will be used for Seabras-1, which is Seaborn's new Brazil-U.S. submarine cable project.

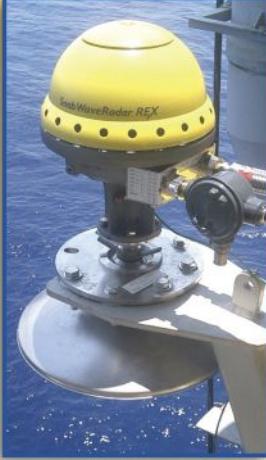
Seabras-1 is a new 40 Tbps submarine fiber optic cable system between São Paulo and New York City, with an additional landing in Fortaleza, Brazil, that is scheduled for completion in 2015. The new system is being built for Seaborn by Alcatel-Lucent Submarine Networks and will be the first direct route between São Paulo and the U.S.

"Seaborn's approach of selling spectrum and lit capacity on the wholesale market helps to accelerate broadband development, an important tool for economic growth, in Brazil and other South American countries," said Aniko Szigetvari, IFC Head of Telecom, Media and Technology for Africa and Latin America.

While Seabras-1 remains Seaborn's priority, certain other routes are already in the development stage.

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

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- WaveView software
- Full technical support

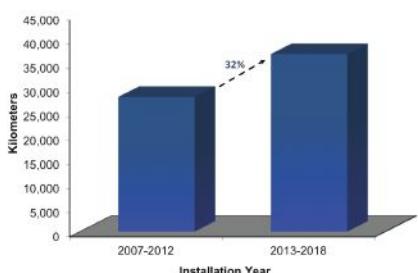
**RS Aqua Ltd**  
[www.rsaqua.co.uk](http://www.rsaqua.co.uk)  
[waferadar@rsaqua.co.uk](mailto:waferadar@rsaqua.co.uk)

# Offshore At-A-Glance

## Quest Offshore Activity Report

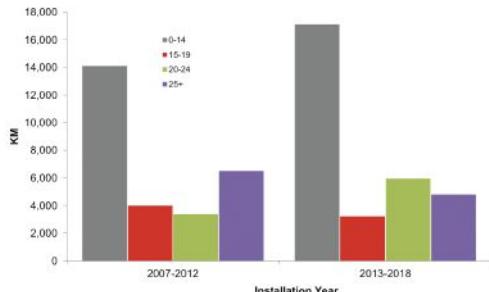
Worldwide Pipeline Demand Growth

2007 – 2012 vs. 2013 – 2018



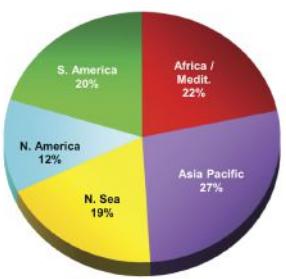
Worldwide Pipeline Demand Growth

2007 – 2012 vs. 2013 – 2018



Worldwide Pipeline Demand by Region

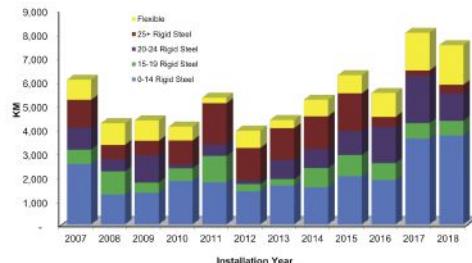
2013 – 2018 Installations (36,871 km)



Worldwide Pipeline Demand

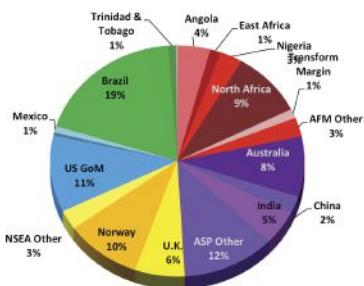
2007 – 2018

World pipeline demand will continue its growth trend into the foreseeable future buoyed by the development of large projects such as those in the Brazilian Pre-Salt and investments in export infrastructure in select regions such as Australia and the Norwegian Sea. 2013 installations see a significant increase particularly on the heels of the installation of new export lines in the Gulf of Mexico.



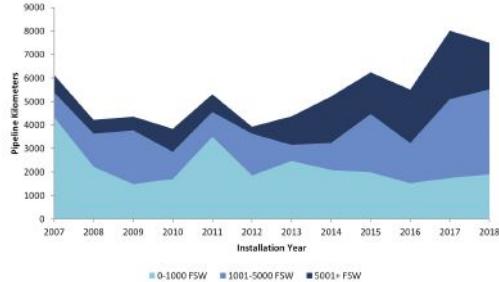
Worldwide Pipeline Demand

2013 – 2018 by Province (36,871 km)



Global Project Water Depth Installation Analysis

2007 – 2018e



Note: Water Depth According to Stated Water Depth at the Project Level. See Slide 79 for Further Explanation

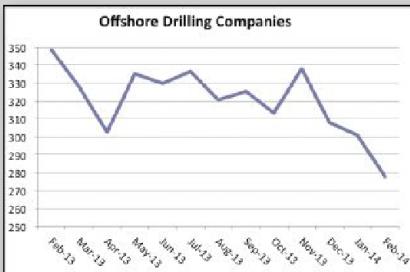
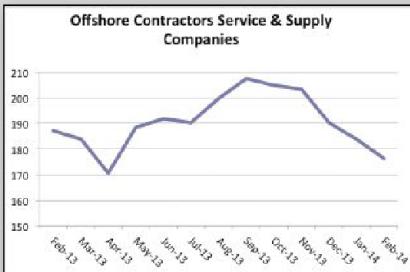
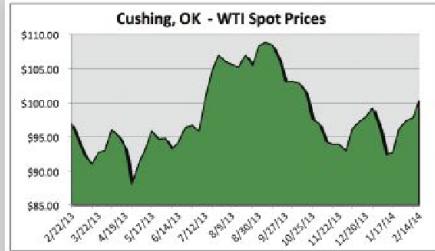
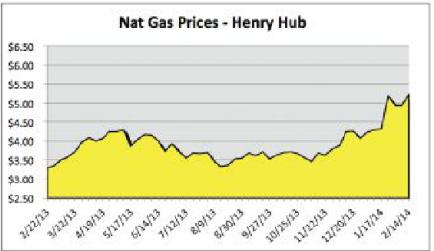
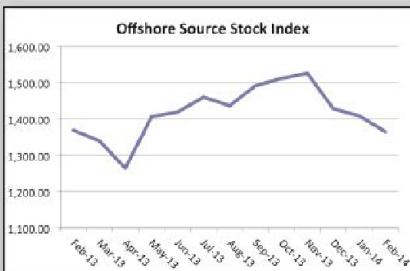
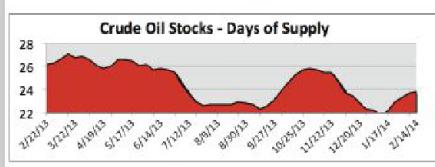
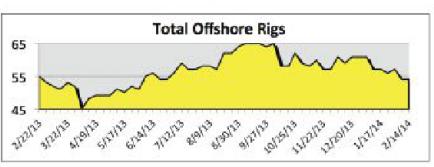
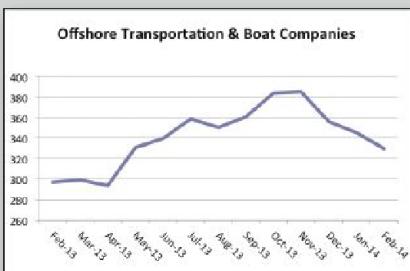
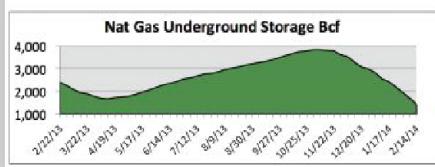
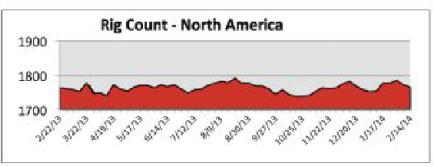
FOR MORE DETAILED INFORMATION

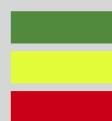
(281) 491-5900 - USA • 44 (0) 1737 371704 - London • e mail: corp@questoffshore.com  
www.QuestOffshore.com • www.SubseaZone.com • www.FloatingProductionZone.com

# Monthly Stock Figures & Composite Index

Industry Company Name	Symbol	Close(Mid) January	Close(Mid) December	Change	Change %	High 52 week	Low
<b>Diversified, Production Support and Equipment Companies</b>							
Baker Hughes, Inc.	BHI	59.90	53.73	6.17	11.5%	61.73	42.60
Cameron Intl. Corp.	CAM	61.21	58.77	2.44	4.2%	67.42	52.50
Drill-Quip, Inc.	DRQ	102.51	107.41	-4.90	-4.6%	121.07	76.44
Halliburton Company	HAL	53.74	50.81	2.93	5.8%	56.52	36.77
Tenaris SA	TS	47.15	44.29	2.86	6.5%	49.87	38.47
Newpark Resources, Inc.	NR	11.88	12.10	-0.22	-1.8%	13.64	8.17
Schlumberger Ltd.	SLB	90.68	89.99	0.69	0.8%	94.91	69.08
Superior Energy Services, Inc.	SPN	26.48	26.14	0.34	1.3%	29.22	22.85
Weatherford International, Inc.	WFT	14.87	14.68	0.19	1.3%	17.38	11.11
Deep Down, Inc.	DPDW	1.89	1.99	(0.10)	-5.0%	2.70	1.17
FMC Technologies	FTI	51.23	51.00	0.23	0.5%	59.79	47.58
<b>Total Diversified, Production, Support and Equipment.....</b>	<b>521.54</b>	<b>510.91</b>	<b>10.63</b>	<b>2.1%</b>	<b>574.25</b>	<b>406.74</b>	
<b>Geophysical / Reservoir Management</b>							
Dawson Geophysical Company	DWSN	29.29	33.57	-4.28	-12.7%	40.86	26.88
Mitcham Industries, Inc.	MIND	14.75	16.78	-2.03	-12.1%	18.41	13.75
Compagnie Gnrale de Gophysique-Veritas	CGV	15.90	16.52	-0.62	4.50%	28.17	14.53
<b>Total Geophysical / Reservoir Management.....</b>	<b>59.94</b>	<b>66.87</b>	<b>-6.93</b>	<b>-10.4%</b>	<b>87.44</b>	<b>55.16</b>	
<b>Offshore Drilling Companies</b>							
Atwood Oceanics, Inc.	ATW	47.56	51.70	-2.50	-5.0%	59.49	43.91
Diamond Offshore Drilling, Inc.	DO	46.83	55.94	-7.42	-13.7%	76.08	45.24
ENSCO International, Inc.	ESV	51.21	58.08	-3.59	-6.6%	65.50	48.25
Nabors Industries, Inc.	NBR	18.21	15.81	0.86	5.0%	18.42	14.34
Noble Drilling Corp.	NE	31.23	36.61	-5.38	-14.7%	42.34	30.04
Parker Drilling Company	PKD	7.29	7.81	-0.77	-9.6%	8.67	3.75
Rowan Companies, Inc.	RDC	32.16	33.90	-0.78	-2.4%	38.65	30.21
Transocean Offshore, Inc.	RIG	43.13	48.10	-3.80	-8.1%	57.49	41.44
<b>Total Offshore Drilling.....</b>	<b>277.62</b>	<b>307.95</b>	<b>-23.38</b>	<b>-7.8%</b>	<b>366.64</b>	<b>257.18</b>	
<b>Offshore Contractors, Services, and Support Companies</b>							
Helix Energy Solutions Group, Inc.	HLX	22.26	23.31	0.16	0.7%	27.58	19.44
Gulf Island Fabrication	GIFI	20.86	23.23	-1.93	-8.5%	26.82	18.06
McDermott International, Inc.	MDR	8.57	8.18	-0.53	-5.8%	13.08	6.68
Oceaneering International	OII	71.27	78.99	-3.34	-4.5%	87.64	58.08
Subsea 7 SA	SUBCY.PK	17.98	18.81	-1.32	-6.8%	25.04	17.05
Technip ADS	TKPPY.PK	22.44	24.11	-0.24	-1.1%	31.32	21.08
Tetra Technologies, Inc.	TTI	11.21	11.98	-0.15	-1.3%	13.41	8.15
Cal Dive International, Inc.	DVR	1.79	1.69	-0.07	-3.8%	1.51	2.38
<b>Total Offshore Contractors, Service, and Support.....</b>	<b>176.38</b>	<b>190.30</b>	<b>-7.42</b>	<b>-4.0%</b>	<b>226.40</b>	<b>150.92</b>	
<b>Offshore Transportation and Boat Companies</b>							
Seacor Holdings, Inc.	CKH	86.06	91.10	-1.74	-2.0%	99.00	67.76
Gulfmark Offshore, Inc.	GLF	42.70	46.32	-1.53	-3.5%	53.89	34.49
Bristow Group	BRS	71.28	76.08	-2.21	-3.0%	85.70	55.83
PHI, Inc.	PHII	37.62	37.21	0.65	1.8%	40.57	23.43
Tidewater, Inc.	TDW	48.38	56.01	-8.22	-14.5%	63.22	45.19
Trico Marine Services, Inc.	TRMAQ.PK	0.04	0.04	0.00	0.0%	0.11	0.01
Hornbeck Offshore	HOS	43.59	49.06	-2.36	-5.1%	59.93	39.25
<b>Total Offshore Transportation and Boat .....</b>	<b>329.67</b>	<b>355.82</b>	<b>-15.41</b>	<b>-4.5%</b>	<b>402.42</b>	<b>265.96</b>	

# Monthly Stock Figures & Composite Index

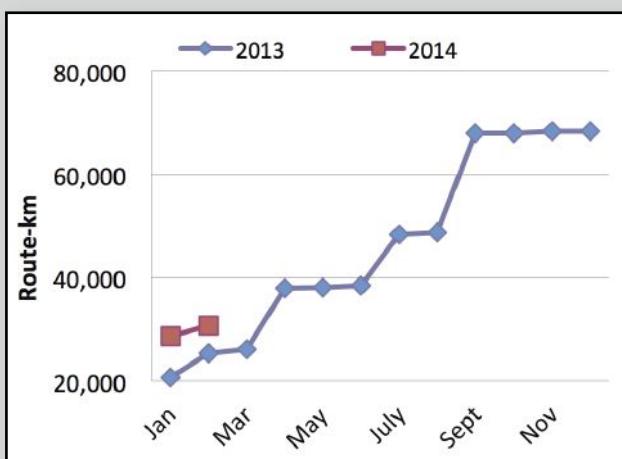
Industry	Close(Mid) January	Close(Mid) December	Change	Change %	High 52 week	Low
<b>Geophysical &amp; Reservoir Management Companies</b> 	<b>Total Diversified, Production, Support and Equipment</b> 521.54	510.91	10.63	2.1%	574.25	406.74
<b>Total Geophysical / Reservoir Management</b> 59.94	66.87	-6.93	-10.4%	87.44	55.16	
<b>Total Offshore Drilling</b> 277.62	301.00	-23.38	-7.8%	366.64	257.18	
<b>Total Offshore Contractors, Service and Support</b> 176.38	183.80	-7.42	-4.0%	226.40	150.92	
<b>Total Offshore Transportation and Boat</b> 329.67	345.08	-15.41	-4.5%	402.42	265.96	
<b>Total Offshore Source Index</b> 1,365.15	1,407.66	-42.51	-3.0%	1,657.15	1,135.96	
<b>DISCLAIMER</b> 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.						
<b>Offshore Drilling Companies</b> 	<h2>Oil &amp; Gas Industry Trends</h2> <p>Monitoring the Pulse of the U.S. Offshore Oil &amp; Gas Industry</p>					
<b>Offshore Contractors Service &amp; Supply Companies</b> 	 					
<b>Offshore Source Stock Index</b> 	 					
<b>Offshore Transportation &amp; Boat Companies</b> 	 					



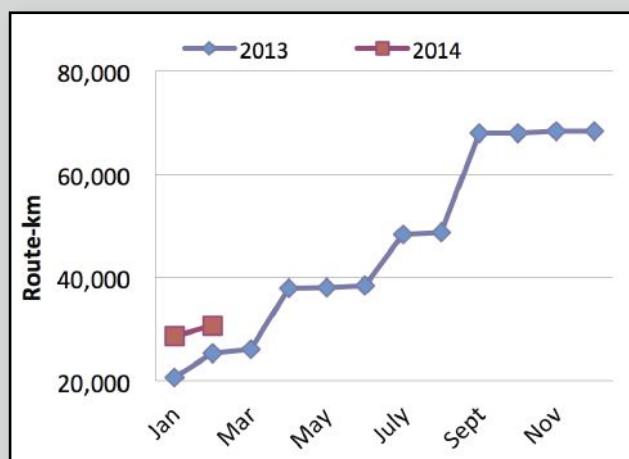
**Positive trend, at least 3 weeks**  
**Changing trend, less than 3 weeks**  
**Negative trend, at least 3 weeks**

# Subsea Telecom & Power Cable Data

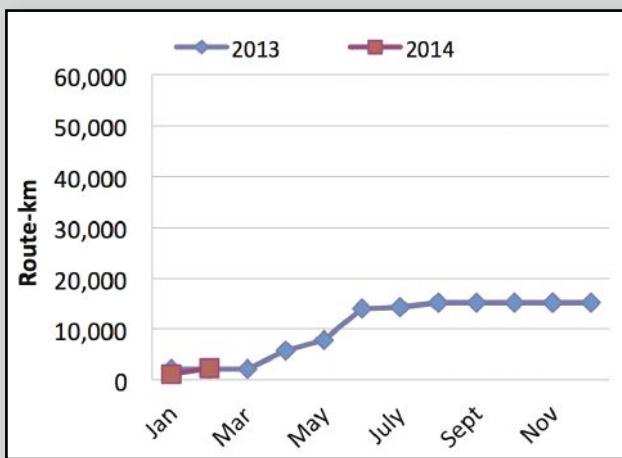
## FO Cable Awards by Month



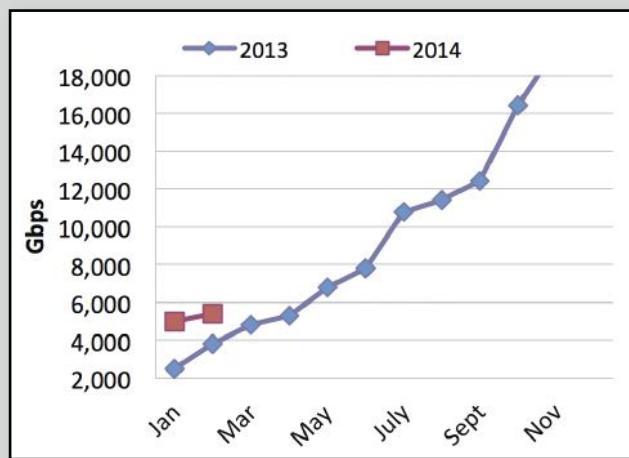
## FO Cable Announcements



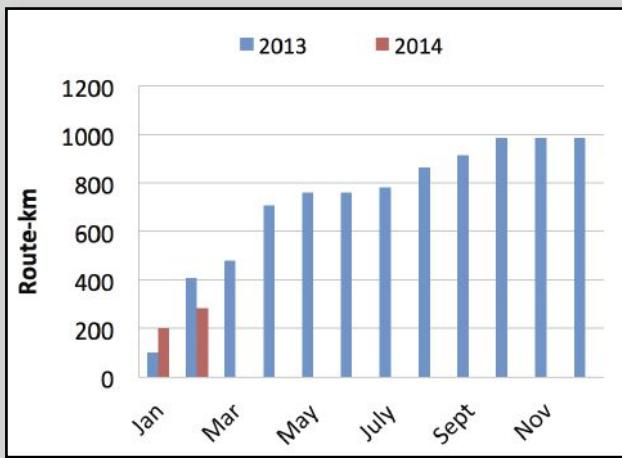
## Submarine FO Cables Entering Service in Route-km



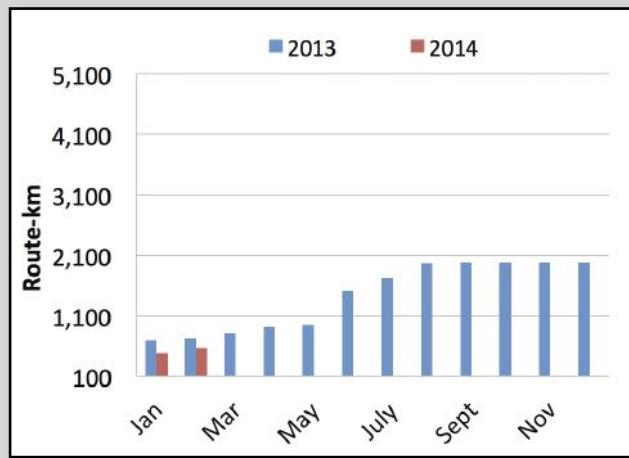
## Upgrades of Existing Cable Systems in Gbps



## Submarine Power Cable Awards in Route-km



## Submarine Power Cable Announcements in Route-km



# Gulf of Mexico Data

## Current Deepwater Activity

Operator		OCS		Prospect Name	Water Depth (ft)
	Area	Block	Lease	Rig Name	
Shell Offshore Inc.	WR	508	G17001	NOBLE JIM DAY	9,553
Anadarko Petroleum Corp.	LL	317	G31834	T.O. DISCOVERER SPIRIT	9,313
Shell Offshore Inc.	AC	857	G17565	H&P 205	7,818
Exxon Mobil Corp.	KC	964	G21451	T.O. DEEPWATER CHAMPION	7,667
Shell Offshore Inc	MC	525	G31507	NOBLE GLOBETROTTER	7,479
Noble Energy, Inc.	MC	698	G28002	ENSCO 8501	7,221
BP Exploration & Production, Inc.	GC	743	G15607	T.O. DEVELOPMENT DRILLER II	6,824
Chevron USA, Inc.	KC	829	G25814	T.O. DISCOVERER CLEAR LEADER	6,428
BHP Billiton Petroleum (GOM) Inc.	AT	575	G08036	T.O. DEVELOPMENT DRILLER I	6,251
Repsol E&P USA Inc.	KC	642	G33335	ENSCO DS-5	6,124
BP Exploration & Production Inc.	MC	429	G07944	ENSCO DS-3	6,106
BP Exploration & Production, Inc.	MC	778	G14658	THUNDER HORSE PDQ	6,040
Shell Offshore, Inc.	WR	95	G25234	STENA ICEMAX	5,860
Murphy Exploration & Production Co.	DC	4	G10437	T.O. DISCOVERER DEEP SEAS	5,822
Union Oil Co. of California	WR	143	G21849	T.O. DISCOVERER INDIA	5,764
BP Exploration & Production, Inc.	MC	776	G09866	SEADRILL WEST AURIGA	5,742
BP Exploration & Production, Inc.	MC	777	G09867	SEADRILL WEST CAPRICORN	5,719
BP Exploration & Production, Inc.	MC	778	G09867	SEADRILL WEST VELA	5,631
Eni US Operating Co. Inc.	MC	773	G19996	NABORS POOL 140	5,610
BP Exploration & Production, Inc.	GC	743	G15604	T.O. DEVELOPMENT III	5,414
Hess Corp.	MC	726	G24101	STENA FORTH	4,610
Anadarko Petroleum Corp.	GC	683	G18421	ENSCO 8505	4,457
Freeport-McMoRan Oil & Gas LLC	GC	645	G11080	HOLSTEIN SPAR RIG	4,344
Anadarko Petroleum Corp.	GC	608	G18402	NABORS SUPER SUNDOWNER XXI	4,320
Chevron USA, Inc.	GC	640	G20082	T.O. DISCOVERER INSPIRATION	4,297
BHP Billiton Petroleum (GOM) Inc.	GC	653	G20084	GSF C.R. LUIGS	4,235
BP Exploration & Production, Inc.	KC	57	G25777	SEADRILL WEST SIRIUS	4,065
Chevron USA, Inc.	GB	973	G32911	PACIFIC SANTA ANA	3,960
Shell Offshore, Inc.	MC	810	G09873	CAL-DIVE Q-4000	3,948
Shell Offshore, Inc.	MC	809	G09873	NOBLE DON TAYLOR	3,853
Shell Offshore, Inc.	MC	934	G07975	ATWOOD CONDOR	3,852
Eni US Operating Co. Inc.	GC	473	G05922	T.O. DEEPWATER PATHFINDER	3,840
Anadarko Petroleum Corp.	EB	645	G32822	ENSCO 8506	3,798
Shell Offshore, Inc.	MC	809	G05871	H&P 204	3,797
Shell Offshore, Inc.	MC	894	G24122	NOBLE DANNY ADKINS	3,787
Anadarko Petroleum Corp.	EB	602	G14205	WIRELINE UNIT (L.J. DIST)	3,680
Anadarko Petroleum Corp.	EB	602	G14205	WIRELINE UNIT (L.J.#2)	3,678
Anadarko Petroleum Corp.	EB	646	G20725	ENSCO 8500	3,637
Shell Offshore, Inc.	GC	248	G15565	T.O. DEEPWATER NAUTILUS	3,233
Shell Offshore, Inc.	VK	956	G06896	NABORS 202	3,214
Anadarko Petroleum Corp.	GB	668	G17407	COIL TUBING UNIT (L.J. DIST)	3,152
Shell Offshore, Inc.	MC	762	G24112	NOBLE BULLY I	3,144
Shell Offshore, Inc.	GC	158	G07995	H&P 202	2,985
Shell Offshore, Inc.	MC	807	G07963	H&P 201	2,945
LLOG Exploration Offshore, LLC	MC	503	G27277	NOBLE AMOS RUNNER	2,647
Chevron USA, Inc.	GC	205	G07996	NABORS 85 (MAYRONNE 162)	2,600
Stone Energy Corp.	MC	29	G13997	ENSCO 8502	2,123
Marubeni Oil & Gas (USA) Inc.	GC	113	G15546	NOBLE DRILLER	2,045
Chevron USA, Inc.	VK	786	G12119	COIL TUBING UNIT (N.O. #2)	1,754
Chevron USA, Inc.	VK	786	G12119	NABORS 87	1,754
EnVen Energy Ventures, LLC	EW	1003	G06921	NABORS S.D. XIV	1,483
SandRidge Offshore, LLC	GC	65	G05889	H&P 206	1,353
Stone Energy Corp.	MC	26	G31474	DIAMOND OCEAN VICTORY	1,113
Walter Oil & Gas Corp.	VK	821	G27243	CAL-DIVE UNCLE JOHN	1,030
Apache Deepwater LLC	GB	169	G31613	DIAMOND OCEAN ONYX	919
SandRidge Offshore, LLC	EB	165	G06280	HYDRAULIC WORKOVER UNIT (L)	863
LLOG Exploration Offshore, LLC	MC	705	G31521	DIAMOND OCEAN SARATOGA	849
Chevron USA, Inc.	GB	189	G06358	HYDRAULIC WORKOVER UNIT (L)	718
SandRidge Offshore, LLC	EB	110	G02650	NABORS S.D. IV	660

Deepwater prospects with drilling and workover activity: 59

Current Deepwater Activity as of Monday, 10 February 2014

### Activity by Water Depth

Water Depth (m)	Active Leases	Approved Applications	Active
0 to 200	1,514	35,398	2,534
201 to 400	114	1,121	20
401 to 800	285	868	10
801 to 1,000	365	578	9
1,000 & above	3,395	1,897	26

### Rig Activity Report 24 January 2014

Location	Week of 2/14	Week Ago	Week +/-	Year Ago	Year +/-
Land	1692	-4	1696	1	1691
Inland Waters	18	-3	21	2	16
Offshore	54	0	54	-1	55
U.S. Total	1764	-7	1771	2	1762
Gulf of Mexico	52	-2	54	-1	53
Canada	624	3	621	-27	651
N. America	2388	-4	2392	-25	2413

Activity by Water Depth Information current as of Monday, 10 February 2014

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

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

## New enhanced key options introduced for Birns Millennium™ connector series

BIRNS, Inc., an ISO 9001:2008 certified global leader in the design and manufacturing of high performance connectors, custom cable assemblies, and lighting systems, has announced a range of new keying options for its popular BIRNS Millennium™ connector series. The

BIRNS Millennium series is a 6 km rated, high-density metal shell connector line trusted worldwide for demanding subsea applications, from manned and unmanned submersibles to sensors and towed arrays. The series is specifically engineered for challenging power and signal applications and systems requiring electro-opto-mechanical solutions.

The new BIRNS Millennium series keys are fully machined, as opposed to commercially available press fit versions, and feature a new squared silhouette, providing greatly increased strength and making the keying process



more seamless, secure and user-friendly. BIRNS has also launched the position of an optional third key, providing purposeful incompatibility of different positions between the same connector with different circuits. This will obviate potential confusion in the field

when more than one of the same connector – with the same pin configurations but different circuits, for example – are being used in a subsea system. The new third key option can be specified in one of four positions, which are designated by part number nomenclature.

Another additional enhancement added to the connector series is its new hard phosphor bronze engaging nut, providing even more strength and robustness to replace the brass formerly used.

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

## D.A.S. Boat and S.A.M. Software

Shark Marine Technologies Inc. is proud to introduce its newest system for autonomous bathymetric surveying: The DiveLog Automated Survey Boat or D.A.S. Boat. As its name suggests, D.A.S. Boat is controlled by Shark Marine's field proven DiveLog software. Originally designed to create an intuitive interface for Shark Marine's Navigator product line, DiveLog is now being used for ROV control, diver delivery system control, survey, and search and recovery computer topsides, as well as autonomous surface vessel control. DiveLog manages multiple positioning systems, route creation and following, and control of many different sensor types such as side scan, multi beam profiling, echo sounders, scanning sonars, magnetometers, gradiometers and cameras, and provides data collection and coverage mapping.

D.A.S. Boat can be operated manually using a hand controller or be programmed to precisely follow routes created in DiveLog. While in autonomous mode, DiveLog sends control information from a shore station using a radio modem. A small computer can also be installed in the D.A.S. Boat for operation without a shore station. Positioning and hydrographic data are sent from the D.A.S. Boat back to shore so its progress can be monitored. Control can be reset back to manual mode at any time, if required.

Data collected by D.A.S. Boat can be viewed in DiveLog and exported for processing in programs such as Hypack, Caris, and Fledermaus, or for use in Shark Marine's Sediment Accumulation Monitor (S.A.M.) Software.

S.A.M. was designed to track sediment build up over time. By importing depth readings created in DiveLog, S.A.M. creates a readable, but detailed, grid of average, minimum, and maximum sediment depths, filtering out incorrect or noisy sonar readings. User settable alarms allow users to be alerted to problematic sediment buildup, or rate of buildup, quickly and without time-consuming user evaluation. Single-click graphing of buildup over time allow quick presentation and evaluation of data.

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



### Sonar image stabilization – A powerful tool

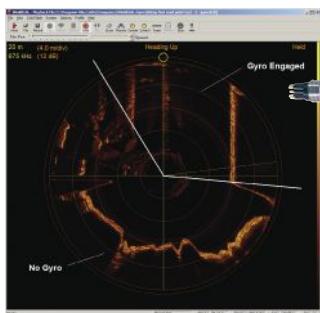
Every experienced ROV pilot is familiar with the vanishing target problem when operating mechanically scanning sonar. During the approach with an ROV or any other moving platform, heading alterations of major proportion will often place sought-after targets outside of the viewing sector of the sonar on successive sweeps. What follows frequently, in order to re-locate the object, is a sector increase on the sonar as well as platform stabilization via contact with the bottom, which is time-consuming.

Smaller unwanted changes in rotation of the sonar platform will either compress or expand the scanning density on the target, thereby causing sufficient distortion of the displayed image to deny object recognition. Needless to say, with any kind of rotational errors, it isn't just the distortion of objects creating a recognition problem, but also of not knowing accurate bearings to the object.

The new Imagenex Model 881L-GS sonar, which employs a low drift gyroscope as well as a magnetic compass, is capable of correcting for orientation changes at a rate in excess of 500 degrees per second, which allows it to compensate for sudden turns and inadvertent bumping or jarring. Therefore, scan lines are displayed without blurring, compression, or smearing effects in all modes of operation – be it polar, sector, or North-up. The North-up mode references the sonar image to true north when using an appropriate variation input. Regardless of platform heading changes, the sonar is able to keep the target continuously at the center of the scanning sector. Positional changes of aspect relative to the target are easily compensated by clicking the "Set Gyro Reference" button on the screen.

For use as a drop sonar suspended from its umbilical, this system provides a simple solution offering reliable and stable screen image orientation during most types of operation.

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





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Ocean News & Technology

## New SubConn® coax connector series

MacArtney is pleased to announce the introduction of SubConn® coax connectors—a brand new series within the industry-leading SubConn® underwater connector range. The new connectors will primarily be used for facilitating the transmission of HD video signal within underwater technology systems and for interfacing HD video-based equipment such as cameras and telemetry systems.

The SubConn® coax connector series will embrace two primary connector models, including a coax-only connector option and a combined coax and electric connector option with six electric pins for handling power and signal on interfaced equipment. With the latter option, users are enabled to fully control and power equipment using only a single connector, hereby allowing for design optimization of underwater systems.

Both connector types are available with an impedance of 50 or 75 Ohms and can be delivered with dedicated SubConn® coax cable. The entire SubConn® coax connector and cable assembly is designed to sustain an unbroken passage of signal between interfaced units, hereby minimizing signal attenuation caused by noise interference.

The new coax connectors harness the same rugged quality and basic SubConn® design that has been trusted by marine industry operators for decades. Both new connector models feature a standard A-size footprint and are held in place by means of the characteristic SubConn® locking sleeves.

To ensure optimal performance and durability in harsh underwater environments, SubConn® coax connectors have been tested to endure 600 bar pressure corresponding to the hydrostatic conditions at 6,000 m water depth.

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



## New compact in situ pCO<sub>2</sub> sensor

Turner Designs is very excited to offer C-sense, a compact, lightweight pCO<sub>2</sub> sensor for measuring the partial pressure of gas in liquids. Designed for applications involving immersion in water, oil, or water and oil mixtures, C-sense combines an oil-resistant mem-



brane interface with a compact temperature-compensated, non-dispersive infrared (NDIR) detector. Small (<2 in. x 8 in.; 5 cm x 20.3 cm) and lightweight (<1 lb; 0.5 kg) with low power requirements (6 to 12 VDC, 80 mA @ 6 VDC) and a simple four-pin analog output, C-sense is designed to easily integrate with monitoring systems at a significantly lower price than traditional submersible pCO<sub>2</sub> sensors. C-sense is offered in three range configurations – 1,000 ppm, 2,000 ppm or 4,000 ppm with accuracies at 3% of full-scale and can be deployed to a depth of 600 m.

C-sense was developed specifically for Turner Designs by Pro-Oceanus Systems Inc in Nova Scotia, Canada. Pro-Oceanus has been providing the oceanographic research community with accurate submersible pCO<sub>2</sub> sensors for more than 8 years.

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

## EdgeTech 2205 AUV side-scan sonar payload selected for Polish Armed Forces AUVs

EdgeTech, the leader in high-resolution sonar imaging systems and underwater technology, continues to make great strides with the ever-growing field of smaller sized AUV systems around the world. With the introduction of the 2205 AUV-based sonar system, manufacturers and operators of smaller sized AUV systems have embraced the high quality sonars that were traditionally only available in larger sized AUV systems. One area that continues to see an adoption of the smaller size vehicles is the military community. High performance compact sonar systems have helped that growth curve.

The recently delivered Teledyne Gavia AUVs to the Polish Ministry of Defence for mine countermeasures (MCM) were equipped with the latest EdgeTech 600/1600 kHz simultaneous dual-frequency side-scan sonar payloads. The very high frequency EdgeTech systems were selected for the long range detection and the ultrahigh resolution classification capability for MLOs (mine like objects). The EdgeTech 2205 classification frequency of 1600 kHz is capable of producing near photographic quality images of targets making MLO target classification very easy. Other 2205 attributes that contributed to the selection of the EdgeTech systems were low power, small electronics' volume, and compact transducers, making integration on the small AUVs possible and easy.

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

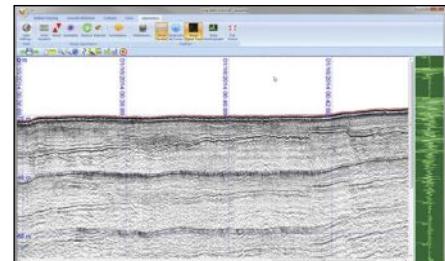
## Chesapeake Technology now offers a 24-bit analog sub-bottom SonarWiz interface

Chesapeake Technology Inc. (CTI), a world leader in real-time sonar acquisition and GIS-based processing software for seafloor mapping, is pleased to announce a new 24-bit analog sub-bottom SonarWiz interface (SBP24) for high-resolution geophysical surveys.

SBP24 provides extremely high-resolution 24-bit data at sample rates from 10 to 100 kHz per channel for up to two channels over a standard USB 2.0 interface. Digitized data are stored in standard SEGY floating point format. The 24-bit data sampling provides greater dynamic range, and the increased sampling rates allows for higher resolution of fine-scaled sub-bottom reflectors.

CTI offers custom software and hardware solutions to the marine geophysical and seafloor mapping industry for over 20 years. Through its developments in marine surveying technology & solutions, CTI has become the standard for navies, government agencies, survey companies, and universities around the world.

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



## Xeos mooring asset beacons rated to 11,000 m below sea level

Ocean research continues to receive unprecedented levels of focus and attention in the rising evidence of climate change. Scientific instruments are presented with unique challenges in the ocean, not the least of which is the extreme pressure the equipment is under at depth. The deepest part of the ocean was measured in 2010 as being 10,994 m below sea level. Xeos Technologies is proud to announce that its line of miniature mooring asset beacons for protecting scientific platforms has been successfully pressure tested to a pressure equivalent to 11,000 m below sea level.

The XMA-11K ARGOS Sub-Surface Mooring Beacon , XMB-11K RF Sub-surface Mooring Beacon and, XMF-11K LED Flasher Mooring Beacon are miniature, all titanium, beacons which know when they have surfaced and provide a way to locate the platform. The XMA-11K sends messages via the ARGOS satellite system that are received as emails by scientists. The XMB-11K transmits a long range radio frequency that can be located

using a Direction Finder. The XMF-11K has a super bright LED that flashes across the water for enhanced visibility. All three are rated to 11,000 m below sea level.

For more information, visit [www.argos-system.org](http://www.argos-system.org).

## Reflex Marine launches newly developed FROG-XT4

Reflex Marine, a global leader in safe marine transfer solutions to the offshore, marine and renewable industry, has launched its newly developed FROG-XT4.

The company's clients work in the most demanding conditions and have a duty of care to transfer their personnel safely to and from, their offshore work places. At times, they face difficult operational scenarios and may have to respond to emergency situations.

The FROG-XT4 is Reflex Marine's response to these demands and has been developed with over 20 years of experience, over 800 transfer devices operating globally, and with an estimated 1 million safe transfers performed using our capsules every year.



The FROG-XT provides greater comfort and safety to passengers and offers operators wider operating parameters and higher capacity transfers. The unit has a small footprint, making it easy to store and cost effective to ship. One improved feature is the main load plate for the rigging terminations, which provides easy access and eye level inspection, making it simple to ensure the safety of the unit before each trans-

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fer. It is also capable of being deployed quickly in Medical Evacuation situations (MedEvac), a crucial feature in emergency scenarios.

Reflex Marine has established a number of accredited service centers for FROGs and TOROs around the world. These service centres offer stock, spares, rental services, inspection and maintenance, and training to exacting standards set by Reflex Marine.

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

### icListen AF

Ocean Sonics launches the icListen AF at Oceanology International 2014. The icListen AF extends the low frequency ultra low noise performance of the respected icListen LF up into the Audio Frequency range.

The AF comes with all the features of the icListen HF, including spectral processing, event detection, PPS synchronization, and the powerful Webserver available on the Ethernet interface. Play deep-ocean sounds from icListen AF through your PC speakers using the Lucy software, in real-time.

Like the icListen HF, the new AF is compatible with many radio systems, including GSM, ISM, and satellite. Applications include marine mammal observation, earthquake/tsunami monitoring, and shipping noise measurement.

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

### See the bigger picture with SeeByte's new sonar mosaic tool for ROVs

SeeByte, the global leader in creating smart software for unmanned maritime systems, has announced the launch of a new Multibeam Imaging Sonar Mosaic Tool for use with the company's SeeTrack CoPilot software.

Users of SeeTrack CoPilot are now able to generate a multibeam imaging sonar forward-look mosaic. They can do this using a simple on/off button in the SeeTrack CoPilot interface. The tool can be used to quickly generate maps of the environment and improve ROV pilots' situational awareness.

Dr. Mahesh Menon of Soil Machine

Dynamics Ltd (SMD), a partnering company of SeeByte and leading manufacturer of Work Class ROVs, commented: "Our smart partnership with SeeByte has been great for our customers from the start, particularly with the introduction of SMD's DVECS-S ROV control system, where CoPilot forms part of its core. With DVECS-S, pilots are able to engage autonomous functions on an ROV, such as auto cruise-control and object tracking using multi-beam sonar, which are beneficial in subsea operations, for example riser inspection, drill support and construction. We are very excited by the release of SeeByte's sonar mosaic tool, which will further benefit our customers, enabling them to paint a map of their environment and use that map to navigate more effectively. There is currently no other capability like this in the marketplace."

The Multibeam Imaging Sonar Mosaic Tool by SeeByte is now fully available to users of the SeeTrack CoPilot system, the world's most advanced, easy-to-use, plug-and play software that makes piloting any ROV a much simpler task. SeeTrack CoPilot permits pilot controlled auto-transit and stop-and-hover, while providing automated sonar tracking and movement relative to a target.

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

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

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

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

public and private sources are also readily accessible.

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

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

### UniFlex air lift bags

Unique System LLC (USA), a Unique Maritime Group company, participated in the Under Water Intervention Conference in New Orleans and was prodoud to showcase a range of UniFlex Air Lift Bags specifically designed for the U.S. market.

The UniFlex range covers the most commonly used sizes of air lift bags in the offshore industry (500 kg, 1 ton, 2



ton, 3 ton and 5 ton) and have been specifically designed to meet the rigorous safety requirements of the now widely recognized IMCA Guidance D016. UniFlex Air Lift Bags have not only been designed with a 5 times working load limit safety factor built in, but each size has been physically overloaded by water-filled drop test to verify

that the minimum requirement is not only met but exceeded. Independent type test certificates are available for all sizes of UniFlex air lift bags. They are also fitted with a robust inverter line attachment point that again, has been function tested during full-scale underwater trials. No other manufacturer worldwide has gone to such lengths to ensure their products are fit for purpose, safe in use, and made of the highest quality materials while maintaining a competitive price tag.

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

### **SBG Systems unveils the Ekinox Subsea Series**

SBG Systems unveiled at SUBSEA EXPO (Aberdeen, UK) the Ekinox Subsea Series, a product family of survey-grade inertial systems designed for underwater applications – up to 6,000 m. Based on the robust and cost-effective MEMS technology, the series includes the Ekinox-M, a Motion Reference Unit (MRU), and the Ekinox-U, an underwater Inertial Navigation System (INS).

The state-of-the-art Ekinox Subsea

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Series integrates the latest MEMS sensors to offer robust, small-sized, cost-effective, but exceptionally high performance MRU & INS. Ekinox outputs survey-grade roll, pitch, and heading (0.05°) at a high update rate, making it compliant with IHO standards. To obtain the most accurate and reliable navigation data, the internal Extended Kalman Filter fuses in real-time inertial and aiding information (DVL, RTK GPS, etc.). All collected data are recorded in the 8 GB data logger.

Ekinox offers highly accurate real-time heave which can be delivered on up to four different locations. The delayed heave feature allows surveying in every sea state. With this computation, heave accuracy is increased to 2.5 cm, while period swells can reach 50 s. To always get the best performance, the heave period is automatically computed and constantly adjusted.

Without mounting orientation limitation, numerous serial and Ethernet ports, and an internal Web interface, Ekinox Subsea Series is easy to install, connect, and configure. Available in long-life enclosure such as stainless

steel or titanium, they are operational up to 6,000 m. Every product is calibrated from -20 to 60°C to ensure the highest data integrity in all conditions, and is shipped with its own calibration report.

Ekinox-M makes hydrographic and offshore operations possible in all sea conditions by joining accurate motion measurement with delayed heave. Meanwhile, the Ekinox-U provides high accuracy navigation data in a compact and sealed package, making it the ideal solution for ROV orientation, AUV navigation, and data georeferencing.

For more information, visit [www.sbg-systems.com](http://www.sbg-systems.com).

## ATLANS-C position and orientation system launched

iXBlue, a leading provider of navigation, positioning, and mapping solutions, launched its new ATLANS-C position and orientation system, developed in close cooperation with Septentrio Satellite Navigation. The system is designed to provide continuous and accurate positioning in urban environments, where global navigation satellite system (GNSS) signals are



obscured, intermittent, or possibly distorted by reflective surfaces.

ATLANS-C benefits from the optimized integration of iXBlue's leading fiber-optic gyroscope (FOG) based inertial navigation system (INS) and Septentrio's world-renowned multi-constellation GNSS receiver technologies. Experts from iXBlue and Septentrio worked closely to develop an unrivaled smart coupling method that combines the advantages of the two companies' leading technologies. The result is an easy-to-use, easy-to-integrate, and highly reliable INS-GNSS mobile mapping solution.

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

The advertisement features a collage of images related to maritime defense, including a submarine periscope, a military uniform patch, and a ship's hull. Overlaid on this is a blue rectangular graphic containing event details.

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The book concludes with a brief history of the Marine

Technology Society. This limited edition publication is a must for everyone in the industry or with a desire to learn more about "how it all happened."

Order by calling Suzanne Voelker at the Marine Technology Society at 202-717-8705. Or send \$60 (hardbound)/\$45 (soft-bound) plus \$5 shipping and handling to the Marine Technology Society, 1100 H. Street, NW, Ste LL-100, Washington, DC 20005. It can also be ordered online by clicking on the 'Store' link on [www.MTSociety.org](http://www.MTSociety.org).

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Ocean News & Technology

Pacific Drilling S.A. said that **Paul T. Reese**, formerly vice president controller, was to assume the role of chief financial officer in late February. Reese succeeded William Restrepo, who was to leave the company to pursue another opportunity. Reese, a founding member of Pacific Drilling's management team, joined the company in 2008 from BHP Billiton, where he was controller for exploration and development. His industry experience includes more than a decade at Transocean with international postings in the Far East and Latin America, including finance director for the North and South America Business Unit and assistant vice president for Audit and Advisory Services. Prior to joining Transocean, he worked at Arthur Andersen LLP. He completed his CPA in 2000. He holds a bachelors in economics and managerial studies and a masters in accounting from Rice University.

Conductor Installation Services Ltd. (CIS), an Acteon company that provides pile- and conductor-driving services to the marine construction and oil and gas industries, has appointed **Paul G. Adams** to the newly created position of regional technical sales manager for the Americas region. In addition to managing opera-

tions in the region, Adams will be instrumental in driving new business development in North and South America, especially the continued growth of the company's conductor-driving services and recently launched subsea piling services, the company said. Before joining CIS, Adams served as global hammer operations manager for Baker Hughes in Woodlands, Texas where he was responsible for overseeing its global hammer operations as well as plug and abandonment activities. Adams launched his career in 1982 with Louisiana-based PetroDrive.

Duoline® Technologies, which solves oilfield corrosion problems through products and services, appointed **Joe Farmer** as manufacturing engineer. He earned his bachelor's degree in mechanical engineering from the University of Texas at Tyler. Most recently, he was a product engineer in Houston, where he was able to gain additional experience in manufacturing, OSHA regulations, and ISO standards. "Joe Farmer will be involved in Duoline® Technologies comprehensive



Adams

training program for young engineers," said Lauren Conley, director of human resources.

Horizon Marine, Inc. announced the addition of **David Fratantoni** as chief technology officer, **Ryan Carlson** as technical support specialist, and the promotion of Marine Technician **Joseph Bertrand** to HSE compliance officer. Fratantoni joins Horizon Marine after 17 years with the Woods Hole Oceanographic Institution. As a member of the WHOI scientific staff, founder and principal investigator of the autonomous systems laboratory, Fratantoni contributed to the development and novel application of underwater gliders and conducted pioneering research on eddies in the western Atlantic and Indian Oceans. Carlson has a diverse background in electromechanical systems, data processing, mechanical modeling, and alternative energy. During two summer internship positions with Horizon Marine, he focused on optimization algorithms for oceangoing vessels and enhancements to the company's surface current sensors. Bertrand has 5 years of experience as an oceanographic technician, participating in FAST Eddy ocean current surveys.



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Ashtead Technology has announced the appointment of **Wendy Lee** as regional general manager in Singapore and **Paul Morrison** as key account manager in Aberdeen. Lee has more than 16 years of experience in the oil and gas industry and joins the company following 6 years as managing director of Dominion Gas in Singapore. She previously worked for Petroleum GEO Services and BOC gases, both in Singapore. Paul has worked in technical sales for more than a decade and brings his technical knowledge and expertise to Ashtead from MacArtney UK where he was sales manager for 5 years. He will manage key accounts and work with the sales team to build relationships with new customers.

RBR is pleased to welcome **Douglas Schillinger** to our sales team. Schillinger will be joining us as our scientific sales representative for Atlantic Canada and East Coast U.S. region. Having spent the past 13 years working both for the Ocean Acoustic Lab at Dalhousie University and as a private consultant, Schillinger brings a wealth of knowledge and experience. He obtained his M.Sc. from Memorial University, studying ambient sound in the ocean generated by wind and precipitation; over his career, he has worked as a research assistant, project manager, and research associate on a range of topics, including marine mammal detection, nearshore sediment dynamics, real-time coastal and regional-scale ocean observatories, and most recently on instream tidal power.

Seatronics, an Acteon company, has promoted **Phil Middleton** to deputy managing director based in the Aberdeen office. Middleton has 18 years of experience in the oil and gas industry and 13 years within the rental market. During this time, he has demonstrated expertise in engineering, operations, commercial, and business development. Middleton's qualifications include a BEng Hons degree in electronic and electrical engineering from Robert Gordon University. He started his career with Scientific Drilling Controls before moving into the survey industry, joining Hydroquip in 1997 where he worked for 6 years. Following a change of career from assistant workshop manager, he joined Seatronics in 2003 as an internal sales engineer, progressing through the ranks to his new position.



Middleton

Bowtech Products Ltd announces the appointment of **Colin Main** as sales manager – subsea Connections. Main has 30 years of experience in the field of subsea connectors and cable moulding and is a recognized expert in this industry. Bowtech's managing director Steve Bowring says "Colin's knowledge, experience, customer relationships and wealth of knowledge in underwater connectors, cabling, and moulding will be a real asset to the company."

Global Diving & Salvage, Inc. announces the hiring of **John Propeck** as general manager for their Gulf Coast regional office, located in Houston, Texas. In this position, Propeck will be responsible for the day-to-day undertakings of this region both administratively and operationally. He will lead the development of new and ongoing business opportunities within Global's core service lines: offshore operations, marine construction, and casualty response. Propeck brings with him over 45 years of multi-faceted experience in the commercial diving and maritime industry. He began his career as a commercial diver, logging over 1,000 days in saturation. He has over 20 years of program and project management experience, including business development, marketing, sales, purchasing, and procurement management.

Sonardyne International Ltd. is pleased to announce the promotion of **Anthony Gleeson** to the position of vice president Sonardyne Asia Pte, based in Singapore. Gleeson joined Sonardyne in 2009 and brought with him a wealth of knowledge and experience from his previous sales and offshore engineer roles at Teledyne TSS and Seistech Offshore. During his time so far with Sonardyne, he has been highly influential in developing business opportunities in the region, particularly in China. As Sonardyne Asia's new regional head, Gleeson will draw on this experience, his industry connections, and knowledge of the subsea marketplace to develop strategies that will lead the company into the next stage of expansion.

DNV GL - Oil & Gas, the leading technical advisor to the global oil and gas industry, has appointed **Liv Hovem** as director of its Europe and Southern



Main

Africa Division. Hovem has been with DNV GL since 1988. She has more than 25 years of experience in international management, technical advisory, engineering, development, and research in the oil and gas and maritime industries—in areas such as classification, risk and probabilistic modeling, hydrodynamics, and strength of ships and offshore structures.

**2H Offshore**, an Acteon company, announces the opening of a newly refurbished 16,547 sq.ft office space, located on the fourth and fifth floors of Hollywood House in the center of Woking, Surrey. Due to the sustained growth of the company, 2H Offshore upgraded facilities to better service its clients and employees.

Offshore engineering, construction and support services specialist **Sembmarine SLP** is investing for the future with the establishment of additional facilities in Lowestoft, and Aberdeen. In Lowestoft the company's Offshore Services Group has just moved into new premises at Newcombe House. In Aberdeen, the company has identified a growing number of opportunities to provide a comprehensive front-end engineering design [FEED] service to the offshore oil, gas, and wind energy sectors and is planning to open an office in early 2014 to provide this service.

**Seatronics Inc.**, an Acteon company, is moving to a new, purpose-built facility in Houston to expand its rental, sales, and service work for customers throughout North and Central America. The new plant, at 1319 West Sam Houston Parkway North, Suite 150, contains service facilities for cable moulding, connector assembly production and injection polyurethane moulding, along with a state-of-the-art calibration laboratory, an electrical and electronic repair center and capabilities for gyro calibrations, inertial navigation, and Doppler velocity log special services. It will also have an acoustic test tank and a current meter test tank. The facility has 15,000 sq.ft of floor space, which provides scope for expansion in all departments.

Global-leading energy production technology services company **Proserv** has further bolstered its rapidly expanding subsea manufacturing capabilities and specialist integrated services after completing the acquisition of major engineering player KRG Industries Ltd. Proserv has acquired the entire share capital of UK-based KRG Industries (KRG) from majority shareholder Torishima Pump Mfg. Co. Ltd, (Torishima) in Japan.

# CALENDAR & EVENTS

March 2014

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Ocean News & Technology

March 5-7, 2014  
**Subsea Tieback**  
San Antonio, TX  
[www.subseatielbackforum.com](http://www.subseatielbackforum.com)

March 9-13, 2014  
**NACE Corrosion**  
San Antonio, TX  
[www.nace.org](http://www.nace.org)

March 10-12, 2014  
**Decommissioning & Abandonment Summit**  
Houston, TX  
[www.decomworld.com](http://www.decomworld.com)

March 11-13, 2014  
**Oceanology International**  
London, UK  
[www.oceanologyinternational.com](http://www.oceanologyinternational.com)

March 25-28, 2014  
**OTC Asia**  
Kuala Lumpur, Malaysia  
[www.otcasia.org](http://www.otcasia.org)

March 29-May 1, 2014  
**IDGA Maritime Homeland Security**  
Baltimore, MD  
[www.maritimehssummit.com](http://www.maritimehssummit.com)

April 7-10, 2014  
**Oceans '14 Taipei**  
Taipei, Taiwan  
[www.oceans14mtsieetaipei.org](http://www.oceans14mtsieetaipei.org)

April 8-10, 2014  
**European Offshore & Energy**  
Birmingham, UK  
[www.europeanoffshoreenergy-expo.com](http://www.europeanoffshoreenergy-expo.com)

April 15-16, 2014  
**Offshore Well Intervention Conference**  
Aberdeen, UK  
[interventioneu.offsnetevents.com/](http://interventioneu.offsnetevents.com/)

April 15-17, 2014  
**GMREC**  
Seattle, WA  
[www.globalmarinerenewable.com](http://www.globalmarinerenewable.com)

April 28-30, 2014  
**National Hydropower Association**  
Washington, D.C.  
[www.nationalhydroconference.com](http://www.nationalhydroconference.com)

May 5-8, 2014  
**Offshore Technology Conference**  
Houston, TX  
[www.otcnet.org](http://www.otcnet.org)

May 12-15, 2014  
**AUVSI's Unmanned Systems N.A.**  
Orlando, FL  
[www.auvsi.org](http://www.auvsi.org)

May 15-16, 2014  
**ICMSA**  
Amsterdam, The Netherlands  
[www.waset.org](http://www.waset.org)

May 21-22, 2014  
**All Energy**  
Aberdeen, UK  
[www.all-energy.co.uk](http://www.all-energy.co.uk)

May 12-15, 2014  
**AUVSI's Unmanned Systems NA**  
Orlando, FL  
[www.auvsishow.org](http://www.auvsishow.org)

May 15-16, 2014  
**ICMSA 2014**  
Amsterdam, The Netherlands  
[www.waset.org](http://www.waset.org)

May 20-22, 2014  
**MAST EurAsia 2014**  
Istanbul, Turkey  
[www.mastconfex.com](http://www.mastconfex.com)

May 21-22, 2014  
**All Energy**  
Aberdeen, UK  
[www.all-energy.co.uk](http://www.all-energy.co.uk)

June 2-4, 2014  
**Submarine Cable Forum**  
Miami, FL  
[www.marcusevans-conferences.com](http://www.marcusevans-conferences.com)

June 3-5, 2014  
**Energy Ocean International**  
Atlantic City, NJ  
[www.energyocean.com](http://www.energyocean.com)

June 10-12, 2014  
**Capitol Hill Ocean Week**  
Washington, D.C.  
[www.nmsfocean.org/CHOW-2014](http://www.nmsfocean.org/CHOW-2014)

June 10-12, 2014  
**SeaWork International**  
Southampton, UK  
[www.seawork.com](http://www.seawork.com)

June 10-12, 2014  
**UDT**  
Liverpool, UK  
[www.udt-global.com](http://www.udt-global.com)

June 11-12, 2014  
**Global Offshore Wind**  
Glasgow, UK  
[www.renewableuk.com](http://www.renewableuk.com)



# Ocean News & Technology 2014 EDITORIAL CALENDAR

## JANUARY

**Editorial:** Forecast: 2014 and Beyond; GIS/Mapping  
**Distribution:** GOM Oil Spill & Ecosystem; Subsea EXPO;

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

## FEBRUARY

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

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

## MARCH

**Editorial:** Subsea Fiber Optic Networks; Maritime Security

**Distribution:** GMREC; Offshore Well Intervention Conference

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

## APRIL

**Editorial:** Offshore Technology; Ocean Mapping & Survey

**Distribution:** OTC; AUVSI; Well Control and Containment Conference

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

## MAY

**Editorial:** UW Imaging & Processing; Marine Salvage/UW Archeology

**Distribution:** Energy Ocean; Seawork International; UDT; Submarine Cable Forum

**Product & Services Focus:** Magnetometers; Water Dredges & Airlifts; Diving Services

## JUNE

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

**Distribution:** TBD

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

## JULY

**Editorial:** Workclass ROVs; Deepwater Pipeline/Repair/Maintenance

**Distribution:** Offshore Northern Seas

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

## AUGUST

**Editorial:** Ocean Observing Systems; Subsea Telecom

**Distribution:** Oceans'14 MTS/IEEE

**Product & Services Focus:** Water Sampling Equipment; Cable Installation Services

## SEPTEMBER

**Editorial:** Ocean Engineering; Marine Construction; *Corporate Showcase*

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

**Product & Services Focus:** Navigation, Mapping & Signal Processing; Data Processing Services

## OCTOBER

**Editorial:** Offshore Communications; Subsea Inspection, Monitoring, Repair and Maintenance

**Distribution:** OilComm; North Sea Decommissioning

**Product & Services Focus:** Acoustic Modems, Releases & Transponders; Marine Communications; Survey & Exploration Services

## NOVEMBER

**Editorial:** Offshore Support, Supply & Emergency Vessels; Deep Sea Mining

**Distribution:** Clean Gulf; International Workboat

**Product & Services Focus:** Ship Protection Systems; Winches & Control Systems; Vessel Charter/Leasing Services

## DECEMBER

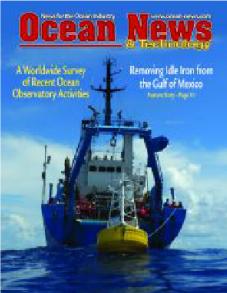
**Editorial:** Light Workclass ROVs; Commercial Diving; *Year in Review*

**Distribution:** Clean Pacific; Underwater Intervention

**Product & Services Focus:** Diving Equipment & Services; Buoyancy Materials; Construction & Repair Services

Serving the Ocean and Offshore industry, Ocean News & Technology has a long, rich history as the primary information resource executives around the world rely on.

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# Ocean News & Technology

# OCEAN INDUSTRY DIRECTORY

The image shows several pages of the Ocean Industry Directory, featuring company profiles and contact information. The companies listed include PMI, SubConn, Gold Land & Marine Prod Distributors, GEOMETRIC, TELEZYNE OOI, IXBLUE, Interdive, and many others. Each listing includes a logo, company name, address, phone number, fax number, email, and website. The pages are arranged in a grid-like fashion, representing different issues of the directory.

## CURRENT LISTINGS IN EVERY ISSUE

Ocean Industry Directory is featured in every issue of Ocean News, and the industry knows this is the one source they can count on to provide them with up to date listing information for the products and companies they're looking for.

Don't miss the opportunity to provide your next prospect with the information he needs to contact you. Place your listing in the Ocean News & Technology Ocean Industry Directory today! Listing can be changed at any time.



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**WWW.OCEAN-NEWS.COM**

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Fax: +44 (0) 1493 440720  
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Website: www.appliedacoustics.com  
Contact: Gavin Willoughby



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Website: www.falmouth.com



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Fax: +401 946 5790  
E-mail: eslab@electrostandards.com  
Website: www.electrostandards.com  
Contact: Dr. Raymond B. Sepe, Jr.



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Fax: +1 902 468 4442  
E-mail: emily@metocean.com  
Website: www.metocean.com  
Contact: Emily MacPherson



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Website: www.falmat.com  
Contact: Shawn Amirehsani



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Fax: +44 (0) 1923 216061  
E-mail: tsssales@teledyne.com  
Website: www.teledyne-tss.com  
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# OCEAN INDUSTRY DIRECTORY

ON&T's Product & Service Directory

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Fax: +1 310 762 1616  
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Website: www.ak-ind.com  
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Fax: +1 805 487 0427  
USA: +1 888 BIRNS 88 (+1 888 247 6788)  
E-mail: service@birns.com  
Website: www.birns.com  
Contact: Eric Birns



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Pawtucket, RI 02860 USA  
Tel: +1 401 723 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.*

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E-mail: seacon@seaconworldwide.com  
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*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 and Texas, 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.*

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Fax: +1 386 236 0906  
Toll Free: +1 888 506 2326  
E-mail: oilandgas@teledyne.com  
Website: www.teledyneoilandgas.com



**TELEDYNE OIL & GAS**

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Fax: +44 1752 56 90 90  
E-mail: vanessa@interdive.co.uk or diving@interdive.co.uk  
Website: www.interdive.co.uk  
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Colonial Heights, VA 23834  
Tel: +1 804 451 5211  
E-mail: sales@bgbtechnology.com  
Website: www.bgbtechnology.com and www.bgbengineering.com



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TECHNOLOGY INC.

*BGB is a manufacturer of fiber optic rotary joints (FORJ), media converters and wave division multiplexers used in the transmission of high speed data and video signals. The Optilinc FORJ is available with either ST or Deutsch RSC TM connectors. BGB can also supply integrated slip ring/FORJ assemblies if required*

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E-mail: mcg@moog.com  
Website: www.moog.com/marine  
Contact: John Purdy



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Website: www.seaviewsystems.com  
Contact: Matthew Cook



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Tel: +44 (0) 1923 216020  
Fax: +44 (0) 1923 216061  
E-mail: tsssales@teledyne.com  
Website: www.teledyne-tss.com  
Contact: Carolyn Jones



**USA Office:** 7701 West Little York, Suite 300  
Houston, TX 77040, Contact: Keith Pope  
Tel: +1 713 461 3030, Fax: +1 713 461 3099

*Supplier of the Meridian range of IMO, Wheelmark and High Speed Craft approved surface and subsea gyro compasses. Options include heave, roll and pitch and battery backup versions as well as a range of repeaters and ancillary products. TSS also continues to support the world-renowned range of SG Brown gyro compasses and marine equipment.*

### **INSURANCE**

#### John W. Fisk Company

4833 Conti Street, Suite 200  
New Orleans, LA 70119  
Toll Free: +1 888 486 5411  
E-mail: insure@jwfisk.com  
Website: www.jwfisk.com



*Fisk Marine Insurance provides all types of insurance to any limit required for commercial diving, marine contractors, offshore oilfield and platforms, plug and abandonment (P&A) contractors, land based energy, ocean marine cargo and oceanographic research worldwide. Our coverages include Workers Compensation (USL&H & Jones Act, General Liability, Professional Liability, Hull P&I, Equipment, Bonds and International Packages for clients working outside of the USA. Contact us for more information: 1-888-486-5411 or insure@jwfisk.com. Visit our website: www.jwfisk.com*

### **LIQUID STORAGE**

#### Aero Tec Laboratories, Inc. (ATL)

45 Spear Road Industrial Park,  
Ramsey, NJ 07446 USA  
Tel: +1 201 825 1400  
Fax: +1 201 825 1962  
E-mail: atl@atlinc.com  
Website: www.atlinc.com  
Contact: David Dack



*ATL specializes in the design/manufacture of custom bladder-type fluid containment systems, including tanks, inflatables, pillows and bellows for surface and subsea. ATL's flexible fluid containers boast unparalleled chemical tolerance, abrasion resistance, and remarkable durability - used with methanol, diesel fuel, gases, ethyleneglycol, hydraulic fluids and chemical cleaning cocktails. Expedited deliveries are also available.*

### **MAGNETOMETERS**

#### Geometrics, Inc.

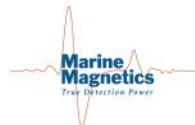
2190 Fortune Drive  
San Jose, CA 95131  
Tel: +1 408 954 0522  
Fax: +1 408 954 0902  
E-mail: sales@geometrics.com  
Website: www.geometrics.com  
Contact: Ross Johnson



*Geometrics, a member of OYO Corporation, manufactures, sells, and services portable geophysical instruments for land, marine, and air investigations of the subsurface. Geometrics' product line includes proton precession and cesium magnetometers, high-resolution seismographs, and electrical conductivity imaging and resistivity systems. Geometrics' instruments are used around the world for natural resource exploration, geotechnical and environmental assessments, ordnance detection, locating archeological and treasure sites, teaching and research.*

#### Marine Magnetics Corp.

135 Spy Court  
Markham, Ontario,  
Canada L3R 5H6  
Tel: +1 905 479 9727 x232  
E-mail: info@marinemagnetics.com  
Website: www.marinemagnetics.com  
Contact: Rebecca Milian



*Designs and manufactures magnetometers using advanced Overhauser technology for high sensitivity and unmatched accuracy characteristics.*

*Products include:*

- *SeaSPY is a versatile and tough marine magnetometer that is suitable in any environment, from small zodiac-type boats to full-ocean survey vessels. It is adaptable with a large variety of options to suit many applications.*
- *Explorer is a miniature, lightweight magnetometer designed primarily for in-shore surveys in harbours, lakes, or rivers. It is ideal for small-boat applications where size and weight are most important.*
- *SeaQuest is a multi-sensor gradiometer. It is the most advanced magnetic search tool available - improving speed and accuracy in UXO and mine detection. Available auxiliary sensors include, tilt sensor, pressure sensor, altimeter, built-in GPS.*

### **MANUFACTURERS' REPRESENTATIVE**

#### Ocean Marine Industries

2810 Hudson Street  
Chesapeake, VA 23324  
Tel: +1 757 382 7616  
Fax: +1 757 382 5012  
E-mail: info@oceanmarineinc.com  
Website: www.oceanmarineinc.com  
Contact: Jeanne Dorsey



*Ocean Marine Industries (OMI) specializes in strategic product distribution and sales representation with special emphasis on working with U.S. Federal and State Government Agencies, Scientific Research Institutes, Academia and commercial organizations. OMI's primary product line is multi-beam imaging sonars made by Sound Metrics of Bellevue, WA www.soundmetrics.com*

### **MARINE ENVIRONMENTAL CONSULTING SERVICES**

#### ASRC Energy Services

3900 C Street, Suite 700  
Anchorage, AK 99503  
Tel: +1 907 339 6200  
Fax: +1 907 339 5475  
Email: Paul.Ramert@asrcenergy.com  
Website: www.asrcenergy.com  
Contact: Paul Ramert, Vice President/General Manager, Regulatory and Technical Services



*ASRC Energy Services provides marine environmental consulting services and compliance support for offshore projects. RTS has experience in public and private sectors and takes a multidisciplinary and strategic approach to regulatory permitting, environmental assessment, and integrated stakeholder engagement to support a complete range of projects.*

#### CSA Ocean Sciences Inc.

8502 SW Kansas Avenue  
Stuart, FL 34997  
Tel: +1 772-219 3000  
Fax: +1 772-219 3010  
E-mail: tmartin@conshelf.com  
Website: www.csaocean.com  
Contact: Tony Martin



*CSA Ocean Sciences Inc. (CSA) is a marine environmental consulting firm specializing in multidisciplinary projects concerning potential environmental impacts of activities throughout the world. With extensive experience in environmental sciences and technical field operations, CSA is staffed and equipped to offer a complete range of services for projects in offshore, nearshore, estuarine, wetland, and freshwater environments.*

# OCEAN INDUSTRY DIRECTORY

ON&T's Product & Service Directory

## MOTION SENSING EQUIPMENT

### iXBlue

Tel: +33 (0) 1 30 08 88 88  
Fax: +33 (0) 1 30 08 88 01  
Website: [www.ixblue.com](http://www.ixblue.com)



- **PHINS**, Full Inertial Navigation System
- **PHINS 6000**, subsea INS
- **HYDRINS**, hydrographic INS
- **MARINS**, naval INS
- **ROVINS**, survey full-featured INS

*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

### Kongsberg Seatex AS

Pirsenteret  
N-7462 Trondheim, Norway  
Tel: +47 73 54 55 00  
Fax: +47 73 51 50 20  
E-mail: km.seatex@kongsberg.com  
Website: [www.km.kongsberg.com/seatex](http://www.km.kongsberg.com/seatex)  
Contact: Finn Otto Sanne at finn.otto.sanne@kongsberg.com



*Kongsberg Seatex is a leading international marine electronics manufacturer specializing in the development and production of precision positioning and motion sensing systems. Our commitment is to provide quality products and solutions for safe navigation and operations at sea in the commercial offshore, maritime, hydrographics and defence industries*

### Teledyne TSS Ltd.

UK Office: 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](mailto:tssales@teledyne.com)  
Website: [www.teledyne-tss.com](http://www.teledyne-tss.com)  
Contact: Carolyn Jones



**TELEDYNE TSS**  
Everywhereyoulook™

94

USA Office: 7701 West Little York, Suite 300  
Houston, TX 77040, Contact: Keith Pope  
Tel: +1 713 461 3030, Fax: +1 713 461 3099

*Comprehensive family of motion sensors available; ranging from a heave sensor through to heave, pitch and roll, and at the top end of the range highly accurate position and heading systems.*

## OCEANOGRAPHIC INSTRUMENTS/SERVICES

### ASL Environmental Sciences, Inc.

#1-6703 Rajpur Place, Victoria  
BC, Canada V8M 1Z5  
Phone: +1 250 656 0177  
Fax: +1 250 656 2162  
Email: [asl@aslenv.com](mailto:asl@aslenv.com)  
Web: [www.aslenv.com](http://www.aslenv.com)



*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

rue Gutenberg  
56700 Hennebont, France  
Tel: +33 2 97 36 41 31  
Fax: +33 2 97 36 10 12  
E-mail: [info.instrumentation@nke.fr](mailto:info.instrumentation@nke.fr)  
Website: [www.nke-instrumentation.com](http://www.nke-instrumentation.com)



- Fresh and marine waters multiparameter probes: CTD, dissolved oxygen, turbidity, fluorescence, pH • Monitoring data loggers for atmospheric and marine corrosion, and cathodic protection • Dedicated and customized measurement and monitoring equipment for: sediment transport, underwater systems behaviour, fishing efforts and environmental parameters, intelligent networks...  
Contact : Valérie Le Pen - [vlepen@nke.fr](mailto:vlepen@nke.fr) or Goulven Prud'homme - [gprudhomme@nke.fr](mailto:gprudhomme@nke.fr)
- Provor and Arvor profiling subsurface floats (ARGO project), CTD, dissolved oxygen and optical sensors; Argos and Iridium transmission. • Drifting surface buoys with temperature and GPS receiver for Surface velocity project. • Carioca drifting buoy: sea water dissolved pCO<sub>2</sub>, chlorophyll, wind speed and salinity.  
Contact: Patrice Brault - [pbrault@nke.fr](mailto:pbrault@nke.fr)

### Nortek AS

Vangkroken 2  
1351 Rud, Norway  
Tel: +47 6717 4500  
E-mail: [inquiry@nortek.no](mailto:inquiry@nortek.no)

### Nortek USA

27 Drydock Avenue  
Boston, MA 02210  
Tel: +1 617 206 5750  
Email: [inquiry@nortekusa.com](mailto:inquiry@nortekusa.com)  
Website: [www.nortek-as.com](http://www.nortek-as.com)



*Nortek's products span from single point turbulence sensors to long range current profilers. Our customers are scientists, consulting engineers and professionals working in the offshore oil and gas industry. Nortek provides solutions measuring surface waves to currents 6,000 m deep. Nortek is global, positioned to help you wherever your solution is needed.*

### RBR

95 Hines Road, Ottawa  
Ontario Canada K2K 2M5  
Tel: +1 613 599 8900  
Fax: +1 613 599 8929  
E-mail: [info@rbr-global.com](mailto:info@rbr-global.com)  
Website: [www.rbr-global.com](http://www.rbr-global.com)



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

### Sea-Bird Electronics, Inc.

13431 NE 20th St.  
Bellevue, WA 98005  
Tel: +1 425 643 9866  
Fax: +1 425 643 9954  
E-mail: [seabird@seabird.com](mailto:seabird@seabird.com)  
Website: [www.seabird.com](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.*

### Star-Oddi

Skeidaras 12, 210  
Gardabaer, Iceland  
Tel: +354 533 6060  
Fax: +354 533 6069  
E-mail: [baldur@star-oddi.com](mailto:baldur@star-oddi.com)  
Website: [www.star-oddi.com](http://www.star-oddi.com)  
Contact: Baldur 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.*

### TDI Brooks

14391 South Dowling Road  
College Station, Texas 77845 USA  
Tel: +1 979 693 3446  
Fax: +1 979 693 6389  
Email: [Jimbrooks@tdi-bi.com](mailto:Jimbrooks@tdi-bi.com)  
Website: [www.tdi-bi.com](http://www.tdi-bi.com)  
Contact: Dr. Jim Brooks



*Scientific services with a focus on petroleum geochemistry, surface geochemical exploration, geotechnical coring and analysis, oil spill response, oceanographic surveys, hazard surveys, environmental chemistry and environmental assessments. Operating six research vessels and maintaining geochemical, geotechnical and environmental laboratory facilities.*

### Turner Designs

845 W Maude Avenue  
Sunnyvale, CA 94085  
Phone: +1 408 749 0994 x146  
Toll Free: +1 877 316 8049 x149  
Fax: +1 408 749 0998  
Contact: Tom Brumett, Sales Engineer  
E-mail: [sales@turnerdesigns.com](mailto:sales@turnerdesigns.com)  
Website: [www.turnerdesigns.com](http://www.turnerdesigns.com)



*Providing fluorescence-based solutions for research, water quality, and pollution control for over 40 years. Known for reliable and stable submersible, field, handheld, laboratory, and online fluorometers and turbidimeters. Customers rate us an average of 9, on a scale of 1-10, when asked how likely they would be to recommend us.*

## POWER SYSTEMS

### SouthWest Electronic Energy

823 Buffalo Run  
Missouri City, Texas 77489  
Tel: +1 281 240 4000  
Fax: +1 281 240 4535  
Email: [seasafe@swe.com](mailto:seasafe@swe.com)  
Website: [www.swe.com](http://www.swe.com)  
Contact: Leon Adams



*SouthWest Electronic Energy specializes in safe, high-quality battery solutions for industrial subsea applications, ranging from one bar Lithium-Ion to 10,000+ PSI tolerant Lithium-Ion polymer rechargeable battery solutions leveraging our patented battery management system. We safely deliver 4X the run time of Sealed Lead Acid with extended lifecycles for AUVs, ROVs, electronics and motors.*

#### Tinitron, Inc.

6501 NW Croeni Road  
Hillsboro, OR 97124-8506  
Tel: +1 503 533 4400  
Toll free: +1 800 786 5824 (7-VOLTAGE)  
Email: sales@tinitron.com  
Website: www.tinitron.com  
Contact: Tinny Srinivasan, President & CEO, David Fulton, Director of Bus. Dev. x234

Tinitron Marine designs and manufactures high-voltage systems and subsea components, transformers, Power Distribution Units, high-quality inverters, energy storage systems, optically-controlled subsea transformers, Insulation Leakage Monitors (for umbilicals), rotary switches for grounding and tap selection, and solenoids for ROVs and other subsea tools. Since 1962, over 5,000 designs. [www.tinitron.com](http://www.tinitron.com).

#### PROJECT CONSULTING/ADVISORY SERVICES

#### Ocean Specialists Inc.

8502 SW Kansas Ave  
Stuart, FL 34997  
Tel: +1 772 219 3033  
Fax: +1 772 219 3010  
Email: jbyous@oceanspecialists.com  
Website: [www.oceanspecialists.com](http://www.oceanspecialists.com)  
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.

#### SONAR SYSTEMS

#### iXBlue

Tel: +33 (0) 1 30 08 88 88  
Fax: +33 (0) 1 30 08 88 01  
Website: [www.ixblue.com](http://www.ixblue.com)



#### SHADOWS SAMS

- High-performance mapping sonar
- Synthetic Aperture Sonar processing
- Provides real time ortho-rectified and geo-referenced images
- No gap at nadir

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

#### L-3 Klein Associates, Inc.

11 Klein Drive  
Salem, NH 03079  
Tel: +1 603 893 6131  
Fax: +1 603 893 8807  
Email: Klein.Mail@L-3com.com  
Web: [www.L-3Klein.com](http://www.L-3Klein.com)  
Contact: Deborah Durgin, Supervisor, Marketing & Sales



Klein Associates, Inc.

L-3 Klein is the world's leading sensor technology provider that manufactures and designs high-resolution side scan and multi-beam sonar equipment, and radar-based security and surveillance systems. L-3 Klein has developed a worldwide reputation of excellence in the industry by providing quality products and excellent customer service. Please feel free to check out our product offerings at [www.L-3Klein.com](http://www.L-3Klein.com).

#### Marine Sonic Technology, Ltd.

P.O. Box 730  
White Marsh, VA 23183-0730  
Toll Free: +1 800 447 4804  
E-mail: jdemille@marinesonic.com  
Website: [www.marinesonic.us](http://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.

#### Sound Metrics

11010 Northup Way  
Bellevue, WA 98004  
Tel: +1 425 822 3001  
E-mail: sales@soundmetrics.com  
Website: [www.soundmetrics.com](http://www.soundmetrics.com)  
Contact: Jeanne Dorsey



Sound Metrics manufacturers imaging sonars, capturing the clearest, most detailed video images in their class. Sound Metrics has built a reputation for support and for innovating solutions around their customers' applications. ARIS, the next generation of DIDSON, offers lower power consumption, smaller size, unprecedented clarity and resolution among other benefits.



TINITRON MARINE  
Division of TINITRON, INC.

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#### SOUND VELOCITY PROBES/CTDS

#### SAIV A/S

Nygardsviken 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](http://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 profilings, installation on ROVs and towed systems, etc. Robust and compact designs are combined with accuracy and "plug and 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](http://www.ixblue.com)



#### ECHOES

- wide band
- flat spectrum
- from 500 Hz to 15 kHz
- fish, hull-mounted, pole-mounted, AUV-mounted
- shallow to 6000 m deep

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 70380  
Tel: +1 985 385 6789  
E-mail: bill.new@newindustries.com  
Website: [www.newindustries.com](http://www.newindustries.com)  
Contact: Bill New



New Industries provides quality fabrication services to the offshore oil & gas and marine industries focusing on large diameter pressure vessels, suction piles, DNV buildings and deepwater subsea production equipment such as jumpers, PLETs, PLEMs and manifolds.

#### SUBSEA TOOLING

#### Seanic Ocean Systems

8860 Fallbrook Drive  
Houston, TX 77064  
Tel: +1 713 934 3100  
E-mail: info@seanicusa.com  
Website: [www.seanicusa.com](http://www.seanicusa.com)  
Contact: Karen North



Seanic was formed to address the growing demand for simple, rugged and reliable subsea tooling for remote intervention. Along with engineered solutions, Seanic also offers expertise in the design, manufacturing, storage, repair & maintenance of subsea products. Seanic provides a worldwide standard product line of ROV tooling such as torque tools, FLOT's, hot stabs, manifolds, buckets and ROV interface panels.

#### Subsea Americas

3447 Hwy 182  
P.O. Box 185  
Berwick, LA 70342  
Tel: +1 985 714 1767 or 985 518-0055  
E-mail: charles@subseamericas.com  
Website: [www.subseamericas.com](http://www.subseamericas.com)  
Contact: Charles Mayea



Subsea Americas (SSA) is a leading provider of rental ROV tooling equipment on a world-wide basis. SSA is a 24 hr. / 7 days a week service provider of a comprehensive range of standard subsea tooling equipment. From torque tools and flying lead orientation tools to 15k isolated hydraulic intensifiers and wire rope cable cutters - SSA can fully support the client's needs with quality service, and reliable equipment at a most competitive cost.

#### SWITCHES

#### SEACON Advanced Products, LLC.

1321 Neliaus Road  
P.O. Box 767  
Bellville, TX 77418 USA.  
Tel: +1 979 865 8846  
Fax: +1 979 865 8859  
E-mail: sales@seacon-ap.com  
Website: [www.seacon-ap.com](http://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.

# OCEAN INDUSTRY DIRECTORY

ON&T's Product & Service Directory

## UNDERWATER VEHICLES/AUVs

### Exocetus Development LLC

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



The Exocetus Coastal Glider, designed for coastal waters where high currents and large variations in water densities occur, has a larger buoyancy engine than legacy gliders, enabling the glider to operate in 2+ knots of current, handling water densities from 7 - 37 ppt, operate for 60 days with a lithium battery and integrate additional sensors.

### Hydroid, Inc. a subsidiary of Kongsberg Maritime

6 Benjamin Nye Circle  
Pocasset, MA 02559-4900 USA  
Tel: +1 508 563 6565  
Fax: +1 508 563 3445  
E-mail: glester@hydroid.com  
Website: www.hydroid.com  
Contact: Graham Lester



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

### OceanServer Technology, Inc.

151 Martine Street  
Fall River, MA 02723 USA  
Tel: +1 508 678 0550  
Fax: +1 508 678 0552  
E-mail: sales@ocean-server.com  
Website: www.iver-auv.com  
Contact: Jim Kirk



OceanServer Technology, Inc. is a leading provider of man-portable Autonomous Underwater Vehicles (AUVs) with over 200 AUVs deployed worldwide. The Iver AUV is an affordable, commercial vehicle used for general survey and sub-surface security work, and serves as a research platform for autonomy, behavioral and sensor development studies at universities and navy research facilities.

## UNDERWATER VEHICLES/ROVs

### Deep Ocean Engineering Inc.

2528 Quine Drive, Suite 11  
San Jose, CA 95131 USA  
Tel: +1 408 436 1102  
Fax: +1 408 436 1108  
E-mail: sales@deepoceango.com  
Website: www.deepoceango.com  
Contact: Bill Charbonneau



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

### Delta SubSea LLC.

550 Club Drive, Suite 345  
Montgomery, TX 77316  
Tel: +1 936 582 7237  
Fax: +1 713 583 1369  
E-mail: sdingman@deltaubsea-rov.com  
Website: www.DeltaSubSea-ROV.com  
Contact: Scott Dingman, President / CEO



Delta SubSea is a leading integrated independent provider of ROV services and solutions. With the industry's newest ROV fleet and a deeply experienced ROV operations team, as well as ROV tooling, engineering and CAD, Delta is the global offshore oil and gas industry's choice for Best-In-Class solutions and Maximum Uptime.

### i-Tech

22330 Merchants Way  
Katy, TX 77449  
Tel: +1 281 693 9403  
E-mail: Katarina.Tehlirian@Subsea7.com  
Website: www.interventiontechnology.com  
Contact: Katarina Tehlirian



i-Tech is a global division of Subsea 7 delivering world class remotely operated vehicle (ROV) and intervention tooling support services to the offshore energy industry, operating from four regional centers: Europe & Africa, Asia-Pacific the Americas and Brazil.

### Perry

10344 Sam Houston Park Drive, Suite 300  
Houston, TX 77064  
Tel: +1 713 329 8230  
Fax: +1 713 329 8299  
E-mail: subsea.sales@f-e-t.com  
Website: www.f-e-t.com/Subsea



SUBSEA TECHNOLOGIES  
everything remotely possible™

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



### Schilling Robotics, LLC

260 Couston Place  
Davis, CA 95618  
Tel: +1 530 753 6718  
Fax: +1 530 753 8092  
Contact: Peter MacInnes  
E-mail: peter.macinnes@fmcti.com  
Website: www.fmctechnologies.com



Schilling Robotics, a business unit of FMC Technologies, is a leading global producer of high-technology subsea systems, including remotely operated vehicles (ROVs), manipulators, and custom-engineered systems for subsea production. We bring nearly 30 years of technological expertise and innovation to the challenges facing customers in the subsea environments. [www.fmctechnologies.com](http://www.fmctechnologies.com)

### SeaBotix Inc.

2877 Historic Decatur Road, Suite 100  
San Diego, CA 92106 USA  
Tel: +1 619 450 4000  
Fax: +1 619 450 4001  
E-mail: Info@SeaBotix.com  
Website: www.SeaBotix.com



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AB21 0PS, Scotland  
Tel: +44 (0) 1224 798660  
Fax: +44 (0) 1224 798661



10344 Sam Houston Park Drive, Suite 300  
Houston, TX 77064  
Tel: +1 713 329 8730  
Fax: +1 713 329 8299  
E-mail: subsea.sales@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

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Fax: +1 610 458 3010  
E-mail: sales@videoray.com  
Website: www.videoray.com  
Contact: Brian Luzzi



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## UNDERWATER VIDEO EQUIPMENT

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Fax: +44 (0) 1224 226501  
Email: km.camsales.uk@kongsberg.com  
Website: [www.km.kongsberg.com/cameras](http://www.km.kongsberg.com/cameras)  
Contact: Mark Esslemont



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### ROVSCO, Inc.

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Tel: +1 281 858 6333  
Fax: +1 281 858 6363  
E-mail: sales@rovSCO.com  
Website: [www.rovSCO.com](http://www.rovSCO.com)  
Contact: Jessica Kenney



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.

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E-mail: info@sidus-solutions.com  
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*SIDUS Solutions LLC is an integrated systems provider for security/video surveillance systems specializing in customization with products operational to subsea depths of 6,500m. As a full service provider offering end-to-end solutions from concept design, product selection, engineering, manufacturing, technical and customer support, we serve the Oil and Gas, Scientific, Military and Academic industries worldwide.*

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**2 Describe your job function (circle 1):**

1. OWNER      5. BUYER  
 2. MANAGER/PROF      6. SALES  
 3. ENG'R/SCIENTIST      7. OTHER (Specify) \_\_\_\_\_  
 4. TECH'N/OPERATOR

**Radoil, Inc.**

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Contact: Brian Abel

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**3 Describe your organization (circle up to 4):**

- A. SHIPS, CONSTRUCTION, SALVAGE
- B. U/W VEHICLES / COMPONENTS
- C. NAVIGATION / POSITIONING
- D. RESEARCH & DEVELOPMENT
- E. OCEAN INSTRUMENTATION
- F. OFFSHORE OIL & GAS
- G. COMMUNICATIONS / UTILITIES
- H. SCIENCE, ENVIRONMENTAL
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- M. FISHING INDUSTRY, AQUACULTURE
- N. SURVEY, MAPPING, EXPLORATION
- O. DIVING EQUIPMENT/SERVICES
- P. CONSULTING, DATA SERVICES
- Q. MARINE ELECTRICAL/ELECTRONICS
- R. COMPUTER SERVICES/SOFTWARE
- S. OCEAN RENEWABLES
- T. SUBSEA IRM
- U. OCEAN OBSERVING
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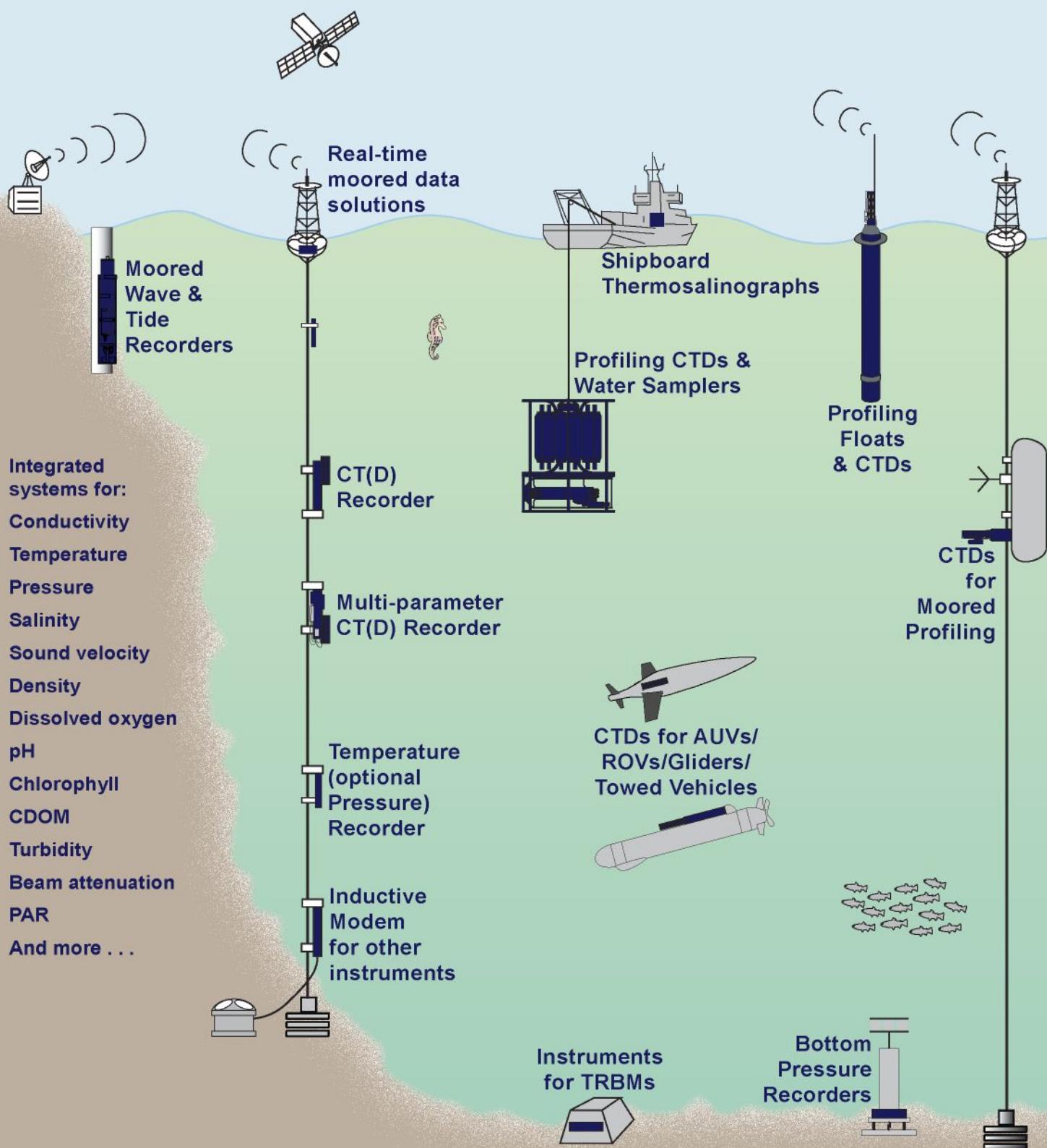
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