

# Ocean News & Technology

News for the Ocean Industry

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May 2014



**Multiple Magnetometer Sensor  
Arrays and their Applications in  
Marine Environmental Surveys**

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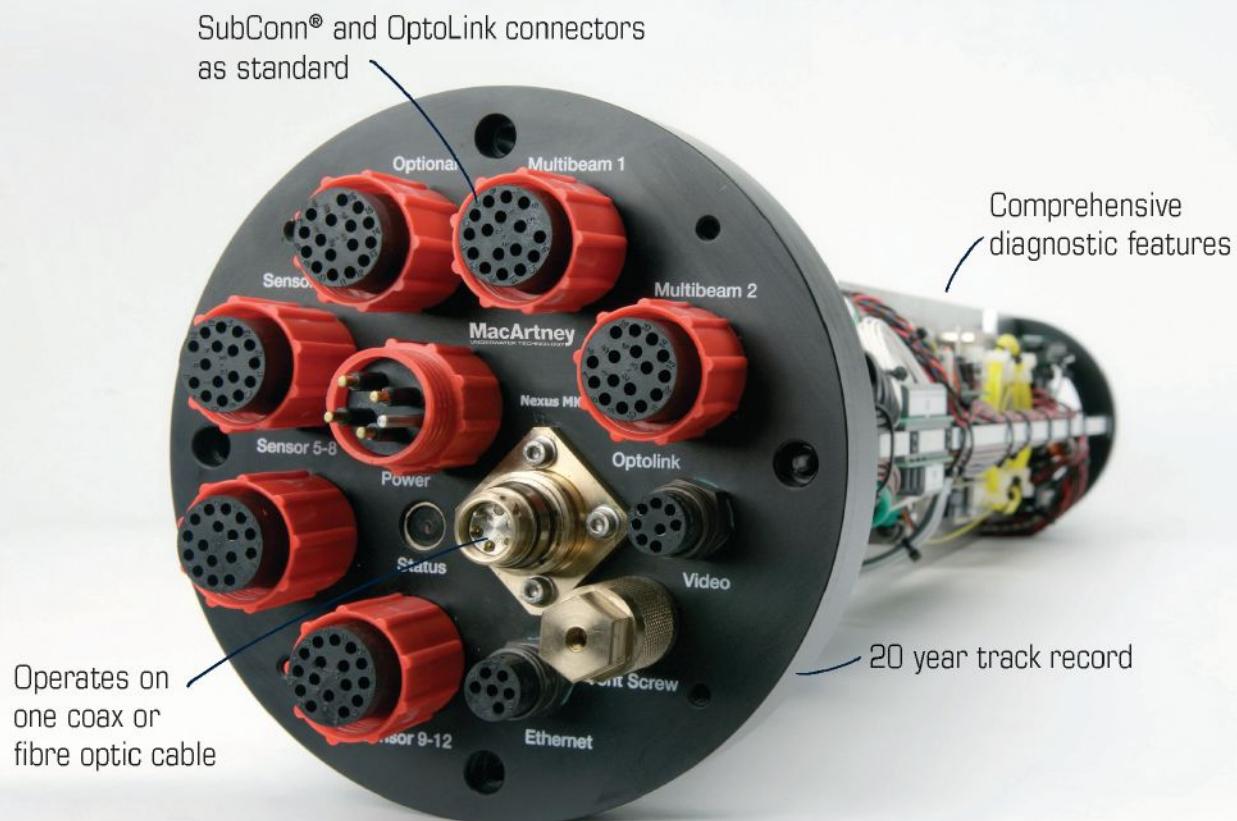


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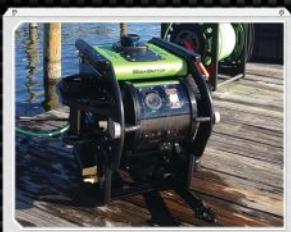
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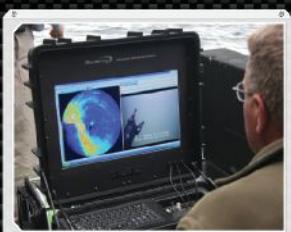
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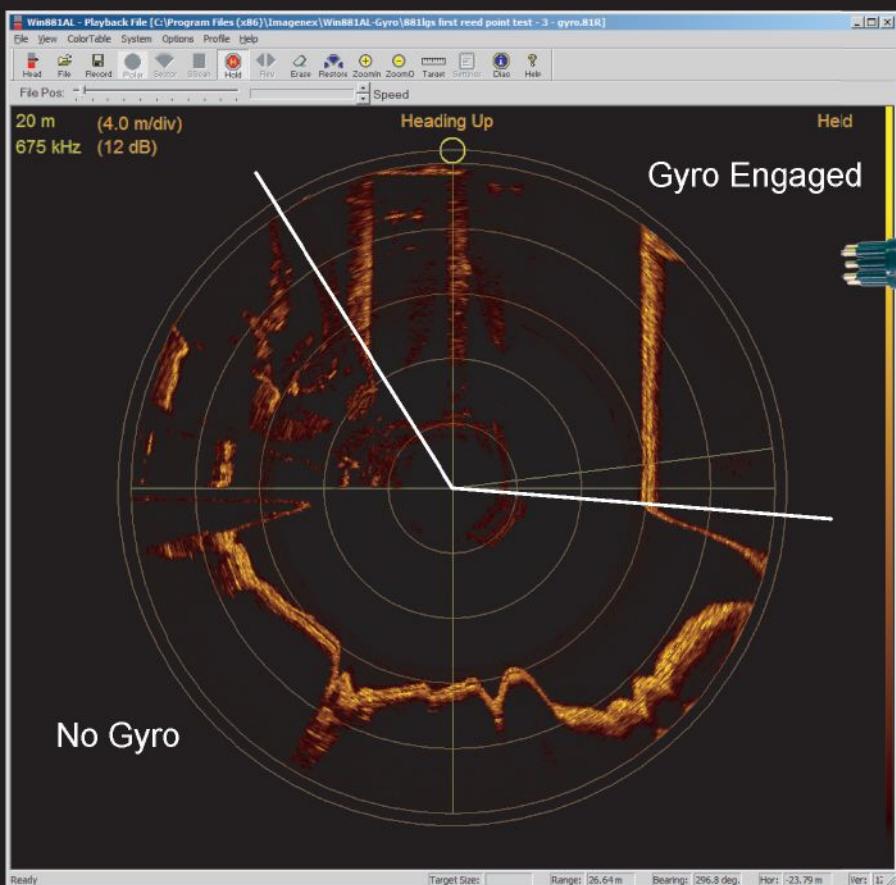


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I M A G E N E X

# EDITORIAL

By John Manock



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## Marine Archaeology: Who Knows What's Down There?

I have always been a history buff, having studied history in undergraduate and graduate school. My career took me in a different direction, but writing for Ocean News & Technology in recent years has allowed me to get back into history a bit through marine archaeology.

The subject of marine archaeology has entered my life on several fronts in 2014. A marine archaeology project almost literally in my backyard is for the search for the wreck of Captain Cook's Endeavor. The ship in which Cook found Australia is believed to be resting on the bottom of Newport Harbor in Rhode Island. We hope to have some details about this discovery in the near future.

Meanwhile, I recently read "Dragon Sea: A True Tale of Treasure, Archaeology, and Greed Off the Coast of Vietnam." This is a fascinating book that can be enjoyed on many levels, as the title implies, and I highly recommend it. The description of the effort, both human and technological, involved in the salvage of a 15th Century cargo of unique Vietnamese porcelain is spellbinding.

Finally, I learned that there will be a new expedition to the Antikythera shipwreck later this year. This is where the fabled Antikythera mechanism, an amazing mechanical model of the heavens built in the 1st Century BCE, was discovered at the beginning of this century.

These and other activities in marine archaeology always bring to mind how much of our history is missing. The Antikythera mechanism is still mindboggling, demonstrating a level of mechanical sophistication that we had no idea existed in Ancient Greece. There must have been many such mechanisms, or at least prototypes, prior to the making of the one found in the shipwreck, but not one survived on dry land. The same is true of the Vietnamese porcelain in "Dragon Sea." Incredibly, sinking in a storm and sitting on the seafloor for more than 500 years preserved more unique objects of Vietnamese culture than what survived on shore.

In fact, many of the expeditions to ancient shipwrecks just drive home how little we know, raising more questions than answers and tempting us with clues of what might remain to be discovered.

One historical tidbit has fascinated me since childhood. It is the story of an expedition supposedly launched by an

Egyptian pharaoh, Necho II, around 600 BCE. The story is that Necho commissioned a Phoenician fleet to sail around Africa from east to west. It took 3 years, but the ships made it back to Egypt.

The only account of this voyage is Herodotus' writing a century and a half later. It is a tantalizingly brief description. The crews stopped twice along the African coast to grow grain before continuing the voyage. Herodotus repeats the story that, as the ships sailed west around what is now the Cape of Good Hope, the sun was to their right, which makes perfect sense if you are in the Southern Hemisphere, but for Herodotus this was absurd as no one in the Greek world had traveled below the Equator. This statement is the main reason some people believe that the voyage really happened. Many, however, do not and it is a topic of controversy even today.

Unfortunately, we will probably never know if Necho's expedition happened. It is tempting, however, to dream that one of the Phoenician ships may have sunk along the way (Herodotus says nothing about this) and may still be sitting off the coast of southern Africa waiting for us to find it. Probably not, but that is why it is called a dream.

This brings me back to marine archaeology. If the study of ancient shipwrecks has taught us anything, it is how much of our history is still out there waiting to be found. Who knows how many amazing discoveries may lie on the ocean floor or what new marvels we might find that we can't even imagine now. Woods Hole Oceanographic Institution, which is engaged in the return to the Antikythera shipwreck with the Hellenic Ministry of Culture, makes the comment on their website that, "Since the ship was transporting the highest quality of luxury goods, there is a very real possibility of unimaginable finds, similar in importance to the [Antikythera] Mechanism."

Our history is full of missing pages. Some can be filled in by dry land archaeology, but discovering the secrets buried in the sand is only part of the solution. There may be a huge amount of our missing history resting at the bottom of the seas, and we don't have any idea as yet how much that might be.

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# Multiple Magnetometer Sensor Arrays and their Applications in Marine Environmental Surveys

By: Mikhail Tchernychev, Ross Johnson, and Jeff Johnston, Geometrics, Inc.

## Introduction

A magnetometer is a device used to measure the magnetic field at a point in space. All magnetometers can be divided into two groups — vector magnetometers measure the magnetic field in terms of its components (fluxgate and SQUIDS are examples) while total field magnetometers such as Proton Precession, Overhauser and Optically Pumped Quantum magnetometers measure the scalar (directionless) value of the field. The total field magnetometers measure the amplitude of the magnetic field regardless of the magnetometer orientation. All magnetometers are passive devices that do not rely on energizing the nearby environment.

Manmade objects made of steel or iron alloys such as a ship's hull, munitions and pipelines can distort the Earth's field and are therefore detectable by sensitive magnetometers.

## Marine Portable Magnetometers

Marine magnetometers are produced commercially by two companies, Marine Magnetics of Markham, Ontario, Canada and Geometrics of San Jose, California, USA. The Marine Magnetics technology is based on a proton precession variant known as Overhauser, which has low power requirements, good absolute accuracy and a sample speed of 1 to 5 Hz. Geometrics produces an optically pumped Cesium Vapor magnetometer that has high sensitivity and high sample speed of 10 to 20 Hz. Marine magnetometers have digital RS-232 data output and provide other measurements such as depth and height above the seafloor.

## Locating Unexploded Ordnance (UXO) and chemical munitions

Magnetometers are routinely used for UXO clearance surveying because explosive projectiles include a steel shell. One of the highest concentrations of UXO is in the coastal waters off the southern UK and Northwestern Europe. Here, WWII bombardment and post-conflict dumping of munitions left large areas of the seabed littered with hazardous material. The munitions include conventional explosives as well as chemical warfare agents.

Today wind turbine farms are being constructed in some of the coastal regions where UXO is encountered. Surveying prospective construction areas of the seabed is helpful in

identifying dump locations and also the positions of isolated objects that could pose a risk. Magnetometers arrays have been an important part of these surveys in the last few years. Due to the sheer volume of dumped munitions and the size of the areas where wind farm development is planned, the effort has required the deployment of many dozens of high-speed magnetometer arrays and extensive survey efforts.

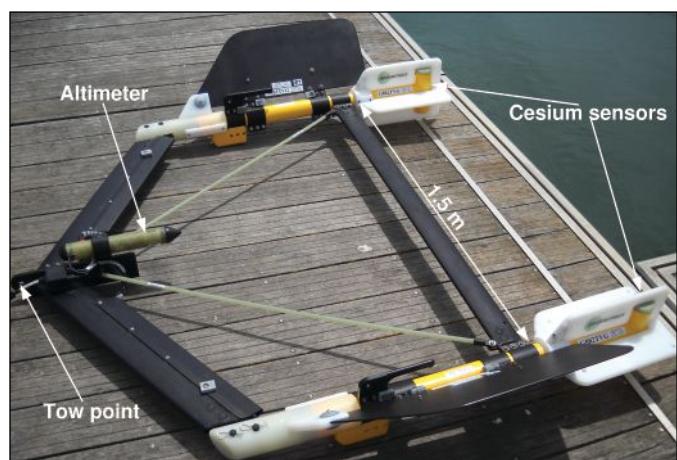


Figure 1. Two Geometrics 882 sensors in Transverse Gradiometer (TVG) configuration.

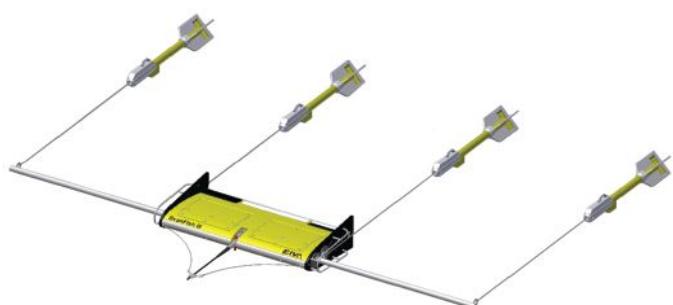


Figure 2. Four sensor SCANFISH system used for UXO locating in the North Sea (Photo courtesy of EIVA, Denmark).

To assist the interpreter, Geometrics Inc. has developed Open-Source software to carry out processing tasks. The software is designed for data collected using transverse arrays of magnetometers that are commonly referred to as Transverse Gradiometers (TVG) or more sophisticated multi-sensor arrays (Figures 1 and 2). The interpretational stages include the following:

1. Total Field data pre-processing, including diurnal correction for Earth's field variations over time.
2. Creating Total Field Maps if there is sufficient data density.
3. Creating Analytic Signal maps [1,2]. The Analytic Signal maps greatly reduce the anomalies' visual complexity, yielding simple positive anomalies instead of a complex "dipole" signatures and reduce the effects of geology (Figure 3). Geometrics TVG system uses two sensors to generate the analytic signal computing the vertical gradient using mathematical techniques.
4. For each individual profile anomaly a numerical inversion can be carried out using an inversion toolkit [3] to estimate depth, position and magnetic moment of the object, which are an indirect indications of the target's mass.
5. The results can be presented as worksheets and color "plates" (Figure 4), with magnetic field map, graphs and target parameter information in text format.

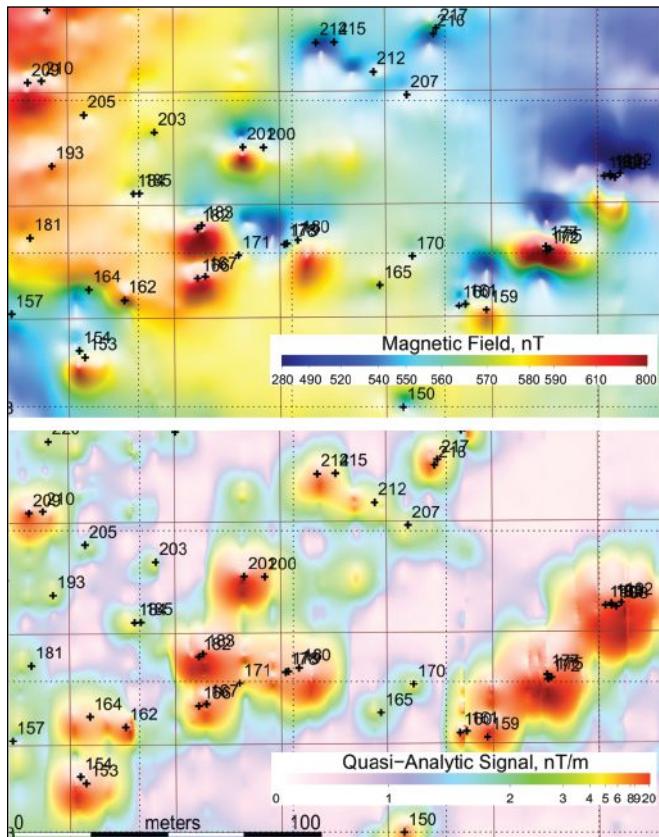


Figure 3. Total Magnetic field Map (top) and Quasi Analytic signal (bottom). It can be seen that Quasi Analytic signal map is a simplified version of total field map [4].

## Pipeline locating

Buried steel pipelines are another type of structure that may be located by magnetometer surveys, although interpretation of the data can be challenging. Although a pipeline is a simple, uniform object for much of its length, its magnetic field is complex with minimums and maximums interleaved in a seemingly random order. This effect is due to differences in the magnetization along the pipe as well as to the presence of flanges or other structures at the pipeline's joints. The analytic signal analysis reduces these anomalies to simple, positive bell-shaped features. The depth of the pipeline can be estimated by applying simple half-width rules to the analytic signal. Typical field over the pipeline is shown on Figure 5.

## High Voltage Direct Current (HVDC) cable application

High Voltage Direct Current (HVDC) technology is now widely used to transmit electrical power over considerable distances using submarine cables. These cables are inspected periodically and their location and burial depth verified.

In 2009 and 2013, Alpine Ocean Seismic Survey, Inc. conducted an inspection of the "Neptune" HVDC cable off coast of New Jersey using two Geometrics G-882 magnetometers in TVG mode. The surveys provided cable position and depth estimates, along with probable cable orientation. To achieve these goals "Geometrics" has developed modeling software using a simple current pair model [6].

The magnetic field created by a HVDC cable is due the electrical current and not the material properties as in the case of a pipeline. Therefore, the measured field profile is fairly uniform from one survey crossing to another, with two of the TVG sensors reporting almost identical values. One of the cross survey lines, along with results of interpretation, is shown on Figure 6

The cable itself comprises two parallel conductors, deployed horizontally [7]. It appeared that deviation from horizontal layout could be visible in the magnetic field.

## Conclusions

Marine magnetometer arrays are now being used in large numbers to improve seafloor mapping. The systems have several important environmental applications:

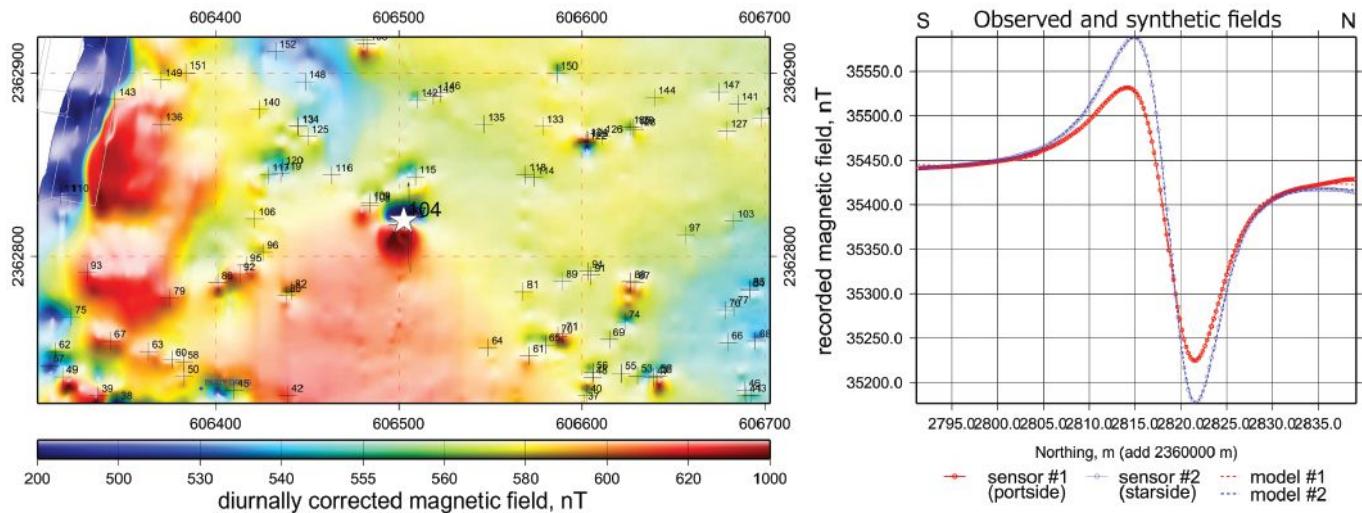
1. UXO. This is the most developed application, with well understood acquisition procedures and processing software. UXO targets are treated as objects that generate a simple magnetic dipole field.

2. Pipelines. Observed anomalies show significant total field variations along the structures. This feature can be reduced to a simpler anomaly signature using the Analytic Signal approach. Half-Width analysis is useful to estimate depth of burial.

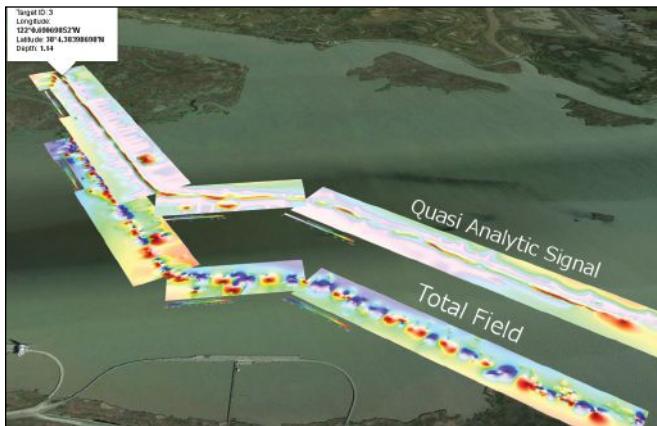
3. HVDC cables. This modern type of power transmission has only been minimally investigated. The example survey shows that it should be easy to recognize the power cable by its uniform signature. The initial inversion efforts provide an encouraging result: they show a very good match between the numerically modeled and observed field and realistic burial depth estimates.

All three of the examples can be processed using Geometrics Inc. Open-Source MagPick software. As with any complex software, training is valuable for its effective use. Instructional videos are available from the Geometrics website.

# FEATURE STORY



**Figure 4.** Top part of the automatically generated anomaly page (aka “color plate”) reported as part of UXO survey in Pearl-Harbor. White star shows location of the target under consideration over the part of the Total Field map. The part of the survey profile selected for interpretation is shown in the right, along with the magnetic field modeled as part of the inversion. It can be seen that observed and synthetic fields match almost exactly, which indicates good inversion quality. The plot is created with help of GMT [5].



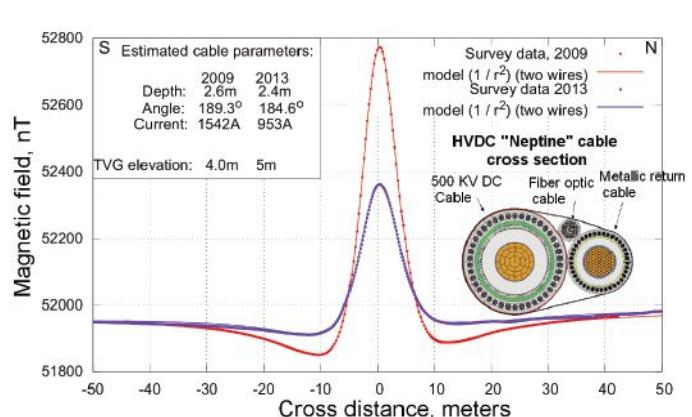
**Figure 5.** Total Magnetic Field (shown at sea level) and corresponding Analytic Signal (elevated) for gas pipeline near Ryer Island, California. One estimated pipeline location is shown as a balloon. It can be noted that while Total Field signature is very complex, Analytic Signal is greatly simplified.

## Acknowledgements

We would like to thank Alpine Ocean Seismic Survey, Inc., New Jersey, for supplying data of HVDC survey over “Neptune” as well as Environmental Solutions, Inc., California, for sharing data over Ryer Island gas pipeline.

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**Figure 6.** Inversion results for one of the HVDC cable intersections. The dots show actual measured data, the solid line represent synthetic field as result of inversion. The closer the data and model compare, the better the inversion quality. The insert on the right shows cable cross section.

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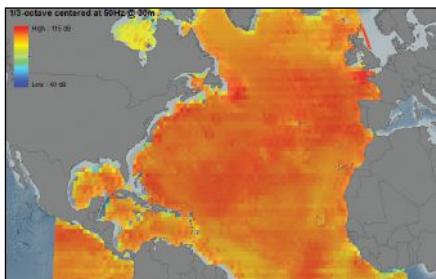
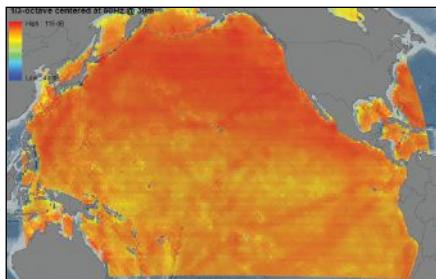
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# OCEAN INDUSTRY

## NRDC: Milestone in ocean noise fight



A milestone has been reached in the fight against ocean noise pollution. After 5 years, the International Maritime Organization adopted guidelines to reduce underwater noise from commercial ships.

These are voluntary guidelines, not mandatory code, but their passage is a big deal. If you read this blog regularly, you know how important sound is to whales and other marine life. The ocean, simply put, is an acoustic world, and marine species depend on sound for virtually everything they do to survive: feeding, finding mates, avoiding predators, maintaining social bonds, orienting themselves in the world. But noise from shipping and other human activity has radically altered their environment.

What's most remarkable is the scale of transformation. There are very few places left in the open ocean where shipping doesn't dominate the same low frequencies vital to much of the ocean's wildlife. Background noise levels are now orders of magnitude greater than they were before the advent of mechanized shipping, when whales and other species evolved to use hearing as their primary sense.

In the northeast, according to NOAA and Cornell biologists, ship traffic has made it virtually impossible for endangered right whales to communicate almost 80% of the time. Blue and fin whales were once able to communicate across entire ocean basins; now on many days their range is limited to mere miles. In my neck of the woods, ships using the Ports of Seattle and Metro Vancouver contribute to a background din that easily exceeds safe levels for ocean noise proposed a few years ago by the European Commission.

The NOAA maps above showing average noise levels in the Atlantic and Pacific Oceans paint the picture: red represents sound around 60 decibels above natural ambient. For biologists, this growing, omnipresent noise is like a smog that is urbanizing the seas, shrinking the sensory range of animals, and unraveling the web of ocean life.

To deal with a problem on this scale, you need international intervention, which is where the International Maritime Organization comes in. For the past 6 years, NRDC has partnered with NOAA, the Coastal Guard, progressive industry, and academic and research institutions to put noise-quelling on the organization's work plan and shepherd the guidelines that were adopted yesterday through its often byzantine processes.

The new guidelines:

- recognize that shipping noise can have short-term and long-term impacts on marine life, especially on marine mammals;
- call for measurement of shipping noise according to objective, available international standards;
- identify computational models for determining effective quieting measures;
- provide guidance for designing quieter ships and for reducing noise from existing ships, especially by minimizing the roar produced by ship propellers, in a process known as cavitation; and
- advise owners and operators on how to minimize noise through ship operations and maintenance, such as by polishing ship propellers to remove fouling and surface roughness.

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

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### TE Connectivity to acquire the SEACON group

TE Connectivity Ltd. announced that it has signed a definitive agreement to acquire the SEACON group, a leading provider of underwater connector technology and systems, for \$490 million in cash. The SEACON group serves the military marine and sub-sea sectors for remotely operated vehicles (ROV) / autonomous underwater vehicles (AUV), oil and gas, environmental and oceanographic applications. "The acquisition of the SEACON group expands TE's position as a leader in connectivity solutions for harsh environments and significantly strengthens our position in the high-growth oil and gas industry," said Tom Lynch, TE Connectivity chairman and CEO. Patrick Simar, President and chairman of the Board, SEACON group, said, "We have given careful thought about how best to position the company for a new phase of growth and are pleased to be joining forces with TE, a true industry leader. TE has achieved tremendous success by focusing on providing the highest quality, most innovative connectivity solutions to customers across a broad range of industries and geographies. We have known TE for many years and recognize that they share our commitment to providing both best-in-class solutions to our customers, as well as great opportunities for our people." The sale is subject to certain regulatory approvals and other closing conditions and is expected to close in the company's current fiscal year.

### CARIS and Kongsberg Maritime sign renewed MOU

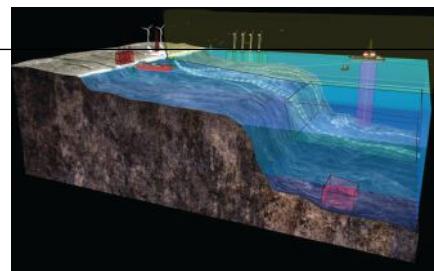
CARIS and Kongsberg Maritime put pen to paper on an enhanced Memorandum of Understanding (MOU) at Oceanology International 2014 in London, United Kingdom. CARIS and Kongsberg, who have partnered for over a decade, continue to work closely together to ensure their hydrographic solutions work hand-in-hand. Expanding upon previously signed agreements, the renewed MOU will continue to facilitate the migration of Kongsberg Neptune users to the CARIS HIPS and SIPS software. In addition to this, CARIS will now be able to provide Kongsberg's SISQA software with HIPS and SIPS, which will allow users to accurately re-sound velocity correct Kongsberg multibeam data in CARIS using the original proprietary algorithms. Another highlight of the MOU is for the two companies to explore onboard data processing and real time product creation initiatives.

## Presentations illustrate the many dimensions of accurate marine mapping

Two new products—the Ocean Dimensions animation and Crowded Ocean Spaces: A 3D View visualization—explain why two-dimensional marine maps cannot tell the whole story. Understanding this fact helps viewers gain a more accurate picture of marine-siting conflicts and compatibilities, including those related to offshore wind energy development.

Traditional maps can give the false impression that the marine space is very crowded. In reality, marine uses are spread out among many dimensions: the sea surface, seafloor, water column, air column, and even the dimension of time. Marine planners and managers who take into account these many dimensions are better able to consider specific uses for specific locations.

The animation and visualization are included on MarineCadastre.gov, an integrated information system that features 170-plus authoritative ocean data layers as well as offshore planning tools and technical support. MarineCadastre.gov allows users to create and customize marine maps, share maps and data, and address critical



planning details with partners.

MarineCadastre.gov was co-developed by the U.S. Department of the Interior (DOI) Bureau of Ocean Energy Management (BOEM) and the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center.

## SCF invests in Seanic Ocean Systems

SCF is pleased to announce its investment in Seanic Ocean Systems, a subsea services company based in Houston.

Seanic, founded in 2007, provides subsea tooling and rental services. The company designs, assembles and maintains various tools used in the subsea energy industry for ROV-based applications. Seanic has operations in the Gulf of Mexico, the North Sea, and Asia.

Tom Ayars and Andy Guinn, the president and VP of operations will, continue to lead the company going forward. Tom has 30 years of experience

in the O&G industry, including Oceaneering and most recently with American Oilfield Divers where he built a significant inland diving and construction group. Tom also was involved with the designing and planning of the fiber optic network in the Gulf of Mexico. Andy began his career in the U.S. Air Force, after which he entered the oil and gas sector where he held several positions, notably as regional manager for Oceaneering's Deepwater Technical Solutions Aberdeen group.

Alongside management and SCF, the company's two founders, Bill New and Kevin Petersen, will continue to be investors in the company. Kevin is chairman of Continental Shelf Associates, having previously held significant roles at Oceaneering, Martech and Perry Tritech. Bill is the founder of New Industries, a steel fabricator and manufacturer of pressure vessels and subsea production equipment.

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

## Wreck of USCS Robert J. Walker added to National Register of Historic Places

NOAA announced that the wreck of the ship Robert J. Walker, a steamer that

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served in the U.S. Coast Survey, a predecessor agency of NOAA's Office of Coast Survey, has been added to the National Register of Historic Places.

The Walker served as survey ship, charting the Gulf Coast—including Mobile Bay and the Florida Keys—in the decade before the Civil War. It also conducted early work plotting the movement of the Gulf Stream along the Atlantic Coast.

Twenty-one men died when Walker sank in rough seas in the early morning hours of 21 June 1860, 10 mi off Absecon Inlet on the New Jersey coast. The crew had finished its latest surveys in the Gulf of Mexico and was sailing to New York when the Walker was hit by a commercial schooner off New Jersey. The side-wheel steamer, carrying 66 crewmembers, sank within 30 min. The sinking was the largest single loss of life in the history of NOAA or its predecessor agencies.

"Robert J. Walker is a rare and unique reminder of the pioneering work of the U.S. Coast Survey," said James Delgado, director of maritime heritage for NOAA's Office of National Marine Sanctuaries. "The crew of Walker, working from this vessel helped survey and open ports vital to commerce and the national economy before the Civil War. The National

Register listing highlights that role as well as the fact that Walker is now the grave of many of its crew, which is why we sought this designation."

Built in 1847, the Walker was one of the U.S. government's first iron-hulled steamers, and was intended for the U.S. Revenue Service, the predecessor of the United States Coast Guard. Instead, the Walker and some of its sister steamers were sent to the U.S. Coast Survey, established by President Thomas Jefferson in 1807 to survey the coast and produce the nation's nautical charts.

For more information, visit [www.noaa.gov](http://www.noaa.gov).

### **NOAA, historic whaling ship join forces for preservation effort**

NOAA's Office of National Marine Sanctuaries announced its partnership with Mystic Seaport to support the 38th Voyage of the Charles W. Morgan. Nearly 100 years after its last whaling voyage, the Morgan will sail across the New England coast this summer to celebrate America's maritime heritage and the whales that gather in Stellwagen Bank National Marine Sanctuary.

The Morgan, a National Historic Landmark built in 1841 and restored to

seaworthy status over the past 5 years, is the flagship of the watercraft collection at Mystic Seaport, the nation's leading maritime museum located in Mystic, Connecticut. Over an 80-year whaling career, the Morgan sailed on 37 voyages to the remote corners of the globe, including waters of national marine sanctuaries in California, Hawaii and American Samoa.

During the voyage, NOAA will work with Mystic Seaport and its partners to conduct a series of science and outreach activities around the voyage. The ship's stop in each port will be accompanied by a dockside exhibit customized for each location. Upon its return to Mystic Seaport, the ship will resume its status as an exhibit at the museum.

"The Charles W. Morgan is an exceptional and truly unique artifact of our shared maritime heritage," said Mystic Seaport president Steve White. "While the ship is an American icon and a living portal into an important chapter of American history, she now embarks on a new journey with transformed purpose. She's no longer an instrument of commerce but a source of education, knowledge, and understanding."

For more information, visit [www.noaa.gov](http://www.noaa.gov).

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## ABS releases report on LNG bunkering regulations

ABS, the leading provider of classification services to the global marine and offshore industries, released a report entitled Bunkering of Liquefied Natural Gas-Fueled Marine Vessels in North America. The objective of the report is to provide guidance to potential owners and operators of gas-fueled vessels, as well as LNG bunkering vessels and facilities, to help them obtain regulatory approval for projects. The report, developed by ABS and ABS Group, takes a broad look at the requirements of various regulatory bodies including the IMO, U.S. Coast Guard, Transport Canada, U.S. Environmental Protection Agency and the many state and local authorities involved in a bunkering project. Included in the report is a recommended process for meeting those requirements and obtaining approval for the LNG bunkering infrastructure project. The report touches on a number of key considerations for any LNG bunkering project, including reviewing potential bunkering options; identifying potential hazards and risks and recommending potential safeguards; presenting state, local and port-specific issues; and summarizing applicable regulations and outlining a process for meeting those requirements and ultimately obtaining project approval.

**Jinglu Shipbuilding invests in the future with AVEVA Marine**  
Penglai Zhongbai Jinglu Shipbuilding Co. Ltd (Jinglu Shipbuilding), one of the key shipbuilding enterprises in Shandong Province, Greater China, has signed a new contract for AVEVA Marine software to address the current, challenging market situation and to future-proof its operations. The AVEVA technical team in China supported Jinglu Shipbuilding with a detailed evaluation exploring how AVEVA Marine would improve project efficiency and quality across the shipyard. As a result, the company selected AVEVA Marine, providing it with the most complete software solution for its current and future shipbuilding requirements. "Jinglu Shipbuilding shares many of the same technical and business challenges facing other AVEVA customers in the shipbuilding industry," said Paul Eveleigh, EVP and head of Greater China, AVEVA. "While AVEVA Marine delivers immediate business benefits, it is also an investment in the future, since it gives shipbuilders the tools to address more complex project opportunities in a very difficult market. AVEVA Marine is the most productive solution available to the shipbuilding industry now and in the future."

## Research highlights cruise industry's failure to take sustainability seriously

New research by Leeds Metropolitan University reveals that the cruise industry is ignoring their corporate social responsibility towards the environment, society and the destinations they visit. The study, published this month in the journal *Tourism Management*, analyses the industry's lack of corporate social disclosure and ranks companies through analysis of their corporate social responsibility reports and websites to provide the first cruise sector sustainability reporting index. Approximately 65% of the 80 cruise companies worldwide which were analyzed do not mention corporate social responsibility on their websites, and only 12 brands publish corporate social reports—belonging to only four companies: Carnival Corporation, Royal Caribbean International, TUI and Disney Cruises. Dr. Xavier Font, the lead author of the study from Leeds Metropolitan University explains: "Most companies report soft data, such as statements from their CEOs, that are easy to copy and do not show real change. Companies mostly report on their corporate vision and strategy, their credentials and their governance and management systems, but they fail to report on actual performance data on many key environmental and socio-economic indicators. Reporting on emissions, effluents, waste or water is the result of eco-saving strategies and regulatory pressure. But not one of the 80 companies reports on the sustainability of the resources consumed or biodiversity actions, and few disclose their positive social or economic impact on destinations." The report highlights that more must be done by the cruise industry in terms of the environmental impact of cruise ship's discharges, as cruises usually operate in highly valued coastal water and marine ecosystems.

## Damen, Delft University of Technology and De Vries Naval Architects gain royal approval



Damen Shipyards Group and Delft University of Technology have developed a new prototype search and rescue SAR 1906 lifeboat, built for the Royal Dutch rescue organisation KNRM. De Vries Naval Architects contributed to the newbuilding as well. Lady Sponsor Queen Máxima admired the innovative 'Nh1816' at its homeport IJmuiden, after she named the vessel.

Shipbuilder, naval architect, knowledge centre and Royal Dutch rescue organization all joined forces when developing the design for the first of the new generation of self-righting lifeboats. The Nh1816 (length 19.30 m, width 6.54 m, depth 1.10 m) and its successors are to replace the 10 lifeboats of the current 'Arie Visser' Class.

Damen design & proposal engineer John Nieboer adds that the Nh1816 has an aluminium hull and a FRP flexible composite lightweight top construction, thus providing pleasant working conditions in a soundproof wheelhouse. The lifeboat's bow shape allows smooth navigation, even in rough seas and stormy weathers.

The Nh1816 is equipped with two Hamilton 571 water jets, propelled by two MTU 8V2000M84I, 1790kW (2400 bhp) engines in separate watertight engine rooms, allowing a maximum speed of 31 knots. When possible, the crew of six can relax in the fully equipped technical room in the front of the vessel. The lifeboat's radius of action is 185 nmi off the Dutch coast and a total of 348 nmi. It can take in 120 passengers if need be.

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

## Sydney Ports get safety boost from personalized forecasts

Sydney Ports has invested in the latest weather technology as part of its ongoing commitment to improving harbor safety. Global weather intelligence company MetraWeather has been contracted to deliver real-time weather and marine forecasting information.

The new services will provide regularly updated high resolution and probabilistic forecasts of important marine and weather conditions, likely to impact on the day-to-day and longer-term running of the port. Sydney Ports will also have access to MetraWeather's interactive under-keel clearance safety and berth safety forecasts, helping to plan not only for the safety of ships in the harbor, but also for those wanting to enter.

"With the increasing amount of cargo, and the large number of cruise ship visitors we have through our ports, safety is a huge priority for us. With MetraWeather's forecasts we know exactly what's happening in the harbor and what's on the horizon, so we can be prepared," said Sydney Ports executive general manager operations and harbour master, Philip Holliday.

"Botany Bay is the second busiest box terminal in Australia and Port Jackson is home to the nation's busiest cruise terminals—we have a major responsibility for the safe navigation of these ships and this real-time data will be of great assistance."

"We chose MetraWeather's service because it provides the information we need in a usable way," said Captain Holliday. "The forecasts are crucial to the running of the ports. They help ensure the safety of cruise ship passengers as well as the security of freight. In the long-term, the forecasts will help improve safety practice and protocol, and will aid us in reducing workplace incidents."

MetraWeather business development manager Peter Fisher said the company would deliver wind speed, direction and

gusts as well as wave height, and swell and tide through its online industry-specific MetOceanView technology.

"Our expertise in advanced numerical weather prediction, classic meteorology and oceanographic forecasting means we're able to deliver forecasts ideally tailored for companies such as Sydney Ports. These forecasts not only help them plan for their activities in the harbor, but the information also lets the ports monitor weather systems well outside the port area that are likely to impact on the safe travel of vessels heading towards the port," he said.

"Sydney Ports aspires to be a leader in world-class, efficient and sustainable ports and logistics networks. We think MetraWeather's forecasts will help us achieve that aim," said Mr. Holliday.

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

#### BMT Nigel Gee provides advanced windfarm support vessel design

BMT Nigel Gee Ltd, a subsidiary of BMT Group, the leading international maritime design and engineering consultancy, is pleased to announce it has won a design for the construction of up to

eight advanced 26-m Windfarm Support Vessels (WSV), to be built by the Australian shipbuilder, Strategic Marine. The vessels are to be built for Njord Offshore Ltd who has already taken delivery of eight BMT designed 21-m WSVs, also built by Strategic Marine.

Developed from BMT's well-established range of WSVs with Njord Offshore, the vessels will be 26 m in length with a beam of 9.1 m, powered by four Scania DI16 070 diesel engines, driving Servogear controllable pitch propellers (CPP) through a combining gearbox. Capable of speeds in excess of 27.5 kts with 10 tonnes of deadweight, the vessels will have a resiliently mounted superstructure together with the BMT patented Active Fender System. Furthermore, they will be built to the DNV Wind Farm Service 1 R1 notation suitable for operation up to 150 nmi from shore.

These vessels will offer significant improvement in efficiency and comfort, with market leading fuel consumption and noise levels. The first two vessels will be delivered early in 2015.

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

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## Space age development for Kongsberg Seatex AIS

Kongsberg Seatex, a Kongsberg Maritime subsidiary, has announced the launch of a new generation of Blue Force (BF) Automatic Identification Systems (AIS), the AIS 300BF. The unit, which supersedes the current AIS 200BF, offers outstanding secure mode abilities alongside unique AIS receiver sensitivity and robustness – refinements made possible by Kongsberg Seatex's involvement in a number of pioneering AIS space projects.

The AIS 300BF is tailor-made for vessels undertaking demanding coast guard, anti-piracy, navy and boarder police operations. Simple to install and maintain, on any vessel regardless of type or size, the Class A mobile station allows "friendly forces" to identify vessels, while restricting the transmission of their own AIS information. However, these data can be freely transmitted between Blue Force vessels in encrypted format, with the unit decrypting incoming information to facilitate effective multi-vessel communication and collaboration.

Kongsberg Seatex's experience developing an AIS receiver for use in space—first launched upon the Norwegian

AIS satellite AISSat-1 in July 2010 and currently in use in the International Space Station—laid the foundation for the firm to enhance the receiver technology in this, its latest BF unit. The AIS 300BF thus offers market-leading reliability and sensitivity, providing a larger range than competing AIS units.

Anti-piracy operations provide a typical scenario where the AIS 300BF can excel. With units placed on (for example) large military vessels and smaller combat craft, AIS 300BF can keep track of, and help coordinate (through encrypted data exchange), multiple 'friendly' craft, such as RIBs, as they tackle the situation. In addition, portable units can be used in convoy operations to enable encrypted communication between navy vessels and participating merchant ships.

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

## Rowan Renaissance first vessel built using ISQM

ABS, the leading provider of classification services to the global offshore industry, has achieved an industry first with the completion of the Rowan Companies' Rowan Renaissance drill-

ship. This newbuild, which was built in the Hyundai Heavy Industries (HHI) yard in Ulsan, South Korea, is the first in the world to have earned ABS' Integrated Software Quality Management (ISQM) notation.

Historically, Class rules have focused on steel and equipment. ISQM focuses on the software that controls the equipment. ABS' ISQM notation provides a clear process of minimizing software-related risk throughout the life of an asset.

Rowan Companies recognized the ABS ISQM process as the best option for describing the operation of the equipment, identifying and mitigating risk and verifying the many safety critical components of its high-specification asset. In its first application on the high-specification ultra-deepwater drillship Rowan Renaissance, ISQM facilitated reliable integration of products from more than half a dozen major suppliers and more than 35 subsystems.

The ISQM process has a goal of reducing safety, environmental and productivity risks while increasing efficiency and productivity of the drillship.

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

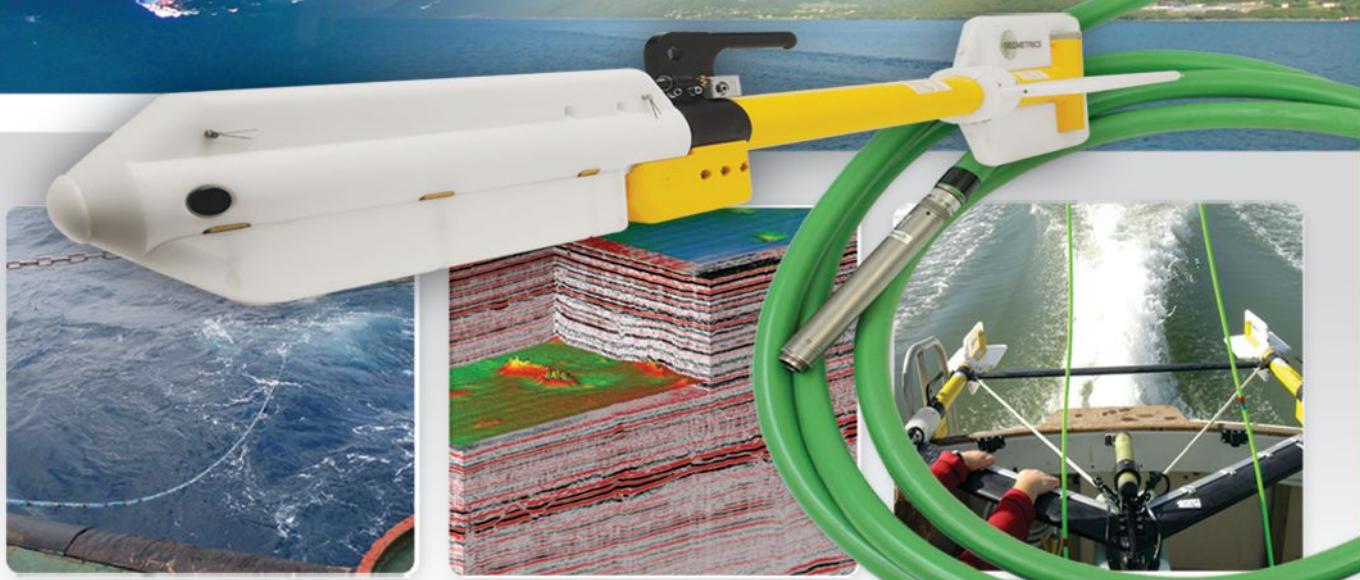
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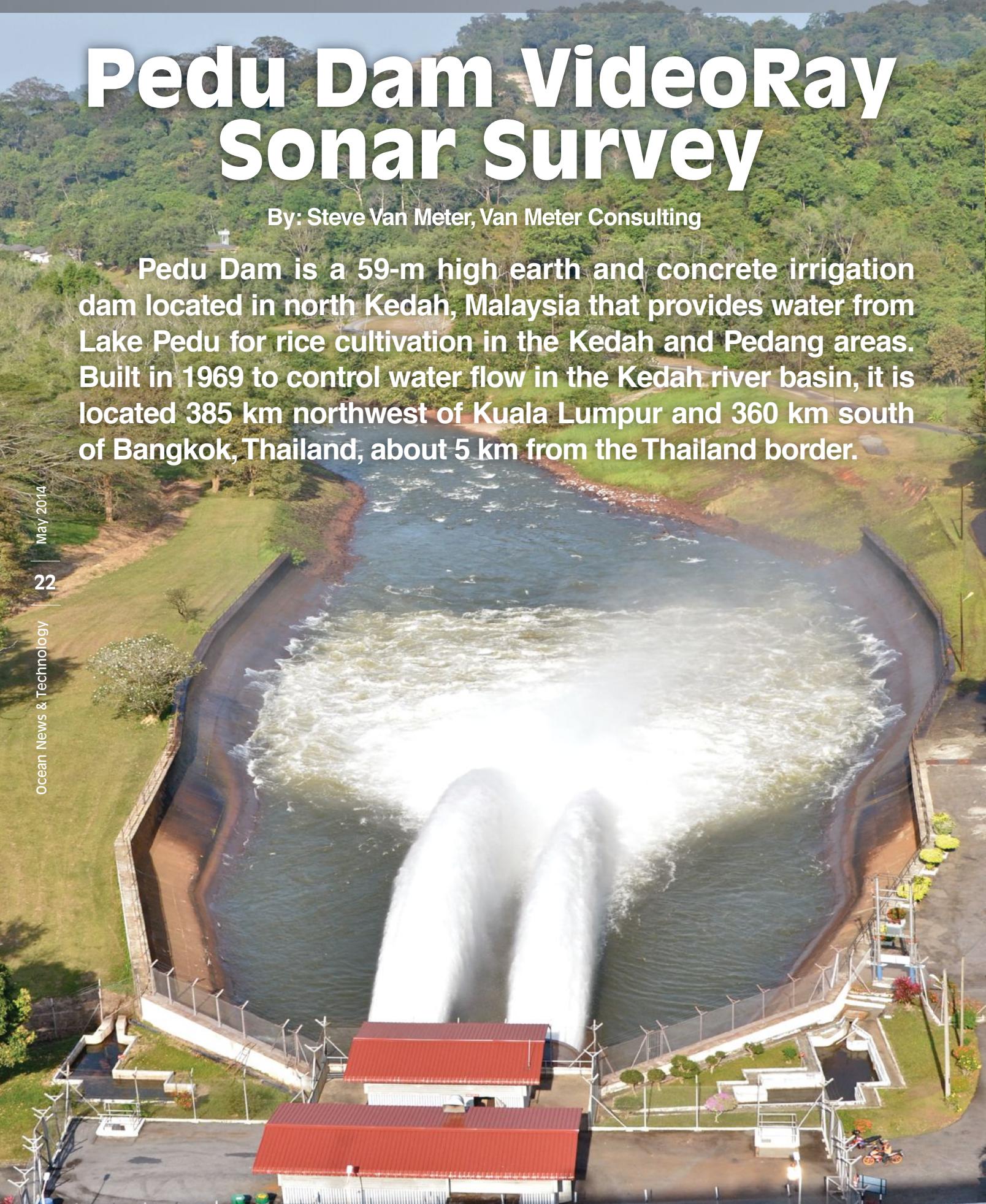
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# Pedu Dam VideoRay Sonar Survey

By: Steve Van Meter, Van Meter Consulting

Pedu Dam is a 59-m high earth and concrete irrigation dam located in north Kedah, Malaysia that provides water from Lake Pedu for rice cultivation in the Kedah and Pedang areas. Built in 1969 to control water flow in the Kedah river basin, it is located 385 km northwest of Kuala Lumpur and 360 km south of Bangkok, Thailand, about 5 km from the Thailand border.



The Pedu dam is currently in the planning phases of a major construction and refurbishment project scheduled for 2014 and 2015. The city of Alor Setar, located 60 km from the dam, serves as the staging location for this project.



Senior consultant Steve Van Meter of Van Meter Consulting, Cocoa, Florida, joined a crew in January from Low Hoo & Sons, a Kuala Lumpur-based engineering company, to navigate the dam and conduct internal measurements of the flow ways and penstock to gather measurements for a coffer dam assembly to be built and installed for the scheduled construction phase.

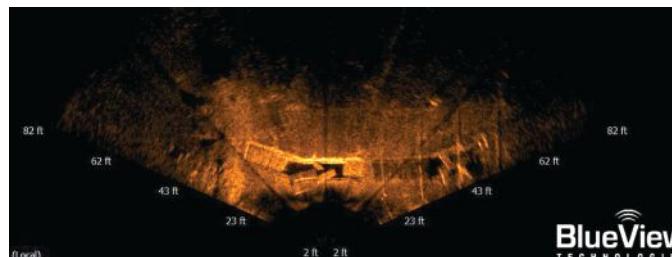


Due to poor water visibility and the challenging nature of entering the dam through small access portals located on the upstream dam face, Van Meter suggested using scanning sonar as the appropriate tool to secure the required measurements inside the dam structure. His choice to carry the scanning sonar was the VideoRay Pro 4 Remotely Operated Vehicle (ROV).

Van Meter assisted on the project for 2 days while in Thailand on another mission. He traveled from Bangkok, Thailand to Alor Setar via overnight train with his complete ROV setup and sonar gear for the mission. He met the Low Hoo crew and drove to the dam, located in the remote and hilly jungle area, 2 hours away.

On site, the VideoRay Pro 4 ROV was quickly setup on a floating platform centered on the face of the dam. The platform had a moon pool cut into the center of the deck with power provided by a small 1,000-W Yamaha generator.

To locate the entry points into the dam interior, the VideoRay Pro 4 equipped with the BlueView P900-130 multi-beam sonar was used to map the face of the dam and establish landmarks for navigation. The dark, murky water reduced visibility to approximately 8 to 10 in.



Once landmarks were observed and recorded, a plan was developed to navigate using the depth and heading information from the VideoRay Pro 4 to the general area and then follow landmarks to the entry point. The depth to the main entry point was 39 m, with the bottom of the dam interior at 49.5 m.

To support the penetration dives into the dam interior, a second VideoRay Pro 4 equipped with a BlueView P900-130 sonar was used to vector the Pro4 with the Micron sonar into position.

For the mission, Van Meter used a 75-m neutral tether with a clump weight to hold it in position over the face of the dam and a 30-m tether for free swimming the VideoRay Pro 4. Once inside the dam, the TriTech Micron scanning sonar was used to identify specific locations for recording measurements both horizontally and vertically of the dam interior. Two penstock flow ways feed into each outlet pipe of the dam; this required four chambers to be surveyed with the Micron scanning sonar in both horizontal and vertical orientation. For the vertical scans, the sonar was placed in a 90° fixture on the rear mounting spot of the Pro 4 float block.

During the survey, debris items were located and identified for the dam operator. A 55-gal drum of hydraulic oil, lost over 20 years ago, was located and shown to be intact. Three large concrete blocks weighing several tons each were located inside the flow chambers, left over from construction of the dam. These items were a surprise to the dam operator.

The VideoRay Pro 4 ROV, along with the Micron and BlueView sonar units, worked superbly. The job could not have been accomplished without these imaging tools. The VideoRay platform provided critical depth and heading information required to navigate into position. The use of the VideoRay Pro 4 auto-depth and auto-heading were very helpful. The Pro 4 turns indicator was used to establish a basic direction pointer in the murky water.

The dam operators and their engineering staff made a visit to the worksite and were impressed with the small size and large capabilities of the VideoRay Pro 4 ROV. In addition, the techniques used to gain entry and record measurements of the interior were innovative.

A challenging operation made possible by using the appropriate technology tools, developing a flexible work plan supported by the high performance VideoRay Pro 4, BlueView multibeam, and TriTech Micron scanning sonar, was all in a day's work for Van Meter Consulting.

**ERISS and TMA awarded industry study by IOOS-NOAA**

The U.S. Integrated Ocean Observing System has awarded ERISS Corporation the funds to work with The Maritime Alliance on a study that will articulate the economic impact of the ocean observation sector in the U.S. "We'll be building upon the ground-breaking San Diego Maritime Industry Report 2012 we conducted for San Diego in 2012 that was sponsored by the San Diego Workforce Partnership, the San Diego Regional Economic Development Corporation and The Maritime Alliance", said Barbara Nyegaard, CEO of ERISS. This nationally-focused study will inventory companies classified as providers of technology to IOOS and intermediate users of IOOS information that sell it to end users. The study will address items such as number of companies in each category (provider and intermediate user), size of these companies, volume of activity, volume of exports, and number of employees. The study will include narratives by companies on how IOOS has helped their operations, planning, and growth, as well as perceived potential for future growth and investment.

**International Court of Justice: Japanese whaling ends now!**

The International Court of Justice (ICJ), the principal judicial organ of the United Nations, has rendered judgment in the case concerning Japan's whaling in the Antarctic. The case was brought by Australia, with New Zealand intervening. In that Judgment, which is final, the court found that Japan, by granting special permits to kill, take and treat fin, humpback and Antarctic minke whales in pursuance of JARPA II, broke the International Convention for the Regulation of Whaling. The court decided that Japan shall revoke any extant authorization, permit or license granted in relation to JARPA II, and refrain from granting any further permits in pursuance of that program. The court rejected arguments that the purpose of permits were "for purposes of scientific research," citing, among other things: the scale of the program's use of lethal sampling; the time frame associated with a program; and the program's (lack of) scientific output.

**CSA Ocean Sciences Inc. to continue long-term nearshore hardbottom monitoring**

CSA Ocean Sciences Inc. (CSA) is currently conducting six nearshore hardbottom monitoring projects in Brevard, Broward, Indian River, Martin, and St. Lucie Counties in Florida. These projects, which typically include several years of annual environmental monitoring, are conducted under subcontract to engineering firms or directly with the Counties. Nearshore hardbottom monitoring programs typically comprise four primary tasks: 1) surveys of permanent cross-shore monitoring transects, including in situ quadrat surveys and qualitative and quantitative video collection; 2) sediment depth and hardbottom relief measurements; 3) diver-mapping of the landward edge of hardbottom; and 4) aerial imagery interpretation, ground-truthing, and hardbottom habitat mapping. Additional tasks may include pre- and post-construction pipeline corridor surveys, pre- and post-construction surveys of artificial mitigation reefs, and estimation of the extent of mitigation required via the Uniform Mitigation Assessment Method. For several decades, beach restoration programs have been at the forefront of Florida's beach management programs in order to restore sandy beach resources and protect upland properties. Environmental services associated with beach restoration and renourishment projects throughout the state have been an integral component of CSA's Marine Sciences & Mitigation business line for over 30 years. These environmental services primarily include monitoring programs for nearshore hardbottom resources, which provide habitat, food, and shelter to a wide variety of invertebrates, fishes, and endangered sea turtles and also help protect coastlines from erosion and storm surge by dissipating wave energy. To date, CSA has surveyed approximately 375 monitoring transects, performed over 3,000 in situ quadrat surveys, and diver-mapped approximately 100 mi of the landward edge of hardbottom associated with beach restoration projects in Florida. Continuation of current projects will take place in summer 2014 to coincide with macroalgal growing season and periods of visibility in nearshore waters along Florida's east coast.

**'Virtual explorers' invited to the depths of the Gulf of Mexico on NOAA expedition**

*The smaller ROV Seirios operates as a camera platform above the larger ROV Deep Discoverer which explores close to the seafloor. Deep Discoverer has a range of capabilities and both vehicles have high-definition video cameras and bright lights. (Credit: NOAA Okeanos Explorer Program).*

During the month of April, members of the public were invited to join NOAA Ship Okeanos Explorer as it explored deep-sea habitats in the Gulf of Mexico. "Virtual ocean explorers" had the chance to see canyons, deep-sea coral communities, and shipwrecks dating to the early 1800s via live video transmitted from the deep seafloor.

Technicians aboard the ship launched ROVs, allowing scientists on shore to explore features such as salt domes, gas seeps, and canyons, while also investigating shipwrecks and marine life, including deep-sea coral habitats. NOAA's ROV Deep Discoverer, accompanied by the ROV camera-sled Seirios, are equipped with high-definition video cameras and advanced lighting systems to obtain and send live video. The ROVs can operate as deep as 3,000 m.

The live video included exploration of a deep-sea canyon, characterizing the features, habitats and species they encounter. Expedition scientists investigated shipwrecks to determine if they may be significant national maritime heritage sites. Such sites require not only study, but protection in partnership with industry and other federal partners.

NOAA's Office of Ocean Exploration and Research (OER) developed the expedition plan with input from more than 40 scientists and managers from NOAA's Office of Oceanic and Atmospheric Research, NOAA's National Marine Fisheries Service and NOAA's National Ocean Service, as well as from interagency partners, the Gulf of Mexico Fishery Management Council and multiple academic institutions. Scientists from these organizations, including those from more than a dozen academic institutions, supervised the expedition as they participated from shore-based locations using telepresence technology — satellite and high-speed Internet pathways between ship and shore.

OER's Okeanos Explorer Program systematically explores the planet's largely unknown ocean. NOAA Ship Okeanos Explorer is operated, managed, and maintained by NOAA's Office of Marine and Aviation Operations which includes commissioned officers of the NOAA Corps and civilian wage mariners.

## UCSB researchers create first regional ocean health index

Owing much of its prosperity to the ocean, Brazil was the site of the first Ocean Health Index regional assessment designed to evaluate the economic, social and ecological uses and benefits that people derive from the ocean. Brazil's overall score in the national study was 60 out of 100.

The findings from that study — conducted by researchers from UC Santa Barbara's National Center for Ecological Analysis and Synthesis (NCEAS), the Department of Ecology, Evolution and Marine Biology (EEMB) and the Bren School of Environmental Science & Management, in collaboration with scientists from Conservation International — appear in the science journal PLOS ONE.

The index assesses ocean health with respect to the benefits and services it provides to people both now and in the future. Using a scale of 0 to 100, the index produces scores for each of 10 categories — artisanal fishing opportunities; biodiversity; carbon storage; clean waters; coastal protection; food provision; livelihoods & economies; natural products; sense of place; and tourism & recreation — referred to as goals. By assessing Brazil's coastal states, the research team was able to incorporate more detailed data not available at the global scale and provide more specific weighted information based on the relevance and importance of each goal to Brazil.

"This is the first time we've been able to gather in a single index the environmental, social and economic goods and services provided by the ocean specific to Brazil," said lead author Cristiane Elfes, an EEMB graduate student at UCSB. "We hope to make the Ocean Health Index a program led by Brazilian institutions to monitor the status of the oceans in the long term."

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

## Study resolves controversy over nitrogen's ocean "exit strategies"

A decades-long debate over how nitrogen is removed from the ocean may now be settled by new findings from researchers at Princeton University and their collaborators at the University of Washington.

The debate centers on how nitrogen—one of the most important food sources for ocean life and a controller of

atmospheric carbon dioxide—becomes converted to a form that can exit the ocean and return to the atmosphere where it is reused in the global nitrogen cycle.

Researchers have argued over which of two nitrogen-removal mechanisms, denitrification and anammox, is most important in the oceans. The question is not just a scientific curiosity, but has real world applications because one mechanism contributes more greenhouse gases

to the atmosphere than the other.

"Nitrogen controls much of the productivity of the ocean," said Andrew Babbin, first author of the study and a graduate student who works with Bess Ward, Princeton's William J. Sinclair Professor of Geosciences. "Understanding nitrogen cycling is crucial to understanding the productivity of the oceans as well as the global climate," he said.

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In the new study, the researchers found that both of these nitrogen “exit strategies” are at work in the oceans, with denitrification mopping up about 70% of the nitrogen and anammox disposing of the rest.

The researchers also found that this 70-30 ratio could shift in response to changes in the quantity and quality of the nitrogen in need of removal. The study was published online in the journal *Science*.

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

### **Sharks contain more pollutants than polar bears**

The polar bear is known for having alarmingly high concentrations of PCB and other pollutants. But researchers have discovered that Greenland sharks store even more of these contaminants in their bodies.

Researchers have studied Greenland sharks in the ocean off Svalbard, Spitsbergen. Greenland sharks are one of the largest species in the world. It can grow to as much as 7 m long and weigh over a metric ton. They live at depths of 200 to 600 m, and live farther north than any other shark. They can also live to be 100 years old.



Researchers from the Norwegian University of Science and Technology (NTNU), the Norwegian Polar Institute and Windsor University in Canada wanted to study behavior, distribution, population size, concentrations of pollutants and the effect of pollutants on the species. Forty-three individuals were marked with a tracking device and a depth gauge. The researchers also took liver samples.

This species has not been extensively studied before, and for a long time researchers thought that the Greenland shark was a carrion feeder. But the shark catches a lot of live prey, both fish and seals. The liver samples showed accumulation of alarmingly high concentrations of PCB, brominated flame retardants and other pollutants.

“We think this is due to their diet, because Greenland sharks around Svalbard eat a lot of seals, which are high

on the food chain, which leads to an accumulation of pollutants,” Jenssen says.

Since Greenland sharks also live so long, contaminants can accumulate in their bodies over decades. The species is also poor at excreting the pollutants.

For more information, visit [gemini.no/en](http://gemini.no/en).

### **Teledyne RD Instruments ADCPs selected to support China's WPOS Project**

Teledyne RD Instruments (RDI) has been selected by the Chinese Academy of Science’s Institute of Oceanology in Qingdao to provide their Acoustic Doppler Current Profilers (ADCPs) in support of the Western Pacific Ocean System (WPOS) project.

WPOS is a 5-year research project that commences in April 2014. The project includes the deployment of five research vessels, a remotely operated submersible and an array of sub-surface moorings off the eastern coasts of the Philippines and Indonesia. These resources will be utilized to examine the deep ocean and its connection to climate change and coastal environments.

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moorings, will be central to this program. Each mooring will be outfitted with Teledyne RDI's 75 kHz Long Ranger ADCPs, as well as a series of additional Workhorse ADCPs ranging from 150 to 600 kHz. The ADCPs will be utilized to monitor ocean currents at depths of between 400 and 6,000 m, including the powerful Kuroshio current, which runs northeast through the East China Sea.

Teledyne RDI's 38 kHz Ocean Surveyor (OS) ADCP will also be used to collect detailed, deep-water current profiling data while their research vessel is underway.

Teledyne RDI worked closely with their local representative, Laurel Technologies, as well as scientists and members of the WPOS program to provide a comprehensive solution to meet the project's specific long-term needs. In support of this and other near-term programs, Teledyne RDI will provide a total of 130 Longer Ranger ADCPs, 50 high-frequency Workhorse ADCPs configured in a variety of frequencies, and 1 OS ADCP. Teledyne RDI has already delivered a total of 113 ADCPs, including 62 Long Rangers in support of WPOS.

Additional details on the WPOS pro-



ject can be found at: [www.nature.com/news/chinaplunges-into-ocean-research-1.14732](http://www.nature.com/news/chinaplunges-into-ocean-research-1.14732).

### Scientific mission will explore one of the deepest ocean trenches

An international team of researchers led by deep-sea biologist Tim Shank of the Woods Hole Oceanographic Institution (WHOI) will use the world's only full-ocean depth, hybrid remotely operated vehicle, Nereus, and other advanced technology to explore life in the depths of the Kermadec Trench.

The 40-day expedition, which begins on 12 April, kicks off an ambitious 3-year collaborative effort funded by the National Science Foundation (NSF). The goal of the project, known as Hadal Ecosystem Studies (HADES), is to conduct the first-ever systematic study of life in ocean trenches, comparing it to the neighboring abyssal plain—flat areas of the seafloor usually found at depths between 3,000 and 6,000 m.

Due to the extreme pressures of these deep-sea environments and the technical challenges involved in reaching them, ocean trenches remain among the least explored environments on the planet.

"We know relatively little about life in our ocean trenches—the deepest marine habitat on Earth. We didn't have the technology to do these kind of detailed studies before," said Shank. "This will be a first-order look at community structure, adaptation, and evolution—how life exists in the trenches."

The multi-disciplinary international science team includes NSF-funded co-principal investigators Jeff Drazen of the University of Hawaii (UH), and Paul Yancey of Whitman College (WC), and international collaborators Malcolm Clark and Ashley Rowden of the National Institute of Water and Atmospheric Research (NIWA) in New Zealand; Henry Ruhl of the National Oceanography Centre at the University of Southampton; and Alan Jamieson, Daniel Mayor and Stuart Piercy of the University of Aberdeen (UA).

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

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**Fortum partners to develop wave power in the UK**

Fortum has signed a leasing agreement with the UK-based Wave Hub in order to test wave power solutions off the coast of Cornwall. The agreement provides Fortum with a new opportunity to rapidly deploy advanced, full-scale wave power converters in ocean conditions. Fortum believes that a transition to a Solar Economy, where energy production is based solely on renewable energy sources, is inevitable, although gradual. As an inexhaustible and emissions-free energy form, wave power can play an important role in the future, and that is why it is also a key focus area in Fortum's research and development work. The Wave Hub facility offers Fortum a unique opportunity to test wave power converters in favorable ocean conditions. The site is consented, constructed and grid connected, which significantly reduces the time it takes to get devices into the water. The berth that Wave Hub will provide is capable of handling up to 10 megawatts (MW) installed generation.

**BOEM to assess interest in Oregon wave energy test center**

The Bureau of Ocean Energy Management (BOEM) is assessing whether there is competitive interest in wave energy research or development in an area of federal waters offshore Oregon where the Northwest National Marine Renewable Energy Center at Oregon State University (NNMREC-OSU) proposes to site a hydrokinetic energy facility to test utility-scale wave energy devices. NNMREC-OSU proposes to develop and deploy its Pacific Marine Energy Center – South Energy Test Site as a facility for developers to test utility-scale wave energy devices at four test berths, with a connection to the mainland electric grid via a subsea cable. The project is designed to support up to 10 MW of electricity generation from individual devices and small-scale arrays. The facility would be located about 4 nmi offshore Newport, Oregon in water depths ranging from 180 to 230 ft. The Northwest National Marine Renewable Energy Center is one of three national centers supported by the Department of Energy to facilitate the development of marine renewable energy technology with research, education and outreach. NNMREC-OSU's proposed project is the latest in a series of lease initiatives BOEM has undertaken to support offshore renewable energy development. On 5 February 2014, Secretary of the Interior Sally Jewell was joined by Oregon Governor Kitzhaber and BOEM director Tommy Beaudreau to announce BOEM's determination, after a similar request for interest and public comment, that there was no competitive interest in an area proposed for a 30-MW floating wind energy technology pilot project offshore Coos Bay, Oregon. The Electric Power Research Institute estimates that the total technically recoverable wave energy resource along the U.S. coast to be 1,170 TWh/yr, which is almost one third of the 4,000 TWh of electricity used in the United States each year. The potential of just 1 TWh/yr of energy will supply around 93,850 average U.S. homes with power annually. The recoverable wave energy resource for the West Coast is estimated at 250 TWh/year.

**Crowdfunding renewable energy on Kickstarter**

Crowd Energy, having completed construction and successful testing of its first generation prototype of the Ocean Energy Turbine, has launched a major Kickstarter campaign on 24 March 24 2014 to construct a second generation turbine and move the project to (SNMREC) Southeast National Marine Renewable Energy Center at Florida Atlantic University for verification and open water testing. The Ocean Energy Turbine is so important because it is the first renewable energy system designed to effectively harness ocean currents on a commercial scale. Globally, ocean currents have the power necessary to completely replace the world's dependence on fossil fuels and nuclear energy. The Ocean Energy Turbine project brings this yet untapped clean renewable energy source within reach of a world starving for energy. Ocean energy has a substantial advantage over wind power and solar power. The quantity of energy available from ocean energy greatly exceeds that of wind and solar. Ocean energy production is also a consistent reliable source of energy, whereas solar and wind power are limited by the availability of sun and wind. Crowd Energy is on Kickstarter to raise \$75,000 to construct the second generation turbine and a laminar flow test tank. If the funding goal is exceeded there are a number of "Stretch Goals" that will allow Crowd Energy to accelerate development of the Ocean Energy Turbine.

**OpenHydro, ARE forge JV to develop European tidal array**

Tidal technology company OpenHydro, a DCNS company, and Alderney Renewable Energy (ARE) have signed a joint venture which will see the two companies combine their expertise and resources to develop a 300-MW tidal array in Alderney waters. The joint venture company is called Race Tidal Ltd. The formal agreement took place at a signing event held at the Thetis Marine Renewable Energy.

The island of Alderney is located in the Channel Islands and its territorial waters contain one of the world's largest tidal energy resources which once fully developed is estimated to power 1.5 million homes. Once completed, the array developed by OpenHydro and ARE is expected to consist of 150 turbines (2.0 MW each) which will produce enough power for over 150,000 homes. Related to this, as announced previously, FAB Link Limited, a joint venture between ARE and Transmission Investment LLP is developing a power interconnector between France, Alderney and Britain. This link will enable the tidal power generated in Alderney's waters to be exported to European markets, as well as allowing energy to be traded between France and Britain. Development of the FAB project is progressing in conjunction with French Grid operator RTE.

ARE has a long established relationship with OpenHydro (OpenHydro holds a 31% shareholding in ARE) with both companies bringing their complementary expertise to this project. In 2008, ARE secured a 65-year license from the States of Alderney permitting ARE to develop marine renewable energy projects in Alderney's waters. OpenHydro will provide the turbines which will be manufactured in Cherbourg, France, in an industrial site which will also support future tidal energy farms off the French coast.

Over the next 3 years, the partners will be working closely with The States of Alderney, the Alderney Commission for Renewable Energy, local communities and stakeholders to complete the required surveys and environmental impact assessments prior to making an application for full Information Consent. The 300-MW tidal array is expected to reach full scale deployment from 2020 which will coincide with the commissioning of the FAB interconnector.

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

## Pioneering research offers new insight into improved wave energy testing

Scientists from the University of Exeter have studied how wave energy developers can more accurately measure, and predict the wave conditions within wave energy test sites. The research, which is published in leading scientific journal Energy, deployed wave measurement buoys and used wave modeling to show how variations in wave size and strength could be resolved.

The results should aid developers to better predict sea conditions within wave energy test sites, which is the crucial factor governing how much energy can be produced.

This latest study is part of ongoing research by the University and key partners into waves as a renewable energy source. With ongoing support from the Regional Growth Fund, these methods are now being applied to the Wave Hub and FaBTest energy test sites in Cornwall to support industrial partners testing at these sites.

The research has been co-authored by Dr. Ian Ashton and Dr. Lars

Johanning, both from the Renewable Energy department based at the University of Exeter's Penryn Campus in Cornwall and was supported by the National Environmental Research Council (NERC) Flowbec project.

FaB Test is a pre-consented 2 sq. km area situated within Falmouth harbor between 3 and 5 km offshore in Falmouth Bay. The site offers wave energy device developers the opportunity to test components, concepts or full scale devices in a moderate wave climate with excellent access to nearby port infrastructure.

FaB Test's pre-consented status which allows for up to three devices to be deployed concurrently aims to provide a fast, flexible low cost solution for the testing of wave energy technologies, components, moorings and deployment procedures.

The site is leased from Crown Estates and has a Marine Consent for testing subject to permits issued by Falmouth Harbour Commissioners.

Falmouth, on the south coast of Cornwall, offers both extensive dock facilities incorporating three dry docks,

wharf space, craneage and a heavy load out quay; and an experienced supply chain, with an impressive track record in delivering marine renewable projects.

For more information, visit [www.exeter.ac.uk](http://www.exeter.ac.uk).

## BOEM to conduct environmental review of activities offshore Virginia

The Bureau of Ocean Energy Management (BOEM) has sought out public comment as it prepares an Environmental Assessment (EA) to analyze potential impacts from proposed wind energy research activities offshore Virginia.

The Virginia Department of Mines, Minerals and Energy (DMME) has requested a research lease and proposes to design, develop, and demonstrate a grid-connected, 12-MW offshore wind test facility on the Outer Continental Shelf (OCS) off the coast of Virginia. The proposed project area is located adjacent to the BOEM-designated Wind Energy Area (WEA) offshore Virginia, and will inform the future production of renewable energy within the WEA.

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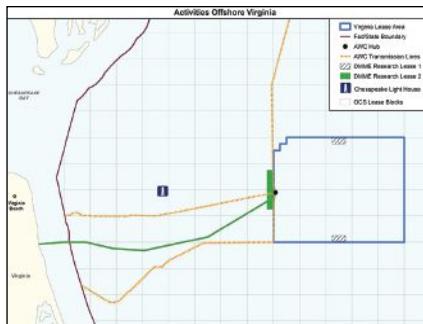
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The proposed wind test facility offshore Virginia is one of seven proposed “Offshore Wind Demonstration Projects” for the nation’s coasts that received U.S. Department of Energy funding awards in December 2012. The award was given to Dominion Resources, Inc., which partnered with DMME and others to establish the Virginia Offshore Wind Technology Advancement Project (VOWTAP). Dominion Resources was the winner of a recent commercial lease sale held for the Virginia WEA.

Before VOWTAP can install any facilities on the OCS, it must obtain BOEM approval. Therefore, DMME submitted a proposal to BOEM to install and operate two 6-MW turbines located about

24 nmi offshore Virginia with cables connecting to existing infrastructure located in the City of Virginia Beach.

For more information, visit [www.boem.gov](http://www.boem.gov).

### Cape Wind wins major legal victories

In a set of major legal victories for the Federal Government and for Cape Wind, U.S. District Judge Reggie B. Walton issued rulings against project opponents in their four lawsuits that had challenged Cape Wind’s permitting approval by the U.S. Department of Interior.

In his rulings, Judge Walton upheld the Department of the Interior’s review and approval of Cape Wind, a thorough and comprehensive permitting process that took 10 years. The Court soundly rejected the plaintiffs’ request to vacate the granting of the nation’s first offshore wind lease by the Department of the Interior to Cape Wind.

Judge Walton rejected a long list of legal claims project opponents had raised, including arguments over navigational safety, alternative locations, alternative technologies, historic preservation, Native American artifacts, sea turtles, and the adequacy of the pro-

ject’s environmental impact statement and biological opinions. In two narrow instances, Judge Walton has asked Federal agencies to clarify its findings on whales and birds. The order indicates that the case is administratively closed until the Court is provided with the clarifications. Cape Wind expects these two compliance actions to be minor agency administrative actions that will not impact Cape Wind’s financing schedule.

While the Court upheld the decision of the National Marine Fisheries Service that impacts to right whales would be “insignificant or discountable” and that whale presence would be “rare, sporadic and extremely limited in duration and frequency,” it nonetheless directed the agency to issue a statement of the volume, however unlikely, of potential whale incidents that would raise the need for further consultation with the agency. With respect to the Fish and Wildlife Service, the Court directed the agency to confirm that its decision regarding a proposed operational restriction was arrived at through an independent determination.

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

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## Federal license issued for tidal project in Puget Sound

The Federal Energy Regulatory Commission (FERC) voted unanimously to issue a license to Snohomish County Public Utility District (PUD) for a tidal energy pilot project in Admiralty Inlet, west of Whidbey Island, Washington. The project—the first grid-connected array of large-scale tidal energy turbines in the world—includes installation, operation and evaluation of two turbines at a depth of about 200 ft. The utility plans to move forward on contractual agreements, construction and deployment over the next 2 years. The turbines would be installed for a period of 3 to 5 years.

In issuing the license, FERC commissioners commended the PUD for its diligence in securing the license and for its extensive studies and public engagement. It noted the PUD's license plans to protect fish, wildlife, cultural and aesthetic resources, navigation and existing infrastructure in Puget Sound.

The proposed tidal turbines are manufactured by OpenHydro (Dublin, Ireland). Each turbine measures 6 m in

diameter, with a 414-ton total weight. The foundation is secured by gravity only (no piling or pinning needed). The turbines have only one moving part and require no lubricating oils or greases. Subsea cables will connect to shore on PUD-leased land south of the Coupeville Ferry Terminal, where it will connect to the electrical grid.

Admiralty Inlet offers attractive features, including swift currents, good access, a rocky seabed floor with little sediment and vegetation, and viable grid connections. The inlet is a very large body of water, which makes the footprint of the pilot plant small by comparison and helps to minimize any impacts.

As part of its FERC license application, the PUD has addressed a broad range of issues, such as the pilot project's design, operation, environmental studies, monitoring plans and biological assessments. During its public process, the utility also engaged numerous stakeholders, including local, state and federal agencies, tribal groups, business organizations and residents.

The PUD has worked with many technical partners on project studies

covering areas such as acoustics, under-water topography (bathymetry), marine life, underwater monitoring, geotechnical data and water quality. Partners have included the University of Washington, Pacific Northwest National Laboratory (PNNL), Sound & Sea Technology and the National Renewable Energy Laboratory. The pilot project has been supported with grants from the U.S. Department of Energy, Bonneville Power Administration and federal appropriations.

OpenHydro projects in other parts of the world have shown no impact on marine life. Scotland's Orkney Islands (another OpenHydro site) have an ecologically diverse and productive marine ecosystem that is home to numerous fish species, shellfish, dolphins, seals, porpoises, whales and migrating turtles. Operations at the site have been continuously videotaped, and no marine life incidents have been recorded. OpenHydro's experience has been that fish and marine mammals do not interact with the tidal device.

For more information, visit [www.ferc.gov](http://www.ferc.gov) or [www.snopud.com](http://www.snopud.com).

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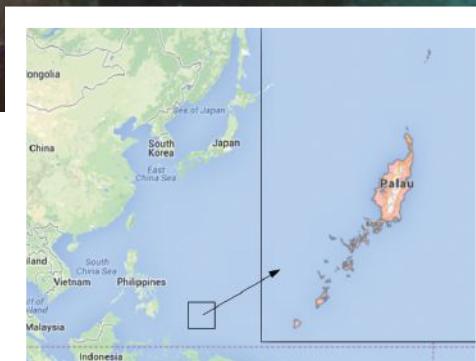
# RETURNING FROM THE DEEP: WW2 Aircraft Discovered off the Coasts of Palau

*By: Hunter C. Brown, Mark A. Moline,  
Eric J. Terrill, and Megan A. Cimino*

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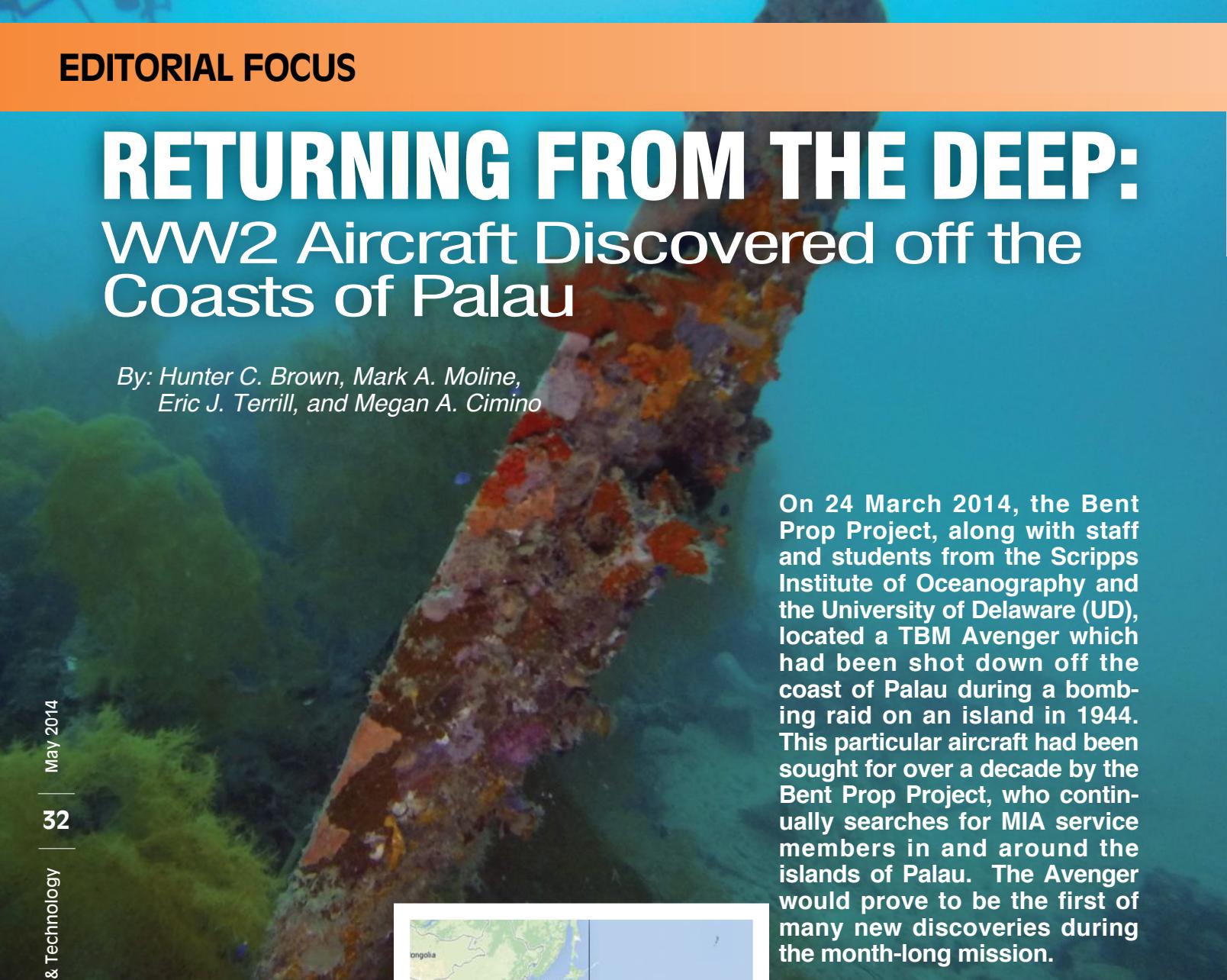


In 1944, American B-24s, F4U Corsairs, F6F Hellcats, and TBM Avengers conducted numerous aerial bombing raids on the Japanese fortifications around the islands of Palau. Up to 11,000 Japanese troops were said to be encamped at one time on the island of Peleliu alone. While the island chain had little in the way of natural resources, the islands were a strategic prize for use as forward airfields for refueling and resupplying aircraft on their way to Japan. On bombing runs around the islands, fighter craft such as Hellcats would escort and protect the more cumbersome Avengers and B-24s along their routes. This particular Avenger, during one such bombing run, took several fatal shots and made the ultimate sacrifice to ensure a successful overall mission. Unfortunately, that sacrifice was neither to be the first nor the last on the islands around Palau. The battles on these islands produced some of the highest number of casualties in all battles of the Pacific Theater during the war. In addition to the casualties, a large number of missing-in-action (MIAs) and prisoners-of-war (POWs) have been reported in war-time logs kept by both Japanese troops and American forces near Palau.

On 24 March 2014, the Bent Prop Project, along with staff and students from the Scripps Institute of Oceanography and the University of Delaware (UD), located a TBM Avenger which had been shot down off the coast of Palau during a bombing raid on an island in 1944. This particular aircraft had been sought for over a decade by the Bent Prop Project, who continually searches for MIA service members in and around the islands of Palau. The Avenger would prove to be the first of many new discoveries during the month-long mission.

The Bent Prop Project was founded in 1993 by Dr. Pat Scannon as an organization dedicated to locating and assisting with identifying American prisoners of war and missing in action from World War II within the islands of Palau. Included in this purpose is helping to repatriate every American service member who has not come home. Each year, special volunteers join in the search by climbing through the dense Palau jungles, scuba diving in murky channels, and conducting painstaking research in war archives around the world. While the reward for months-to-years of work may be finally bringing an American pilot home, too often the time in Palau ends and volunteers must leave empty-handed to wait another year to resume the search. Many in the Bent Prop group return year after year to continue their efforts. The motivation for a lot of the volunteers is the hope of finding relatives who were MIA during the war. Another common motivation is the honor and joy in helping others learn the fate of missing family members, ending years of mystery.

In 2005, a native of Palau led the Bent Prop team to a large piece of aircraft aluminum deep in a mangrove swamp near a lagoon. The debris proved to be the wing of an American TBM



Avenger aircraft. In the intervening years between its crash and discovery, mangrove roots had lifted the wing completely out of the water, but no other parts were found in the area. The Bent Prop group searched the mangroves and nearshore areas exhaustively using scuba and a donated vessel-towed Marine Sonic Technology side-scan sonar system but found no traces of any other aircraft remnants. Depending on the altitude and speed of the fighter at the instant the wing separated from the fuselage, the main wreckage could be miles from the wing.

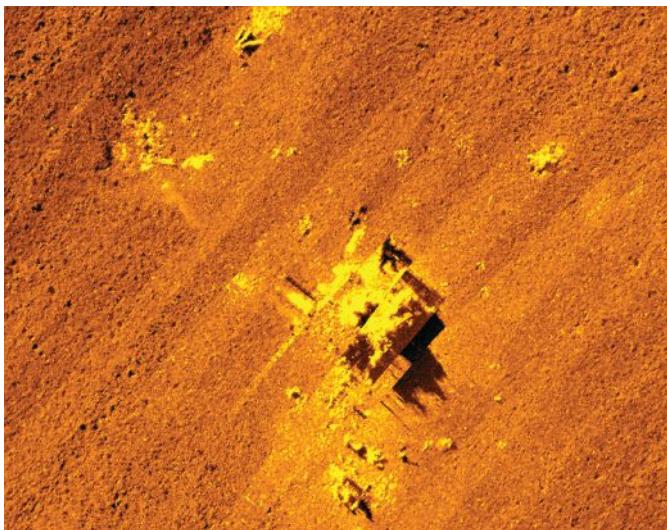
Nine years later, AUVs (autonomous underwater vehicles), from Scripps and UD, equipped with side-scan sonar, identified several “interesting” targets along the coast of Palau. Each day, the three Remus 100 vehicles were programmed with a particular mission plan in a pre-determined area. Bathymetric maps, LIDAR data, and aerial and remotely sensed photographs were consulted to help guide operators in creating mission plans. After the vehicles were programmed, the vehicles were ferried to the area of operation on a small boat and gently lifted over the side and into the sea. Up to six hours in length, each mission can cover more than 1 sq. km and generate hundreds of sidescan images, visual images, scientific data, and vehicle navigational and diagnostic messages that must be manually reviewed after each mission.



Upon returning to shore, operators download the mission data and begin the herculean task of manually sifting through the hundreds of sonar images, using SonarWiz by Chesapeake, in hopes of spotting something that doesn't belong underwater. After alerting Bent Prop team members about the daily finds, a short list of high-likelihood targets was created and divers assigned to investigate each potential target and learn whether the target was an aircraft, or simply an aircraft-shaped coral formation.

During the month-long mission, side-scan surveys located 12 shipwrecks previously unknown to the Palau government and the Bent Prop team. Some of the side-scan results were detailed enough to allow immediate vessel-type identifications. Others, however, were made more difficult by the ship orientation or encrustation by marine life. Dives on several of the shipwrecks indicated that in each case the wreck was of the correct vintage to have been sunk during the war. Diver video and still-frame photography was recorded, but positive identifications of the wrecks, however, was precluded by the time constraints of the project.

While the Remus vehicles can certainly locate shipwrecks and aircraft on the sea-floor, the side-scan imagery also can show where man-made objects are not. The near-shore regions surrounding many of the small ancient coral islands in southern Palau are often too treacherous for AUVs. Research conducted at the National Archives and through personal interviews pointed to an American aircraft sinking in a particular region, but side-scan missions had already ruled out much of the search area. While the AUVs were performing the large-scale offshore searches, members from the Bent Prop team dove in areas closer to the shore. The combination of wide-area searches with the AUVs and targeted searches with divers succeeded again. The team-work paid off in the form of locating a Grumman F6F Hellcat, missing since 1944. During another bombing run, this Hellcat engaged a squadron of Japanese A6M Zeros and successfully shot several out of the sky before receiving critical damage from enemy fire. The debris field was widely distributed and easily missed by cursory searches, but the sharp eyes of Bent Prop divers identified several empennage components covered with marine growth. These few parts led to the main debris field.



Almost 70 years since the aircraft went missing, human eyes rested again upon the Avenger and Hellcat and filled with hopes of locating and repatriating up to four missing aircrew, thus bringing closure to the family and friends of these dutiful service members. A final report summarizing the finds will now be submitted to the Joint POW/MIA Accounting Command (JPAC) for review. Upon a favorable review, JPAC would likely return to the sites for further exploration



**Ultra Electronics USSI and Liquid Robotics announce the development of long duration, maritime security solution**  
Liquid Robotics and Ultra Electronics USSI announced the joint development of a revolutionary and cost effective surveillance system for the global maritime security market. This new product leverages the Liquid Robotics Wave Glider, the world's first wave powered ocean robot, with Ultra Electronics USSI's state of the art acoustic sensing and signal processing to provide a persistent, best of breed, surveillance capability. This solution helps address the critical need for affordable, long duration, maritime surveillance of the world's Marine Protected Areas (MPAs), Exclusion Economic Zones (EEZs), ports and coastlines. "Countries around the globe are losing valuable natural resources and economic opportunity without the ability to persistently patrol their coastlines, MPAs and EEZs," said Bill Vass, CEO of Liquid Robotics. "This strategic partnership will bring to market a powerful solution with the ability to help close this gap globally." The Sentinel Passive Acoustic Sensor, designed and manufactured by Ultra Electronics USSI, will be scalable and configurable to meet the end user's operational requirements covering a broad range of mission applications. The sensor/software suite is designed to acoustically detect, track and form contact reports on waterborne targets that are transmitted to a command and control node on shore, ship or aircraft platform. Contact reports will contain spatial information that allows for data fusion with other sensor sources to achieve an affordable common operational picture that will provide the user maximum situational awareness. Applications for this product are vast and include area surveillance, perimeter trip wire notification, marine mammal monitoring and data collection, environmental data collection and Defense and military mission capability sets. Liquid Robotics' Wave Gliders will host the Sentinel Passive Acoustic Sensors in conjunction with additional weather, optical, communications and computing resources to provide real time maritime domain awareness. Able to operate 24x7, through all weather conditions, the Wave Glider reduces the risk and costs to long duration maritime security. Both Liquid Robotics and Ultra Electronics USSI's combined engineering excellence have resulted in an integrated system that brings a disruptive persistent platform surveillance capability to a host of water surface security applications.

**Coast Guard bids farewell to the Gallatin**

In a decommissioning ceremony at the Federal Law Enforcement Training Center, the Coast Guard bid a fond farewell to its last East Coast-based high endurance cutter, the Cutter Gallatin. Coast Guard Atlantic Area Commander Vice Adm. Robert C. Parker presided over the decommissioning where he commended the crew, its leaders and the cutter's long and distinguished history. "There is a special relationship that exists between sailor and ship, especially for a cutter as long-serving and loyal as Gallatin," said Capt. Caleb Corson, commanding officer of the Gallatin. "In writing the final chapter as the last high endurance cutter in the East Coast, its proud legacy will live on forever in Coast Guard history, our memories and in our hearts." As the sixth Coast Guard cutter bearing its namesake, the honorable Albert Gallatin, Secretary of the Treasury under Presidents Thomas Jefferson and James Madison, Gallatin's distinguished history and contributions since 1968 include missions in maritime law enforcement, domestic and international humanitarian relief, search and rescue, nation-building and ambassador of goodwill. Gallatin leaves the U.S. government service on a high note with its last drug bust halting the influx of 2.8 tons of cocaine over the course of three separate patrols in 2013. As Gallatin is "released from active duty" from the U.S. Coast Guard, it will change flags and continue to serve as a Nigerian Navy ship. Months prior to the event, the cutter was slated for transfer to Nigeria through the Foreign Assistance Act. The FSA allows the transfer of excess defense articles as a grant to friendly foreign governments under the auspices of the State Department. Scheduled for commissioning in early December 2014, the first East Coast-based National Security Cutter Coast Guard Cutter Hamilton will replace the Gallatin.

**Bollinger delivers CGC Kathleen Moore**

Bollinger Shipyards, Inc. has delivered the Kathleen Moore, the ninth Fast Response Cutter (FRC) to the U.S. Coast Guard.

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

The Coast Guard took delivery on 28 March 2014 in Key West, Florida and is scheduled to commission the vessel in Key West, Florida during May 2014.

Each FRC is named for an enlisted Coast Guard hero who distinguished him or herself in the line of duty. This vessel is named after Coast Guard Hero, Lighthouse Keeper Kathleen Moore. Kathleen Moore first stood the watch at the age of 12, when her father began tending the light in 1817 after a shipboard injury prevented him from going to sea. She took on the duties herself as her father's health worsened, although she was not officially appointed as head keeper until 1871. She served that station for an astounding 72 years where she continually braved the harsh storms of Long Island Sound to save those in peril. Kate Moore served as keeper of the Black Rock Harbor Light on Fayerweather Island, Connecticut. She was officially credited with saving 21 lives. Her light made the difference between a successful journey and catastrophe for more than 200 vessels sailing the sound nightly.

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

**Navy to deploy electromagnetic railgun aboard JHSV**

The U.S. Navy plans to install and test a prototype electromagnetic railgun aboard a joint high speed vessel in fiscal year 2016. This test will mark the first time an electromagnetic railgun (EM railgun) has been demonstrated at sea, symbolizing a significant advance in naval combat.

EM railgun technology uses an electromagnetic force – known as the Lorenz Force – to rapidly accelerate and launch a projectile between two conductive rails. This guided projectile is launched at such high velocities that it can achieve greater ranges than conventional guns. It maintains enough kinetic energy that it doesn't require any kind of high explosive payload when it reaches its target.

High-energy EM railguns are expected to be lethal and effective against multiple threats, including enemy warships, small boats, aircraft, missiles and land-based targets.

"The electromagnetic railgun represents an incredible new offensive capability for the U.S. Navy," said Rear Adm. Bryant Fuller, the Navy's chief engineer. "This capability will allow us to effectively counter a wide-range of threats at a relatively low cost, while keeping our ships and sailors safer by removing the need to carry as many high-explosive weapons."

EM railgun technology will complement current kinetic weapons currently onboard surface combatants and offer a few specific advantages. Against specific threats, the cost per engagement is orders of magnitude less expensive than comparable missile engagements. The projectile itself is being designed to be common with some current powder guns, enabling the conservation of expensive missiles for use against more complex threats.

This demonstration is the latest in a series of technical maturation efforts



designed to provide an operational railgun to the fleet. Since 2005, the Navy and its partners in industry and academia have been testing railgun technology at the Naval Surface Warfare Center in Dahlgren, Virginia, and the Naval Research Lab where the service has a number of prototype systems.

The final operational system will be capable of launching guided, multi-mission projectiles to a range of 110 nmi against a wide range of threats. The series of tests are designed to capture lessons for incorporation into a future tactical design and will allow the Navy to best understand needed ship modifications before fully integrating the technology.

For more information, visit [www.navy.mil](http://www.navy.mil).

## General Dynamics continues to power Independence-variant LCS

The U.S. Navy christened its newest Independence-variant Littoral Combat Ship (LCS), the future USS Jackson (LCS 6), at the Austal shipyard in Mobile, Alabama. As systems integrator on the Austal USA-led team, General Dynamics Advanced Information Systems is continuing to apply its proven open architecture and open business model approach to the LCS program. General Dynamics' open architecture computing infrastructure, OPEN CI, serves as the technology backbone for the ship's core mission system and provides the Navy with unprecedented flexibility to rapidly and affordably address mission-critical needs.

"Our open architecture computing infrastructure ensures commonality in the ship's interfaces, allowing for the rapid upgrading and swapping of mission capabilities to enhance performance where and when it's needed most," said Carlo Zaffanella, vice president and general manager of Integrated Platform Solutions at General Dynamics Advanced Information

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**USS JACKSON (LCS 6)**

Systems. "With OPEN CI, we are helping the Navy drive time and cost out, and innovation and capability in."

LCS 6, the third Independence-variant ship to be built for the Navy, includes a significant number of core mission system improvements that are the direct result of the lessons learned and the rapid evolution of technology from the LCS 2 and LCS 4 design to the current version. Applying its open architecture approach to the Independence-variant ships, General Dynamics has made it possible to increase system capability, address obsolescence and maintain compatibility with the ship's many subsystems, while substantially lowering the cost ship-over-ship.

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

### Royal Navy signs UUV agreement with National Oceanography Centre

The Royal Navy took a major step forward in developing a framework to allow Unmanned Underwater Vehicles (UUVs) to be deployed from its anti-submarine warfare warships. A Memorandum of Understanding between the Service and the National Oceanography Centre (NOC) was signed which allows the two parties to work together in sharing ideas and developing a working strategy.

The NOC, which is based in Southampton, already has its own UUVs—also referred to as marine autonomous systems—which it uses to collect scientific data from the ocean for environmental and climate change studies.

With the information gathered, computer models can predict how the environment will change over time and—critically for the Royal Navy—how submarine and weapon sensors on frigates will respond to those changes.

Once placed in the sea by boat, the UUVs can operate for up to 4 months at a time, returning to the surface several times a day to send their data back via satellite. Travelling at slow speed, UUVs can be used in oceans across the world as they have specialist equipment that allows them to adapt to warmer or colder seas.

The Royal Navy does not currently have a mature UUV capability—but the work with the NOC will provide the basis for trialling and understanding how they can best be used. Plans are underway to launch two UUVs from Royal Navy warships—one will be launched from a survey ship in the South West Approaches near Plymouth and the other from a minehunter in the Mediterranean.

"We chose the survey ship and minehunter because they both work with similar equipment," explained Nick Hammond, the Royal Navy's Environmental Information Officer.

The NOC also uses Unmanned Surface Vehicles (USV) which sit on the ocean's surface and keep contact with the UUV below. They can stay out for the same period of time using energy from the sun, wave and wind power to keep moving—the advantage of these being that scientists can keep continual track of the UUV underwater position.

For more information, visit [www.royalnavy.mod.uk](http://www.royalnavy.mod.uk).

### Navy's laser weapon ready for summer deployment

Navy engineers are making final adjustments to a laser weapon prototype that will be the first of its kind to deploy aboard a ship late this summer. The prototype, an improved version of the Laser Weapon System (LaWS), will be installed on USS Ponce for at-sea testing in the Persian Gulf, fulfilling plans announced by Chief of Naval Operations Adm. Jonathan Greenert at the 2013 Sea-Air-Space Expo.

Navy leaders have made directed-energy weapons a top priority to counter what they call asymmetric threats, including unmanned and light aircraft and small attack boats that could be used to deny U.S. forces access to certain areas. High-energy lasers offer an affordable and safe way to target these threats at the speed of light with extreme precision and an unlimited magazine, experts say.

"Our nation's adversaries are pursu-

ing a variety of ways to try and restrict our freedom to operate," Klunder said. "Spending about \$1 per shot of a directed-energy source that never runs out gives us an alternative to firing costly munitions at inexpensive threats."

Klunder leads the Office of Naval Research (ONR), which has worked with the Naval Sea Systems Command, Naval Research Laboratory, Naval Surface Warfare Center Dahlgren Division and others to make powerful directed-energy weapons a reality.

For more information, visit [www.navy.mil](http://www.navy.mil).

### U.S. Navy accepts delivery of USNS Millinocket

The U.S. Navy accepted delivery of the third joint high speed vessel, USNS Millinocket (JHSV 3), from Austal USA in Mobile, Alabama, March 21. The delivery marks the official transfer of the vessel from the shipbuilder to the Navy and is a major milestone in the ship's transition to operational status.



Millinocket, the third ship of the JHSV class is commercially designed, with modifications made to suit military needs. The ship will transport troops, equipment, and supplies to littoral offload points over operational distances. She is designed to transport 600 short tons of military cargo 1,200 nmi at an average speed of 35 kts.

JHSV 3 is equipped with a flight deck and an off-load ramp which allow for vehicles and helicopters to quickly access ports and quays. Littoral operations and port access are further enhanced by the ship's 15-ft shallow draft, ability to interface with roll-on/roll-off discharge facilities, and ease of access to austere and deteriorated piers. This makes JHSV an extremely flexible asset, capable of supporting a wide range of operations including non-combatant evacuation operations, humanitarian assistance and disaster relief.

USNS Millinocket will be owned and operated by MSC and will be manned by a crew of 22 civil service mariners.

For more information, visit [www.navy.mil](http://www.navy.mil).



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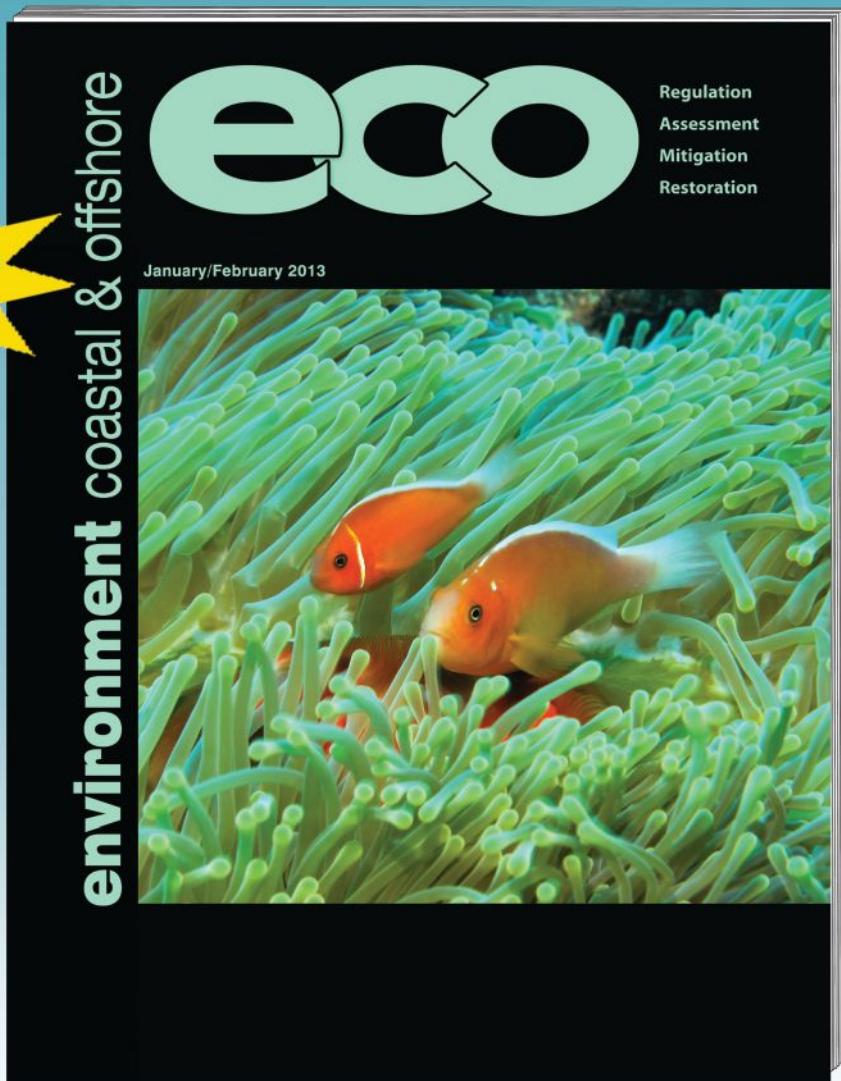
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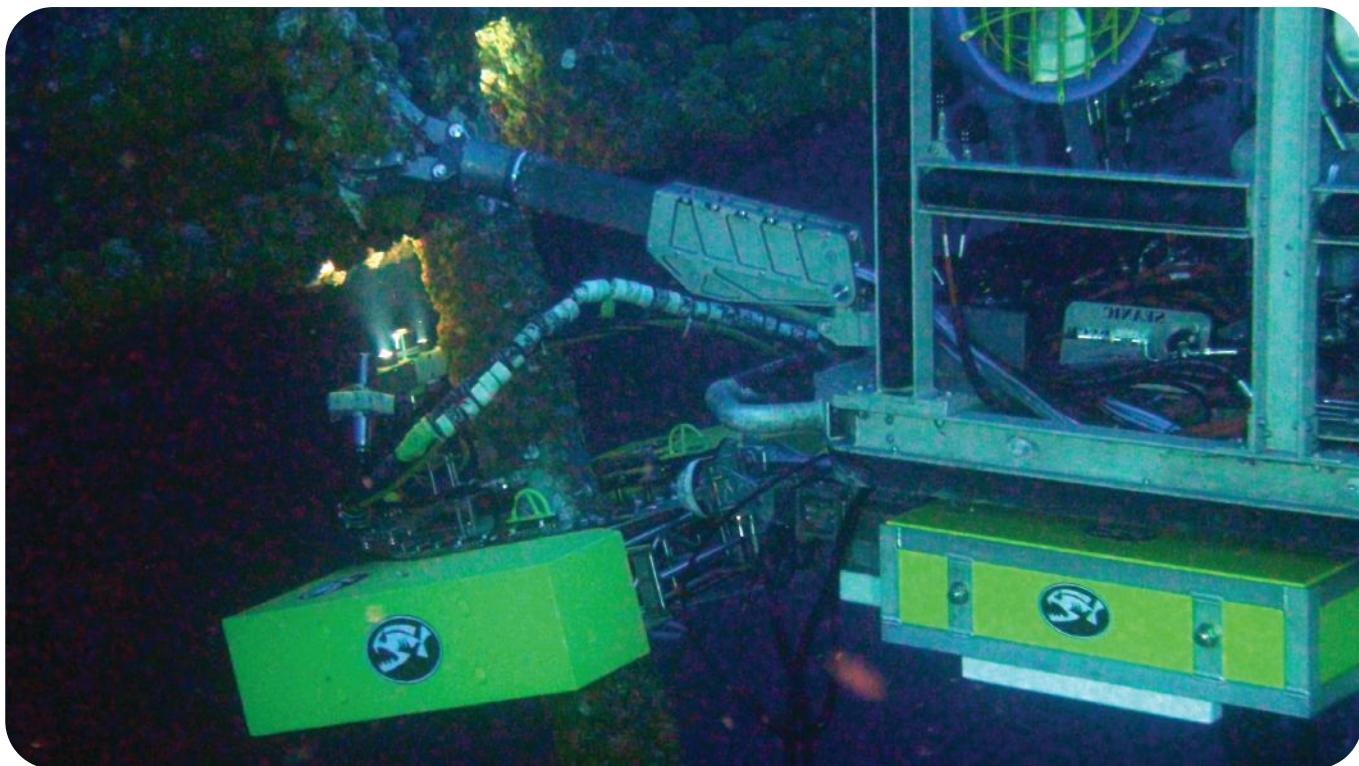
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# SCR FLEX JOINT INSPECTIONS AND CLEANING

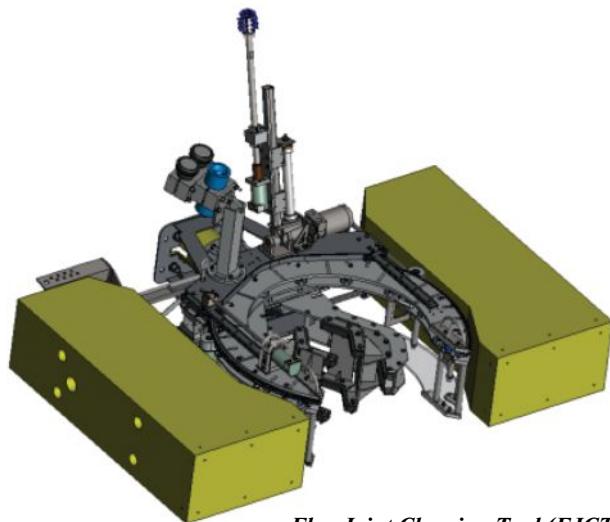
By: Michael P. McGuyer, Seanic Ocean Systems

Steel Catenary Riser (SCR) flexible joints are used in deepwater operations as a common method of attaching an offshore pipeline or flow line to a deepwater floating oil production platform. The primary function of a flexible joint is to suspend the SCR from the host platform, providing an articulated interface between the host and the SCR pipe. This allows for angular motion between the host platform and the SCR, thus reducing the bending moments in the upper section of the SCR. Preventative maintenance and inspection of the flexible joints is necessary to ensure the highest safety and reliability; however, these tasks are complicated by a number of factors, including disruption to production, challenging locations on the asset, special tools, depth, production processes, awkward geometry, sea state, marine growth, and shallow water remotely operated vehicle (ROV) operations.



The criticality or risk for all scenarios relating to SCR failure modes must be dealt with through periodic inspections. Some failure modes include the following:

- Fatigue due to excessive Vortex Induced Vibrations (VIV);
- Cut or loss of choke control;
- Spool flange leakage;
- Asset exceeds design motions;
- Dropped objects;
- Riser clashing due to VIV;
- Fatigue due to excessive vessel motions;
- Loss of straise, fairings, and marine growth; and
- Damage to coating leading to corrosion



**Flex Joint Cleaning Tool (FJCT)**

While the design, monitoring, and inspection decisions are wide-ranging for the SCR flexible joint (i.e., pipe soil interaction, turbulence, water depth, rotation tension cycles, pressure cycling, temperature, load, etc.), their surroundings limit opportunities for maintenance or repair. As a result of the limits on inspecting the flexible joint elastomeric element underside, a new tool was needed to effectively clean and inspect the flex element. Seanic Ocean System's Flex Joint Cleaning Tool (FJCT) is designed for SCR flexible joints in offshore deepwater developments to meet the inspection requirements of the flexible elastomeric element. The FJCT clamps around Subsea SCR flexible joints with pipeline diameters ranging from 4 to 24 in. and provides the overall visual inspection process of in-service SCR flexible joints installed on offshore assets. The inspection process can be performed while Flexjoints are in service, eliminating any loss of production or disruption to facility operations.

While the technique is quite simple, the characteristics of the cleaning and inspection methods of the FJCT give Oil & Gas Operators a way to inspect and compare quantitative assessments of their in-service SCR flexible joints. Inspecting the elastomeric element for damage allows Oil & Gas Operators to clean and document their in-service flexible

joints. The inspection is a qualitative method of measuring the impact of operations on flexible joint life rather than relying on a life prediction alone.

A few inspection methods that can be performed at fixed intervals relevant to the SCR risers have been identified. These inspections are described as periodic inspections and event-triggered inspections:

- General visual inspection (GVI) by ROV;
- Close visual inspection (CVI) by ROV;
- Close visual inspection (CVI) by divers (Flex joint and spool);
- External NDE by divers;
- Intelligent pigging for wall thickness, pitting and cracks;
- Flexjoint Stiffness calculations; and
- Fatigue calculations, etc.

Types of monitoring systems onboard the assets include the following:

- Pressure and temperature (sensors);
- Current (ADCP);
- Vessel motions (navigation and GPS);
- SCR stresses (strain gauges);
- Flex joint angles (angular sensors);
- Visual observations (sheen in the water); and
- Wind and waves (weather buoys).

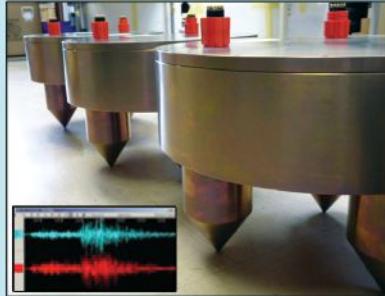
The objective of the inspection is to obtain a visual record of each SCR flexible joint and document any real-time irregularities found. The data for each SCR flexible joint will be assessed by the Oil & Gas Operators Integrity Management Departments following the inspection process using HD still photos, HD video recordings, hand drawn maps of potential anomalies, and a 3D model for trending higher risk SCR FJs or those found to have surface anomalies.

Potential problems are identified by noting anomalies along the surface of the cover rubber flex element. It is common to have a fairly uniform series of bumps or low-amplitude circumferential rings around the surface of the cover rubber due to normal bulging of the elastomeric pads due to riser tension and internal pressure. Anomalies would be characterized by cracks, large irregular bumps, tears, or extrusions in the cover rubber. The inspection will measure any anomaly length, width, or protrusion if a 3D model is built, along with providing the location to assist with future flexible joint assessments.

Data are gathered through the various monitoring systems and design documents. Critical locations are elected and subjected to periodic or event-triggered inspections, maintenance, or repair.

Seanic Ocean Systems has cleaned and performed inspections on more than 100 SCR flexible joints in the Gulf of Mexico. The results from those inspection campaigns differ for each Operator's requirements and results. For more information, visit [www.seanicusa.com](http://www.seanicusa.com).

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



# OFFSHORE INDUSTRY

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

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

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

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

Crude oil makes up the lion's share of the United States' energy imports, nearly 70%. Petroleum products, like gasoline blending components, are the next largest portion, with 16%. About 12% of the energy imports are natural gas. The U.S. also imports some coal, electricity and biofuels.

## U.S. crude oil exports could create upward of 300,000 new jobs: study

A new study shows that exports of crude oil could create up to 300,000 additional U.S. jobs in 2020 and shave billions off fuel costs for consumers.

"Consumers are among the first to benefit from free trade, and crude oil is no exception," said Kyle Isakower, American Petroleum Institute's vice president for regulatory and economic policy.

"Gasoline costs are tied to a global market, and this study shows that additional exports could help increase supplies, put downward pressure on the prices at the pump, and bring more jobs to America. Access to foreign customers could drive significant investment in U.S. production, helping to strengthen our energy security. Now that the U.S. is poised to become the world's largest oil producer, the economic case for exports is clear."

The new report was conducted by ICF International and EnSys Energy. It suggests that, in addition to reducing fuel costs and creating new jobs, if current restrictions on crude exports were lifted:

\*The cost of gasoline, heating oil and diesel fuel is projected to fall, saving

American consumers up to \$5.8 billion per year, on average, between 2015 and 2035. Prices could decline as much as 3.8 cents per gallon in 2017, dropping as much as 2.3 cents per gallon, on average, from 2015 to 2035.



Kyle Isakower

\*America's trade deficit could fall by \$22 billion in 2020.

\*The economy could grow by as much as \$38 billion in 2020, with an average GDP increase of up to \$27 billion annually through 2035.

\*U.S. federal, state, and local government revenues could rise by as much as \$13.5 billion in 2020.

\*U.S. oil production could increase by as much as 500,000 b/d in 2020.

\*Up to an additional \$70 billion is projected to be invested in U.S. exploration, development, and production between 2015 and 2020.

\*U.S. refiners could process, on average, an additional 100,000 b/d of oil because of more efficient distribution of heavy and light crudes over the 2015 to 2035 period.

"This is a new era for American energy, but our energy trade policies are stuck in the 1970s," said Isakower. "The U.S. and China are the only major oil producers in the world that don't export a significant amount of crude. It's time unlock the benefits of trade for U.S. consumers and further strengthen our position as a global energy superpower."

## Anadarko found not culpable in Deepwater Horizon drilling tragedy

A federal judge found that Anadarko Petroleum Corp. was not culpable in the well-drilling operations that led to the 2010 Deepwater Horizon tragedy in the Gulf of Mexico. The March ruling came after the Justice Department made the push for Anadarko to be held responsible along with BP for the 20 April 2010, drilling disaster and rig explosion that killed 11 workers and led to the nation's worst offshore oil leak. As a partial drilling partner with BP, Anadarko could potentially still be held liable though for some of the spill damages. BP is facing civil fines of up to \$17 billion.

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### New Bush Library and Museum exhibit to explore offshore drilling

Learn about the history, pioneers, and technological advances of the offshore drilling industry at a new interactive exhibit "Offshore Drilling: The Promise of Discovery" on display through 1 February 2015 at the George Bush Presidential Library and Museum at Texas A&M University.

The exhibit focuses on the history, current developments, and future of offshore drilling, with an emphasis on the work of George Bush, Sr., emerging technologies, and ongoing research at Texas A&M University.

"President Bush was an entrepreneurial Texas oilman, first in Midland-Odessa then later in Houston and offshore in the Gulf of Mexico. This exhibit is an ambitious undertaking for our museum and staff, reflecting the ambition and enormous scale of the offshore industry itself," said Bush Library and museum director Warren Finch.



George Bush Presidential Library

With Shell as title sponsor and supporting sponsorships from Enso, Schlumberger, Move Resource Group, and the George Bush Presidential Library Foundation, the exhibit covers all aspects of the search for oil offshore, with a special look at the geology of finding oil, focusing on exploration of the Gulf of Mexico. Industry pioneers recount their personal experiences.

"The offshore oil and gas industry has gone from 0 to 10,000 ft of water depth in the past 100 years, a journey full of amazing achievements by courageous individuals and organizations committed to bringing us energy to run our daily lives," said John Hollowell, executive vice president for Deep Water, Shell Upstream Americas.

For more information about the exhibit go to [bushlibrary.tamu.edu/offshore](http://bushlibrary.tamu.edu/offshore).

# OFFSHORE INDUSTRY HEADLINES

Research & Development • Environmental Assessment • Discovery

## Energy company CFOs said to be more pessimistic about the future

Chief financial officers of some of the largest energy companies are more pessimistic than the rest of the business community on earnings growth this year, according to a new survey released by the consulting firm Deloitte.

Despite a U.S. energy boom, energy executives forecasted the second-lowest sales growth and domestic personnel growth of any industry in the study.

Deloitte surveyed more 109 CFOs from some of North America's largest companies, most of which are publicly traded and have annual revenues above \$1 billion. The quarterly survey included 13 energy industry CFOs, but Deloitte doesn't disclose their names or companies.

The findings contrast with the recent surge in U.S. oil and gas production. But Deloitte notes that energy companies are faced with low natural gas prices and flat oil prices at a time when they've been spending big.

The energy industry CFOs forecasted earnings growth of 4.1% this year, less than any other sector. Their sales growth outlook of 1.9% was the second-worst. And the energy executives believe industry payrolls will decline 0.3% in the U.S., while most other executives surveyed planned on adding staff.

Deloitte said the energy sector, in particular, is showing a more measured response to the survey. While oil and gas producers ramped up leasing activity and spending during the early days of the domestic energy boom, not all of those projects have been as profitable or were completed as quickly as they were expected to be.

## Drydocks World delivers oil spill containment vessel to U.S. Gulf

Drydocks World has delivered Eagle Louisiana, the second of two modular capture vessels (MCV) for spill containment operations in the Gulf of Mexico. The shipyard converted the Aframax tanker for Singapore-based AET, which has a 20-year agreement with Marine Well Containment Co. (MWCC) for operation of Eagle Louisiana and Eagle Texas, which was delivered earlier.

MWCC members are Anadarko, Apache, BHP Billiton, BP, Chevron, ConocoPhillips, ExxonMobil, Hess, Shell, and Statoil. The MCVs will operate as normal tankers, but will also be outfitted and deployed for containment services in the event of a deepwater well control incident in the GoM.

Both vessels have 700,000 bbl of liquid storage capacity, and can process, store, and offload the liquids to shuttle

tankers. Their process equipment will separate the liquids from gas, safely store them, and flare the gas. Liquids will then be offloaded to shuttle tankers which will transport the liquids to shore. A newly-fabricated subsea containment assembly will attach to risers and other containment equipment to direct the flow of fluids to the MCVs for processing and storage.

The shipyard's work scope included installing four retractable azimuth thrusters, one tunnel bow thruster, new machinery



*Spill capture vessel Eagle Louisiana.*

spaces, diesel generator sets and associated tanks, auxiliaries, switchboards, and electrical distribution equipment.

The main engine was modified for controllable pitch propeller (CPP) operation and a control system was added for dynamic positioning, power management, and equipment monitoring. Structural support stools and foundations were added for future installation of topsides processing modules, a turret, flare tower, communications equipment, control facilities, and other items.

Additionally, the ship's systems were modified to provide services to topsides processing equipment, along with hydraulic systems for the CPP, thrusters, cargo valve control and fire pumps. A new main deck central pipe rack was fabricated and piping was installed to support topsides processing equipment.

Drydocks World upgraded the living quarters to accommodate more than 65 personnel, and performed mechanical completion, pre-commissioning, commissioning, testing and sea trials of the converted vessel.

## Two-thirds of U.S. imports came from Canada, Mexico, Saudi Arabia

The United States imported 61% of its foreign oil from Canada, Mexico and Saudi Arabia in 2013, the most in more than four decades, as overall crude oil imports fell, the Energy Information Administration reported.

Those three countries accounted for 4.6 mmbbl per day of oil imports, down 1.5% from 2012, the EIA said. Total oil imports were 7.6 mmbbl per day, down 10.2% and the lowest level since 1996. The share of

oil imports from Canada, Mexico and Saudi Arabia was the highest since the EIA began keeping records in 1973.

"These countries generally produce medium to heavy, sour crude oil that is desirable to U.S. refineries, while increasing U.S. crude oil production from tight oil formations is typically of the light sweet quality," the EIA said. "Also, with the exception of Saudi Arabia, these countries are near the United States, with Mexico having a short shipping distance for its oil to the large number of refineries along the U.S. Gulf Coast."

The three countries have consistently been the U.S.'s top oil suppliers, though their rankings shift. Canada was last year's largest, supplying 2.5 mmbbl per day, followed by Saudi Arabia and Mexico, EIA noted.

## Oil and gas companies express support for Alaska gas project bill

Oil and gas company executives said they're prepared to move into the next phase of pursuing a major liquefied natural gas project under terms of a bill that recently passed the Alaska Senate.

The House Resources Committee was hearing SB138, which would set state participation in the project at about 25% and move the project, currently estimated to cost between \$45 billion and more than \$65 billion, into a phase of preliminary engineering and design and cost refinement.

David Van Tuyl, a regional manager for BP Alaska, told the committee in late March that it's important to take the time needed to get a mega-project right and not rush. But he said his company believes the project, as things stand today, can compete in the Asian markets and to the extent the gas resource can be monetized, he said it behoves everyone involved to move forward expeditiously.

The state has signed an agreement with the North Slope's major producers—BP, ConocoPhillips and ExxonMobil Corp.—TransCanada Corp. and the Alaska Gasline Development Corp., setting out broad terms for moving ahead.

The state also signed a separate agreement with TransCanada to hold its interest in a pipeline and gas treatment plant, with the state having an option to buy back some of the equity. Both agreements are contingent upon passage of enabling legislation deemed acceptable by all the parties.

The process envisioned for pursuing the project would happen in stages, with opportunities for the state or another party to get out if they don't want to continue. Executives said they were prepared to take the next step.

## ExxonMobil releases reports on managing climate risk

All energy sources, including carbon-based fuels, are necessary to meet future global energy demand growth as society manages the risks of climate change, ExxonMobil, the world's largest publicly traded company, said in two reports to shareholders outlining the company's business planning and risk assessment practices.

"Our analysis and those of independent agencies confirms our long-standing view that all viable energy sources will be essential to meet increasing demand growth that accompanies expanding economies and rising living standards," said William Colton, ExxonMobil's vice president of corporate strategic planning. "It is equally essential that society manages the risk of climate change by increasing energy efficiency and by investing in research into technologies to reduce greenhouse gas emissions."

The reports to shareholders outline how the company plans capital expenditures, assesses and plans for policies limiting greenhouse gas emissions and works to reduce emissions. They also include information such as distribution of reserves by asset location and type.



"The risk of climate change is clear and the risk warrants action," said Colton. "ExxonMobil is taking action by reducing greenhouse gas emissions in its operations, helping consumers reduce their emissions, supporting research that leads to technology breakthroughs and participating in constructive dialogue on policy options."

Release of the reports is part of an ongoing dialogue between ExxonMobil and shareholders about important matters such as the company's long-term supply and demand forecasts, business plans and views on climate change. Information included in the reports is available in a variety of existing materials including ExxonMobil's Outlook for Energy, its 2013 Financial and Operating Review, the company website and in its annual Form 10-K regulatory filing.

The reports point out that ExxonMobil's Outlook for Energy and all credible forecasts, including that of the International Energy Agency, predict that carbon-based fuels will continue to meet about three-quarters of global energy needs through 2040.

"All of ExxonMobil's current hydrocarbon reserves will be needed, along with substantial future industry investments, to address global energy needs," said Colton.

The reports also detail ExxonMobil's efforts to reduce greenhouse gas emissions through increased efficiency and production of lower-carbon fuels, notably natural gas, and by helping consumers of carbon-based fuels reduce their emissions. The reports can be found at [www.exxonmobil.com/climatereports](http://www.exxonmobil.com/climatereports).

ExxonMobil released its reports on the same day as the latest report by the Intergovernmental Panel on Climate Change, a United Nations group assembled to assess the science and risks of climate change.

That report alleges that climate change is already having sweeping effects on every continent and throughout the world's oceans, and warned that the problem was likely to grow substantially worse unless greenhouse emissions are brought under control.

## Study to analyze ocean currents offshore West Africa

BMT ARGOSS is teaming up with the UK's Met Office and Oceanweather Inc. to support offshore engineering design and operations planning in the mid-Atlantic region. The Mid-Atlantic Current Hindcast (MACH) project involves a regional 20-year ocean current review, with nested high-resolution grids

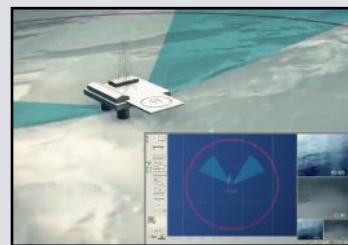
## Repsol, Indra develop early warning system for offshore operations

Global energy company Repsol and consultancy and technology company Indra have jointly developed a new early warning system designed to detect leaks, enabling the energy industry to maximize safety in offshore operations.

The new hydrocarbon early automatic detection system (HEADS) has successfully completed testing at the company's Industrial Complex in Tarragon, including the Casablanca platform, according to Repsol.

HEADS, which requires no human intervention, uses a combination of various detection sensors, adding the automatic interpretation of infrared images and radar, as well as activating alarms.

Reliability can be increased due to the combined use of infrared images and radar, and the automation of the process allows for monitoring continuously without the requirement of an operator.



*Repsol and Indra's hydrocarbon early, automatic detection system. Photo: courtesy of Indra.*

Variations in temperature between water and hydrocarbons can be detected using the infrared camera, and different operations such as drilling, production, loading or safety are monitored in a control room by the system.

Upon detecting an incident, HEADS activates the alarm automatically and also collects all the associated information. It then registers and analyses all the related parameters.

HEADS uses an automatic identification system (AIS) to identify ships in the vicinity and allow ships to communicate their position and other relevant information, so that other ships or stations can track them to avoid any collisions.

With a short response time, the system increases detection reliability in any incident on the water's surface, night or day and even in bad weather conditions, such as rain or fog.

Repsol provided the HEADS project with its knowledge of physical phenomena related to hydrocarbons and the marine environment, while Indra offered its expertise on image interpretation and algorithms, as well as its experience in the development of real time data processing.

covering the main oil and gas concession areas.

"In recent years, ocean modeling technology has significantly advanced; therefore we recognized the importance and timeliness of conducting a comprehensive, new West Africa ocean current 'hindcast,'" said Robin Stephens, metocean group manager at BMT ARGOSS.

Much of the oil and gas activity in this region is in deepwater and involves the design, installation, and operation of floating production systems with substantial subsea components such as risers and moorings, both of which are very susceptible to current-induced loadings.

"By simulating ocean current, temperature, and salinity in profile we can provide...a long-term simulation which has been validated and optimized against data that has been measured in the region," Stephens said.

**Aramco picks McDermott for subsea cable installation**

McDermott International said one of its subsidiaries won a contract to provide the electrical power supply system for Saudi Aramco at the Abu Ali and Khursaniyah fields in the Arabian Gulf. The project includes the procurement, construction, and installation of two 12-mi 230 kv subsea circuits routed offshore to connect land based facilities. The cables weigh about 95 kg/m. Project completion, including hookup and commissioning, is expected in the third quarter of 2015. "The subsea cables for this project are some of the largest ever transported and installed in the Arabian Gulf," said David Dickson, president and chief executive officer of McDermott International.

**Saipem gets first-phase South Stream offshore pipelay**

South Stream Transport contracted Saipem to lay the first of the four South Stream offshore gas pipelines through the southern part of the Black Sea. Under the \$2.78-billion contract, Saipem will compile project documentation, perform the offshore installation, erect process facilities in the shore crossing areas, and construct the landfalls. It will weld the pipes together onboard an unnamed vessel, with the Castoro Sei and Saipem 7000 assigned to lay the pipes. Saipem 7000 installed the Blue Stream gas pipeline in the northern part of the Black Sea in the early 2000s. For the shore crossings, four "micro-tunnels" will be built on both the Russian and the Bulgarian sides of the route, designed to preserve the local coastlines. Preparations for tunneling operations will start this June with offshore construction to begin in the fall. Work on the first offshore line will last until summer 2015, followed by commissioning of the first line by the end of 2015.

**Subsea 7 wins \$110M contract for BC-10 project in Brazil**

Subsea 7 was awarded a contract valued around \$110 million by Shell for the installation of jumpers, umbilicals and associated subsea structures for the BC-10 phase 3 project. Shell operates the Parque das Conchas (BC-10) project offshore Brazil, in which it holds a 73% interest. BC-10 lies in approximately 1,780 m of water in the Campos Basin offshore Brazil. Due to start in the first quarter of 2014, Subsea 7 will perform project management and engineering from its offices located in Rio de Janeiro. The offshore campaign is expected to begin in the third quarter of 2015, using the construction-flexlay vessel the Skandi Neptune. According to Subsea 7, the project has a total duration of about 2 years. The project's key contractors include BDFT (JV between SBM/MISC), Subsea 7, FMC Technologies, V&M do Brasil, Oceaneering, Transocean-Global Santa Fe and Halliburton. In January, Shell announced an agreement to sell a 23% interest in the BC-10 project to Qatar Petroleum International for about \$1 billion.

**AGR to provide well management services on NCS**

Premier Oil has selected AGR to provide well management and well planning services for exploration drilling and field developments within the Norwegian Continental Shelf (NCS). The scope of work includes delivery of resources, competence and methodology by AGR's well management team in Norway. The contract will run for 5 years, with the possibility of extension for an additional 3 years. AGR Norway and Russia executive vice president Sjur Talstad said that the company will perform the activity from its Stavanger office, which has a track record of delivering well management and operational HSE support. "This contract win follows a busy 2013 for us when at peak we delivered five operations in parallel," Talstad added.

# GoM lease sales draws \$872M in winning bids

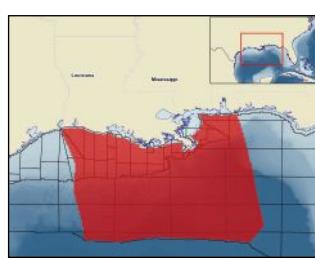


*Transocean's Discoverer Enterprise drillship is currently working for BP Exploration & Production in the U.S. Gulf of Mexico.*

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

Lease Sale 231 for the Central Planning Area attracted \$850,809,921 in high bids on 326 blocks covering 1.7 million acres on the outer continental shelf offshore Louisiana, Mississippi, and Alabama. A total of 50 companies participated in submitting 380 bids.

E&P independents were top winners in Central Gulf Sale 231, both in the total sum of high bids and the total number of tracts won. Freeport-McMoRan Oil & Gas LLC captured 16 blocks for bids totaling \$321,440,000, while Cobalt International Energy, LP, picked up 44 tracts for a total of \$25,846,096. The highest single bid also was submitted by Freeport-McMoRan—\$68,790,000 for an Atwater Valley tract.



Lease Sale 225, the first of two lease sales proposed for the Eastern Planning Area under the 5-Year Program received no bids. This was the first sale offering in that area since 2008. The sale encompassed 134 whole or partial unleased blocks covering approximately 465,200 acres 125 mi south of eastern

Alabama and western Florida. Plans are to offer the area again in 2016, according to BOEM.

In addition to opening bids for these two sales, BOEM opened three pending bids submitted in the August 2013 Western Planning Area Lease Sale 233 for blocks located or partially located within 3 statute miles of the maritime and continental shelf boundary with Mexico. A total of \$21,333,850 in high bids was submitted on three tracts by one company, ExxonMobil. Leases awarded as a result of these bids will be subject to the terms of the U.S.-Mexico Transboundary Hydrocarbons Agreement, BOEM said.

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*SCF Geo's Vyacheslav Tikhonov vessel.*

### Nordic Maritime wins offshore seismic contract from Cairn India

Singapore-based Nordic Maritime received a contract from Cairn India to provide 3D marine seismic data acquisition and processing services off the coast of Andhra Pradesh, India. Under the terms of the \$23.5 million contract, Nordic Maritime will collaborate with Russia-based SCF Geo to feature the group's seismic survey vessel Vyacheslav Tikhonov, which will survey about 1,000 sq. km of ocean bed.

The companies also will charter and mobilize a supply ship and 10 chase vessels from Indian owners in order to support the 3D data acquisition program. As part of the offshore project, gravity and magnetic data will also be acquired alongside the seismic data near Nizamapatnam Bay.

The Vyacheslav Tikhonov, which is operated by SCF Geo and based in St. Petersburg, was built in 2011 and is an eight-streamer seismic survey vessel, based on the X-bow Ulstein design from Norway. The project is scheduled for completion by the middle of June. It is to depart from the Port of Kakinada.

### Bumi Armada wins \$2.9B FPSO contract from Eni block in Angola

Malaysian offshore oilfield services provider Bumi Armada has received a letter of intent (LOI) from Italian oil and gas company Eni, stating its intention to award a \$2.9 billion contract to provide a floating production, storage and offloading (FPSO) vessel.

Eni awarded the contract to a consortium of Bumi Armada Offshore for the chartering, operation and maintenance of the FPSO vessel for deployment at Block 15-06, East Hub located offshore Angola.

As part of the LOI, Bumi Armada was authorized to commence engineering and procurement work on the FPSO with a contract effective date in late March. According to Bumi Armada, first oil from the block is scheduled for October 2016.

"This LOI is our second largest FPSO award in six months and underscores our successful migration into the large-project FPSO sector," said Hassan Basma, Bumi Armada's chief executive officer and executive director.

"This is the second time Eni has turned to Bumi Armada for an FPSO in West Africa and we will continue to collaborate with our tried and tested value-chain, as we have done in the past, to successfully deliver this project for our repeat customer."

To be delivered in 31 months, the project is set to take Bumi Armada's FPSO fleet to eight vessels. Bumi Armada operates in more than 18 countries spread across five continents, and provides offshore services through five strategic business units.

### Subsea 7 taps Jumbo for Western Isles FPSO moorings installation

Subsea 7 has contracted Jumbo to install the mooring piles and chains of the FPSO for Dana Petroleum's Western Isles development project in the UK northern North Sea.

Jumbo's DP heavy-lift vessel Fairplayer, which features two 990-ton deepwater cranes, is expected to start the program in July. The same vessel is booked for mooring installations this summer for Ithaca Energy's Greater Stella Area project in the central UK sector.



*Jumbo's Fairplayer to do heavy lifting.*

Western Isles is in Block 210-24a, 56 mi east of Shetland in 525 ft of water. It is being developed via subsea wells tied back to a central FPSO. Oil will be exported by shuttle tanker with produced gas sent through a dedicated pipeline to TAQA's Tern platform. First oil is due in summer 2015.

### Keppel FELS wins order from TS Offshore for new design jack-up

Singapore's Keppel FELS Ltd., a wholly-owned subsidiary of Keppel Offshore & Marine has secured a contract from TS Offshore Ltd., to construct an ultra-high specification jack-up rig worth about \$500 million. Scheduled for delivery from the shipyard in first quarter



*The robust KFELS N Plus jackup design is an enhancement of Keppel's proprietary KFELS N-Class design (above).*

2017, it will be the first jack-up built to Keppel's new proprietary KFELS N Plus design. With its legs measuring 678 ft and a maximum combined drilling load of 3,860 kips, the KFELS N Plus is able to meet operating requirements for the most challenging wells. It can work at a maximum water depth of 500 ft, drill to depths of 35,000 ft, and is equipped with a 100 ft cantilever outreach.

When delivered, it is expected to be deployed in the Eastern China Sea but will also have provisions built in to enable the rig to operate in the North Sea, according to the company.

Developed by Offshore Technology Development (OTD), the shipbuilder's R&D arm, the robust KFELS N Plus jack-up is an enhancement of Keppel's proprietary KFELS N-Class design, three of which have been successfully operating in the North Sea. It is equipped with 72 high-capacity pinion jacks and self-positioning fixation system of OTD's proprietary design.

"The KFELS N Plus rig is a robust and cost-efficient rig with distinctive safety and operational features," said Dr. Xiong Shaohui, chairman of TS Offshore.

He said Keppel FELS was probably the only yard able to provide the company with such a high specification rig customized to its needs that would be well received by the market.

"It is one of the world's most advanced rigs of its class with better drilling capabilities, a superior cantilever load performance, a larger deck space, a higher variable load and enhanced accommodations," the chairman said. "We are confident it fills the gap for ultra-high specification rigs needed in the Eastern China Sea or almost anywhere."

## Huisman to build largest cranes for new semi lift vessel

Huisman has received a letter of intent for the delivery of the world's largest cranes to Heerema's planned new semi-submersible crane vessel, the company said.

While Huisman is known for its mast crane design, these cranes will be tub-mounted. The two cranes will be built by the Huisman production facility in China. The final decision to build this new semi-submersible crane vessel will be made by Heerema before the end of this year.

The cranes will have a lifting capacity of 11,023 tons at a radius of 158 ft. They will also feature a 2,756-ton aux hoist and a whip hoist with a maximum reach of 509 ft. The main hoist, in a reduced reeving, can lift 1,102 tons to 3,281 ft of water depth, and is fitted with active heave compensation.

## GSP enters new long-term contract with OMV Petrom

Grup Servicii Petroliere has signed a new contract with OMV Petrom. The contract refers to offshore drilling and workover operations which will be carried out by GSP Uranus. The rig will operate in the Black Sea offshore Romania under an aggregate duration of 2 years.

GSP Uranus is a three legs, self-elevating unit, cantilever type Marathon Le Tourneau Class 116-C. This is the most recently concluded investment project carried out in order to extend the company's fleet.

GSP Uranus upgrade and reclassification project, worth over \$44 million, was completed with the support of EximBank. GSP Uranus upgrade and reclassification project was developed under the management of GSP Shipyard and ABS supervision and included repair works, upgrading works and certification. GSP has completed the upgrade and reclassification of the jack-up GSP Uranus at its shipyard in Constanta Sud Agigea Port on the Black Sea.

Romania's EximBank provided \$30 million of finance for the rig acquisition and upgrade. The overhaul program drew together a team of around 400 Romanian staff including naval fitters, welders, mechanics and electricians, supported by naval engineering graduates.

"Our development plans focus on both the expansion and modernization of our fleet, maintaining our company among the top players of the offshore oil and gas industry in the Black Sea," said Gabriel Comănescu, president of GSP's board.

## COSCO Nantong delivers heavy-lift pipelay vessel

COSCO (Nantong) Shipyard Co. Ltd. has delivered the SapuraKencana 1200 pipelay heavy-lift vessel to its Asian buyer. The vessel is designed for multiple functions, including oil piping processing, laying, installation, and heavy lifting.

Classed by ABS, the vessel is capable of working in shallow water of up to 656 ft with a 10-point mooring system. It is also equipped with DP-3 which enables it to carry out heavy-lifting installation of large-scale offshore structures such as platform blocks, modules, and jackets, as well as S-type pipe-laying operations in water depths of up to 4,921 ft.

The SapuraKencana 1200 measures 504 ft in length, 15 ft in breadth, and 55 ft in depth, with a design draft of 25 ft and a lifting capacity of 1,432 tons.

## Castoro Sei in harbor ahead of North Sea pipelay season

Fairmount Marine's tug Fairmount Glacier has towed Saipem's semi-submersible vessel Castoro Sei to Rotterdam, where it will prepare for a pipelay program in the North Sea.

Fairmount Glacier mobilized from Las Palmas in the Canary Islands to hook up with the 28,000-dwt, 498-ft long Castoro Sei in Genoa, Italy. The convoy crossed the Mediterranean Sea to reach Gibraltar within 6 days.



*Fairmount Marine's tug Fairmount Glacier.*

For the next part of the voyage, including the passage through the English Channel, Fairmount Glacier was assisted by the tug Salviceroy. On arrival in Rotterdam, Castoro Sei was towed inside and safely moored.

## Hitachi delivers centrifugal compressors for FPSO

Japanese engineering and electronics company Hitachi has delivered six sets of centrifugal compressors for Petrobras' floating production, storage and offloading system (FPSO) based on a contract received from Modec and Toyo Offshore Production in January 2013.

The company said it will seek further orders for Petrobras projects, which includes plans to build more FPSOs, used to produce crude oil and gas, store it in storage tanks and directly offload it into oil and gas shuttle tankers at sea.

Demand for FPSOs is expected to grow, especially in South America and South Africa, as oil companies are said to be actively developing offshore oil and gas fields in recent years.

The FPSO will be deployed in the Iracema North oil field, which is located around 300 km south of Rio de Janeiro and lies approximately 5,000 m under the sea floor, under a pre-salt layer. With the capacity to process 150,000 b/d after conversion, the FPSO will store about 1.6 mmbbl.

Hitachi delivered three sets of high-pressure centrifugal compressors and three sets of intermediate-pressure centrifugal compressors with discharge pressure of around 25,000 kPag and 6,400 kPag, respectively. The company plans to expand compressors, pumps and water treatment equipment sales for oil and gas plants in order to meet expected rising demand, specifically in the Middle East, Asia and South America.

## Baku Shipyard to build transport vessels for SOCAR

Russian Maritime Register of Shipping (RS) has signed an agreement with Baku Shipyard for the project 38M crew boat high-speed craft designed by Shiptech in Singapore. SOCAR, the Azeri state oil company, has commissioned up to 10 of the vessels to transport personnel working offshore.

The vessels were to be built as part of the Azerbaijan state program for fleet renovation, with construction to start in April or May. RS specialists will review the design documentation of five ships under construction for compliance with its new requirements which apply to vessels not engaged in international voyages. Personnel carried by such ships must hold certificates of competence containing a statement of compliance with the Seafarers' Training, Certification, and Watchkeeping Code.

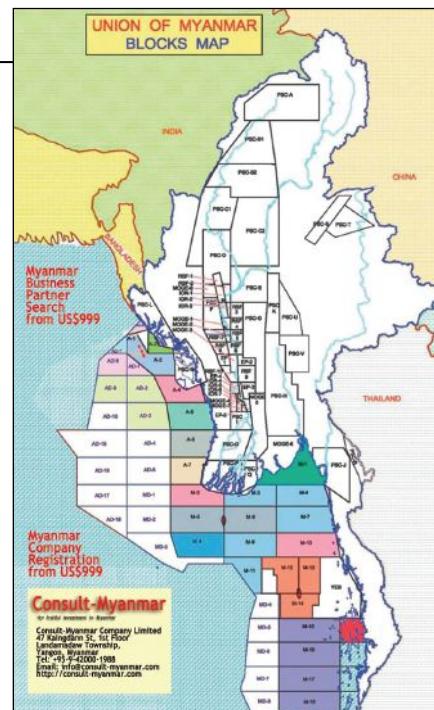
## Myanmar awards 20 offshore oil and gas exploration tenders

Myanmar has awarded tenders to explore for oil and gas in its 20 offshore blocks to international energy companies, including Royal Dutch Shell, ConocoPhillips and Total SA.

Myanmar Oil and Gas Enterprise (MOGE) and the Burmese Ministry of Energy put 30 offshore blocks up for bidding in April 2013, but out of the 61 international oil and gas firms pre-qualified, only 30 submitted formal proposals, and 20 have now been awarded with exploration rights for the blocks.

The final list of winners for both shallow and deep blocks also includes domestic Burmese energy companies such as BG Asia Pacific and Woodside Energy, who jointly won four blocks, according to International Business Times. Oil India, Mercator Petroleum and Oilmax Energy jointly won three blocks, while Italy's Eni Myanmar BV won two.

International winners of the tenders will be working with at least one local partner, according to the tender regulations. Winners will also be required to invest at least \$3 billion after production-sharing contracts are signed with MOGE, and the investment will entitle companies



to 30-year licenses to explore and produce oil and gas offshore Burma, according to the Myanmar Times.

"We are going to have detailed discussions with winning candidates for production sharing contracts," said U Pe Zin The Ministry of Energy's energy planning department director general. "Hopefully the contracts will be signed

within the next 3 months."

The offshore oil and gas industry earned the Burmese government \$1.5 billion in the 2014 fiscal year ending in February, according to government data, while oil and gas overall earned around \$4 billion in the same period.

## New Zealand launches 2014 Block Offer for oil and gas exploration

Energy and Resources Minister Simon Bridges has announced New Zealand's third annual block offer for petroleum exploration permits. Block Offer 2014 covers total acreage of 156,371 sq. mi.

Offshore release areas include the Reinga-Northland basin; the New Caledonia basin; the Taranaki basin; the Pegasus-East Coast basin; and the Canterbury and Great South basins.

Bidding closes on 25 September 2014. Permits are expected to be issued between December 2014 and March 2015.

The Petroleum Exploration and Production Association New Zealand has welcomed Block Offer 2014, saying that "the blocks offer...is really just the start of a lengthy process to establish whether these blocks have large quantities of oil and gas."



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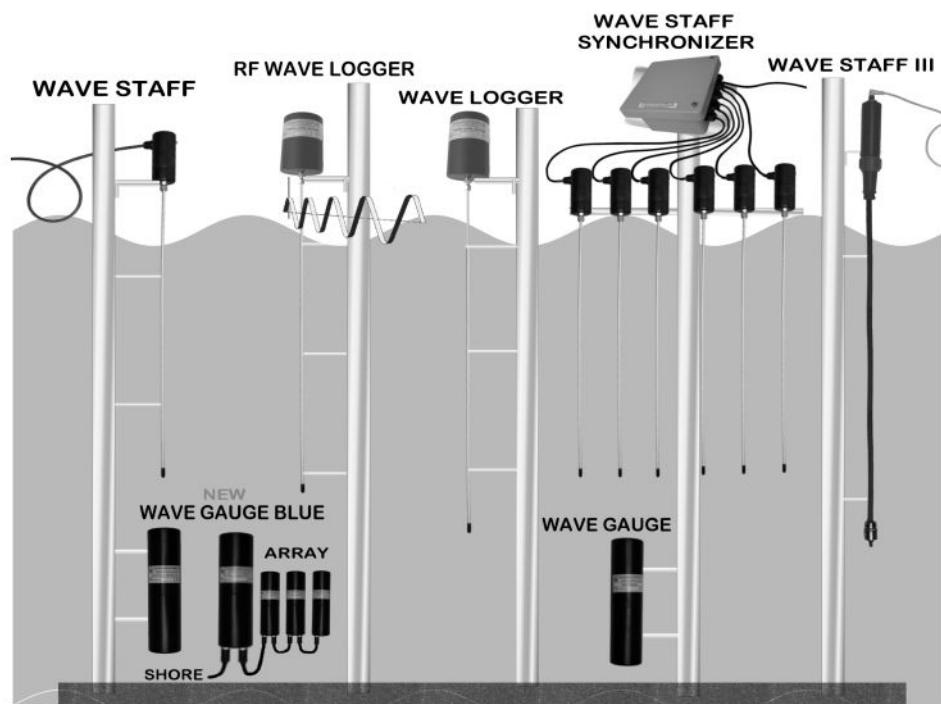
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**Concordia Maritime, Neste Oil sell jointly owned tankers**

Concordia Maritime and Finnish Neste Oil have reached an agreement on the sale of the two jointly owned Ice Class 1A panamax tankers, Stena Poseidon and Palva. The buyer is Transport Maritime St-Laurent Inc. and the tankers were expected to be delivered in April-May 2014. Stena Poseidon and Palva—length 228 m, beam 32 m, draft 12.2 m, deadweight 75,000 tons—were delivered from Brodosplit Shipyard in Split in 2007. Both vessels also have been signed to time charters with Neste Oil since 2007. “We are content to see this sale go through as it suits our strategic objective of focusing on our spot operated P-MAX fleet,” said Kim Ullman, chief executive officer of Concordia Maritime.



Maritime St-Laurent buying Poseidon (above) and Palva.

**WesternGeco, PGS win contracts for offshore seismic in Barents**

WesternGeco and PGS have won contracts from the Norwegian Ministry of Petroleum and Energy for seismic acquisition in the southeastern Barents Sea, covering blocks proposed for the 23rd concession round. In total, the surveys will cover 5,290 sq. mi.

Statoil is the operator for a project for joint acquisition of seismic 3D data from these areas, with 33 participating oil companies. The surveys, which will acquire the data in preparation for applications to the 23rd round, will begin in April and continue throughout the second and third quarters of 2014, with subsequent processing of data until the summer of 2015.

**Ophir Energy launches work on two frontier wells offshore Africa**

Ophir Energy has started drilling two deepwater frontier wells offshore West and East Africa. The drillship Titanium Explorer was drilling Affanga Deep-1 off Gabon, targeting an extension to the proven Ogooué Delta play with potential recoverable resources of 170 mmbbl. Planned depth is 14,764 ft. A success would de-risk various follow-on prospects that could be integrated into a hub development, according to Ophir.

Another drillship, Deepsea Metro 1, was drilling the Taachui prospect on the northwest margin of block 1 off Tanzania. The BG-operated well (Ophir has a 20% interest) is targeting potential recoverable resources of 1.4 tcf in Cretaceous reservoirs. Planned depth is around 13,287 ft.

**Statoil, ConocoPhillips team up for deepwater block offshore Myanmar**

Statoil was awarded operatorship of deepwater block AD-10 in the Bay of Bengal offshore Myanmar, in partnership with ConocoPhillips. The 3,475-sq. mi concession is 124 mi from the coast in water depths of around 6,562 ft. The partners will acquire new 2D seismic during the first 2.5-year study period, and then decide whether or not to enter a 3-year exploration term.

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West Linus on multi-year drilling program.

## Two more rigs mobilizing to Ekofisk area offshore Norway

ConocoPhillips Norge plans an intensive drilling program at the Greater Ekofisk Area in the southern Norwegian North Sea, according to the company.

The new wells are designed to sustain production from the Ekofisk and Eldfisk fields for several more decades.

This spring the newbuild West Linus will arrive at the Ekofisk Complex to start a multi-year drilling program at the Ekofisk 2/4 Z wellhead platform.

When the campaign is completed, 2/4 Z will have 35 production wells and one well for reinjection of drill cuttings.

On the neighboring wellhead platform Ekofisk 2/4M, the Rowan Norway will perform slot recovery on seven wells.

Mærsk Innovator is currently completing wells on the Ekofisk 2/4 V B seabed installation. This facility has eight water injection wells to maintain pressure in the reservoir. The same rig will start drilling production wells on Eldfisk 2/7 S later this year.

The 2/7 S platform has 40 well slots. So far the Maersk Gallant has drilled four production wells and one well for reinjection of drill cuttings.

Rowan Gorilla VI will also arrive in the spring to plug wells on Ekofisk 2/4 A, which was shut down last September following 39 years of oil production. In total, 23 wells will be plugged on the platform.

In addition, ConocoPhillips anticipates a busy activity period for two of the permanent platform drilling rigs, Ekofisk 2/4 X and 2/4 K.

## Kashagan offshore oilfield may fail to resume production in 2014

Kazakhstan's offshore oilfield Kashagan may not restart production in 2014 if test results reveal cracks in the offshore part of its pipeline network, according to Kazakh Oil and Gas Minister Uzakbai Karabalin.

The results are expected this month, although "suspicions have emerged" of microcracks in pipelines laid in the Caspian Sea, Karabalin told reporters. The recoverable reserves of the field are estimated at 9 to 13 Bbbl of oil.

In early October production was halted following the detection of gas leaks in the pipeline network. Asked when output could be restarted, Karabalin said: "It's impossible to say anything right now... because suspicions have emerged that there may be microcracks in the offshore stretch of the pipeline, as well."

He added that closer checks of "possible risks offshore" were hampered by ice melting in the shallow Caspian Sea, although he confirmed that checks must be completed in late May.

Harsh conditions, including sea ice during the winter and temperature variation, make the field one of the most challenging oil megaprojects.

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## Petrobras launches P-58 offshore platform operations in Campos basin

Petrobras has started platform P-58 production operations in the Parque das Baleias complex, off the coast of Espírito Santo state, in the Campos basin. In line with the company's 2014-2018 business and management plan, first production is through the well 7-BFR-7-ESS, a presalt reservoir producer.

P-58 is 53 mi off the coast, at a water depth of 4,593 ft. It is part of the North project of Parque das Baleias, which encompasses production from the Baleia Franca, Cachalote, Jubarte, Baleia Azul, and Baleia Anã fields.

In the upcoming months, 15 production wells (eight presalt and seven post-salt), along with nine injection wells, will be interconnected to P-58 through 155 mi of flexible pipelines and two subsea manifolds that transfer oil from the wells to the platform.

The FPSO can process 180,000 b/d of oil and 212 mmcf/d of natural gas. Shuttle tankers will carry oil from the platform, while a pipeline will transport natural gas to the Cacimbas gas treatment unit in the municipality of Linhares, in Espírito Santo state.

## Lundin Petroleum completes Johan Sverdrup appraisal wells drilling

Swedish company Lundin Petroleum has successfully completed drilling of the Johan Sverdrup appraisal wells 16/3-8 S and 16/3-8 S T2 in the eastern part of PL501 offshore Norway.

Appraisal well 16/3-8 S, which was drilled approximately 4 km southeast of the discovery well 16/2-6 and 3 km west of appraisal well 16/3-4, is located on the Avaldsnes High, in the eastern part of the Johan Sverdrup discovery.

The well was drilled in order to investigate the late Jurassic Draupne sandstone reservoir, as well as the Permian Zechstein carbonates' thickness and quality. According to the company, the well encountered an oil-filled reservoir comprising 13 m of late Jurassic Draupne sandstone with good reservoir quality and 67 m of Zechstein carbonates with variable, tight reservoir quality with oil shows. During the interval, a production test (DST) was performed and flowed at a rate of 4,900 b/d of oil through a 52 in./64 in. choke.

Based on the DST, it was revealed that some of the reservoir quality is found in the central area of the Avaldsnes High with a high permeability of 65 Darcy and no flow restrictions within a 3 to 4 km radius of investigation. The well was drilled to a total vertical depth of 2,010.5 m below MSL into sediments of Permian

age, while 16/3-8 S T2, a technical side-track, was drilled to investigate petrophysical properties in the reservoir.

"The test results from this well are as good as anything previously encountered on the Norwegian Continental Shelf," said Ashley Heppenstall, Lundin Petroleum president and chief executive officer.

Semi-submersible drilling rig Bredford Dolphin was used to drill the well. Lundin Norway operates PL501 with a 40% interest.

## Alfa Laval to acquire Norwegian offshore pumping group for \$2.17B

Swedish engineering group Alfa Laval has signed an agreement to acquire Norwegian marine and offshore pumping group Frank Mohn for \$2.17 billion. The acquisition will add a new portfolio to Alfa Laval's fluid handling portfolio pumping technology to its existing range of equipment. Upon closing of the transaction, Alfa Laval intends to include Frank Mohn and the product brand Framo in the marine and diesel division.

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The advertisement features a large image of the ocean with an oil rig in the distance. In the foreground, there is a piece of scientific equipment, possibly a rosette or CTD recorder, being deployed or recovered from the water.

## Crowley tugs deliver Tubular Bells topside



*Crowley's tug Ocean Wind completes delivery of Tubular Bells topside on Crowley barge 455 7 to SAIPEM S7000.*

Closely following the delivery of the Jack-St. Malo floater, Crowley has again demonstrated its petroleum industry support capabilities by providing ocean towing services for the Tubular Bells topside in the Gulf of Mexico for Saipem. Crowley participated in each of the major installations that took place in the U.S. Gulf in 2013 and year to date, 2014.

"We are proud of the consistent use of not only our new Ocean class tugs but also our faithful fleet of heavy lift barges and Invader class tugs," said Mike Rampolla, general manager of Crowley's solutions group. "As we've continued to flex the usage of our varied fleet and become more familiar with the advanced capabilities of our ocean class tugs in particular we, along with our customers, have gained an important level of comfort with their performance that keeps them in high demand job after job."

In the case of Tubular Bells, Crowley's Ocean class tug, Ocean Wind towed the production deck, while Invader class tug Pilot, towing barge Marmack 303, preceded with delivery of the construction deck. In both cases, the vessels took delivery of their cargo at the sea buoy—Cat Island Pass for Ocean Wind and Eugene Island for Pilot—before transiting the mammoth structures to Mississippi Canyon Block 725, roughly 135 mi southeast of New Orleans.

"The Ocean Wind was particularly suited for the Tubular Bells deck section tow out and lift due to its Dynamic Positioning (DP) capabilities, which are outstanding for station holding," said Ocean Wind Captain Ward Davis. "The Ocean

Wind was able to position and hold the barge alongside the SAIPEM 7000 semi-submersible crane and pipelaying vessel with light tension on the tow wire while they prepared for, and made the lift of the deck section."

Captain Steve Berschger of the Pilot praised the new ocean class equipment saying, "The ocean class boats with their DP capability eliminate the need for manual maneuvering which could sometimes go on for hours while being exposed to the elements. We are all very excited with the DP training we have received and are especially pleased with the way the ocean class vessels are performing. The invaders have also served us well and continue to do so, but Crowley knew it was time to upgrade the fleet and the ocean class vessels are a perfect fit for heavy-lift tow and maneuvering requirements."

Both captains also spoke highly of the training and work ethic of their crews in performing the job.

In addition to Captain Berschger, Pilot crew members included Chief Mate Ray Adams Jr; Second Mate Pat McLaughlin; Trainee Second Mate Steven Tonn; Chief Engineer Gary McNab; AB Preston Harper; AB Edward Rynn; and Cook David Zasadni.

The Ocean Wind crew consisted of Captain Davis; Captain Steven White; Chief Mate Scott Ellis; Second Mate Cecil Wilson; Chief Engineer David Fenton; Assistant Engineers Towanda Brown and James Murray; ABs Jonathan Solomon, Brooke English and Iker Urruchi; OS/Cook Stephen Goletz; and Third Mate Adam Beba.

Crowley's ocean class tugs are modern ocean towing twin-screw vessels with controllable pitch propellers (CPP) in nozzles, high-lift rudders and more than 147 MT bollard pull. The first two ocean class vessels, the Ocean Wave and Ocean Wind, are classed as Dynamic Positioning 1 (DP1) tugboats and are twin-screw, tugs with an overall length of 146 ft, beam of 46 ft, hull depth of 25 ft and design draft of 21 ft.

The second two tugs of the class, Ocean Sky and Ocean Sun, are classed as DP2 and are 10 ft longer. All four vessels are capable of rig moves, platform and floating production, storage and offloading (FPSO) unit tows, emergency response, salvage support and firefighting.

Tubular Bells is scheduled to begin production in 2014 and should peak in the range of 40,000 to 50,000 b/d of oil, with total estimated recoverable resources at more than 120 mmboe. Hess is the operator of the field and owns a 57.14% working interest. Chevron owns the remaining 42.86% interest.

### Technip wins Jangkrik subsea package off Indonesia

Technip awarded a subsea contract by Eni Muara Bakau BV (Eni), the operator of the Muara Bakau production-sharing contract (PSC), for the Jangkrik project in the Muara Bakau PSC working area, located 44 mi off the coast of Makassar Strait, Indonesia, at water depths ranging from 656 ft to 1,411 ft.

The contract covers the engineering, procurement, commissioning, and installation of 23 mi of flexible risers and flowlines with diameters ranging from 4 in. to 14 in., 121 mi of pipeline with diameter ranging from 4 in. to 24 in., and subsea equipment that includes mid-water arch and flowline end termination.

Technip will also carry out the installation of 32 mi of umbilicals, five manifolds, and seven subsea isolation valve structures and associated flying leads. Finally, the project also includes the engineering, procurement, and construction of an onshore receiving facility, including pig traps, metering systems, and utilities.

The flexible pipes will be manufactured at Technip's Asiaflex Products plant in Tanjung Langsat, Johor, Malaysia. Technip's S-Lay and heavy-lift vessel, G1201, and its multipurpose installation and construction vessel, the Deep Orient, will be used for the installation.

### EMAS gets subsea projects in Asia-Pacific, West Africa

EMAS has won subsea construction and offshore support contracts in Asia-Pacific and West Africa with a combined value exceeding \$125 million, including options. Following contract wins in January, EMAS AMC continued its momentum with subsea contracts awarded in West Africa and Asia, including a deepwater pipeline installation project in the South China Sea. The scope of work includes FPSO mooring repair work in West Africa, and in Asia, the installation of flowlines, associated pipeline end terminations, and spools in working water depths of up to 4,593 ft.

## Production begins from Peluang project in Indonesia

Australian oil and gas company Santos has commenced natural gas production from the Peluang gas project located offshore East Java in Indonesia. Located in the Madura Offshore production sharing contract, Peluang is a tie-back to the existing facilities at the Maleo gas field, sanctioned in February 2013.

According to the company, gas production commenced ahead of schedule and on budget at the project, which is expected to have gross peak production of 25 mmmscf per day. Peluang is the fourth operated asset for Santos in Southeast Asia. As operator of the Madura Offshore PSC, Santos holds a 67.5% interest while other partners include PC Madura and PT Petrogas Pantai Madura.

"We already have gas production from the Oyong, Wortel and Maleo fields in offshore East Java, so this builds on our capacity in the region," said Marjolijn Wajong, Santos Indonesia president. "Peluang also demonstrates our ability to deliver new projects in Indonesia."

## Cairn confirms heavy oil from JM-1 offshore well

Scottish oil and gas exploration and production company Cairn Energy has confirmed heavy oil from its Juby Maritime-1 (JM-1) well offshore Morocco. The company's operational update pertained to its 2014 exploration drilling campaign on the JM-1 well, where operations began in January 2014.

Cairn operates the JM-1 well and has a working interest of 37.5%. The company drilled the well, which reached a total depth of 3,711 m to evaluate Upper Jurassic and Middle Jurassic objectives, then plugged the well and abandoned it without testing.

## Petronas okays plan to proceed with Bentara field development

Petronas has approved BC Petroleum's plan for the initial development phase of the Bentara oil field in the Balai Cluster offshore eastern Malaysia.

Phase 1 will use the existing wellhead platform and two wells producing from Bentara-2 and Bentara-3 through the early production vessel Balai Mutiara.

According to BCP shareholder ROC Oil, production is expected to begin during second quarter of 2014 and average around 2,000 to 3,000 b/d, depending on weather and sea conditions.

Bentara is 175 km (109 mi) northwest of Bintulu in water depths of 60 to 70 m (197 to 229 ft).

ROC CEO Alan Linn said: "Approval for the initial phase of the Bentara oil development is a direct outcome of



the risk managed and staged pre development approach implemented by BCP to appraise and accelerate oil production from the Balai Cluster."

"In the process, we have also identified additional potential within the cluster area and will be proposing further study and appraisal activity in support of the next stage of potential development from Bentara and associated fields."

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First Subsea's pipeline contingency tool.

### First Subsea to supply pipeline recovery tool for LNG project

Saipem Portugal Comercio Maritomo Sociedade Unipresso has awarded a contract to First Subsea for supplying a 42-in. pipeline recovery tool (PRT) for the gas export pipeline on the Ichthys LNG project.

The project, a joint venture between Inpex group companies, Total and the Australian subsidiaries of Tokyo Gas, Osaka Gas, Chubu Electric Power and Toho Gas, is located in the Browse basin offshore western Australia.

Claimed to be the UK-based First

Subsea's largest modular PRT, the contingency tool features a twin seal dewatering system, check valve, pig catcher, pig signaler and an ROV deployment arm. According to the company, the LNG project is operated by INPEX and includes an offshore central processing facility (CPF), as well as a floating production storage and offloading facility. The FPSO is located in the field with various satellite manifolds and subsea wells tied back to the CPF.

In water depths of up to 275 m, Saipem is installing 889 km of 42-in. diameter subsea pipeline, connecting the CPF to an onshore processing facility located in Darwin.

### Baker Hughes acquires software technology company Perfomix

Oilfield service company Baker Hughes Inc. has acquired Perfomix, Inc., a Texas-based oilfield software technology company focused on solutions to enhance oil and gas operations' performance. Perfomix will operate as a wholly-owned subsidiary of Baker Hughes and will be integrated into the company's remote operations services organization.

Perfomix offers a data and advisory services delivery platform to support

drilling, pressure pumping, completions and production operations, and regulatory reporting requirements. The addition of Perfomix will expand the Baker Hughes portfolio of field devices integration, real-time data management, visualization, and analytics software, thus complementing existing capabilities with a modern, elastically scalable and standards-based technology platform.

### Energy XXI agrees to buy all of EPL Oil & Gas shares for \$2.3B

Energy XXI has agreed to acquire for \$2.3 billion all outstanding shares of EPL Oil & Gas Inc. This will give Energy XXI production of about 65,000 boe per day, 70% of which is oil. EPL owns working interests in 37 producing fields on the Gulf of Mexico shelf, mainly in nine producing areas: an estimated 91% of proved reserves, 88% of production, and 91% of revenues are associated with the Ship Shoal, East Bay, South Timbalier, South Pass 78 and 49, West Delta, Main Pass, Eugene Island and South Marsh complexes. EPL operates 90% of its properties, by reserves, similar to Energy XXI's 94%. The deal makes Energy XXI the largest public independent producer on the shelf.

## G-882 TVG - TransVerse Gradiometer Marine Magnetic Survey System

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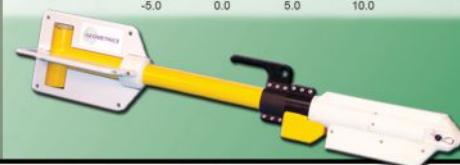
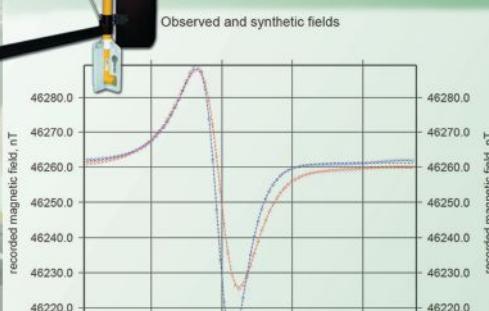
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## Wärtsilä to deliver VIEC systems for three North Sea oilfields

Lifecycle power solutions provider Wärtsilä will deliver its Vessel Internal Electrostatic Coalescer (VIEC) systems for three North Sea oilfields, as part of contracts signed with Norway-based Aker Midsund.

The systems, which are claimed to improve the speed and efficiency of the separation process of oil and water onboard, were scheduled for delivery between April and August. Wärtsilä will deliver VIEC to be used at North Sea's Gina Krog, Mariner and Ivar Aasen oil fields.

For all three offshore projects, Aker Midsund is the separation package supplier towards the EPC contract holders.

In each project, Wärtsilä will supply a complete VIEC system with all required elements, all vessel internal cabling and tubing, penetrators and stainless steel frames and supports, including power distribution.

The systems will also enable the improvement of the quality of oil and water.



*The Vessel Internal Electrostatic Coalescer*

"Wärtsilä continues to actively develop new and innovative products to make oil and water separation more efficient, cost-effective and environmentally safe," said Tore Lunde, Wärtsilä gas solutions director.

"The Wärtsilä VIEC technology offers a wide range of benefits, particularly in the lowering of both capital and operating expenditures," he said. "The systems will also enable

the improvement of the quality of oil and water."

According to Wärtsilä, its VIEC system breaks the emulsion without excessive use of chemicals or heat, resulting in the increase of production, lowering of costs and promotion of environmental sustainability.

Electrostatic coalescer technology had been unavailable for use in inlet separators, prior to the development of the VIEC.

## AWE wins exploration permit offshore

### Western Australia

AWE has secured a new exploration permit in offshore Western Australia as part of the Australia 2013 Offshore Petroleum Exploration Acreage Release. The new WA-497-P permit, formerly known a release area W13-18, covers an area of 560 sq. km in water depths ranging from 150 m to 500 m. Located in the Exmouth Sub-basin of the North Carnarvon basin, the permit is next to the producing Pyrenees, Vincent and Coniston oilfields and north of the Macedon Gas field. AWE holds 100% equity in the 6 year exploration permit WA-497-P, and will be the operator.

The company has proposed to reprocess existing permit-wide 3D seismic data in the first year using new technology. AWE exploration and geoscience general manager Neil Tupper said in the permit area's initial review, the company has identified a new play concept in addition to the proven plays in adjacent permits.

"Exploration permit WA-497-P contains a number of interesting prospects that complement AWE's strength's in subsurface appraisal and early stage development," Tupper said. The company has been growing its base of exploration and early stage appraisal assets.

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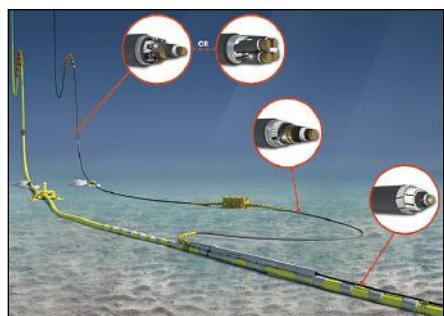
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Nexans' DEH cable system.

### Nexans to install \$137M DEH cable system at Shah Deniz field

Nexans has signed a contract worth \$137 million with BP to install direct electrical heating (DEH) cable systems at BP's Shah Deniz field, located in the Azerbaijan sector of the Caspian Sea.

As part of the DEH project, Nexans will deliver a total of 130 km of the cable system to provide flow assurance for a total of 10 subsea flow lines. Nexans will design, engineer and manufacture the DEH systems, including riser cables, piggy back cables and accessories, at its subsea cable and umbilicals facility in Halden, Norway.

The systems include an integrated

protection system (IPS) to protect the piggy back cables against damage after installation on the seafloor.

According to Nexans, the first and second system will be delivered in July 2014 and June 2016, respectively.

"This contract forms part of the 10-year frame agreement Nexans concluded with BP to supply umbilical cables, DEH systems, accessories and services for various deep-water oil and gas projects across the globe," said Krister Granlie, Nexans Norway hybrid underwater cables division vice-president.

"It represents further recognition of the key role that our state-of-the-art DEH technology can play in providing reliable and environmentally friendly flow assurance. We have already performed several pre-studies in cooperation with BP regarding the application of DEH systems across the Shah Deniz field."

DEH technology for flow assurance has been developed to safeguard well-stream flow through the pipeline to the platform. Alternating current (AC) transmitted from the DEH cable runs through the steel in the pipe, which heats up due to its own electrical resistance allowing the pipeline to be operated in an environmentally safe manner.

### Hybrid engine helps drillers reduce fuel costs: FlexGen Power Systems

At a plant east of downtown Houston, Texas, a North Carolina company is building hybrid power systems for oil rigs.

The systems are designed to hook up to normal generators used in the oil field, and charge while the generators are working, according to FlexGen Power Systems, which designed the systems and is building them with Amerimex Motors & Controls in Houston.

The systems load electricity into solid-state storage devices called ultracapacitors that are different from batteries, providing short-term storage of up to 1.2 MW of capacity, said Josh Prueher, chief executive officer of FlexGen.

The systems can cut down fuel use about 15%, and are meant to be used with either natural gas or diesel-powered generators, said Jeff Juergens, director of FlexGen's oil and gas business.

Oilfield generators burn enormous quantities of fuel, especially when engines need bursts of power for such tasks as pulling miles of pipe from a well. The result is a sudden jump in the work rate and a lot of wasted generator fuel, according to the company.



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- JUNE 10TH - 12TH
- JUNE 18TH - 19TH

- ACAPULCO, MEXICO
- SOUTHAMPTON, UK
- BERGEN, NORWAY

- BOOTH #907
- BOOTH #R7
- BOOTH #40

## Swissco to acquire Scott and English Energy in \$225M deal

Singapore offshore services provider Swissco has proposed acquisition of Scott and English Energy, a wholly owned subsidiary of Double Dragon Energy, in a bid to venture into the offshore rig chartering business.

The company has entered into a heads of agreement (HoA), worth approximately \$225 million, with Double Dragon, which will form the basis of the sale and purchase agreement for the entire issued and paid-up share capital in Scott and English.

According to Swissco, the company's latest move in the offshore oil and gas exploration and production sector will lead to a diversification of its fleet business, while representing an investment for long-term growth.

The group expects to obtain potential operational synergies, as well as benefit from the stable and recurring income base arising from the acquisition, which is also set to increase its market capitalization.

In order to fuel its future growth, Scott and English proposes to acquire additional rigs either through majority ownership or by forming joint-venture partnerships with companies.

## Ownership of Seadrill Ltd.'s West Auriga drillship to change hands

Seadrill Ltd. has agreed to sell the West Auriga drillship to Seadrill Capricorn Holdings for \$1.24 billion, less \$443.1 million outstanding under the facility related to the West Auriga.

The drillship is a sixth generation, dynamically positioned vessel delivered from the Samsung shipyard to its current customer, BP, in October 2013.

The West Auriga is expected to carry out operations in the U.S. Gulf of Mexico until the end of its contract in October 2020 at a dayrate of \$565,000, excluding about \$37,500 per day payable by the customer over the term of the contract relating to mobilization, variation orders, and other special and standby rates.

Capricorn Holdings is owned 51% by Seadrill Partners.

## Sun European buys Transocean drilling management subsidiary

Sun European Partners has acquired well design, construction, and completion specialist Applied Drilling Technology International (ADTI) from Transocean.

ADTI, which was established in the UK in 1991, has since managed around 370 wells and 180 completions offshore northwest Europe, mostly on the UK continental shelf.

It employs team that allows oil company clients to outsource their entire offshore drilling and completion operations.

ADTI has five business segments: Turnkey Drilling, Turnkey Completion, Project Management, Decommissioning and Well Engineering Studies. Clients include Hess, Tullow Oil, Summit Petroleum, Premier, Sterling Resources, Ithaca Energy, GDF Suez, and Xcite Energy.

## Chariot nabs stake in Mohammedia Reconnaissance license, Morocco

Chariot Oil & Gas Investments (Morocco), a wholly-owned subsidiary of Chariot Oil & Gas, has secured a 75% interest and operatorship of the Mohammedia Reconnaissance license offshore Morocco. The company secured the interest in partnership with the Office National des Hydrocarbures et des Mines (ONHYM), which holds a 25% carried interest.

According to Chariot Oil & Gas, the licence area, covering approximately 4,600 sq. km with water depths less than 500 m, is located adjacent to its Loukos and Rabat Deep licences. In order to conduct a single 3D seismic program of about 1,700 sq. km across all three of its Moroccan licence areas using the Sanco Swift vessel, Chariot Oil & Gas has contracted Dolphin Geophysical.

The company's total offshore Morocco acreage will stand at more than 16,500 km<sup>2</sup>. The program was scheduled to commence early April 2014 and the survey will consist of ~1,075 sq. km in Rabat Deep, ~250 sq. km in Loukos Offshore, and ~375 sq. km in Mohammedia Reconnaissance. The combined survey's objective is to mature drillable prospects in the Mio-Pliocene and Jurassic plays.

## Hungary's MOL acquires North Sea assets from Wintershall for \$375M

Hungary-based oil and gas company MOL has closed its previously announced deal with German BASF Group member Wintershall and acquired offshore assets with 14 licenses in the North Sea for \$375 million. Under the share purchase agreements signed with Wintershall on 12 December 2013, MOL has acquired offshore assets on the UK Continental Shelf.

According to MOL, the portfolio includes non-operated equity stakes in the Broom (29%), Catcher (20%), Cladhan (33.5%), Scolty and Crathes fields (50%).

Wintershall's equity share in Sullom Voe Terminal and Brent Pipeline System's infrastructure assets were also part of the deal. MOL Group E&P execu-

tive vice president Alexander Dodds said the North Sea is a "very attractive" area, and MOL will continue to develop its presence in the region.

"We intend to take part in upcoming licensing bid rounds and aim to become operators ourselves," he said.

The deal, which is said to be of strategic value for MOL, provides the company with an opportunity to acquire a foothold in the attractive North Sea area.

In December, the companies also signed a strategic cooperation memorandum to develop their partnership and pursue E&P opportunities in both the North Sea and the Middle East region jointly. Recently, MOL opened an office in Aberdeen in a bid to support its operations and its future expansion in the region.

## Rosneft, GE form engineering partnership with two centers

Rosneft and General Electric have signed an agreement to form a series of joint ventures, according to the companies. Under a first phase they said they would establish two specialized centers.

The Application and Engineering Center will focus on development of Rosneft projects through the application of GE Oil & Gas products and technologies, the companies added.

Goals include concept selection and support for front-end engineering and design (FEED) work for oil and gas projects, and providing training on application engineering and other technical topics to enhance the capabilities of Rosneft engineers and technical managers.

The center's focus will be on the development of gas sales solutions such as LNG and CNG, power generation, production enhancement including artificial offshore lift technologies, and subsea equipment, the companies said.

Priorities of the Research and Development (R&D) Center will be gas monetization activities, including GTL technologies and new polymers; offshore and subsea projects, including development of low temperature materials; and production enhancement.

Rosneft and General Electric said they will initially contribute \$20 million to the two centers, with additional financing of up to \$50 million to follow for specified projects. Between now and 2020 the partners aim to jointly invest up to \$400 million in the centers.

One of Rosneft's goals is to enhance its Arctic and offshore shelf projects by implementing the most advanced and safe technologies.

## Sonardyne launches modern Field Evaluation Program

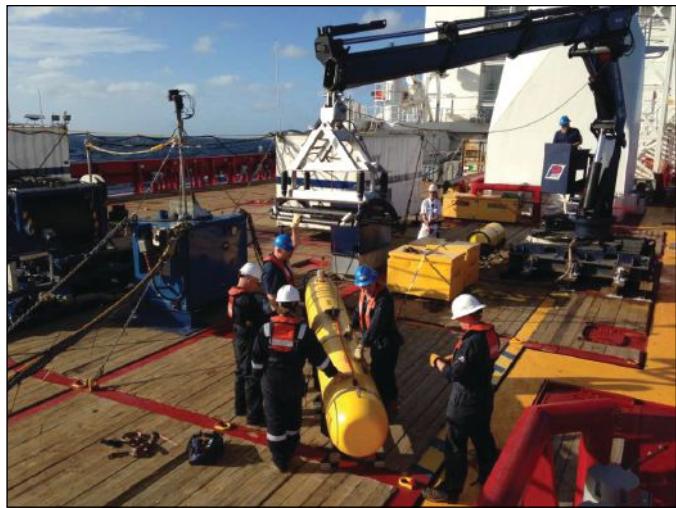
Sonardyne International Ltd. has announced that it is inviting qualifying academic establishments and research institutions to apply to participate in a Field Evaluation Program for its new family of acoustic modems, uComm. Applicants with an upcoming, short-term ocean science project that would benefit from an underwater modem are invited to submit details to Sonardyne. If selected, the UK-based company will provide a pair of uComm modems on loan for the project's duration. uComm is a simple to use underwater modem that when deployed, intelligently senses its environment and adapts its configuration to ensure data is transferred in each direction as fast, as reliably and as energy efficiently as possible. uComm can be used in pairs with a single subsea unit communicating with a topside unit, or multiple subsea units reporting to a single topside unit. Subsea and topside units are identical and can be configured in either role. uComm's extensive feature list, together with attractive pricing, is expected to generate considerable interest. "We are looking for qualifying organizations to work with us to ensure uComm is put to the test in as many different operational scenarios as possible," explained Stephen Fasham, a global business manager at Sonardyne. "Applicants can sign-up during Oceanology or after the show via the Sonardyne website. The most interesting projects will receive a pair of uComm units on loan for an agreed period during which time, participants will be invited to give us feedback on the technology's performance. Our aim is to ensure that novice or expert users alike achieve success with their uComms straight out the box." For more information about uComm and the Field Evaluation Program, visit [www.sonardyne.com](http://www.sonardyne.com).

## Osiris Marine Services completes world's first commercial nitrox diver training course

Osiris Marine Services, a division of James Fisher and Sons plc, has completed the world's first commercial Nitrox diver training at the Underwater Centre, Fort William. As the first commercial diving company to undertake this course, Osiris continues to demonstrate its commitment to health and safety. The course, written by The Underwater Centre with consultant support from James Ridgeway, offshore manager at Osiris, trains divers in the use of Enriched Air Nitrox in an offshore commercial application. The pilot course was taught by James Ridgeway who will continue to support the Nitrox course's development as a consultant. With divers certified to international Nitrox standards, Osiris is able to provide customers with additional assurance in its offshore capabilities and deliver a competent Nitrox diving team to any global location. Osiris' general diving manager Kevin Hood added: "This training gives our team a good all-round understanding of diving on Nitrox, to a standard which meets industry approval and will also provide divers with clarification due to a lack of previous lack of specific training." Osiris has also recently invested in an offshore Nitrox diving system which complies with the most stringent of international standards, allowing its divers to spend longer at shallower depths and reduces the risk of decompression illness. This investment within its core diving and ROV capability means Osiris continues to develop its position as a complete solutions provider for the global offshore industry. "With the coming together of offshore wind and offshore activities in general, being the first to undertake this course, as well as our Nitrox system investment, ensures Osiris can meet all expectations of current and future offshore clients," explains Aiden West, managing director of Osiris.



## Artemis AUV searches for Malaysia Airlines flight 370



Phoenix International Holdings, Inc. has mobilized its 4,500 m depth capable AUV "Artemis" and the U.S. Navy Towed Pinger Locator (TPL-25) system onboard Australian Defense Vessel (ADV) Ocean Shield. Phoenix is part of a multinational team assisting in the search for the lost Malaysia Airlines (MH370) aircraft. Phoenix is supporting the U.S. Navy's participation in this effort under its multi-year Undersea Operations contract with the Naval Sea Systems Command's Office of the Supervisor of Salvage and Diving.

Using the TPL-25, signals (pings) thought to belong to the emergency locator beacons (ELB) on the flight data and cockpit voice recorders were heard near a suspected location of MH370. This location was identified by signal analysis of the Inmarsat satellite's last partial handshake with the aircraft. The ELB signals were detected on four occasions but for short periods of time only. Ping detections then ceased before stopping presumably because the batteries on the ELBs expired.

The search then resumed using the Phoenix Artemis AUV System. Artemis is currently conducting side scan sonar surveys in water depths up to 4,500 m of seawater. Once launched over the side of the Ocean Shield, it takes approximately 2.5 hrs for Artemis to reach the seafloor. There, she flies 45 m above the seafloor on a search pattern designed to assure 100% coverage of the search area. Scanning with an EdgeTech 2200-M side scan sonar operating at 120 kHz, the AUV can map 1 sq. km per hr, for about 16 hrs before taking the 1.5 hr trip back to the surface where it is recovered.

Once back on deck, the analysis of the side scan data commences. The data is downloaded through an Ethernet connection on the AUV's main electronic housing to the post-mission analysis computer. The data is then processed using special software and displayed for investigators. Geo-referenced targets of interest are marked, measured, catalogued, and prioritized for further action and classified from strong to weak prospects depending on size, shape, shadow, and surrounding terrain. Meanwhile, the nine depleted 1.5 kWh batteries are removed from the AUV and replaced with a charged set ready for the next mission.

In order to positively identify any targets of interest, the AUV is subsequently sent down with its hi-resolution camera payload to take detailed photographs for analysis back on deck.

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

## Kongsberg GeoAcoustics delivers 200th GeoSwath Plus

Kongsberg GeoAcoustics delivered the 200th GeoSwath Plus on Kongsberg Maritime's 200th anniversary to the Canadian Hydrographic Service. The Canadian Hydrographic Service uses its GeoSwath Plus systems for shallow water mapping when a high rate of coverage is required. According to Ken Halcro, hydrographer in charge, the GeoSwath Plus is part of the Canadian Hydrographic Service's plan to reduce the unknown areas now portrayed as grey or white zones on Canadian hydrographic products.

The GeoSwath Plus is capable of covering an area of 12 x the depth of the water in areas that are not always accessible using other systems. The design of the GeoSwath Plus's rugged transducers and the high quality data that it produces makes it the logical choice in the wave zone when occasional "physical soundings" may occur.

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

## Global AUV fleet to increase 42% by 2018

Douglas-Westwood (DW) forecast that the global AUV fleet will increase 42% in the 2014-2018 period, compared to the previous 5 years. The fleet is forecast to total 825 units in 2018, led by strong demand in the military sector.

The military sector makes up 50% of AUV demand, with North America accounting for 75% of this market in 2014. However, this market share may decrease to 70% by 2018, as emerging economies increasingly invest in their military fleets. Overall growth of military demand in AUVs closely mirrors the investment in unmanned aircraft—so called 'drones.'

Increasing environmental awareness continues to drive demand for use of AUVs on research activities, with environmental sensing and research mapping combined forming approximately 47% of the current AUV fleet. However, the research sector may represent a smaller proportion of the market by 2018, as commercial activities gain pace.

Highest growth is expected to come from the commercial sector, but from a small base, more than doubling its proportion of active units during the forecast period (from 3% to 8%). Key developments have taken place in areas such as sensing, battery endurance and tracking stability, which allow a wide range of applications to emerge in the

offshore oil & gas industry (life-of-field, pipeline inspections and rig moves) also in civil hydrography, in addition to existing work in site and pipeline route surveys.

North America will continue to dominate global AUV expenditure, predominantly on military unmanned technology, although the region's market share is forecast to decrease from 64% in 2014 to 60% by 2018. Africa and Latin America are set to experience the high-

est growth, driven by deepwater oil & gas activities in pre-salt areas. Demand in Asia will be varied with research activities in Japan, deepwater expenditure in India, Indonesia and Malaysia and military investment in China.

DW's 5th edition of the AUV Market Forecast covers all key commercial themes relevant to players across the value chain in all AUV sectors.

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

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## Seabee divers from UCT2 in Diego Garcia

Seabee Divers from Underwater Construction Team (UCT) 2's Construction Diving Detachment Charlie (CDD/C) spent February deployed to Naval Support Facility (NSF) Diego Garcia to inspect, maintain and repair fleet moorings and offshore hydro-acoustic cables in the Indian Ocean. These waterfront facilities provide vital support to U.S. and allied operations in the region.

Shortly after arriving on two C-130s with more than 40,000 pounds of diving and support equipment 12 members of CDD/C began conducting diving operations, inspecting two fleet mooring buoys in support of 6th Fleet operations in the Indian Ocean.

During inspections, divers utilized specialized tools to measure chain links identifying and documenting excessive wear.

Seabee divers also replaced more than 150 sacrificial zinc anodes that provide cathodic (corrosion) protection, extending the life span and serviceability of fleet moorings.

In support of future fleet mooring installations members of CDD/C conducted work unique to Seabee divers,



collecting hydrographic and geotechnical survey data. They used underwater hydraulics to operate a rapid penetration test (RPT) unit to drive steel rods at measured intervals in over 80 ft of seawater (FSW). The amount of time it takes to penetrate 2-ft increments is recorded, along with torque measurements at the end of each rod. Engineers from the Naval Facilities Engineering Command will use these data to design mooring solutions based on bottom type and density.

The final task divers from UCT 2 had to complete was the inspection and repair of two Hydro-acoustic Data Acquisition System (HDAS) cables located outside of a lagoon on North of the island. The cables start from the shore and extend to 110 ft of seawater until they plunge to the ocean floor 600 ft below the crystal clear water of the Indian Ocean.

## Saving coral reefs – one shipwreck at a time

In the summer of 1991, a 121-ft long Taiwanese long line fishing vessel, the Hui Feng #1, ran aground on an atoll in the middle of the Pacific. With a footprint of just 4.6 sq. mi Palmyra Atoll forms the most northern vegetated island in the Northern Line Islands, lying some 1,000 mi south of Honolulu. The atoll is a national monument and wildlife refuge, cooperatively managed by the U.S. Fish & Wildlife Service (USFWS) and The Nature Conservancy.

Palmyra Atoll encompasses some of the last remaining near-pristine reef environment on earth, boasting an intact marine predator-dominated marine ecosystem where species' richness and diversity abound, with over 176 species of hard coral and 418 species of reef fish. Through monitoring of the reefs, a slow and insidious destruction was identified by the Hui Feng #1 and the other wrecks deteriorating on Palmyra and Kingman Reef.

At Palmyra the problem lay in a native marine organism called coral-limorph that was effectively smothering the corals surrounding the wreck. Researchers have made observations over several years that showed the spread of the organism progressively increasing due to the leaching of iron into the environment as the wreck corroded serving as a fertilizer of sorts. At Kingman the problem was not coral-limorph, but an invasive form of algae feeding off nutrients released from the dissolving wreckage of a burned fishing vessel.

In September of 2012, the U.S. Fish & Wildlife Service's issued an RFP for the removal of the two wrecks from Palmyra Atoll and Kingman Reef. Global Diving & Salvage, Inc. reached out to Curtin Maritime, frequent partners in unique and challenging projects, to collaborate on this. Several factors were fundamental in the planning process: the safety of personnel and equipment, followed closely by mitigating the potential of further damage to the extremely delicate living coral and reef structure. Working together a creative plan was developed to remove the wreckage from the inner-tidal areas. Flat deck scows were designed and built with shallow draft to transit the debris across the coral reef areas to the main barge that provided logistical support and housing for the project.

In total, the combined crew of 12 worked 79 days with 880 hrs spent underwater to cut, rig and remove over 970,000 lbs of steel and debris, as well as 605 gal of hydrocarbons.

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

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## Seatrionics impress Expo visitors with Predator and SeeTrack CoPilot demo

SeeByte, the global leader in creating smart software for unmanned maritime systems, and Seatronics, world leader in the rental and sale of marine electronic equipment, successfully demonstrated the fruits of their collaboration at this year's Oceanology International Exhibition in London.

Having announced their partnership in July last year, SeeByte and Seatronics have been working together to bring SeeByte's software control capabilities to the Seatronics Predator ROV. Having successfully integrated and demonstrated SeeTrack CoPilot at trials in Florida earlier in the year, Seatronics took the system to Oceanology International, where they wowed visitors with daily demos of SeeTrack CoPilot's advanced control capabilities.

"We were eager to demonstrate what an advanced piece of equipment the Predator is when paired with CoPilot," commented Adil Ali of Seatronics. "By running through the software flight modes with ease in front of hourly audiences, I personally feel we've proven that this piece of hardware is now game-changing in the marketplace."

Ioseba Tena, Sales Manager at SeeByte also said: "The feedback we received at Oceanology from the Seatronics demo was fantastic. We worked closely with the team in Aberdeen to ensure they received our full support leading up to the event, but on the days of the demo SeeByte had no involvement, and I think that allowed SeeTrack CoPilot's capability to speak for itself. The software ran perfectly and showed the proficiencies of the Predator ROV to the fullest."

SeeTrack CoPilot is the worlds 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).

## Smart Cougar leaps from platform to pipeline

An ROV able to work at both platform and pipeline—and handle many different projects—attracted CCC (Underwater Engineering) to the Saab Seaeye Cougar XTi, fitted with the iCON intelligent control system.

Won over by its versatility, CCC's ROV manager, Tavis Letherby, says it gives them one vehicle for both scopes



of work—and one that can cope with the different demands placed on vehicle and pilot when operating on either platforms or pipelines.

"It is the particular blend of compact size, six powerful SMX thrusters and intelligent iCON control system that makes such versatility possible."

"Pipeline operations use a plethora of kit that makes intensive demands on the ROV," he explains, "whereas platform work makes greater demands on the pilot."

"During platform work the small size of the Cougar and its manoeuvrability, even in strong currents, makes it easy to fly inside and around structures."

"The pilot also needs more information during complex manoeuvres, which is provided in simple form through the

intuitive iCON system," he says.

Another appealing factor is that faults are easily identified through the diagnostic nature of iCON which makes it is possible to isolate failed components and avoids bringing the vehicle to the surface to keep the ROV working.

In addition to incorporating the iCON control system into their Cougar, CCC has additional cameras including a Seaeye wide-angle low-light camera, Kongsberg color zoom camera and a rear-facing camera.

A Tritech Super SeaKing sonar is also included along with a dual five-function manipulator, wheeled skid with camera booms and cameras, and a tether management system.

This sale follows the earlier addition to Abu Dhabi-based CCC's fleet of a Saab Seaeye Panther XT Plus electric work ROV.

The Cougar is a proven and reliable concept that is designed to undertake light work jobs, observation and survey tasks and carry a wide variety of sensors, ancillary equipment and tooling while working in strong currents and in tight places. Its small footprint on deck also cuts costs.

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

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## EMC awarded contract from Brazilian Navy for maritime VSAT services

Emerging Markets Communications (EMC) has been awarded a contract from the Brazilian Navy (Marinha do Brasil) to provide VSAT satellite connectivity services for the entire Brazilian Navy Fleet. EMC will deliver services using its Global Ku-Band network, allowing seamless roaming across undefined routes in varying satellite beams. This unique satellite communications service incorporates EMC's Satlink technology and enables high speed, secure Wi-fi, VoIP, video conferencing, and real time management, supported by EMC engineers and Global Operations Center, available 24 hours, 7 days per week. EMC's maritime solution for the Marinha do Brasil includes satellite capacity from its Ku-Band network and its proprietary industry-leading SatLink® 2900 Mobile modems. EMC's Ku-Band network provides seamless coverage for global roaming across varying satellite beams, which allows for travel across undefined routes while maintaining connectivity at a rate of 99% SLA. In addition, EMC has provided a dedicated, private IP network for increased security across the network. EMC's solutions for maritime applications provide all the benefits of a carrier-class network for traditional ISPs and telecom carriers. Using products with high-availability and excellent throughput, such as EMC's own SatLink® line, plus renowned 24x7 customer support, EMC provides secure networking necessary for the voice, data, and corporate communication needs of the maritime industry. SatLink VSATs are in place on thousands of vessels today with support for global roaming across many satellite beams serviced by many different EMC Hubs installed around the world.

## MTN expands network in Southeast Asia and Oceania regions

MTN Communications (MTN) announces its expansion of the world's most powerful maritime and remote broadband communications network in yet another key region through an agreement with NewSat. The agreement between MTN and NewSat considerably enhances the satellite coverage and throughput for MTN customers in Southeast Asia and Oceania. The agreement extends C- and Ku-band satellite coverage in these regions now, and puts MTN in a strategic position for future service launches, including Ka-band. Between 2008 and 2013, MTN managed a six-fold increase in satellite bandwidth requirements for Internet, content and voice usage on vessels, aircraft and vehicles. Internet logins on the MTN network more than doubled to almost 33 million per year. Voice communications increased approximately 50%. For more than three decades, MTN has been a communications industry pioneer. The MTN history of innovation started more than three decades ago by delivering the first live video broadcasts at sea on both above-and-below water vessels for the U.S. Government. Since then, MTN delivered the first live video broadcasts and the first Internet cafes on cruise ships. In addition, MTN launched the first hybrid satellite and terrestrial broadband communications network as part of an ecosystem of advanced computing solutions to deliver a transformative, land-like experience at sea.

## DX-64 Systems installed along Danube to manage vessel communications

In collaboration with Transas, Omnitronics has recently deployed a number of DX-64 Radio Management Systems to manage voice communications across the 700 km+ length of the Danube River in Romania. To meet these large communication requirements, a network of radio operator positions and remote repeater sites were integrated across a vast geographic region using IP. The DX-64's were integrated with Transas' ATIS (Automatic Transmitter Identification System), and include advanced automatic failover measures for remote operators and a customized voting solution. Simon Baldacchio, regional business development manager, shore based systems from Transas has stated, "On behalf of the Transas project team I would like to thank Omnitronics for delivering a state-of-the-art VHF Management solution for Romania RIS project; a solution specifically designed to meet particular requirements of inland navigation. Omnitronics have once again shown that they are a top-end provider for such solutions by delivering the solution in very strict deadlines while being flexible to adapt to the needs."

## Orolia, Transas sign partnership to offer e-maritime solutions

Orolia and Transas Group have signed a Memorandum of Understanding whereby they will jointly develop new solutions to address the maritime industry's need for high-end e-maritime systems that integrate the latest in Maritime Domain Awareness (MDA) and Search and Rescue (SAR) functionality.

Under the terms of the agreement, the two groups will leverage complementary products, state-of-the-art technologies and in-depth expertise in vessel management, asset protection and emergency response to create innovative solutions that continue to save lives and improve operations. Orolia, through its McMurdo Group, provides one of the industry's most comprehensive ecosystems of SAR and MDA technologies including distress beacons, satellite communications infrastructure, emergency and surveillance operations control centers and fleet management software. Transas has established itself as one of the world's leading e-maritime innovators covering the design and implementation of integrated navigational solutions, virtual modeling and augmented reality.

While the partnership includes short-term business cooperation initiatives such as sharing product portfolios for broader solution offerings and leveraging sales channels for wider global reach, the primary focus of the agreement is on joint market and solution development for the maritime industry including:

- Creating Advanced SAR-enhanced MDA Systems. Adding McMurdo Group's proven beacon technology and COSPAS-SARSAT/MESOAR satellite-based solutions (including mission control and rescue coordination centers) to Transas' world-leading vessel traffic management, training and 3D simulation systems can result in higher levels of navigational and safety proficiency. These new offerings will fully integrate emergency preparedness, risk detection, crisis response and emergency operations for activities such as commercial fishing, illegal immigration control and arctic navigation.

- Developing Innovative Coastal Surveillance and Port Management Systems. Augmenting Transas' widely-deployed coastal surveillance and port management offerings with McMurdo Group's advanced threat detection and web-based fleet management technologies can deliver safer, more secure and efficient solutions for sectors such as port operations, inland waterways, oil and gas, renewable energy and border security.

For more information, visit <http://www.orolia.com>.



## Globecom, Future Care create 'Virtual ER' for Seafarers

Future Care, Inc., a leading provider of health management services to the maritime community, and Globecom Maritime have formed a strategic relationship to create Future

Care Live, a video-enabled telemedicine solution to the global maritime industry, and integrate it into Globecomm's popular Access Chat service.

Future Care Live combines Future Care's Caring for the Crew® program with Globecomm's Access Chat Plus live video streaming software to provide a revolutionary level of medical care now available to commercial vessel and yachting crews during emergency illness or injury at sea, as well as to respond to routine healthcare needs.

Using the video streaming properties of Access Chat Plus, Future Care Live creates a "virtual ER," which allows for the simultaneous remote participation of network general and specialist physicians, hospital treatment staff, Future Care case manager, shipowner representatives and family members, as needed, while onboard ship, at sea.

Christina DeSimone, president and CEO of Future Care, said the alliance would allow both companies to greatly expand the reach and effectiveness of maritime telemedicine services. "Telemedicine is a truly shared benefit—to the ship and yacht owner, shipmanager, as well as to individual crew members—and in ways not imaginable a few short years ago. Seafarers will benefit from the virtual presence of Future Care's network physicians and other medical professionals onboard ship while the shipowner and his P&I Club will save in medical costs, time lost and avoidance of deviation."

Originally developed for military use, Future Care Live meets the requirements of the U.S. Health Insurance Portability and Accountability Act and international standards for the electronic transmission of private medical information. Other capabilities include virtual face-to-face secure communication in one-to-one or group settings for non-medical discussions, as well as the encrypted transmission of business documents of any size and in any format between ship and shore.

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

### KVH adds antenna systems to its TracVision Line

KVH Industries, Inc., is introducing the TracVision TV-series, a powerful family of fully stabilized marine satellite television antenna systems designed to provide superior performance, including HDTV, for worldwide satellite TV entertainment at sea. TracVision TV1, TV3, TV5, and TV6 – the four systems that make up the TracVision TV-series – was unveiled at the Palm Beach International Boat Show in Palm Beach, Florida, in March. These systems represent the latest technology in marine satellite television antenna systems, a market where KVH has had award-winning TracVision products for more than 16 years.

Innovative features of the new TracVision TV-series include a streamlined IP-enabled TV-Hub delivering easy setup and operation, and a web-based user interface providing system access from any smartphone, tablet, smart TV, or computer.

Offering a complete range of sizes, features, and options, the TracVision TV-series is designed to support DIRECTV®, DISH Network® and DISH HD, Bell TV, and nearly all



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Whether a boat, yacht, or ship is cruising along the coast or voyaging worldwide, there is a perfectly suited TracVision TV-series antenna system. The ultra-compact TracVision TV1 (32 cm, 12.5-in. antenna) is ideal for use in coastal cruising or traveling on inland waterways. The small yet powerful TracVision TV3 (37 cm, 14.5-in. antenna) has single and dual linear LNB options for multiple receiver installations, and is designed for use when traveling within 100 nmi offshore. The TracVision TV5 (45 cm, 18-in. antenna) combines big performance with a compact size and provides access to worldwide regional programming. The high performance TracVision TV6 (60 cm, 24-in. antenna) provides the tracking, reception, and extended coverage area needed when voyaging offshore for short or long passages.

All four systems of the TracVision TV-series feature advanced functionality and performance:

- Single coaxial cable for power, data, and video enables easy installations and retrofits.
- High performance tracking ensures crystal-clear television picture in heavy seas.
- IP-enabled antenna control unit with Ethernet connection and built-in Wi-Fi interface allows access to system information from any Wi-Fi device.
- Advanced inertial-based stabilized search enables fast satellite acquisition.
- Exclusive RingFire™ antenna technology provides stronger signals, wider geographic coverage, and better reception.
- Single Wire Multiswitch (SWM-8) integrated into belowdecks TV-Hub supports up to eight DIRECTV receivers.
- DVB-S2 technology ensures compatibility with current and future Ku-band satellites.
- IP AutoSwitch option for multiple receiver installations delivers simple automatic satellite switching on DISH Pro and DiSEqC-compatible services.

TracVision has been well established in the marine market for many years, with a current roster of more than a dozen TracVision antenna choices for use on boats, yachts, and merchant vessels of all sizes, types, and needs. For 16 consecutive years, TracVision has

won the annual product award given by the National Marine Electronics Association (NMEA), a trade group made up of 600 companies in the marine electronics and manufacturing field. KVH is the satellite system supplier for industry-leading leisure marine boatbuilders such as Sea Ray, Sunseeker, and Viking Yachts, and has been chosen by merchant fleet operators worldwide for use on everything from containerships to offshore supply vessels and workboats.

For more information, visit <http://www.kvh.com>.

## Airbus launches next generation XChange

Airbus Defence and Space has launched XChange v3, the latest evolution of its XChange communications platform, which is set to further improve the flow of operational data between ship and shore through sophisticated voice and connectivity service management.

XChange is an all-in-one solution to manage communications services in an easy and intuitive way. It gives more control with less operational overhead while on board administrative tasks can also be out-sourced to onshore offices. It is fully integrated with Airbus Defence and Space's leading Pharostar (entry and premium) services and v3 makes VSAT (Very Small Aperture Terminal) voice and data management even more intuitive. Improved features include an ability to flexibly prioritize traffic, in order to give corporate traffic priority over crew traffic, thereby securing delivery of critical data.

This new solution now boasts full VSAT and MSS compatibility. Being fully compatible with the largest range of VSAT terminals means that shipping companies can use the antenna system available on board and simply integrate XChange as the optimal network management device. As a single, powerful device offering complete connectivity control, regardless of a vessel's existing network configuration, it enables easy, reliable access to the preferred satcoms connection. It only takes a few minutes to configure XChange v3 to enable access to the innovative new features it offers.

Voice functionality has also been significantly enhanced with this new version, with the choice of VSAT voice and up to three MSS optimized voice connections. Available lines are automatically selected for more convenience.

It equally improves network access for end-users. Crew members benefit from a single account with an automatically remembered login for data and telephone services on their individual devices. All data and voice costs can be charged to each crew member's account.

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

## Crewtoo social media site launches online maritime jobs board

Crewtoo, the world's largest online network dedicated to seafarers, has launched an online maritime jobs board as a direct response to requests from its members, who have continuously pinpointed recruitment as one of their main priorities. Crewtoo, which has more than 100,000 members and was founded by KVH Media Group, part of KVH Industries, Inc., premiered the service recently in Stamford, Connecticut, at Shipping 2014, the annual shipping conference and exhibition of the Connecticut Maritime Association.

The Crewtoo jobs board is integrated into the Crewtoo site and enables seafarers to simply change a setting on their profile to state that they are available for work; they are then prompted to fill in their full employment details on the site and upload their current CV/resumé. For the seafarer, membership to the popular social network remains free of charge and, even before the jobs board launch, thousands of seafarers had already taken the opportunity to complete their jobs profile.

Maritime recruiters using Crewtoo can choose from three advertising packages: a single vacancy post, a monthly plan, or an unlimited annual service that includes social media posts and a featured company profile service.

Crewtoo members represent a wide range of nationalities, with 55% from Europe, 34% from Asia and the Middle East, 9% from Africa, and the rest from North America, Latin America, and Australasia. Likewise, the membership encompasses a broad range of ranks, including masters, ordinary seamen, chief officers, chief engineers, electrical engineers, deck cadets, engine cadets, and cooks.

In addition to Crewtoo, KVH Media Group has a number of other services aimed at improving crew welfare. NEWSlink is a daily news and information service customized for seafarers,

with more than 75 publications in 17 languages delivered by email to vessels around the world. MOVIElink, TVlink, and TRAININGlink provide commercially licensed movies, television programs, and training films for onboard viewing by seafarers, delivered in a range of formats from hard-copy DVDs delivered directly to ship agents anywhere in the world to fully digital services. SPORTSlink provides daily video clips of sporting events.

KVH provides maritime broadband connectivity to vessels worldwide through its TracPhone V-IP series terminals and mini-VSAT Broadband network. In addition, KVH is introducing IP-MobileCast, a content delivery service that is designed to enable MOVIElink, TVlink, SPORTSlink, TRAININGlink, NEWSlink, and MUSIClink commercially licensed entertainment content to be delivered via multicasting technology to subscribing vessels, over the top of the mini-VSAT Broadband network.

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

### MTN and Fred.Olsen Cruise Lines extend relationship

Fred.Olsen Cruise Lines has extended its 4-year relationship with MTN Communications. Fred.Olsen chose to increase the breadth of communications, and content services and support MTN provides. Passengers have increased expectations to stay connected, even when on vacation. The MTN partnership includes an enhanced onboard suite of connectivity options for those passengers, as well as for crew. MTN will continue to provide crew calling and its Worldwide TV service (MTN TV).

Known for exclusive service catering to European travelers, Fred.Olsen itineraries include the Caribbean, Mediterranean and Baltic regions, Norway, the British Isles and Africa.

MTN operates a worldwide connectivity footprint through its combined satellite and terrestrial network across the globe. The pioneer of cruise industry communications, MTN is the leader in delivering innovation, value and service excellence to its customer base.

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

### Communications systems for South Korean container ships

Intellian, the technology leader in satellite communication antennas, has won the contract to supply Hanjin Shipping of South Korea with FleetBroadband FB500 terminals for a fleet of 38 container ships.

The installation process has already commenced and will be completed by Intellian over the coming months as the ships arrive into port.

The FB500 is the largest of Intellian's FleetBroadband product range and provides the fastest and most cost-effective FleetBroadband service available. It is designed specifically for intensive use onboard merchant and offshore vessels using Inmarsat's I4 satellite, global broadband coverage.

The FB500s will replace Hanjin Shipping's current F77 systems, significantly reducing their ship communications costs. Hanjin Shipping was also attracted to Intellian's industry leading 3-year warranty which provides the company with confidence and trouble free operation over an extended period.

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



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## Nexans wins Gode Wind cable contract

DONG Energy is set to increase its offshore wind power capacity in Germany after signing a contract with Nexans for the delivery and installation of 140 km of 34 kV cables. The inter-array cables will link individual turbines at the Gode Wind 1 and 2 wind farms and connect them to an offshore transformer platform, off the Lower Saxony coast in northeast Germany. Nexans cables will boost Germany's Energy Turnaround in offshore wind farm contract for DONG Energy. The new agreement is part of a larger outline contract between DONG Energy and Nexans for the supply of a total 900 km of medium-voltage cable for internal farm cabling. Wind energy is a vital element in Germany's ongoing Energy Turnaround (Energiewende). The wind farms, which lie around 45 km off the coast, just off the islands of Norderney and Juist, will have a capacity of 582 MW—enough to power around 600,000 German homes. Total investment for the two projects stands at around €2.2 billion with construction commencing in the spring of 2015.

## DNV GL releases subsea power cable guideline

DNV GL announced the launch of its guideline "Subsea power cables in shallow water renewable energy applications" (DNV-RP-J301), which provides a comprehensive review of subsea power cable practice and advice for managing the risk commonly associated with the cables. The technical guideline covers entire lifecycle of subsea power cables, from concept development to decommissioning, and is a comprehensive resource of project guidance. Many existing offshore wind farms have faced subsea power cable problems caused by underestimation of complexities and interrelationships. The guideline will become essential tool for stakeholders involved in renewable energy projects, improving safety and lowering costs for the wind industry. Problems with subsea cables have affected many offshore wind farms and damage to cables has been identified as a major insurance risk for the offshore wind industry. Cable related problems are costly and most often arise from inadequate risk identification, lack of planning, sub-standard design and deficiencies in how procedures are applied. To date, cabling failures have cost millions of euros in delays and numerous legal disputes. In order to address these problems, a guideline was developed by the Joint Industry Project (JIP) known as "CableRisk," which was established in August 2012 by DNV GL and 15 partner organizations, including Bohlen & Doyen, Boskalis Offshore, DONG Energy, Electrabel GDF SUEZ, Iberdrola, Inch Cape (EDPR, Repsol), JDR Cable Systems, Norddeutsche Seekabelwerke, Offshore Marine Management, Siem Offshore Contractors, Tekmar Energy, Tideway Offshore Solutions, Van Oord Offshore Wind Projects and VSMC. The subsea power cable guideline is a comprehensive technical guide that covers all project phases of subsea cable projects. It applies to the entire length of the cable and its surroundings including assessment of project conditions, planning and execution of works as well as asset management. Important sections of the 145-page document cover design of the physical interfaces at offshore units and in the landfall area.

## Etisalat joins AAE-1 consortium

Etisalat has announced its strategic investment along with 16 leading global service providers to construct Asia Africa Europe-1 (AAE-1), one of the largest global submarine fiber optic cable systems ever built. A massive undertaking, the AAE-1 submarine cable spans 25,000 km, connecting Hong Kong to Singapore, the Middle East, Africa and Europe with a design capacity of 40 Tbps. The other global operators include China Unicom, Djibouti Telecom, Mobily, Omantel, OTEGLOBE, Ooredoo, PCCW Global, PTCL, Telecom Egypt, TOT and Viettel. AAE-1 uses the latest 100 Gbps technology. The system has two diversified Points of Presence (PoP) in Asia (Hong Kong and Singapore) and three onward connectivity options in Europe (via France, Italy and Greece), providing additional flexibility for the operators and customers. The cable is expected to be completed by 2016, connecting the UAE, Hong Kong, Vietnam, Malaysia, Singapore, Thailand, India, Pakistan, Oman, Qatar, Yemen, Djibouti, Saudi Arabia, Egypt, Greece, Italy and France.

## Commissioning complete for Poseidon submarine network



Radius Oceanic Communications, Inc. and Cyta announced testing and commissioning are complete on the Poseidon submarine cable system, a fiber optic network built to serve the oil and gas and scientific markets in the Eastern Mediterranean. Radius and its regional telecom partner, Cyta have also completed work to establish dual landing facilities in Cyprus, and to implement high-bandwidth end-to-end connectivity from Cyprus to the U.S.

The commissioning of Poseidon provides unprecedented opportunities to the developing oil and gas industry in the region. For the first time, companies can create their development plans for deep water production with the certainty that the benefits of fiber optic capacity are available and can be easily extended to their platforms.

CSnet International, Inc., the initial tenant on Poseidon, and whose existing Offshore Communications Backbone (OCB) provided an integral fiber segment for the Poseidon network, will begin migrating scientific traffic to Poseidon in April. CSnet will use Poseidon to more efficiently offer oceanographic, hydrographic and seismic data to all interested parties on a near real-time basis.

### Key Network Facts and Benefits

- The POSEIDON network extends for some 800 km from two shore landings in Cyprus, creating a fiber ring that borders the Cypriot EEZ, and enveloping the offshore oil and gas lease blocks established for development by the Republic of Cyprus.

- The Poseidon network is designed as a trunk and branch system, enabling additional fiber extensions and alternate landings as new areas for development are opened outside Cypriot waters and as customer requirements are expanded.

- Secure, high availability fiber services are easily extended to and between platforms, and can provide the backbone for additional services necessary for surrounding operations.

- The Radius operating model will offer high capacity managed broadband services, end-to-end global capacity and 24x7 network monitoring and support.

"With the Poseidon system now live, a strategic goal is realized, that of providing secure, high bandwidth, fiber optic capabilities throughout this highly critical oil and gas environ-

ment," Jim Byous, president of Radius Oceanic Communications, Inc., states. "The collaborative planning and implementation efforts of the Radius, Cyta and CSnet International teams have achieved an industry first, bringing a widely accessible submarine fiber network into operation in advance of full oil and gas production. Planning, monitoring, and exploration functions will benefit greatly and we are excited about the benefits these capabilities will bring to deepwater operators in the region."

Cyta's CEO, Dr. Aristos Riris, says of Poseidon, "We have been pleased to work with Radius to bring the Poseidon network into service. This network, which will support the Eastern Mediterranean deep water developments as they mature, meets Cyta's objective of being a regional leader in the provision of strategic services to the oil and gas communities."

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

#### **OSCV with cable-laying capability ordered**

Vard Holdings Limited (VARD), one of the major global designers and ship-builders of offshore and specialized vessels, has entered into a Letter of Intent with Solstad Offshore for the design and construction of a large Offshore Subsea Construction Vessel (OSCV). The contract will be the largest single vessel order in VARD's history.

The vessel is a VARD 3 19 design, developed by Vard Design in Ålesund. The hull of the vessel will be built at Vard Tulcea in Romania, while outfitting will take place at Vard Brattvaag in Norway. Delivery of the vessel is scheduled for second quarter of 2016.

The vessel, which will be the largest in the Solstad fleet as well as the largest ever constructed by VARD, will have a 550 ton top tension vertical lay system, enabling the installation of large diameter flexible pipes in ultra-deep water and in harsher environments. In addition, it will feature a 600 ton active heave compensated offshore crane and a 4,000 ton under-deck carousel for storage of flexible pipes, cables and umbilicals. The vessel will be about 180 m long, have a beam of 33 m and a deck area of more than 2,500 sq. m.

Solstad Offshore ASA is among the largest shipping companies in Norway, providing advanced vessels and exten-

sive maritime competence for operations related to the offshore petroleum industry. The company has about 1,800 employees, and operates 48 vessels all over the world. Solstad Offshore is headquartered in Skudeneshavn, Norway, and has branch offices in Brazil, Singapore, the Philippines, the United Kingdom and Australia.

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

#### **Cape Wind signs major cable contracts**

Cape Wind announced that South Carolina-based Prysmian Cables and Systems USA has been awarded the contract for the eventual supply of the intra array and export power cables for Cape Wind's offshore wind farm and New Jersey-based Caldwell Marine International has been awarded the contract for the installation of the underwa-

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ter cables. The new contracts mark significant project milestones.

The onshore transmission cables would be manufactured by Prysmian at its high voltage manufacturing facility based in Abbeville, South Carolina, and installed by its New Jersey based installation team in a series of duct banks between the point of landfall and the electric grid interconnection at the NSTAR Barnstable substation. The duct banks will be constructed by Falmouth-based Lawrence-Lynch Corp. under an agreement Cape Wind previously announced.

New Jersey-based Caldwell Marine International will install the submarine intra array and export cables using specialized vessels and equipment. For Caldwell Marine International, which has 30 years of experience in the installation of specialized underwater cable, offshore wind represents a new growth area for their company.

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

## NEC, Alcatel-Lucent win SEA-ME-WE 5 supply contracts

NEC and Alcatel-Lucent has signed a contract valued at several hundred million US dollars with the South East Asia-Middle East-Western Europe 5 (SEA-ME-WE 5) consortium of 15 leading telecom operators to deploy a new 100 Gigabit per second (Gbps) undersea cable system.

The SEA-ME-WE 5 system will span 20,000 km from Singapore to Europe, and will deliver ultra-broadband capacity and faster access to consumers and businesses.

Broadband traffic is growing exponentially as the appetite for new applications like cloud computing and on-demand video, where consumer appetites are becoming limitless. Furthermore, the demand for new connectivity reflects an end-user and business environment in which ultra-broadband access is essential for sustainable growth and development.

Answering these needs, the SEA-ME-WE 5 system will deliver an ultimate design capacity of 24 Tbps. The system will span 20,000 km connecting Singapore to France via Malaysia, Indonesia, Thailand, Myanmar, Bangladesh, Sri Lanka, India, Pakistan, Oman, United Arab Emirates, Djibouti, Yemen, Kingdom of Saudi Arabia, Egypt and Italy. NEC will be deploying



the segment spanning from Singapore to Sri Lanka, while co-contractor Alcatel-Lucent will be deploying the Sri Lanka to France segments.

The consortium is composed of 15 operators: Bangladesh Submarine Cable Company Limited, (BSCCL), China Mobile International, China Telecom Global, China United Network Communications Group Company, Emirates Integrated Telecommunications Company (PJSC), Orange, Myanmar Posts and Telecommunications, Saudi Telecom Company, SingTel, Sri Lanka Telecom, TOT, PT Telekomunikasi Indonesia International, Telecom Italia Sparkle, Telekom Malaysia Berhad and Yemen International Telecommunications (TeleYemen).

SEA-ME-WE 5 is scheduled to be completed by early 2016.

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

## DeepOcean charters new build cable lay vessel

DeepOcean UK, a subsidiary of DeepOcean Group Holding BV, has entered into a 7 year charter agreement with Maersk Supply Services, for a new build next generation cable lay vessel. The vessel is the DOC 8500, a Damen Offshore Carrier which has been designed specifically to suit DeepOcean's requirements.

The DOC 8500 will extend DeepOcean's capabilities in the larger cable laying end of the market, representing a new focus on Interconnector projects, in addition to oil & gas sector and renewables work. The specially-equipped vessel will be delivered from the Damen Galati yard in Romania.

Owned and operated by Maersk Supply Service, the vessel will become the latest addition to the 60-plus strong Maersk offshore support vessel fleet.

Remko Bouma of Damen Shipyards Bergum, who is overseeing vessel construction, describes the DOC 8500 as a

"semi-customized, modular" design.

For DeepOcean, the ship-to-ship rule compliant vessel has been configured to accommodate 90 personnel, mostly in single occupancy cabins.

"The DOC 8500 has been developed as a flexible platform for both transport and installation work offshore," said Mr. Bouma. "Its bow and slender hull optimize sea keeping in rough seas and suppress slamming. The ship will run on either MGO or HFO and has DP2 capabilities in line with offshore market preferences. Its high on-deck cable carrying capacity makes it particularly competitive as a cable layer, while the vessel has also been optimized for shallow water operations, coming complete with a seven-point mooring system and the ability to take the ground fully loaded."

The 138 m length, 27.5 m breadth DOC 8500 features 2,200 sq. m of unobstructed deck of 20T/square meter load capacity with ro-ro capability. The 9,300 dwt vessel will have a top speed of 12 kts.

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

## CT Offshore wins offshore wind contract

An agreement has been finalized and signed between CT Offshore and Gwynt y Môr Offshore Wind Farm Limited, covering free-laying, installation and burial of 63 cables of the in total 161 inter-array cables at one of Europe's largest offshore wind farms.

The cable laying and installation will be conducted by the company's own cable laying vessel SIA, which has already arrived at Gwynt y Môr and will start the cable installation once fully mobilized.

To carry out the post lay burial of the cables in scope, CT Offshore has entered into a framework agreement with Fugro Subsea Services Limited, as principle subcontractor. They will bring in the vessel Saltire to bury the cables subsequently using their Q1400 trencher.

Offshore construction, 8 mi off the North Wales coast in Liverpool Bay, is progressing well with 113 of the 160 turbines now in place, first generation achieved last August and only 11 foundations left to be installed. Construction is on schedule to be completed later this year.

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

## SingTel announces launch of SEA-ME-WE 5

A group of leading telecommunications companies have formed a consortium to build a state-of-the-art undersea South East Asia - Middle East -Western Europe (SEA-ME-WE) 5 cable.

With significant growth in data traffic in recent years, SEA-ME-WE 5 will address the urgent need for a new generation data superhighway to cater to the increasing demand for next generation Internet applications. It will also ease the strain on the heavily loaded networks that currently connect Western Europe, Middle East and Southeast Asia as well as offer an extra layer of network diversity.

The SEA-ME-WE 5 cable system is expected to start carrying commercial traffic by early 2016. It is designed to provide upgradable transmission facilities by adopting state-of-the-art 100 Gbps technology. Fully loaded, it is capable of carrying 24,000 Gbps of capacity, which is the equivalent of transmitting about 4,800 high-definition movies per second.

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

## Global Marine to rely on Nexans' cables for new projects

Global Marine Systems has ordered Nexans' submarine fiber optic cable for three major telecommunications projects in Northern Europe. This major contract covers the supply of around 1,050 km of Nexans URC-1 unrepeatered fiber optic cable – since this type of cable typically comprises between 24 to 48 individual fibers that is enough optical fibers when laid end to end to span the globe.

Global Marine to rely on Nexans' fiber optic cables for major subsea telecommunications projects in Northern Europe. The Global Marine projects cover a wide range of applications from transmitting scientific data from an arctic observation station, offshore communication between oil platforms and providing broadband access in remote areas of Scotland.

The URC-1 cables, manufactured in Nexans' Norway plant, are an unrepeatered design, capable of connecting land stations up to 500 km apart without the need for amplification by subsea repeaters. They feature a strong, robust

construction and can be installed at water depths of up to 4000 m.

Global Marine will deploy two fiber optic cables, each around 250 km in length, to connect the Ny Aalesund observation station on the Arctic island of Svalbard to Longyearbyen, the administrative capital. Since the satellite station at Longyearbyen is already connected to mainland Norway this extension, headed by UNINETT, an organization serving communication solution for universities, research institutes and high schools in Norway, will provide Ny Aalesund with high speed access to the international network.

A second project will provide communications for oil platforms in the North Sea. Global Marine will also install the Nexans fiber optic cables as part of an on-going expansion of broadband services to isolated communities in the Highlands and Islands of Scotland, funded by a partnership of Scottish Government, Highlands and Islands Enterprise, Broadband Delivery UK and BT.

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



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### KDDI to build CLS as part of disaster-resistant global network

In preparation against large-scale natural disasters and in order to enhance the business continuity of its communications services, KDDI will establish a new submarine cable landing station, Chikura-Westhill Cable Landing Station (CLS) in Minamiboso City, Chiba Prefecture, to serve as a hub for international communications linking Japan with America and Asia.

Chikura-Westhill Cable Landing Station will be located some 28 m above sea level, where it will not be affected by any tsunami that may be generated by a large-scale earthquake. Currently, the Chikura Cable Landing Station operates a number of high-capacity submarine fiber optic cables linking Japan with America and Asia, and plays an important role in supporting large-capacity data communications, including the Internet. However, in order to fortify the Business Continuity Plan (BCP) against large-scale earthquakes, the new station will be set up so as not be impacted by tsunami damage, and, in the event of such damage, will enable swift recovery of the network. In addition to playing its role as a base for

the BCP, the new station will also operate networks to America and Asia in order to meet growing demand for Internet communications and to provide networks of higher-capacity and lower-latency, which are strongly demanded from financial institutions and other clients.

In addition to its submarine cables linking Japan with America and Asia, as part of its international communications network BCP, KDDI is working to ensure the continuity of international communications in times of disaster through the utilizing cable routes to Europe via Russia and satellite networks. KDDI will continue to strive to provide safe and secure communications services.

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

### Seaborn mandates Natixis for financing of cable project

Seaborn Networks and Natixis announced that Seaborn has mandated Natixis, a major French bank, to act as sole structuring bank, underwriter and lead arranger for a fully underwritten US\$290 million senior secured project financing debt for the development and installation of Seaborn's new subsea fiber

optic cable system between commercial and financial centers of Brazil and the United States. Natixis is also expected to serve as COFACE Facility Agent and Security Agent for this project debt.

Seaborn's new submarine cable project, known as Seabras-1, is a 40 Tbps, four fiber pair system extending 10,400 km between São Paulo, Brazil and New York, USA, with a branch landing in Fortaleza, Brazil. It will be the first direct route between São Paulo and the United States, with lower latency than any other competing system, and is also the world's longest system to be fully deployed with 100 Gbps coherent technology.

The mandating of Natixis to arrange the credit facility follows the previously announced "Promise of Cover" provided by Compagnie Française d'Assurance pour le Commerce Extérieur (COFACE), the French export credit agency, for banks that participate in the facility. The mandating of Natixis in the role of Lead Arranger for this credit facility follows the recent announcement by the International Finance Corporation (IFC) of the World Bank Group that the IFC is now one of the owners of Seaborn.

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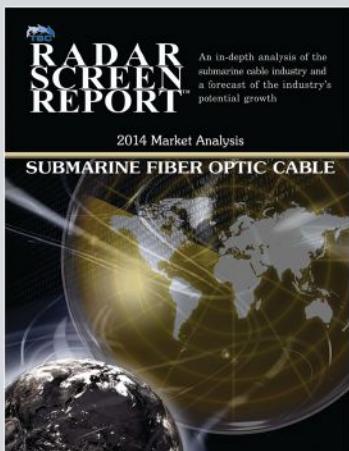
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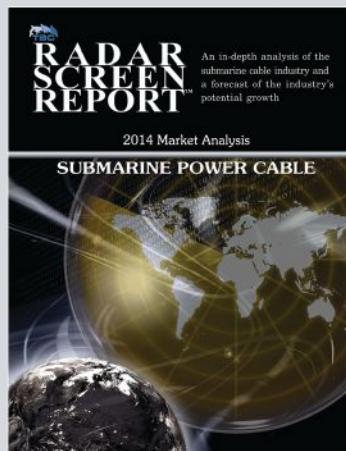
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For more information, visit [www.seabornnetworks.com](http://www.seabornnetworks.com).

## Global Cloud Xchange announces plan for new transpacific cable

Global Cloud Xchange announced that plans are underway for the company's latest investment into expanding its transpacific footprint. The new submarine fiber optic cable infrastructure is part of the company's strategy to lead and drive the world's critical digital trading routes.

Based on state-of-the-art 100G technology, the Pacific Cloud Xchange (PCX) cable will be a four fiber pair system with initial design capacity per fiber pair at 100 x 100 Gbps using next generation coherent submarine fiber. The new system will be ready for service in 2015.

The new fiber system, which runs approximately 8,300 km between Japan (Tokyo) and California (Silicon Valley), will create a next generation IP and Cloud environment held together with a single AS number and connect-

ing into Tier III+ data center facilities on the ground.

According to Telegeography's latest Global Bandwidth Forecast Service report, transpacific demand is expected to increase at a compounded annual rate of 34% between now and 2020; to meet this demand, more than 100 Tbps additional capacity will be required.

Submarine cable vendors and additional partners for the PCX cable are being finalized. Global Cloud Xchange will announce the awarding of the supply contract in second quarter 2014.

Global Cloud Xchange, formerly Reliance Globalcom, brings together the synergies of Reliance Communications' Global Business encompassing capacity sales, managed services and a portfolio of products and services comprising of Internet solutions and value added services.

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

## NKT providing cable monitoring for Baltic 2

After successfully using NKT's VALCAP Load Management System for monitoring the Baltic 1 submarine power cable, the German electricity transmission system operator 50Hertz has decided to

award the monitoring of the Baltic 2 project to NKT Cables as well.

Baltic 1 and Baltic 2 are important submarine cable connections in the Baltic Sea that are used to securely transport wind-generated electricity from offshore wind farms to the mainland grid of 50Hertz. The monitoring system allows additional transmission capacity to be used for this purpose and, therefore, provides technical as well as financial benefits.



The VALCAP Load Management System is a unique development by NKT Cables that continuously monitors the conductor temperature and transmission capacity of power cables. It takes into account the impact of changing environmental conditions in the surroundings of power cables, and provides an intelligent warning and alarm system that is integrated into the customer's infrastructure.

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

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June 12, 2013 Issue# 20  
Rutgers Findings May Predict the Future of Coral Reefs in a Changing World  
Study is first to pinpoint how coral make their mineral skeletons; process also works in more acidic water  
Rutgers scientists have described for the first time the biological process of how corals create their skeletons - destined to become limestones - which form massive and vital coral reefs in the world's oceans. More...  
Ocean Specialists Inc. Achieves Major Milestone in Gulf of Thailand Offshore Fiber Network  
Ocean Specialists Inc. (OSI) reports that 11 major oil and gas company offshore platforms located in the Gulf of Thailand are now connected to shore via a submarine fiber optic network. This caps a six year, groundbreaking effort by OSI in developing the initial technical feasibility and then the detailed

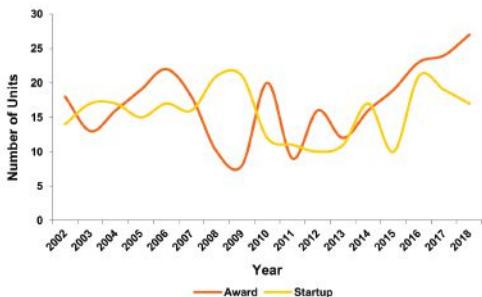
**WEEKLY  
INDUSTRY  
NEWSFEED**

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

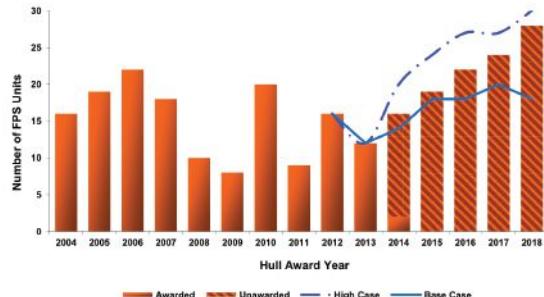
# Offshore At-A-Glance

## Quest Offshore Activity Report

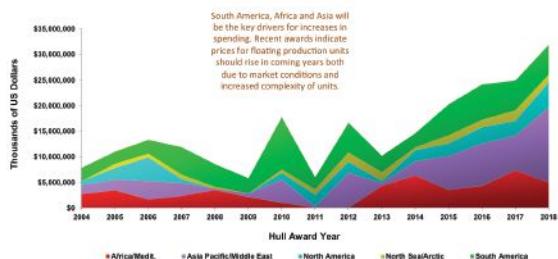
**Worldwide Floating Activity by Year 2002 – 2018e  
(Mean Case)**



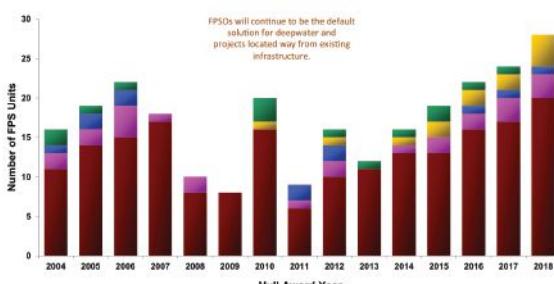
**Worldwide Floating Awards by Year 2004 – 2018e  
(Mean Case)**



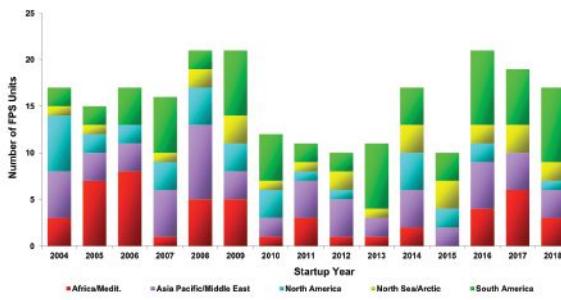
**Worldwide Forecast FPS Spending by Year  
Regional Contribution Thousands of US Dollars by FPS Award Year  
(Mean Case)**



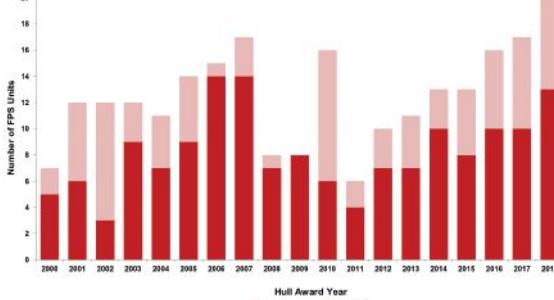
**Worldwide FPS Awards 2004 – 2018e  
By FPS Type (Mean Case)**



**Worldwide Forecast Floating Activity by Startup Year  
2004 – 2018e  
Area Activity Share By Region (Mean Case)**



**Worldwide FPSO New Build vs. Conversion  
2000 – 2018e (Mean Case)**



FOR MORE DETAILED INFORMATION

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# Monthly Stock Figures & Composite Index

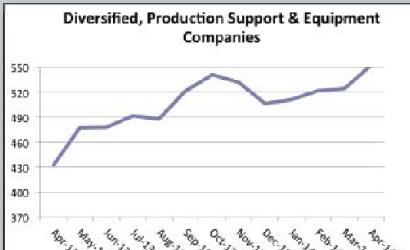
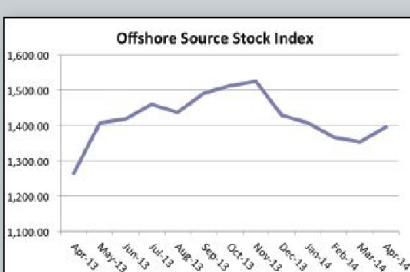
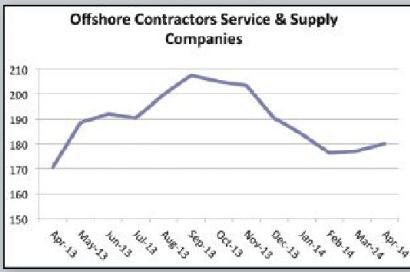
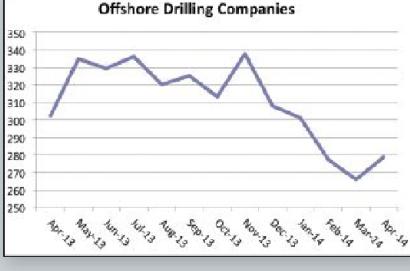
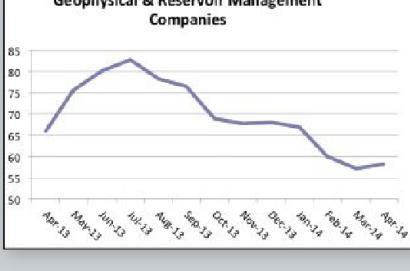
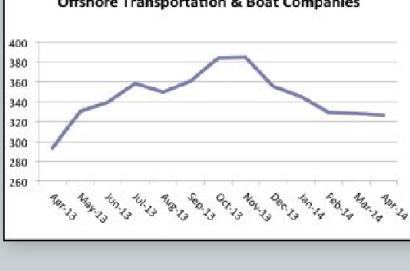
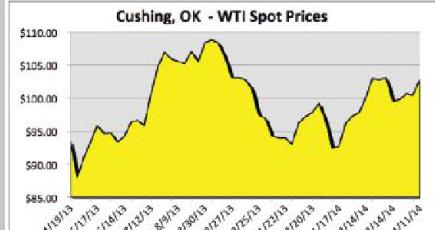
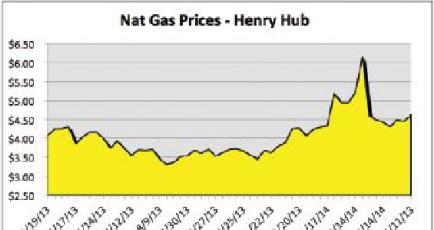
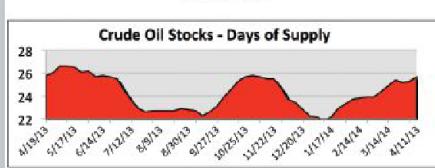
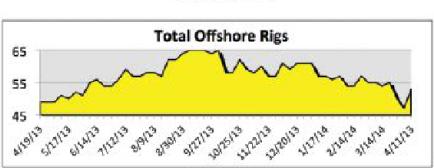
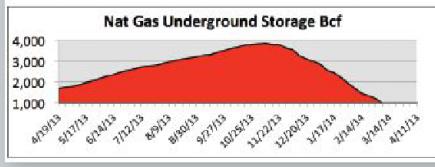
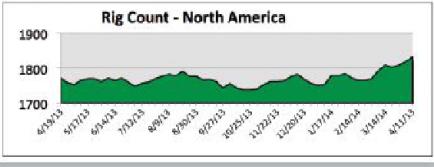
Industry Company Name	Symbol	Close(Mid) April	Close(Mid) March	Change	Change %	High	52 week	Low
<b>Diversified, Production Support and Equipment Companies</b>								
Baker Hughes, Inc.	BHI	64.50	62.86	1.64	2.6%	66.41	42.60	
Cameron Intl. Corp.	CAM	62.31	63.34	-1.03	-1.6%	66.12	52.50	
Drill-Quip, Inc.	DRQ	109.46	101.23	8.23	8.1%	121.07	76.44	
Halliburton Company	HAL	59.09	56.48	2.61	4.6%	57.42	36.77	
Tenaris SA	TS	44.74	42.26	2.48	5.9%	49.87	38.47	
Newpark Resources, Inc.	NR	11.57	11.00	0.57	5.2%	13.64	8.17	
Schlumberger Ltd.	SLB	98.46	89.04	9.42	10.6%	99.69	69.08	
Superior Energy Services, Inc.	SPN	30.78	28.76	2.02	7.0%	31.48	22.85	
Weatherford International, Inc.	WFT	17.15	16.45	0.70	4.3%	17.75	12.06	
Deep Down, Inc.	DPDW	1.70	1.85	(0.15)	-8.1%	2.70	1.17	
FMC Technologies	FTI	52.47	51.11	1.36	2.7%	59.79	47.58	
<b>Total Diversified, Production, Support and Equipment.....</b>	<b>552.23</b>	<b>524.38</b>	<b>27.85</b>	<b>5.3%</b>	<b>585.94</b>	<b>407.69</b>		
<b>Geophysical / Reservoir Management</b>								
Dawson Geophysical Company	DWSN	28.07	28.23	-0.16	-0.6%	40.86	27.20	
Mitcham Industries, Inc.	MIND	13.57	14.04	-0.47	-3.3%	18.41	13.58	
Compagnie Gnrale de Gophysique-Veritas	CGV	16.58	14.92	1.66	4.50%	26.09	14.53	
<b>Total Geophysical / Reservoir Management.....</b>	<b>58.22</b>	<b>57.19</b>	<b>1.03</b>	<b>1.8%</b>	<b>85.36</b>	<b>55.31</b>		
<b>Offshore Drilling Companies</b>								
Atwood Oceanics, Inc.	ATW	47.30	45.59	1.71	3.8%	59.49	43.91	
Diamond Offshore Drilling, Inc.	DO	47.50	43.89	3.61	8.2%	73.19	43.69	
ENSCO International, Inc.	ESV	50.98	47.90	3.08	6.4%	64.14	47.85	
Nabors Industries, Inc.	NBR	24.00	22.40	1.60	7.1%	25.06	14.34	
Noble Drilling Corp.	NE	30.48	28.93	1.55	5.4%	42.34	28.67	
Parker Drilling Company	PKD	6.54	7.16	-0.62	-8.7%	8.67	3.75	
Rowan Companies, Inc.	RDC	30.79	31.40	-0.61	-1.9%	38.65	30.10	
Transocean Offshore, Inc.	RIG	41.35	38.63	2.72	7.0%	55.79	38.55	
<b>Total Offshore Drilling.....</b>	<b>278.94</b>	<b>265.90</b>	<b>13.04</b>	<b>4.9%</b>	<b>367.33</b>	<b>250.86</b>		
<b>Offshore Contractors, Services, and Support Companies</b>								
Helix Energy Solutions Group, Inc.	HLX	22.32	23.16	-0.84	-3.6%	27.58	19.44	
Gulf Island Fabrication	GIFI	22.15	20.98	1.17	5.6%	26.82	18.06	
McDermott International, Inc.	MDR	6.91	7.86	-0.95	-12.1%	11.06	6.68	
Oceaneering International	OII	70.93	70.34	0.59	0.8%	87.64	58.08	
Subsea 7 SA	SUBCY.PK	17.6	17.55	0.05	0.3%	22.76	17.05	
Technip ADS	TKPPY.PK	25.99	23.6	2.39	10.1%	31.32	21.08	
Tetra Technologies, Inc.	TTI	12.49	11.97	0.52	4.3%	13.41	8.15	
Cal Dive International, Inc.	DVR	1.65	1.71	-0.06	-3.5%	2.38	1.51	
<b>Total Offshore Contractors, Service, and Support.....</b>	<b>180.04</b>	<b>177.17</b>	<b>2.87</b>	<b>1.6%</b>	<b>222.97</b>	<b>150.05</b>		
<b>Offshore Transportation and Boat Companies</b>								
Seacor Holdings, Inc.	CKH	83.92	82.61	1.31	1.6%	99.00	69.78	
Gulfmark Offshore, Inc.	GLF	42.63	44.27	-1.64	-3.7%	53.89	35.76	
Bristow Group	BRS	71.84	74.88	-3.04	-4.1%	85.70	59.21	
PHI, Inc.	PHII	41.30	41.91	-0.61	-1.5%	42.40	23.43	
Tidewater, Inc.	TDW	47.97	45.99	1.98	4.3%	63.22	45.51	
Trico Marine Services, Inc.	TRMAQ.PK	0.04	0.04	0.00	0.0%	0.11	0.01	
Hornbeck Offshore	HOS	38.57	38.50	0.07	0.2%	59.93	38.84	
<b>Total Offshore Transportation and Boat .....</b>	<b>326.27</b>	<b>328.20</b>	<b>-1.93</b>	<b>-0.6%</b>	<b>404.25</b>	<b>272.54</b>		

May 2014

Ocean News &amp; Technology

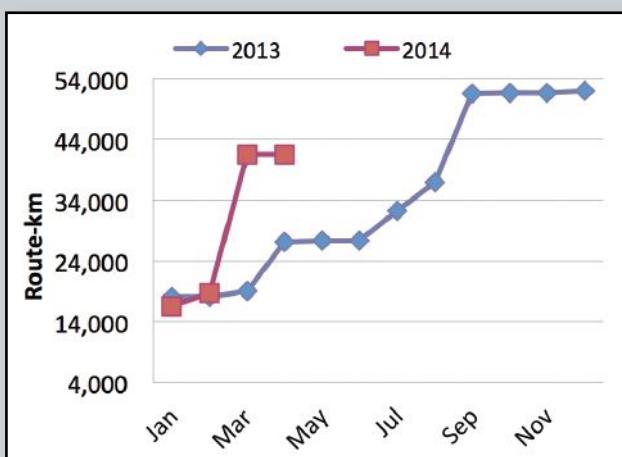
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# Monthly Stock Figures & Composite Index

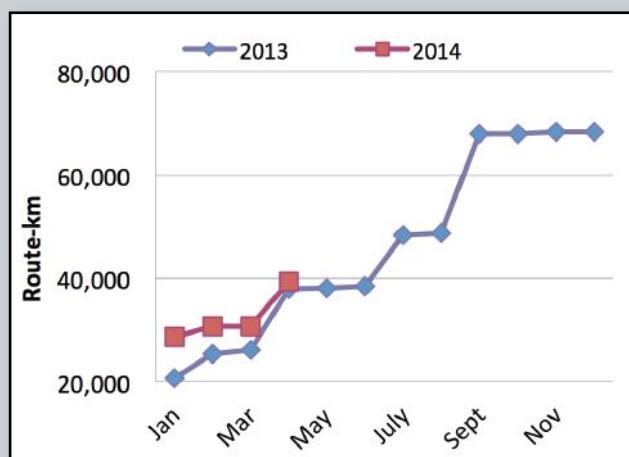
Industry	Close(Mid) April	Close(Mid) March	Change March	Change %	High 52 week	Low	
Diversified, Production Support & Equipment Companies							
	<b>Total Diversified, Production, Support and Equipment</b>	<b>552.23</b>	<b>524.38</b>	<b>27.85</b>	<b>5.3%</b>	<b>585.94</b>	<b>407.69</b>
	<b>Total Geophysical / Reservoir Management</b>	<b>58.22</b>	<b>57.19</b>	<b>1.03</b>	<b>1.8%</b>	<b>85.36</b>	<b>55.31</b>
	<b>Total Offshore Drilling</b>	<b>278.94</b>	<b>265.90</b>	<b>13.04</b>	<b>4.9%</b>	<b>367.33</b>	<b>250.86</b>
	<b>Total Offshore Contractors, Service and Support</b>	<b>180.04</b>	<b>177.17</b>	<b>2.87</b>	<b>1.6%</b>	<b>222.97</b>	<b>150.05</b>
	<b>Total Offshore Transportation and Boat</b>	<b>326.27</b>	<b>328.20</b>	<b>-1.93</b>	<b>-0.6%</b>	<b>404.25</b>	<b>272.54</b>
	<b>Total Offshore Source Index</b>	<b>1,395.70</b>	<b>1,352.84</b>	<b>42.86</b>	<b>3.2%</b>	<b>1,665.85</b>	<b>1,136.45</b>
<b>DISCLAIMER</b> <i>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.</i>							
<h2 style="text-align: center;">Oil &amp; Gas Industry Trends</h2> <p style="text-align: center;"><i>Monitoring the Pulse of the U.S. Offshore Oil &amp; Gas Industry</i></p>							
 <p style="text-align: center;"><b>*Source - EIA</b></p>							
 <p style="text-align: center;"><b>* NYMEX Close</b></p>							
 <p style="text-align: center;"><b>*Source - EIA</b></p>							
 <p style="text-align: center;"><b>*Baker Hughes</b></p>							
							
							
<p><span style="background-color: green; width: 20px; height: 10px; display: inline-block;"></span> Positive trend, at least 3 weeks</p> <p><span style="background-color: yellow; width: 20px; height: 10px; display: inline-block;"></span> Changing trend, less than 3 weeks</p> <p><span style="background-color: red; width: 20px; height: 10px; display: inline-block;"></span> Negative trend, at least 3 weeks</p>							

# Subsea Telecom & Power Cable Data

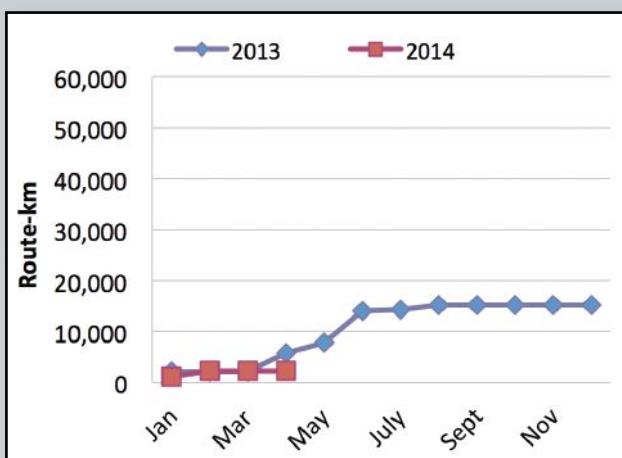
## FO Cable Awards by Month



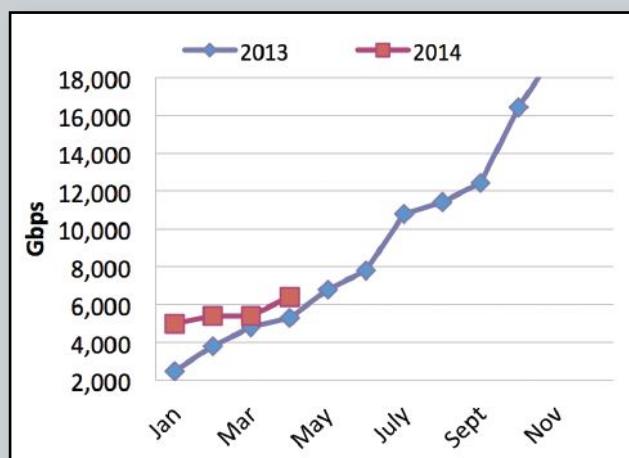
## FO Cable Announcements



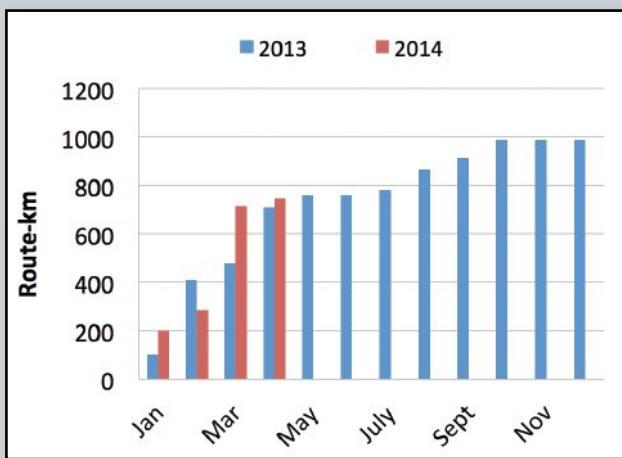
## Submarine FO Cables Entering Service in Route-km



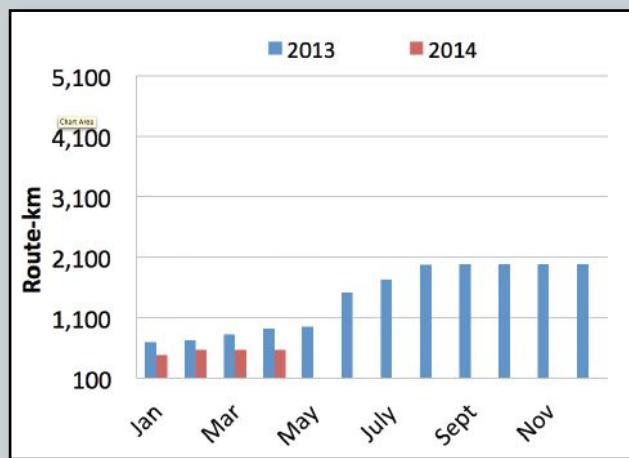
## Upgrades of Existing Cable Systems in Gbps



## Submarine Power Cable Awards in Route-km



## Submarine Power Cable Announcements in Route-km



# Gulf of Mexico Data

## Current Deepwater Activity

Operator	Area	Block	OCS Lease	Rig Name	Prospect Name	Water Depth (ft)
Shell Offshore Inc.	WR	508	G17001	NOBLE JIM DAY	Stones	9,556
Shell Offshore Inc.	AC	857	G17565	H&P 205	Great White	7,815
Shell Offshore Inc.	MC	525	G31507	NOBLE GLOBETROTTER		7,456
BP Exploration & Production, Inc.	GC	743	G15607	T.O. DEVELOPMENT DRILLER II	Atlantis	6,824
Murphy Exploration & Production Co.	DC	178	G25850	T.O. DISCOVERER DEEP SEAS		6,560
Chevron USA, Inc.	KC	829	G25814	T.O. DISCOVERER CLEAR LEADER	Buckskin	6,428
Repsol E&P USA Inc.	KC	642	G33335	ENSCO DS-5		6,124
BP Exploration & Production, Inc.	MC	778	G14658	THUNDER HORSE PDQ	Thunder Horse North	6,035
Shell Offshore, Inc.	WR	95	G25234	STENA ICEMAX	Yucatan North	5,860
Union Oil Co. of California	WR	143	G21849	T.O. DISCOVERER INDIA	Coronado	5,764
BP Exploration & Production, Inc.	MC	776	G09866	SEADRILL WEST AURIGA	Thunder Horse North	5,742
BP Exploration & Production, Inc.	MC	383	G07937	ENSCO DS-3	Kepler	5,741
BP Exploration & Production, Inc.	MC	777	G09867	SEADRILL WEST CAPRICORN	Thunder Horse South	5,719
BP Exploration & Production, Inc.	MC	778	G09867	T.O. DISCOVERER ENTERPRISE	Thunder Horse North	5,631
Eni US Operating Co. Inc.	MC	773	G19996	NABORS POOL 140	Devil's Tower	5,610
BP Exploration & Production, Inc.	GC	743	G15604	T.O. DEVELOPMENT III	Atlantis	5,414
Shell Offshore, Inc.	MC	687	G05862	CAL-DIVE Q-4000	Mensa	5,292
Chevron USA, Inc.	GC	807	G31752	PACIFIC SANTA ANA	GC 807 (Anchor Well)	5,230
Anadarko Petroleum Corp.	GC	680	G21811	BLAKE 1007	Constitution	4,968
Anadarko Petroleum Corp.	GC	726	G24184	WIRELINE UNIT (HOUma #4)	Tonga	4,674
Anadarko Petroleum Corp.	GC	726	G24184	COIL TUBING UNIT (HOUma DIST)	Tonga	4,674
Anadarko Petroleum Corp.	GC	726	G24184	ENSCO 8505	Tonga	4,674
Hess Corp.	MC	726	G24101	STENA FORTH	Tubular Bells	4,610
BP Exploration & Production, Inc.	GC	782	G15609	PRIDE MAD DOG SPAR RIG	Mad Dog Phase 2	4,428
Freeport-McMoRan Oil & Gas LLC	GC	645	G11081	HOLSTEIN SPAR RIG	Holstein	4,344
Chevron USA, Inc.	GC	640	G20082	T.O. DISCOVERER INSPIRATION	Tahiti 2	4,297
Anadarko Petroleum Corp.	GC	608	G18402	NABORS SUPER SUNDOWNER XXI	Genghis Khan	4,287
ExxonMobil Corp.	MC	211	G08803	T.O. DEEPWATER CHAMPION	Mica	4,245
BP Exploration & Production, Inc.	KC	57	G25777	SEADRILL WEST SIRIUS		4,065
Anadarko Petroleum Corp.	GC	562	G11075	T.O. DISCOVERER SPIRIT	K-2	4,017
Shell Offshore, Inc.	MC	809	G09873	NOBLE DON TAYLOR	Princess	3,853
Shell Offshore, Inc.	MC	934	G07976	ATWOOD CONDOR	Europa	3,850
Anadarko Petroleum Corp.	EB	645	G32822	ENSCO 8506	Deep Nansen	3,798
Shell Offshore, Inc.	MC	894	G24122	NOBLE DANNY ADKINS		3,787
Eni US Operating Co. Inc.	GC	385	G25142	T.O. DEEPWATER PATHFINDER	Pegasus	3,489
Noble Energy Inc.	MC	292	G08806	ATWOOD ADVANTAGE	Raton South	3,393
Marathon Oil Co.	GB	515	G20792	ENSCO 8503	Ozona	3,287
Shell Offshore, Inc.	GC	248	G15565	T.O. DEEPWATER NAUTILUS	Glider	3,233
Shell Offshore, Inc.	VK	956	G06896	NABORS 202	Ram-Powell	3,214
Shell Offshore, Inc.	GC	158	G07998	H&P 202	Brutus	2,985
Shell Offshore, Inc.	MC	807	G07963	H&P 201	Mars (Ursa/Princess)	2,945
Woodside Energy (USA) Inc.	GC	452	G28078	MAERSK DEVELOPER	Terrebonne	2,720
Shell Offshore, Inc.	GB	427	G07493	NOBLE JIM THOMPSON	Cardamom	2,719
LLOG Exploration Offshore, LLC	MC	503	G27277	NOBLE AMOS RUNNER	WhoDat	2,647
Chevron USA, Inc.	GC	205	G05911	NABORS 85 (MAYRONNE 162)	Genesis	2,590
Stone Energy Corp.	MC	29	G13997	ENSCO 8502	Cardona	2,121
Noble Energy Inc.	GC	40	G34536	ENSCO 8501		2,079
Marubeni Oil & Gas (USA) Inc.	GC	113	G15546	NOBLE DRILLER	Angus	2,045
Chevron USA, Inc.	VK	786	G12119	NABORS 87	Petronius	1,754
Anadarko Petroleum Corp.	VK	825	G05778	HELIX 534	Neptune(vk)	1,722
Anadarko Petroleum Corp.	VK	825	G05778	WIRELINE UNIT (N.O. DIST)	Neptune9(vk)	1,722
Anadarko Petroleum Corp.	VK	825	G05778	COIL TUBING UNIT (N.O. DIST)	Neptune9(vk)	1,722
Hess Corp.	GB	260	G07461	HYDRAULIC WORKOVER UNIT	Baldpate	1,648
EnVen Energy Ventures, LLC	EW	1003	G06921	NABORS S.D. XIV	Prince	1,483
SandRidge Offshore, LLC	GC	65	G05889	H&P 206	Bullwinkle	1,353
Walter Oil & Gas Corp.	VK	821	G27243	CAL-DIVE UNCLE JOHN		1,030
Apache Deepwater LLC	GB	169	G31613	DIAMOND OCEAN ONYX		919
LLOG Exploration Offshore, LLC	MC	705	G31521	DIAMOND OCEAN SARATOGA		849
Apache Deepwater LLC	GC	89	G15540	WIRELINE UNIT (HOUma DIST)	Cinnamon	671
SandRidge Offshore, LLC	EB	110	G02650	NABORS S.D. IV	Tequila	660

Deepwater prospects with drilling and workover activity: 60

Current Deepwater Activity as of Tuesday, 8 April 2014

### Activity by Water Depth

Water Depth (m)	Active Leases	Approved Applications	Active
0 to 200	1,481	35,500	2,514
201 to 400	103	1,121	20
401 to 800	270	871	10
801 to 1,000	364	580	8
1,000 & above	3,371	1,914	26

### Rig Activity Report 11 April 2014

Location	Week of 3/14	Week +/- Ago	Week +/- Ago	Year Ago
Land	1759	+5	1754	+62
Inland Waters	19	+2	17	-6
Offshore	53	+6	47	+4
U.S. Total	1831	+13	1818	+60
Gulf of Mexico	52	+6	46	+5
Canada	212	-23	235	+56
N. America	2043	-10	2053	+116
				1927

Activity by Water Depth Information current as of Monday, 7 April 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

## Successful sea trials of GSI giant piston corer

The Geological Survey of India (GSI) has recently completed successful sea trials of their new 30 m Giant Piston Corer, supplied by UK-based OSIL, for their new vessel the RV Samudra Ratnakar.

The Giant Piston Corer is capable of achieving varying core lengths of up to 42 m in soft, cohesive sediments and muds, owing to its modular core barrel (individual barrel sections are 6 m in length). The increased penetration depth of the Giant Piston Corer has made it a much sought after tool for the study of marine sediments.

The system is robust and easy to use. The corer is lowered to the seabed, where the programmable acoustic



release mechanism triggers the final free fall penetration to obtain a core sample. The unique two stage piston reduces internal friction and prevents plugging of the sample in the liners.

The vessel is undertaking a National program on High Resolutions Seabed Mapping and Natural Resource Evaluation (NHRSM & NRE) using the equipment on-board. The Giant Piston Corer is suitable for a variety of applications, including geological studies, marine chemistry, sedimentology, exploration and the study of ocean floor processes.

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

## C-Worker successfully demonstrated in the U.S.

C-Worker took to the water in Lake Conroe for its first International showcase following three highly successful demonstrations in the UK. Personnel from over 40 major oil and gas companies gathered in Houston to attend the 2-day demonstration of the revolutionary unmanned surface vehicle.

The demonstration consisted of C-Worker fitted with a Sonardyne Gyro USBL acoustic positioning system, successfully executing seabed positioning and Compatt calibration as well as station keeping and following survey lines.

Since its official launch in February, C-Worker has sparked huge amounts of International interest. The vehicle's unique capability to autonomously conduct subsea positioning, surveying and monitoring has opened up new possibilities and ways of carrying out oil and gas operations at sea.

C-Worker leverages technology from over 50 highly successful unmanned vehicles that ASV has built to date. Additional technological advancements introduced in the C-Worker include the integration of a variety of offshore payload combinations including USBL, ADCP (current meter), CTD, Multibeam Sonar, Acoustic Telemetry, and Passive Acoustic Sonar (PAM) for marine mammal detection.

The vehicles will be operated and leased by ASV with options for bare-boat and full service solutions.

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



## Proserv unveils game-changing technology for subsea intelligence



Global-leading energy technology services company Proserv has unveiled a game-changing technology for subsea control and monitoring communications, reinforcing the company's rapidly expanding subsea capabilities and world-class engineering expertise.

The Artemis 2G (A2G) subsea electronics module is a next generation controls and communications tool that uniquely frees operators from the constraints of an existing brownfield umbilical by finding additional signal capacity to enable a cost-effective field upgrade or extension. In addition, A2G offers high-speed, copper-based, multi-drop networks as a viable alternative to fibre optic infrastructures within the subsea production system.

A2G maximizes flexibility and optimizes functionality providing more powerful communications and instrument support. Furthermore, it increases accessibility for remote usage through its webpage interface from subsea to the desktop and provides advanced configuration and diagnostics to deliver unparalleled adaptable communications.

Proserv's A2G, which was revealed at the 2014 Subsea Tieback Forum in Texas, has been developed as an evolution of the company's suite of subsea control modules and is fully compliant with the latest ISO 13628 part 6, API 17F and Subsea Instrumentation Interface Standardisation. A2G can be used to co-exist with existing networks, is fully back compatible with all existing technology and does not require any proprietary software for remote configuration and support.

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

### MSI begins delivery of core components for Raytheon's Advanced PROSAS Surveyor solutions

MSI is now producing two new Synthetic Aperture Sonar (SAS) components for two systems of Raytheon Integrated Defense Systems' PROSASTM suite of sonar solutions.

Raytheon's PROSAS Surveyor family of sophisticated synthetic aperture sonar systems provides leading edge high-definition sonar capabilities for a wide range of applications. The PROSAS Surveyor 60 (PS60) and PROSAS Surveyor 175 (PS175) systems collect simultaneous side scan, SAS data and operate at 6,000 m depth. Both multi-function, wide swath systems enable coverage rates up to three times greater than conventional side scan sonar systems.

MSI's broad bandwidth piezocomposite technology enhances both range and resolution on these two systems. MSI's array design uses injection molded piezoceramic preforms and layered manufacturing techniques to reduce touch labor and facilitate electrical interconnect of 100 or more elements at the same time. Lean manufacturing techniques are also being applied to maximize production efficiency.

Raytheon's PS60 is a long-range, high-definition sonar for deep-ocean imaging operations, such as wreck searches, cable/pipeline route surveys, and exclusive economic zone (EEZ) seabed investigation. PS175 is a modular, high-definition sonar for seabed search and salvage, cable/pipeline route surveys, mine countermeasures and port and harbor security operations.

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

### Powering research with Li-ion batteries for maritime applications

Beckett Energy Systems, a division of the RW Beckett Corporation, and Nuyco Research Ltd have announced a strategic sales alliance focusing on the maritime industry applications of Beckett's Model 8224S Li-ion Battery Modules and Model 84BMS Battery Management System / Controllers.





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Beckett Energy's 24Vdc lithium-ion battery module's versatility has proven itself in many market applications. With its large 1.1 kWh (42 Ah) storage capacity, light weight less than 8 kg (17.5lb), and configurability from 24Vdc to 500Vdc, it is an ideal power source for the Maritime industry, ocean research and sea exploration. "The Maritime power industry will receive significant benefits from our lithium-ion battery technology and having the reputation of Nuytco in this market space adds significant credibility for our solutions," states Mark Kasinec of Beckett Energy Systems.

Nuytco has been successfully utilizing Beckett's lithium-ion battery packs in their Dual Deepworker manned submersible and has recently specified them for all future Nuytco built manned submersibles. Nuytco is pleased with the performance and support of the Beckett lithium-ion battery solution and as a pioneer in the industry, can leverage their substantial relationships in the market. Nuytco Research president Phil Nuytten comments, "The change-over from our conventional power system to one that offered more than twice the duration and less than half the weight was a no-brainer, and after lengthy review of contemporary competitive Li-ion systems we found that the Beckett solution offered us a significantly advanced product at a competitive cost."

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

#### **Seatonics adds Kongsberg Mesotech's M3 multibeam sonar**

Seatonics Pte Ltd, an Acteon company, has purchased Kongsberg Mesotech Ltd's M3 Sonar System to add to its Asia Pacific rental fleet. The purchase is part of an ongoing investment by Seatonics into cutting-edge technology to support its global marine equipment rental fleet growth and marks a significant improvement in



Seatonics' advanced sonar imaging and profiling capabilities.

Offering multiple sonar functional capabilities in a single compact housing, the M3 Sonar is a multibeam system that provides high-resolution and easy-to-interpret images by combining the rapid refresh rate of conventional multibeam sonar with image quality comparable to high-resolution scanning sonar. Exclusive to the M3 Sonar is a multimode function with four pre-defined operating modes (imaging, enhanced image quality, ROV navigation and profiling), which enable advanced application capability not found in any other system.

For bathymetric applications, the M3 Sonar can also be integrated with popular third-party survey data acquisition and post-processing software such as HYPACK®, HYSWEEP and CARIS® HIPs & SIPs. The system will expand customers' operational boundaries, particularly in harsh water environments.

The acquisition of the M3 Sonar System is in response to a series of successful trials. Derek Donaldson, Seatonics vice president Asia, said, "Seatonics remains committed to supporting our customers and the choice to invest in this sonar was easy. Seatonics has always enjoyed support from Kongsberg on a local level and being able to place this order in Asia allows us to further support our regional Asia offices. The Kongsberg Mesotech brand is well known in the industry and the latest M3 Sonar sets new standards in real-time imaging and profiling."

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

#### **Aquatic's first carousel project demonstrates game-changing capabilities**

Aquatic Asia Pacific Pte. Ltd, an Acteon company and subsidiary of Aquatic Engineering & Construction Ltd, has successfully completed its new carousel, the AQCS-01-1500 maiden project. Aquatic partnered with integrated subsea services provider Kreuz Subsea on the project. The carousel was successfully used to install 9.7 km of 218 mm diameter umbilical in the South Belut field offshore Indonesia for ConocoPhillips. As the installation contractor, Kreuz Subsea engaged Aquatic Asia Pacific to mobilize the modular carousel system onto the Seamec Princess Vessel and transpool the umbilical prior to sailing to the field and laying off the vessel starboard side.

The project saw the Aquatic carousel mobilized for the first time after com-



pleting its Factory Acceptance Test in Singapore. Logistically, the first offshore operation for the new carousel was more than sufficient to put it through its paces, requiring three different lengths of flexible product to be spooled onto the carousel at the start of mobilisation. Each length was connected to the next using mid-section connectors, each 8 m long. The Aquatic team met the challenges of this complex engineering operation, with representatives from Kreuz Subsea observing each stage. The entire operation from equipment mobilization through to transpooling, offshore laying and demobilization was completed within 3 weeks.

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

#### **Tritech StarFish for Z-Boat 1800**

The Oceanscience Group has unveiled the first Z-Boat 1800 remotely-operated survey boat with integrated side scan sonar, from Tritech International.

The new boat provides a shore operator with real-time high definition side scan imagery from Tritech's StarFish 990F side scan on a portable 1.8-m surface vessel.

The StarFish side scan is attached to a special skeg (keel fin) under the Z-Boat, eliminating the need for a dedicated hull mounted transducer. In addition, the compact size of the StarFish topside box means that a single or dual frequency single beam echosounder can still be accommodated on the Z-Boat.

Adrian McDonald, Oceanscience Group, Z-boat comments: "Adding side scan capability was a natural progression for our development of the Z-boat and the Tritech side scan sonar was selected owing to its small size and good shallow-water performance."

Z-Boats with single beam echosounders are in operation around the world and can perform shallow water hydrographic surveys in natural and industrial water environments.

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

## Atkins chooses AVEVA Everything3D and AVEVA Laser Modeller

Atkins, one of the world's leading design, engineering and project management consultancies, has chosen AVEVA Everything3D (AVEVA E3D) and AVEVA Laser Modeller software to support Lean Construction processes. Atkins has already executed many successful projects on AVEVA PDMS and is keen to increase its delivery standards with AVEVA E3D. Key capabilities that persuaded Atkins to migrate to AVEVA E3D were its 'BubbleView' laser scan imagery and the tight integration of AVEVA Laser Modeller, which enables laser scans to be readily converted into intelligent, as-built 3D design models.

"We've had a long and productive relationship with AVEVA and are excited to deploy even more advanced AVEVA technology on some of our high-profile projects," said Nick Wells, operations director, Atkins. "The ability to have laser scan data directly integrated into the AVEVA E3D design environment is very impressive. This enables our designers to immediately

understand and work with accurate data, minimizing rework in the design office, the fabrication yard and the construction site. The BubbleView technology provides an accurate and photorealistic view of the laser scans; integrated in the 3D design environment, this will help our designers to understand exactly how new design fits with the currently installed or fabricated plant."

"Atkins is a great example of how a major engineering and design consultancy can adopt the principles of Engineering and Design for Lean Construction across its client portfolio," said Hanno Tam, vice president SEA & Australasia, AVEVA. "Laser scan data that is available across the entire project lifecycle can dramatically reduce discrepancies between designers, contractors and fabricators by enabling them to quickly and correctly respond to changing circumstances. Engineers can position new designs and run clash checks against the existing plant. This will, in turn, minimize rework, drive quality and directly benefit the returns realized across the project."

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

## MacArtney to distribute LISST instruments in Scandinavia

MacArtney is pleased to announce the entry of an exclusive representative agreement with Seattle-based oceanographic instrument manufacturer, Sequoia Scientific Inc., to distribute the full range of LISST laser particle sizers and other Sequoia products in Denmark, Norway, Sweden, Finland and Iceland.

For two decades, Sequoia has held the position as the world's only manufacturer of portable, field, and submersible laser particle sizers. The company is primarily renowned for its LISST product range, which boast an extensive track record of use for environmental monitoring, industrial, and scientific applications across the globe.

With group headquarters in Esbjerg, Denmark, and Norwegian operations located in Stavanger, Norway, MacArtney is well geared for supplying LISST solutions to major North Sea and Norwegian Continental Shelf based offshore oil, gas and renewable energy operators.

Furthermore, empowered by expert ocean science staff, MacArtney is looking to harness the vast potential of sup-

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plying LISST solutions to Scandinavian and Icelandic science institutes, authorities, applications and projects. What is more, MacArtney is confident that LISST products will provide a welcome addition to the toolkit of Scandinavian hydroelectric power plant operators.

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

#### Comtech EF Data introduces new CDM-570A and CDM-570AL satellite modems

Comtech EF Data Corp. announced the introduction of two new entry-level satellite modems, the CDM-570A and CDM-570AL. These next generation models provide industry-leading performance and flexibility in a 1RU form factor. While the units are priced very competitively, they offer tremendous value via an innovative feature set.

The CDM-570A and CDM-570AL are the first Comtech EF Data modems in the entry-level category to support DoubleTalk Carrier-in-Carrier bandwidth compression, VersaFEC® low-latency LDPC advanced Forward Error Correction, and optimized transmit filter rolloff. DoubleTalk Carrier-in-Carrier is based on Raytheon Applied Signal Technology's patented "Adaptive Cancellation" technology, which allows transmit and receive carriers of a duplex link to share the same transponder space. Also available with these new modems is optimized transmit filter rolloff, specifically 5%, 10%, 15%, 20%, 25% and 35%. The combination of technologies enables multi-dimensional optimization and can provide over 50% bandwidth savings when compared to legacy modems.



Heading Reference Systems (AHRS) that were launched at Oceanology International in London. Seatronics has also taken options on a further 38-units which takes the total projected purchase to 50 systems.

The new Saturn systems are available in two versions with surface and subsea models for each. The Saturn 10 systems are designed to support the offshore construction, ROV, surface navigation and multibeam survey sectors where reliability, competitive pricing and performance are essential.

The Saturn 30 is designed as a solid-state attitude and heading reference system (AHRS) for primary surface and subsea navigation. It is a compact and highly reliable unit which makes it ideal for all sizes of vessel and especially for smaller craft such as fast ferries, yachts and small patrol craft where space is at a premium.

Saturn has been based upon state-of-the-art fibre-optic gyro technology that has been developed and manufactured by Teledyne TSS at its modern headquarters in Watford, UK. The Saturn product family also incorporates advanced digital signal processing and algorithm design to deliver a highly accurate and reliable product to meet the demanding needs of the marine and offshore market. All units are compact, lightweight in both air and water and provide a superior alternative to other products currently on the market.

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

Given the feature set and value, the CDM-570A and CDM-570AL Satellite Modems are geared towards a range of users, including enterprise, ISPs, satellite service providers, offshore, maritime and mobile operators. As the products continue to evolve, additional functionality and options to optimize networks will be available.

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

#### Seatronics goes for Teledyne TSS

Aberdeen-based global rental and marine technology supply company, Seatronics Ltd has placed an order with Teledyne TSS for 12 of the new Saturn 30 Subsea Attitude and

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Given the feature set and value, the CDM-570A and CDM-570AL Satellite Modems are geared towards a range of users, including enterprise, ISPs, satellite service providers, offshore, maritime and mobile operators. As the products continue to evolve, additional functionality and options to optimize networks will be available.

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

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### LinkQuest delivers a TrackLink 5000HA System

LinkQuest recently delivered a TrackLink 5000HA long-range USBL acoustic tracking system to Israel Oceanographic & Limnological Research (IOLR). After delivery, the system was immediately installed and commissioned successfully by IOLR.

The TrackLink 5000HA system is a long-range USBL tracking system capable of reaching a range of 5000 m.

IOLR is a non-profit governmental research institute that primarily monitors and conducts research of the marine and fresh water environments. Currently, IOLR plans to use the TrackLink 5000HA USBL system with towed geophysical equipment in the research of the Levant continental margin (SE Mediterranean), especially assessing the risks of submarine slides on the continental slope. The geophysical equipment will also be used by the Israeli universities and students for conducting their own research.

The TrackLink 5000HA system will also be used with IOLR's sampling equipment of the water column and the shallow sub-bottom. It will be connected to CTD, Box core, Piston core and towed nets. These types of sampling activities are mainly conducted during IOLR's yearly monitoring studies of the water quality, marine organisms and sub-surface of the Levant margin.

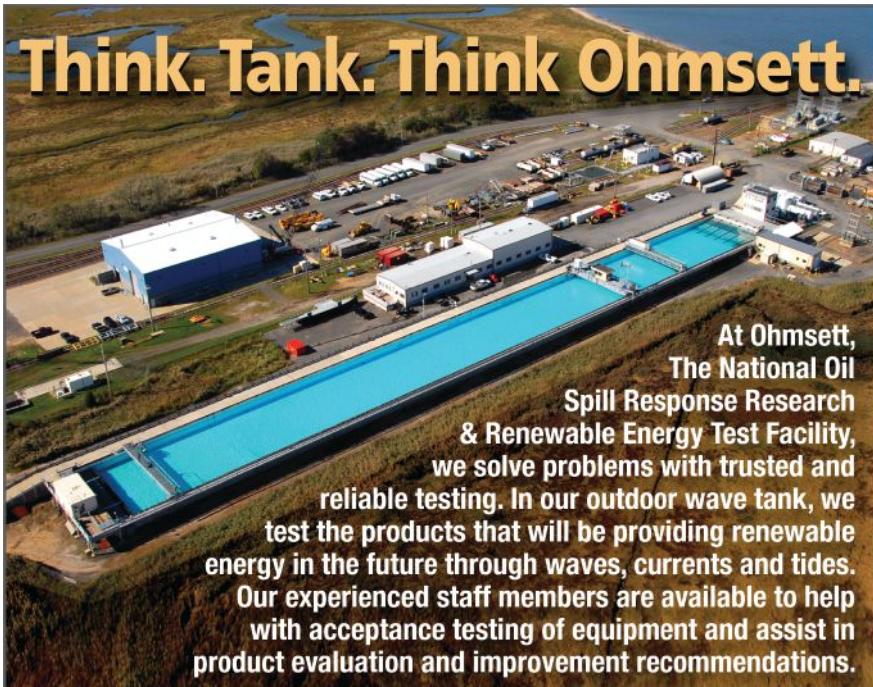
With advanced Broadband Acoustic Spread Spectrum technology and highly accurate and robust field performance, LinkQuest's TrackLink systems are the world's best selling USBL positioning systems, widely used by research organizations, universities, government agencies and commercial companies worldwide.

For more information, please visit [www.link-quest.com](http://www.link-quest.com).



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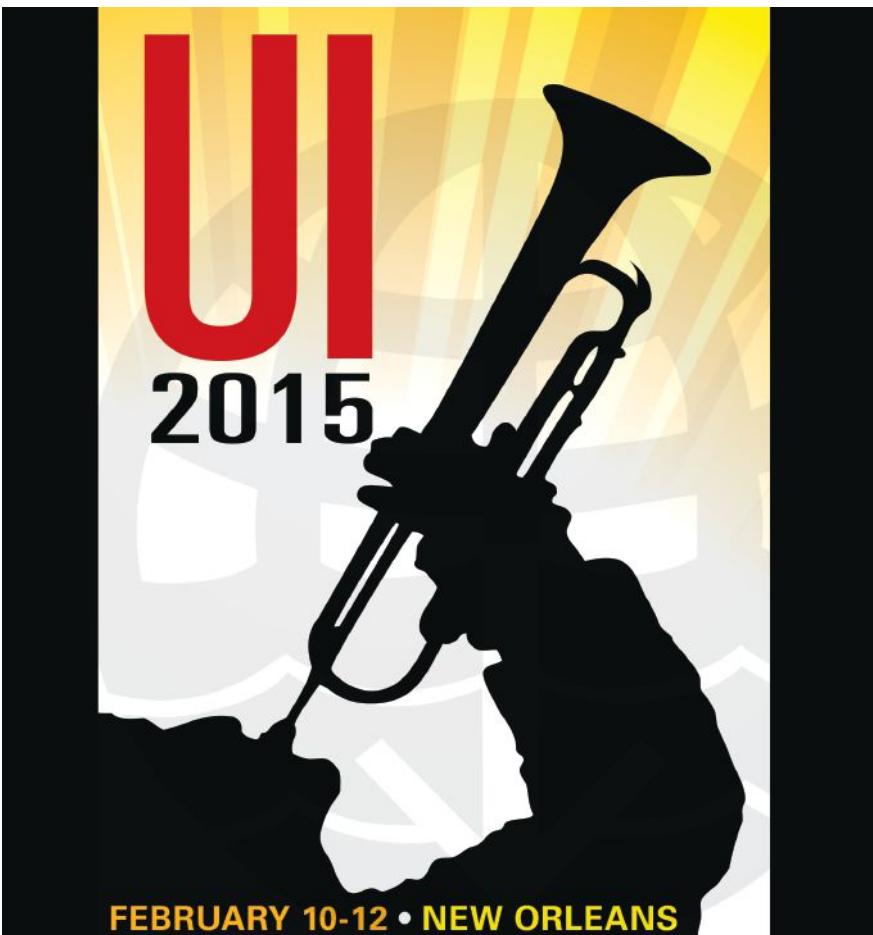


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## Xeos Technologies announces world's first Iridium recovery beacon rated to 11,000 m

Xeos Technologies Inc., a global exporter of high quality environmental monitoring products, has just upgraded the depth rating of one of its new oceanographic beacons for extreme environments. The XMi-11K Sub-surface Iridium Recovery Beacon is a lightweight, small size recovery beacon which is able to be submerged to 11,000 m (or 11 km) below sea level.

The XMi-11K is primarily used for asset protection and detection of surfacing events. It is able to detect when it surfaces using Xeos' proprietary water sense circuit, field proven in all oceans and seas around the world. Once the protected asset reaches the surface, it begins transmitting Global Positioning Satellite (GPS) locations via the Iridium satellite communications system. The two-way Iridium communication system allows users to send commands to the surfaced beacon, changing its configuration settings.

The XMi-11K was developed in response to customer requirements for smaller, more versatile mooring asset beacons with global tracking capability. The Iridium satellite communication system was chosen because of its truly global nature, allowing communication even from Polar Regions. XMi-11K includes the ability to send messages to a web-enabled monitoring platform, Xeos Online, or via email.

The XMi-11K features an all-titanium enclosure for durability and resistance to pressure at depths, custom-designed titanium, dual-band Iridium and GPS antenna, and user-replaceable standard alkaline batteries. At only 910g in water including batteries (1407 g in air), the XMi-11K can fit a wide range of moorings or sub-surface vehicles.

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The XMi-11K is available with a remote head which separates the electronics from the battery pack with a 6' waterproof cable. The remote head allows for easier weight management on submerged platforms as well as more complex installations on existing underwater vehicle moorings.

The XMi-11K joins the MicroBeacon line which includes the XMA-11K Argos Subsurface Beacon, the XMF-11K LED Flasher and the XMB-11K RF Subsurface Beacon, all of which can be submerged to 11,000 m below sea level.

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

## iXBlue extends inertial-acoustic solution offerings and releases next generation

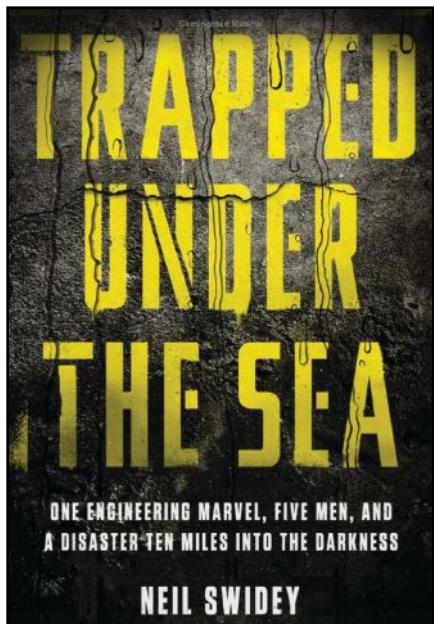
iXBlue, a leading provider of navigation, positioning, and mapping solutions, is launching the next-generation mediumfrequency RAMSES, a long synthetic baseline positioning system for ROV/AUV navigation, offshore oil and gas support, metrology, and other demanding subsea applications. The system can be tightly coupled with iXBlue inertial navigation systems (INS) and delivers extreme precision and robustness in challenging acoustic operational environments. Available in MF and LF versions (medium frequency for most applications and low frequency for ultra-long range applications), RAMSES is part of iXBlue's inertial-acoustic solutions for underwater positioning and navigation.

The next-generation product offers a variety of new features, such as sparse-array positioning and more open architecture with greater interoperability, making it more versatile, faster to deploy and easier to use—all of which translates into genuine cost savings for RAMSES users. For an iXBlue complete inertial-acoustic solution for ultra-short baseline (USBL) positioning applications, RAMSES MF can be combined with iXBlue fourth-generation USBL GAPS and OCEANO MF transponders; alternatively, RAMSES LF can be combined with POSIDONIA and OCEANO LF transponders.

In the past, for the best performance, systems have required six or more transponders to provide the necessary redundancy and reliability, and several hours have had to be set aside to deploy the transponders and calibrate their relative or absolute positions. The advantage of the latest RAMSES system is that it provides the same accuracy as previous systems with fewer transponders (sparse array). Further, through the all-in-one self-contained on-board computing engine (no need for umbilical) and the use of innovative algorithms and Kalman filtering techniques, the transponders can be fully calibrated by performing a simple "box-in" around the entire (sparse) array.

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





### Trapped Under the Sea: One Engineering Marvel, Five Men, and a Disaster Ten Miles Into the Darkness

By Neil Swidey

This is the harrowing story of five men who were sent into a dark, airless, miles-long tunnel, hundreds of feet below the ocean to do a nearly impossible job—with deadly results.

A quarter-century ago, Boston had the dirtiest harbor in America. The city had been dumping sewage into it for generations, coating the seafloor with a layer of “black mayonnaise.”

In the 1990s, work began on a state-of-the-art treatment plant and a 10-mile-long tunnel—its endpoint stretching farther from civilization than the earth’s deepest ocean trench—to carry waste out of the harbor. With this impressive feat of engineering, Boston was poised to show the country how to rebound from environmental ruin. But when bad decisions and clashing corporations endangered the project, a team of commercial divers was sent on a perilous mission to rescue the stymied cleanup effort. Five divers went in; not all of them came out alive.

Drawing on hundreds of interviews and thousands of documents collected over 5 years of reporting, award-winning writer Neil Swidey takes us deep into the lives of the divers, engineers, politicians, lawyers, and investigators involved in the tragedy and its aftermath, creating a taut, action-packed narrative.

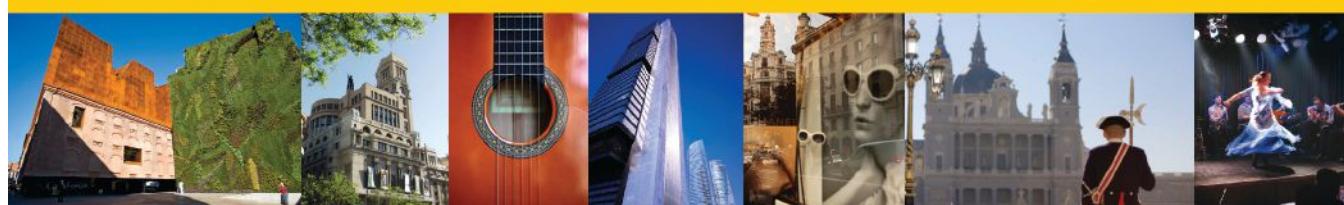
Crown; ISBN-10: 0307886727  
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**Victor Aquina**, Hertel Caspian region managing director and former Nacap chief executive officer, is Hertel's new CEO. He succeeded **Paul Broekhuijsen**, who joined the company in April 2011 and led it through a major reorganization. "With Victor Aquina... we have an excellent successor, who already knows the business quite well," the company's supervisory board said in a prepared statement. Aquina joined Hertel in May 2013. He has extensive international experience from his previous positions in senior management at Philips Electronics, Mondi Group, as well as at Nacap.

Air and steam equipment rental specialist Airpac Bukom Oilfield Services appointed **Chris Taylor** as director for the Americas. He will help broaden the company's portfolio of activity within the Americas oil and gas market sector for Airpac Bukom. Taylor last worked for Coates Offshore as head of business development, emerging markets. Previously, he worked as the business development director at Scantech Offshore, focusing on its activities in Africa and Latin America.

An Obama administration official who oversees offshore oil leasing and

helped shake up federal agencies after the Deepwater Horizon disaster is now joining Interior Secretary Sally Jewell's inner circle. **Tommy Beaudreau**, acting assistant secretary of land and minerals management at the Interior Department, is set to become the secretary's chief of staff, succeeding **Laura Daniel Davis**, a 5-year veteran of the post. Beaudreau is a lawyer who first joined the Interior Department in June 2010 to oversee the reorganization of the former Minerals Management Service after the Deepwater Horizon disaster in the Gulf of Mexico. Later, he was tapped as the first director of the new Bureau of Ocean Energy Management, which handles offshore energy leasing, and then he took over the acting assistant secretary post.

**Charles Nugent**, 52, was appointed vice president, manufacturing, for GE Oil & Gas, reporting to Lorenzo Simonelli, senior vice president and chief executive officer of GE Oil & Gas. Nugent has been with GE for 30 years, holding a number of leadership roles in plant management and operations with GE



Beaudreau

Aviation. Most recently, he served as senior executive, product management at GE Aviation. Nugent holds a bachelor's degree in electrical engineering from Michigan State University and a master's degree in engineering from the University of Cincinnati.

JP Energy Partners appointed **Patrick Welch** as the company's executive vice president and chief financial officer. Welch has been serving as the interim CEO for the company since last November. He brings over 24 years of energy industry finance and accounting experience. Most recently he served as a managing director at Opportune LLP, a financial consultancy firm focused exclusively on the energy sector, where he focused primarily on providing IPO readiness services to energy companies. Welch previously served as CEO for Atlantic Power Corp., a publicly traded independent power producer and for a privately-held renewable energy development and construction company. Prior to Atlantic Power, Welch was vice president and controller of DCP Midstream and DCP Midstream Partners in Denver, Colorado, where he was responsible for the accounting and public reporting functions of the company.

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AML Oceanographic of Sidney, BC, Canada is proud to announce the promotion of **Dustin Olander**, PhD, to director of engineering. Olander earned his PhD in Mechanical Engineering from the University of Victoria, after which he worked for several years designing instruments and sensors in the forestry sector



Olander

for FPI Innovations. He joined AML in October of 2011, and after 2.5 years as mechanical designer of AML's oceanographic instrumentation, he now takes the helm of the entire engineering team. His experience in technical project management, product development, and research, combined with a thorough understanding of oceanographic technology and its applications will assist him in guiding his team to continue to create innovative products for the ocean sensing market.

InterMoor, an Acteon company, has appointed **Duncan Cuthill** as general manager of InterMoor Marine Services Ltd in the UK. Mr.



Cuthill

Cuthill will report directly to Alan Duncan, managing director of InterMoor, and will be responsible for InterMoor Marine Services in the UK and Mediterranean regions. Mr. Cuthill has a bachelor's degree in management systems from the Open University, a Post Graduate Diploma in systems practice and is a Master Mariner with extensive experience in the offshore oil and gas industry. Following a 17-year seagoing career, he began a 10-year career at Trident Offshore in 1992, including 5 years as operations director.

Seanic Ocean Systems is proud to announce the addition of **Todd G. Holtz** as manager of development of standard products. Mr. Holtz brings over 20 years of experience in ROV tooling, general engineering, and manufacturing knowledge to the growing Seanic engineering team. Mr. Holtz began his technical training after enlisting in the U.S. Navy. While serving, he worked on the repair and manufacture of components for the Navy's surface and nuclear submarine fleet. This sparked an interest in machining and manufacturing that became the foundation for his passion for product development. He moved to Houston in the late 90's and where he worked for several innovative ROV firms, including a 16 year tenure with Oceaneering.

CSA Ocean Sciences Inc. (CSA) is pleased to announce the addition of **Melisa Reiter** as regional manager in the Tampa Bay area. Ms. Reiter will work closely with CSA's scientific and business development staff to assist in the growth and diversification of CSA services along Florida's west coast. In addition to expanding the client base, she will be involved in project management and supporting ongoing work efforts.

NCS Survey, an Acteon company, has appointed **Simon Goldsworthy** as business development



Goldsworthy

manager in its Aberdeen office. Goldsworthy will be responsible for building relationships with existing and potential clients and growing NCS Survey's presence in the offshore industry globally. Having been active in the offshore industry for more than 18 years, he has already demonstrated a successful track record in new business development. Before joining NCS Survey, Goldsworthy was in global commercial roles within both Sonardyne International and Teledyne TSS.

**Horizon Marine, Inc.** is pleased to announce the opening of its Brazilian office and the hiring of **André Gellers** as country manager. Gellers has worked for more than 10 years supporting the Brazilian oil & gas industry, managing projects related to environmental licensing, emergency response, oceanographic monitoring, and logistics. During that time, he gained a deep understanding of the Brazilian market and formed a solid network with players from Petrobras and the IOCs operating in the country, as well as the industry's supply chain. He earned a degree in business administration from FGV (Fundação Getúlio Vargas) and an MBA in environmental management from PROENCO/LNCC, both in São Paulo.

**Bibby Offshore** has further expanded its operations in Westhill, Aberdeenshire, with the opening of a purpose built workshop and warehouse facility this month. Named The Hangar, the building has been leased for 15 years and has in excess of 50,000 sq.ft, including storage, workshops, warehouse, office space, a yard and maintenance facilities. In addition to the lease agreement, the firm has further invested in the facilities; fitting it out with a 16 tonne Gantry Crane, and five separate workshops for various specialties including fabrication, hydraulics, electronics, dive hats and diver umbilical's.

**Trelleborg's** marine systems operation has opened a new sales and business development office in Houston. Citing growth in the region as a strategic priority, Trelleborg Marine Systems' U.S. president, Faiyaz Kolsawala, will relocate to Houston as will a number of its global sales team. Among them will include a specialist docking and mooring representative and an oil and gas transfer and vessel technology salesperson to provide a closer relationship with customers in the area. Trelleborg will further strengthen its Houston-based sales team with several new appointments.

Driven by a major strategic expansion of its operations in Singapore, the **MacArtney Group** is significantly growing its presence and activities in all Asian markets for underwater technology. Over the next few months, MacArtney Singapore is securing several new staff members, implementing a major expansion of stock and workshop facilities and opening a dedicated slip ring repair and service center. What is more, the MacArtney Singapore operations will be streamlined to provide direct local access to global MacArtney support for all Asian and Asia Pacific markets.

Leading international energy services company, **Global Energy Group**, is launching a new offshore diving division to expand its existing inshore diving operations. Representing a multi-million pound investment by the highly successful Scottish-based group, Global Diving will deliver services for the offshore oil and gas and renewables sectors in the UK and worldwide. Global is confident there are strong opportunities in both of its key target markets for offshore air and nitrox diving in the construction, maintenance and inspection services they are offering.

**Hicks Equity Partners** (HEP), a private equity firm led by the Thomas O. Hicks family, announced that its portfolio company, **Directional Rentals, Inc.**, has acquired **Reamco, Inc.**, a company based in Lafayette, Louisiana that manufactures, rents and refurbishes downhole drilling tools and related products used in the drilling industry. Directional Rentals, Inc., a leading oilfield services company, has also been renamed Drilling Tools International (DTI) to more accurately reflect the company's mission of renting, manufacturing and selling drilling tools used in bottom hole assemblies to the world's leading oilfield services companies, independent directional drillers and exploration companies, both onshore and offshore.

# CALENDAR & EVENTS

May 5-8, 2014 <b>Offshore Technology Conference</b> Houston, TX www.otcnet.org	June 3-5, 2014 <b>Energy Ocean International</b> Atlantic City, NJ www.energyocean.com	August 25-28, 2014 <b>Offshore Northern Seas</b> Stavanger, Norway www.ons.no/2014
May 12-15, 2014 <b>AUVSI's Unmanned Systems N.A.</b> Orlando, FL www.auvsi.org	June 10-12, 2014 <b>Capitol Hill Ocean Week</b> Washington, D.C. www.nmsfocean.org/CHOW-2014	September 3-5, 2014 <b>Oceanology International China</b> Shanghai, China www.oichina.com.cn
May 15-16, 2014 <b>ICMSA</b> Amsterdam, The Netherlands www.waset.org	June 10-12, 2014 <b>SeaWork International</b> Southampton, UK www.seawork.com	September 14-19, 2014 <b>Oceans '14 MTS/IEEE</b> St. John's, Newfoundland www.oceans14mtsieestjohns.org
May 20-22, 2014 <b>MAST EurAsia 2014</b> Istanbul, Turkey www.mastconfex.com	June 10-12, 2014 <b>UDT</b> Liverpool, UK www.udt-global.com	October 7-9, 2014 <b>AWEA Offshore Windpower</b> Atlantic City, NJ www.awea.org
May 21-22, 2014 <b>All Energy</b> Aberdeen, UK www.all-energy.co.uk	June 11-12, 2014 <b>Global Offshore Wind</b> Glasgow, UK www.renewableuk.com	October 13-17, 2014 <b>Sea Tech Week</b> Brest, France www.seatechweek.com/
June 2-4, 2014 <b>Submarine Cable Forum</b> Miami, FL www.marcusevans-conferences.com	August 12-14, 2014 <b>Deepwater Intervention Forum</b> Galveston, TX www.deepwaterintervention.com	October 14-16, 2014 <b>Deep Offshore Technology International</b> Aberdeen, Scotland www.deepoffshoretechnology.com

May 2014

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Ocean News & Technology

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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

**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  
 I. EDUCATION INSTITUTION / LIBRARY  
 J. GOVERNMENT MILITARY  
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 R. COMPUTER SERVICES/SOFTWARE  
 S. OCEAN RENEWABLES  
 T. SUBSEA IRM  
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 Z. OTHER (specify) \_\_\_\_\_

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# 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  
**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; Submarine Cable Forum; International Conference on Ocean Energy  
**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:** Underwater Intervention  
**Product & Services Focus:** Diving Equipment & Services; Buoyancy Materials; Construction & Repair Services

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



#### **North America**

[MacArtney Inc.](#)  
Houston, TX, USA  
Tel: +1 713 266 7575  
[mac-us@macartney.com](mailto:mac-us@macartney.com)  
[www.macartney.com](http://www.macartney.com)

*For more than 35 years, SubConn® wet mateable connectors have been the number one connector supplier for the underwater industry. The range features standard circular, micro, low profile, metal shell, power and ethernet connectors, penetrators and custom connectors for special applications. Worldwide SubConn® sales and support is provided exclusively by the MacArtney Group.*

#### [Teledyne ODI - A Teledyne Technologies Company](#)

1026 North Williamson Blvd.  
Daytona Beach, FL 32114  
Tel: +1 386 236 0780  
Fax: +1 386 236 0906  
Toll Free: (888) 506 2326  
E-mail: [ODI\\_marketing@teledyne.com](mailto:ODI_marketing@teledyne.com)  
Website: [www.odi.com](http://www.odi.com)



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

#### [Teledyne Oil & Gas](#)

1026 North Williamson Blvd.  
Daytona Beach, FL 32114  
Tel: +1 386 236 0780  
Fax: +1 386 236 0906  
Toll Free: +1 888 506 2326  
E-mail: [oilandgas@teledyne.com](mailto:oilandgas@teledyne.com)  
Website: [www.teledyneoilandgas.com](http://www.teledyneoilandgas.com)



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

### **DATA ACQUISITION**

#### [Geometrics, Inc.](#)

2190 Fortune Drive  
San Jose, CA 95131  
Tel: +1 408 954 0522  
Fax: +1 408 954 0902  
E-mail: [sales@geometrics.com](mailto:sales@geometrics.com)  
Website: [www.geometrics.com](http://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.*

## DIVING & MEDICAL TRAINING COURSES

### Interdive Services Ltd & InterMedic Services UK

3 Stoke Damerel Business Centre  
5 Church Street, Stoke Plymouth  
Devon, PL3 4DT, Great Britain  
Tel: +44 1752 55 80 80  
Fax: +44 1752 56 90 90  
E-mail: vanessa@interdive.co.uk or diving@interdive.co.uk  
Website: www.interdive.co.uk  
Contact: Ms. Vanessa Yardley



*High quality marine related training courses approved by HSE, IMCA, JDS, NPD, MCA and RYA. Training from basic to advanced levels (including hospital based) by friendly & experienced instructors. Training providers to UK Ministry of defense. Training on your site, at our facilities, inhouse or overseas. Also, experienced diver assessments and Offshore Medic course.*

## FIBER OPTIC PRODUCTS

**BGB Technology Inc.**  
1060 Port Walthall Drive  
Colonial Heights, VA 23834  
Tel: +1 804 451 5211  
E-mail: sales@bgbtechnology.com  
Website: www.bgbtechnology.com and www.bgbengineering.com



*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.*

### Moog Components Group

77 Frazee Avenue  
Dartmouth, Nova Scotia  
Canada B3B 1Z4  
Toll free: +1 800 361 2263 USA,  
Toll free: +1 888 302 2263 Canada  
Tel: +1 902 468 2263, Fax: +1 902 468 2249  
E-mail: mcg@moog.com  
Website: www.moog.com/marine  
Contact: John Purdy



*Moog Components Group now offers Focal™ and Prizm™ marine products for demanding projects. Fiber Optic Rotary Joints (multi-channel, pressure compensated). Electrical slip rings (explosion proof, purged, oil filled, connectors, junction boxes). A wide range of multiplexers. Fluid rotary unions. Integrated units (electrical, fluid and fiber in one convenient package). Advanced CAD systems for rapid development of products. A leader in technology, performance and reliability.*

### SeaView Systems

7275 Joy Road, Suite A  
Dexter, MI 48130, USA  
Tel/Fax: +1 734 426 8978  
E-mail: info@seaviewsystems.com  
Website: www.seaviewsystems.com  
Contact: Matthew Cook



*SeaView Systems Fiber Optic Multiplexer: PC-104 PCB assembly supports 3 channels SD video, 100mb Ethernet (onboard 2 port switch), 8 serial (RS-232 and RS-485 with onboard conversion) and two high speed trigger channels. Easy: Baud-rate tolerant circuitry. No DIP switches. Flexible: Options for HD-SDI and Gigabit Ethernet. Reliable: Robotically assembled and thoroughly tested. Cost: Affordable!*

## GYRO COMPASSES

### iXBlue

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



### OCTANS, IMO-certified survey grade gyrocompass

- true North-seeking FOG unit
- complete motion sensor
- calibration and maintenance-free

*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

## Teledyne TSS Ltd.

1 Blackmoor Lane  
Croxley Business Park  
Watford, Hertfordshire WD18 8GA  
Tel: +44 (0) 1923 216020  
Fax: +44 (0) 1923 216061  
E-mail: tssales@teledyne-tss.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.

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# OCEAN INDUSTRY DIRECTORY

ON&T's Product & Service Directory

## 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, Academic and commercial organizations. OMI's primary product line is multi-beam imaging sonars made by Sound Metrics of Bellevue, WA www.soundmetrics.com*

### ROMOR Ocean Solutions

51 Raddall Ave, Unit 10  
Dartmouth, Nova Scotia  
Canada B3B 1T6  
Tel. +1 (902) 466-7000  
Fax. +1 (902) 466-4880  
Email: Sales@romor.ca  
Website: www.romoroceansolutions.com  
Contact: Darrin Verge, President & CEO



*ROMOR Ocean Solutions provides instrumentation solutions for the geophysical, oceanographic, defense, security, oil & gas, and renewable energy industries. By partnering with world renowned manufacturers, ROMOR is able to offer technical knowledge, value added services, logistics expertise, and the most reliable instrumentation on the market.*

## 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.*

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### CSA Ocean Sciences Inc.

8502 SW Kansas Avenue  
Stuart, FL 34997  
Tel: +1 772-219 3000  
Fax: +1 772-219 3010  
E-mail: t.martin@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.*

## MOTION SENSING EQUIPMENT

### iXBlue

Tel: +33 (0) 1 30 08 88 88  
Fax: +33 (0) 1 30 08 88 01  
Website: 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

Pirsentet  
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  
Contact: Finn Otto Sanne at finn.otto.sanne@kongsberg.com



KONGSBERG

*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  
Website: www.teledyne-tss.com  
Contact: Carolyn Jones



**TELEDYNE TSS**  
Everywhereyoulook™

**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 Rajput Place, Victoria  
BC, Canada V8M 1Z5  
Phone: +1 250 656 0177  
Fax: +1 250 656 2162  
Email: asl@aslenv.com  
Web: 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-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  
Website: 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 or Gouven Prud'homme - 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

### Nortek AS

Vangkroken 2  
1351 Rud, Norway  
Tel: +47 6717 4500  
E-mail: inquiry@nortek.no



*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  
Website: 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 Scientific

13431 NE 20th St.  
Bellevue, WA 98005  
Tel: +1 425 643 9866  
Fax: +1 425 643 9954  
E-mail: info@sea-birdscientific.com  
Website: www.sea-birdscientific.com  
Contact: Calvin Lwin, Sales



**SEA-BIRD**  
SCIENTIFIC

*Sea-Bird Scientific, comprised of Sea-Bird Electronics, WET Labs, and Satlantic, provides integrated solutions to customers' measurement needs. Sea-Bird Scientific is the leader in accurate, stable ocean instruments for measuring conductivity (salinity), temperature, pressure, oxygen, pH, chlorophyll, CDOM, turbidity, beam attenuation, irradiance, radiance, PAR, nitrate, and phosphate. Our CTD profilers, water samplers, moored CT recorders, wave/tide recorders, DO sensors, and optical sensors are used by research institutes, ocean observing programs, government agencies, and navies globally.*

### Star-Oddi

Skeidarars 12, 210  
Gardabaer, Iceland  
Tel: +354 533 6060  
Fax: +354 533 6069  
E-mail: baldur@star-oddi.com  
Website: 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  
Website: 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  
Website: 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  
Website: 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: Timmy 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.

### 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  
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

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Fax: +33 (0) 1 30 08 88 01  
Website: 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  
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



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  
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.

### 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  
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



#### 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

# OCEAN INDUSTRY DIRECTORY

ON&T's Product & Service Directory

## 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  
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, PLEM's 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  
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 experience 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@subseaamerica.com  
Website: www.subseaamericas.com  
Contact: Charles Mayea



Subsea Americas (SSA) is a leading provider of rental ROV tooling equipment on a worldwide 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

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### SEACON Advanced Products, LLC.

1321 Nellus 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



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

## UNDERWATER VEHICLES/AUVS

### Exocetus Development LLC

1444 East 9th Avenue  
Anchorage, AK 99501  
Tel: 858-864-7775  
Fax: 907-569-0268  
Contact Ray Mahr  
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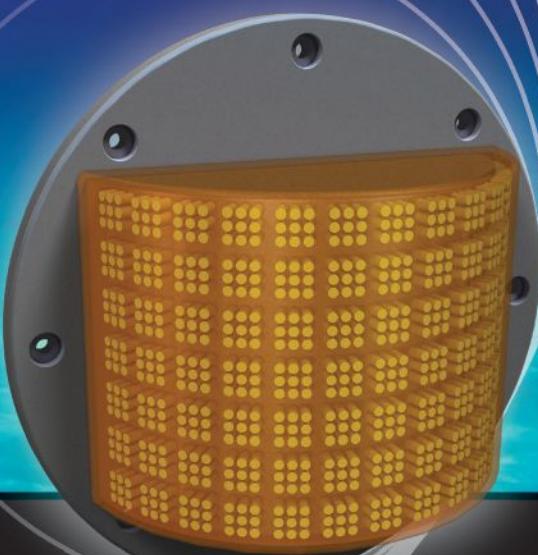


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