

March 2011

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Lithium Batteries Drive
Oceanographic Technology
Full Speed Ahead

Feature Story – Page 10

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Pictured : Joe Haxel (left) and Oregon State University's lost Hydrophone recovered from a depth of 175 feet by Dennis Lancaster of Water Work Resources, LLC (right) and Craig Thorngren (not pictured) of Submerged Recovery & Inspection Services along with all it's data using a VideoRay Pro 4 ROV with imaging sonar to attach a recovery line in September 2010.

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SportScan image of "Dundee" shipwreck in Lake Erie

Courtesy of David VanZandt and Kevin Magee of the Cleveland Underwater Explorers (CLUE)

YellowFin image of a shipwreck in Lake Ontario

Courtesy of Dan Scoville and Jim Kennard



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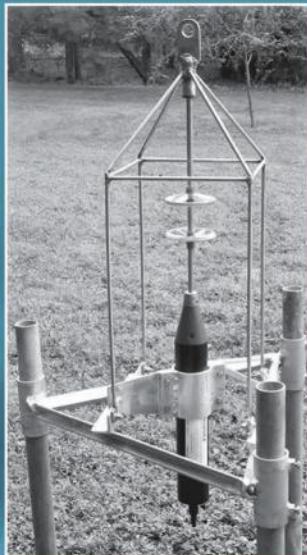
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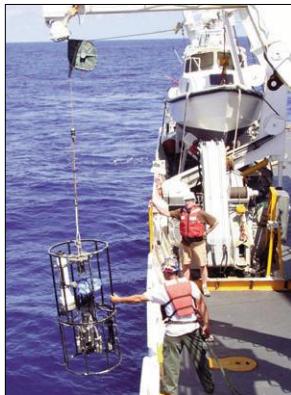
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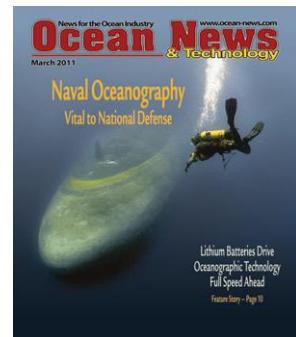
Feature Story



10 Lithium Batteries Drive Ocean Technology Full Speed Ahead

AWACs can measure the full profile of ocean currents, waves, and ice thickness and are equipped with four hybrid lithium battery packs, each containing 2,000 Wh of power.

Cover Photo



Cover photo

Diver and Submarine

Source: Stocktrek

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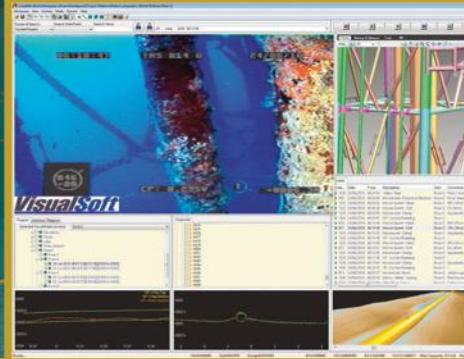
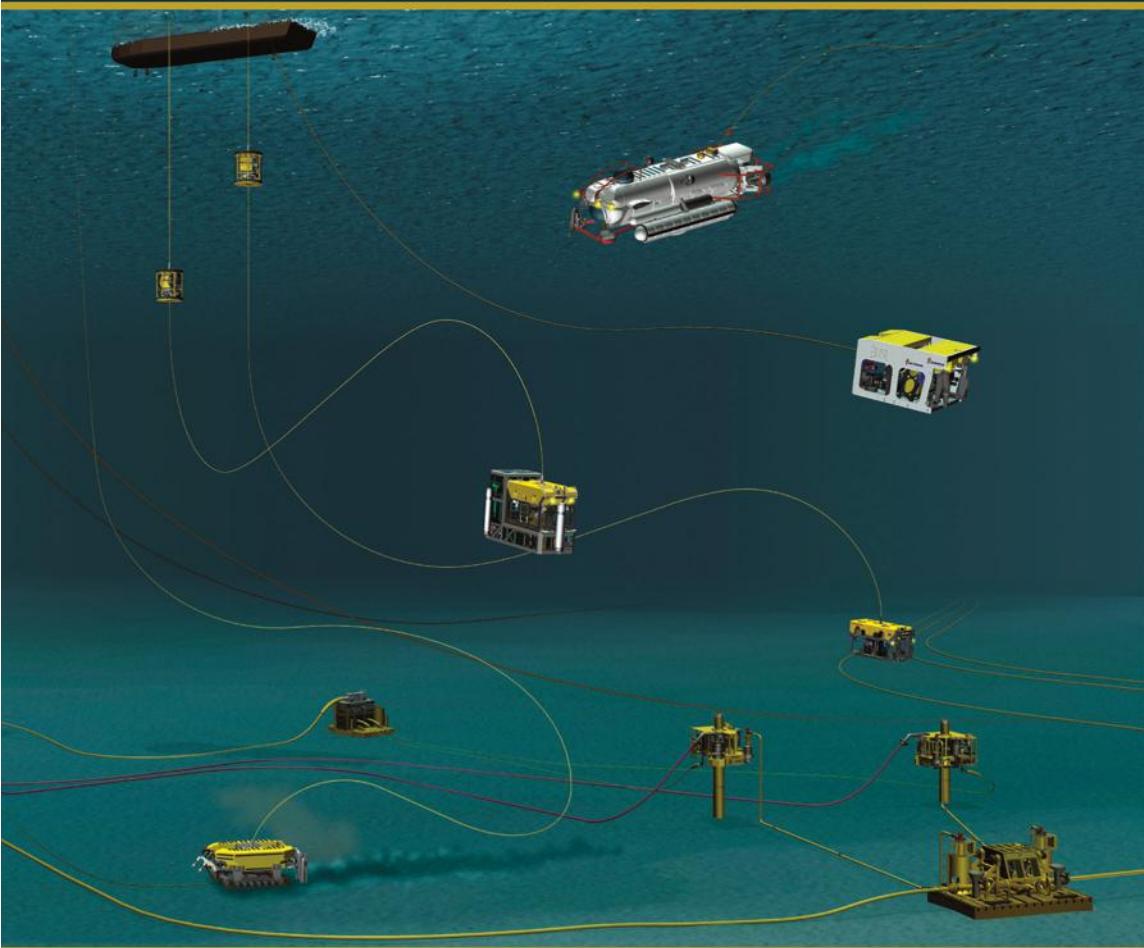


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By Dan White

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U.S. Navy Marine Mammal Program Using marine mammals for key naval operations

K-Dog, a bottle nose dolphin (right) and a member of Naval Special Clearance Team-One, and Sgt. Andrew Garrett in March of 2003 during Operation Iraqi Freedom helped disarm more than 100 antiship mines and underwater booby traps planted in Umm Qasr's port

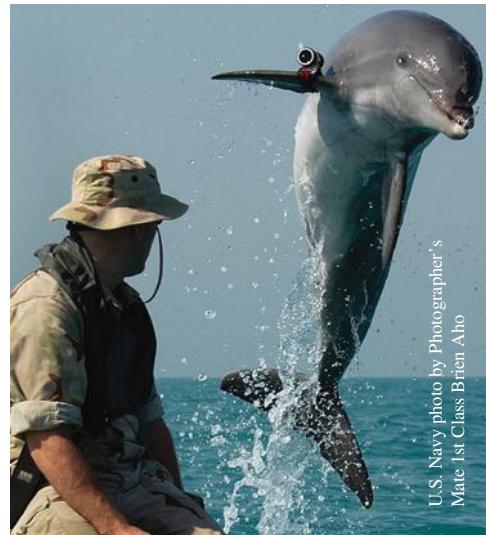
In the midst of all that is going on around the world, it would have been easy to pick a topic for the *Defense & Naval Systems* issue of ON&T centering around current events. However, I decided to pick one that is not on everyone's mind.

First, I would like to be clear that the purpose of this editorial is not to decide if the use of marine mammals by the U.S. Navy is right or wrong, but to bring light on a controversial subject that has been around for years. The U.S. Navy Marine Mammal Program (NMMP) is considered to be an extremely important capability for the Navy — so important that an entire program was dedicated to studying, training, and deploying them.

We all remember the 1973 movie *The Day of the Dolphin* — you cried, you know you did — where dolphins with bombs on their backs were sent to assassinate the President of the United States aboard his yacht. Supposedly, based on Robert Merle's novel, a satire of the Cold War, the film's plot was substantially different from that of the novel. The movie is instead inspired in part from the scientist John C. Lilly's life. A physician, biophysicist, neuroscientist, and inventor, Lilly specialized in the study of consciousness. In 1959, he founded the Communications Research Institute at St. Thomas in the Virgin Islands and served as its director until 1968. There, he worked with dolphins exploring dolphin intelligence and human-dolphin communication.

To date, the Navy claims that these animals are not being trained for any such missions and after the program was declassified — one of earlier reasons it came under fire by animal rights organizations — the program was now in the full public view. That is not to say the animals don't perform dangerous missions, which include locating and marking undersea mines. But, they are never in the area when the mines are disposed of and the decision to perform an action is always made by a human.

Currently, the Navy primarily relies on two species: the bottlenose dolphin (*Tursiops truncatus*), and the California sea lion (*Zalophus californianus*). The main advantage of using these animals is their ability to dive deep without suffering the effects of decompression sickness. The Navy is subject to all federal



U.S. Navy photo by Photographer's Mate 1st Class Brian Aho

laws regarding the protection and humane treatment of marine mammals. These include the Marine Mammal Protection Act (MMPA) and the Animal Welfare Act (AWA).

The Navy is responsible for meeting all requirements of these laws regarding acquisition, care, and treatment of its marine mammals, and not only meets but exceeds them and leads the industry in many cases. In response to charges that the program abused the animals, the presidentially appointed Marine Mammal Commission investigated the program in 1988 and 1990. The Commission reported that the allegations were not only false, but that the Navy's care of its marine mammals was "exemplary."

In March of 2003, nine dolphins that are a part of the U.S. Navy's Special Clearance Team-One, became the first marine mammals to take part in mine-clearing operations in an active combat situation. Together with Navy SEALS, Marine Corps reconnaissance swimmers, explosive ordnance disposal divers, and unmanned undersea vehicles, they helped disarm more than 100 antiship mines and underwater booby traps planted in Umm Qasr's port by Saddam Hussein's forces. In fact, the team proved so effective that coalition forces were able to open Umm Qasr to ship traffic, including the British supply ship Sir Galahad loaded with rice and other foodstuffs, only a week after hostilities began.

Today, the training continues, and there is even a student intern program where interested students are chosen from all over the country to participate in the program that provides valuable exposure and experience in various aspects of marine mammal training, husbandry, and research.

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Lithium batteries drive oceanographic technology full speed ahead

By Lee Gordon, President, Doppler Ltd., lee@dopplerltd.com

Rapidly evolving technology is creating dynamic opportunities for remote oceanographic sensing equipment capable of delivering real-time information that expands the boundaries of scientific knowledge. These advances are being supported by a new generation of lithium thionyl chloride batteries that offer significant performance advantages.

As computer technology inevitably becomes more complex and miniaturized, increasingly sophisticated power management solutions are required, which enable design engineers to pack more product features into less space, with less weight, and longer service life.

Recent advancements in technology have spawned a new generation of remote sensors for marine and oceanographic applications. These applications include a wide variety of buoys (drifting, moored, ARGO), mayday and other emergency systems, GPS and ARGOS tracking devices, current meters, transponders, harbor lights, acoustic releases, seismometers and other oceanographic devices. Often, these applications require low background currents for extended periods, alternating with high current pulses for brief intervals during data acquisition and/or transmission, then returning to a low current "sleep" or "standby" state.

Adapting lithium batteries to remote oceanographic applications

Initially, many of these applications were powered by everyday Alkaline batteries. However, Alkaline batteries have drawbacks such as low energy density (causing Alkaline packs to be large and heavy), high self-discharge (making these cells unsuitable for long-term scientific experiments), and unreliable performance in extreme temperatures.

Lithium batteries are often preferred for high current pulse marine applications due to their inherent long life and high energy density. These applications typically require a battery power system that can withstand extreme temperatures and harsh marine environments. Long life and reliability are also important concerns, as battery failure will result in total system failure for stand-alone systems in remote locations with no back-up power source. Safety is always a major concern, as is cost. Reduced size and weight are important requirements for transportation.

Of all the different types of lithium chemistries, bobbin-type lithium thionyl chloride (Li/SOCL_2) cells are best suited for remote applications due to their high energy density, high cell voltage, good low temperature performance, low self-discharge rate, and good safety characteristics. Bobbin-type Lithium cells use an outer cylinder of lithium metal and an inner electrode which is reminiscent of a bobbin of thread. The other common construction is called spiral wound, and it consists of flat sheets wound around a core. Bobbin cells have less surface area and thus cannot supply the current of spiral cells, but they can hold more lithium, which gives them a greater energy density. Because they are limited to low currents, they cannot dissipate their energy as quickly as spiral cells. Bobbin cells (and spiral cells) can also suffer passivation after storage at high temperature. Passivation layers that build up on the cell electrode surfaces temporarily reduce the cell's ability to supply current. Passivation produces a voltage delay, or temporary reduction in the battery voltage while the passivation layer dissipates.

To address limited current and passivation issues, engineers at Tadiran developed PulsesPlus™, a patented hybrid technology that combines bobbin-type lithium thionyl chloride chemistry

with a hybrid layer capacitor (HLC). This combination results in a battery pack that combines high energy density with high current pulses without any voltage delay problems. The following examples demonstrate the advantages of PulsesPlus technology.

PulsesPlus battery packs reduce the size of a GPS/ice buoy pack by 90%

Oceantronics, a Hawaii-based manufacturer of scientific data collection devices, employed PulsesPlus hybrid lithium battery technology to create a smaller, more cost efficient GPS/ice buoy.

A leading supplier of commercial radars, GPS systems and peripheral equipment for the U.S. Navy and other federal agencies, Oceantronics developed GPS/ice buoys for NOAA/PMEL back in 1994. The original battery pack weighed 54 kg, and required 380 alkaline D cells to operate for a period of 1 year.



Oceantronics' GPS/ice buoy being retrieved by helicopter to the Arctic for use in experiments measuring wind, temperature, sunlight and ice thickness near the North Pole. (Courtesy Sigrid Salo NOAA/PMEL.)

In 2001, Oceantronics delivered a newer generation of GPS/ice buoys to the North Pole Environmental Observatory for use in measuring the effects of global climate change on ice floating on the Arctic Ocean. The redesigned battery packs weighed just 3.2 kg, and used 32 D cell lithium thionyl chloride batteries and 4 hybrid layer capacitors.

Ease of transport is essential to technicians working in frigid Arctic waters, and switching to a hybrid lithium battery technology resulted in a size and weight reduction of over 90%. The resulting space savings also meant that a number of the smaller lithium packs could be used in place of the larger alkaline packs to extend the operational life of the system many fold.

Oceantronics' hybrid lithium pack provides same operating life with smaller size for use in GPS/ice buoys. The original battery pack (left) used 380 alkaline D cells (54 kg). The new battery pack (right) uses 32 lithium thionyl chloride D cells and four hybrid layered capacitors (3.2 kg).



The hybrid lithium battery also fulfilled critical requirements that the battery be able to operate at -40°C as well as meet UN standards for shipping hazardous goods.

Hybrid lithium technology boosts capacity and extends product life

Whereas Oceantronics utilized hybrid lithium batteries to reduce space and weight, Nortek, a manufacturer of current meters, employed this same hybrid lithium technology to provide longer life within the same physical size as the present battery.

Over a decade ago, Nortek began substituting PulsesPlus battery packs for standard alkaline battery packs of equal size to power its Aquadopp acoustic current meters and profilers. In tests conducted by Nortek, the hybrid lithium solution resulted in greatly increased battery capacity by 330% compared to standard alkaline battery packs.



Nortek's Aquadopp GPS current meter being installed by Canadian Wildlife Service as part of a field study in Hudson Bay. The Aquadopp is used to study the effects of tidal currents on eider ducks in areas near the open ocean in seas otherwise covered with ice. (Courtesy of Grant Gilchrist, Canadian Wildlife Service.)

Lithium batteries provide real-time data for subsurface oceanographic sensors

Subsurface oceanographic sensors are becoming increasingly feature-rich, and are able to record and transmit real-time data. These devices are now being deployed at high latitudes where scientists are studying global climate change and hunt for new energy reserves.

Because of the remote nature of these studies and the need for periodic measurements, advances in battery technology are required to provide high energy density, long-life, reduced weight, smaller footprints, and increased reliability to ensure the validity of data.

For example, researchers at Woods Hole Oceanographic Institute have teamed up with other researchers around the world to measure the ocean currents below the Ross Ice Shelf of Antarctica. In 2006, after drilling through several hundreds of meters of ice, the team deployed a string of multiple Nortek Aquadopp current meters to measure the ocean currents below the ice shelf. Recently, the team returned to the Ross Ice Shelf to deploy a newer generation of Nortek Aquadopp current meters configured with integrated inductive modems that allow the current velocity data to be sent through the mooring line to a data logger and telemetry system on the ice surface. Because the data is now available in real-time, the current meters can be deployed for extended periods without having to be retrieved to recover the



Nortek Aquadopp, photo was taken by Dr. Richard Limeburner, WHOI in Antarctica in 2006.

data. Two PulsesPlus battery packs (165 Wh each) were installed in each device, providing enough power to run the current meter and the inductive modem for several years.

A similar example involving oil exploration in the Northern Hemisphere, engineers sought to study sea ice formation, movement, and potential damage to coastal structures and subsea pipelines in the Beaufort Sea, Alaska. A team of engineers from Woods Hole Group, Inc (East Falmouth, MA) deployed a number of Nortek AWAC acoustic Doppler current profilers during the open-water summer season to measure the currents, waves, and ice – nearly continuously – throughout the winter and into the following summer.



Nortek AWAC acoustic Doppler current profiler, photo taken in Beaufort Sea, AK, 2008, courtesy of Dr. Bruce Magnell, Woods Hole Group, Inc.

Safely mounted on the sea floor, tens of meters below the surface, these AWACs can measure the full profile of ocean currents, waves, and ice thickness. Wave observations require collection and recording of an inordinately large amount of data, and to accomplish this, each instrument is equipped with four hybrid lithium battery packs, each containing 2,000 Wh of power.

Improved safety during installation

Golder Associates Inc. (Redmond, WA), which specializes in geotechnical engineering, environmental sciences, and marine geophysics, uses hybrid lithium battery packs to reduce the time, effort, and risk associated with measuring waves and currents in remote parts of the world.



Vessel used in Santa Marta, Colombia, to deploy a bottom-mount ADCP.

Golder Associates often conducts baseline studies for port and terminal developments in North, Central and South America. Many of the study sites are undeveloped, far from infrastructure and require continuous measurements for at least six months in severe wave and current environments.



Modular bottom frame with Teledyne RDI ADCP and Benthos Pop-Up buoy.

The wave and current measuring sensors are mounted on modular, bottom-mount frames that can be lowered to the bed or retrieved by a vessel using divers and float bags, when necessary. The bottom-mount frames are equipped with a Teledyne RDI Acoustic Doppler Current Profiler (ADCP) to measure waves and currents for an interval of at least two months between servicing. A single PulsesPlus hybrid lithium battery pack replaces three alkaline battery packs (one in the ADCP and two in an external battery pack), which substantially reduces the overall weight of



Golder team member servicing a Teledyne RDI ADCP on a beach in Colombia.

the ADCP system. The reduced weight makes it much easier for divers to retrieve the system.

The modular frames are deployed in three stages: the base of the trapezoid frame is lowered first; followed by individual lead weights which are bolted to the trapezoid base, and finally an unweighted upper trapezoid with the instrumentation is lowered. Upon turn-around, the lower-weighted trapezoid is left in place and the upper trapezoid with instrumentation is floated to the surface. The hybrid lithium packs make this easier because one hybrid lithium pack weighs only 60% of an Alkaline pack and because the external battery case can be eliminated.

On most of project sites, it is cost prohibitive to return to the nearest port to service the instruments, and, therefore, the instruments are serviced in the field. Use of a single hybrid lithium battery pack instead of three Alkaline packs reduces exposure to risk by requiring only one pressure housing to be serviced rather than two. In addition, a six-month deployment would require nine Alkaline battery packs as compared to three hybrid lithium battery packs, thereby reducing shipping and disposal costs.

MBARI seismic device increases capacity by 50% at less cost

The Monterey Bay Aquarium Research Institute (MBARI), a major center for advanced ocean science and technology research and education, was conducting deep sea seismic research in Monterey Bay, one of the most biologically diverse bodies of waters in the world. The underlying canyon is important to the complex geology of the continental plate margin, and is one of the deepest underwater canyons in North America.

In developing the original seismic measuring device, MBARI had used a battery pack consisting of 128 spiral-wound lithium DD cells. To increase operating life and reduce cost, MBARI switched to a PulsesPlus battery pack consisting of 128 bobbin-type lithium DD cells plus 4 AA HLCs. At the 2°C operating temperature, PulsesPlus pack has 50% more capacity as compared with their original pack due to less de-rating at low temperatures. The hybrid bobbin-type batteries have about 20% more capacity at room temperature, and they lose relatively little capacity when the temperature falls to freezing. They are also less expensive than spirally-wound lithium cells.

Advanced oceanographic sensing applications can benefit from bobbin-type lithium thionyl chloride batteries that offer major performance advantages such as higher capacity, higher energy density, lower self-discharge, and a broader temperature range. These performance advantages are becoming increasingly important to design engineers who are looking to pack more power and performance into less space.

About the author

Lee Gordon is President of Doppler Ltd., Poway CA. Lee and his partner Kent Deines founded Doppler Ltd. in 2005, which designs and supplies PulsePlus battery packs, consults on oceanographic and electronic projects, and designs and develops electronic products.

About Tadiran

Tadiran manufactures a complete line of lithium thionyl chloride batteries, including a variety of primary cylindrical batteries, PulsesPlus™ batteries for high current pulse applications, TLM Series for high power and high energy applications, TLH Series batteries for high temperature applications up to +125°C, coin-sized cells and custom battery packs. Tadiran products are available in a variety of terminations and assemblies. For more information, contact Tadiran at 2001 Marcus Avenue, Suite 125E, Lake Success, NY 11042. Tel: 1-800-537-1368, (516) 621-4980 Fax: (516) 621-4517, Web: www.tadiranbat.com.



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Tsunami detection sensors delivered for Mediterranean warning system

Sonardyne International has delivered tsunami detection technology for incorporation within an advanced warning network being installed in Cyprus. CSNet of Florida, USA and Limmasol, Cyprus is working with the Oceanography Centre of Cyprus to develop a prototype tsunami warning system to protect Cyprus and the eastern Mediterranean coastline. They have turned to Sonardyne for some of its specialized tsunami warning technology that is already in operation in the Bay of Bengal where a Sonardyne system is being used to help protect the Indian coastline. The order includes sensitive water pressure sensors and a software algorithm developed to control the system.

The Tsunami Warning and Early Response System for Cyprus (TWERC) will differ from other warning systems because of the relatively confined nature of the Mediterranean. Tsunamis originating in the deep ocean may travel thousands of miles before they come ashore, and this gives more time to register and distribute a warning. The Mediterranean, on the other hand, is seismically active and could generate a tsunami that hits the coast in less than an hour, which demands a warning system capable of rapid activation and response. The TWERC system will consequently consist of an array of seismometers working in conjunction with the Sonardyne pressure sensors that are configured to create an Offshore Communications Backbone (OCB) that can also support the region's emerging offshore energy enterprise. The OCB covers several hundred kilometers of seafloor off the southern coast of Cyprus and will provide real-time, continuous communications with a control center ashore.

TWERC will be using four Sonardyne sensors to detect the changes in water pressure that indicate a tsunami. They will be analyzed by the Sonardyne software algorithms that will also generate various



messages time-tagged and formatted to meet the specific operational requirements. These messages will be sent at regular intervals and contain data on pressure and seabed system health. The precise message will depend on the status of the system and whether it has been 'triggered'. The sensors will be hardwired to a power and communications network that provides an immediate link to the shore control center. This will avoid the delays inherent in mid-ocean systems that use acoustic and satellite communication to relay their warnings.

Dr. Georgious Georgiou, director of the Oceanography Centre of Cyprus and TWERC project leader, said, "The system will include both offshore technology and capacity building on shore, including public education and outreach. Detecting the wave is only part of the solution. Transmitting that warning quickly to a population that knows what to do when they receive it is equally critical."

Dr. Andrew Clark, president and chief executive officer of CSNet, added, "This system will not only serve to protect citizens and visitors of Cyprus, but also all those along the entire, densely populated eastern Mediterranean coast, a very seismically active region."

The success of the Sonardyne tsunami warning system is attributed to its use of proven acoustic technology that is in everyday use in the offshore oil and gas industry.

For more information, visit www.sonardyne.com.

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New Assistant Administrator for NOAA Ocean Service—Lubchenco Names Kennedy NOS Chief

David Kennedy has been named NOAA assistant administrator for the National Ocean Service effective immediately. He has served in an acting capacity since January 2010 when John Dunnigan was named a senior policy advisor to the NOAA administrator. The announcement was made today by under secretary of commerce and NOAA administrator Dr. Jane Lubchenco. Kennedy, a 22-year NOAA career employee, was previously director of NOAA's Office of Ocean and Coastal Resource Management (OCRM). Included in OCRM's responsibilities are federal consistency, coordination with state and local coastal zone management programs and the National Estuarine Research Reserves System, the new National System of Marine Protected Areas, and the land acquisition grant program, Coastal and Estuarine Land Conservation Program.

Inspector General's review of stolen emails confirms no wrong-doing by NOAA climate scientists

At the request of U.S. Sen. Inhofe, the Department of Commerce Inspector General conducted an independent review of the emails stolen in November 2009 from the Climatic Research Unit (CRU) at the University of East Anglia in Norwich, England, and found no evidence of impropriety or reason to doubt NOAA's handling of its climate data. The Inspector General was asked to look into how NOAA reacted to the leak and to determine if there was evidence of improper manipulation of data, failure to adhere to appropriate peer review procedures, or failure to comply with Information Quality Act and Freedom of Information Act guidelines.

Judge orders BOEMRE to act on drilling permits

A federal district judge in New Orleans ordered the US Bureau of Offshore Energy Management, Regulation, and Enforcement to decide whether to issue five pending Gulf of Mexico offshore drilling permit applications to Enserch Offshore Co. within 30 days. Drilling permits were processed in about 2 weeks time before the Macondo accident.

OTC Brasil Expands Exhibition for New Conference in Rio de Janeiro in 2011

OTC Brasil is expanding its exhibition space because of strong company interest in participating in the inaugural event, which will address the deepwater offshore sector in Brazil and around the world, scheduled for 4-6 October 2011 in Rio de Janeiro.

The event is being held at Riocentro, and the expansion adds approximately 3,500 square meters of net additional space, bringing the total space to more than 14,450 square meters. Already more than 210 companies representing 17 countries have taken space at OTC Brasil, including long-time OTC exhibitors as well as companies new to OTC. National pavilions from China, USA, Korea, Norway, Denmark, and Finland are confirmed, and more than 50 Brazilian companies are exhibiting.

OTC Brasil is being developed with the same collaboration of 12 sponsoring societies that has worked so well for OTC, plus four Brazilian supporting organizations.

For more information, visit www.otcbrasil.org.

Whaling ship found off Hawaii

A fierce sperm whale sank the first whaling ship under George Pollard's command and inspired the classic American novel "Moby-Dick." A mere two years later, a second whaler captained by Pollard struck a coral reef during a night storm and sank in shallow water.

Marine archaeologists scouring remote atolls 600 miles northwest of Honolulu have found the wreck site of Pollard's second vessel — the Two Brothers — which went down in 1823.

Two Brothers was a Nantucket whaling ship that sank on the night of February 11, 1823, off the French Frigate Shoals. The ship's captain was George Pollard, Jr., former captain of the famous whaling ship Essex. The wreck was discovered in 2008 (announced on February 11, 2011) by a team of marine archaeologists working on an expedition for the National Oceanic and Atmospheric Administration (NOAA) in the Papahānaumokuākea Marine National Monument.

The wreck of the Two Brothers was

discovered in 2008 by a team of marine archaeologists working on an expedition for the NOAA. The identity of the ship was not immediately known so it was called the "Shark Island Whaler"; the ship's identification as the Two Brothers was announced by NOAA on February 11, 2011, the 188th anniversary of her sinking. The wreck is the first discovery of a wrecked Nantucket whaling ship.

Some of the first artifacts found at the wreck site include two anchors, three try pots, bricks, and the remains of the ship's rigging. Expeditions in 2009 and 2010 turned up more artifacts, including blubber hooks, five harpoon tips, three whaling lances, four cast-iron cooking pots, and ceramics, and glass.

The sinking of the Two Brothers was relatively uneventful compared to the Essex's epic run-in with the whale. While the sperm whale attack inspired Melville to write "Moby-Dick," the author isn't believed to have used Pollard as the basis for the book's notorious Capt. Ahab.

The artifacts are due to go on display at the marine monument's Discovery Center in Hilo, and she hopes the exhibit will travel to Nantucket.

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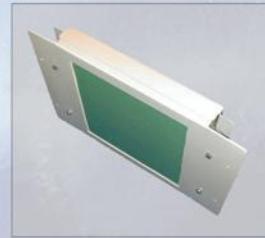
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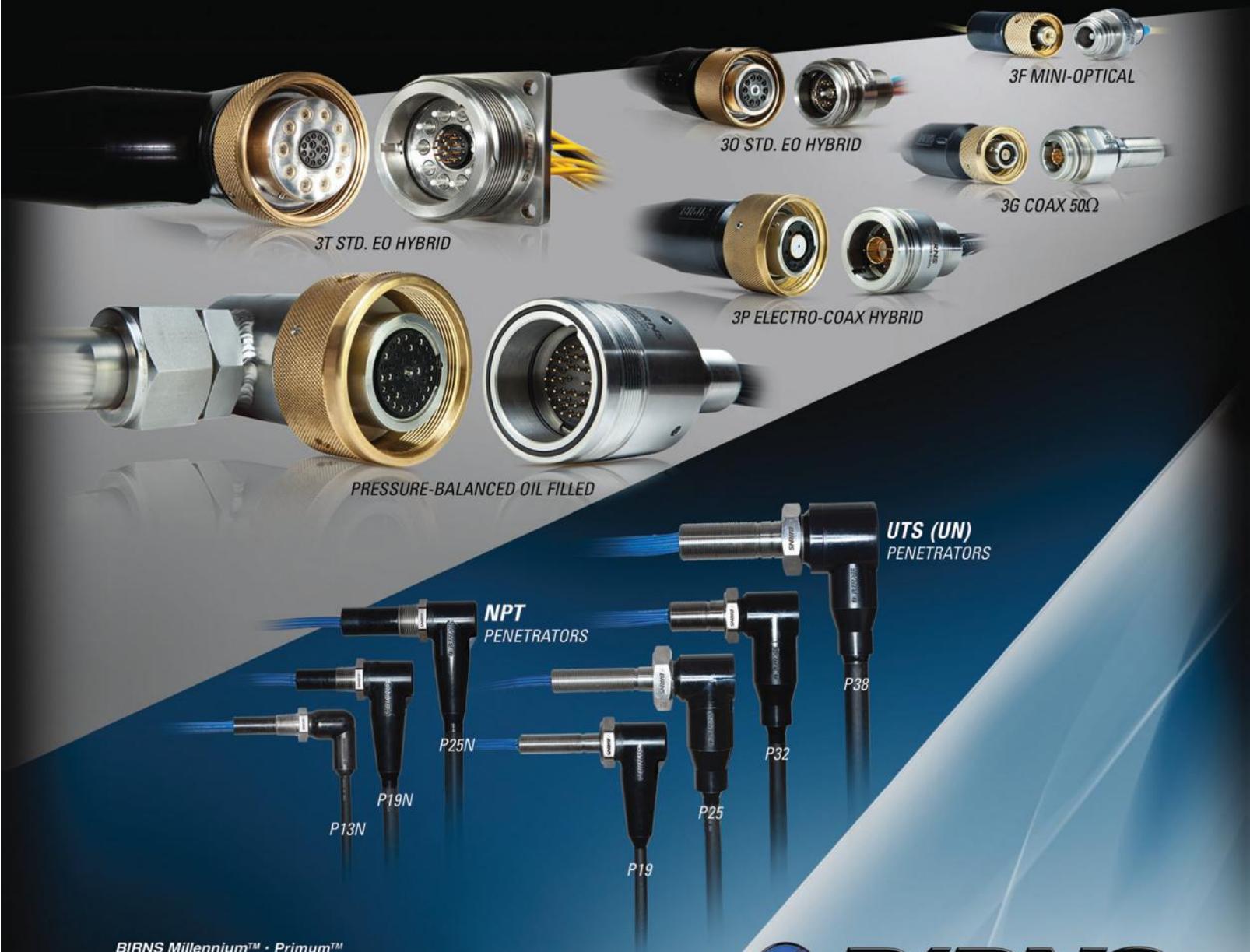


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Oil prices to average \$99/bbl by late 2012

Crude oil prices are projected to steadily increase over the next two years and will average \$99 per barrel in the fourth quarter of 2012, according to DOE's Energy Information Administration (EIA). The EIA's "Short-Term Energy Outlook," released on January 11, projects a continued tightening of world oil markets over the next two years, with consumption growing by an annual average of 1.5 million barrels per day. At the same time, growth in supply from countries that are not members of the Organization of Petroleum Exporting Countries (OPEC) will average less than 0.1 million barrels per day each year. The EIA expects oil markets to rely on OPEC production increases and to draw down inventories to fill the demand gap. As a result, crude oil is expected to average \$93 per barrel in 2011 and \$98 per barrel in 2012, although these figures depend heavily on the rate of economic growth and the magnitude of OPEC production increases. Crude oil spot prices averaged more than \$89 per barrel in December 2010, about \$5 per barrel higher than the November average.

C-Nav chosen for Osiris Projects vessel

C-Nav, the premier supplier of international GNSS Precise Point Positioning services, will provide the GNSS positioning system for Osiris Projects' latest new-build survey vessel, the SV Bibby Tethra. C-Nav has been chosen to provide the vessel's primary GNSS positioning system and to integrate it with a survey and navigation suite. The vessel will be fitted with a C-Nav 3050 RTK GNSS receiver and C-NaviGator II remote control and display unit. The 3050 RTK has been carefully selected after a number of sea trials. The Bibby Tethra is three times larger than the company's existing flagship, the SV Chartwell, and will be one of the most advanced vessels of its kind operating in Europe. The latest vessel will establish a new benchmark for coastal marine survey work (www.cnavgnss.com).

USCG releases findings on ship sinking

The Coast Guard released its final report of the investigation into the March 23, 2008 sinking of the fish-processing vessel Alaska Ranger and the subsequent loss of five of the 47 people aboard the ship. The Alaska Ranger sank approximately 130 miles west of Dutch Harbor, Alaska. Of the 47 people aboard, 42 were rescued. The Alaska Ranger was a 189-foot, 1,577 gross ton, fish-processing vessel in the Bering Sea/Aleutian Island federal groundfish trawl fisheries. The vessel was owned by the Fishing Company of Alaska. The Board determined that the cause of the sinking was flooding that likely started in the rudder room, but rapidly progressed to the engine room and other spaces due to a lack of watertight integrity. While the exact source of the uncontrolled flooding remains unknown, a thorough analysis of the facts indicates the most likely source was related to the vessel's poor material condition and may have been related to the Kort nozzle struts. The Board concluded that the Fishing Company of Alaska failed to properly maintain the structural condition of the Alaska Ranger.

STX OSV Selects AVEVA

AVEVA, one of the world's leading providers of engineering design and information management solutions to the plant, power, and marine industries, announced that STX OSV AS has signed an agreement to purchase the full AVEVA Marine solution suite. This deployment will provide STX OSV AS with a powerful system for integrated hull and outfitting design.

STX OSV AS, together with its subsidiaries, is one of the major global designers and shipbuilders of offshore and specialised vessels used in the offshore oil and gas exploration and production and oil services industries.

Headquartered in Norway and with approximately 9,000 employees, STX OSV operates nine strategically located shipbuilding facilities, including five in Norway, two in Romania, one in Brazil, and one in Vietnam. STX identified an important need for distributed engineering and a tighter integration between the separate disciplines of hull and outfitting design and selected AVEVA Marine because it was the only solution that could address such demanding requirements.

The long-term agreement covers the full AVEVA Marine solution, supporting efficient engineering and design processes from early/basic design, through detailed hull and outfitting design, to the creation of manufacturing data and documents. The system will be used by up to 300 concurrent users across all of the group's nine shipyards.

Mr. Stig Sandanger Riise, Senior Vice President Technology & Engineering of STX OSV AS said "We selected AVEVA Marine to provide this integration and they also offer us an advanced database capability allowing STX to accommodate ship buyer's requests at short notice and enabling changes very close to production start. Equally important, AVEVA Global supports concurrent engineering across all of our nine yards in Norway, Romania, Brazil, and Vietnam."

"We have a significant technology advantage in the integration between shipbuilding disciplines," explained Nigel Sams, Vice President North EMEA, AVEVA. "STX OSV has a strong reputation for its flexibility and its ability to meet customer requests quickly."

STX has already begun the first project using AVEVA Marine with the design of a Platform Supply Vessel and two sister ships.

For more information, visit www.aveva.com.

Austal launches largest catamaran

The final stages of construction of Austal's largest catamaran to date were celebrated this week with a traditional "coin ceremony", followed by the vessel's successful launch.



"Leonora Christina" will join the 86 metre Austal-built catamaran, "Villum Clausen", which has been operating the route between Rønne on the Danish island of Bornholm and Ystad in south east Sweden for over 10 years.

The vessel is owned by Danish company Færgen (formerly Nordic Ferry Services) and will be operated by Bornholmer Færgen, a subsidiary of Færgen. Bornholmer Færgen currently operates a fleet of three ships (one of which is "Villum Clausen") and has been transporting passengers to the Danish island of Bornholm since 1866.

The 113 meter ferry was designed and built in Austal's Western Australian shipyard and, once completed, will be able to hold up to 1,400 passengers and 357 cars and travel at speeds of up to 40 knots.

The vessel has been built in accordance with the requirements and under the survey of Det Norske Veritas, conforming to International Maritime Organisation HSC Code and Danish regulations. Registration will be under the Denmark Flag.

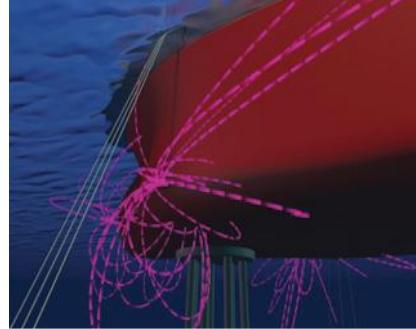
With Danish environmental regulations for fast ferries among some of the most stringent in the world, Austal's design is required to comply with legislation covering environmental noise, wave-wash, and exhaust emissions.

The vessel is on track to commence sea trials in March, with delivery scheduled to take place in May 2011.

Cathelco supply hull corrosion protection system for P63 FPSO

Cathelco has won an order to supply a hull corrosion protection system for the P63 FPSO, which will be operated on behalf of Petrobras in the Papa Terra offshore oil field off Brazil. This follows the recent announcement of an order for an ICCP system for the P62 FPSO.

The project will involve the conversion of the BW Nisa, a 323,000 dwt ultra large crude carrier that was built in 1985 and is owned by BW Offshore of Norway, who



will supervise the marine scope of the conversion contract. The conversion will take place at the COSCO (Dalian) shipyard, with delivery scheduled for the first quarter of 2011.

Cathelco is supplying an impressed current cathodic protection (ICCP) system for the vessel that will protect the underwater surface of the hull against corrosion.

To optimize the effectiveness of the system, it has been designed with four power units that are positioned throughout the length of the vessel. These enable arrangements of anodes and reference electrodes to be located on the hull in forward, midships, and stern sections to achieve the best distribution of impressed current around the vessel.

In operation, the reference electrodes measure the electrical potential at the hull/seawater interface and send a reading to the control panel that increases or decreases the output to the anodes. In this way, the hull receives the optimum level of corrosion protection at all times.

The system has been supplied with a centralized controller that enables all four control panels to be monitored and controlled from a single location for the convenience of the crew. This provides a clear graphical representation of the system and enables the anode outputs to be displayed individually as well as the readings from the various reference electrodes.

In addition, the controller stores the readings for each ICCP unit on a daily basis and generates monthly log readings for analysis by engineers at Cathelco Ltd.

Cathelco ICCP systems are being increasingly installed on FPSOs, FSOs, and semi-submersibles, including the FPSO P57 that was supplied in 2009 and more recently the FPSO P62, which is being converted for Petrobras.

For more information, visit www.cathelco.com.

Remora HiLoad DP completes final sea trials using Kongsberg DP

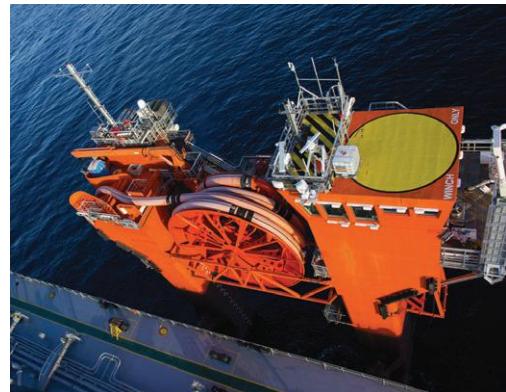
January 27, 2011 was a milestone in the development of the unique Remora HiLoad DP as it completed its final sea trials before live field implementation. HiLoad is a revolutionary deepwater offshore loading terminal, made possible by innovative vessel design and the use of a cutting-edge Kongsberg Maritime Integrated Automation System (IAS).

Built at the Aibel Shipyard in Haugesund, Norway, HiLoad is the first vessel in a new generation of generic offshore loading systems that through state-of-the-art technology, including Remora's patented HiLoad Attachment System and Kongsberg Maritime's IAS, which includes K-Pos Dynamic Positioning; K-Chief marine automation; K-Bridge; and fire, safety, and emergency shutdown system, can control the position of a standard oil tanker without its own thrusters or DP system. This mobile system can be deployed at any field and used for the safe and efficient transfer of oil from an FPSO to any size and type of tanker, effectively replacing the need for a shuttle tanker.



The K-Chief automation system aboard HiLoad monitors and controls the ballast, power management, thruster control, machinery and bilge system. There are approximately 2,500 I/O (signals) with Field stations placed around the ship connected to each other and the operator stations on the bridge via redundant network. The IAS includes custom automatic ballast sequences for docking and undocking of a tanker, which are based on predefined sequences of valve and ballast pump operation, with back pressure automatically controlled via integrated PID controllers.

The K-Pos Dynamic Positioning system controls the position of HiLoad when



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alone and when connected to an oil tanker loading oil behind a FPSO. Because the application is brand new, Remora and Kongsberg Maritime had to develop several unique processes for the DP system.

"Early in the project, several big challenges that needed special attention were identified," comments Pål Borge Korneliussen, Kongsberg Maritime. "The most challenging operation for the HiLoad is connecting or disconnecting the oil tanker. For the final sea trial using the Aframax tanker SKS Tana, we implemented local reference systems between the HiLoad and the Oil tanker, Kongsberg Maritime's own RADius, and a Fanbeam system. This gave HiLoad the possibility to determine the heading and the position of the oil tanker relative to itself. A modified follow target function made the approach towards the oil tankers safe. The size and shape of HiLoad is unique, so there was a significant effort to establish the correct parameters. All in all, the final 21-day sea trial was successful for the customer and for the Kongsberg Maritime systems aboard HiLoad."

The DNV-approved HiLoad DP is the first of a planned series of HiLoad vessels. Approximately 13 oil companies representing the majority of the world's oil production observed the sea trials and have

shown interest in using the system.

For more information, visit www.remoratech.com or www.kongsberg.com.

Operator orders second ferry

Tourism operator, Mary D Enterprises, has selected Austal to design and construct a 35-meter high speed monohull passenger ferry, heralding the second Austal-built vessel for the Noumea-based company.

The ferry is principally intended for operation between Noumea and Amadee Island, but will also service other locations on New Caledonia's south and west coasts. The new vessel will be joining the Austal-built "Mary D Dolphin", which has transported more than 300,000 passengers on the Amadee Island route since its delivery in 1998, and will carry 138 passengers on two decks.

The new vessel will be one of only a small number of monohull ferries that are fully compliant with the International Maritime Organisation High Speed Craft (HSC) Code 2000. This is a significant step for Mary D Enterprises in modernizing its fleet and maintaining compliance with French regulations that now require adoption of the full HSC Code on all high-speed vessels flying the French Flag.



Sembawang Shipyard wins multiple contracts

Teekay Shipping (Australia) has awarded Sembawang Shipyard a contract for the engineering, procurement, construction, and commissioning (EPCC) of a dynamically positioned blue water research vessel. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) will operate the vessel on behalf of the Australian Government for use by the Australian marine research community.

Upon completion and delivery in 2Q 2013, the vessel will be named RV Investigator. It will be based in Hobart, Tasmania and will operate from the tropical north to the Antarctic ice-edge and across the Indian, Southern, and Pacific oceans.

Recently, Sembawang Shipyard has been awarded three major upgrading projects: an upgrade of a dynamically positioned heavy-lift and pipelay vessel with a lifting capacity of up to 4,400 tons (3,991 metric tons); an LNG carrier longevity project; and an upgrade of a drillship.

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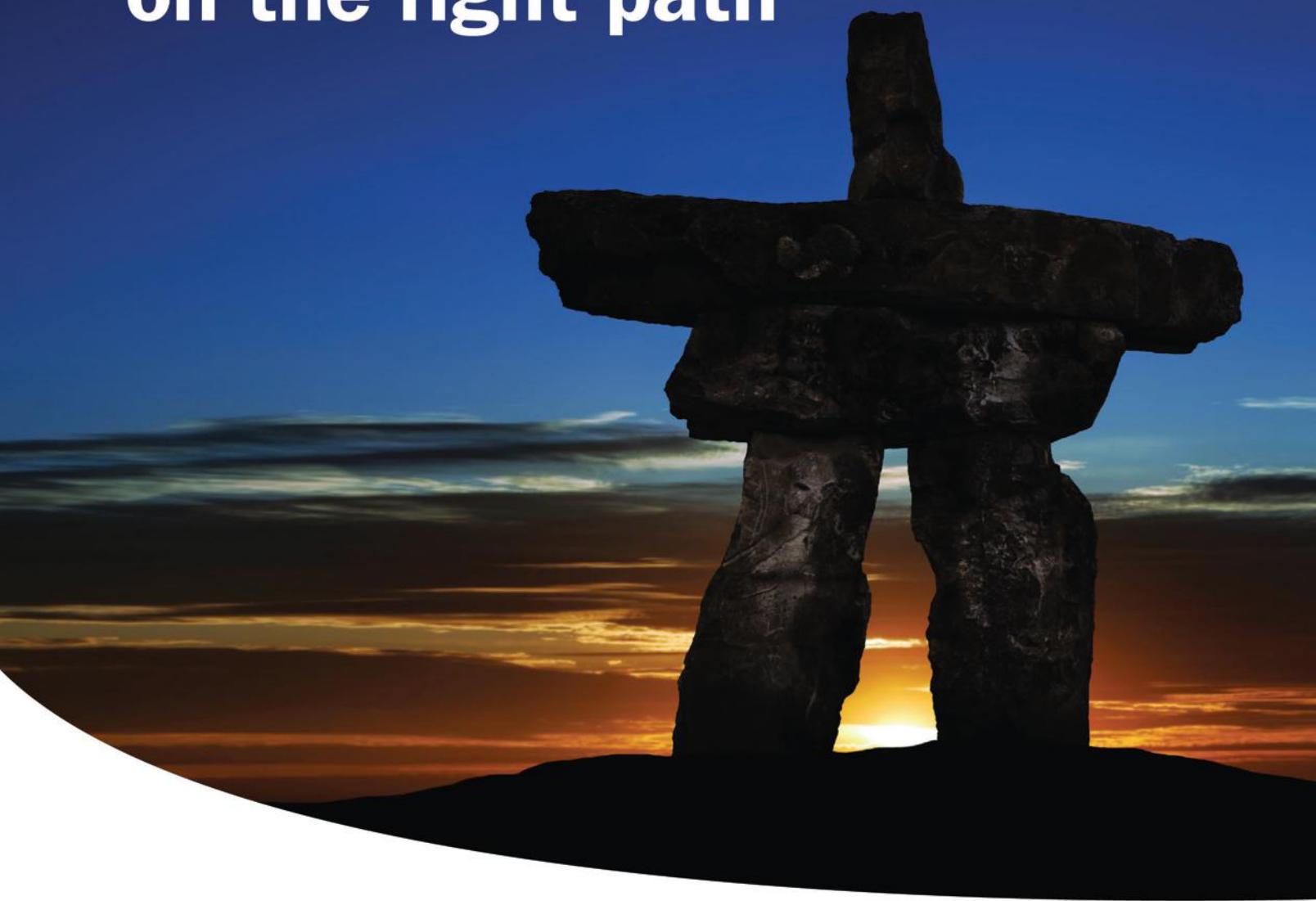
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Woods Hole Group receives DER Contract extension

Woods Hole Group announced its contract has been extended with the Massachusetts Division of Ecological Restoration (DER), extending its integral role in the State's wetland restoration efforts. The Cape Cod-based company has been working as a consultant with the DER for several years to restore and protect the Commonwealth's rivers, wetlands, and watersheds. The extension ensures Woods Hole Group will help to preserve and restore the State's ecological habitats until 2013, with two potential one-year renewal options through 2015.

Plastic pollution research voyage

Environmentalists, researchers, and adventure-seekers are being offered the rare opportunity to join one of the world's leading marine research organizations for its next high-seas expedition in search of plastic ocean pollution. Algalita Marine Research Foundation, based in Long Beach, Ca., has 10 open spaces on this eco-adventure, a 20-day voyage from Honolulu, Hawaii to Vancouver, B.C. through the North Pacific Gyre. The July 7-27 trip, aboard a 72-foot racing sloop owned by Algalita's partner, Pangaea Explorations, will give participants a direct role in advancing research into one of our time's most pressing environmental concerns (info@algalita.org).



Onset offers Wetlands monitoring guide

Wetlands act as a natural filter for polluted water and, thus, play an essential role in water quality protection. They serve as floodwater storage to help minimize erosion and create a habitat for many fish and wildlife. While a variety of factors have decreased the number of wetlands in the U.S. by half since 1950, many organizations are restoring wetlands back to their original flourishing ecosystems. To ensure success, it is necessary to monitor wetland environmental conditions such as water level, temperature, and rainfall. A new best practices guide from Onset, Monitoring Wetlands with Portable Data Loggers, shares field-proven best practices for configuring, launching, and deploying portable data loggers in wetland monitoring applications. A range of data logger types is covered, and tips are provided on data logger installation and maintenance. Download a free copy of the guide at www.onsetcomp.com/wetlands.

Lawsuit for leatherbacks

The Center for Biological Diversity, Oceana and the Turtle Island Restoration Network has filed a notice of intent to sue the federal government for failing to protect leatherback sea turtle habitat off the coasts of California, Oregon and Washington. Specifically, the government failed to meet the Endangered Species Act deadline for finalizing the endangered turtle's critical habitat, putting the survival of leatherbacks in jeopardy.

Ancient undersea volcanoes yield clues to earth dynamics



Over 800 meters (nearly half a mile) of rock pulled from below the seafloor near the coast of New Zealand may yield new clues to understanding how some hotspot volcanoes are created and whether and how the sources of these volcanoes have moved over time deep within the Earth.

An international team of scientists has just returned from an expedition in the Pacific Ocean, where they collected samples of sediment, basalt lava flows, and other volcanic eruption materials to piece together the formation history of an ancient trail of underwater volcanoes known as the Louisville Seamount Trail. The expedition, part of the Integrated Ocean Drilling Program (IODP), marks the beginning of a scientific journey to better understand processes occurring deep within the Earth that shape the features on the planet's surface such as seamounts or ancient volcanic mountains in the sea. Tens of thousands of seamounts exist in the Pacific Ocean alone.

Anthony Koppers of Oregon State University led the expedition aboard the scientific research vessel, JOIDES Resolution, with co-chief scientist Toshitsugu Yamazaki from the Geological Survey of Japan at the National Institute of Advanced Industrial Science and Technology.

Over the last two months, the IODP Louisville Seamount Trail Expedition drilled 1,113 meters (3,651 feet) into the seafloor to recover 806 meters of mostly pristine volcanic rocks, making it one of the most successful research expeditions ever to recover this type of rock from the Earth's oceanic crust. The samples were recovered from six sites at five seamounts varying in age from 50 to 80 million years old.

Linear trails of volcanoes found in the middle of tectonic plates, such as the Hawaii-Emperor and Louisville Seamount Trails, are believed to form from a hotspot – a plume of hot material found deep within the Earth that supplies a steady stream of heated rock from depths as great as 2,900 km up to the surface. As the tectonic plate drifts over the hotspot, new volcanoes are formed – and old ones become extinct. Over time, a linear trail of these aging volcanoes is formed. The Louisville Seamount Trail is 4,300 kilometers (about 2,600 miles) long.

Scientists use these volcanoes to study the motion of tectonic plates, comparing the ages of the volcanoes against their location over time to calculate the rate at which the plate moved over a hotspot. These calculations assume the hotspot stays in the same place over time.

Recent studies in Hawaii have shown that the Hawaii hotspot may have moved as much as 15° latitude (about 1,600 kilometers or 1,000 miles) over a period of 30 million years.

In addition to the volcanic rock, scientists on this expedition also recovered sedimentary rocks that preserve shells and an ancient algal reef – typical of living conditions in a very shallow marine environment. These ancient materials show that the Louisville seamounts were once an archipelago of volcanic islands.

The IODP Louisville Seamount Trail Expedition wasn't solely focused on geology. More than 60 samples from five seamounts were collected for microbiology research, making the Louisville samples the largest collection of volcanic basement rock ever collected for microbiology research during 40 years of scientific ocean drilling expeditions.

For more information, visit http://iodp.tamu.edu/scienceops/expeditions/louisville_seamounts.html.

SmartBay ocean observing system secures federal funding

The SmartBay ocean observing system in Placentia Bay, Newfoundland has secured \$224,000 in funding from the Government of Canada's Atlantic Canada Opportunities Agency (ACOA) to support two years of operations and the development of a sustainability plan.

The federal government funding support supplements \$451,000 in provincial government support for SmartBay announced in September, 2010.

These funding commitments bring total federal government support to \$2.2 million and provincial government support to \$1.1 million since 2006.

SmartBay, an initiative of the School of Ocean Technology at the Fisheries and Marine Institute of Memorial University of Newfoundland in St. John's, provides near real-time wave, wind, and water data from three buoys in the Bay, utilizing the technology of the Marine Institute's partners, AMEC Earth and Environmental, ICAN, and EIT Ltd. Hourly weather forecasts are accessible 24/7 through the web portal www.smartbay.ca. The site's buoy page is accessed approximately 7,000 times per month, mostly by repeat users.

There are between 1,400 and 1,600 tankers movements in Placentia Bay each year related to the operations of Newfoundland Transshipment Ltd. and North Atlantic's refinery.

The Atlantic Pilotage Authority is a regular user of SmartBay. The Canadian Marine Pilot's Association is taking the lead on "SmartAtlantic", an initiative to adopt the SmartBay model of providing high-resolution marine forecasts and near real-time wind and wave information for the Atlantic Canadian ports of Halifax and Chedabucto Bay in Nova Scotia and Saint John in New Brunswick.

New vertical array for acoustic communications studies in Trondheim Fjord

Chelsea Technologies Group has delivered a novel acoustic array to the Norwegian University of Science and Technology (NTNU). The six meter long, oil filled array, houses six omni directional identical hydrophones. The array is designed to be suspended from a small boat or buoy to depths of 100 meters.

Dr. Zhang Guosong of NTNU commissioned Chelsea to build the custom hydrophone array to conduct novel underwater acoustic experiments in the Trondheim fjord. Dr. Guosong and his team are looking to exploit spatial diversity in order to research novel communications and acoustic propagations. Chelsea has



previously supplied a range of acoustic transducers and hydrophones to NTNU.

For more information, contact Ellen Keegan, Communications Manager, at +44 (0)20 8481 9019.

U.S. Coast Guard and EPA step up efforts to protect U.S. waters

The U.S. Environmental Protection Agency (EPA) and U.S. Coast Guard (USCG) signed a Memorandum of Understanding (MOU) outlining steps the

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agencies will take to better coordinate efforts to prevent illegal discharges of pollutants from more than 61,000 commercial ships based in the U.S. and more than 8,000 foreign ships operating in U.S. waters. This MOU creates a framework for improving EPA and USCG cooperation on data tracking, training, monitoring, verifying compliance, and industry outreach.

Under the MOU, the USCG has agreed to incorporate components of EPA's vessel general permit (VGP) program into its existing inspection protocols and procedures to help the United States address vessel pollution in U.S. waters. The agencies have also agreed to improve existing data requirements so that information on potential violations observed during inspections can be sent to the EPA for evaluation and follow-up.

The vessel permit program applies to owners and operators of non-recreational vessels at least 79 feet long, such as cruise ships or oil and cargo tankers, operating in U.S. waters.

Hydrophones in North Atlantic help scientists locate right whales

Scientists using undersea hydrophones have documented the appearance of

endangered right whales in a region east of Greenland, where they historically had been hunted but were thought to be extinct.

The scientists recorded more than 2,000 whale vocalizations from 2007 to 2008, and since have identified them as right whales and mapped the geographic origin of those recordings. This mapping shows that the whales are using an area where ships commonly pass while in transit between the United States and Europe. And more shipping may take place as northern regions become increasingly ice-free.

David Mellinger of Oregon State University said the use of hydrophones enables scientists to "listen" for whales in remote areas where visual observations are difficult to conduct. Right whales have unique vocalization patterns that allow scientists to differentiate their calls from those of other whales.

"In the last 50 years, there have only been two confirmed sightings of right whales in the Cape Farewell Ground, which is about 500 kilometers east of the southern tip of Greenland," said Mellinger, an associate professor at OSU's Hatfield Marine Science Center in Newport, Ore.

"The weather there makes it almost impossible to conduct regular surveys."

"But it was an important area historically for the whales, and we needed to determine if they were still using it," he added. "The hydrophones showed that not only are they using the Cape Farewell Ground, but that they've broadened the range of where we've known them to be in the past."

The North Atlantic right whale is among the rarest cetaceans in the world. Despite more than 75 years of international protection, scientists estimate that fewer than 450 individuals remain. Most of those are a "western stock" that can be seen off the east coast of North America from Florida to the Gulf of Saint Lawrence. It is unknown whether most of the whales heard off Greenland and Iceland are from this stock. Nor are scientists certain of the size of the population.

Right whales were nearly decimated by whaling in the 1800s and early 1900s, and, despite a moratorium on hunting them, their recovery has been slow. The cause of many recent deaths has been anthropogenic, scientists say, especially collisions with ships and entanglement with fishing gear.

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OTEC heat exchanger test facility

Makai has completed construction of an OTEC heat exchanger test facility at the Natural Energy Laboratory of Hawaii (NELHA) on the Big Island of Hawaii. The test facility is a 40-foot tall tower that supports evaporators, condensers, seawater piping, and an accurately instrumented ammonia working fluid piping system. NAVFAC and ONR sponsored the facility as a cost-effective means to test the performance of modular heat exchangers on land using NELHA's existing seawater pipe infrastructure. In general, OTEC will be most cost-effective when installed as large floating offshore platforms.

BOEMRE pursues rule change

The Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) will continue to push forward with a proposed rule that will eliminate a redundant step in the non-competitive leasing process for commercial renewable energy development on the Outer Continental Shelf (OCS). Under the current regulation, if BOEMRE issues a request for interest for a specific area being considered for commercial leasing, and only one entity responds expressing interest in acquiring a lease for that area, the Bureau must still issue a second request for interest to ensure there is indeed no competitive interest in that area. This process can take several months, and the Bureau determined that it is redundant.

Coastline Surveys provide CPT services to MMT on Scottish offshore wind farm site

Coastline Surveys recently completed a program of cone penetrometer tests (CPT) for MMT as part of a seabed survey on Scottish and Southern Energy's (SSE) proposed Islay and Kintyre wind farm developments off the west coast of Scotland. Coastline Surveys used their C-Pen40 seabed penetrometer to collect over 70 meters of *in situ* geotechnical data from over 20 locations across the two sites spread over only four operational days. C-Pen40 is based around a single wheel Roson drive unit manufactured by A P van den Berg in The Netherlands which has been successfully used worldwide over the past 30 years. On this site, where operating conditions were known to be difficult, the unit worked very well achieving up to 5m of penetration on several stations (www.coastlinesurveys.co.uk).

DOE, Commerce Department form renewable energy modeling partnership

DOE and the U.S. Department of Commerce announced on January 24 a new agreement to further collaboration between the agencies on renewable energy modeling and weather forecasting. This teaming will enable U.S. renewable energy resources to be used more effectively by businesses and entrepreneurs. The Memorandum of Understanding (MOU) signed by the DOE and the Commerce Department's National Oceanic and Atmospheric Administration (NOAA) will encourage the agencies to disseminate weather and climate information needed for renewable energy technologies that are dependent on short-term weather and longer-term climate trends. Better information on weather patterns and improved modeling of the variability of the wind, sun, water, ocean currents, and other sources of renewable energy will ultimately increase the United States' ability to reliably integrate renewable energy into the electrical grid.

OPT completes utility-scale wave power device



Ocean Power Technologies, Inc., a leading wave energy technology company, has announced the completion of the first of its new generation utility-scale PowerBuoy® device, the PB150.

The PB150 PowerBuoy is the largest and most powerful wave power device designed by OPT to date, and builds on the Company's 15 years' innovation and in-ocean development experience of producing such systems. With a peak-rated power output of 150 kilowatts – equivalent to the energy consumption of approximately 150 homes – the PB150 is designed for use in arrays for grid-connected power generation projects worldwide.

The development of the device, built and assembled at Invergordon, Scotland, has utilized the skills of local firms and represents a multi-million pound sterling investment in the region. It is currently being prepared for ocean trials at a site approximately 33 nautical miles from Invergordon, off Scotland's northeast coast. The sea trials are expected to commence as soon as weather conditions permit. The Company is seeking additional financing for the commercial utilization of the buoy after the trial phase is completed including its possible deployment at various potential sites. A second PB150 is already under construction in the U.S. for a proposed utility-scale project in Oregon, and the Company is involved in other planned projects in Australia, Japan and Europe that may utilize the PB150.

The ocean trials off Scotland have been fully consented by the Scottish Government. In addition, Marine Scotland, the directorate of the Scottish Government responsible for regulating marine and fisheries matters, consulted with many interested parties and stakeholder groups covering areas such as local wildlife, shipping, oil & gas and fishing interests.

OPT's PowerBuoy has a low visual profile, as most of the structure is submerged, and is designed to have a minimal environmental impact. The Company has considerable experience with in-ocean performance of its PowerBuoys, including its PB40 system which has been operating off Oahu, Hawaii, since December 2009 and has subsequently been connected to the grid. That system was developed under a multi-year project for the US Navy and the PowerBuoy underwent an extensive independent environmental assessment. This resulted in a Finding of No Significant Impact (FONSI) – the highest level of environmental assessment rating in the US. In addition, last year the Company signed a ground-breaking agreement with 11 US federal and state agencies and three non-

governmental stakeholders for the phased development of a 1.5 megawatt wave power project at Reedsport, Oregon in a manner that protects ocean resources and stakeholder interests.

For more information, visit www.oceanpowertechnolgies.com

Salazar, Chu announce major offshore wind initiatives

Unveiling a coordinated strategic plan to accelerate the development of offshore wind energy, Secretary of the Interior Ken Salazar and Secretary of Energy Steven Chu announced on February 7, major steps forward in support of offshore wind energy in the United States, including new funding opportunities for up to \$50.5 million for projects that support offshore wind energy deployment and several high-priority wind energy areas in the mid-Atlantic that will spur rapid, responsible development of this abundant renewable resource.

The joint National Offshore Wind Strategy: Creating an Offshore Wind Industry in the United States is the first-ever interagency plan on offshore wind energy. The departments also named several high priority "wind energy areas" in the Mid-Atlantic that will spur rapid, responsible development of wind energy. The initiatives are part of DOI's "Smart from the Start" program, announced in November 2010 and designed to speed appropriate commercial-scale wind energy development. The plan includes deployment of 10 gigawatts (GW) of offshore wind generating capacity by 2020 and 54 GW by 2030, enough energy to power 2.8 million and 15.2 million average American homes.

Deployment of clean, renewable offshore wind energy will help meet the President's goal of generating 80% of the Nation's electricity from clean energy sources by 2035.

"The mid-Atlantic Wind Energy Areas are a key part of our 'Smart from the Start' program for expediting appropriate commercial-scale wind energy development in America's waters," Secretary Salazar said. "Through the Strategic Work Plan, the United States is synchronizing new research and development initiatives with more efficient, forward-thinking planning so that we can help quickly stand up an American offshore wind industry. This initiative will spur the type of innovation that will help us create new jobs, build a clean energy future, and compete and win in the technologies of the 21st century."

"Offshore wind energy can reduce greenhouse gas emissions, diversify our energy supply, and stimulate economic

revitalization," said Secretary Chu. "The Department of Energy is committed to working with our federal partners to provide national leadership in accelerating offshore wind energy deployment."

The joint plan, A National Offshore Wind Strategy: Creating an Offshore Wind Industry in the United States, made public in February is the first-ever interagency plan on offshore wind energy and demonstrates a strong federal family commitment to expeditiously develop a sustainable, world-class offshore wind industry in a way that reduces conflict with other ocean uses and protects resources. The plan focuses on overcoming three key challenges: the relatively high cost of offshore wind energy; technical challenges surrounding installation, operations, and grid interconnection; and the lack of site data and experience with project permitting processes.

In support of this Strategic Work Plan, Secretary Chu announced the release of three solicitations, representing up to \$50.5 million over 5 years, to develop breakthrough offshore wind energy technology and to reduce specific market barriers to its deployment:

- Technology Development (up to \$25 million over 5 years);
- Removing Market Barriers (up to \$18 million over 3 years); and
- Next-Generation Drivetrain (up to \$7.5 million over 3 years).

Salazar also identified four wind energy areas offshore the mid-Atlantic as part of Interior's "Smart from the Start" approach announced in November 2010 that uses appropriate designated areas, coordinated environmental studies, large-scale planning, and expedited approval processes to speed offshore wind energy development. The areas, on the Outer Continental Shelf offshore Delaware (122 square nautical miles), Maryland (207), New Jersey (417), and Virginia (165), will receive early environmental reviews that will help lessen the time required for review, leasing, and approval of offshore wind turbine facilities.

A similar process will occur for the South Atlantic region, namely North Carolina, this spring. DOI's Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) will prepare regional environmental assessments for wind energy areas to evaluate the effects of leasing and site assessment activities on leased areas.

Based on stakeholder and public participation, BOEMRE will prepare regional environmental assessments for Wind

Energy Areas to evaluate the effects of leasing and site assessment activities on leased areas. If no significant impacts are identified, BOEMRE could offer leases in these Mid-Atlantic areas as early as the end of 2011 or early 2012.

Comprehensive site-specific NEPA review will still need to be conducted for the construction of any individual wind power facility, and BOEMRE will work directly with project managers to ensure that those reviews take place on aggressive schedules.

Under the National Offshore Wind Strategy, the Department of Energy is pursuing a scenario that includes deployment of 10 gigawatts of offshore wind generating capacity by 2020 and 54 gigawatts by 2030. Those scenarios include development in both federal and state offshore areas, including along Atlantic, Pacific, and Gulf coasts as well as in Great Lakes and Hawaiian waters. Those levels of development would produce enough energy to power 2.8 million and 15.2 million average American homes, respectively.

The announcement is the latest in a series of Administration actions to speed renewable energy development offshore by improving coordination with state, local, and federal partners; developing wind research and test facilities for new technologies to reduce market barriers; identifying priority areas for potential development; and conducting early environmental reviews.

NOAA launches website on emerging marine renewable energy

In response to resurging interest in renewable energy production, NOAA has launched a website containing legal and licensing information for industries interested in developing Ocean Thermal Energy Conversion (OTEC) capability in the United States.

OTEC produces renewable energy by using temperature differences between deep cold water and warm surface water to power a turbine. The electricity generated from an off-shore facility is sent to land by power cable. The technology is considered particularly viable in tropical areas with year-round warm surface water. In addition to generating electricity, OTEC technology has the potential to produce other products such as potable water, hydrogen and ammonia. Surplus cold water from OTEC can also be used for aquaculture and air conditioning systems.

The new website contains information on OTEC technology and potential environmental impacts and on NOAA's licensing authority under the Ocean Thermal Energy Conversion Act of 1980. It also

contains information on workshops with federal, state, academic, non-government and private sector interests to explore the technological and environmental issues of commercial-scale OTEC systems.

There are currently no commercial OTEC facilities and to date, NOAA has not received any license applications. However, federal agencies and private industry are conducting and pursuing OTEC-related demonstration and research projects. The U.S. Department of Energy may authorize demonstration projects after consulting with NOAA.

Interested companies must submit an application for a license through NOAA's Office of Ocean and Coastal Resource Management.

To access the website, visit: <http://coastalmanagement.noaa.gov/programs/otec.html>.

Offshore Wind Power Systems Met-Tower platform available

Offshore Wind Power Systems of Texas announced that it is releasing for full production its offshore wind measurement system for sales.

The design incorporates the Titan 3.6



MW and 5 MW Titan platforms with a state-of-the-art metrological tower that is self installing, self supporting, and portable from one location to another. The design is certified to meet industry standards.

The system design allows the user to sample wind and ocean data in multiple locations prior to setting turbine foundations and then doubles as a foundation turbine support after the data sampling job is complete, resulting in significant savings to the client company while enabling the client to collect a wider range of information for his particular wind site location. Existing systems require the developer to place fixed foundations in place for one year's required wind measurement to document the energy potential for a given site. The Titan "WMPS" System is mobile and re-installable to the rated water depth. This capability enables the developer to gain a

more accurate sample of the overall wind site, and its pay-back potential to the investors into the wind farm. In addition the capabilities of the system allow for full scale measurement 3.6 and 5 MW (428 ft) blade tip to blade tip, existing fixed systems are restricted in height of the sample tower because of restrictions in the foundations and tower structural strength by code.

For more information, visit www.offshorewindpowersystemsoftexas.com.

The World Wave and Tidal Market Report 2011-2015—New edition

The World Wave & Tidal Market Report by energy industry analysts Douglas-Westwood is now in its second edition. The report focuses on the current and future prospects, technologies, and markets for the wave and tidal current stream sectors. The first commercial wave and tidal current stream projects are now appearing online and forecast expenditures for the 2011-2015 period at \$1.2 billion. The sectors have been characterized by a large number of concept devices.

For more information, contact publications@dw-1.com.

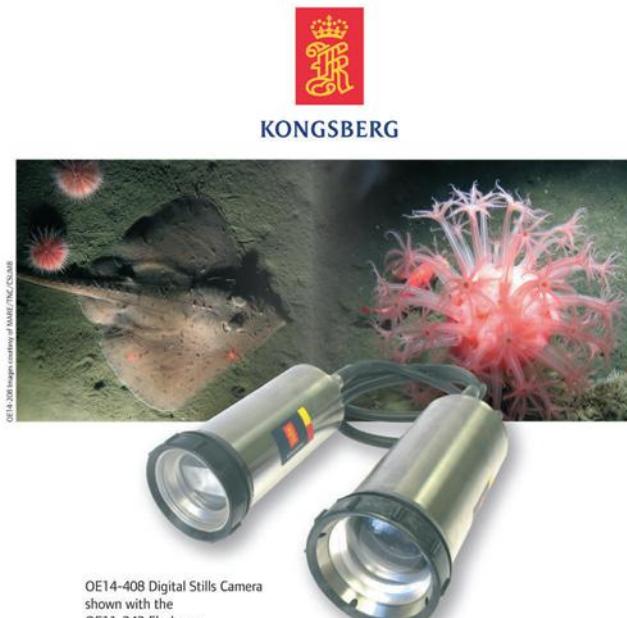
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Offshore and Eastern Europe new growth drivers for wind power in Europe

9.3 gigawatt (GW) of new wind power capacity was installed in the EU during 2010, reaching a total of 84 GW by the end of 2010, according to figures released today by the European Wind Energy Association (EWEA) and coinciding with today's publication by the European Commission on financing renewable energy.

While offshore wind power installations grew 51% from 582 MW in 2009 to 883 MW last year, new onshore wind power installations (8.4 GW) were down 13.9% compared to 2009 (9.7 GW).

Total investments in new wind power plant was unchanged at €13 billion, compared to 2009, due to the larger share of offshore wind capacity.

Newly installed capacity in 2010 (9.3 GW) was 10% down on 2009 (10.3 GW).

"Remarkable growth in the onshore wind markets of Romania, Poland, and Bulgaria could not make up for the decline in new onshore installations in Spain, Germany, and the UK. Strong development of the offshore wind market was lead by the UK, Denmark, and Belgium," said Christian Kjaer, Chief Executive Officer of EWEA.

The overall market for renewable power capacity, including wind, solar, hydro and biomass, reached record levels in 2010, increasing 31% from 17.5 GW in 2009 to 22.6 GW in 2010. Renewable energy accounted for 41% of all new installations.

Wind power installations accounted for 17% of new electricity generating capacity in 2010, the first year since 2007 that the EU did not install more wind power than any other generating technology. The EU continues to move away from fuel oil and nuclear power for electricity production, decommissioning more old capacity than installing new capacity. However, for only the second time since 1998, the EU installed more coal power capacity than it decommissioned in 2010. 28 GW of new gas capacity was installed last year, compared to 6.6 GW in 2009. Gas represented 51% of all new power capacity in 2010.

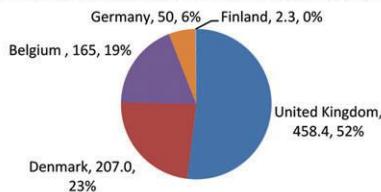
The wind power capacity installed by the end of 2010 will, in a normal wind year, produce 181 TWh of electricity (up from 163 TWh), meeting 5.3% of overall EU electricity consumption (4.8% in 2009).

Cumulative offshore wind power market (in Megawatt)

Country	UK	Denmark	Netherlands	Belgium	Sweden	Germany	Ireland	Finland	Norway	Total
Capacity installed	1,341.2	853.7	246.8	195	163.7	92	25.2	26.3	2.3	2,946.2

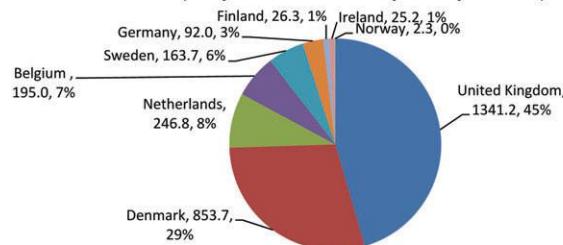
Source: EWEA

Installed capacity: share of 2010 installations (MW)



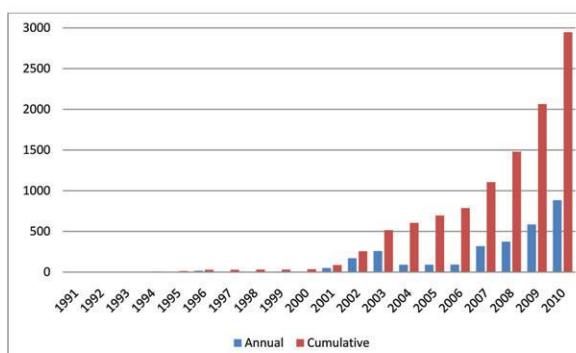
Source: EWEA

Installed capacity: cumulative share by country in 2010 (MW)



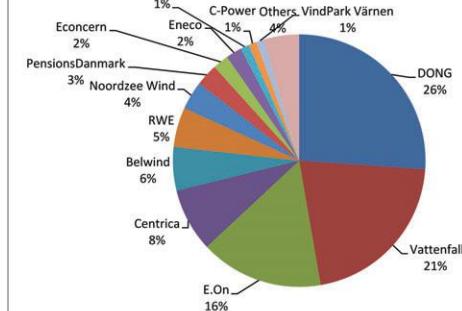
Source: EWEA

Development installed offshore wind power capacity in Megawatt (MW)



Source: EWEA

Owners share of installed capacity



Source: EWEA

U.S. Navy's shipbuilding budget

The U.S. Navy's 2012 budget request was made public February 14. Overall spending remains nearly the same in fiscal 2012 as the previous year, although the service is asking for modest increases in the number of ships and aircraft. The Department of the Navy, which includes the Navy and Marine Corps, is asking for \$161 billion in its baseline budget request, plus another \$15 billion for war funding. The baseline request is \$800 million over the 2011 request, while the department asked for \$3.5 billion more in 2011 war funding. The 2012 request asks for \$45.8 billion in procurement spending, down from \$46.6 billion a year ago. Two ships were added to the 2012 request compared with plans a year ago. As announced in late December, an extra Littoral Combat Ship is being requested in 2012, for a total of four ships. An additional mobile landing platform (MLP) ship is now in the 2012 request, a change from the previous plan to buy the three ships in alternate years beginning in 2011. The new scheme to procure the ships in consecutive years allows shipbuilder National Steel and Shipbuilding in San Diego, California, to take advantage of efficiencies by accomplishing more work at once. Two more Virginia-class SSN 774 nuclear attack submarines, an Arleigh Burke-class DDG 51 destroyer, a San Antonio-class LPD 17 amphibious ship, and a joint high-speed vessel (JHSV) round out the 2012 shipbuilding request. An additional JHSV is being requested for the U.S. Army, for a total of 11 ships in the Pentagon's shipbuilding program.

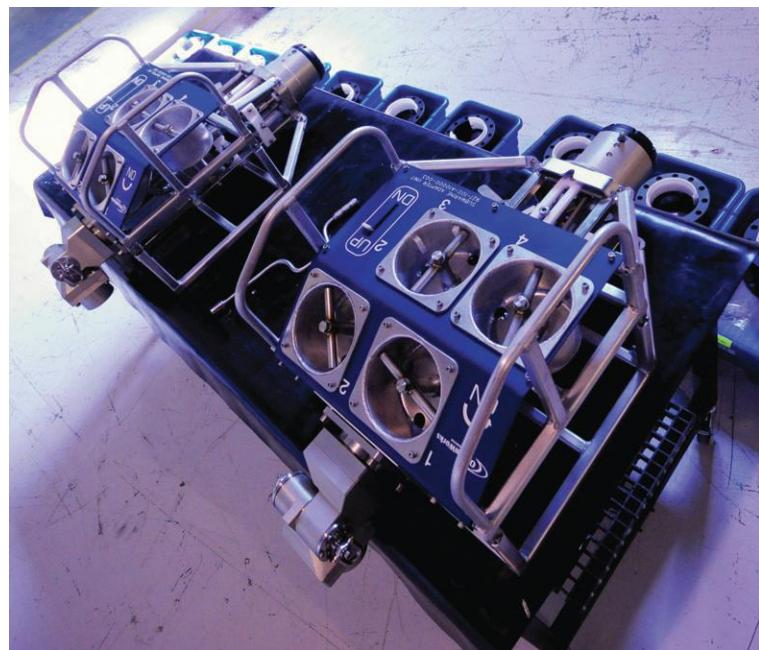
Russia deploys extra weapons to Kuri Islands

Russian President Dmitry Medvedev on February 9 ordered the deployment of extra weaponry on the Kuril islands claimed by Japan, escalating tensions in a dispute that has festered since World War II. Russia claims the Pacific islands as an "inseparable" part of Russia's territory and a strategic Russian region. Medvedev also ordered an expansion of its presence on the remote archipelago. This bold move in the dispute with Tokyo comes after Japan's Prime Minister Naoto Kan called Medvedev's unprecedented visit to the islands in November an "unforgivable outrage".

Singapore increases 2011 defense budget

Singapore, which has one of Asia's best-equipped militaries, has raised its national defense budget by 5.4% this year, according to government data released February 18. The government plans to spend S\$12.08 billion (\$9.5 billion) on defense in the 2011 fiscal year, up from S\$11.46 billion the year before. Singapore's navy, army, and airforce will get S\$11.53 billion to buy and maintain military equipment, for the upkeep of camps, and for payment of salaries. The city-state currently has a population of more than 5 million, a quarter of whom are foreigners. Singapore's economy grew 14.5% in 2010, the fastest in Asia. The defense budget is about 5% of gross domestic product.

OceanWorks provides Canadian Navy submarines with Submarine Emergency Ventilation and Decompression Systems



OceanWorks has recently delivered 24 Submarine Receiving Fittings (SRF) and four Submarine Adapter Units (SAU) to the Department of National Defence (DND) for the Victoria-Class Submarine Emergency Ventilation and Decompression System (SEVDS). DND selected OceanWorks International to design and build the SRF and SAU portions of the SEVDS.

The SRFs are a custom-designed modification of the existing hi-lo salvage fittings of the Victoria-Class submarines, allowing them to be adapted for submarine rescue operations.

The SAUs are custom-designed interface modules, which allow any SEVDS utilizing the North Atlantic Treaty Organization (NATO) standard to be used in an operation involving the Victoria-Class submarines. The SAU also provides the interface for operation by a diver, Atmospheric Diving System (ADS), or Remotely Operated Vehicle (ROV) system in connecting the SEVDS safely and securely to the submarine.

The purpose of the SAU and SRF portions of the SEVDS is to provide a safe and reliable method of supplying crewmembers on board these submarines with ventilation and decompression during an emergency, which in turn allows for an extended timeframe for the U.S. Navy SRDRS or other submarine rescue assets to arrive on site and start personnel transfer to the surface.

OceanWorks works closely with navies around the world to provide top-of-the-line submarine rescue equipment and support.

For more information, visit www.oceanworks.com.

Coast Guard Commandant delivers State of the Coast Guard Address

U.S. Coast Guard Commandant Adm. Bob Papp delivered his first State of the Coast Guard address at Joint Base Bolling-Anacostia in Washington, D.C., recently.

Papp reported the State of the Coast Guard as "ready to meet mission demands, but facing real challenges."

Papp charted the course ahead for the Coast Guard and announced the release of his Commandant's Direction, which contains four priorities: Sustaining Mission Excellence, Recapitalizing and Building Capacity, Enhancing Crisis Response and Management, and Preparing for the Future. Papp also highlighted the Service's accomplishments during his first eight months in command.

Noting that the Coast Guard has recently experienced unprecedented personnel losses, Papp told his Service, "I fear that our focus on reorganization and expanding missions post 9/11 has taken the edge off our skills across the service." He stressed that the Coast Guard needs to focus on "training to proficiency."

Papp proclaimed 2011 as "The Year of the Coast Guard Family," announcing a renewed focus on improving housing, child care development centers, and military family support programs.

Papp also discussed recruiting and retaining a diverse workforce and challenged the Service stating, "I need...every Coast Guardsman to create command climates that foster retention. The repeal of Don't Ask, Don't Tell will require your leadership – and I'm counting on you to exercise it...You must value your shipmates, no matter what their background."

Discussing U.S. strategic interests in emerging Arctic waters Papp said, "If we are serious about protecting our Arctic national interests and resources, then we must make the investment to do so."

Papp stressed the Coast Guard's need to continue recapitalizing its fleet, saying, "Unless we continue to update our ships, planes, and boats and improve our shore stations, we will not be able to maintain an acceptable level of readiness to perform our missions."

Papp assumed the duties of the 24th Commandant of the Coast Guard May 25, 2010. He leads the largest component of

the Department of Homeland Security, comprised of 42,000 active-duty men and women, 8,000 civilians, 8,200 reservists, and 31,000 volunteer auxiliarists.

The Commandant's Direction is available online at www.uscg.mil/senior-leadership/DOCS/CCGs-Direction-2011.pdf.

U.S. Navy buys Mobilarm VHF locator beacons and commits to large-scale simulation exercise

The U.S. Naval Sea Systems Command (NAVSEA) has exercised its option to purchase an additional \$300,000 worth of test units and engineering services. The option was exercised following initial testing success of the VHF Locator Beacon and precedes extensive final capability testing. NAVSEA will then look to procure the V200 for its submarine fleet.

Mobilarm was awarded a Sole Source contract by NAVSEA in April 2010 to develop a modified version of the Mobilarm V100 VHF Locator Beacon specifically for use during and after an at-sea evacuation from a submarine. The United States Department of Defence for Submarine Escape and Rescue awarded Foreign Comparative Testing (FCT) fund-

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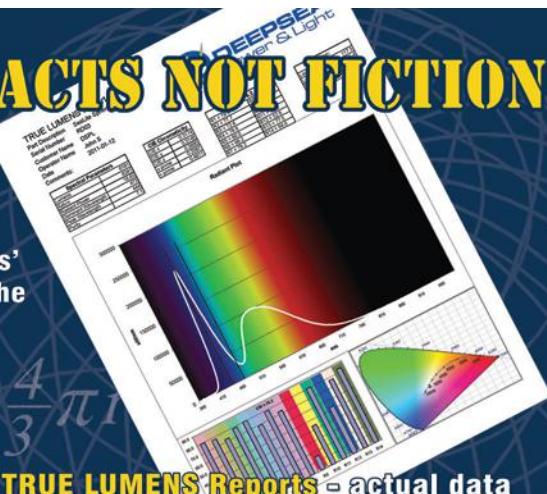
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Defense

ing to Mobilarm to co-develop and supply the V200 Beacon.

Sea trials are planned to take place in June 2011 when NAVSEA will undertake a large-scale sea and air capability demonstration involving multiple vessels and aircraft from the U.S. Navy fleet and U.S. Coast Guard, including satellite tracking of the beacons AIS capability.

The capability testing follows a successful joint exercise between the US Navy and Royal Australian Navy in November 2010, which was conducted at the Submarine Escape Training Facility on Garden Island, Western Australia, and successfully confirmed the wearability and operational benefits of the beacon.

Mobilarm Chief Executive Officer, Lindsay Lyon said, "The U.S. Navy has in place 71 commissioned submarines, each carrying approximately 143 people. This could provide strong initial revenue for Mobilarm upon procurement. There are also additional opportunities to follow with a large number of NATO countries."

In independent trials, Mobilarm's VHF Locator Beacons have significantly outperformed existing technology with their ability to enable search and rescue teams to locate, track, and recover people in the water, and plan their rescue more effectively. The U.S. Navy contract provides for a new submariner version of the Mobilarm V100 VHF Locator Beacon (V200) to be evaluated and considered as a safety-enhancing addition to survival suits to enable locating and tracking of evacuated submariners.

For more information, visit www.mobilarm.com.

VSD, LLC awarded \$15,050,000 contract

VSD, LLC (VSD) has been awarded a contract from Naval Air Warfare Center, Training Systems Division, Orlando, Fla., to provide the design, fabrication, installation, and testing of the Iraqi navy training systems and the training development and delivery for the 60-meter Offshore Support Vessel (OSV). Total contract value is \$15,050,000, and work is anticipated to be complete in November of 2011.

VSD will develop, construct, and deliver training for and manage the team of contractors in the development of four simulators to include the Full Mission Bridge Trainer, 30-mm Fire Control Trainer, Engine Control Room Trainer, and Small Arms Trainer. The training effort will involve OSV operation and maintenance to Iraqi naval personnel in one training session in Morgan City, La. The effort also includes support for Iraqi engineers who

will monitor the ship's construction. The training will ensure the Iraqi sailors have a working knowledge of OSV operation and maintenance to sustain operational requirements and systems availability throughout the OSV service life.

Navy Energy Conservation Open BAA released

The Naval Surface Warfare Center, Carderock Division (NSWCCD) has issued a Broad Agency Announcement (BAA) discussing Energy Conservation Applications for the U.S. Navy's Military Sealift Command (MSC) Combat Logistics Force, Auxiliaries, and Sealift ships. The BAA solicits innovative concepts for Navy shipboard energy conservation and carbon footprint reduction with the potential for rapid transition to Fleet operation. The solicitation is BAA number N00167-11-BAA-01.

Non Kink™ Strong Tether Fiber Optic Cable (STFOCTM)

Under contract for the U.S. Navy, Linden Photonics has developed a proprietary miniature optical fiber cable that offers high tensile strength and crush resistance at a fraction of the cost of competing technologies. Extruded technology and high-performance resins allow for cable diameters generally ranging from 0.7-mm to 4-mm with tensile strengths from 50 lbs to >350 lb. Developed originally for use with the Navy's Mk48 "wire" guided torpedo, the lightweight, small diameter cable is ideally suited for use with tethered ROVs or AUVs. In addition to its unique mechanical properties, the STFOC cable jacket is also extremely impervious to moisture and oxygen, chemically stable, and capable of operating at up to 250°C.

As part of a collaborative effort with some of the world's premier companies involved in fiber optic security and oceanography, Linden has developed several variants of its original STFOC that are virtually unkinkable. This non-hocking fiber optic cable combines all of the best features of the original STFOC, including extreme tensile strength, crush proof, and barrier properties while adding a protective secondary layer that provides fish-bite resistance.

If a cable loops back on itself and creates a kink, the fiber can break and this results in expensive down time. STFOC Non-Kink uses a proprietary design to improve its flexibility and provide a cable, which is virtually impossible to kink.

For more information, visit www.LindenPhotonics.com.

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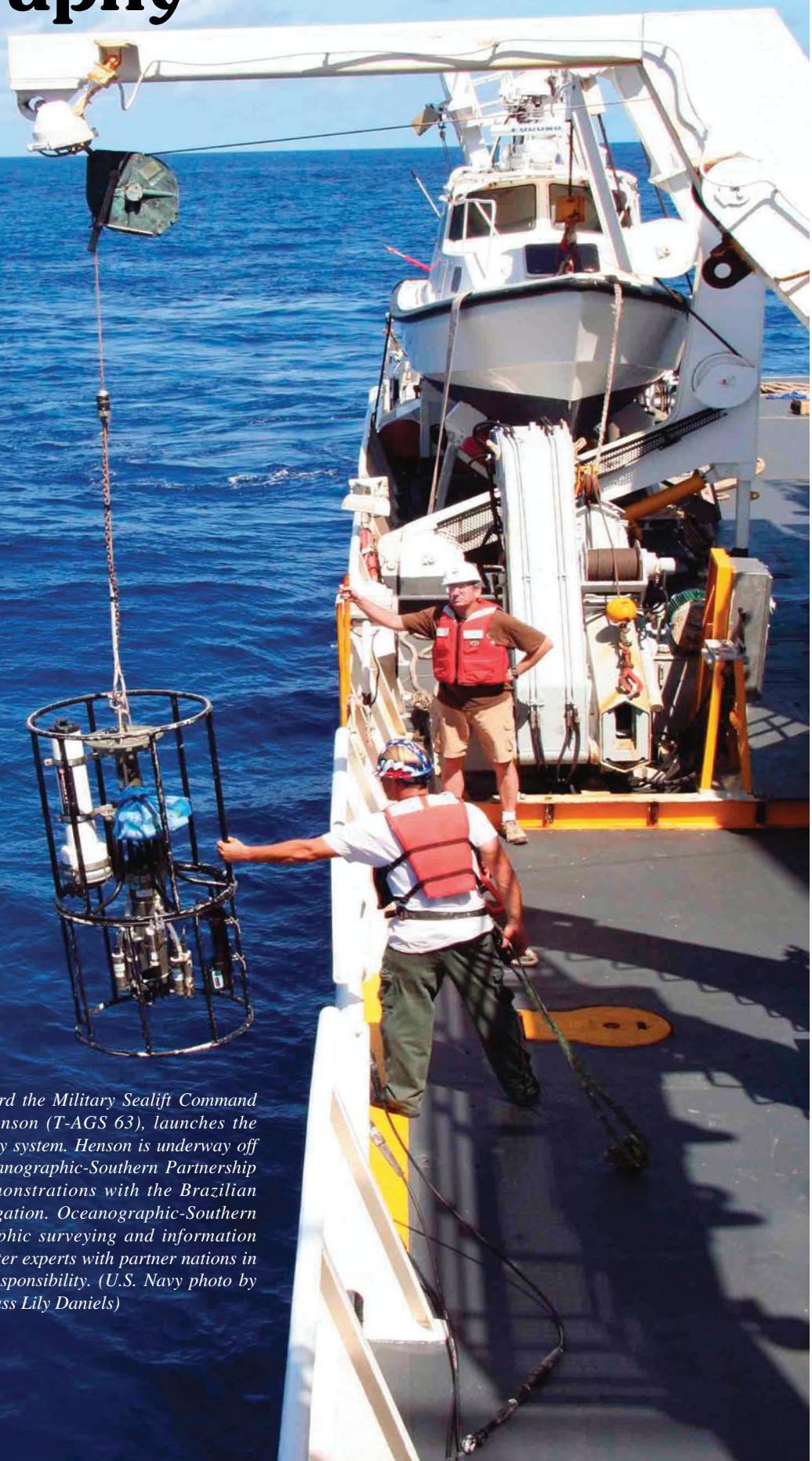
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Naval Oceanography Turns Data into Decisions

Editorial Focus

By George Lammons and Jenni T. Ervin,
Naval Meteorology and Oceanography Command



Nicholas Landino III, chief mate aboard the Military Sealift Command oceanographic survey ship USNS Henson (T-AGS 63), launches the Seabird 911 Plus CTD shipboard survey system. Henson is underway off the coast of Fortaleza, Brazil for Oceanographic-Southern Partnership Station 2010 conducting survey demonstrations with the Brazilian Directorate of Hydrograph and Navigation. Oceanographic-Southern Partnership Station is an oceanographic surveying and information exchange program between subject matter experts with partner nations in the U.S. Southern Command area of responsibility. (U.S. Navy photo by Mass Communication Specialist 2nd Class Lily Daniels)



Members of the Fleet Survey Team install hydrographic sonar and GPS navigation equipment on their 9-meter survey vessel during a pre-deployment training session. (U.S. Navy photo)

The Naval Meteorology and Oceanography Command (NMOC) plays a vital role in nearly every aspect of U.S. Naval operations by identifying the risks and opportunities encountered while operating the natural environment.

"Naval Oceanography's ability to characterize the ocean and atmosphere is unequaled, and of vital importance to our nation's defense," said Rear Adm. Jonathan White, NMOC commander.

Using a unique concept of operations that balances operational needs and technological capability, NMOC translates knowledge of the current and predicted physical environment – including the impact on U.S. Naval sensors, platforms and people – into meaningful operational recommendations. This process, called Battlespace on Demand (BonD), also guides and informs the command's operational and technical development, and drives its investment strategy.

"Naval Oceanography turns environmental data into decisions, generating a competitive advantage across the warfighting spectrum," White said. "The Fleet depends on us at multiple levels, to both keep our forces safe and provide additional operational effectiveness. The BonD process delivers these enhanced decision-making capabilities for the warfighter."

The BonD construct consists of four distinct levels, or "tiers," beginning with data collection and concluding with a mission recommendation for the warfighter. The foundation is Tier 0, in which data from various sources are collected, assimilated and fused to provide initial and boundary conditions that accurately describe the current ocean and atmosphere environment, as well as the celestial and temporal reference frames.

In Tier 1, NMOC's high-performance supercomputers run complex models to continually forecast and verify the future state of the ocean and atmosphere.

Tier 2 takes into account how the environment modeled in Tier 1 will impact sensors, weapons, platforms and people, outlining the opportunities and risks for operations. This process can be depicted using a "performance surface" that accounts for both the

predicted environment and the capabilities and behaviors of the force – both allies and adversaries.

"Through a variety of performance surfaces we provide actionable recommendations on force allocation and employment that directly enhance safety and warfighting effectiveness," White said.

The command's flagship Tier 2 product, the Piracy Performance Surface, predicts the likelihood of pirate attacks during a specific timeframe. By weighing intelligence data with meteorological and oceanographic forecasts, the Piracy Performance Surface narrows the thousands of square miles of potential pirate operating areas into areas of varying risk levels, enabling mission planners to focus assets on high-probability areas.

In Tier 3, performance surfaces are applied to specific decision-making processes to quantify risk and opportunity at the tactical level. The BonD principles are also employed in such tasks as ship and aircraft routing, incorporating fuel savings and transit time into the equation. NMOC strives to continually employ rapid transition of maturing technology into operational capabilities that produce such products.



Surveyors from the Naval Oceanographic Office and Brazilian hydrographic officers are lowered in a hydrographic survey launch vessel from the Military Sealift Command oceanographic survey ship USNS Henson (T-AGS 63) in the Port of Fortaleza. The surveyors conducted a shallow water survey demonstration for the Brazilian officers. Henson is participating in Oceanographic-Southern Partnership Station (O-SPS), an exercise focused on oceanographic surveying and the exchange of information between subject matter experts with partner nations in the U.S. Southern Command area of responsibility. (U.S. Navy photo by Mass Communication Specialist 2nd Class Lily Daniels)

Command Structure

NMOC's subordinate commands focus on 10 directorates that are key to Navy operations – mine warfare, anti-submarine warfare, expeditionary warfare, special operations, strike operations, aviation weather, maritime weather, navigation, precise time and astrometry; and intelligence, surveillance and reconnaissance.

The Naval Oceanographic Office (NAVO) at Stennis Space Center, Miss., and Fleet Numerical Meteorology and Oceanography Center in Monterey, Calif., are NMOC production centers that use supercomputers to develop complex oceanographic and atmospheric forecasts, based on the analysis and fusion of millions of oceanic and atmospheric observations. The third production center, the U.S. Naval Observatory in Washington, D.C., provides star measurements and precise time for navigation and targeting.

The Naval Oceanography Operations Command is the operational arm of the enterprise, overseeing seven subordinate commands located in Fleet concentration areas around the world. The forward commands leverage reachback from the production centers for forecasts and special guidance. These civilian-military teams provide comprehensive forecasts, as civilians contribute Ph.D.-level forecasting expertise to military members' insight into Navy operations.

Technology

Since the products are only as good as the data, Navy oceanographers embrace continual improvements in data collection and forecasting techniques, and work with developers to transition emerging technologies into operations as quickly as possible.

NMOC uses both deep and shallow water unmanned vehicles in its data collection processes. The unmanned vehicles contribute

near-real-time data, and add a previously unavailable level of clarity to the Navy's mine warfare, anti-submarine warfare, navigation, special operations and expeditionary war efforts. Ocean models use these new data sources to produce more accurate forecasts, further increasing the fidelity of operational recommendations.

The command uses both ocean gliders and unmanned vehicles with power propulsion systems for deep-water data collection. Gliders carry suites of sensors, and are programmed to "swim" certain courses by varying their buoyancy as well as exploiting currents, sending data via satellite uplinks back to NAVO. These gliders can remain on-station for up to six months, and can be deployed as well as retrieved by hydrographic vessels or a ship of opportunity.

NMOC employs REMUS UUVs, conducting pre-programmed independent operations from a host platform or shore facility. Various platforms are employed from near shore to depths to 6,000 meters, and collecting physical oceanography and bottom-mapping data for ocean modeling.

Shallow water vehicles use battery-powered propulsion systems and are used for mine warfare and harbor surveys. Aerographer's Mates (AGs) with mine warfare units download the data and fuse the data with other sources to depict mine like object at a much faster rate than previously possible. These capabilities are being integrated with Explosive Ordnance Disposal (EOD) capabilities to produce a greatly improved mine clearance capability for Naval operations.

Disaster Assistance and International Cooperation

NMOC is often called upon to leverage unique capabilities and expertise to respond to disaster relief efforts around the world and in cooperative efforts with foreign nations and other U.S. government agencies. These activities reflect a core element of the U.S. Naval Maritime Strategy, emphasizing the importance of working with international partners as the basis for global maritime security.

In response to the 2010 earthquakes in Chile and Haiti, the command's Fleet Survey Team and a hydrographic survey ship performed harbor and route surveys to ensure safe navigation of ships carrying relief supplies into ports. The timely efforts of these teams quickly identified navigation hazards caused by changes in the ocean bottom, allowing for chart updates and notices to be sent to incoming ships, minimizing any delay in providing much-needed supplies.

Closer to home, NMOC deployed and operated gliders and drift buoys in response to the 2010 Mississippi Canyon 252 oil spill in the Gulf of Mexico. This ensured that NMOC's partners with NOAA and other agencies had critical oceanographic information to accurately model the oil's movement.

The oceanographic survey ship USNS Henson (T-AGS 63) is currently conducting activities with forces in Chile and Peru as part of Oceanographic Southern Partnership Station (OSPS). These engagement activities, focused on oceanography and hydrography, aim to generate positive long-term relationships with partner nations. These visits follow last year's OSPS activities in Columbia and Brazil.

The command also has over 40 cooperative agreements with nations around the world. These agreements provide partner countries with instruction and local survey data and field charts from hydrographic surveys performed in conjunction with U.S. hydrographic assets.

Headquartered at Stennis Space Center, Miss., NMOC's 3,000 military and civilian members are globally distributed and serve in a variety of sea and shore billets. Aerographers' Mates serve on every Amphibious Ready Group and Carrier Strike Group, are embedded with SEAL teams, and work side-by-side with mine warfare commands and ASW operations.



Danielle Bryant, right, an oceanographer from the Naval Oceanographic Office (NAVOCEANO), establishes a satellite connection to the Glider Operations Center at NAVOCEANO before launching the seaglider unmanned underwater vessel from the Military Sealift Command oceanographic survey ship USNS Henson (T-AGS 63). The vessel is designed to collect physical oceanography data in deep water. Henson is underway off the coast of Fortaleza, Brazil for Oceanographic-Southern Partnership Station 2010 conducting survey demonstrations with the Brazilian Directorate of Hydrograph and Navigation. Oceanographic-Southern Partnership Station is an oceanographic surveying and information exchange program between subject matter experts with partner nations in the U.S. Southern Command area of responsibility. (U.S. Navy photo by Mass Communication Specialist 2nd Class Lily Daniels)

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OFFSHORE INDUSTRY

Energy demand to rocket by 2030

Expanding prosperity for a growing world population will drive an increase in energy demand of about 35% by 2030 compared to 2005, even with significant efficiency gains, and natural gas will emerge as the second-largest energy source behind oil, ExxonMobil Corp. said as it released its new edition of Outlook for Energy: A View to 2030.

The growing use of natural gas and other less-carbon intensive energy supplies, combined with greater energy efficiency in nations around the world, will help mitigate environmental impacts of increased energy demand. According to the Outlook, global energy-related carbon dioxide emissions growth will be lower than the projected average rate of growth in energy demand.

"Our energy outlook clearly points to a growing demand for energy globally, which reflects improving living standards for millions of people around the world," said Rex W. Tillerson, ExxonMobil's chairman and chief executive officer. "ExxonMobil will continue to invest in technology and innovation to develop new economic energy supplies to help meet this demand while looking for ways to reduce environmental impacts."

Shell scraps Alaska drilling plans

Royal Dutch Shell will scrap its plans to drill an exploratory well in the Beaufort Sea near Alaska this summer, after failing to secure key permits for the project. Shell CEO Peter Voser reportedly confirmed the drilling will now be postponed until at least 2012, as the company works to obtain necessary environmental permits and convince federal regulators it is prepared to contain an out-of-control well in remote, icy waters.

This is the latest delay in the company's five-year quest to drill in the Beaufort and Chukchi seas. "Despite our investment in acreage and technology and our work with stakeholders, we have not been able to drill a single exploration well," Voser said in an February 3 earn-

ings call. "Despite our best efforts, critical permits continue to be delayed, and the timeline for getting these permits is still uncertain."

The company's plans for drilling in the Beaufort Sea last summer were put on hold after the lethal blowout at BP's Macondo well in the Gulf of Mexico.

BP joins nonprofit venture MWCC

BP plc said it joined the Marine Well Containment Co. LLC (MWCC). Last year, BP announced plans to join the organization and to share its response experience and equipment. MWCC, a nonprofit joint venture, was organized following the April 2010 blowout of BP's deepwater Macondo well in the Gulf of Mexico off Louisiana.

The blowout resulted in an explosion and fire on Transocean Ltd.'s Deepwater Horizon semi-submersible and a massive oil spill. Chevron Corp., ConocoPhillips, ExxonMobil Corp., and Royal Dutch Shell formed the MWCC to provide emergency equipment and response services for future oil spills in the Gulf.

Capex to hit \$64.2 billion this year

Global offshore drilling expenditures are expected to increase from an estimated \$58.8 billion in 2010 to \$64.2 billion in 2011, with the growth largely driven by investments in Asia-Pacific, according to new GlobalData report "Oil & Gas Capital Expenditure Outlook 2011."

After witnessing a sharp decline in their capital expenditures in 2009, most companies increased their spending in 2010. GlobalData estimates that global oil and gas spending would be up by 14% in 2010 over 2009 after declining around 18% in 2009 over 2008. Most of the capital spending during the year was from National Oil Companies (NOCs) with strong capital reserves. On the other hand, integrated and independent oil companies opted for a wait and watch strategy during 2010.

Most of the growth in 2011 is expected to be driven by NOCs and integrated oil companies, which could contribute 97% of capital expenditure growth this year. A positive demand outlook is encouraging most integrated companies to increase their capital spending in 2011, GlobalData reported.

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Merger and acquisition deal value rebounds in oil-gas sector in 2010

The total value of oil and gas transactions announced globally reached \$270 billion in 2010, according to Ernst & Young's Global oil and gas transactions review 2010. This is 35% higher than the total for the previous year of \$200 billion. In aggregate, 947 deals were announced in 2010, with upstream continuing to dominate the landscape, accounting for 73% of transactions. Volumes were 5% higher than 2009.

Rebounding crude prices — Brent averaged \$79.62/bbl in 2010 compared to \$74.58/bbl in 2009 — and better capital availability provided a support to the increase in deal values.

Gas prices, a victim of a robust supply position in a time of moderate demand, were not as strong, but this dynamic also represented an important driver of transaction activity in many regions, according to Ernst & Young's analysis.

"As we predicted, 2010 was a healthier year for upstream and oilfield services transactions, whereas overcapacity in some regions drove a period of uncertainty and challenges in the downstream sector," said Andy Brogan, global oil and gas transaction advisory services leader for Ernst & Young. "There have, however, been diverse regional trends underlying this macro view. 2011 looks set to continue the themes of 2010 against the backdrop of gradually improving capital market conditions."

An improving corporate environment and strengthening share valuations have led to a reversal of last year's dominance of corporate transactions, with asset deals moving from 34% to 58% of 2009 transaction values. Corporate transactions continue to be a material component of the deal mix, driven by their ability to deliver a larger value of reserves as well as critical expertise and people, according to Ernst & Young's study.



Rex Tillerson



Ensero takes Pride in \$7.3 billion deal

Ensero, a London-based offshore oil drilling contractor, plans to acquire Pride International of Houston for \$7.3 billion in cash and stock. The merger would create the second largest offshore driller in the world, behind Transocean, with 74 rigs spanning 25 countries on six continents. The combined company will have 21 ultra-deepwater and deepwater rigs.

"Together, we will form an even stronger company that is ideally positioned to capitalize on growth opportunities within our industry," Daniel W. Rabun, Ensero's chief executive, president, and chairman, said in a statement.

The merger also reflects a desire of drilling contractors to move rigs into lucrative foreign waters. With its acquisition of Pride, Ensero will further expand its business into Brazil and West Africa. Recently, Ensero reached a deal with Petrobras, the state-controlled oil giant, to move a deepwater rig to Brazil.

"The combination is an ideal strategic fit, as our rig types, markets, customers, and expertise complement each other with minimal overlap," Rabun said.

The combined company, to be called Ensero, will be based in London. Rabun



Ensero's 8500 ultra-deepwater rig

will maintain his top post. The rest of its executive management team will be named in the coming months. Each company's board unanimously approved the merger. The deal could close as soon as spring.

Hercules to buy Seahawk Drilling

Hercules Offshore, Inc. entered into an asset purchase agreement with Seahawk Drilling, Inc. and its affiliates to purchase 20 jack-up rigs and related assets from Seahawk for about 22.3 million shares of Hercules Offshore common

stock and cash consideration of \$25 million, which will be used primarily to pay off a debtor loan, which Seahawk secured in connection with its bankruptcy filing to support the business and provide liquidity prior to the closing of the transaction.

The assets to be acquired will consist of the 20 jack-up rigs located in the U.S. Gulf of Mexico and related equipment, accounts receivable, cash, and contractual rights.

Wood selling well support division

Wood Group will sell its well support division to GE Oil & Gas for \$2.8 billion. The sale will include Wood Group's electrical submersible pump, surface well equipment, and logging services operations. Following the disposal, \$1.7 billion of the \$2.8 billion cash deal will be returned to shareholders.

"Our shareholders will benefit from a significant return of cash," said Wood Group chief executive Allister Langlands. "We plan to pursue our successful growth strategy of targeted geographic expansion and broadening of the service offering in our core engineering and operations and maintenance activities in the oil and gas and power markets."

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Offshore Industry Headlines

Drilling delays could curb U.S. crude production: study

Delays in offshore drilling prompted by the Deepwater Horizon disaster could curb crude production over the next decade, according to a report that predicts the slowdown may jeopardizes as much as 680,000 barrels of oil equivalent each day in 2019.

The study, produced by the energy research firm Wood Mackenzie for the American Petroleum Institute, also concludes that because of regulations imposed since last year's oil spill and delays in getting offshore drilling permits, roughly a third of deep-water Gulf of Mexico fields could cost more to produce than they would generate in revenue.

"We are talking about . . . a major threat to Gulf region jobs and to the nation's energy security," said Kyle Isakower, API's vice president of economic and regulatory policy. "Policy makers need to understand the seriousness of what is happening in the Gulf of Mexico."

The study comes as oil and gas industry supporters pressure the Obama administration to speed up approvals for offshore drilling projects that have been on hold since the lethal blowout of BP's Macondo well last year. Although the administration lifted a ban on deepwater exploration in October, federal regulators, as of late February, had not yet approved any new wells that would have been barred by the moratorium.

Good chance of big gas deposit off Cyprus: Noble Energy

U.S. company Noble Energy said that seismic data indicate a strong chance of a sizable natural gas deposit off the southeastern coast of Cyprus and that it hopes to begin drilling late this year or in early 2012, according to the Associated Press.

Terry Gerhart, Noble Energy vice president for international operations, said Noble Energy's confidence of a large gas find off Cyprus is boosted by its discovery of large natural gas fields in Israeli waters close to Block 12, an 800,000-acre area that Cyprus licensed the U.S. firm to explore in 2007. One of the recently discovered Israeli fields, dubbed Leviathan, contains more than 450 billion cubic meters (15.9 trillion cubic feet) of natural gas.

He said Noble Energy would be interested in bidding for additional exploration rights inside Cyprus' 17,000-square-mile exploration zone that is carved into 13 blocks when the island proceeds with a second licensing round in the second half of this year.

Planning begins for 2012-2017 Gulf of Mexico lease sales

The Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) said it would prepare an Environmental Impact Statement (EIS) for proposed oil and gas lease sales in the Western and Central Planning Areas of the Gulf of Mexico, off the coasts of Texas, Louisiana, Mississippi, and Alabama, for the 2012 to 2017, five-year oil and gas leasing program.

BOEMRE said it is proposing to prepare a single EIS (multi-sale EIS) for all proposed 2012-2017 Central and Western Planning Area sales. As part of the scoping process, federal, state and local government agencies and other interested parties can submit comments that will assist BOEMRE in determining significant issues and alternatives to be analyzed in the multi-sale EIS.

Judge to U.S. Interior: move faster on drilling permits

U.S. District Judge Martin Feldman, who struck down the Obama administration's moratorium on deepwater drilling after the Gulf oil spill on February 17, ordered the Interior Department to act quickly on five pending permits and told the Interior Department's Bureau of Ocean Energy Management, Regulation and Enforcement to act within 30 days. The agency rules on permit applications in the Gulf of Mexico.

The judge said the agency needed to process permits to "restore normalcy to the Gulf region. He said the inaction had hurt drilling companies and threatened them with "endless disability."

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Petrobras selects vessel for pipeline installation
McDermott International, Inc. said its subsea construction vessel Agile was contracted by Petrobras to install subsea flexible pipelines and umbilicals in up to 2,000 meters of water offshore Brazil. The company will also provide subsea installation engineering for the duration of the contract, which is for a five-year term. Work is expected to begin at the end of the second quarter of 2011, with McDermott's dedicated subsea engineering team mobilizing to Macae in Brazil in the coming months for the duration of the project.

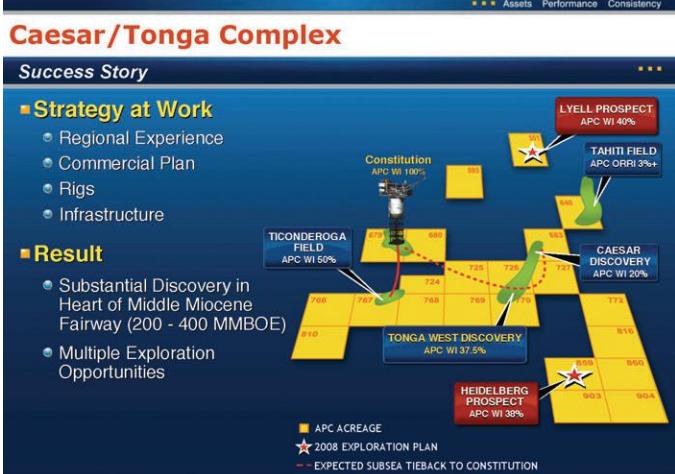
SeaBird lands \$20 million in seismic contracts
SeaBird Exploration has received contracts worth \$20 million to conduct surveys in 2D and 3D shallow waters using its seismic vessels. Aquila Explorer will extend its stay in New Zealand for the continuation of an ongoing survey. Hawk Explorer will operate in West Africa for three months. Northern Explorer will be in East Africa to carry out a survey, with expected completion in May this year. Osprey Explorer has completed a survey in the Bahamas and is heading for the U.S. Gulf where it will embark on a four-month, multi-client survey. The contracts represent 11 vessel-months of use, including mobilization time.

FMC awarded contract to support Gygrid project
FMC Technologies, Inc. said it signed a contract with Statoil for the manufacture and supply of subsea production equipment to support the Gygrid offshore development. The award has a value of approximately \$54 million in revenue to FMC Technologies. Gygrid is a fast-track oil and gas field located in water depths of about 820 feet in the Norwegian sector of the North Sea. FMC's scope of supply includes the manufacture of two subsea production trees, one manifold, and associated subsea and topside control systems. Deliveries are scheduled to commence in the third quarter of 2011.

Flour to get \$3.5 billion contract for LNG project
Fluor Corp. was awarded an engineering, procurement, and construction contract by Santos Ltd. for its Gladstone Liquefied Natural Gas project in Queensland, Australia. Fluor's EPC contract includes upstream facilities associated with the 7.8 million tonne-per-year liquefied natural gas (LNG) project that will extract and liquefy gas from coal deposits for eventual export to Asia and other global markets. Fluor booked \$3.5 billion in its fourth quarter of 2010 for this new contract.

Transocean to take \$1.009 billion impairment
Transocean Ltd. said it expected its fourth quarter 2010 results to include an after-tax, non-cash charge of \$1.009 billion, or \$3.16 per diluted share, resulting from the impairment of the Standard Jackup fleet. The impairment is due to projected declines in dayrates and utilization, which adversely impacted this asset group, and is calculated in accordance with U.S. generally accepted accounting principles. Transocean's fourth quarter and full-year 2010 results were expected to be released in late February.

Caesar-Tonga startup derailed because of problems with riser



A mechanical problem involving the production riser system at the Caesar-Tonga project in the deepwater Gulf of Mexico will delay first production, which was expected in mid-2011, field operator Anadarko Petroleum Corp. disclosed.

The Houston-based E&P independent said that while the production riser system underwent an extensive qualification program prior to installation, Anadarko's recent hydro-testing of the riser provided results that preclude it from being put into service on the project.

"We are delaying first production at the Caesar-Tonga project after our recent hydro-test of the production riser system indicated it was not fit for service," said Chuck Meloy, Anadarko's senior vice president of worldwide operations. He said the project was otherwise on schedule, noting that Anadarko had recently secured the necessary permits to begin completions on the first two wells.

"Nonetheless, in the interest of safety and the environment, delaying startup is clearly the right decision," Meloy said. "We plan to continue the completion activities as we work with the co-owners to secure a reliable alternative for the production riser. Importantly, this should not impact our ability to meet the 2011 sales-volumes estimate that we provided in March of last year."

He said Anadarko continues to expect total full-year 2011 volumes to be well within the range of 240 million to 250 million barrels of oil equivalent. The company planned to announce its 2011 guidance and capital program during an extended investor conference call in late February.

Anadarko operates the Caesar-Tonga development with a 33.75% working interest. Co-owners in the project include Statoil Gulf of Mexico LLC, with a 23.55% working interest; Shell Offshore Inc., with a 22.45% working interest; and Chevron USA, Inc., with a 20.25% working interest.

Caesar-Tonga is located in the Green Canyon area of the U.S. Gulf, in close proximity to Anadarko's Constitution spar in Green Canyon Block 680.

The Caesar-Tonga development consists of three discoveries — Tonga, Tonga West, and Caesar — which will be tied back to the Constitution spar for production.

Helix inks agreements for GoM deepwater containment system

Helix Energy Solutions Group, Inc. has executed agreements for its Helix Fast Response System (HFRS) to be named as a spill response resource for the U.S. Gulf of Mexico in response plans submitted by oil and gas producers with state and federal authorities.

The HFRS centers on two vessels, the Helix Producer I and the Q4000, both of which played a key role in the BP Macondo spill response and are presently operating in the U.S. Gulf.

Helix signed an agreement with Clean Gulf Associates (CGA), a non-profit industry group, making the HFRS available for a two-year term to CGA participants in the event of a Gulf well blowout incident in exchange for a retainer fee.

In addition to the agreement with CGA, Helix also has signed separate utilization agreements with 19 CGA participant member companies to date, specifying the day rates to be charged should the solution be deployed.

"We are pleased to have reached agreements with a key group of industry



The drilling vessel Helix Q4000

players to provide the Gulf of Mexico's first proven spill containment system and are honored by its recent endorsement from BOEMRE Director Bromwich," said Owen Kratz, chief executive officer of Helix.



The Helix Producer I vessel

Davy Jones shelf prospect yields more hydrocarbon bearing sand

Oil and natural gas explorer McMoRan Exploration Co. said it discovered a new hydrocarbon bearing sand at its ultra-deep Davy Jones prospect in the Gulf of Mexico shelf.

The appraisal well is drilling below a vertical depth, of 27,900 feet; and near that depth it indicated over 200 feet of gross and about 100 net feet of hydrocarbon bearing sand, the company said. The well, now at a depth of 5.3 miles, is one of the deepest in the shallow waters of the U.S. Gulf. McMoRan holds a 60.4% working interest and 47.9% net revenue interest in Davy Jones. Energy XXI and Nippon Oil Exploration USA Ltd. hold minor interests, among others.

Meanwhile, Blackbeard East drilling is below 31,400 feet, McMoRan said, noting that the well was re-permitted to 34,000 feet. Recent wireline logs have indicated hydrocarbon bearing sands in the Oligocene (Frio) section below 30,000 feet. This is the first hydrocarbon bearing Frio sand encountered either on the shelf or in the deepwater offshore Louisiana, the company said.

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Is industry building too many deepwater drilling rigs?

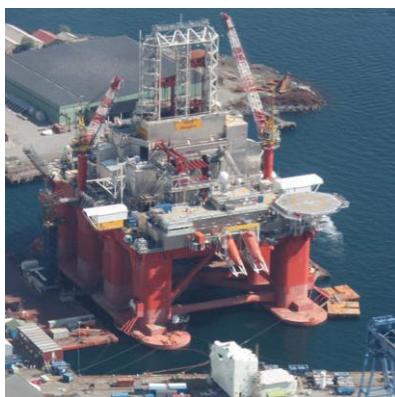
Offshore oil drillers are said to be building new rigs at the fastest pace in four years, causing concern among industry analysts that this latest boom threatens to glut the \$125 billion market.

Drilling companies have ordered or secured options to construct more than 20 deepwater rigs since November, a pace not seen since early 2006, when lease rates were rising, according to Omar Nokta, head of maritime research at Dahlman Rose & Co. With contracts for more than 30 existing vessels scheduled to expire by the end of 2012, drillers may struggle to find customers for newly constructed rigs, he said.

Nokta lowered his ratings on Diamond Offshore Drilling Inc., Ensco Plc, Seadrill Ltd., and Atwood Oceanics Inc. to hold from buy. His ratings on Noble, Transocean Ltd., Pride International Inc., and Rowan Cos. were unchanged at hold.

The expected oversupply of rigs that can operate in thousands of feet of water and drill miles beneath the seafloor will prevent rates from rising above \$400,000 or \$450,000 a day, Nokta said in a note to clients. As recently as two years ago, crude producers, including ExxonMobil Corp., signed deals to pay more than \$650,000 a day for the most sophisticated drilling vessels.

"Oil companies have been reluctant to secure available rig capacity, yet drilling contractors continue to urgently place speculative



new-building orders," Nokta wrote in the note. "We note that these latest orders have come following some stability in day rates, as opposed to the last cycle when day rates were surging."

Energy producers have been expanding the search for crude into deeper and deeper oceans for the past two decades as technological advances enabled drillers to handle the enormous pressure and searing temperatures encountered in geologic formations trapped miles beneath the seafloor.

More recently, rig operators are taking advantage of declining construction costs, a team of Barclays Capital analysts led by James C. West said in a note to clients. A state-of-the-art drillship costs about \$600 million, down 20% from the peak of \$750 million a few years ago, West said.

Noble recently placed \$1.21 billion in orders for two deepwater drillships. The vessels, capable of operating in water more than 10,000 feet, are scheduled to be finished in Hyundai Heavy Industries Co. Ltd.'s South Korean shipyard by late 2013.

Royal Dutch Shell Plc, Europe's biggest oil producer, has signed a five-and-a-half-year deal to lease one of the rigs for \$410,000 a day. The other vessel hasn't yet been contracted. Noble has six other offshore rigs already under construction, and an option to order two more for 2014 delivery.

Pride International, Inc. recently accepted delivery of the Deep Ocean Mendocino, the third new deepwater drillship to be



added to the Pride International fleet, during a ceremony at the Samsung Heavy Industries Ltd. shipyard in South Korea. The Mendocino is expected to mobilize to the U.S. Gulf of Mexico and commence a five-year contract with a subsidiary of Petroleo Brasileiro (Petrobras) during the second quarter of 2011.

Atwood Oceanics announced that Atwood Oceanics Pacific Ltd., a wholly-owned subsidiary of Atwood Oceanics, Inc., executed a turn-key construction contract with Daewoo Shipbuilding and Marine Engineering Co., Ltd. to construct an ultra-deepwater drillship, to be named the Atwood Advantage, at the DSME yard in South Korea. The Atwood Advantage is expected to be delivered by September 30, 2013 at a total cost, including project management, drilling, and handling tools and spares, of about \$600 million.

Diamond Offshore Drilling subsidiary, Diamond Offshore Drilling Ltd., exercised its option to build a second ultra-deepwater drillship with Hyundai Heavy Industries Co., Ltd., with delivery scheduled for the fourth quarter of 2013. Total cost, including commissioning, spares and project management, is expected to be around \$590 million. Diamond Offshore also obtained from Hyundai a fixed-price option for the purchase of a third drillship that the company has the right to exercise at any time before the end of the first quarter of 2011. The two new drillships are planned to be named Ocean BlackHawk and Ocean BlackHornet.

Moreover, Brazil's Petrobras approved a \$4.64 billion contract for seven deepwater drilling rigs. Brazilian shipbuilder Estaleiro Atlantico Sul, based in the northeastern state of Pernambuco, emerged as the winner of the bidding process. The contract is part of Petrobras' plans to acquire or charter 28 rigs to develop deepwater reserves. The drilling platforms are to be built in Brazil and contain a minimum domestic content of 20%. In winning the contract, EAS beat out other domestic shipyards and foreign groups interested in opening plants in Brazil. Most of the rigs will be used to develop Brazil's promising, recently discovered pre-salt fields, so-named because they are located deep below the ocean floor under a layer of salt up to 1.2 miles thick.

The "glut" fear is worth noting. But since it takes nearly three years before these orders are built and ready for drilling, it seems premature to worry about a glut, according to one analyst, who noted that especially with oil approaching \$100 and the disturbances in Egypt reminding us that while offshore drilling has operational risks, onshore drilling in the Middle East has larger political issues. The other major issue in the sector remains the age of the existing fleets. While limited information can be found, most drillers maintain very old fleets with numerous rigs over 25 years old similar to Atwood. It's likely that drillers will finally be forced to retire numerous rigs, leaving the supply more limited than Dahlman and other analysts expect.

Port Dolphin Energy receives key permits for LNG port serving Florida

Port Dolphin Energy, LLC, received key environmental permits from the state of Florida to allow construction of onsite components for its offshore liquified natural gas (LNG) terminal. When completed, specially designed vessels operated by Port Dolphin's parent company, Hoegh LNG, will return LNG to a gaseous state onboard and move natural gas through the terminal's pipeline. Port Dolphin's infrastructure will enable suppliers to provide much needed natural gas to help serve the state's growing energy needs.

The Florida Department of Environmental Protection (FDEP) issued an Individual Environmental Resource Permit to build and operate the port and pipeline. Florida Governor Charlie Crist and the Florida Cabinet voted in November to authorize issuance of a long-term easement on state-owned submerged lands to accommodate the under-sea pipeline. Port Dolphin received its federal deepwater port license in Oct. 2009 and a certificate of public necessity and convenience from the Federal Energy Regulatory Commission in Dec. 2009.



A SRV will typically moor at the deepwater port for between four and eight days, depending on vessel size and send-out rate

The unloading facility of this new deepwater port will be located about 28 miles southwest of Tampa Bay. The terminal's pipeline will be capable of transporting up to 1.2 billion cubic feet of natural gas per day, enough to serve more than one million homes. The Florida Public Service Commission has predicted continued growth in Florida's demand for natural gas, particularly for use in electric power generation. When not connected to

an SRV (shuttle and re-gasification vessel), the unloading buoy would be submerged 60 to 70 feet below the sea surface. In this position, the buoy would be held in position by the mooring lines and resting on the STL Buoy landing pad.

A marker buoy and retrieval line would be used to locate and recover the buoy as the SRV arrives at the deepwater port. The unloading buoy would be retrieved from its submerged position by means of a winch and recovery line. It would be hoisted up through a moon-pool in the forward part of the SRV where it would be located in a receiving cone within the hull trunk.

After the buoy is locked in position, unloading of natural gas would begin. The gas would be unloaded through the flexible riser into the Pipeline End Manifold (PLEM) for transportation to shore via the subsea pipeline.

Hoegh LNG, with headquarters in Oslo, Norway, is a fully-integrated shipping company offering long-term floating production, transportation, re-gasification and terminal solutions for LNG. The company operates a fleet of seven LNG carriers, including two innovative SRVs.

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Anadarko hits again offshore Mozambique

Anadarko Petroleum Corporation announced the latest in a string of major deepwater natural gas discoveries off the coast of Mozambique. The Tubarao discovery well encountered more than 110 net feet of natural gas pay and no water in a high-quality Eocene-age reservoir that is separate and distinct from the hydrocarbon accumulations in Anadarko's three previous discoveries in the Offshore Area 1 of the Rovuma Basin.

"The discovery at the Tubarao prospect opens an entirely new play style, which has additional opportunities in

Mozambique's Offshore Area 1," Bob Daniels, Anadarko's senior vice president of worldwide exploration, said, noting that the Tubarao discovery is the company's fourth significant discovery in the offshore Rovuma Basin, which further strengthens company confidence in its geologic and geophysical models of the basin.

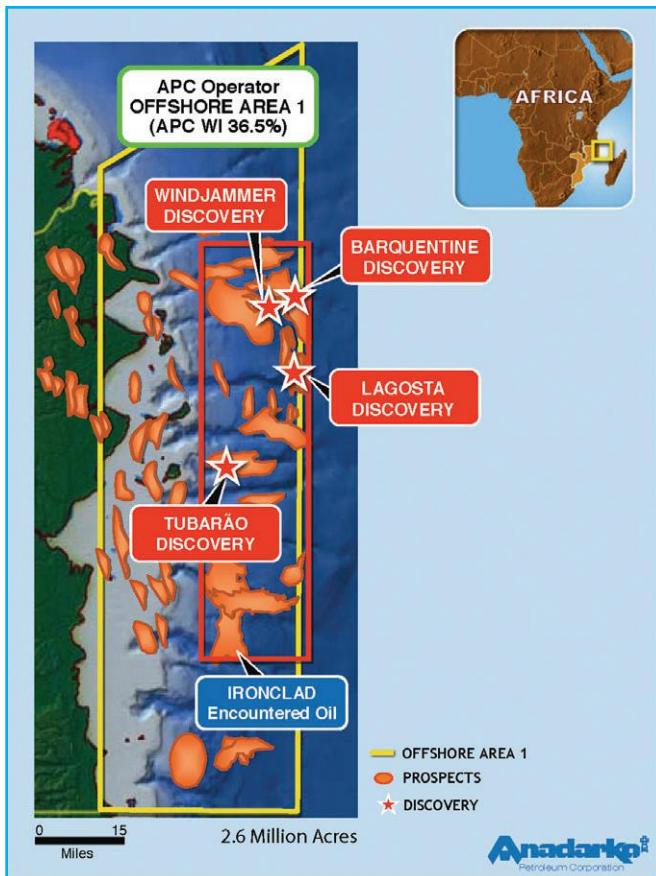
"Our seismic imaging indicates Tubarao's areal extent could cover about 15,000 acres that will be better defined with appraisal drilling," he said. "In addition, we continue to safely enhance our drilling efficiencies, procedures, and methodology in Mozambique, as we drilled this well in half the time of our first exploration wells."

The Tubarao discovery well was drilled to a total depth of about 13,900 feet in water depths of around 2,950 feet, about 18 miles off the Mozambique coast. The partnership plans to preserve the wellbore at Tubarao for potential utilization in future testing. Once operations are complete, the partnership plans to mobilize the rig to the previously announced Windjammer discovery, approximately 26 miles northeast of Tubarao, to begin a coring program that will be followed by appraisal drilling in the Windjammer, Barquentine, Lagosta complex.

Anadarko is the operator of the 2.6-million-acre Offshore Area 1 with a 36.5% working interest. Co-owners in the area are Mitsui E&P Mozambique Area 1, Ltd. (20%), BPRL Ventures Mozambique B.V. (10%), Videocon Mozambique Rovuma 1 Ltd. (10%), and Cove Energy Mozambique Rovuma Offshore, Ltd. (8.5%). Empresa Nacional de Hidrocarbonetos, E.P.'s 15% interest is carried through the exploration phase.

Exploratory well offshore Ghana comes up aces

Meanwhile, Anadarko said that one of its exploration wells encountered oil off the coast of Ghana a few days after the company found deepwater natural gas in Mozambique. The Teak-1 exploration well in Ghana encountered a total of about 240 net feet of oil, condensate, and natural gas, Anadarko said. The well encountered about 70 net feet of oil and almost 108 net feet of natural gas in the Campanian-age reservoir. The Teak-1 discovery well was drilled to a total depth of about 10,400 feet in water depths of about 2,850 feet.



New areas could expand Arctic's oily component: conference

The Arctic, thought to be natural gas-dominant on the basis of limited exploration, could become more oily as more of the region is more fully explored, delegates at the Arctic Technology Conference were told February 7 in Houston, Texas, according to an article that appeared in the Oil & Gas Journal.

The oil and gas industry must overcome negative stereotypes and expectations in order to gain access to vast Arctic resources, another speaker said.

Prudhoe Bay field and its satellites on Alaska's North Slope are the major exceptions to the gas-prone nature of the explored parts of the Arctic, said Marc Blaizot, Total

SA senior vice-president, exploration. But virgin Arctic basins cover an area five times the size of Texas, he noted.

O&GJ reported that more liquids could be found as exploratory drilling moves from the shelves into deeper water where no drilling has occurred so far and around the rims of basins where liquids might have been displaced by gas generation, as in the case of giant Snohvit field in the Hammerfest basin off Norway, Blaizot said.

The Yamal Peninsula-Kara Sea area off northern Russia, where two supergiant gas fields were discovered in the 1980s, is one area that has basin characteristics similar to those of Hammerfest, he said.

Total's studies indicate that oil discoveries can be expected both to the north

and south around the edges of the Yamal-Kara area as well as off North America and Greenland, Blaizot said.

When Arctic deepwater drilling commences, it will likely be off North America and could involve two to four operational seasons for staging and single-well costs of \$200 million spread over groups of participants, the speakers said.

Unless industry trumpets the positive effects of industrial development such as those that have elevated Newfoundland, it faces consequences such as moratoria, long waits to obtain approvals, and limited access, said Mark Shrimpton, senior associate, Stantec Consulting Ltd., St. John's, Newfoundland. The Arctic has a permanent population of 4 million in five countries.

Exploration

Shell is first company to complete deepwater plan under new rules

Royal Dutch Shell has become the first company to complete a Gulf of Mexico deepwater exploration plan under new requirements adopted by federal officials after the Deepwater Horizon spill. The company's exploration plan, submitted by subsidiary Shell Offshore Inc., includes three exploratory wells about 130 miles off the coast of Louisiana.

Shell's ability to complete an exploration plan, announced February 9 by the U.S. Interior Department, means it has submitted all documents and materials required by federal officials for review. The company first submitted the plan in October.

Oil and gas companies, eager to resume drilling in the U.S. Gulf, have accused the Interior Department of failing to define the types of documents and data it needs to approve new projects. The Interior Department, meanwhile, has said the energy companies have not submitted requested materials.

The announcement does not mean the Interior Department has approved Shell's exploration plan. It merely started a 30-day process in which the department will review the plan and decide whether to approve it, disapprove it or request modifications. In the event of approval, Shell still has to obtain drilling permits before it can start work on its wells.

"While a move in the right direction, this is just one small step in a process that must ultimately result in a permit to drill," said Erik Milito, director of upstream and industry operations for the American Petroleum Institute.

Shell is proposing three new exploratory wells in the so-called Auger field, an area it first leased in the 1980s. The company is currently producing oil and gas on the lease.

As part of its review of Shell's exploration plan, the Interior Department will also conduct an environmental assessment of the plan and solicit comment on that assessment for 10 days.

OGX discovers hydrocarbons in Campos Basin offshore Brazil

OGX discovered hydrocarbons in the Albian section of well 1-OGX-28D-RJS in the Campos Basin, offshore Brazil. The OGX-28D well is located in the BM-C-41 block and is situated 80 kilometers off the coast of the state of Rio de Janeiro at a water depth of 126 meters.

A hydrocarbon column of 52 meters

with 24 meters of net pay was encountered in carbonate reservoirs in the Albian section, according to Bloomberg. The drilling of the well was still in progress and expected to reach an estimated final depth of 3,700 meters. OGX holds a 100% working interest in the block.

RWE Dea Egypt uncovers natural gas in North El Amriya concession

RWE Dea Egypt discovered gas in its North El Amriya concession in the

Mediterranean Sea. The NEA 3x find is in the offshore North El Amriya concession, 24.8 miles north of Alexandria. The well was drilled to a true depth of 10,023 feet, encountering gas in a lower Pliocene sand in the Kafr El Sheik formation. It was then sidetracked to a true depth of 8,668 feet where a conventional gas-filled sand channel was encountered, with an unconventional reservoir above. A drillstem test on the unconventional reservoir flowed at up to 14 MMcf/d.



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Statoil outlines modifications plan for 990 Norwegian shelf projects

Statoil plans a total of 990 modification projects on the Norwegian continental shelf (NCS) this year, incurring costs of \$1.51 billion.

Last year, nearly 500 modification projects were completed. Around 300 were designed to improve safety and the working environment on offshore installations, or to reduce emissions. The remaining 200 projects were implemented mainly to increase production, improve regularity of throughput, and cut costs.

"One important challenge is to find solutions and methods that allow the projects to be completed without shutting down production," said Hans Jakob Hegge, Statoil's senior vice president for Development and Production Norway. "This way, we can reduce the scope of planned shutdowns."

The projects are wide-ranging in scope. One on the Kristin platform in the Norwegian Sea last year involved ventilation of produced water close to decks and walking areas. This type of ventilation can contain small amounts of the carcinogenic substance benzene, inhalation of which can cause nerve damage.

Statoil's solution was to extend the outlet pipe 65.6 feet up the flare boom so that the deck area could be opened for regular work. This, it claims, gives personnel on board greater assurance, knowing they are not exposed to chemicals.

ExxonMobil projects in Australia are over budget and face delays

ExxonMobil Corp. said offshore gas projects it's helping to develop and operate in Australia are over budget and face delays amid rising costs for engineering services and a tight labor market in the resource-rich nation.

Natural gas and liquids production from the Kipper and Turrum developments offshore Victoria will be pushed back to 2012 and 2013, respectively, from a previous target of 2011, the company said. Costs for the projects, including the smaller Tuna venture, have increased to a total \$4.4 billion, from an initial estimate of \$2.7 billion.

The Kipper, Tuna, and Turrum projects are designed to help meet Victoria's domestic energy needs. Exxon has said the fields hold enough energy to power a city of a million people for 35 years.

Exxon confirmed the cost increases and delays after its partner BHP Billiton Ltd. cited overruns in a filing to the Australian Securities Exchange, according to Dow Jones Newswires.



Drilling rig that set world ERD record.

Sakhalin-1 Project drills world's longest extended-reach well

ExxonMobil Corp. subsidiary, field operator Exxon Neftegas, successfully drilled the world's longest extended-reach well at the Odoptu field, in the Sakhalin-1 Project, offshore far east Russia.

The Odoptu OP-11 well reached a total measured depth of 40,502 feet, or 7.67 miles, to set a world record for extended-reach drilling (ERD). The Odoptu OP-11 also set a world record with a horizontal reach of 37,648 feet, or 7.13 miles. Exxon Neftegas completed the record-setting well in only 60 days using ExxonMobil's fast drill process and Integrated hole quality technology to maximize performance in every foot of hole drilled at OP-11.

Odoptu, one of three Sakhalin-1 Project fields, is situated five to seven miles offshore northeast Sakhalin Island. The ERD process enables onshore drilling beneath the seafloor to the offshore oil and gas reservoirs to successfully operate in a safe and environmentally responsible manner in one of the most challenging sub-arctic environments in the world.

Since the first Sakhalin-1 well was drilled in 2003, six of the world's 10 record-setting ERD wells have been drilled at the project. And since startup, the Sakhalin-1 project has produced approximately 300 million barrels (39 million tons) of oil for export to world markets.

ExxonMobil, Rosneft reach accord on joint development in Black Sea

Russia's Rosneft and U.S.-based ExxonMobil have reached agreement on joint development of oil and gas in the Black Sea. The agreement envisages formation of a joint operating company performing exploration and production in the Tuapse Trough, a 4,324 square-mile deepwater area off the Black Sea coast of Russia's Krasnodar region.

Eduard Khudainatov, Rosneft president, and ExxonMobil Development Co. President, Neil Duffin, signed the accord

in Davos, Switzerland. It gives both companies opportunities to expand their Black Sea cooperation in the form of additional exploration and production, deepwater technology research and development, crude oil sales to Rosneft's Tuapse refinery and other Black Sea markets, and development of regional transportation infrastructure.

"ExxonMobil technologies will effectively complement Rosneft's experience and resources," Igor Sechin, deputy prime minister of the Russian Federation, said. He added that "development of this area will become the springboard for full-scale Black Sea basin development, and this challenge will require coordinated efforts of many nations and companies in the region."

"ExxonMobil will bring its technology, project execution capabilities, and innovation to complement Rosneft's strengths and experience in the region," said Rex Tillerson, Exxon's chairman and chief executive officer. "We will build on the successful relationship we have with Rosneft through the Sakhalin 1 project to help meet energy needs in Russia and the wider Black Sea area."

CNOOC orders subsea equipment for Liuhua 4-1 in South China Sea

China National Offshore Oil Corp. (CNOOC) ordered \$85 million in subsea production equipment from FMC Technologies Inc. The hardware is for the Liuhua 4-1 development, which will have eight subsea trees and tieback to the existing Liuhua 11-1 field. Delivery is scheduled to begin in the fourth quarter of 2011. Liuhua 4-1 is in water depths of 850 to 1,000 feet in the South China Sea, about 130 miles off Hong Kong.

Start up of Platong II natural gas project a year ahead of schedule

Chevron Corp. is to start up the \$3.1 billion natural-gas project Platong II in the Gulf of Thailand in 2011, one year ahead of schedule. The shallow water Platong II development, which is located 120 miles offshore, is designed to process 420 million cubic feet of natural gas per day at its peak.

Chevron, which owns 69.8% of Platong II, is working on the project in collaboration with Mitsui Oil Exploration and Thailand's state-owned PTT Pcl.

Much of Thailand's natural gas supply comes from the Gulf of Thailand, where Chevron operates 14 blocks.

Natural gas consumption in Asia's emerging economies is projected to rise 65% to 463 million tons of oil equivalent during 2008 to 2020.

Production

Eni launches first Arctic production offshore Alaska at Nikaitchuq field

Italian company Eni has commenced oil production on its first Arctic project at the Nikaitchuq field, located offshore the North Slope of Alaska. The field has recoverable reserves estimated at 220 million barrels of oil and an expected lifecycle of 30 years.

The field's 30 offshore facilities are connected to 22 onshore facilities by a seabed pipeline bundle, which is the heaviest



The Nikaitchuq field offshore Alaska

bundle ever installed in the Arctic, according to Eni. The company built two process and utilities modules of 4,000 tons each in Louisiana, and the remaining facilities comprising 22 modules were constructed in Alaska. The processing facilities were designed and built with technolo-

gy to minimize the impact on the environment. The crude oil will be shipped through the Trans-Alaska oil pipeline, with no need for further processing. The processing plant will treat 40,000 barrels per day of heavy crude with sand and up to 120,000 barrel per day of water.

FMC agrees to manufacture, supply subsea equipment for GirRI project

FMC Technologies, Inc. signed an agreement -- Option 3 - Girassol Infills -- with Total Exploration & Production Angola for the manufacture and supply of subsea production equipment to support the Girassol Resource Initiative (GirRI) project. The award has a value of about \$80 million in revenue to FMC Technologies. The GirRI project has now reached a cumulative value of around \$180 million in revenue to FMC.

Equipment supplied under Option 3 will support the Girassol field, located offshore Angola in the Gulf of Guinea. FMC's scope of supply includes the manufacture of three subsea production trees, six wellheads, and assorted flowbase and jumper equipment. Deliveries are scheduled to commence in late 2011.

First oil expected from Ebok field Phase I despite late vessel arrivals

Afren expected to achieve first oil in February from its Ebok field Phase I development offshore Nigeria, even though two of the major components had yet to reach the field location.

The floating storage and offloading vessel (FSO) remained in transit, having set sail from the Yulian shipyard in Shenzhen, China, on December 2, and the mobile offshore production unit (MOPU) was in the Atlantic Ocean undergoing a dry tow.

However, the Phase I wellhead platform has been installed, as have all in-field flow lines and the 12 fixed-point mooring lines for the FSO.

Three of the five Phase I production wells were tested in December 2010, delivering a total constrained flow of 12,500 b/d of oil. Afren anticipates output from these and the remaining producers of 15,000 b/d from Phase I, with first oil anticipated in February 2011.

Afren anticipated production starting from Phase II at the beginning of March, with both phases of Ebok delivering a total of over 35,000 b/d by mid-year.

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Small, smart survey system cuts costs



Submagnetix, a division of Innovatum, has integrated their system with the compact Saab Seaeye Falcon ROV to create a small and rapidly mobilized package that can be deployed from a small vessel, ready to survey all types of inshore and coastal submarine cables and pipelines.

Costs can be cut from £500,000 for a conventional system to just £150,000 for this innovative new solution.

Called SMARTRAK 9, it is the only system in the world that can sense cables carrying either AC or DC current as well as cables carrying no current or signal at all. It can also sense steel pipelines.

The Seaeye Falcon ROV is fitted out with a Tritech Super SeaKing profiler system to provide high-quality cross-sectional profile data of the seabed; to give underwater ROV positioning a Tritech Micron-Nav USBL navigation transducer along with pitch and roll sensing; and to have an accurate flux gate compass, a high-accuracy altimeter and a pressure sensor for depth.

For survey work, the Seaeye Falcon has the advantage of a low electrical and acoustic noise signature, allowing for optimum survey sensor data. It also has the power and manoeuvrability to give unrivalled stability in strong cross currents.

With over 200 in use around the globe, the Falcon has the reliability of a trusted design that is packed with technological innovations, including intelligent "plug-and-go" electronics that enable different tooling to be added and changed as needed.

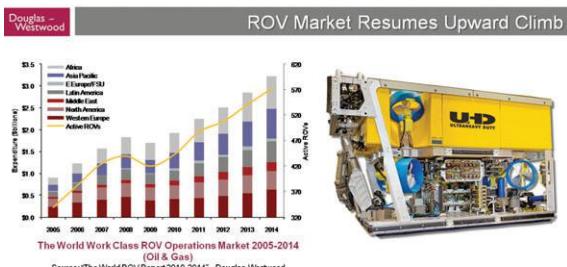
Surface equipment consists of three small rack units - one for the ROV controller, the other for the cable tracker and acoustics unit, and another for the surface navigation and video and event logger.

Only two people per shift are needed to launch and operate the system, with one controlling the ROV and the other the survey equipment.

The system creates comprehensive reports and charts showing accurate cable route and depth of burial along the route. This data are required by installation contractors, owners, and regulatory authorities to ensure that the cable is properly buried and not in danger of being exposed to damage.

For more information, visit www.seaeye.com and www.innovatum.co.uk.

ROVs Required by 2014



- The ROV market saw a modest decline in 2009—revenues down 6-7%
- Fared better than many other sectors
- Recovery seen from 2010 to new records
- 550 new work class ROV's to 2014
- Expenditure up 89% from 2008 to 2014, reaching to \$3.2 billion

Courtesy of Douglas Westwood

SeeByte announces sale to DRDC Canada



SeeByte, a global leader in creating smart software technology for unmanned systems, is pleased to announce their most recent sale of SeeTrack Military to Defence Research and Development Canada (DRDC), the Canadian Forces' science and technology agency.

DRDC purchased the SeeTrack Military licence together with SeeByte's Performance Analysis & Training Tool (PATT) to help develop Automatic Target Recognition (ATR) algorithms for the Canadian Navy. Improved ATR will assist in one of the key challenges facing naval Mine Counter Measures (MCM): the ability to detect and classify objects, generating fewer false alarms and improving the value of data gathered. SeeTrack Military will provide DRDC with a tool for tactical system mission planning, asset tracking, data analysis and object correlation. PATT provides a platform on which they can analyse the performance of their ATR algorithms.

Ioseba Tena, Sales Manager at SeeByte said: "We are pleased to be working with DRDC to provide them with the capabilities and tools they require for their development of novel, state-of-the-art ATR solutions."

Vincent Myers of DRDC commented: "Our motivation in developing these ATR algorithms is to reduce workload for operators performing route survey and change detection, in turn creating more accurate and timely MCM information. By using SeeByte's SeeTrack Military software with the PATT module, we will be able to easily integrate our ATR algorithms into a recognised commercial product and assess potential improvements in the change detection process, which is currently considered to be highly operator intensive."

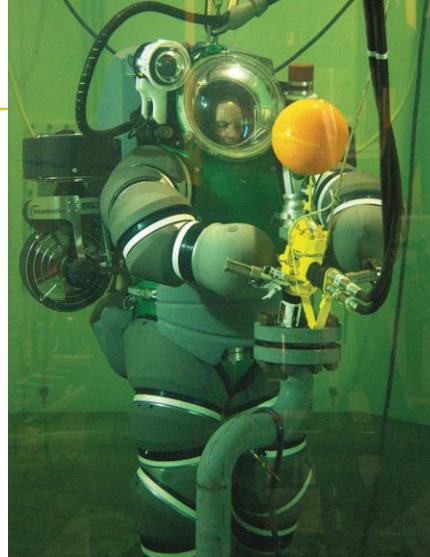
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17th International Symposium on Unmanned Untethered Submersible Technology (UUST11)

The Autonomous Undersea Systems Institute (AUSI) is sponsoring the 17th International Symposium on Unmanned Untethered Submersible Technology (UUST11). The Symposium will be held August 21-24, 2011 at the Sheraton Portsmouth Harborside Hotel and Conference Center, Portsmouth, New Hampshire.

UUST is a series of symposia focused on unmanned, untethered submersible technology. The symposium seeks to provide a mechanism for the exchange of information among members of the research, development, and user communities involved in the development of autonomous underwater systems. Historically, these symposia have attracted large international participation, and the broad spectrum of participants results in a unique educational experience for senior researchers as well as students interested in this evolving technology.

More information about UUST11 can be found at ausi.org or contacting Regan Gentner via e-mail at gentner@ausi.org or by phone at 603-868-3221.



OceanWorks forms strategic alliance Down Under

OceanWorks has announced that they have signed a formal teaming agreement with The Underwater Center Fremantle (TUCF) and Ocean Technix, both located in Western Australia, to provide submarine rescue and atmospheric diving-related equipment and services to both the Royal Australian Navy and the commercial subsea oil and gas market. Rod Stanley, Chief Executive Officer of OceanWorks, notes that: "...aside from providing support and technical services to the Royal Australian Navy, the alliance

provides a solid foundation for services to the Oil & Gas industry, with initial focus on the Oceanworks Quantum Atmospheric Diving System (ADS)."

Full atmospheric diving services are now offered by the strategic alliance for operations in Australia/South East Asia. A HARDSUIT™ Quantum ADS with an integrated launch and recovery system is based in the region with operations and management personnel.

OceanWorks, TUCF, and Ocean Technix are now poised to offer our customers strong, on-the-ground presence to support ADS subsea operations and submarine rescue-related activities in Australia and the Australasia region.

For more information, visit www.oceanworks.com.

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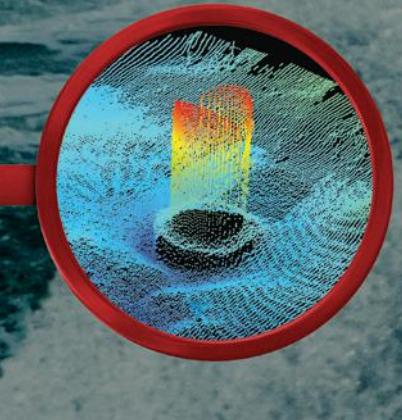
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www.kongsberg.com



Underwater Intervention

preparing the mission of the ECA's unmanned vehicles such as the AUV range ALISTER and the USV INSPECTOR range of vehicles.

The tool used for that is called TRITON NAV, a GIS (Geographic Information System).

Mission monitoring

TRITON NAV is also used for mission monitoring while the vehicle is carrying out the mission.

Data acquisition phase

TRITON products support all current sensors to be found on the market place, which belong to the families cited below. The TRITON software particularly used during this stage are:

- MB logger for data-acquisition by the
- Multi-beam Echo Sounder
- SS-Logger for data coming from the Side Scan Sonar
- SB-Logger for data from the Sub Bottom Profiler

Data processing phase

During the data processing phase, the three following products are used:

- BATHY-ONE
- MOSAIC ONE
- SB-INTERPRETER

Exportation of data, its analysis and the interpretation of results follow with the software tool PERSPECTIVE MAP of Triton Imaging Inc.

Concerning Harbor and Port Security missions, two of ECA's unmanned vehicles are specifically adapted: the Unmanned Surface Vehicle INSPECTOR and the new AUV ALISTER 100. Both vehicles have a low draught and are equipped with a side scan sonar and a multi-beam echo sounder. They can also be fitted with a combination of both called SWATH, probably the best choice since the SWATH provides already merged data.

In using PERSPECTIVE MAP from TRITON Imaging Inc., a merger between the data coming from two separate sensors can be provided without problem in any case.

For more information, visit www.tritonimaginginc.com.

SMD Houston operation underway

SMD has completed its move into their new Houston facility located on Beltway 8 and Clay Road. The new premises includes warehouse and workshop space, meeting and conference/training rooms, and client offices. Experienced local staff will provide access to 24-hr technical customer support and an inventory of spares

will be managed to service its machines.

The SMD

team consists of Tim Jaramillo who brings 16 years of operational and technical ROV experience; Chandra Gilbreath, with 11 years ROV industry experience in supply chain management; Ian Griffiths with 18 years in the offshore business, 11 of which in the ROV/Subsea sector; and Rachel Nichols with 10 years of customer service-oriented experience. It has retained the services of industry specialist Norm Robertson, with over 20 years in the ROV business.



By late 2011, SMD will have the first Atom ROV available as a demonstration vehicle at the Houston office. This hydraulic vehicle provides industry standard manipulator capability from an ultra-compact footprint, saving space, weight and cost. The Atom is available in either 60 or 100 hp configurations and is suitable for inspection, survey, and light intervention operations. The vehicle, when used in conjunction with a SMD lightweight LARS, saves valuable deck space and payload. The Atom comes from the same pedigree as SMD's Quasar and Quantum vehicles. While the design focus has been on size and weight reduction, SMD's reputation for rugged and durable systems has not been compromised.

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

Analox partners with Drass Group

Analox has signed an agreement with Drass Group, the Italian firm that is recognized as world leader in the design, manufacture, and installation of saturation diving systems. Drass Group and Analox Sensor Technology have agreed to work closely together, with Drass Group integrating Analox's market-leading equipment into its commercial diving systems and also reselling its range of products designed for the commercial diving industry.

The formal agreement comes after working closely for some time. Drass Group has integrated Analox equipment into its dive systems for a number of years, including using Analox's SubMKIIIF hyperbaric oxygen and carbon dioxide monitor.

Drass Group was formed in 1967 to respond to the specific demands of the offshore industry. Galeazzi, founded in 1930, is a longstanding pioneer in the research and development of deepwater equipment as well as the medical use of hyperbaric chambers. Drass Galeazzi, a

Drass Group company, holds expertise in the underwater defense business and submarine rescue solutions.

Drass Group is now the global leader in the design and manufacture of diving and subsea equipment for commercial and military underwater activities. It is also the leading supplier of medical hyperbaric chambers, deep diving simulators (wet and dry), aeronautical simulators, and rescue submarines.

For more information, visit www.analox.net.

Remotely Operated Vehicles (ROV) and Autonomous Underwater Vehicles (AUV) in the Energy Market 2011-2021

Remotely Operated Vehicles (ROV) and Autonomous Underwater Vehicles (AUV) in the Energy Market 2011-2021, by ASDReports, examines in depth one of the most powerful and exciting areas in the offshore oil and gas industry, an industry that is seeing a profound movement towards deep sea development. ROVs and AUVs are a vital component of subsea work, especially where great depths and extreme environments create challenging conditions. Based on its research, the global ROV and AUV market in the energy sector was worth \$1.27bn in 2010. They analyse, quantify and forecast the expected growth in the global and regional ROV and AUV markets over the period 2011-2021.

This report covers recent big contracts, progression in politically sensitive areas, and the knock-on effects of the Deepwater Horizon oil spill. The report analyses a wealth of data and introduces a clear breakdown of where the market will develop based upon diverse factors and insight, anticipating how and why the market will evolve from 2011 onwards.

The report also provides a comprehensive assessment of applications of ROVs and AUVs in the energy industry and considers emerging technologies and likely future developments.

How much will the ROV and AUV sector in the energy market increase over the period 2011-2021? How much will individual regions spend on ROVs and AUVs between 2011 and 2021? Who are the leading companies in the ROV and AUV industry? Which market will be the largest in 10 years? Which geographical regions will see the most impressive growth over the next ten years? Which technologies are likely to succeed? These critical questions and many more are definitively answered in this comprehensive report.

Comprehensive analysis of the ROV and AUV market

The Remotely Operated Vehicles (ROV) and Autonomous Underwater Vehicles (AUV) in the Energy Market 2011-2021 report examines this sector critically with a comprehensive review of recent contracts, news reports, industry publications, market analysis, and expert consultation. The report provides detailed sales forecasts for the global market; regional market forecasts; a strengths, weaknesses, opportunities, and threats (SWOT) analysis; discussions of commercial and technological trends; and assessments of market drivers and restraints.

This report also includes transcripts of in-depth interviews with industry experts. This package of analysis cannot be obtained anywhere else.

For more information, visit www.asdreports.com.

RBG boosts subsea services

RBG announced that it is to invest more than £3million to boost the capability of its offshore diving fleet.

This company will add two new 15-meter purpose built crafts and two 8.5-meter support craft to its existing fleet. Specially designed for RBG to enhance the company's diving services capability, the new crafts will include dedicated launch and recovery systems as well as introducing efficiencies in air nitrox diving, WROV works, and surveying.

The crafts will provide specialist marine-based services to rigs, platforms, FPSOs, and support vessels throughout RBG's global operations.

RBG has also chartered the specialist dive support vessel Olympic Triton to support its diving, ROV, and subsea capabilities. With the vessel, air nitrox diving operations will be able to be carried out from diver Launch And Recovery A-frames (LARS) located on the port side of the vessel. Diving operations will also be able to be carried out remotely from the vessel, utilising one certified to MCA Category I craft and one MCA Category II transfer craft. Both crafts have self launch capability.

The vessel also has the capability of launching two work class ROVs from both the port and starboard sides. The vessel main crane is capable of lifting 150-tonnes at 10-meters, 75-tonnes at 20-meters and 25-tonnes at 35-meters and is also fitted with a 20-tonne auxiliary crane.

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

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Tesacom receives iridium certification

Iridium Communications Inc. has certified Tesacom new VKI maritime satellite communication system for operation on the Iridium network. The new Tesacom VKI product provides integrated voice, data, email, and vessel tracking solutions for the maritime sector, including commercial, military, fishing, and recreational vessels (www.tesacom.net).

Iridium to establish worldwide network of maritime service centers

Iridium Communications Inc. is establishing a Global Service Program for its Iridium OpenPort® broadband marine satellite communication product. Launching first quarter 2011, this new program aims to provide full-service shipboard support to any Iridium OpenPort customer at more than 50 ports around the globe. Iridium is the first mobile satellite service provider to offer full-service support of this kind for any of its products. Iridium OpenPort is the world's only global voice and data service specifically engineered for maritime use. The service leverages Iridium's global constellation of 66 cross-linked, low-Earth orbiting (LEO) satellites to provide pole-to-pole coverage for ships at sea.

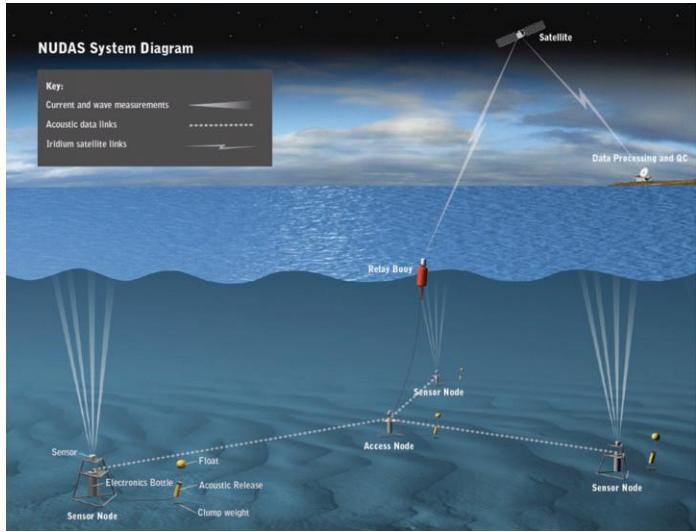
Broadpoint signs contracts with V.Ships

Broadpoint signed new contracts with global shipping company V.Ships Offshore to provide Ku- and C-band satellite services for the company's worldwide operations. The contracts mark V.Ships Offshore's expansion into the global construction market and will have Broadpoint providing connectivity services internationally, including the offshore regions surrounding Mexico, West Africa, Europe, Indonesia, and the Mediterranean. Under the contracts, Broadpoint will deliver satellite connectivity that includes telephone access with local dialing capabilities, crew calling card services, and internet access (including Wi-Fi) to the vessels in V.Ships' global construction fleet (www.broad pointinc.com).

Marine Instruments uses Quake Global modems to monitor vessels

Quake Global Inc. has announced that Marine Instruments has selected QUAKE's Q9612 and 9602 communicators for its electronic positioning and communications systems to track vessels and buoys in the rugged open oceans of the marine fisheries industry. These communicators combine the low latency of SBD (short-burst data) service with the global coverage of the satellite network. QUAKE™ modems will be employed on a variety of Marine Instruments' buoys used to remotely monitor, locate, and control drifting fishing aggregate devices (FAD) for tropical tuna fishing and floating mussel platforms as well as on rescue and scientific buoys. QUAKE's modems provide global two-way communication with these devices that enable fishing boat captains to locate the best areas for catching fish or harvesting seafood (www.quakeglobal.com).

Subsea data acquisition system capabilities extended



Since 2007, Fastwave's unique OceanStar system has provided near real-time data acquisition from subsea sensors via the Iridium satellite system. The system is used by major offshore energy organizations for marine environmental monitoring, operating at more than 30 sites in the remote, cyclone-prone tropical waters surrounding northern Australia.

Building on OceanStar's success, Fastwave has recently formed a partnership with L-3 Communications to develop commercial applications for a networked underwater data acquisition system (NUDAS) integrated with the Iridium satellite system. Applications include environmental, oceanographic, and subsea infrastructure data acquisition.

Mike Gallagher, Managing Director of Fremantle, Australia-based L-3 Communications said, "L-3 Communications is pleased to be partnering with Fastwave on the NUDAS system. Fastwave has a proven track record in this field and the ability to introduce the full scope of this technology into the commercial market. L-3 has developed advanced technology in through-water communications as well as undersea networks and sensors through its partnerships with the Australian, U.S. and UK Departments of Defense."

The subsurface system uses L-3's through-water acoustic communications technology between distributed sensor nodes. This advanced signalling technology has been proven in both deep water and the harsh multipath shallow water environment.

Nick Daws, Director, Fastwave added, "The combination of L-3's advanced undersea sensor network technology, the reliability of Iridium's global satellite telemetry capabilities, and Fastwave's ability to integrate them into a seamless data system will provide new opportunities to deliver timely, cost-efficient information from the seafloor for a wide range of applications."

The system can accommodate a wide range of sensor types, depending on the application. The NUDAS configuration uses two or more remote sensor nodes to communicate with the central access node, and the modular design enables additional nodes to be easily added.

The central access node relays the data to the sea surface, where Fastwave's OceanStar system delivers the sensor readings via Iridium satellite telemetry and a browser-based data management system anywhere in the world, within seconds.

Marlink expands contract with DOF ASA

Marlink, the global provider of maritime satellite communications, has secured a new three year contract with DOF ASA, a Norwegian-based operator of offshore and subsea vessels. As part of the new contract, Marlink will supply its cutting-edge Sealink™ VSAT services to an additional 20 vessels, increasing the total number of DOF ASA vessels sailing with Marlink VSAT services to 52.



Marlink's new contract with DOF ASA will include the delivery and installation of the innovative Sealink™ C-band and Ku-band VSAT system to provide dedicated bandwidth onboard 29 of its vessels. Marlink's shared bandwidth Ku-band VSAT system will be installed onboard 23 of its vessels. The satellite communications package, which has been developed by Marlink for DOF ASA, includes both dedicated and shared bandwidth services to meet specific requirements of individual vessels. In addition to the initial installations, Marlink anticipates that the scope of its supply will expand further to include several new builds planned for 2011.

For more information, visit www.marlink.com.

New mooring communications system provides fast, low-power wireless communication

Off the coast of the islands of Morea, a new innovation provided by MacArtney Underwater Technology Group transfers data via wireless modem. This new technology opens up areas otherwise unavailable by mobile networks and unsuitable for conventional radio transmission systems.

In the drive to understand the mechanics and effects of global warming on our planet, oceanographic institutes are installing buoys in various areas to map the water conditions and wildlife and to

chart any changes over time that relate to an increase in global temperatures. The sites of such buoys vary greatly and one of the more recent installations has taken place in the coastal waters of the volcanic island of Morea, 15-km north west of Tahiti in French Polynesia. Chosen for its well-established coral reef and its abundance of life, this location is expected to provide valuable information about changes in a range of underwater parameters, including water temperature, changes in current speed, and water levels.

Of the many considerations in designing and building a mooring system is the communications system. Information gathered from the range of instruments on the mooring needs to be transferred in some way onshore. Typically, data from buoys are relayed to onshore information centers via mobile telephone networks, by radio transfer, or by cable.

When the Coastal Research Center of the Marine Science Institute at the University of California, Santa Barbara (UCSB) commissioned its monitoring buoy system in the shallow coastal waters off the islands of Morea, it needed a communications system that would take into account the unsuitability of radio and satellite data transfer and avoid cable along the seafloor. Radio transfer demands high power levels, satellite transfer using mobile telephone networks is not available in all areas, and running a cable along the seabed could damage the coral reefs. The resulting system was a breakthrough in buoy communication technology, combining for the first time inductive moorings — including inductive measuring of current profiles — and high-speed wireless Ethernet connection.

The MacArtney Underwater Group developed and delivered an innovative, real-time full communication package. The communication system collects data from 9 underwater instruments on the mooring that measure temperature, conductivity and pressure, temperature and pressure, and a tide recorder. It sends the data at preset intervals to the onshore base through a high-speed wireless Ethernet data link. The data link is 2.4 GHz, with data speed up to 11Mb/s. Data from each instrument is gathered at preset intervals and sent through the wireless connection to a wireless Ethernet action point at the shore station every 20 minutes. Real-time data can be accessed through the Internet, and this communication is 2-way, allowing not only for access to data but also allowing operators to directly access various testing and sending parameters.

MacArtney supplied the complete



communications system, including data loggers, Ethernet connection, and solar charged batteries; a range of sensors, including temperature, conductivity and pressure, temperature and pressure gauges; and a special manta ray anchor, designed for shallow waters.

For more information, visit www.macartney.com.

Commercial fleets gain enhanced communications with CommBox

Maritime fleets that demand a competitive advantage require powerful integration capabilities for their communications, allowing them to reduce expenses, maintain operational flexibility, manage multiple communication services, improve shore-to-ship integration, and improve crew welfare. To meet this demand, KVH Industries, Inc. unveiled the new KVH CommBox™ Ship/Shore Network Manager at the Digital Ship Scandinavia Conference.



Developed by KVH Norway, the original CommBox technology is now supporting more than 800 vessels worldwide. The new, enhanced KVH CommBox solution includes dedicated shipboard network management hardware, network hub options for enhanced performance and network control, and versatile software applications that expand onboard communication capabilities and add valuable capabilities.

For more information, visit www.kvh.com/commbox.

Caribbean Cable System Announced

Claro and Puerto Rico Telephone (PRT) plan to roll out the deployment of a submarine fiber optic cable system that will extend throughout the Caribbean linking North and South America. The new system will stretch 16,000 kilometers and connect the United States (two landing points), Puerto Rico, the Dominican Republic, Jamaica, Colombia, Mexico and Brazil. The statement said that the system will have a total transmission capacity of over 90 Tbps. Claro and PRT are subsidiaries of America Movil, the leading mobile phone operator in the Caribbean. The project is scheduled for completion in late 2012 (www.telefonicapr.com).

E-Marine Signs Maintenance Contract for I-ME-WE

E-Marine, an Etisalat Services Holding Company, announced a maintenance and storage agreement with the I-ME-WE (India-Middle East-Western Europe) submarine cable system. The agreement will ensure the effective Maintenance and Storage of the fiber optic submarine cable system, which links India and Europe via the Middle East through high speed internet access, providing business and mobile data services to the region. The I-ME-WE network cable is approximately 12,000 kilometers in length and consists of three fiber paired systems. It is complemented by nine terminal stations and forms a consortium of nine telecom providers across eight countries (www.emarine.ae).

Nexans Wins Subsea Umbilical Contract

Nexans has been awarded a contract by Subsea 7 for the design, engineering and manufacture of a total length of 143km of static subsea electro-hydraulic control umbilicals for the Laggan-Tormore gas field development, 125km west of the Shetland Islands in the UK. The umbilical product will integrate steel tubes for fluids, 3 kV power cables and fiber optic cables. The project will be carried out at Nexans' specialized umbilical facility in Halden, Norway, with delivery scheduled for early 2012. The subsea production system offshore will consist of two production template-manifolds. The system will be controlled by two Nexans static subsea electro-hydraulic umbilicals that will link the Laggan and Tormore fields over a distance of 17km and then a further 126km to the Shetland shore. The 126km umbilical will be one of the longest in the world (www.nexans.com).

Briggs Marine Wins Maintenance Contract

The Briggs Group has secured a new five year agreement with SSE (Scottish and Southern Energy). The deal will see Burntisland-based Briggs deploying tailored systems from among its fleet of 30 vessels to repair and maintain a network of over 500 kilometers of cable in some of the harshest marine environments in Europe. As the second largest electricity generator across the UK and Ireland, SSE is responsible for distributing electricity to 3.5 million homes, offices and businesses in the north of Scotland and central, southern England. This new agreement will secure the electricity supply to some of Scotland's most remote communities. Under the five-year agreement Briggs will provide 24/7 immediate mobilization and specialized end-to-end support for the maintenance of the SSE network comprising 102 live cables totaling 450km supplying islands, homes and businesses across the region. This will include network survey, cable protection work, cable installation, repair and testing through all seasons in locations where currents can reach speeds of 8 knots (www.briggsmarine.com).

NTT Com to Launch New Cable System

NTT Communications (NTT Com), with assistance from Hong Kong-based NTT Com Asia, the company plans to launch the Asia Submarine-cable Express (ASE), a 40-Gigabit-per-second (Gbps) submarine cable, in June 2012. The ASE eventually will connect major business hubs across East Asia via some 7,200 kilometers of cable, and boast a total carrying capacity exceeding 15 terabits per second.

The ASE is being constructed by NTT Com, Malaysia-based Telekom Malaysia, Philippines-based PLDT and Singapore-based StarHub. Total cost of construction is estimated at approximately US\$ 430 million.

When it initially starts operating, the ASE will serve Japan, Malaysia, Singapore and the Philippines. A separate route to Hong Kong will be added in December 2012. Connections to Mainland China and additional Southeast Asian countries are expected to be launched in collaboration with major carriers in these markets.

Incorporating the latest 40 Gbps optical technology, the ASE will boost the capacity and strengthen the redundancy of NTT Com's Asian cable networks, paving the way for enhanced global network services that will meet the region's increasing needs for global traffic, low network latency and reliability. The ASE also has a capability to incorporate 100 Gbps optical technology in the future.

The ASE will be specially designed to withstand earthquakes and typhoons, particularly in areas such as the Bashi Channel south of Taiwan, where undersea earthquakes have disrupted international communications in the past few years. Routes between Japan, Hong Kong and Singapore will cover the shortest possible distances to maximize reliability and minimize latency.

For more information, visit www.ntt.com.

NEC and Fujitsu win ASE Supply Contract

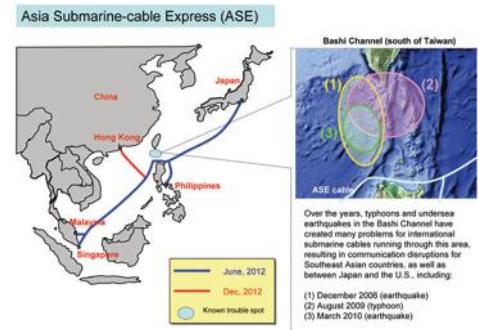
NEC Corporation and Fujitsu Limited have signed an agreement with NTT Communications, the Philippines Long Distance Telephone Company, StarHub Limited and Telekom Malaysia Berhad to construct the Asia Submarine-cable Express system, a high-bandwidth optical submarine cable system that will link Japan to Singapore, Hong Kong, the Philippines and Malaysia.

Overall project management will be carried out jointly by the NEC and Fujitsu consortium. The manufacture and installation of all submersible plants such as repeaters, OADM branching units and cables, the power feeding equipment and submersible plant monitoring system will be implemented by NEC. The manufacture and installation of submarine line terminal equipment and the management controller will be implemented by Fujitsu. The ASE will meet the demand for intra-Asia connectivity between South East Asia and North Asia.

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

Installation of East-West Cable Completed

LIME, Cable & Wireless Communications' business in the Caribbean, has completed the installation of its new East-West



Submarine Telecom

submarine fiber optic cable system linking Jamaica, the British Virgin Islands and the Dominican Republic.

The East-West cable will also link Jamaica in the west of the Caribbean to the British Virgin Islands (Tortola) in the East, completing the connection in Santo Domingo, in the Dominican Republic. It will triple available bandwidth and reduce interconnection costs in the Dominican Republic, a key market in the region.

Accomplished in less than six months and ahead of schedule, the cable system completes a Caribbean network ring that increases LIME's capability to serve carrier customers in North and Latin America, as well as within the Caribbean. The submarine cable enables LIME to meet the rising demand for high-speed bandwidth from consumers and business customers in the region. LIME operates in 13 Caribbean countries, and is developing a range of new fixed broadband and mobile data services for customers, which will require high-quality capacity support.

The new cable is the third new submarine cable built by LIME in the region since 2008, adding to the CBUS cable between Bermuda and the British Virgin Islands and the Gemini-Bermuda cable between Bermuda and the east coast of the US.

For more information, visit www.cwc.com

SEA-ME-WE 4 to Upgrade with 40G/100G Technologies

The South East Asia-Middle East-Western Europe 4 (SEA-ME-WE 4) co-owners have selected Alcatel-Lucent and Ciena Corporation for their network expansion project. Alcatel-Lucent was selected for an upgrade to 40G (Gigabit per second) transmission of all the submarine segments. Ciena was selected to supply optical switching equipment for all 16 cable landing sites as well as for 100G transport for an upgrade of the terrestrial link connecting Alexandria to Suez in Egypt.

The deployment will commence in the first quarter of 2011, and will provide substantial capacity increase to the existing cable system (ultimate capacity of 2.4 Terabit per second per fiber pair), which supports the delivery of high-speed internet and broadband services along the approximately 20,000 km route connecting Europe to the Middle East and South East Asia.

For more information, visit <http://www.alcatel-lucent.com>.

ITU connectivity boost for Cuba

International Telecommunications Union (ITU) Secretary-General

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Power Cables

Dr. Hamadoun Touré was guest of honor at a ceremony in Santiago de Cuba on 9 February marking the arrival of a new submarine fiber optic cable that will dramatically increase Cuba's connectivity with the outside world.

With a 640-Gbps capacity and a lifespan of 25 years, the ALBA-1 cable will provide a near 3,000-fold increase in Cuba's voice, data and video transmission speeds.

Costing around US\$70 million, the cable runs 1,630 kilometers from the Venezuelan port of La Guaira to the eastern Cuban town of Siboney. A second segment will stretch 230 kilometers from Cuba to Ocho Ríos in Jamaica.

Cuban officials say the country's priority will be to build more public telecenters and improve Internet access at schools, hospitals and scientific institutions.

For more information, visit www.itu.int.

Installation Begins for Balearic Islands Cable

Spanish power utility Red Eléctrica has begun laying the submarine cables for the electrical interconnection between the Iberian Peninsula and the Balearic Islands, known as the Romulo project.

The cable ship Giulio Verne began the installation in Santa Ponsa Bay, Mallorca. This is the first of three submarine cables of which the interconnection is comprised of. This task shall continue over the coming days on the high seas until the cable reaches Sagunto, Valencia, where it will be connected to the Spanish peninsular electricity system.

The cable ship Skagerrak began to lay a second cable only a few days later. The connection of the end of the cable with the Majorcan electricity system was carried out with the aid of a team of divers, which brought it to the coast.

The electricity link between the Peninsula and the Balearic Islands will consist of three cables, each one measuring 237 kilometers in length and reaching a maximum depth of 1,485 meters below sea level. The interconnection will operate in direct current, and as such it has been necessary to build a converter station at either end to convert it into alternating current, as this is what is used in the electricity systems on the Peninsula and Balearic Islands.

After the laying of the three electrical cables and the fiber optic cable to guarantee communications, Red Eléctrica shall begin a period of tests prior to commissioning the line, planned for later this year.

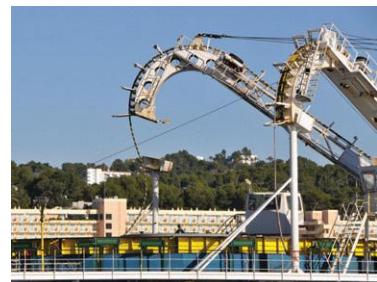
The Romulo Project has, at all times, sought to fully respect the environment. For this reason, at depths of less than 800 meters, the submarine cables will be protected below the sea bed in a trench one-meter deep. Additionally, in these areas the route of the cables and their protection system have been specially selected, so as to respect the meadows of Posidonia oceanica seagrass, a species of vegetation native to the Mediterranean and protected at a European level, to guarantee its conservation.

For more information, visit www.ree.es/ingles.

Nexans Provides Specialized Trenching Service for Offshore Wind Farm

Nexans has been called in by EnBW (Energie Baden-Württemberg) to use its specialized Capjet trenching system to protect the HV (high voltage) subsea power export cables for Baltic 1, Germany's first commercial offshore wind farm.

The Baltic 1 wind farm, comprising 21 wind turbines with a total capacity of 48 MW, is located around 16 km offshore from the German coast. The electricity produced by the wind farm is connected to the onshore grid by three 170 kV AC cables that make landfall close to the city of Rostock.



Power Cables

Because of the relatively shallow waters in this area of the Baltic Sea (typical depths range from 16 to 19 meters) it is vital that the power export cables are protected against damage by sea anchors and fishing activities. So in December 2010, Nexans started work on a four-week contract to protect a total length of some 50 km of cables by burying them into the seabed to a depth of around 1.5 meters.

The Baltic 1 cables are being buried by Nexans' specialized trenching system, developed in-house and known as Capjet. This uses a water-jet system both to create a trench and to propel the trenching machine.

The Capjet system is used for trenching umbilicals, power cables and fiber-optic cables as well as pipelines.

For more information, visit www.nexans.com.

Subsea power cable planned from Scotland to England and Wales

National Grid and ScottishPower Transmission (SP Transmission) have announced plans for a new 2000 megawatt subsea power cable that will bring renewable energy from Scotland to England and Wales.

The companies are working together to deliver a major project to build a 400-km high voltage circuit that will run predominantly under the sea from Scotland to England/Wales.

The new circuit will enable the transfer of large volumes of energy from Scotland directly to England and Wales through subsea cables, bypassing the constraints on the existing transmission system. Scotland traditionally generates more electricity than it consumes and as new renewable energy projects continue to come on-line, it is anticipated that exports will increase.

It is proposed that the new circuit will begin at Hunterston, in Ayrshire on the west coast of Scotland and will run through the Irish Sea to the tip of the Wirral peninsula on Merseyside. Here, it will travel across the Wirral to Connah's Quay in North Wales.

For more information, visit www.nationalgrid.com.

Goliat installation job for Aker Solutions

ABB has awarded Aker Solutions' wholly-owned subsidiary Aker Marine Contractors the contract to install its subsea power cable for the Goliat field in the Barents Sea.

Aker Marine Contractors will install the cable utilizing its new-build subsea installation and construction vessel, AMC Connector. She will install 106.5 kilome-

ters of cable -- in one length -- stretching from Hammerfest, Norway, offshore to the Goliat FPSO.

The subsea power cable, supplied by ABB, will weigh approximately 6,000 tons. The AMC Connector -- previously called Aker Connector -- will take this in one load as she will be equipped to handle a total payload of 9 000 tons, divided onto two turntables for high voltage power cables or subsea umbilicals.

The vessel will be owned 50/50 by Aker Solutions and Singapore-based Ezra Holdings Ltd (Ezra), which recently acquired 100 percent of the shares in Aker Solutions' subsidiary Aker Marine Contractors AS. As part of the agreement, Aker Solutions becomes a substantial shareholder in Ezra. The transaction is expected to be completed during Q1 2011.

For more information, visit www.akersolutions.com.

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Prysmian Secures SylWin1 Project

Prysmian has been awarded a project worth more than €250 million by the Dutch-German grid operator TenneT for the connection project SylWin1, linking offshore wind farms in the North Sea to mainland Germany.

Prysmian will provide complete supply, installation and commissioning of submarine and land cable connections as part of a larger contract awarded to the consortium of Prysmian and Siemens

Energy. Siemens will deliver the Voltage Sourced Converter (VSC) system, with a rating of 864 MW. The turnkey connection will link the offshore wind park DanTysk, located about 160 km offshore, to the mainland with the purpose of transmitting power from renewable source into the German Grid.

The interconnection comprises of HVDC subsea and land cable types at a voltage of ± 320 kV DC to be supplied by Prysmian along a 159 km sea route pass-

ing to the east of Helgoland and continuing along a 45 km land route to the land converter station in Büttel, north-west of Hamburg. Extruded 155 kV HVAC submarine cable connections will complete the connections from the DanTysk offshore wind park transformer platform to the offshore converter platform. The cable system's configuration comprises also of a fiber optic cable for signaling and communication purposes.

The cables and accessories will be manufactured from 2012 onwards at Prysmian's European HV factories. Installation activities will commence in 2012 and continue into 2013. The commencement of commercial operation of the HVDC link is planned for 2014.

For more information, visit www.prysmian.com.

ABB wins order for Norway-Denmark power transmission link

ABB has won an order worth about US\$180 million from utilities Statnett of Norway and Energinet.dk of Denmark to supply an HVDC Light® (high-voltage direct current) converter solution to support the interconnection of the Norwegian and Danish power grids. The 500 kV (kilovolt) link is a new record in transmission voltage using this technology.

The underwater link will boost transmission capacity between the mainly hydroelectric-based Norwegian system and the wind and thermal power-based Danish system. It will enable both networks to add more renewable energy to their energy mix, and to use electricity more efficiently.

ABB will design, supply and commission two 700 MW (megawatt) converter stations based on the company's leading-edge HVDC Light® technology. The converter stations will be located at both ends of the 240-km long interconnection, and will be situated at the same site as the existing converter stations for Skagerrak 1-3 previously supplied by ABB, in Kristiansand, Norway and Tjelle, Denmark. The bipolar link will be operated with the Skagerrak 3 transmission system. An advanced control system is key to optimizing converter performance, and ABB will install its world-leading MACH2 control system. The project is scheduled for commissioning in 2014.

For more information, visit www.abb.com.

Draka nets repeat wave and tidal renewable energy order

The European Marine Energy Centre (EMEC) has once again selected Draka as their subsea power cable provider with a further purchase of cables and logistical solutions.

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The new contract requires Draka to deliver 5,000 meters of 20kV subsea power cable to the EMEC wave and tidal test site in Orkney.

As the first of its kind, EMEC provides test facilities for a wide range of technologies that can tap into the huge potential of wave and tidal renewable energy. Wave power alone has an estimated global

potential of approximately 1,000-10,000 GW — in the same order of magnitude as the world's electricity consumption, according to the World Offshore Renewable Energy Report 2004-2008 published by UK Renewables.

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

SSE to investigate electricity interconnector to Norway

SSE Interconnector Limited, a wholly owned subsidiary of SSE (Scottish and Southern Energy plc), has signed a cooperation agreement with three Norwegian utilities, E-CO Energi, Agder Energi (AE) and Lyse, and Swedish company Vattenfall to investigate the feasibility of building a high voltage electricity link between the UK and Norway.

The partners have agreed to establish NorthConnect, a jointly owned interconnector development company. NorthConnect will undertake a program of work over the next three to four years which will examine the technical and economic viability of developing, building and operating a HVDC (High Voltage Direct

Current) electricity interconnector. The interconnector would be designed so that electricity could flow in both directions.

Initial studies show that an interconnector would require a subsea cable of between 550 km and 700 km in length, with landing points in Norway and the UK. An HVDC converter station would be required at each landing point. At this very early stage, the technical preference is to have the shortest possible interconnector cable and this would result in a landing point in the north east of Scotland.

The NorthConnect partners will undertake commercial, technical and environmental assessments including engineering studies to identify the most suitable locations for converter stations. The assessment of each possible UK landing point will also include an evaluation of likely use of interconnector charges and timescales. Subject to these assessments, applications could then be made to the relevant planning and regulatory authorities and for the necessary consents and licenses to build, own and operate the interconnector.

For more information, visit www.scottish-southern.co.uk.



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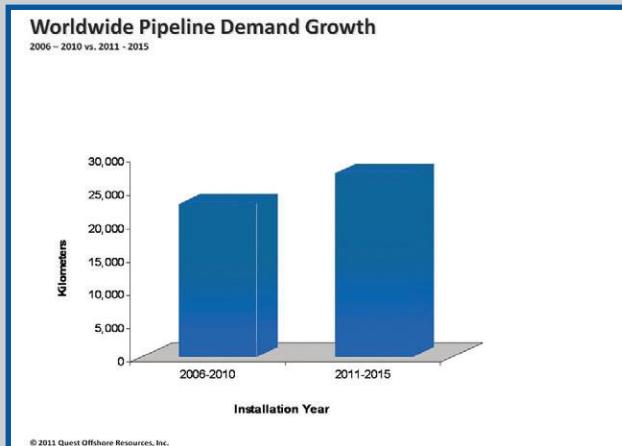
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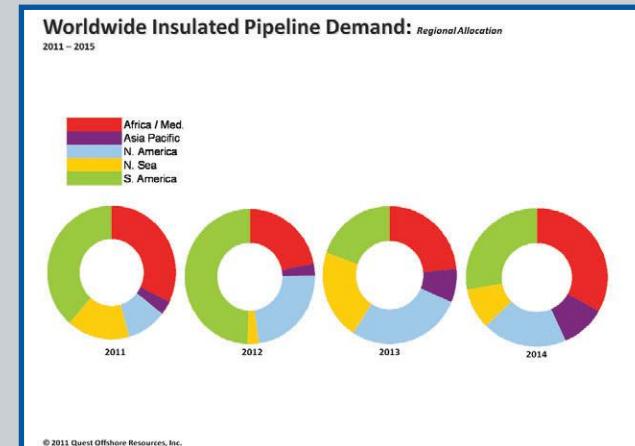
Offshore At-A-Glance

Quest Offshore Activity Report

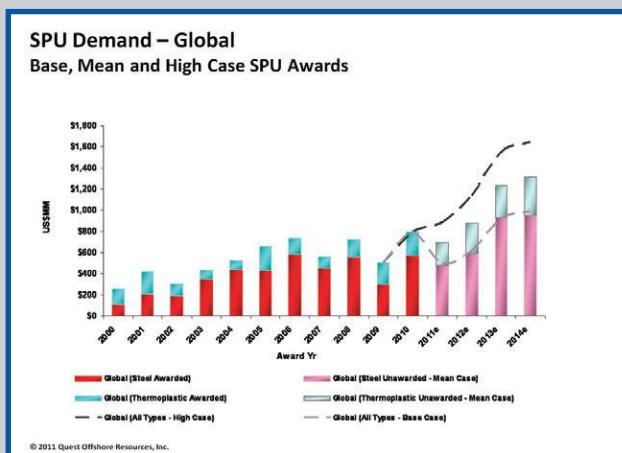
Worldwide Pipeline Demand Growth



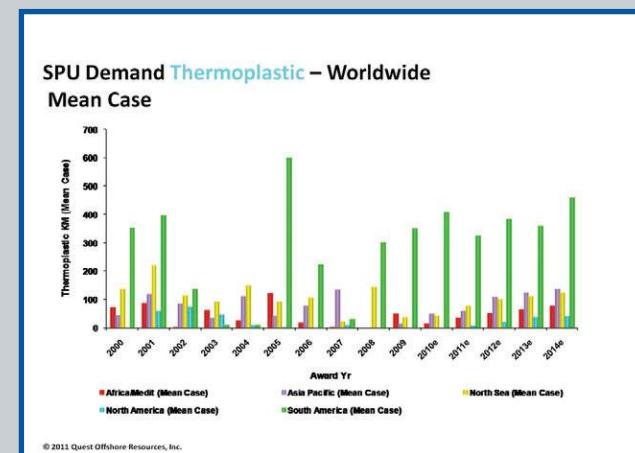
Worldwide Insulated Pipeline Demand



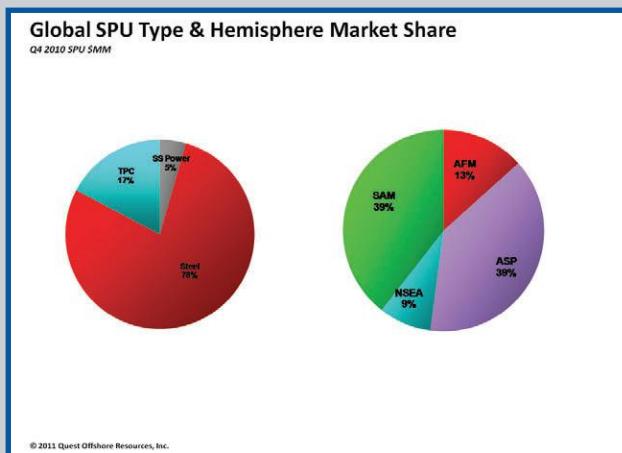
SPU Global Demand



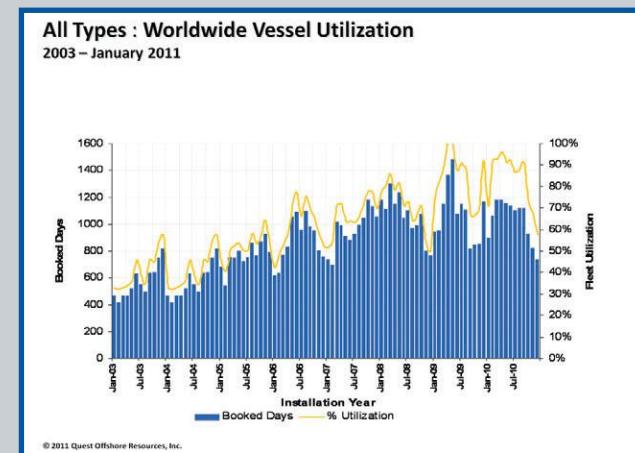
SPU Thermoplastic Demand



Global SPU Market Share



Worldwide Vessel Utilization

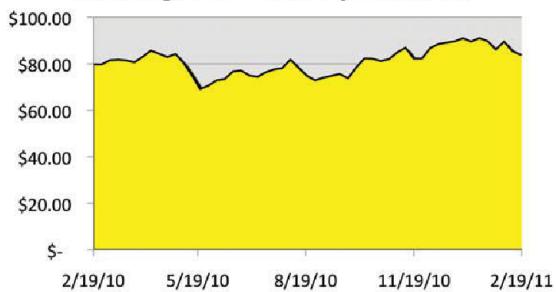


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 GO TO: www.QuestOffshore.com • www.SubseaZone.com • www.FloatingProductionZone.com

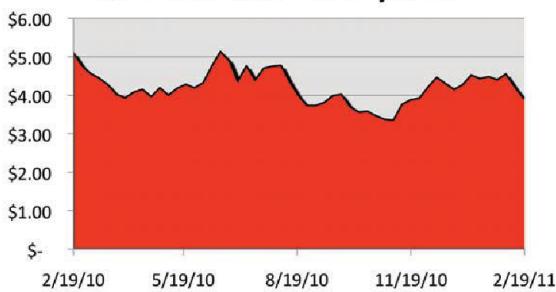
Oil & Gas Industry Trends

Monitoring the pulse of the US Offshore Oil & Gas Industry

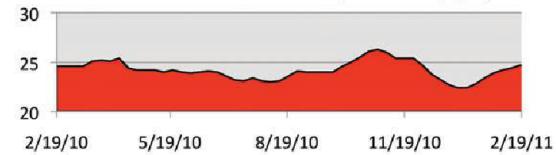
Cushing, OK - WTI Spot Prices



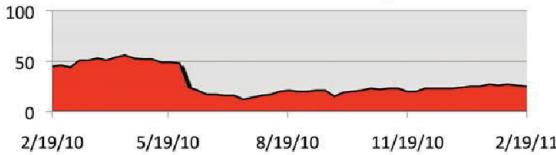
Nat Gas Prices - Henry Hub



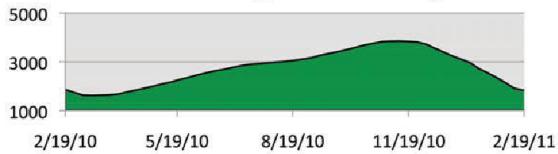
Crude Oil Stocks - Days of Supply



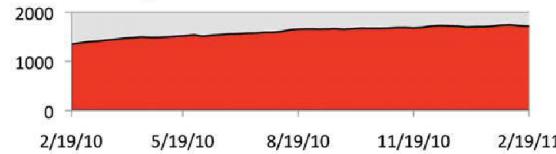
Total Offshore Rigs



Nat Gas Underground Storage Bcf



Rig Count - North America



positive trend at least 3 weeks

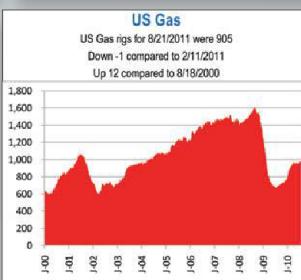
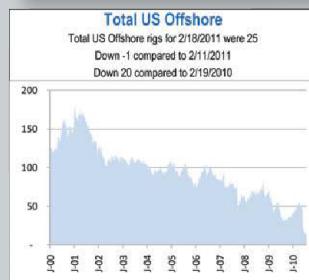
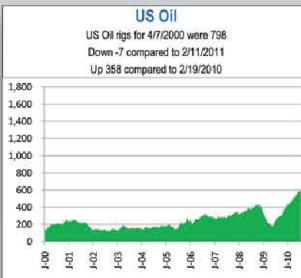
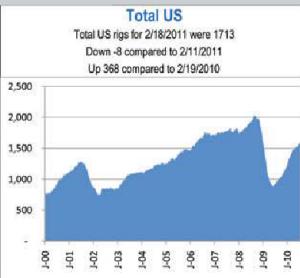
changing trend < 3 weeks

negative trend at least 3 weeks

Baker Hughes Rig Report

North American Rig Report February 18, 2010

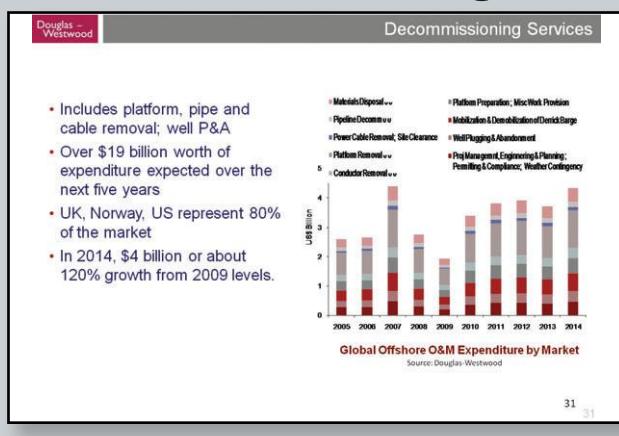
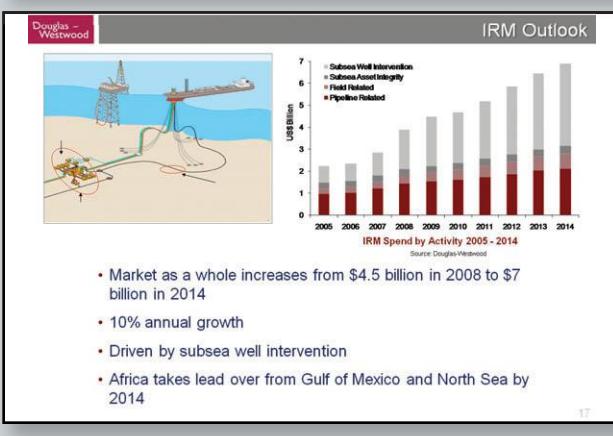
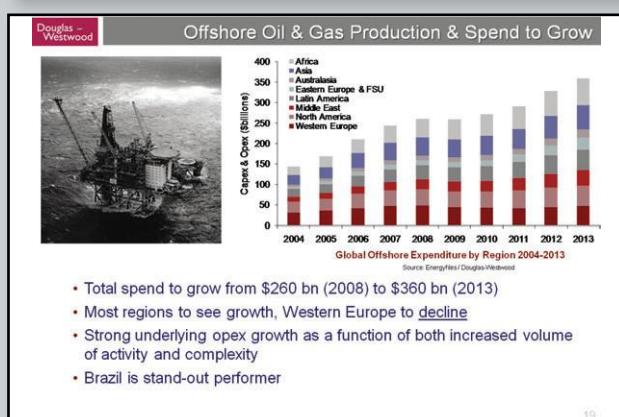
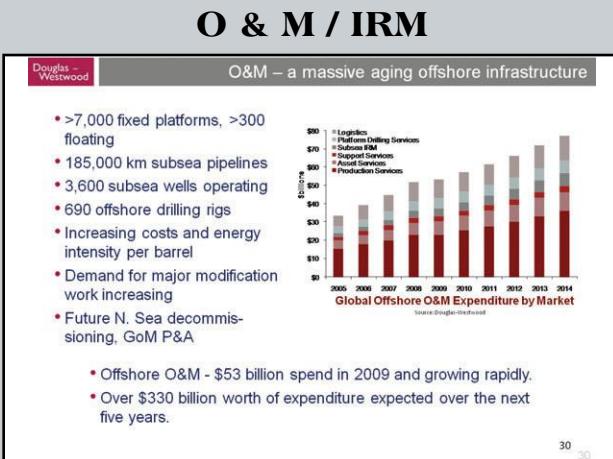
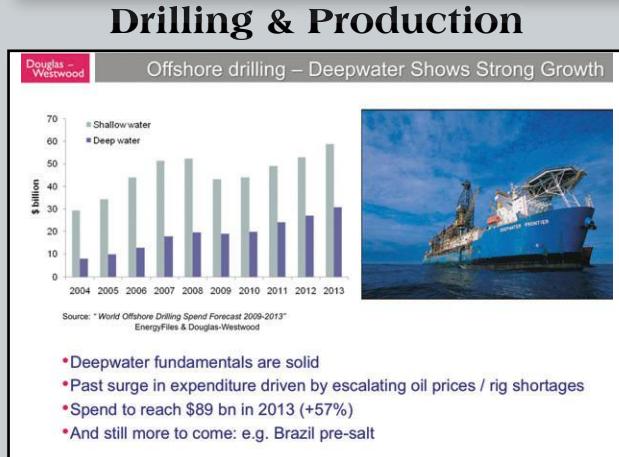
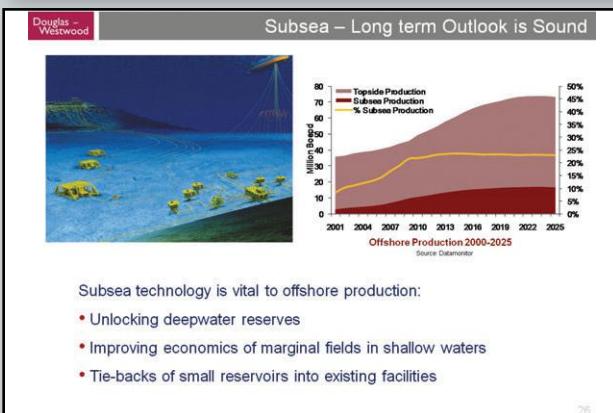
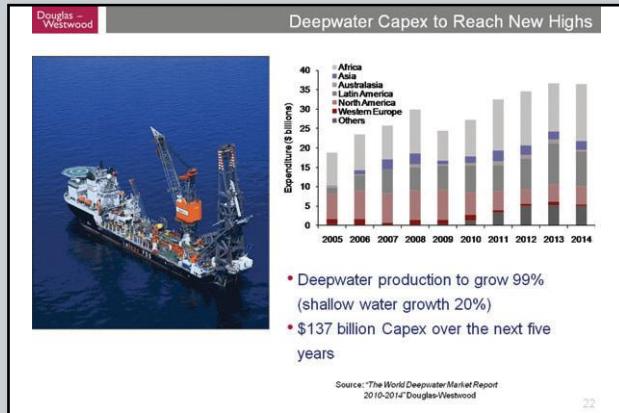
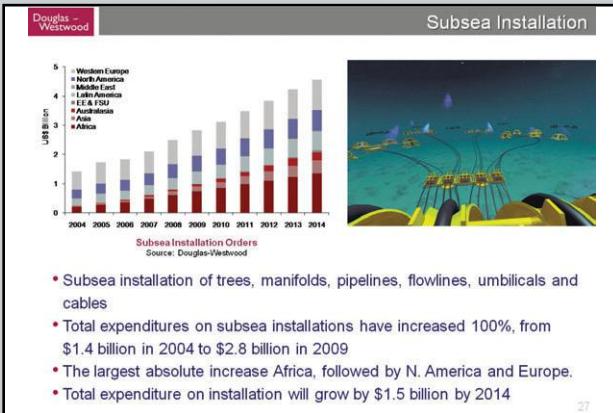
Location	Week of 2/18	Week Ago	Year Ago
Land	1672	-7	1679
Inland Waters	16	0	16
Offshore	<u>25</u>	<u>-1</u>	<u>26</u>
U.S. Total	1713	-8	1721
Gulf of Mexico	25	-1	26
Canada	636	6	630
N. America	2349	-2	2351



Douglas Westwood Markets Forecast

Subsea

Deepwater Capex



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Gulf of Mexico Data

Current Deepwater Activity

Operator	OCS Area/Block	Lease	Rig Name	Prospect Name	Water Depth(ft)
Shell Offshore Inc.	AC 857	G17565	H&P 205	Great White	7,811
Anadarko Petroleum Corp.	GC 726	G24179	T.O. DISCOVERER SPIRIT	Tonga	4,674
Anadarko Petroleum Corp.	GC 683	G18421	ENSCO 8500	Caesar	4,457
BHP Billiton Petroleum (GOM)	GC 654	G20085	T.O. DEVELOPMENT DRILLER I	Shenzi	4,383
BHP Billiton Petroleum (GOM)	GC 654	G20085	GSF C.R. LUIGS	Shenzi	4,337
Chevron USA Inc.	GC 640	G20082	T.O. DISCOVERER CLEAR LEADER	Tahiti	4,298
Shell Offshore Inc.	MC 809	G09883	H&P 204	Princess	3,800
Shell Offshore Inc.	MC 764	G08852	NOBLE DANNY ADKINS	Mars	3,283
Anadarko Petroleum Corp.	GB 668	G17407	COIL TUBING UNIT	Gunnison	3,152
LLOG Exploration Offshore, LLC	MC 503	G27277	NOBLE AMOS RUNNER	Appaloosa	3,099
Marathon Oil Company	GC 244	G11043	CAL DIVE Q-4000	Droshky	2,949
Shell Offshore Inc.	MC 807	G07963	H&P 201	Mars b	2,945
Anadarko Petroleum Corp.	VK 826	G06888	NABORS P-10	Neptune	1,920
Chevron USA Inc.	VK 786	G10944	NABORS 87	Petronius	1,754
Eni US Operating Co. Inc.	EW 965	G12142	T.O. AMIRANTE	Morpeth	1,692
Stone Energy Corp.	MC 109	G05825	H&P 206	Amberjack	1,030

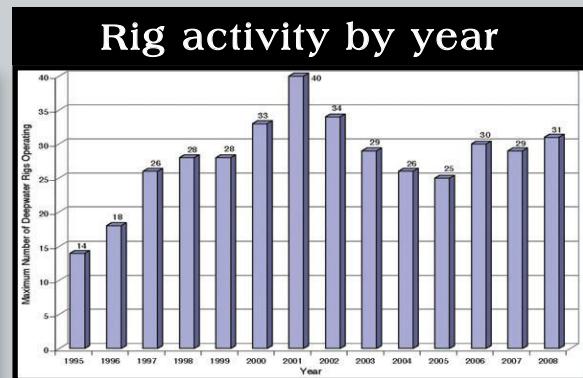
Deepwater prospects with drilling and workover activity: 16

New Deepwater Activity

Operator	OCS Area/Block	Lease	Rig Name	Prospect Name	Water Depth(ft)
No activity since moratorium was lifted					

New Deepwater Activity as of Friday, February 18, 2011

Activity by Water Depth			
Water Depth in Meters	Active Leases	Approved Applications	Active
0 to 200	2,088	33,736	3,244
201 to 400	138	1,106	20
401 to 800	317	833	10
801 to 1,000	403	507	7
1,000 & above	3,390	1,639	26



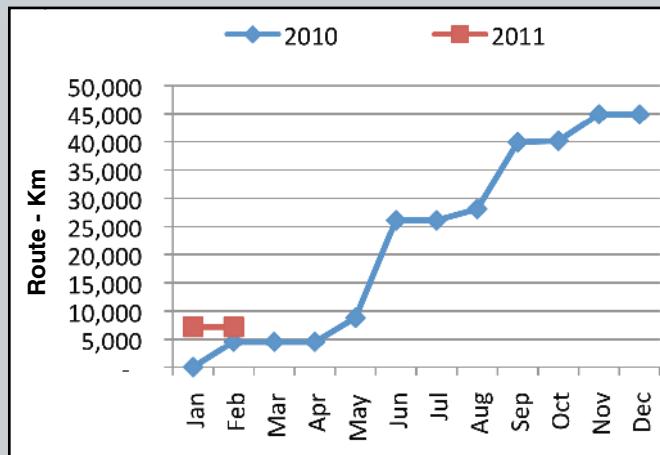
Activity by water depth Information current as of Tuesday, February 22, 2011

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.

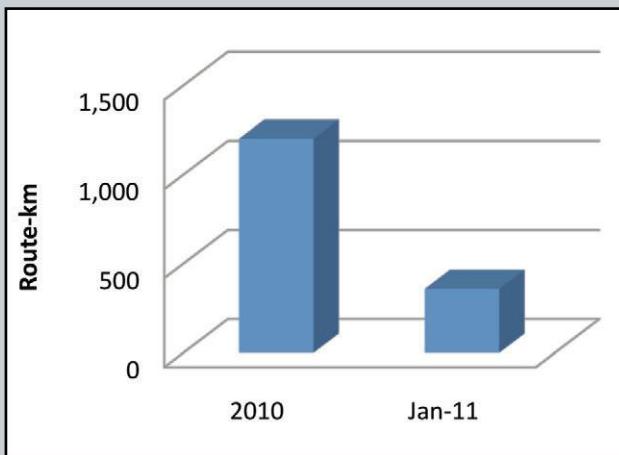
Information provided courtesy of the U.S. Bureau of Ocean Energy Management

Subsea Telcom & Power Cable Data

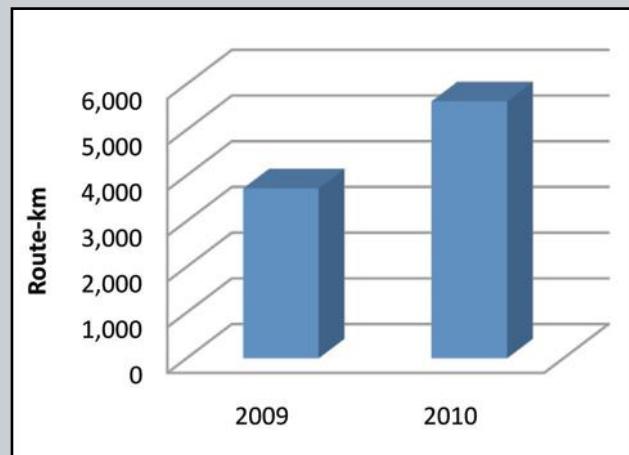
FO Awards by Month



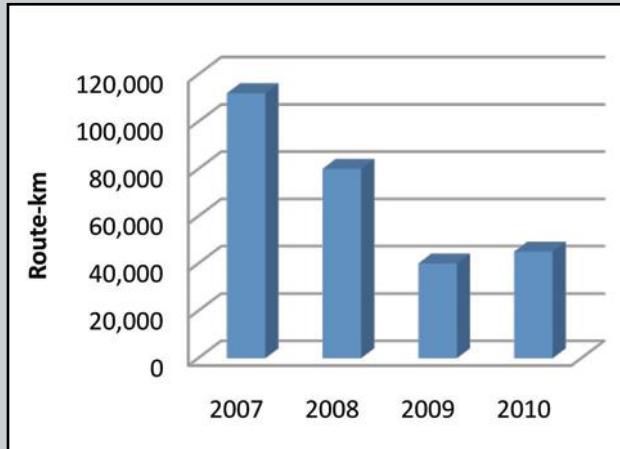
**Wind Farm Cabling Contract Awards,
2010 versus Jan 2011, in route-km**



**Grid Interconnection Projects
under Development, 2009 versus
2010, in route-km**



FO Awards by Year



Excerpts from MUSINGS FROM THE OIL PATCH

By Allen Brooks, Managing Director

From the January 18, 2011 issue

Offshore industry: waiting for Godot; will he ever come?

The offshore oil and gas and oilfield service industries appear to be playing the roles of Vladimir and Estragon, the two lead characters in Samuel Beckett's Waiting for Godot. The play deals with two days in the lives of these gentlemen who are awaiting the arrival of an acquaintance who they admit they hardly know and probably might not recognize when he arrives. Godot never does come, which forces the two men to fill their waiting time. While waiting they eat, sleep, talk, argue, sing, play games, exercise, swap hats, and contemplate suicide – anything "to hold the terrible silence at bay." It sure sounds like the actions of the domestic offshore industry both during and after the offshore deepwater drilling moratorium.

The play was voted "the most significant English language play of the 20th century." It was written during the winter of 1948-1949 and had its initial performance in Jan. 1953. It is often described as an absurdist play and its script has led to much discussion about the hidden meanings behind the storyline. One drama critic wrote about Mr. Beckett and his play that it "has achieved a theoretical impossibility—a play in which nothing happens, that yet keeps audiences glued to their seats. What's more, since the second act is a subtly different reprise of the first, he has written a play in which nothing happens, twice." That description seems an appropriate characterization of the Gulf of Mexico offshore petroleum business for the past six months.



Commission's report dismisses industry's safety record

Last week, the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling issued its long awaited report and Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) Director Michael Bromwich delivered a speech about the status of his bureau's operations, reorganization and new offshore rule promulgation efforts. The commission's report has a number of worthy ideas about offshore regulation and operations that should be explored and discussed. The report also dismisses the positive historical drilling safety record of the offshore industry and characterizes its operations as suffering from a "systemic" problem. The government's solution is to add additional layers of regulation to the industry's operations without fully determining the cause of the Deepwater Horizon disaster and the Macondo oil spill. (We have just received a copy of the full report and have not yet had time to read it all.)

Director Bromwich's talk focused on the status of the reorganization efforts of the former Minerals Management Service (MMS). The new structure has created three separate organizations – one dealing with revenue collection, another with safety and the third focused on managing the development of the nation's offshore resources in an environmentally and economi-

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ENERGY INVESTMENT BANKING, LP

cally responsible way. The reorganization was designed to reduce and eliminate the conflicting roles the MMS was trying to perform and to increase the professionalism of the department.

Pace of permit approval likely will never return to normal

In reading Director Bromwich's talk, there appeared to be little in the way of new information. Clearly during the question and answer time following the speech, at least according to the story reported by Dow Jones Newswire, Director Bromwich did offer some new information. He said that the primary question he is asked when he talks with operators of offshore drilling rigs is when the pace of permit approval will return to what it was before the Macondo oil spill began on April 20, 2010. His response to that question is, "The honest answer is probably never." Given all the new rules and regulations now required of operators and rig owners, that response is probably quite accurate. That prospect, however, will certainly not boost the spirits of, nor help the planning by, the offshore industry. What may have been a shocker to the industry, however, was after he commented that new offshore drilling permits were coming he said, "I would be stunned if we waited until the third or fourth quarter."

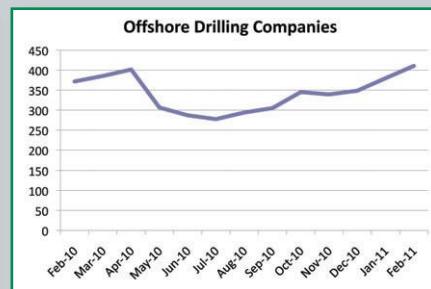
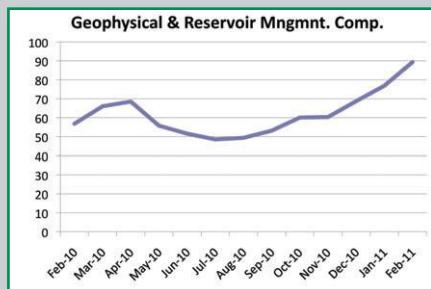
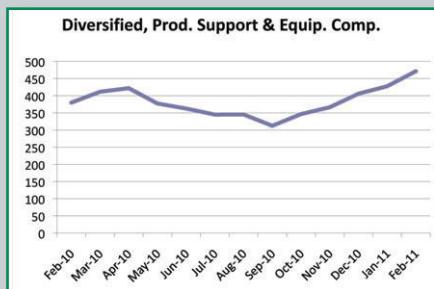
Many industry people held out hope this summer that once the deepwater drilling moratorium was lifted permits would begin to flow. With the early termination of the deepwater drilling moratorium, it was anticipated that permits would be forthcoming quickly and that the industry would be drilling before the end of 2010. We are now well into January with no new deepwater drilling permits having been issued. Director Bromwich's comment about the third and fourth quarters has to be a jolt to the offshore industry.

I am sure that had the issuing of new deepwater drilling permits been imminent, Director Bromwich would have telegraphed that somehow in his speech or in responses to questions. The increased likelihood that the industry may go for a full year following the Macondo accident without a new deepwater drilling permit will have a negative impact on Gulf of Mexico capital spending, rig and auxiliary offshore equipment employment and the nation's crude oil and natural gas supply in 2011 and likely 2012, too. Every day of further delay in granting permits increases the prospect of permanent damage to the domestic industry.

Considering suicide at the end of the play

In each act of Waiting for Godot the two characters contemplate suicide. The first time they decide not to follow through because possibly one of them might not die, leaving him alone, which they considered to be an intolerable situation. Instead, they decide to do nothing – "It's safer." At the end of the play, when informed that Godot would not be coming that day but rather the next, they contemplate suicide again, but the rope that is used as a belt by one of them turns out to be too short. They resolve to bring a longer rope the next day and hang themselves if Godot doesn't show. Should we begin passing out lengths of rope to the offshore industry?

Monthly Stock Figures & Composite Index

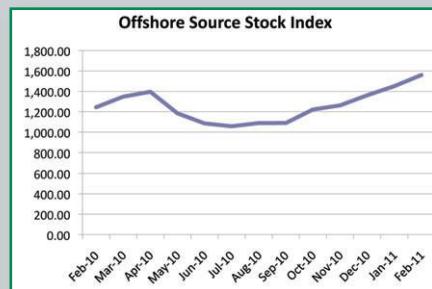
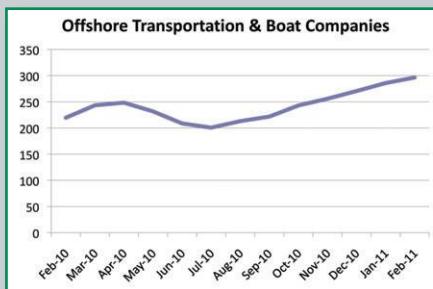
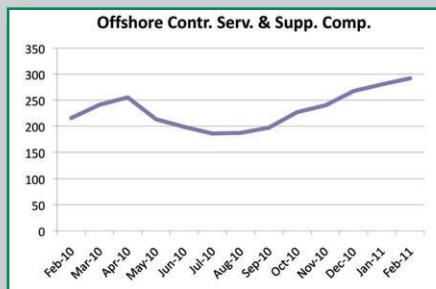


Industry Company Name	Symbol	Close Mid-February	Close Mid-January	Change	Change %	High 52 week	Low
Diversified, Production Support and Equipment Companies							
Baker Hughes, Inc.	BHI	70.52	59.58	10.94	18.4%	71.58	35.62
Cameron Intl. Corp.	CAM	58.76	52.23	6.53	12.5%	59.83	31.42
Drill-Quip, Inc.	DRQ	80.65	77.04	3.61	4.7%	83.80	40.38
Halliburton Company	HAL	47.94	39.99	7.95	19.9%	48.84	21.10
Tenaris SA	TS	48.11	46.49	1.62	3.5%	49.88	32.91
Newpark Resources, Inc.	NR	6.80	5.94	0.86	14.5%	9.50	4.61
Schlumberger Ltd.	SLB	94.49	86.91	7.58	8.7%	95.15	51.67
Superior Energy Services, Inc.	SPN	38.58	35.49	3.09	8.7%	39.29	18.02
Weatherford International, Inc.	WFT	25.62	23.93	1.69	7.1%	26.25	12.34
Deep Down, Inc.	DPDW	0.10	0.10	-	0.0%	0.29	0.05
Total Diversified, Production, Support and Equipment.....		471.57	427.70	43.87	10.3%	484.41	248.12
Geophysical / Reservoir Management							
Dawson Geophysical Company	DWSN	45.42	34.62	10.80	31.2%	46.16	20.05
Mitcham Industries, Inc.	MIND	11.23	11.15	0.08	0.7%	12.28	5.56
Compagnie Gnrale de Gophysique-Veritas	CGV	32.73	31.11	1.62	5.2%	33.39	16.42
Total Geophysical / Reservoir Management.....		89.38	76.88	12.50	16.3%	91.83	42.03
Offshore Drilling Companies							
Atwood Oceanics, Inc.	ATW	44.44	37.78	6.66	17.6%	44.96	23.71
Diamond Offshore Drilling, Inc.	DO	75.39	74.90	0.49	0.7%	93.42	54.70
ENSCO International, Inc.	ESV	53.06	53.85	-0.79	-1.5%	55.88	33.33
Nabors Industries, Inc.	NBR	27.98	22.52	5.46	24.2%	28.05	15.55
Noble Drilling Corp.	NE	41.99	38.09	3.90	10.2%	44.73	26.23
Pride International, Inc.	PDE	40.13	33.98	6.15	18.1%	40.84	21.51
Parker Drilling Company	PKD	4.70	4.34	0.36	8.3%	5.76	3.43
Rowan Companies, Inc.	RDC	39.51	35.25	4.26	12.1%	40.25	20.44
Transocean Offshore, Inc.	RIG	83.34	79.01	4.33	5.5%	92.67	41.88
Total Offshore Drilling.....		410.54	379.72	30.82	8.1%	446.56	240.78

DISCLAIMER

The information on this page is provided for information and comparison purposes only and should not be used to make financial and business decisions and is accurate to the best of our knowledge for the period indicated.

Monthly Stock Figures & Composite Index



Industry Company Name	Symbol	Close Mid-October	Close Mid-September	Change	Change %	High 52 week	Low
Offshore Contractors, Services and Support Companies							
Helix Energy Solutions Group, Inc.	HLX	14.33	12.23	2.10	17.2%	17.00	8.38
Gulf Island Fabrication	GIFI	28.30	28.29	0.01	0.0%	30.56	14.18
Global Industries, Ltd.	GLBL	8.23	7.31	0.92	12.6%	8.45	4.05
McDermott International Inc.	MDR	23.79	20.54	3.25	15.8%	28.98	12.10
Oceaneering International	OII	81.71	74.89	6.82	9.1%	83.65	39.75
Subsea 7 SA	SUBC	24.17	25.09	-0.92	-3.7%	25.93	13.25
Technip ADS	TKPPY.PK	98.90	100.51	-1.61	-1.6%	103.61	56.65
Tetra Technologies, Inc.	TTI	12.65	11.53	1.12	9.7%	14.64	8.00
Total Offshore Contractors, Service and Support.....		292.08	280.39	11.69	4.2%	312.82	156.36
Offshore Transportation and Boat Companies							
Seacor Holdings Inc.	CKH	95.78	104.44	-8.66	-8.3%	116.50	67.01
Gulfmark Offshore, Inc.	GLF	43.04	34.40	8.64	25.1%	43.39	23.27
Bristow Group	BRS	48.11	47.32	1.09	2.3%	52.39	28.32
PHI, Inc.	PHII	23.00	21.87	1.13	5.2%	24.10	13.15
Tidewater Inc.	TDW	61.15	56.32	4.83	8.6%	61.78	37.99
Trico Marine Services, Inc.	TRMA	0.13	0.13	0.00	0.0%	3.70	0.11
Hornbeck Offshore	HOS	25.01	21.43	3.58	16.7%	25.75	12.63
Total Offshore Transportation and Boat		296.52	285.91	10.61	3.7%	327.61	182.48
Total Diversified, Production, Support and Equipment		471.57	427.70	43.87	10.3%	484.41	248.12
Total Geophysical / Reservoir Management		89.38	76.88	12.50	16.3%	91.83	42.03
Total Offshore Drilling		410.54	379.72	30.82	8.1%	446.56	240.78
Total Offshore Contractors, Service and Support		292.08	280.39	11.69	4.2%	312.82	156.36
Total Offshore Transportation and Boat		296.52	285.91	10.61	3.7%	327.61	182.48
Total Offshore Source Index...		1,560.09	1,450.60	109.49	7.5%	1,663.23	869.77

Titan Batteries Boost ROV Range and Power

By Grant Brown, Corvus Energy

Current remotely operated underwater vehicles rely on lead-acid batteries and diesel generators to perform their daily functions. They're limited by short life spans and insufficient power supply.

Corvus Energy, based in Richmond, B.C., has introduced a new lithium-ion battery system designed for marine applications that will drastically increase an ROV's range and duration. With Corvus, ROVs can operate underwater four to six times longer. It's a game-changing technology that gives early adopters a significant strategic advantage by allowing their ROVs to extend underwater range from days to weeks and boost power exponentially over current designs.



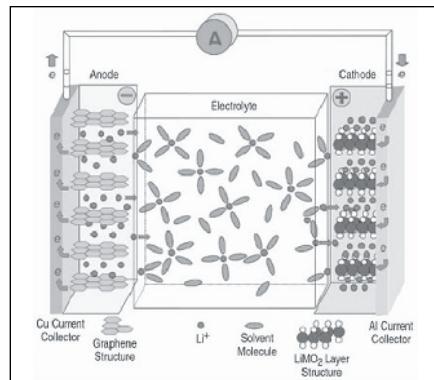
In 2007, George Roddan, a groundbreaking naval architect, and Neil Simmonds, who holds more than 70 patents in battery management systems, joined forces to create a super-charged, ultra-safe battery capable of unprecedented power. The battery is completely sealed and is fully operational when submerged in one meter of water. The batteries are pressure sealed up to 6,000 meters deep. It functions at 100 percent in the world's harshest marine environments.

Corvus rolled out its first Titan series batteries in 2010. At 6.2 kWh in a two cubic foot volume, the batteries pack up to 10 times the energy density in the same volume as traditional batteries. The Titan fully functions between -4 degrees and 140 degrees Fahrenheit and, with a life cycle of 25 years, the batteries last up to four times as long as preceding battery technologies. Comparatively, lead-acid batteries last a maximum of just seven years.

Technology Overview

The smallest working unit in a battery is the electrochemical cell, consisting of a cathode and an anode separated and connected by an electrolyte. The electrolyte conducts ions but is an insulator to electrons. In a charged state, the anode contains a high concentration of intercalated

lithium while the cathode is depleted of lithium. During the discharge, a lithium ion leaves the anode and migrates through the electrolyte to the cathode while its associated electron is collected by the current collector to be used to power an electric device (illustrated below).



The electrodes in lithium-ion cells are always solid materials. One can distinguish between cell types according to their electrolytes, which may be liquid, gel, or solid-state components. The electrolytes in gel and solid-state cells represent a structural component and do not need additional separators for the effective separation of electrodes and avoidance of short circuits. Cells come in button, cylindrical, and prismatic forms.

For low-energy and low-power applications, a cell often represents a full battery. For high-energy and high-power applications (such as transportation or stationary storage) a number of cells are packaged in a module, and a number of modules are packaged in a battery.

Lithium ion based battery systems have dominated every market they have ever been introduced into, including cell phones, laptop computers, power tools, and most recently, automobiles. Utilizing newly developed technology, Corvus is now poised to enter the untapped market of large foot print lithium ion batteries. There is a strong demand in many industries to replace the existing lead acid based batteries with smaller and lighter batteries. In addition to being less costly than the existing battery systems, the new Corvus battery system has opened up the doors for new applications. These include hybrid/electric marine propulsion applications such as environmentally sensitive harbor tug boats, pure electric passenger ferries, high performance sailboats, improved personal yachts and submersibles. Corvus lithium ion batteries are also ideal for light weight solar array bat-

teries and portable wind power storage batteries. There are also a number of military battery applications which would benefit from Corvus technology.

Autonomous Underwater Vehicles and Submarines

Manned and autonomous underwater vehicles (AUV) currently use lead-acid batteries to power all functions on board. These underwater vehicles are employed in the offshore oil industry, the tourist industry, and other sectors as well, to perform missions critical to each operation. There is a significant opportunity for Corvus Energy's power systems based on superior lithium ion chemistry which supplies up to four times the power density of lead acid. This characteristic has the potential to immensely lower operating costs for UAV's and Submarines in reduced charging requirements, significantly less down time and greater range and redundancy.

Corvus Energy is working with a number of companies focused in this area. Battery packs can be developed to suit any manned or unmanned subs.



Specialty Oceanographic Instrumentation

These instruments measure environmental conditions above and below the waters' surface. Ocean gliders and wave buoys make up the majority this market segment. Wave buoys are anchored devices that report wind speed and direction, wave height, current speeds and water temperature. Ocean gliders are independent devices which, "swim", freely descending and ascending using bladder systems and moving weights in concert with fins. These instruments, being relatively small and deployed for extended periods of up to a year at a time, makes battery performance an important compo-

continued on page 72

Introducing a Modular Seafloor Communications Network

A pre-engineered, expandable system that can be deployed (and redeployed) anywhere in water depths of up to 3,000 meters.



The Offshore Communications Backbone (OCB)

CSnet's Offshore Communications Backbone (OCB) consists of a network of power and fiber optic cables and sensor ports connected to a surface communications buoy. The OceanNET™ buoy, was designed and built by Maritime Communication Services MCS, a subsidiary of Harris Corp. and serves as the command control and data backhaul for the OCB.

Expandable, Adaptable, Portable

- Each OCB or networked array of OCBs can be deployed to service multiple clients ...or dedicated to a specific project.
- Once the mission(s) are completed, the OCB can be moved to a new location. The OCB is particularly suited to remote areas or areas located far offshore.
- Suited both for long-term and short-term projects

Cost Effective

- 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 can be configured to accommodate large or small applications at a predictable cost
- Networks that will ultimately be cabled to shore may be deployed and operated via the OceanNET satellite telemetry system while cable routes are still being negotiated



Typical Projects Served by the OCB

- Oil & gas exploration and site assessment
- Equipment, pipeline, reservoir monitoring activities
- Scientific ocean observing systems
- Tsunami and seismic warning systems
- Pipeline and infrastructure security monitoring

Finally, an End-to-End Service Provider

CSnet and its partners CSA International, Inc. (CSA), Ocean Specialists, Inc. (OSI) and Maritime Communication Services, Inc. (MCS) offer an end-to-end solution, providing system design and construction, site survey and selection, permitting, environmental impact and assessment, installation as well as ongoing operation and maintenance services.



OCB delivers the data collected to a 24/7 staffed Network Operations Center (NOC) for quality control, processing and forwarding to end-users around the globe



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Modular Seafloor Communication Networks

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info@CSnetIntl.com
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Melbourne Beach, Florida 32951
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nent in the design and capability of these devices. Corvus Energy's power storage systems provide superior performance compared to existing technology.

There are currently more than 1000 gliders and wave buoys being operated out of the US and Canada.

Independent Testing

Greenlight Power Technologies, a leading supplier of test equipment and services to the fuel cell industry, conducted independent tests on Corvus batteries, substantiating Corvus' extraordinary battery power abilities. The batteries are UN transport certified and meet all industry safety and performance standards.

Numerous applications are being engineered, including the development of megawatt capacity power skids that can be dropped into war zones or natural disasters for immediate remote power, hybrid electric power for heavy machinery and port equipment as well as auxiliary backup power for ships and offshore oil and gas platforms. The batteries are capable of delivering up to 10 times their capacity for peak demand times and are capable of fully recharging in as little as 30 minutes. As a result, ROV operators will be able to more effectively manage underwater assignments.

"Corvus technology is safer and stronger than any other battery and it has an extended maintenance-free lifespan that makes the most economic sense of any power source today," said Brent Perry, CEO and president of Corvus Energy. "Our batteries open up new ways of thinking about remotely operated underwater vehicles. ROVs are capable of so much more now."

The Titan packs are one quarter the size of traditional batteries and are controlled by a patent-pending remote Corvus Battery Management System (BMS) that is responsible for monitoring, controlling and shutting down the batteries in emergency situations. In addition, Corvus sealed the batteries and terminal connectors in double-walled casings, making them completely water and tamper proof, as well as installed triple redundant safety features. Each battery cell is individually fused to eliminate the chance of thermal runaway.

Subsea, offshore and undersea military markets are looking to Corvus to provide power capabilities that would have been impossible only a few years ago. The subsea and offshore industries are searching deeper for valuable energy resources as well as new mineral deposits. Military missions are requiring enhanced range and stealth in order to gain superiority.

"Light work-class ROVs are critical for inspecting underwater operations and providing operators with a high-performance viewing system. Whether it's under an ice pack or in a war game environment, the technology is designed to excel in the world's most difficult scenarios," said Perry. "Our battery's components are flame and combat proof, with standard shock ratings at 50G and vibration ratings of 8G aboard current vessels."

The battery packs are notably smaller than standard technologies so new systems can be designed with significant space savings allowing for additional equipment. Costs for Corvus systems are consistent with current grid power costs at approximately 15 cents per kWh.

For more information, visit www.corvus-energy.com.

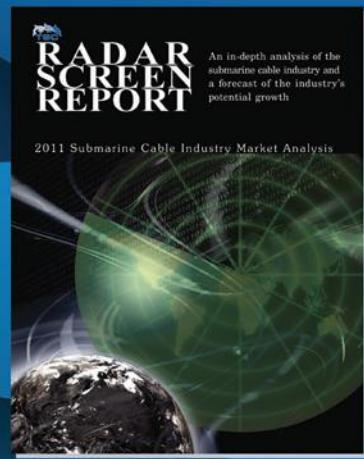
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New Seafloor Observation System

Sidus Solutions LLC of San Diego, California has developed the innovative Seafloor Observer system, featuring remote positioning, lighting, video, and still photography through a single Ethernet cable at depths up to 3,000 meters. The system shown was recently supplied to a major offshore communications corporation and was deployed during the fourth quarter of 2010.

Traditionally, most deepwater video imaging systems have required additional hardware, such as a separate junction bottle or subsea node, to distribute video and telemetry signals via Ethernet. Where previous solutions have also required several software packages to interface with various imaging components, the Seafloor Observer is controlled via a single Ethernet cable from a single console through an intuitively laid out Graphical User Interface (GUI). Additionally, this system allows other operators at other remote sites to control all functions through a web interface – without the need for any special hardware or software installed at the remote site.

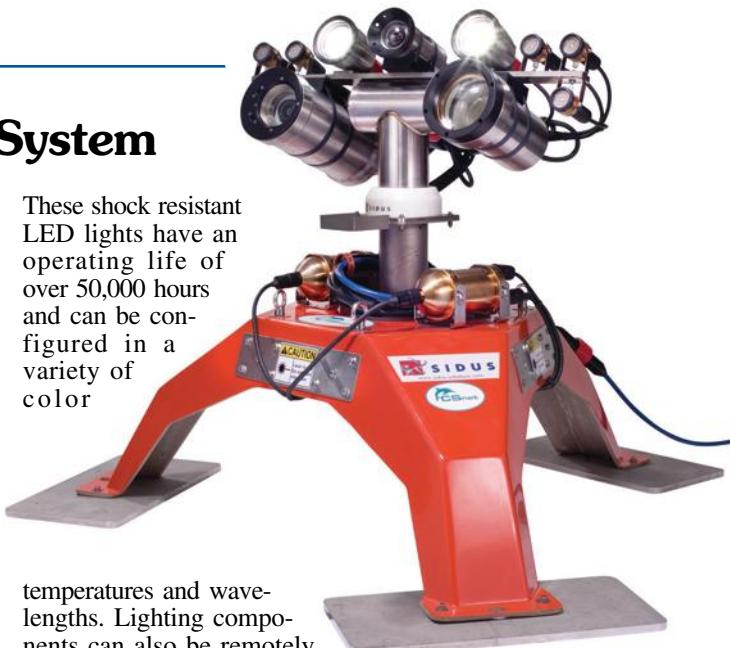
"The development of the Seafloor Observer is a big leap forward, not only for Sidus, but for the worldwide subsea industry," said Jeff Gardiner, Chief Engineer at Sidus and Project Manager of the Seafloor Observer development. "Network based systems along with high-definition video over coax is the future of our underwater business," he continued.

The Seafloor Observer imaging consists of an 8 megapixel digital still/video color camera; a 200 W/s strobe; and a low-light sensitive, optically corrected video camera. Remote users can fine tune image settings, including exposure and annotations, capture still images, and download them to the surface via Ethernet from around the world. MPEG-4 video resolution, compression, and video frame rate is remotely adjustable for optimized performance in bandwidth-limited applications. Integrated red scaling lasers allows for image scaling and object distance measurement.

Through integration of heavy duty stepping technology and extremely low backlash gearing, pan and tilt functionality is provided by the SS252 robotic positioning device. Delivering an impressive 65 ft.-lb. (90 Nm) of torque on each axis, the Seafloor Observer offers high accuracy, 12 bit positioning feedback at speeds up to 40 degrees per second. Whether tracking a slow moving sea slug or chasing a quick cutthroat eel, the system can provide smooth and responsive dynamic monitoring.

Illumination is provided by two dimmable 3000 lumen LED flood lights and six 3000 lumen LED spot lights.

These shock resistant LED lights have an operating life of over 50,000 hours and can be configured in a variety of colors.



temperatures and wavelengths. Lighting components can also be remotely turned on and off in various combinations to offer optimized image exposure and low, medium, and high power operating modes.

A key design challenge in development of the system was the management of the various interconnect cables between subsea components. Most of the subsea components, such as the cameras and lights, move along with the pan & tilt positioner, while others such as the LED light ballasts remain stationary on the fiberglass tripod. Customized brackets were introduced to minimize cable strain and prevent cable snags along with specialized wraps for longer cable runs.

Designed for years of continuous subsea deployment, the entire system is manufactured of corrosion-proof titanium, beryllium copper, and fiber glass. Additional sacrificial zinc anodes are placed on the light heads and junction bottles for further corrosion protection. An integrated ROV grip paddle and heavy-duty lifting eyes allow for ease of maintenance and redeployment.

The system is designed to operate on supplied voltages of 24VDC @ 150 Watts maximum for all components, except the six LED spot lights that operate at 375VDC @ 1000 Watts maximum. Input power is through a single multi-cable that carries both voltages as well as CAT-5 Ethernet. The end user for the initial delivery had a strict system power budget that was satisfied through customized software safeguards that managed individual component power consumption.

For more information, visit www.sidus-solutions.com.

Tritech launches 4,000m Gemini imaging sonar

Following the success of the shallow-water real-time imaging sonar, Gemini 720i, Tritech has launched a deep-rated version of the popular sonar, Gemini 720id.

Available now in 300-meter and 4,000-meter versions, Gemini is a forward-looking sonar that utilizes an array of transducers to provide a 120° field of view for a real-time sonar image of the underwater scene ahead.

With its high-resolution specification Gemini has near-field focus capability ideal for very short-range manipulator work as well as very long range target detection. Gemini sonars can be easily integrated with a variety of ROV and AUV platforms.

Gemini is the technology for subsea sonar vision. As the next generation in real-time multibeam imaging sonars, Gemini has quickly captured the global subsea market most recently achieving the Subsea UK award for Innovation and Technology.

Gemini's rapid and dynamic visualisation of the underwater scene makes it perfect for deepwater applications where successful navigation and obstacle avoidance is required. Gemini



provides instant feedback on changes happening in the underwater scene, which reduces overall operation time and increases ROV effectiveness.

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

SonaSoft™ 2.3 launched

FarSounder has released SonaSoft™ version 2.3, a powerful upgrade to the software that powers all FS-3 series sonars. This upgrade includes significant processing, user interface, and display improvements. Major upgrades and improvements include:

- In-Water Target Detection
- Automatic Bottom Detection
- Shallow water/Short Range Performance
- Support for C-Map Vector Charts

Originally, FarSounder's products concentrated on long range performance. Now, with more and more customers also looking to use their sonars at short ranges when navigating in shallow waters, the system introduces a new set of transmit signals optimized for such conditions.

For more information, visit www.farsounder.com.

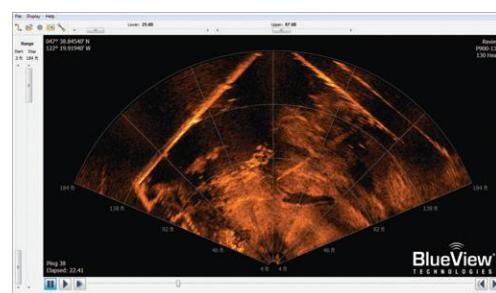
New BlueView 2D Imaging Sonar for Deepwater Applications



BlueView re-engineered its popular P Series Imaging Sonar platform to create the smallest deepwater solutions that meet the stringent requirements for ROV operations. The new P Series Deepwater Systems deliver incredible detailed imagery and accurate point-to-point measurement in a compact, economically priced 2D imaging sonar. Able to operate at depths of 3,000 m (9,842 ft.) the new deepwater systems enhance real-time ROV navigation, obstacle avoidance, operations monitoring, inspections, and object detection even in low and zero visibility conditions. The compact size, light weight, and low power consumption make ROV integration easy.

BlueView is the leader in 3D mechanical scanning sonar and 2D imaging sonar technology with more than 450 installed systems worldwide. BlueView Technologies' advanced sonar systems are currently deployed on AUVs, ROVs, surface vessels, fixed positions, and portable platforms, and have been adopted by leading manufacturers and service providers to support mission critical operations. BlueView customers enjoy a low cost of ownership with reliable operation, exceptional service, in-person training, extensive online information, and worldwide after-sale support.

For more information visit www.blueview.com.



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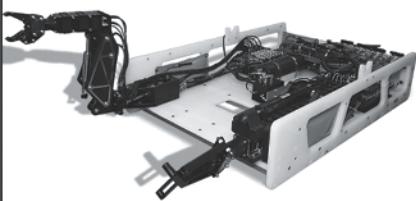


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Product News

Sensornet launches FireLaser™ heat detection system

Sensornet, the global provider of the most advanced monitoring solutions and part of Tendeka, has announced the launch of its FireLaser™ linear heat detection system that was specifically designed for fire hazard detection applications.

The FireLaser™ connects to a fiber optic cable and determines temperature and distance data at thousands of points along its length. The fiber optic cable is installed within the asset to be protected, acting as the temperature sensor.

The FireLaser™ can detect a hotspot on the cable up to 4-km. It can precisely monitor the development of hotspots to within 1 meter and provides a significantly superior and cost-effective fire detection solution to the traditional copper-based multipoint linear heat detection alternatives.

The highly sensitive fiber optic cable, which is suitable for use in hazardous conditions, can detect changes of temperatures of less than 1 degree centigrade in three seconds.

Jerry Worsley, Vice President Industrial Monitoring, of Sensornet, said, "The technology behind the system, which has been used in the oil and gas industry for several years, is highly reliable and embedded, and the system is extremely flexible for use in distributed architectures."

For more information, visit www.sensornet.co.uk" www.sensornet.co.uk.

Hydroid, Inc. integrates Kongsberg Maritime's HiPAP system with REMUS AUVs

Hydroid, Inc., a subsidiary of Kongsberg Maritime, announced that it will offer the integration of Kongsberg Maritime's High Precision Acoustic Positioning (HiPAP) system into its family of REMUS AUVs. The HiPAP system will provide REMUS users a faster, more accurate way to obtain a vehicle's exact position and update the vehicle's navigation system.

The REMUS navigation system currently provides an accurate, real-time estimate of its position, velocity, and heading, which permits the vehicle to autonomously self-navigate and geographically reference and time stamp all data collected during a mission. If desired, the onboard navigation system may be aided by acoustic transponders that are located on the seafloor, or, in shallow waters, aiding may be provided by surfacing and obtaining a position update using the Global Positioning System (GPS).

Kongsberg Maritime's HiPAP provides an additional means of aiding REMUS's navigation system by transmitting an independently established location, which is calculated by the HiPAP system on the surface and then sent to the submerged REMUS vehicle over an acoustic communication link.

The HiPAP information is used either to track the vehicle or to update and bind the vehicle's position if it is accurately time-stamped over the acoustic communication link. HiPAP's unique transducer technology and advanced digital signal processing form an ideal solution for obtaining an AUV's exact position at any time when it's in range of the ship.

The components of a HiPAP positioning system required to support REMUS consist of the vessel-mounted spherical acoustic array, the HiPAP processor, and a subsea transducer mounted on the REMUS vehicle.

HiPAP technology is currently in use with Kongsberg Maritime's HUGIN family of AUVs and is being transitioned to Hydroid's REMUS.

New Imenco Shark product line

Imenco's subsea cameras range has been reviewed and optimized. And, as a tribute to the different sharks around the world and they have been renamed accordingly.



The shark image stands for strong, fast, tough, aesthetics, superior, efficient, discreet and longevity. The Shark Range consists of reliable, robust subsea cameras, lights and lasers, constructed from high quality components and materials, ensuring clear, sharp results and durability. It has also added three new cameras to the range, the new Tiger, the Lizard and the Dusky laser; this gives our customers a wider range of products to suit every job.

For every Shark Range camera sold, Imenco will donate \$10 to the Project AWARE Foundation, a non-profit organization that works in partnership with divers and water enthusiasts to combat challenges facing underwater environments.

For more information, please visit www.imenco.com.

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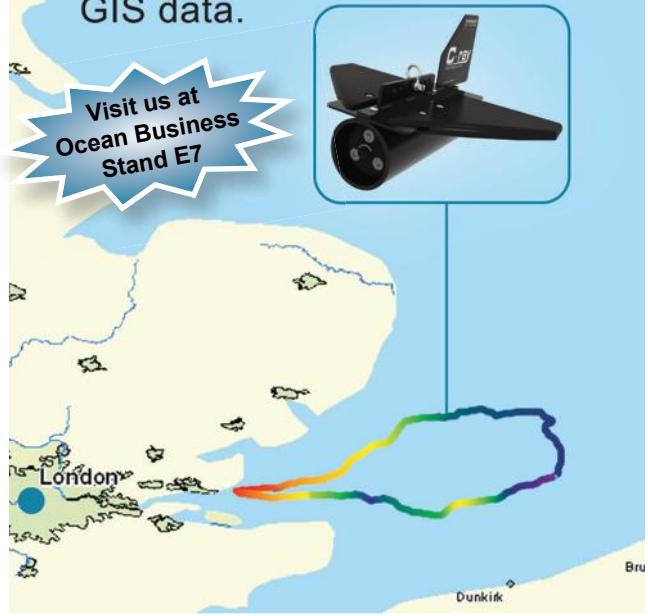
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"I was recently contracted to conduct a video inspection of the fuel tanks of the scuttled SS Pasley, now part of the International Terminal, Port of Newport, Oregon. I was also swiping various sections of the tanks with an oil absorbent material to see if any oil was present and to take samples of the water and material for further analysis."



At first we weren't using the LYYN because everything was crystal clear... It didn't take long for the sediment and silt to get stirred up. That's when the LYYN became invaluable!

Because of the Lynnified video documentation the Port of Newport was able to convince the Department of Natural Resources that the SS Pasley posed no risk of an oil spill, saving the Port hundreds of thousands of dollars."

Read this case on
www.lyyn.com/craig



Product News

Scripps chooses HYDRINS for Roger Revelle

The Scripps Institution of Oceanography, based in San Diego, California, has chosen IXSEA technology for a key aspect of its marine survey activities.

The Institute has fitted a HYDRINS inertial navigation system (INS) to its research vessel Roger Revelle to provide information about the motion and position of the vessel when gathering multi-beam sonar data.

Based on fiber-optic gyroscope technology, HYDRINS is a compact, high-performance INS that has been optimized for use in conjunction with multibeam echosounding equipment. Designed to cope effectively with GPS drop-outs and multipath effects, it delivers accurate position, attitude, and velocity data in real time.

Alternatively, HYDRINS raw data can be post-processed using IXSEA's purpose-designed DELPH INS software.

Rick Morton, IXSEA's North American Sales Manager-Geosciences, said "This is repeat business with one of the world's best-known oceanographic organisations. The new HYDRINS is a replacement for an earlier unit and incorporates several subtle performance enhancements — the result of a continuing equipment development program at IXSEA. On this occasion, the unit was supplied by our sales agent in California, Ocean Innovations."

For more information, visit www.ixsea.com.

Hemisphere GPS announces compact all-in-one Vector GPS compass products

Hemisphere GPS announced the release of two very compact GPS compass products: the V102™ all-in-one and the H102™ OEM module. These products are ideal where heading and positioning are needed for marine and land-based applications, such as yacht navigation, auto-pilot, and machine guidance for earthmoving machinery. V102 is the market's smallest, single-enclosure GPS compass and positioning system, while the H102 OEM board, found in the V102, is the market's smallest fully-integrated single board GPS compass that provides a low-cost yet highly accurate solution for integrators.

Based on Hemisphere GPS' successful Crescent Vector II technology, V102 and H102 provide 0.75 degree heading accuracy while supporting the NMEA 0183 communications format. In addition, H102 supports the NMEA 2000 standardized data communication bus. The stable and maintenance-free design of V102 provides robust GPS positioning and heading, and its small size allows users to easily mount the unit and get up and running quickly. Both V102 and H102 include the Crescent Vector II GPS receiver, two GPS antennas, a single axis gyro, and two tilt sensors providing pitch, roll and heave measurements all on a single board to provide precise heading and better than sub-meter position accuracy, even while stationary.

For more information, visit www.hemispherengps.com.

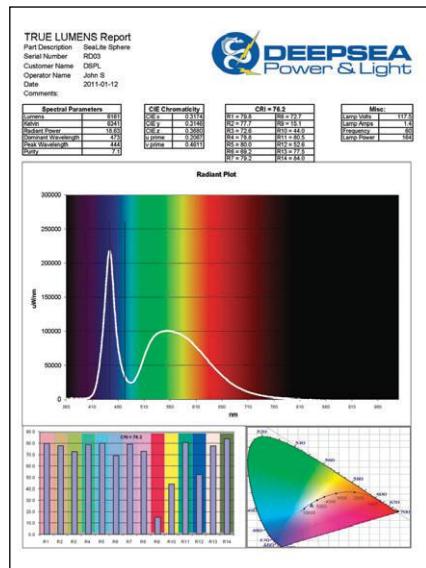
TRUE LUMENS — accurate lighting data guaranteed

DeepSea Power & Light has introduced the TRUE LUMENS reporting program to provide accurate data to underwater lighting users.

In the day of the halogen light, it was common for underwater light manufacturers to simply repeat the light output data published by the manufacturers of the halogen lamps themselves when specifying the light output of their own light assembly. This practice didn't take into account several factors, including reflector performance or light absorption by a pressure window. Now, the same practice is being extended to LED lights whereby manufacturers are simply taking the specs for a single LED as provided by the LED manufacturer and multiplying it by the number of LEDs included in the light assembly. This ignores the same reflector and window considerations as well as factors unique to the performance of the LED drivers and overstates the output of the light.

Since 2006, DeepSea Power & Light has been using an integrating sphere manufactured by SphereOptics and calibrated to standards traceable to the National Institute of Standards and Technology to accurately measure the output of its lights as well as providing this service to other light manufacturers. Early in the development cycle of LED lights, it became clear that many of the specs published by competitive manufacturers of underwater LED lights were over-stated compared to what was actually being achieved by those products.

DeepSea purchased some of the leading competitive lights and measured their output using the integrating sphere. The competitors' light output claims were 70% to 90% above actual measurements, and none came close to the actual light output of DeepSea's comparable LED lights. DeepSea then sent competitive lights as well as its own lights to an independent optical lab. The results were the same - the competitors' light outputs were grossly overstated in their specs and none came close to the actual output of DeepSea's comparable LED lights.



To ensure that users have an honest idea of what to expect from the output of its SeaLite® Sphere lights, DeepSea is supplying a TRUE LUMENS report as measured by its integrating sphere with every SeaLite® Sphere light that it ships for the next 3 months. In addition to the lumen output, the TRUE LUMENS report also provides data about other spectral parameters, including dominant and peak wavelength, CIE chromaticity, and Color Rendering Index.

To learn more about DeepSea's optical measurement services and the SeaLite® Sphere light, visit www.deepsea.com.

Ocean Signal confirms certification approvals

Ocean Signal, the marine communication and safety specialist, will commence the first deliveries of its highly acclaimed SafeSea products this month following receipt of approvals for usage in worldwide markets. The SafeSea EPIRB and SART products have been given the Marine Equipment Directive (MED) Wheelmark certification for Europe, which applies to both leisure and commercial shipping, together with Federal Communications Commission (FCC) approval for all classes of vessels, including SOLAS ships.

Following an enthusiastic reception throughout Europe at shipping and boat shows, the company is now able to commence delivery to its customer base with confirmation that manufacture will continue in the UK.



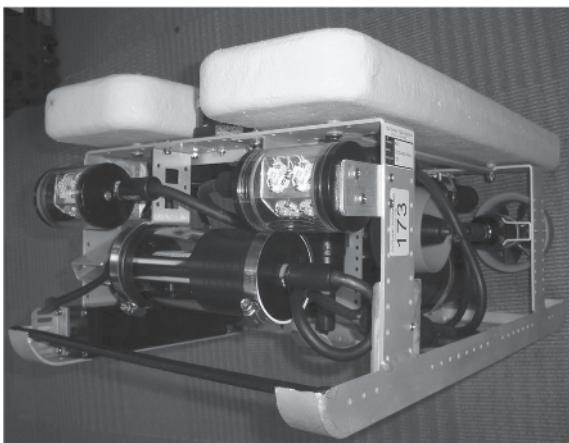
Despite the possibility of some lower costs in Far East manufacture, Managing Director Alan Wrigley is determined to maintain high quality and flexibility of supply, "We have considered manufacturing elsewhere, but we have exceptional expertise here in the UK, and I am determined to deliver our promise that the SafeSea range will be built to the highest quality essential for this critical market. This means we need to control that quality at every stage of production. This is not possible if we manufacture elsewhere. We have gone through a process of exhaustive development and testing over the past year, and we are confident that we have a very special range of products. Manufacturing here also allows us to continue our programme of new product development and bring those new products to market much quicker."

Since its launch in early 2010, Ocean Signal has built a network of dealers throughout Europe that is expanding continuously in both the leisure and commercial marine markets.

For more information, visit, www.oceansignal.com.



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Product News

4125 side scan sonar video release

EdgeTech (an affiliate of ORE Offshore) has announced the release of its 4125 side scan sonar video and YouTube Channel.

This video was created as an educational and promotional tool to highlight the advanced characteristics of the new 4125 Side Scan Sonar. EdgeTech invites you to view this short video at www.youtube.com/EdgeTechMarine.

SubSea Engineering Pte Ltd releases the SSE-AV14

The SSE-AV14 is a multi-channel video overlay based on the advanced Intel Atom processing platform and leading video editing technology from TVOne, configurable from 1 to 4 channels. The overlay superimposes PC generated text and graphics onto live composite video.

It is running Subsea Engineering's custom overlay software under the Windows XP Embedded (OEM) operating system. The information to be superimposed can be dynamic, such as time, date, or any incoming data via serial or analogue ports, as well as static information such as text and pictures.

The user interface is simple and intuitive, no special skills are required to operate the overlay software. Every function except text entry is performed via the mouse with a simple "point and click" operation. Data positioning on the overlay screen is done by dragging and dropping. The information can be resized dynamically live on screen using the mouse. Data can be aligned live on the screen either by a simple mouse function or via a grid that can be superimposed behind the data.

The two serial data inputs automatically have the data stripped out of the string(s) and displayed in a table format to enable a simple "point and click" with the mouse to select and display the data on the overlay. The serial output port allows any of the incoming serial data to be selected and output from the overlay via the same simple "point and click" action.

For more information visit www.subeng.com.

Sound Metrics announces record sales of its imaging sonars in 2010

After a year that saw massive underwater projects like the capping of the Gulf Coast oil spill and the continued development of offshore energy solutions, it's not surprising that demand for imaging sonars has reached an all-time high. Even more surprising are the new applications other industries are finding for these tools.

Around the world, a growing number of industries, including search and recovery, fisheries management, and even underwater construction, are turning to Sound Metrics imaging sonars to achieve results that were previously out of reach. Or at least out of sight.

"Our products allow people to do things they couldn't do before: they provide the ability to 'see' through water that is essentially opaque," said Joe Burch, co-founder and president of Sound Metrics. "Underwater professionals look for the most clarity they can get, and our products have been increasingly well received. In 2009, our sales were up 41%. Last year, that number increased by 52%."

In May of 2010, Sound Metrics agreed to deliver 20 diver-held sonars to the U.S. Air Force's CSAR Guardian Angel Team to aid with search and recovery operations. Delivery was expedited so that these mission-critical tools could be deployed by teams as soon as possible.

"Our sonars are used in a lot of different places for a wide range of applications — monitoring the laying of oil pipe off the coast of Mexico, assessing hurricane damage to bridges in Texas, assisting with victim recovery in Florence, Italy," said Burch. "But what they all have in common is that the operation's success or failure relies on whether or not they have good, clear data."

For more information, visit www.soundmetrics.com.

WFS delivers revolutionary remote control solution to WaveJet Personal Water Propulsion Systems

WFS Defense and WFS Technologies, world leading suppliers of through-water wireless using radio frequency (RF) technology for communication and navigation, have completed delivery of handheld wireless remote control systems to WaveJet Technologies.



WaveJet Technologies of Santee, Ca. has recently introduced a series of Personal Water Propulsion (PWP) Surfboards, Stand Up Paddleboards (SUPs), and Water Rescue Boards. Powered by the patented WaveJet PWP pod, surfing's first miniaturized jet drive technology, the boards make 8 to 10 knots on still water, which is 3 to 5 times faster than paddling. The WaveJet PWP pod is designed for use in an open variety of boards and personal watercraft from kayaks and kiteboards to small watercraft and SCUBA diving. WaveJet technology is a quiet, safe, and green alternative to outboard motors and other external power sources.

WFS' patented through-water radio technology provides a revolutionary and reliable remote control solution that maintains two-way communications between the operator and WaveJet's PWP pod. The rider has the ability to control the propulsion system with the touch of a button on the custom-designed wristband. The system not only allows positive operator control, but it also senses if the rider has fallen off the personal watercraft and will command an engine shutdown.

For more information, visit www.wfs-tech.com.

Surfacesupplied launches high-energy density underwater batteries

Surfacesupplied, a subsea technology startup, has announced availability of their innovative THOR submersible battery pack. It allows saturation diving system manufacturers and operators to add increased energy to existing diving bell battery housings. This product is the only lithium-polymer battery pack designed specifically for mounting and integration on diving bells and Hyperbaric Rescue Chambers (HRCs).

With an increase of 4 times the energy density over competitors products, the THOR battery pack contains 124Wh/Kg over the traditional 29Wh/Kg provided by lead-acid packs. In practical application, the increase of energy allows manufacturers and operators with comfort in knowing that should an emergency situation arise and main power is lost to the diving bell, there is enough energy available to continue operation with as much of the self-contained bell equipment as necessary for upwards of 96 hours.

Company Executive Vice President Jason Van der Schyff says, "The beauty of THOR lies in the ability to provide a substantial increase of energy in a relatively inexpensive module. We've worked hard on ensuring retrofit-ability for the existing battery pack housings on the market, and with such an increase in energy equating to an increase in diver safety, we're hoping to see manufacturers and operators get on board and behind this new product."

Surfacesupplied has recently submitted designs to Lloyd's Registry for the approval of a range custom-designed pressure vessels in which to house an upcoming range of smaller THOR packs. These pressure vessels will allow the replacement of older style battery packs with smaller, lighter, yet energy-equivalent lithium-polymer packs. It is expected that approval of the designs along with Type Approval, will be granted mid 2011.

For more information, visit www.surfacesupplied.com.

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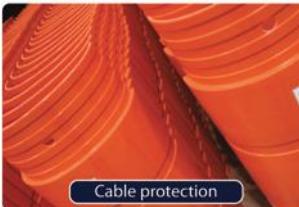
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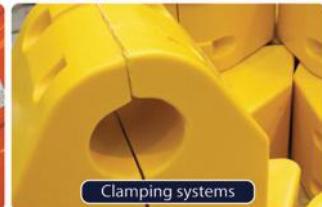
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Bend stiffeners/restrictors



Cable protection



Clamping systems

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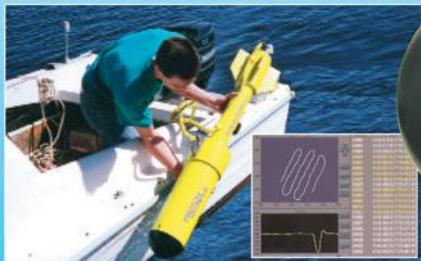
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Calendar

March 14-18, 2011:
5th EGO Meeting/Glider School
Telde, Gran Canaria, Spain
www.ego2011.plocan.eu

March 15-16, 2011:
3rd Annual Decommissioning &Abandonment Summit
Houston, TX
www.eyeforenergy.com

March 16-18, 2011:
NortekUSA Technical Symposium
Newport, RI
www.nortekusa.com

March 28-30, 2011:
MCE Deepwater Development 2011
London, UK
www.MCDEE.com

April 5-7, 2011:
Ocean Business
Southampton, UK
www.oceanbusiness.com

April 25-29, 2011:
U.S. Hydro 2011
Tampa, FL
www.hydrographicsociety.org

May 2-5, 2011:
Offshore Technology Conference
Houston, TX
www.otcnet.org/2011

May 4-5, 2011:
Maritime & Transportation Security
Baltimore, MD
www.maritimessecurityexpo.com

June 6-9, 2011:
Oceans '11 IEEE
Spain
www.oceans11/ieeesantander.org

June 7-9, 2011
UDT
London ExCel, UK
www.udt-europe.com

June 14-16, 2011:
Seawork International
Southampton, UK
www.seawork.com

June 14-16, 2011:
EnergyOcean 2011
Portland, Maine
www.energyocean.com

June 27-29, 2011:
MAST Europe
Marseille, France
www.mastconfex.com

September 19-22, 2011:
Oceans 2011
Kona, Hawaii
www.oceans11mtsieekona.org

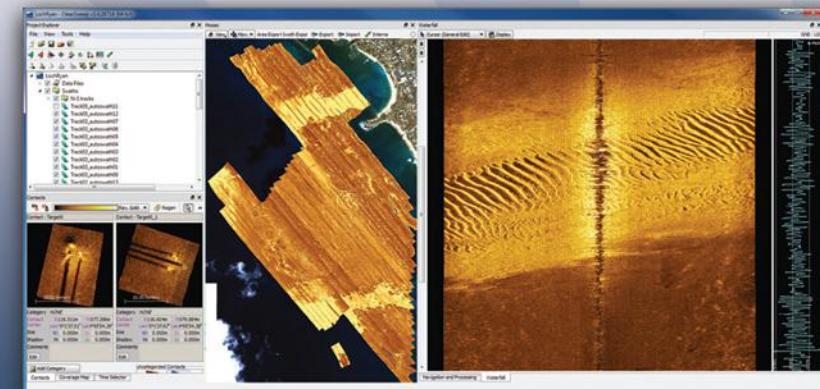
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- ◆ Underwater acoustics and associated processing
- ◆ Ocean and coastal observing systems, platforms and instrumentation
- ◆ Remote sensing of air/ocean surface
- ◆ Ocean data visualization, modelling and information management
- ◆ Marine environment, oceanography and meteorology
- ◆ Optics, imaging, vision and e-m systems
- ◆ Marine and Coastal law, policy, management and education
- ◆ Naval and Offshore structures and technology
- ◆ Ocean vehicles and floating structures

The Special Topics of the OCEANS '11 IEEE Santander are:

- ◆ Marine renewable energy
- ◆ Marine communications and technology
- ◆ Climate change
- ◆ Marine life and ecosystems
- ◆ Ocean sequestration of carbon dioxide
- ◆ Coastal engineering
- ◆ Estuarine systems
- ◆ Marine aquaculture and fishing
- ◆ Coastal hazards
- ◆ Desalination
- ◆ Oil Spill
- ◆ Electronic Warfare Technology & Equipment
- ◆ Onboard electronics.
- ◆ E-learning

www.oceans11ieeesantander.org

For further information, please do not hesitate to visit the conference website www.oceans11ieeesantander.org and feel free to contact the Conference's Secretariat.

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- * Aquaculture: Tools and Techniques
- * Ocean Energy: Renewable Energy for the Future
- * Ocean Exploration: Science and Technology Frontiers in the Pacific
- * Ocean Pollution: Environmental Management in the Global Ocean
- * Ocean Acidification: Ocean Chemistry in a Changing World
- * Long Time Series Observation: From the Keeling Curve to HOTS
- * Marine National Monuments: Marine Stewardship for the 21st Century
- * Partnerships across the Pacific: Collaborative Ocean Research
- * Marine Geology and Geophysics: The Science of New Pacific Islands
- * Maritime Security: Preparedness, Response and Recovery for the Marine Environment

Important Dates

Abstract Deadline: 22 April 2011
Final Paper Deadline: 15 July 2011
Early Bird Rooms: 01 August 2011
Online Registration: Mid-April 2011
More information on our website:
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People & Company News

BMT Group Ltd, the leading international maritime design, engineering and risk management consultancy is set to broaden its capabilities in the Asia-Pacific region with the successful acquisition of port and harbour engineering specialists, JFA Consultants Pty Ltd based in Perth, Western Australia.

ABS President and Chief Operating Officer **Christopher J. Wiernicki** will assume the duties of Chief Executive Officer of ABS following the classification society's annual meeting in April 2011. Robert D. Somerville, currently Chairman and CEO of ABS, will relinquish the CEO responsibilities while remaining Chairman of both ABS and the ABS Group of Companies.

ACE Winches has appointed **Håvard Sæverud** as country manager of its Norwegian division, ACE Winches Norge AS, operating from its base in Dusavik, Stavanger.

Leading marine equipment rental company **Ashtead Technology** announces its appointment as exclusive Global Rental Representative, within the Oil and Gas sector, for Vortex International Ltd for the rental of the Vortex Dredge Unit. The most powerful 4-inch ROV and diver dredge unit in the world (40 to 50 ton / hr), the Vortex has removal rate performance more commonly seen in 6-inch dredges.

BIRNS, Inc., an ISO 9001:2008-certified global leader in the design and manufacturing of high-performance lighting and connector systems for deep ocean, marine, military, and nuclear power applications, has launched an all-new interactive website www.birns.com. The new site features highly sophisticated technical and performance data; compelling, professional product and in-use images, and seamless navigation tools.

Emily Farquhar, who has more than 30 years of geophysics experience, has been named President of Fugro Gravity & Magnetic Services. Fugro Gravity & Magnetic Services is a leading provider of potential field products and services for oil and gas exploration. The company acquires, processes and interprets magnetic (susceptibility), gravity (density) and electromagnetic (resistivity) data on land, sea and in the air. In addition, **Lucy Plant** has been named International Marketing Manager at Fugro Multi Client Services, Sverre Berstad, Exploration Manager for East Africa, Middle East and Russia.

Aubrey Price, Executive Director of C&C Technologies (South Africa), has been elected Chairman of the six-member International Federation of Hydrographic Societies (IFHS) in succession to William Heaps, Assistant Marine Advisor & Hydrographic Manager of Associated British Ports (ABP); also elected, as Vice-Chairman, is **Holger Klindt**, Chairman of The German Hydrographic Society (Deutsche Hydrographische Gesellschaft).

Nautronix has announced the appointment of **David Cassie** as Director of Strategy. Cassie, formerly Executive Vice President – Commercial at Subsea 7 brings a wealth of industry experience to the company. He will consult on a part time basis promoting Nautronix and its unique technology in subsea positioning and communication.

OceanWorks welcomes **Lisa Medeiros** as Business Development Manager. Acting as Business

Development Manager for the offshore oil and gas industry, her primary function will be to expand OceanWorks' penetration of the offshore oil and gas market by raising awareness of the company's proven custom engineering, standard products, and service capabilities. Medeiros brings over 15 years of offshore and marine industry experience and has been an active member of the subsea technology community. She has served on the board of the Marine Technology Society and Hydrographic Society, and is currently serving on the OTC Program Committee.

Measutronics Corporation has opened a new office in Seattle, WA. Headquartered in Lakeland, FL, Measutronics specializes in the integration and sales of positioning and sonar equipment for marine construction, hydrographic surveying, dredging, and structure monitoring.

RBR a leading provider of products and services to the water quality and oceanographic markets announces the appointment of **Sea and Land Technologies (SALT)** as the exclusive representative for RBR in the ASEAN economic area.

Bluefin Robotics Corporation has announced a regional partnership with **International Industries, Inc. (III)**, provider of marine, hydrographic and survey equipment and software. Headquartered in Annapolis, Maryland, III will promote and sell Bluefin products. The agreement highlights the emergence and maturity of AUVs as a cost-effective and capable tool for use in a variety of subsea engineering projects.



Farquhar



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Chevron Corp. is making a series of senior management moves in key corporate and upstream leadership positions, effective March 1. **James Blackwell** was named executive vice president, technology and services. Blackwell, who has been with the company since 1980, is currently president, Chevron Asia Pacific Exploration and Production Co. **Rhonda Zygocki** was named executive vice president, policy and planning. Zygocki, 53, is currently vice president, policy, government and public affairs. **John Bethancourt**, executive vice president, technology and services, elected to retire after 36 years of service. Bethancourt, 59, will stay with the company through June to assist in the transition of his duties. In other corporate officer moves, **Steve Green**, 53, managing director for the company's IndoAsia business unit in the international upstream business, will become vice president, policy, government and public Affairs. **Wes Lohec**, 51, managing director, Latin America business unit in the international upstream will become vice president, health, environment and safety. **Chuck Taylor**, 53, vice president, health, environment and safety, will become vice president, strategic planning. Taylor succeeds **Paul Siegele**, 51, who is being appointed, president, Chevron Energy Technology Co.

Fluor Corp. said the company's board of directors elected **David T. Seaton** to the position of chief executive officer and company director, consistent with a transition plan previously announced. Seaton, 49, succeeds **Alan L. Boeckmann**, who retires as CEO. Boeckmann will continue to serve the company as the non-executive chairman of Fluor's board of directors. Seaton becomes Fluor's 12th chief executive in the company's nearly 100-year history. He joined Fluor in 1984. Prior to his appointment as CEO, he served as chief operating officer beginning in Nov. 2009. Seaton also served as senior group president overseeing the company's energy and chemicals, power, and government groups, as well as for Fluor's activities in China and the Middle East. He was also the managing director of Fluor Arabia Ltd., and led the company's global sales function.

W&T Offshore, Inc. appointed **Jesus G. Melendrez** as senior vice president and chief commercial officer. From 2003 to 2010, Melendrez worked at Mariner

Energy, Inc. and served in a variety of positions of increasing responsibility, culminating as senior vice president and chief commercial officer and acting chief financial officer and treasurer. From Feb. 2000 until July 2003, Melendrez was a vice president of Enron North America Corp. in the energy capital resources group, where he managed the group's portfolio of oil and gas investments.

Oilfield services company Reservoir Group has established an engineering office in the heart of Continental Europe to further harness its global expertise in the downhole drilling, completion and production sectors and to complement its strong presence in Aberdeen, Scotland. Technical Director **Philippe Cravatte** will lead the team. The new premises at Weiswampach, north Luxembourg, will act as the hub for Reservoir's specialist team of design engineers and reinforces their support to Reservoir Group's growing cast of companies and clients around the world.

Atwood Oceanics, Inc., a Houston-based international drilling contractor, said **Arthur McGinnis (Mac) Polhamus** was appointed vice president, operations, and will be the principal operating officer of the company. Polhamus comes to Atwood after nearly 16 years at Transocean in positions of increasing general management and operations responsibility involving both deepwater and shallow water drilling rigs. Polhamus most recently held the position of managing director, West Africa South, with oversight for offshore drilling operations in Angola, Gabon and Congo.

Northern Offshore, Ltd. said **Gary L. Bauer** joined the company as senior vice president, operations. Bauer has more than 35 years experience in the drilling industry, culminating with his most recent position as division manager, Egypt and Middle East for Transocean. In that position, Bauer was responsible for operations, business development and the financial performance of 17 rigs in numerous regions.

Helix Energy Solutions Group, Inc. said **Bart Heijermans** resigned as executive vice president and chief operating officer. Heijermans' duties will be assumed by **Owen Kratz** and other members of senior management. Kratz, Helix's president and chief executive officer, said "Since Bart joined the com-

pany in 2005, he has played a prominent role in developing Helix's contracting services business. Under Bart's tenure with Helix, the company added three new vessels to its fleet and expanded its international contracting."

Offshore Hydrocarbon Mapping plc appointed Michael Frenkel as vice president of research and development, based in Houston, Texas. Previously Frenkel was vice president of geosciences at EMGS Americas. During the last three years, Frenkel has been managing a spectrum of large-scale marine CSEM exploration projects and also served as a co-chair of the non-seismic committee of SEAM (SEG Advanced Modeling Corp.). While working at the Houston Technology Center of Baker Hughes from 1992 to 2007, he led research and development of cutting-edge well logging data acquisition and inversion-based interpretation technologies. In the 80s, Frenkel published pioneering works in the areas of CSEM data processing and subsurface imaging, which advanced the idea of back propagating or migrating the scattered EM field.

Apache Corp. elected **Chansoo Joung**, a senior advisor at Warburg Pincus LLC, and **Scott Josey**, former chairman and chief executive officer of Mariner Energy, to its board of directors. Joung, who joined Warburg Pincus in 2005, provides advice on new and existing investments in the energy sector for the firm. Previously, he was an investment banker at Goldman Sachs for nearly 18 years. He headed the firm's Americas Natural Resources Group from 1999 to 2004. Josey served as chairman of the board and chief executive officer of Mariner Energy from Aug. 2001 until Nov. 2010, when it merged with Apache.

Walter K. Compton was promoted to senior vice president and general counsel of Murphy Oil Corp., and **John A. Moore** was promoted to manager, law and will assume the role of corporate secretary. These promotions are concurrent with the retirement of **Steven A. Cossé**, effective March 1. Compton joined the law department at Murphy in 1988 and was promoted to attorney four years later. In 1996, he was promoted to manager, law and corporate secretary. He was named vice president, law in 2009. Moore joined Murphy in 1995 as associate attorney in the law department. In 1998, he was promoted to attorney. He was promoted several times within that position before being named senior attorney in 2005.



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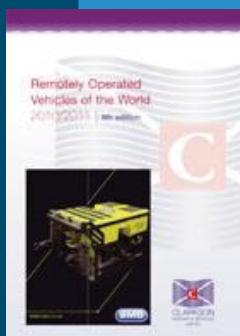
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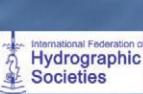
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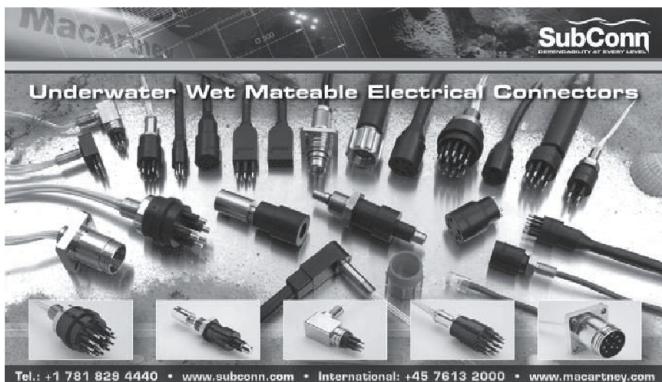
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E-mail: rmulcahy@conshelf.com
Website: www.csaintl.com
Contact: Bob Mulcahy

CSA International, 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, freshwater, and terrestrial environments.

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Website: www.km.kongsberg.com/seatek
Contact: Finn Otto Sanne
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Kongsberg Seatek 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.



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E-mail: tsssales@teledyne.com
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OCEANOGRAPHIC INSTRUMENTS



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Sea-Bird Electronics, Inc.

13431 NE 20th St., Bellevue, WA 98005

Tel: 425-643-9866, Fax: 425-643-9954

E-mail: baldur@star-oddi.com

Website: http://www.seabird.com

Contact: Debbie Bresko

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STAR:ODDI

Vatnargardar 14, 104 Reykjavik, Iceland

Tel: +354 533 6060, Fax: +354 533 6069

E-mail: baldur@star-oddi.com

Website: http://www.star-oddi.com

Contact: Baldur Sigurgeirsson

A manufacturer of miniature data loggers with sensors as temperature, depth/pressure, salinity, compass, magnetometer, acoustic receiver, tilt in 3-D, pitch and roll. The small loggers are used for various researches, including oceanography, fisheries research, fishing gear studies, equipment behavioral monitoring and fish tagging. Data is presented in graphs and tables in the application software along with time and date of each measurement.



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E-mail: ci@channeltech.com;
Website: www.channelindustries.com
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<http://deepsea.com/pressure.html>

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MaRE Trans. Ltd.

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E-mail: sales@m-re.com
Website: www.m-re.com
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MaRE provides an International Brokerage and Equipment Sourcing service to the underwater industry. We are the world's leading source of used ROV systems and components. "DeepSearch", a free-issue database, is distributed monthly highlighting used ROVs and associated equipment for sale worldwide. Our Procurement department offers an equipment and spares sourcing service which complements the brokerage side of the business. MaRE also provides Consultancy on all aspects of remote underwater technology.

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Imagenex Technology Corp.

209-1875 Broadway St., Port Coquitlam
BC, Canada, V3C 4Z1
Tel: (604) 944-8248, Fax: (604) 944-8249
E-mail: imagenex@shaw.ca
Website: www.imagenex.com
Contact: Steve Curnew

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

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Marine Sonic Technology, Ltd. builds high quality, high resolution

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M. Rockwood, sales/marketing

Sound Engineering Solutions – Sonatech, A Division of Channel Technologies Group (CTG) develops innovative solutions for underwater acoustic applications. Existing technologies span a wide variety of acoustic systems, including sonar systems, navigation systems, and custom acoustic solutions. Our solutions are based on a 36-year career of developing high-performance, high-reliability undersea systems that are continually improved through research and development.

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Website: www.saivas.no
Contact: Gunnar Sagstad

- STD/CTD, Sound Velocity probes/recorder with optional multi-parameter facilities; Turbidity, Fluorescence, Oxygen etc.
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Hydracon Company Inc

Anaheim, CA USA
Tel: 1 714 281 2460, Fax: 1 714 281 1199
E-mail: alex@hydracon.com
Website: www.hydracon.com
Contact: Alex

Hydracon manufactures custom underwater devices. Examples include: switches proven worthy to NAVSEA testing and capable to 10,000 psi ambient, scuttle valves used on AUVs. "New Technology" switches feature abundant overtravel, fast response, low hysteresis, high reliability. Applications: Naval Defense, Power facilities, Deepwater Oil & Gas, Dredge systems. Many products are shown on the web site www.hydracon.com



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

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

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International Transducer Corp.

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E-mail: sales@ite-transducers.com
Website: www.ite-transducers.com.com
K. Ruelas, pres.; Art Campbell, v.p.; Jon Monroe, sales & mktg.; E. Kuntsal, eng. mgr.

The Science of Sound Performance – ITC, a Division of Channel Technologies Group (CTG), designs and manufactures both custom and off-the-shelf underwater, air, and ultrasonic acoustic transducers, projectors, hydrophones, hydrophone/preamp, side-scan arrays, OEM and end-item products for commercial and military applications.

UNDERWATER THICKNESS GAUGES



Cygnus Instruments, Inc.
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Tel: (410) 267 9771
Fax: (410) 268 2013
E-mail: sales@cygnusinstruments.com
Website: www.cygnusinstruments.com
Contact: Rod Sanders

Cygnus manufactures the world's first true multiple echo ultrasonic thickness gauge. Multiple echo means that coatings, such as paint or epoxy, do not have to be removed in order to measure the steel. We offer hand held gauges that divers take into the water. Also have models that can communicate topside to a display repeater or PC. Also offer a range of shallow to deepwater units for ROVs. Manufacturing to ISO 9002 standards. Approved by classification societies.

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UNDERWATER VEHICLES

ROVs



Perry Slingsby
10642 West Little York, Suite 100
Houston, TX 77041
Tel: 713-329-8230, Fax: 713-329-8299
E-mail: pss@perrymail.com
Website: www.f-e-t.com

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



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Website: www.SeaBotix.com

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



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Houston, Tx, 77041-4014, USA
Tel: +1 713 329 8730, Fax: +1 713 329 8299
E-mail: sales@sub-atlantic.com
Website: www.f-e-t.com

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Submersible Systems Inc.
333 Progress Road
PO Box 1843
Patterson, LA 70392
Tel: 985 395 0996
Fax: 985 395 0995
Website: www.ssirovs.com
Contact: Wolfgang Burnside

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Tel: (610) 458 3000, Fax: (610) 458 3010
E-mail: brian.luzzi@videoray.com
Website: www.videoray.com
Contact: Brian Luzzi

VideoRay, the global leader in Micro-ROV technology has

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UUVs



iRobot®

iRobot Corporation | Maritime Systems

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E-mail: frochleder@irobot.com
Website: www.irobot.com
Contact: Friedrich Rochleder, Sales Account Manager

iRobot designs and builds robots that make a difference. iRobot's family of unmanned underwater vehicles (UUVs), including the iRobot IKA Seaglider and iRobot 15A Ranger, perform a variety of missions for researchers, oceanographers and military planners including physical, chemical and biological oceanography, persistent surveillance, marine environmental monitoring and other missions.

UNDERWATER VIDEO EQUIPMENT



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KONGSBERG

E-mail: km.camsales.uk@kongsberg.com
Website: www.kongsbergmaritime.com
Contact: Bill Stuart

Kongsberg Maritimes Camera Division in the UK has been designing and manufacturing underwater cameras for over 30 years and is the recognized market leader in supplying underwater imaging technology to the offshore oilfield industry. It also has a 20-year history in supplying the international naval defense sector, with special camera systems.

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SIDUS Solutions, Inc. is an integrated systems provider for security and video surveillance systems specializing in customization. Our products are operational to sub-

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WINCHES, HANDLING & CONTROL SYSTEMS



Hawboldt Industries

220 Windsor Road
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Contact: Brian Abel

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2011 EDITORIAL CALENDAR

January/February

Editorial: Inspection & Light Work Class ROVs, Offshore IRM

Distribution: Underwater Intervention

Deadline: January 14th

Product Focus: Diving Equipment & Buoyancy Materials

March

Editorial: Defense & Naval Systems, Oceanography & Meteorology

Distribution: NACE • Future Naval Forces • Ocean Business • Offshore Survey

Deadline: February 18th

Product Focus: Navigation, Mapping & Signal Processing; U/W Batteries

April

Editorial: Offshore Technology, Maritime Security

Distribution: U.S. Hydro • OTC • Maritime Security Expo-EJ Kraus

Deadline: March 11th

Product Focus: Connectors, Cables & Umbilicals

May

Editorial: AUVs & Gliders, U/W Imaging & Processing

Distribution: Oceans '11 IEEE Spain • UDT Europe

Deadline: April 15

Product Focus: Cameras, Lights & Imaging Sonars

June

Editorial: Ocean Renewables, Ocean Observing Systems

Distribution: EnergyOcean11 • Sea Work Int'l • MAST France

Deadline: May 13th

Product Focus: Tracking & Positioning Systems

July

Editorial: Work Class ROVs, Subsea Fiber Optic Networks

Deadline: June 17th

Product Focus: Subsea Tools & Manipulators

August

Editorial: Coastal Engineering, Aquaculture & Marine Resources

Distribution: AUVSI • Offshore Europe • Oceans MTS/IEEE

Deadline: July 15th

Product Focus: Buoys & Monitoring Instrumentation

September

Editorial: Offshore Wind

Distribution: OTC Brasil • AWEA/Offshore Wind • MTS Dynamic Positioning

Deadline: August 19th

Product Focus: Multibeam & Side Scan Sonars

October

Editorial: Offshore Communications, Environmental Assessment & Monitoring

Distribution: LAGCOE • SPE-ACTE • Offshore Communications

• MAST Americas • Clean Gulf • International Workboat

Deadline: September 16th

Product Focus: Acoustic Modems, Releases & Transponders

November/December

Editorial: Ocean Mapping & Survey, Subsea Telecom

Distribution: Subsea Survey/IRM

Deadline: October 28th

Product Focus: Workboats & Special Purpose Subsea Vehicles

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- D. RESEARCH & DEVELOPMENT
- E. OCEAN INSTRUMENTATION
- F. OFFSHORE OIL & GAS
- G. COMMUNICATIONS / UTILITIES

- H. SCIENCE, ENVIRONMENTAL
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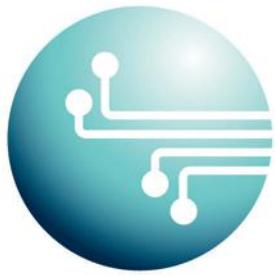
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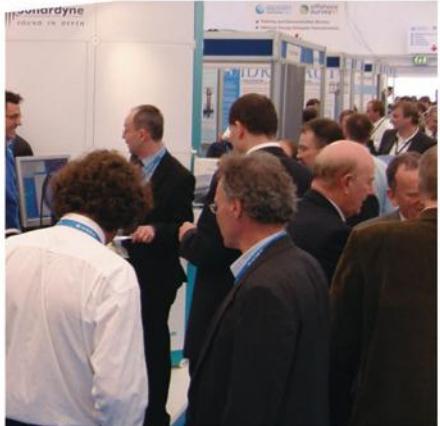


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