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**Mapping the Ghost Fleet
of Iron Bottom Sound**

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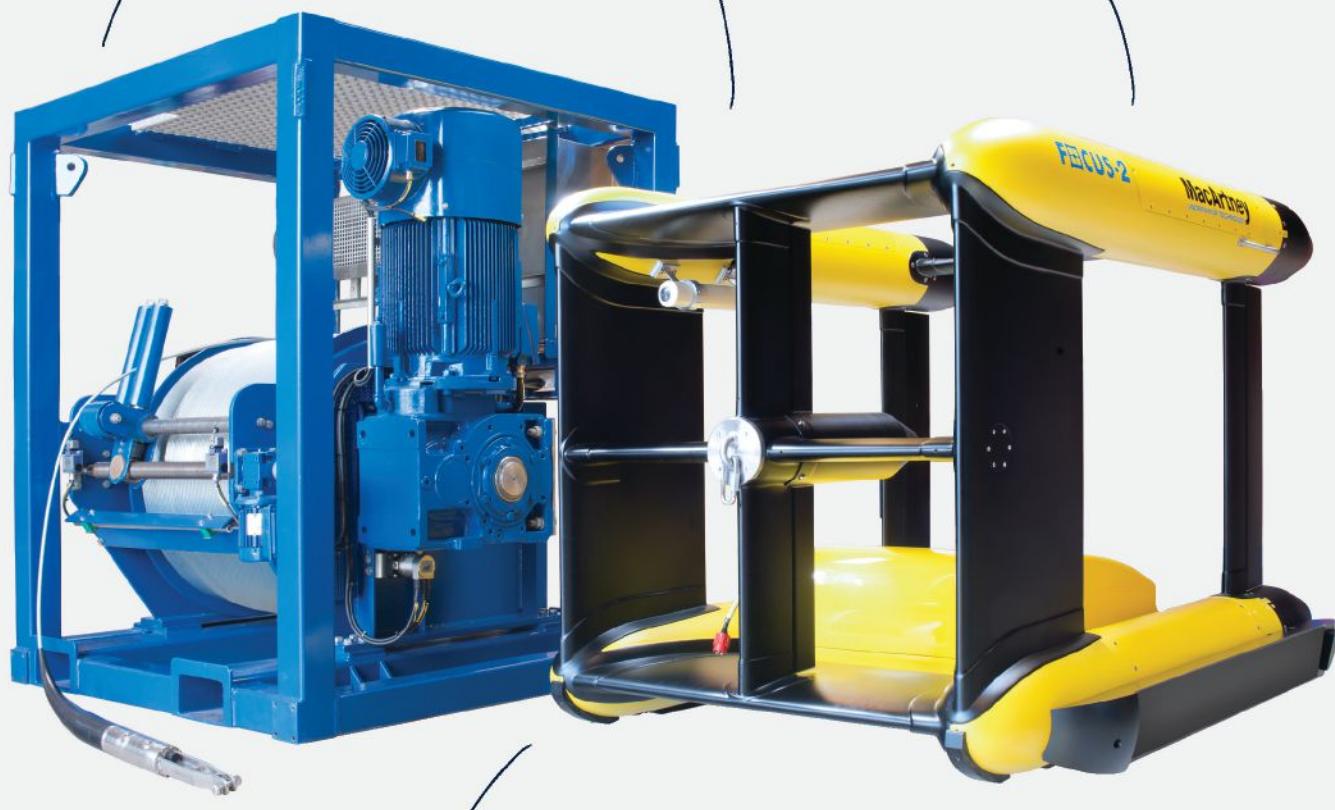
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Deck Gun of USS Vincennes sunk August 9, 1942 during the Battle of Guadalcanal.

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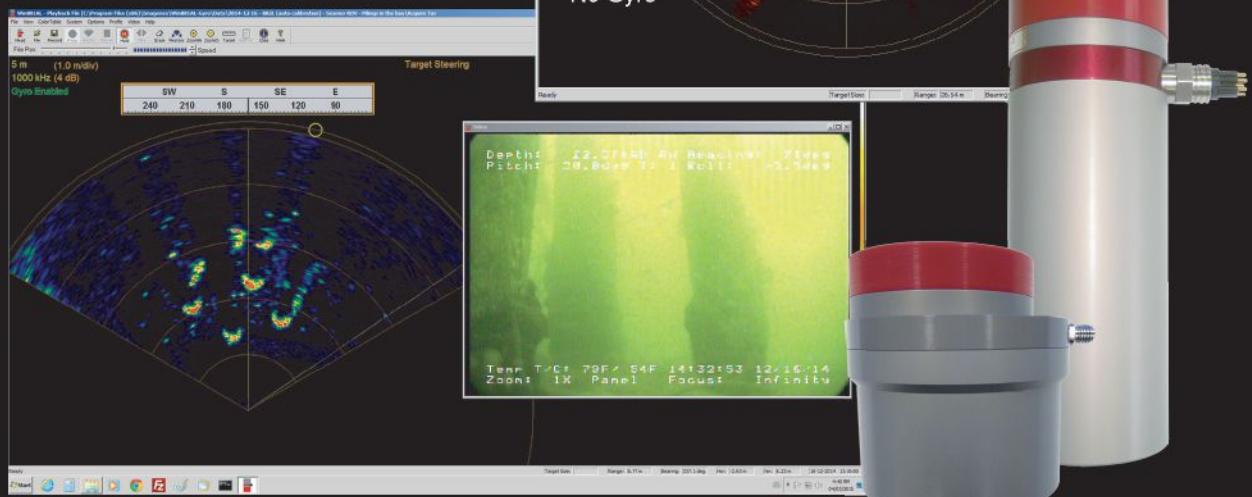


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Optoplan and Alcatel-Lucent Submarine Networks Join Forces: An Opportunity to Make 4D PRM an Industry Standard

By Eric Bougart, Oil and Gas Sales & Marketing Director, Alcatel-Lucent Submarine Networks and Morten Eriksrud, CEO of Optoplan

While PRM has not yet been fully adopted by the oil & gas industry in spite of its numerous advantages, Alcatel-Lucent Submarine Networks and Optoplan have joined forces to bring to the market a truly game-changing solution and create the opportunity to make this advanced technology an industry standard.

In the fast-growing offshore oil & gas market, data collection and transmission to shore have become strategic objectives. Indeed, the data traffic explosion is not just happening onshore, but also offshore—pushed by solid, long-term drivers such as stricter security, safety, and environment (HSE) standards (implying more real-time control for subsea equipment, better emergency communication systems, etc.); economic pressure (implying improved platform management and operations, increased oil recovery through pipe and reservoir monitoring, less offshore workforce and more remote control through videoconferences, CCTV, etc.); and social factors (implying the need to secure industry attractiveness towards talented resources with more collaborative work, Internet access, etc.).

As a consequence, in future e-fields, the traffic generated by the wide range of applications associated with these fundamental trends will go far beyond the current satellite and radio systems limitations, both in terms of bandwidth and real-time transfer. And this trend is not going to stop.

Alcatel-Lucent Submarine Networks benefits from a recognized position as a worldwide leader of subsea telecommunication cable systems and provides oil & gas customers with turnkey telecommunication solutions, including equipment supply, marine installation, and maintenance. The recent acquisition of Optoplan, a leading innovator in seabed optical sensing technology, aims to extend this fully integrated model to 4D Permanent Reservoir Monitoring (PRM), providing oil & gas companies with turnkey PRM solutions, including equipment, marine installation, and maintenance—making this technology simpler and more effective and efficient to implement as well as more affordable.

4D seismic data are essential enablers for increased oil recovery (IOR). Field recoveries have improved enormously in the last 20 years, but the worldwide average for offshore fields is still about 35%, which means that 65% of the resource is left in the ground. Major oil companies are now targeting much higher IOR values (60% to 70%). While PRM is not the only technology available in the 4D seismic world, it is certainly the most advanced in terms of image quality (repeatability) and operation simplicity (shooting campaigns). In addition, it allows users to obtain processed seismic data much sooner after shooting compared to other competing technologies. Therefore, reservoir engineers are able to access more accurate images as a base for their operational decisions.

PRM sensors can also be used for improved HSE and reduced production hazard risks—two concerns that carry significant attention from all parties involved in oil & gas production.

However, in spite of the unquestionable advantages of PRM, only a limited number of fields have been equipped so far with this technology. While the lack of publicly available data from fields in operation and the industry's traditionally long technology adoption cycle likely explain this situation, it is also the consequence of the relatively high upfront cost associated with PRM projects and the complexity of the contractual scheme necessary for their implementation. Alcatel-Lucent Submarine Networks and Optoplan are working together to overcome these barriers.

Optoplan has successfully used its Optowave system, the first-ever optical PRM technology deployed on a large scale, in Conoco Phillips' Ekofisk field off Norway. The technology allows oil & gas experts to gain in-depth knowledge of the evolution of their reservoir over time and, consequently, enables them to extract key seismic data, thus improving drilling locations and the calibration of reservoir models. After 4 years in operation at the Ekofisk field in the North Sea, 99.4% of the installed sensors have remained operational and the quality of the images resulting from the process has been recognized and praised by seismic experts at the European Association of Geoscientists and Engineers (EAGE) PRM Workshop, held in June 2013 in Stavanger, Norway.

Optoplan will now benefit from Alcatel-Lucent Submarine Networks' industrial capabilities, marine fleet, and R&D resources to propose cost-optimized solutions resulting from the synergies from both organizations during the implementation of PRM projects.

Alcatel-Lucent Submarine Networks and Optoplan will be able to offer their customers a comprehensive turnkey solution, including FEED study, design, in-house equipment manufacturing, marine installation, commissioning, and maintenance, thus simplifying the management of the project and the contractual interface with customers as well as offering a global warranty on the system covering both supply and installation.

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MAPPING THE GHOST FLEET OF IRON BOTTOM SOUND

By: Garry Kozak, GK Consulting

The Solomon Islands, a Pacific archipelago comprising 992 islands, is what one thinks of when you look for an untouched South Pacific island paradise. However, during WWII, it was the location of a major decisive battle that changed the tide of war with Japan. The famous “Battle of Guadalcanal” climaxed with naval battles that took place 12 to 15 November 1942. The result was a huge loss of life on both sides and the sinking of an estimated 50+ ships. It is precisely why the area off Guadalcanal after WWII was referred to as Iron Bottom Sound—the iron ships sitting on the seafloor.



The Project

Microsoft founder and philanthropist Paul Allen is a history buff on the events of WWII, and he has a keen interest in the Battle of Guadalcanal. Though Dr. Bob Ballard, with support of U.S. Navy assets, searched Iron Bottom Sound in the 1990s, he found only 13 of the estimated 50 ships sunk during the battles. Mr. Allen felt it would be a fitting tribute to those lost in the battles to definitively locate and map as many of the sunken ships as possible and to precisely position and document the resting place of the lost ships using the latest state-of-the-art underwater survey technology. A plan to map Iron Bottom Sound was outlined, and the project timetable was set in motion. A subsea operations team from Mr. Allen's company, VULCAN Inc., would manage the AUV sonar mapping and ROV operations from the expedition yacht *Octopus*. The VULCAN subsea operations team, managed by Robert Kraft, was mobilized and met on 16 January 2015 in Honiara on Guadalcanal to meet the soon arriving *Octopus*.

Iron Bottom Sound

Iron Bottom Sound is located 1,300 mi northeast of Brisbane Australia (Image 1). It is bounded by the Island of Guadalcanal to the south and the Florida Islands to the north. To the northwest is Savo Island, around which the major naval battles took place during WWII. This would be the area that would be mapped and explored during the mission since this area held the greatest concentration of sunken ships. Water depths within the area to be surveyed range from 600 m in east of the island and to a maximum of 1,350 m west of Savo Island.

AUV Side-Scan Sonar Mapping

Sonar mapping operations used a Bluefin 1,500-m rated AUV (Image 2) equipped with an EdgeTech 2205 side-scan sonar payload operating at 100 and 400 kHz. EdgeTech sonar was chosen because of the proven deepwater, high-performance track record; three EdgeTech Sonar systems are currently being used for the search for the mysterious disappearance of Malaysian flight MH370 in the Indian Ocean. The 100 kHz would be used for the long-range mapping to locate the shipwrecks and aircraft. The 100 kHz has an effective range of 600+ m per side, allowing swath widths of 1.2 km (Image 3). This long-range performance along with the ± 5 m AUV navigation accuracy would allow survey line spacing of 1,100 m to be used, thus maximizing seafloor coverage rate.

Commencing the evening of 16 January, AUV operations were run 24 hrs around the clock with 20-hr missions and 2 to 3 hrs turn-around time on deck to swap AUV batteries, download data, and program a new mission. The benefit of using the Bluefin AUV for side-scan sonar surveys is clearly evident in the sonar data quality and the final mosaic map product. Survey lines are absolutely straight, and the AUV maintains the optimum height above the seafloor for the sonar by terrain following at a set altitude. The AUV missions ran very smoothly with only minor glitches during the 10 days of operations.

Sonar Data Processing

The EdgeTech side-scan sonar data were downloaded after the completion of each AUV mission and then processed into a GIS mosaic map and analyzed for shipwrecks and targets of interest. Chesapeake Technologies SonarWiz software was used because of its high-quality product output as well as its analysis and reporting tools, which simplified the handling

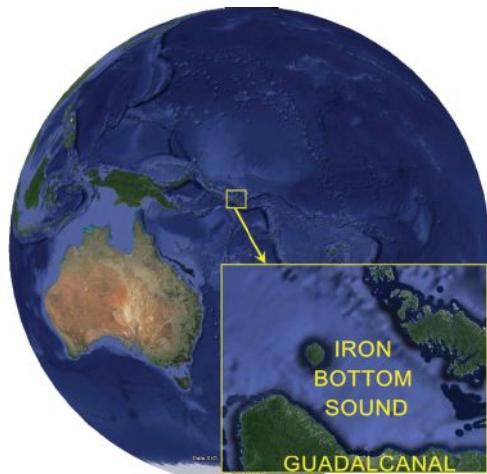


Image 1. GE Iron Bottom Sound.



Image 2. Bluefin AUV Launched from Octopus. Photo Credit Paul Mayer.

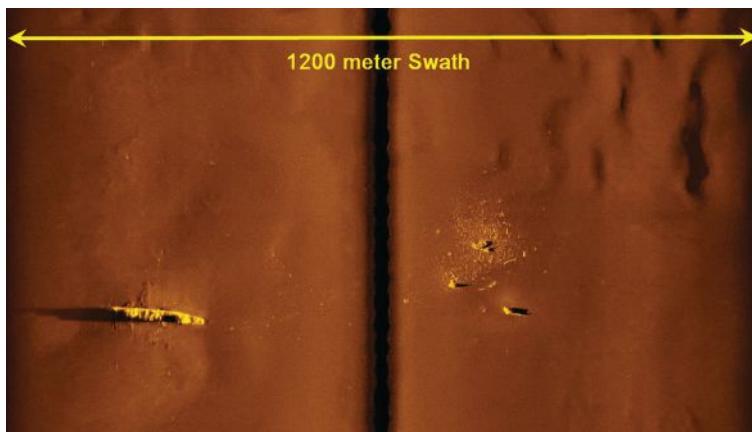


Image 3. Edgetech 100kHz showing 1.2 Km swath.

FEATURE STORY

of the many targets located during the project. Total area mapped during the 10-day project was 380 sq. mi. The SonarWiz mosaic (Image 4) showed a dynamic seafloor with many interesting geologic features. The shipwrecks and targets of interest were all logged, measured, positioned, and classified in SonarWiz.

Shipwrecks Located

The sonar mapping produced a total of 29 wreck locations, 7 wreck debris fields, and several possible plane locations, one being confirmed (Image 5). Of the 29 wrecks located, 6 were positively identified: USS Astoria, USS Quincy, USS Vincennes, USS Northampton, HMAS Canberra, and the USS

Atlanta. Eleven of the wrecks were tentatively identified using the analyzed sonar imagery with vessel measurements and location information from historical records: USS Walke, IJN Ayanami, USS Dehaven, IJN Yudachi, IJN Fubuki, USS Laffey, USS Monssen, USS Barton, USS Cushing, USS Little, and the USS Preston. The remaining 12 wreck locations were not identified and require further investigation to classify them. The 7 wreck debris fields did not provide enough information in the sonar data to classify them with any certainty beyond a debris classification.

ROV Operations

Select wrecks were chosen for inspection using the 3,000-m rated ROV (Image 6) on board the Octopus. These included the previously unfound USS Vincennes and the USS Astoria, both New Orleans class heavy cruisers. High-resolution side-scan sonar missions were run with the AUV before deployment of the ROV to map any possible obstructions or hazards that the ROV pilots should be aware of for safety concerns. The EdgeTech 400 kHz high-frequency sonar data produced extremely high-resolution images. When photographs of the ship were compared with the sonar image, every physical attribute of the ship seen in the photograph could be identified clearly in the sonar image (Image 7). The ROV operations were flawless, beaming stunning images of the ghost ships remains back to the operations center (Image 8). The streaming video showed a record of the battles and the horrific destruction of the ships and, of course, the men that manned them.

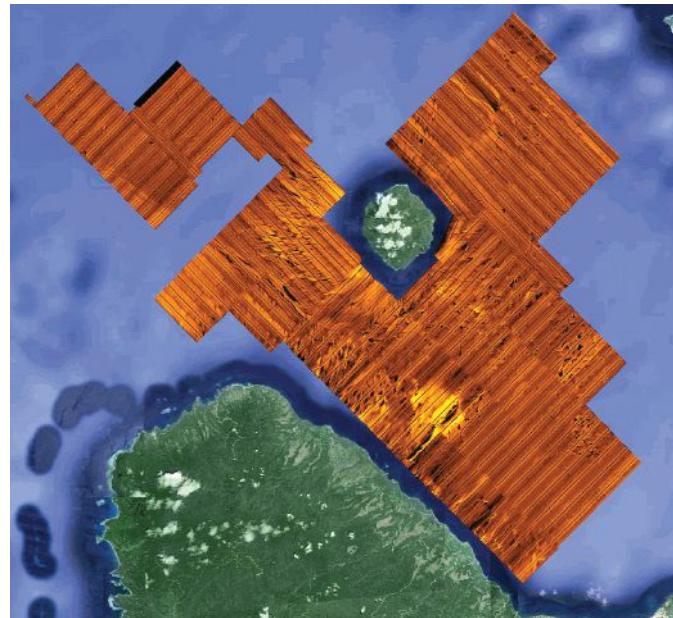


Image 4. SonarWiz Side Scan Sonar Mosaic covering 380 Sq. Mi. of Iron Bottom Sound.

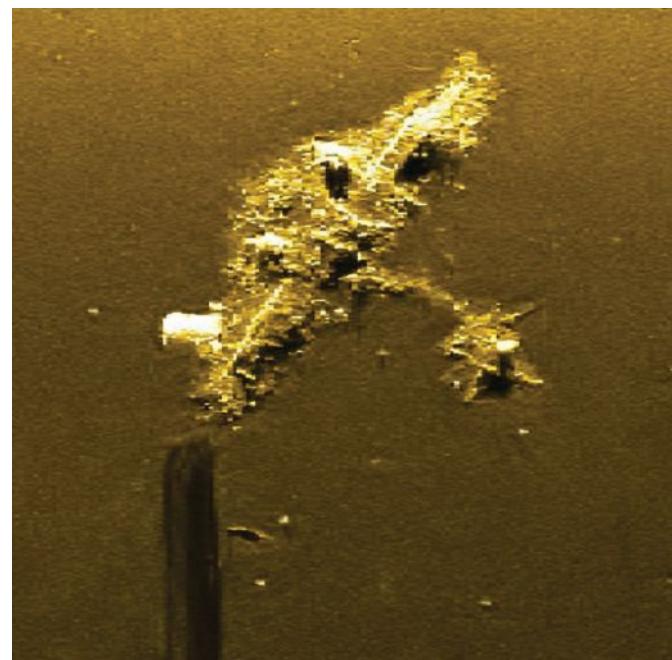


Image 5. ROV inspecting airplane.



Image 6. 3000 meter rated ROV.

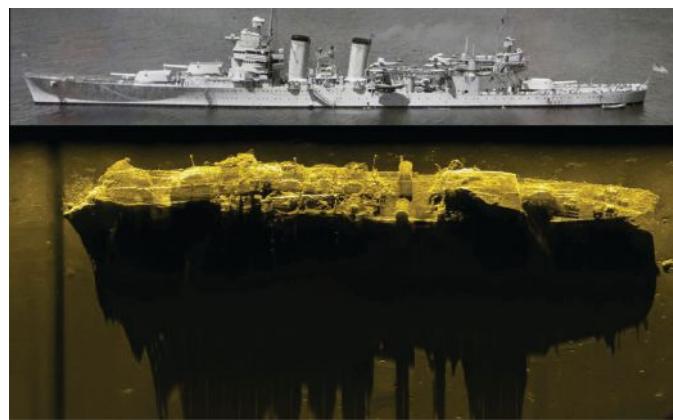


Image 7. Astoria Sonar Image compared to Photo Image.



Image 8. ROV Ops Room.



Image 9. Astoria Turret.



Image 10. Astoria Anti aircraft guns.

Seeing the huge battleship turrets (Image 9) and the anti-aircraft guns ready for action (Image 10) told part of the story. Seeing the USS Astoria name clearly visible on her stern (Image 11) made it even more personal for the operations team knowing the violent history of her sinking. During the exploration of the USS Vincennes, a massive shell hole made by an 8-in. armor-piercing round could be seen in the stern of the vessel (Image 12), symbolizing the violence of the battle. Other battle scars observed by the ROV were the missing bows blown completely off of some of the ships. Shell and gun holes littered the vessels everywhere, and hulls could be seen ripped apart from massive explosions.



Image 11. Astoria Name.

Image 12. Vincennes shell hole in stern.

It was an eerie experience as the ROV cameras swam down the decks, peering into some of the open hatches and port holes. Occasionally, an interesting deepwater animal such as a Dumbo Octopus would swim into the camera view, making the scene even more surreal.

Conclusion

The Iron Bottom Sound mapping mission accomplished all the goals set for the project. The major areas of the naval battle were successfully mapped, locating many of the previously unfound wrecks from the Battle of Guadalcanal. The positions of every wreck and feature were mapped to a precision of ± 5 m, far more accurate than what has ever been accomplished of those wrecks found in the past. Some of these positions now show the error in historical records of where some of the sinkings were thought to have occurred. The ROV exploration produced many hours of amazing video, documenting the present condition of these long-lost ships of war. VULCAN will make available to the U.S. and Japanese navies the shipwreck positions, sonar data, and underwater video from this project to allow for amending the historical record of one of the greatest naval battles of WWII.

Each of the team members found moments during the mission to reflect on the sacrifices made by the men involved in these battles. It left an impression on each and every one of us.

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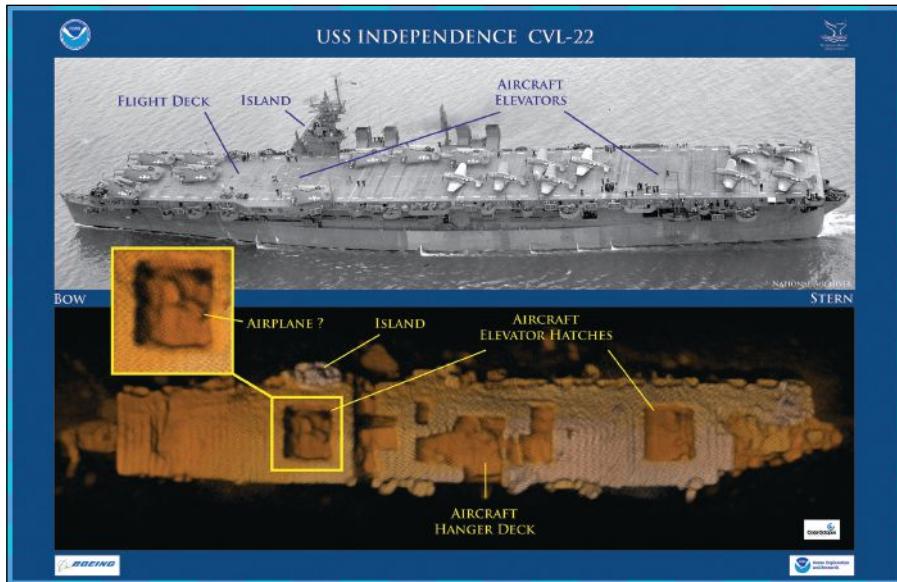
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OCEAN INDUSTRY

NOAA, partners, survey amazingly intact historic WWII-era aircraft carrier



NOAA, working with private industry partners and the U.S. Navy, has confirmed the location and condition of the former USS Independence (CVL 22), the lead ship of its class of light aircraft carriers that were critical during the American naval offensive in the Pacific during World War II.

Resting in 2,600 ft of water off California's Farallon Islands, the carrier is "amazingly intact," said NOAA scientists, with its hull and flight deck clearly visible and what appears to be a plane in the carrier's hangar bay.

Independence operated in the central and western Pacific from November 1943 through August 1945 and later was one of more than 90 vessels assembled as a target fleet for the Bikini Atoll atomic bomb tests in 1946. Damaged by shock waves, heat and radiation, Independence survived the Bikini Atoll tests and, like dozens of other Operation Crossroads ships, returned to the U.S.

While moored at San Francisco's Hunters Point Naval Shipyard, Independence was the primary focus of the Navy's studies on decontamination until age and the possibility of its sinking led the Navy to tow the blast-damaged carrier to sea for scuttling on 26 January 1951.

NOAA's interest in Independence is part of a mandated and ongoing 2-year mission to locate, map and study historic shipwrecks in Gulf of the Farallones National Marine Sanctuary and nearby waters. The carrier is one of an estimated 300 wrecks in the waters off San Francisco and the deepest known shipwreck in the sanctuary.

The mission was conducted last month using an 18.5-ft long AUV, Echo Ranger, provided by the Boeing Company through a cooperative research and development agreement with NOAA's Office of Oceanic and Atmospheric Research. Boeing also partnered with technology company Coda Octopus to integrate its 3D-imaging sonar system, Echoscope, into the AUV.

Scientists and technicians on the sanctuary vessel R/V Fulmar followed the AUV as it glided 150 ft above the wreck and successfully surveyed the carrier's nearly intact hull. The survey determined that Independence is upright, slightly listing to starboard, with much of its flight deck intact, and with gaping holes leading to the hangar decks that once housed the carrier's aircraft.

To see sonar images, historical photos and other materials, visit <http://sanctuaries.noaa.gov/shipwrecks/independence>.

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C & C Technologies Inc. acquired by Oceaneering

Oceaneering International, Inc. announced that it has closed the previously announced definitive agreement to acquire C & C Technologies, Inc., a global provider of survey and satellite-based positioning services. Subject to customary post-closing working capital adjustments, the acquisition price of approximately \$230 million was paid in cash.

CSR announces acquisition of SMD

Zhuzhou China South Rail Times Electric Co. (CSR Times Electric), Ltd., a subsidiary of China South Rail (CSR), announced the completion of a £130 million formal acquisition of the UK-based manufacturer of ocean engineering products, Specialist Machine Developments (SMD) Limited, the top holding company of the SMD group. Following the acquisition, SMD will remain independent in its business operations and the day-to-day functions will still be controlled by its original management team. A new board of directors will be set up to take charge of business strategy, investment decision-making, financial monitoring and important decisions related to government and public relations. SMD will serve as the global headquarters for CSR Times Electric's deepwater equipment division. At the same time, a Chinese subsidiary of SMD will be set up to develop its presence in the Chinese maritime market. In this subsidiary, SMD will be responsible for overall technology planning, market management and other daily operations.

Ocean Business celebrates most successful show yet

The Ocean Business show at the National Oceanography Centre (NOC) in Southampton was phenomenally successful, with visitor numbers up an incredible 29%, taking attendance to 4,589 visitors. With all four previous shows brimming with visitors from all over the world, it's hard to believe it could get any better, but the show delivered everything it promised for face-to-face interaction between exhibitors and customers. There was a constant flow of interest throughout the show with the international exhibition presenting cutting-edge technologies from nearly 350 companies around the globe. This was matched by a presence of international visitors that formed 38% of total visitor numbers. Ocean Business' format, which includes 3 days of training and demonstration sessions for hands-on product testing in test tanks, on vessels, on the dockside or in classrooms, proved a highlight of the show and was exceptionally well attended with nearly 2,200 individual sessions booked.

Divers find 2,000 gold coins

Scuba divers have found the largest cache of gold coins ever discovered in Israel working on wreck site in the ancient harbor of Caesarea on the country's Mediterranean coast, reports the Israeli Antiquities Authority (IAA). The treasure trove of 2,000 coins weighs more than 20 lbs and dates back more than 1,000 years to the era of Fatimid Caliphate, which ruled much of the Middle East and North Africa from 909 to 1171.

"It is probably the shipwreck of an official treasury boat which was on its way to the central government in Egypt with collected taxes," said IAA director of marine archaeology Kobi Sharvit.

Also commenting on the discovery was Bridget Buxton, University of Rhode Island's Associate Professor of Ancient History and Mediterranean Archeology. "In 2011, we received a small grant to purchase a JW Fishers Pulse 8X metal detector to assist in archaeological work I was doing with the Israel Antiquities Authority. Buxton, an accomplished scuba diver, worked with IAA's Jacob Sharvit to investigate several of the country's known shipwrecks and to locate undiscovered sites. One wreck that was uncovered appeared to be the remains of a famous lost warship from the Napoleonic siege of Acre in 1799, a wreck that historians have been trying to find for the last 50 years. Using their Pulse 8X metal detector the team located large copper nails, cannon balls, grapples, 18th century muskets, and other concretions.

"When the project ended, I left the detector with the antiquities authority," said Buxton. "When IAA divers got on the scene of this most recent discovery, they were using the Pulse 8X to locate and recover the bulk of the 2,000 gold coins. This July I'm going back to Caesarea to put together an expedition to find more shipwrecks and a neolithic buried city we believe to be in the same area the gold coins were found."

For more information, visit www.jwfishers.com.



Nova Southeastern University names Its newest oceanographic center building for Guy Harvey

Since Guy Harvey, Ph.D. has supported, and continues to support NSU in scholarship, research and the conservation of marine life, Nova Southeastern University (NSU) has named its newest research facility the Guy Harvey Oceanographic Center.

Opened in 2012, the five-story, 87,000 sq. ft research facility is located within John U. Lloyd State Park in Hollywood, Florida.

"Nova Southeastern University has had a long-standing relationship with Dr. Harvey, and we're thrilled that will continue for many more years to come," said Hanbury. "His generosity is ensuring today's leaders in marine sciences teach and pass on their expertise to tomorrow's researchers. I am very pleased that Guy Harvey is putting his name—literally—on the growing legacy of our Oceanographic Center."

For many years, NSU has enjoyed an excellent working relationship with Harvey through the Guy Harvey Research Institute (GHRI), where researchers and students work together as they study and learn about all aspects of our marine ecosystem.

"I am honored to have my name on such a high profile building in South Florida that is doing cutting-edge marine science research," said Harvey. "It is the latest and most significant step in an incredible partnership with NSU that began 16 years ago. And it is my hope that the work that will be done in the future in this building will make a significant difference in the lives of many individuals and the conservation of our oceans' resources."

Along with Harvey's signature on the side of the facility, his name will also adorn the roof of the building. Given NSU's Oceanographic Center is in the flight path for aircraft coming to and from Fort Lauderdale/Hollywood International Airport, the potential is for millions of people to recognize his name as well as the City of Hollywood, Florida and NSU.

While most people recognize Harvey as a marine wildlife artist, not many are aware that he earned a Ph.D. in fisheries biology. This love of the marine world, his desire to learn more about our ocean-bound neighbors and his mission to provide direction and assistance in the protection and conservation of these creatures that led to the formation of the GHRI in 1999.

For more information, visit www.nova.edu.

Greenpeace climbers leave Arctic oil drilling rig

The six climbers who safely intercepted, scaled, and set up camp on an Arctic-bound Shell oil drilling rig in the Pacific have come down after spending almost a week on the 38,000 tonne platform. The multi-national team of volunteers abseiled off the rig and into inflatable boats, before returning to the Greenpeace ship Esperanza, which has been stationed close by.

They have camped on the Polar Pioneer for the last 6 days and have shared GoPro videos, tweets, and live interviews from the rig, shining a light on Shell's plans to drill in the Alaskan Arctic in less than 100 days.

Shell requested a temporary restraining order from a U.S. federal court in Alaska to remove the six from the Polar Pioneer. The U.S. does not have jurisdiction, Greenpeace has said, as the rig is in international waters. A federal judge in Anchorage declined to rule immediately on Shell's request, saying she would make a decision in 1 or 2 days. However, worsening weather conditions at sea, which could bring swells of up to 7 m, mean the six are leaving the rig before any ruling.

Aliyah Field, from the U.S., one of the six volunteers on the rig, said, "We are coming down and it fills me with a wide range of emotions. This has been the single most proud, humbling, and inspiring experience of my life. I am truly in awe of all the support and passion from around the world. A global movement has grown even stronger over the last days. I might be climbing off this oil rig, but this is merely a transition into the next step of saving the Arctic. I can't wait to join the millions of voices, the volunteers in Seattle, and all Americans who believe we deserve better, safer, cleaner forms of energy. My voice cannot be silenced, and neither can the millions of others taking a stand against Shell."

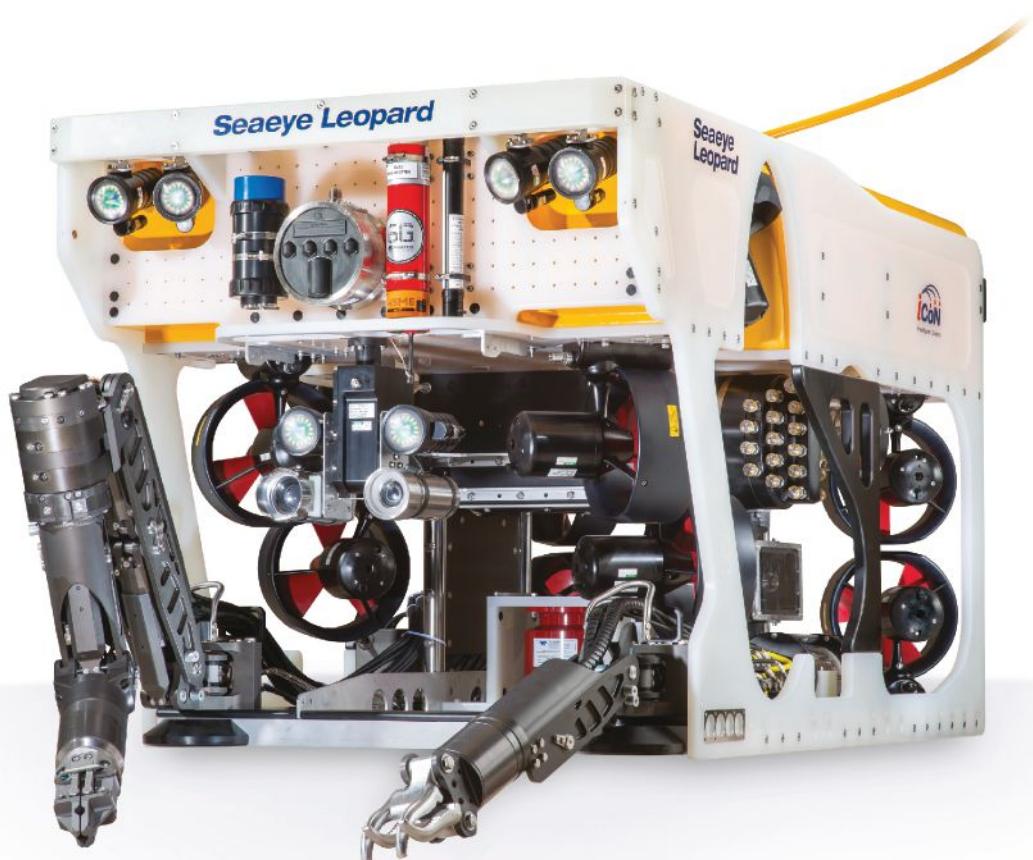
Annie Leonard, executive director of Greenpeace USA, said: "I am so inspired and impressed by the volunteers' decision to climb Shell's drill rig. I hope everyone who sees what they did are inspired to take action in their own way to help save the Arctic."

The Polar Pioneer, which is being transported on a 712 ft (217 m) long heavy-lift vessel called Blue Marlin, is one of two drilling vessels heading towards the Arctic for Shell this year.

The second, the Noble Discoverer, is one of the oldest drill ships in the world.

For more information, visit www.greenpeace.org.

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ABS updates guidance on LNG as fuel & LNG bunkering in North America

ABS has updated its guidance on LNG Bunkering in North America to support the transport sector's increasingly rapid transition to the use of cleaner fuels. The second edition of ABS' Bunkering of Liquefied Natural Gas-fueled Marine Vessels in North America was released recently, offering new market-leading advice to shipowners and operators who may be looking to develop bunkering infrastructure in response to new emissions regulations and showcase their environmental stewardship. Major updates in the second edition include important lessons learned from first adopters of LNG-fueled vessels and LNG bunkering projects, a 'project roadmap' guide of the associated regulatory, stakeholder and technical issues and an in-depth port directory highlighting ongoing projects and local development processes. The report is available to the public through the ABS website, www.eagle.org.

Damen Shipyards join WOC

Damen Shipyards Group, a global shipbuilder headquartered in the Netherlands, has become the latest member of the World Ocean Council (WOC). Damen is the first European shipbuilder to join the WOC, the international business leadership alliance on ocean sustainability, science and stewardship. By focusing on optimizing ship design and working on product innovations, Damen works to reduce environmental impacts of shipping. This has resulted in, for example, an in-house E3 label applying only to new Damen designs that are environmentally friendly, efficient in operation and economically viable. Other examples are the new generations of hybrid, CNG and LNG tugs and inland shipping vessels, some of which are built and some of which are in research programs. In addition, Damen recently formed a partnership with the Bellona Foundation, the Oslo-based institute for sustainable environmental solutions, and with the BlueTec Tidal Energy project.

IMO accepts IMCA paper as basis for updating DP guidelines

The International Maritime Organization (IMO) has agreed to use the International Marine Contractors Association (IMCA) proposals as the basis for the review of the IMO Guidelines for vessels with dynamic positioning (DP) systems (MSC/Circ.645). The review will be taken forward by an IMO intersessional correspondence group that will further develop the draft, with a view to finalizing it at the next meeting of the IMO Ship Systems and Equipment (SSE) sub-committee in 2016. "IMO's circular 645 is the established international standard for DP systems. The guidelines have successfully provided the framework on which national regulations and classification society rules are based, and which are supplemented by a growing body of more detailed industry guidance," explains IMCA's technical director, Jane Bugler. "The IMCA proposals were developed by an internal workgroup, with input from co-sponsors that include a number of governments and other industry organisations. We look forward to a highly constructive time working on MSC/circ. 645 with the correspondence group."

Nautical Institute and DNV-GL accreditation for VSTEP DP simulators

In a timespan of 1 month, three types of VSTEP Dynamic Positioning simulators have been officially certified and accredited by the Nautical Institute and Det Norske Veritas (DNV-GL) certification bodies. The accreditation means the new NAUTIS dynamic positioning simulators from VSTEP are fully certified and approved to be used for official DP training courses. The accredited dynamic positioning simulators were based on different DP control types and included both Class A and Class B type DP simulators. Accreditation of the DP simulators took place no more than 4 weeks apart and at different locations, including VSTEP's world headquarters and acclaimed training institutes in Shanghai and Singapore.

French scientific research vessel to be renovated at Damen Shiprepair Dunkerque



The renowned French research vessel Marion Dufresne II arrived at Damen Shiprepair Dunkerque on 14 March for a project that will extend her life by a further 20 years. The work will span a total of 4 months. On 30 March, the vessel went into dry-dock for a 6-week period, during which the yard will carry out an extensive scope of work.

The multi-purpose vessel is owned by Les Terres australes et antarctiques français (TAAF) and managed by CMA CGM. Marion Dufresne II carries out oceanographic research under the responsibility of the Institut Polaire Paul-Emile Victor (IPEV). The client selected Damen Shiprepair & Conversion following an extremely competitive tendering process. After careful consideration of the vessel's requirements, Damen opted to carry out the work at the Dunkirk yard in northern France.

Khalil Benjelloul, Head of Sales & Marketing at Damen Shiprepair Dunkerque, details the extent of the work the yard will perform, beginning with a replacement of the vessel's most important scientific apparatus: "One of the major parts of the work will be the replacement of the vessel's multi-beam sonar. For this we will scrap the existing equipment, rebuild the ship's hull and install a new gondola and control room."

It's not only equipment that the yard is refurbishing, however. Marion Dufresne II will also receive a visual overhaul. "We will completely blast and repaint the hull and some of the ballast tanks. Actually, almost the entire vessel will have a fresh look."

This includes the vessel's accommodation, which the yard is renewing in cooperation with the client's subcontractor. Marion Dufresne II has accommodation capacity for 104 scientific researchers and 46 crew. Additionally, the accommodation areas of the vessel include laboratory facilities used by IPEV scientists.

Operating out of the Port of La Réunion, the ship transports passengers and supplies to remote locations of scientific interest around the Indian Ocean. Much of her previous work has involved the vessel operating in the Crozet and Kerguelen Islands, in the French Southern and Antarctic Lands.

Having logistical as well as research capabilities, Marion Dufresne II is a multi-purpose vessel with a heli-deck. Mr. Benjelloul explains: "In addition to her scientific capabilities, the vessel is able to act as a supply vessel and to transport containers and fuel to remote areas."

For more information, visit www.damen.com or www.taafr.fr.

CTruk wins order for two 22-m composite workboats

CTruk has won an order for two more of its 22-m multi-purpose catamaran Wind Farm Service Vessels (WFSVs). Both will be delivered to leading offshore wind service supplier CWind this summer as the first-of-class CWind Sword continues to impress on the EnBW Baltic 2 Offshore Wind Farm in Germany.

East Anglia-based builder CTruk continuously incorporates performance feedback into its designs to further enhance seaworthiness. The CTruk MPC22, with the inherent versatility given by the company's patented reconfigurable deck design, represents a very cost-effective option for WFSV operators looking to build an optimum vessel mix into their fleets to meet the expected surge in demand.

The new CTruk MPC22s will feature the Volvo IPS system for optimal bollard pull and service speeds, significantly increasing the already renowned fuel efficiency of the company's vacuum-infused composite catamarans.



Due to an extremely efficient modular production process, CTruk can currently offer two more MPC22 build slots for this season, with capacity at its new facility on the River Colne in Colchester for five more slots by spring 2016.

The next MPC22 to leave the production line will make an appearance at Seawork in Southampton from 16-18 June 2015.

For more information, visit www.ctruk.com.

Not all smooth sailing ahead for container shipping carriers

The outlook for the global container shipping industry remains challenging for the remainder of 2015, according to a new report from AlixPartners. In its annual outlook for the industry, the

global business-advisory firm predicts that operating improvements will continue to prove difficult to achieve amid flat or declining demand and many carriers are now looking to balance their books following an influx of "megavessels."

The AlixPartners report warns that carriers have been too slow to make any changes to their services or networks in the face of the slump in Brent crude oil prices during 2015 and that recent falls in bunker fuel prices are welcome but will not likely offer a permanent fix. The study notes that demand seems to continue to lag, as evidenced by weekly container pricing remaining relatively flat or down in the past 12 months for several transpacific trade routes, whereas critical Asia-Europe routes are down 15% or more.

For more information, visit www.alixpartners.com.

Wärtsilä launches new series of LNG Carrier designs as shipping moves into the gas age

The unmatched track record and expertise that Wärtsilä has in LNG fuel solutions for the marine industry is

CAPTURE THE FULL PICTURE



Image courtesy of Marine Applied Research and Exploration (MARE)



OE15-100D, OE14-370 and OE14-504 Cameras with wide and extended viewing angles

KONGSBERG

www.kongsberg.com

Kongsberg Maritime's HD and SD wide angle colour zoom cameras feature a new optical design that minimises distortion and chromatic aberration while maintaining an exceptionally wide angle of view in water. The recent introduction of the OE15-100D monochrome camera with its extended viewing angle means whatever your viewing requirements Kongsberg Maritime has got all angles covered.

- Extended viewing angles
- High resolution
- Scalloped dome guards
- Titanium housing
- Quality optics
- Compact dimensions
- Excellent low light performance
- Standard depth rating of 4,500 meters



again emphasized with the company's launching of a new series of LNG carrier ship designs. This series of designs is the latest addition to Wärtsilä's ship design portfolio and is an important part of the company's strategic program under the theme "Taking Merchant Shipping into the Gas Age."

The series comprises four vessel designs, the WSD59 3K, WSD59 6.5K, WSD55 12K, and WSD50 20K, all of which have been developed in close cooperation with customers to produce vessels that are appropriate for the global LNG infrastructure and applicable for both ocean-going and inland water operations. In each case, fuel economy, performance guarantees, optional versions to meet specific needs, and the flexibility to choose particular features and solutions have been emphasized.

The WSD59 3K design offers fuel consumption of 7.5 t/d at a service speed of 14 kts. The design draft is 4.75 m. The fuel consumption for the WSD55 12K design vessels is 13.5 t/d at a service speed of 14.5 kts, making it the best in its class. The design draft is 6.2 m. The fuel consumption for vessels based on the WSD50 20K design is also the best in its class at 18.1 t/d at a service speed of 15 kts. The WSD59 6.5K design offers a fuel consumption of 11.0 t/d at a speed of 13 kts. The design draft is 5.8 m.

For more information, visit www.wartsila.com.

Kongsberg simulators selected to enhance offshore training for GoM

Fideicomiso de Formación y Capacitación para el Personal de la Marina Mercante Nacional (FIDENA), on behalf of Mexico's Secretariat of Communications and Transportation (SCT), has selected Kongsberg Maritime offshore simulators for the Marine Education Center in Ciudad del Carmen, Campeche.

Appointed by SCT, FIDENA is the educational institution in charge of managing, organizing and developing the formal education of all seafarers in Mexico. As Mexico's only institution offering higher level programs in maritime education, FIDENA has garnered

widespread international recognition and plans to secure its position through the signing of a contract with Kongsberg Maritime for the supply of K-Sim DP (dynamic positioning simulators) and K-Sim Offshore (offshore vessel simulators).

The new simulators will enable FIDENA instructors to provide training on critical operations relating to the offshore oil & gas industry in the Gulf of Mexico and further afield, with improved capabilities for the simulation of DP, anchor handling, ship handling and navigation for a full range of offshore units from support ships to oil production and storage vessels.

Kongsberg Maritime delivered a full suite of DP simulator systems, including Class B and C as defined by the Nautical Institute (NI) and Det Norske Veritas (DNV). The delivery also includes Kongsberg Maritime's highly advanced K-Sim Offshore Simulator with forward and aft bridges for a wide range of offshore operations such as ship handling and maneuvering, anchor handling and DP Class B.

The delivered K-Sim Offshore solution is equipped with bridge consoles to accommodate different vessel types, in addition to hydrodynamic ship models and area databases (sailing areas) covering navigable waters in key offshore operating areas. The flexible and modular design of the K-Sim Offshore simulator system also provides the opportunity to add subsea training capabilities in the future.

As part of the contract, FIDENA has invested in a Kongsberg Maritime Long Term System Support Program (LTSSP) that will provide comprehensive coverage and site visits by certified Kongsberg customer service technicians. The LTSSP ensures that the simulator facility remains current with evolving regulatory changes and the latest simulation technology developments at Kongsberg Maritime.

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



PortVision® adds new capabilities to TerminalSmart™

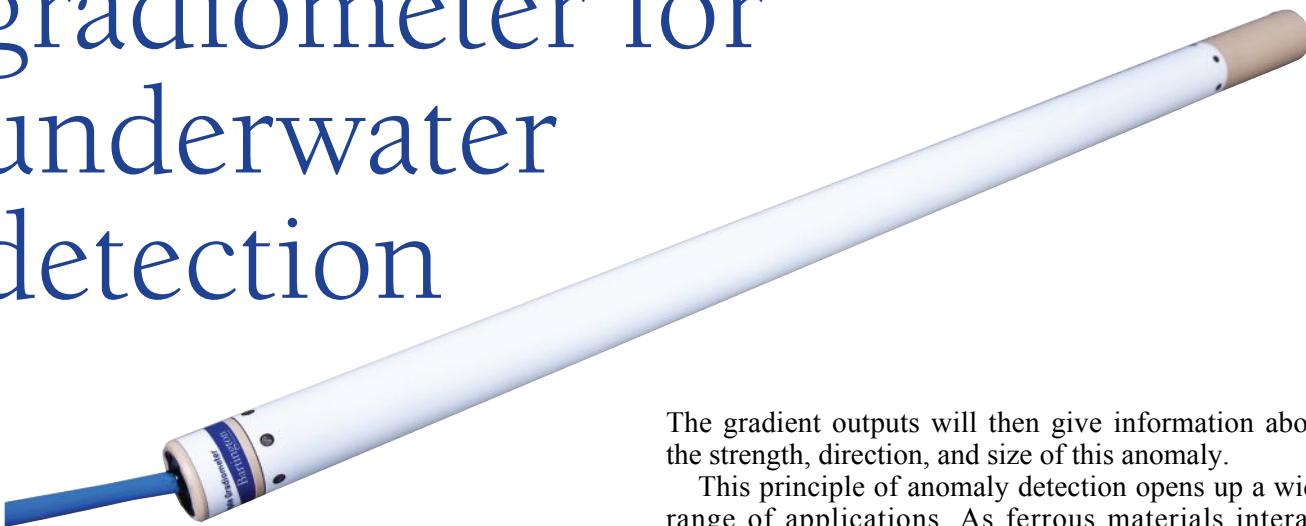
The PortVision TerminalSmart™ platform has become one of the most widely adopted enterprise-class marine terminal optimization solutions for oil companies who've been under growing pressure to streamline operations, reduce costs, increase visibility and enhance business intelligence. Combining dock management, scheduling, reporting and analysis with PortVision's Automatic Identification System (AIS)-based vessel tracking service, the TerminalSmart platform has contributed in recent years to significant improvements in industry-wide vessel traffic-handling capabilities. At the same time, the platform also gives terminal operators and other stakeholders continuous visibility to dock and vessel activities, enabling them to cut costs and labor requirements, optimize the supply chain, and drive better business decisions. Now, new capabilities have been added to TerminalSmart to further improve operational efficiencies, automate more of the terminal operation's daily activities, and expand alerting and reporting options.

Feature highlights include:

- Enhanced user interface, with drag-and-drop scheduling, what-if analysis, and a customizable and shareable calendar.
- Improved handling of dock calls and associated activities – users can now split calls into independently managed segments and streamline the process of handling recurring calls. Users now have more options for logging and retrieving information about more elements of each dock call. Status indicators have been added to improve user convenience and efficiency.
- Vessel fit enhancements – simplifies process of checking dock-to-cargo compatibility during vessel scheduling.
- Demurrage calculator – enhancements make it easier for users to automatically monitor and calculate demurrage costs and to validate claims in the event of a dispute.
- More options for correspondence and alerting – includes tools for generating customizable letters of protest and executing pre-arrival notifications, among others.
- New capabilities for reporting, charting, and dashboards – includes greater options for generating and exporting user-defined ad hoc reports.

For more information, visit www.portvision.com.

New magnetic field gradiometer for underwater detection



Bartington Instruments has used its 20 years of experience designing and manufacturing magnetic field measuring instruments to develop the new Grad-13 digital gradiometer in order to detect vectorial information of sub-nanotesla features. It is suitable for mineral exploration, pipe and cable location, archaeology, and the detection of unexploded ordnance and other magnetic anomalies.

With RS485 output to ease integration with the customer's systems, the Grad-13 can acquire magnetic field data at a rate of 200 points/second, with a precision down to 30 pTrms/ $\sqrt{\text{Hz}}$ at 1 Hz. Accuracy is enhanced by an inbuilt temperature sensor, which allows compensation for any temperature drift in the readings, while an integral accelerometer gives the position of the instrument. It is available in versions submersible to 200 m. Bartington can also supply the necessary multiplexers and acquisition software that enables multiple Grad-13 sensors to be used as part of a sensor array, to build up an overall magnetic picture of a wide area quickly and efficiently.

The gradiometer's non-contact, non-destructive principle of operation has no environmental impact. Two fluxgate magnetometers are installed at either end of a rigid carbon fiber frame in order to give magnetic field information at two known points. In a homogeneous magnetic environment, both sensing elements will give the same reading, keeping the gradient outputs close to zero. However, moving the gradiometer over a source of local magnetic variation will generate a larger change in the reading of the magnetometer nearest the disturbance.

The gradient outputs will then give information about the strength, direction, and size of this anomaly.

This principle of anomaly detection opens up a wide range of applications. As ferrous materials interact strongly with their magnetic field environment, the Grad-13 can detect metallic objects in murky water or buried in layers of sediment. It is, therefore, ideal for locating pipes and detecting unexploded bombs and grenades in post-conflict zones. Variations of the seafloor can also cause local variations in the Earth's magnetic field, so the Grad-13 can be used to map areas of interest for mineral exploration or to look for archaeological remains. In the case of locating buried electric cables, the Grad-13's sensing bandwidth enables the detection of sub-100 Hz electromagnetic interference. To assist customers, the Grad-13 is supplied and calibrated with cables up to 500 m.

Like many of Bartington Instruments' products, the Grad-13 was first developed to meet a particular need. In this case, it was for the same sensor to be used in three different settings: mounted on an ROV for seabed surveys, mounted on a non-magnetic cart for land surveys, and lowered down a borehole. The company's R&D department excels at developing products to meet customers' specific requirements, which has led to it being able to supply equipment in many different markets worldwide. Bartington Instruments offers a range of magnetic field fluxgate sensors for use in environments from the bottom of the sea to low Earth orbit and at temperatures from cryogenic to 215°C. It also offers related test equipment such as Helmholtz Coil Systems for calibrating and testing sensors and a range of magnetic shields.

For more information on the Grad-13 or to discuss how Bartington Instruments can meet your marine requirements, contact sales@bartington.com.

Court rules Navy war games violate law protecting whales and dolphins

A federal court announced that the U.S. Navy's training and testing activities off the coast of Southern California and Hawaii illegally harm more than 60 whale, dolphin, seal, and sea lion populations. The U.S. District Court, District of Hawaii, found that the National Marine Fisheries Service—the agency charged with protecting marine mammals—violated multiple requirements of the Marine Mammal Protection Act and the Endangered Species Act when agreeing to the Navy's plan. "Searching the administrative record's reams of pages for some explanation as to why the Navy's activities were authorized by the National Marine Fisheries Service (NMFS), this court feels like the sailor in Samuel Taylor Coleridge's 'The Rime of the Ancient Mariner' who, trapped for days on a ship becalmed in the middle of the ocean, laments, 'Water, water every where, Nor any drop to drink,'" the Court wrote in its 66-page opinion. The case before the Court was brought by the Natural Resources Defense Council, Cetacean Society International, Animal Legal Defense Fund, Pacific Environment and Resources Center, and Michael Stocker. Under its five-year plan for training and testing, the Navy is permitted to harm whales, dolphins, and other marine mammals nearly 9.6 million times while conducting high-intensity sonar exercises and underwater detonations. These harmful impacts include millions of instances of temporary hearing loss and significant disruptions in vital behaviors, such as habitat abandonment, as well as permanent hearing loss, permanent injury and more than 150 deaths. Ocean noise is one of the biggest threats worldwide to the health and well-being of marine mammals, which rely on sound to 'see' their world. Navy sonar activities, shipping noise, and seismic exploration by oil and gas companies have made our oceans noisier in recent decades, resulting in widespread disruption to feeding, communication, mating, and more.

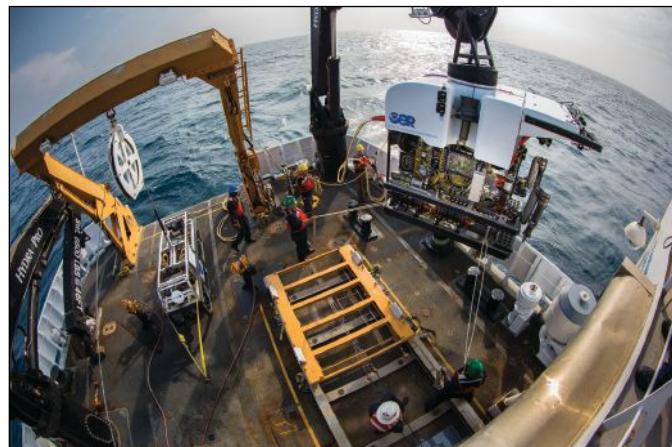
WHOI's Cyndy Chandler elected co-chair of International Oceanographic Data and Information Exchange

Cyndy Chandler, an information systems specialist at Woods Hole Oceanographic Institution (WHOI), has been elected to serve a 2-year term as co-chair of the International Oceanographic Data and Information Exchange (IODE). Established in 1961, the IODE is part of the Intergovernmental Oceanographic Commission (IOC) of UNESCO. IODE's purpose is "to enhance marine research, exploitation and development, by facilitating the exchange of oceanographic data and information between participating Member States, and by meeting the needs of users for data and information products." Chandler's co-chair is Yutaka Michida (Japan). In its announcement, IODE recognized the new co-chairs "bring with them an extensive career and experience in oceanography and data management." Chandler, who first became involved in IODE in 2006, has a passion for marine data and information management, data management best practices and effective integration of modern cyber-information technologies into the marine research infrastructure. She has participated in several influential international data management committees and has led numerous data projects at WHOI, including Rolling Deck to Repository (R2R), the NSF EarthCube OceanLink and GeoLink, the Ocean Data Interoperability Platform (ODIP) project, and is co-PI of the Biological and Chemical Oceanography Data Management Office (BCO-DMO) at WHOI.

AML CTDs with UV-Xchange chosen by Ocean Networks Canada for Smart Oceans™ project

AML Oceanographic has been selected to supply CTDs for Ocean Networks Canada's Smart Oceans™ program. AML Metrec•X instruments will be deployed on cabled observatory platforms off Canadian coasts to provide data imperative to improving environmental monitoring and marine safety. AML's award-winning UV•Xchange and Cabled UV will prevent bio-fouling of Xchange and other environmental sensors on each CTD, in addition to other critical surfaces of the platform. The prevention of fouling-induced drift will allow the sensors to provide accurate data for the duration of the *in-situ* deployments. Scott McLean, director of Ocean Networks Canada Innovation Centre, stated, "With the incredible results of the AML Oceanographic CTD and UV anti-biofouling system in our technology demonstration program, we are very pleased to be deploying these systems across coastal BC as part of the Smart Oceans™ program."

NOAA to explore depths of Caribbean Sea



Okeanos Explorer's dual-body ROV system is loaded from the aftdeck of the ship into the water before conducting an exploration dive (Credit: NOAA).

Scientists aboard the NOAA ship Okeanos Explorer have begun a series of 20 dives to investigate previously unseen depths of the Caribbean Sea and Atlantic Ocean.

During dives that are expected to go as deep as 3.7 mi, a sophisticated ROV will broadcast live video from the seafloor, allowing anyone with Internet access to watch the expedition as it unfolds.

"We'll be exploring an area of the U.S. exclusive economic zone that science knows very little about," said Alan Leonardi, Ph.D., director of NOAA's Office of Ocean Exploration and Research, the federal program responsible for coordinating this expedition. "In order to understand and sustainably manage the ocean's resources, we first have to survey what resources exist."

Many of the expedition's anticipated 20 ROV dives will take place in the Puerto Rico Trench, which is nearly 500 mi long and nearly 5.4 mi at its deepest—deeper than anywhere else in the Atlantic Ocean basin. Other areas to be explored include the Muertos Trough, Mona Channel, and Virgin Islands Trough.

During the dives, Okeanos Explorer's two-body ROV system will continuously capture high-definition video, which the ship will transmit to the Office of Ocean Exploration and Research's website, www.oceanexplorer.noaa.gov.

"We don't know exactly what we can expect to see," said Lt. Brian Kennedy, the expedition's coordinator and a member of NOAA's Commissioned Officers Corps. "That's precisely why we explore."

But, he added, scientists do know a few things about the area. They know that it is tectonically active, with some seismic hazards such as earthquakes and tsunamis. They are also fairly certain the area contains deepwater snapper populations, deepwater corals, and geological features such as seamounts and mud volcanoes.

NOAA's mission is to understand and predict changes in the Earth's environment, from the depths of the ocean to the surface of the sun, and to conserve and manage our coastal and marine resources.

For more information, visit www.noaa.gov.

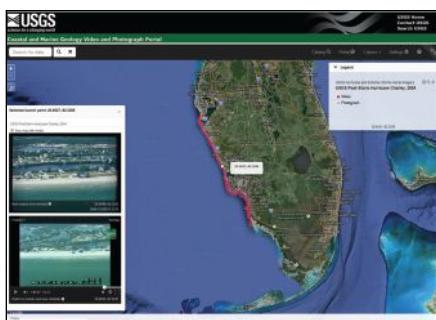
Dive in and explore thousands of coastal and seafloor images

Thousands of photos and videos of the seafloor and coastline—most areas never seen before—are now available and easily accessible online. This is critical for coastal managers to make important decisions, ranging from protecting habitats to understanding hazards and managing land use.

Imagery is available through the U.S. Geological Survey (USGS) Coastal and Marine Geology Video and Photograph Portal.

This USGS portal is unique, due to the sheer quantity and quality of data presented. It is the largest database of its kind, providing detailed and fine-scale representations of the coast. The “geospatial context” is also unique, with maps displaying imagery in the exact location where it was recorded.

This portal contains coverage of the seafloor off California and Massachusetts and aerial imagery of the coastline along the Gulf of Mexico and mid-Atlantic coasts. Additional video and photographs will be added as they are collected, and archived imagery will also be incorporated soon. Areas of



future focus include data sets for Washington State's Puget Sound, Hawaii and the Arctic.

Information in this portal helps create coastal maps and representations of seafloor composition and habitats. It provides references for short- and long-term monitoring of changes to the coast, whether from anthropogenic modifications or natural occurrences. Hurricanes and extreme storms are of particular concern, and USGS imagery helps managers, emergency responders and researchers understand circumstances before, during and after such events. Other critical hazards include coastal flooding and sea-level rise as well as assessments for earthquake and

tsunami awareness.

Data also support coastal and marine spatial planning, including evaluation of sites for renewable ocean energy facilities as well as the development of communities and infrastructure. USGS science helps designate marine protected areas, define habitats, identify needs for ecosystem restoration, and inform regional sediment management decisions.

In total, approximately 100,000 photographs have been collected as well as 1,000 hours of trackline video covering almost 2,000 mi of coastline. Imagery was taken by video and still cameras towed by boat or from aerial flights.

For more information, visit cmgvideo.usgsportals.net.

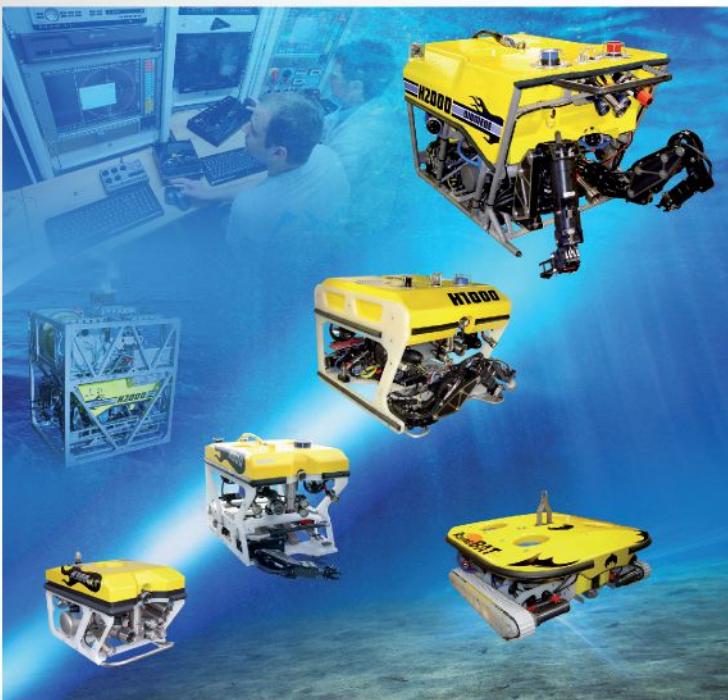
Gode wind noise and marine mammal monitoring contract won

Baker Consultants Marine Limited has been appointed by GeoSea following the success of the previous Borkum Riffgrund 1 project to provide underwater noise and marine mammal monitoring and mitigation during the construction phase of the Gode Wind 1 and 2 offshore wind farms.

May 2015

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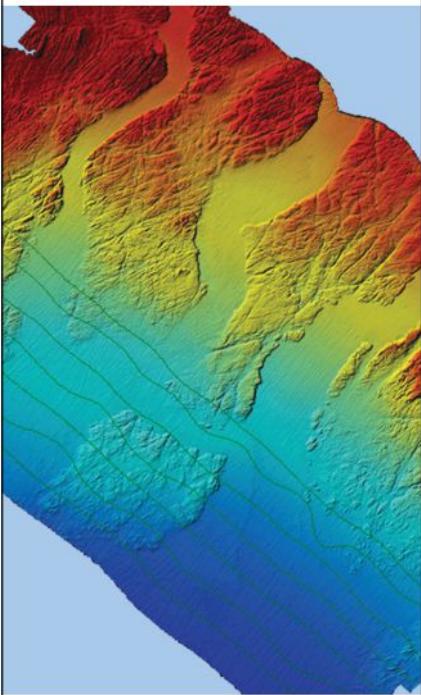
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Dr. Federica Pace, marine technical director at Baker Consultants, said: “Building on our successful work as part of DONG Energy’s Borkum Riffgrund 1 project, we are delighted to be appointed by GeoSea to carry out noise and marine mammal monitoring and mitigation for the Gode Wind 1 and 2 offshore wind farms. We will apply our expertise along with our innovative approaches and use of technology to ensure swift approval by the German government for all the offshore foundations.”

GeoSea will undertake the foundation installation work for this DONG Energy project, which will see 97 Siemens wind turbines with a total capacity of 582 MW installed in the North Sea, 45 km off the German coast. Baker Consultants is contracted to provide noise monitoring and noise mitigation advice throughout foundation installation of the 97 monopiles as well as carrying out harbor porpoise activity monitoring and marine mammal mitigation and reporting on the efficiency of the mitigation strategy. This work begins in April 2015, from when the team will be based in the Netherlands.

The wind turbines are expected to be fully commissioned in the second half of 2016. In total, the Gode Wind 1 and 2 wind farms will supply CO₂-free power approximately equivalent to the annual electricity consumption of 600,000 German households.

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

A mile deep, ocean fish facing health impacts from pollution

Deepwater marine fish living on the continental slopes at depths from 2,000 ft to 1 mi have liver pathologies, tumors, and other health problems that may be linked to human-caused pollution, one of the first studies of its type has found.

The research, conducted in the Bay of Biscay west of France, also discovered the first case of a deepwater fish species with an “intersex” condition, a blend of male and female sex organs. The sampling was done in an area with no apparent point-source pollution and appears to reflect general ocean conditions.

The findings have been published in Marine Environmental Research by scientists from Oregon State University; the Centre for Environment, Fisheries and Aquaculture Science in the UK; and other agencies. It was supported by the European Union.

The research is of particular interest, OSU researchers said, when contrasted to other studies done several years ago in national parks of the American West, which also found significant pollution and fish health impacts, including male fish that had been “feminized” and developed eggs.

“In areas ranging from pristine, high mountain lakes of the United States to ocean waters off the coasts of France and Spain, we’ve now found evidence of possible human-caused pollution that’s bad enough to have pathological impacts on fish,” said Michael Kent, a professor of microbiology in the OSU College of Science, co-author on both these research projects and an international expert on fish disease.

“Deep in the ocean one might have thought that the level of contamination and its biological impact would be less,” Kent said. “That may not be the case. The pathological changes we’re seeing are clearly the type associated with exposure to toxins and carcinogens.”

However, linking these changes in the deepwater fish to pollution is preliminary at this time, the researchers said, because these same changes may also be caused by naturally occurring compounds. Follow up chemical analyses would provide more conclusive links with the pathological changes and man’s activity, they said.

Few, if any health surveys of this type have been done on the fish living on the continental slopes, the researchers said. Most past studies have looked only at their parasite fauna, not more internal biological problems such as liver damage. The issues are important, however, since there’s growing interest in these areas as a fisheries resource, as other fisheries on the shallower continental shelf become depleted.

As the sea deepens along these continental slopes, it’s been known that it can act as a sink for heavy metal contaminants such as mercury, cadmium and lead, and organic contaminants such as PCBs and pesticides. Some of the “intersex” fish that have been discovered elsewhere are also believed to have mutated sex organs caused by “endocrine disrupting chemicals” that can mimic estrogens.

In the previous research done in the American West, scientists found toxic contamination from pesticides, the burning of fossil fuels, agriculture, industrial operations and other sources, which primarily found their way into high mountain lakes through air pollution. Pesticide pollution, in particular, was pervasive.

For more information, visit www.oregonstate.edu.

Gulf resilient 5 years after Deepwater Horizon

The Gulf of Mexico remains resilient 5 years after the explosion of the Deepwater Horizon caused the second largest oil disaster in world history. Scientists at the Harte Research Institute (HRI) for Gulf of Mexico Studies at Texas A&M University-Corpus Christi are leading a historic effort to study the spill's impact from the deepest waters of the Gulf of Mexico to the people who live on its shores.

"There's never been more research on the Gulf of Mexico than there is now," McKinney said. "The Gulf has not received the kind of funding for research that we see on the Atlantic and Pacific coasts. But today, what we are learning from the Gulf will have applications all over the world."

McKinney compared the Gulf's resiliency after the Deepwater Horizon to a rubber band, snapping back into place after a test of its strength. Many of the Gulf's most iconic species, like crabs, shrimp, and oysters, have shown no lasting effects from the spill, McKinney said. But he warned that coastal residents should not take that quick rebound for granted. The Deepwater Horizon spill in 2010 was just one of many challenges testing the resiliency of the Gulf of Mexico. Factors like climate change, habitat loss, and ocean acidification continue to threaten the long-term health and productivity of the ecosystem.

"The true measure of the health of the Gulf of Mexico is how well it can bounce back," McKinney said. "The spill was a tremendous test of that resiliency, and 5 years later it seems the Gulf has passed. But questions remain about the impact of the spill on long-lived species like turtles, marine mammals, cold-water corals, and the deep Gulf ecosystem. If you continue to stretch a rubber band to its limit, you're losing some of that elasticity and making it weaker. That is the concern we must have for the Gulf."

Looking forward, the oil spill has created opportunities for an unprecedented research on both the long-term impact of major oil spills and the environmental health of the Gulf of Mexico.

HRI was recently named as the lead organization of one of Texas' two research Centers of Excellence, funded by oil spill fines set aside by the federal RESTORE Act. Created to serve as a hub of study into the effects of man-made and natural disasters to help guide future science and restoration efforts,

the Texas OneGulf Center of Excellence will join similar efforts in Louisiana, Mississippi, Alabama and Florida.

For more information, visit www.tamucc.edu.

Are phytoplankton reducing greenhouse gases or amplifying Arctic warming?

Phytoplankton, commonly known as plant plankton that remove carbon dioxide from the atmosphere through photosynthesis, are potentially a key driver of Arctic warming under greenhouse warming, a study reveals.

Scientists with Pohang University of Science and Technology (POSTECH), Max Planck Institute for Meteorology (MPI-M), and Korea Institute of Ocean Science and Technology (KIOST), presented in Proceedings of National Academy of Sciences (PNAS) Online the geophysical impact of phytoplankton that triggers positive feedbacks in the Arctic warming when the warming-induced melting of sea ice stimulates phytoplankton growth. The paper is titled "Amplified Arctic warming by phytoplankton under greenhouse warming."

When the Arctic sea ice melts due to greenhouse warming, the ocean surface albedo inevitably decreases, reducing the amount of solar energy reflected back from the earth and ultimately resulting in a warmer ocean surface. As phytoplankton growth is subject to factors such as temperature, light, and nutrients, the explosive growth of phytoplankton follow when both the warming-induced melting and shortwave radiation penetrating the ocean increase.

The new study has confirmed that it is the beginning of the geophysical feedback by which chlorophyll and the related pigments in phytoplankton absorb solar radiation, and in turn, raise the sea surface temperature even further. Using a coupled ocean-atmosphere model, the authors have revealed that the additional positive feedback in the Arctic can amplify Arctic warming by as much as 20%.

"We believe that, given the inseparable connection of the Arctic and global climate, the positive feedback in Arctic warming triggered by phytoplankton and their biological heating is a crucial factor that must be taken into consideration when projecting future climate changes," says Jong-Seong Kug, a professor at POSTECH's School of Environmental Science and Engineering and one of the leaders of this study.

For more information, visit www.postech.ac.kr.



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DONG Energy takes over Massachusetts offshore wind project

DONG Energy has agreed to take over RES Americas Developments Inc.'s more than 1,000-MW newly assigned development project rights off the coast of Massachusetts. At the offshore wind auction held by BOEM on 29 January 2015, RES secured the rights to develop one of the two leases that were awarded. The lease comprises an area that could potentially accommodate more than 1,000 MW. Following approval from BOEM, the lease will be taken over by DONG Energy, the global market leader in developing, building and operating offshore wind farms. RES Americas will continue to support development of the lease area as agreed with DONG Energy. Entering the U.S. offshore wind market earmarks DONG Energy's entry into the first project outside Europe. Samuel Leupold, executive vice president of wind power, said, "The U.S. is an interesting market for offshore wind with the potential to become a significant area for future development. We already have a number of post 2020 projects in our pipeline in North-Western Europe that we will continue to develop. With the takeover of the offshore wind development project in the U.S., we will broaden our geographical scope and follow the market potential outside of our current footprint." A draft policy bill to support the regulatory conditions for offshore wind has been introduced with the Massachusetts government aiming to provide a stable framework that will enable the build-out of projects and the creation of new jobs. The Massachusetts lease has a total size of 760 sq. km and is located approximately 90 km from shore. Water depth is between 40 to 50 m. Leupold continued, "The site conditions are quite similar to those we currently work with in northwestern Europe which means that the project could be developed using well-known technology and logistics."

UK government reaffirms its commitment for Wave Hub

Reflecting the United Kingdom government's commitment to developing low-carbon energy, Ministers have reaffirmed their support for Wave Hub and to ensuring the UK secures maximum benefit from the facility in the future. Wave Hub is wholly owned by the Department for Business, Innovation & Skills (BIS) and exists to accelerate and support the development of offshore renewable energy technology. Claire Gibson, managing director of Wave Hub Ltd, said: "This is a vote of confidence in Wave Hub and the critical role we play supporting the wave energy sector. We are working with government and relevant organizations, such as the Offshore Renewable Energy Catapult, to deliver the government's long-term aims and consider what wider services could add further value to the existing benefits of Wave Hub." Wave Hub continues to act as a catalyst for the development of the offshore marine energy industry in the region. Two wave devices have been successfully built and deployed in Cornwall and two of the Wave Hub customers have established offices in Falmouth and Pool. The Hayle Marine Renewables Business Park is also on track for completion this summer.

Eco Wave Power establishes a subsidiary in China

Eco Wave Power (EWP) established a subsidiary in Changshu, China, under the name of Suzhou Eco Wave Technology. The company was established with investment from a Chinese Governmental fund that believes in EWP's innovative technology and provides funding for EWP's first 100-KW grid connected plant, to be completed by the end of this year. In a short timeframe, Suzhou Eco Wave Technology was able to secure consent to construct a pilot plant in Zhoushan Island, and is in advanced negotiations regarding additional 50-MW projects in Zhejiang. EWP's commercial scale power plant will be the first of its kind. With over 18,000 km of coastline and approximately 6,500 islands, China is believed to be one of the biggest markets in the world for wave energy. The theoretical mean power of wave energy resources along China's coasts reaches 12,852 MW, with most massive resources in Taiwan, Zhejiang, Guangdong, Fujian, and Shandong.

Carnegie signs agreement to develop projects in Chile



Wave energy developer Carnegie Wave Energy Limited has signed a Collaboration Agreement with Fundación Chile (FCH) to collaborate on identifying a development pathway for commercial wave energy projects in Chile.

Carnegie is pursuing a number of opportunities to develop CETO wave energy projects in Chile, and the agreement will assess the potential for commercial wave energy plants capable of producing electrical power and desalinated water in Chile and Peru.

Additionally, Carnegie is now a partner with Fundación Chile in the Valparaíso Regional Government's Innovation Fund of Competitiveness (FIC), which is aimed at developing marine energy in the Valparaíso Region, including Easter and Robinson Crusoe Islands.

The areas defined for collaboration with Fundación Chile include the assessment of wave resources at various sites, the regulatory environment, site identification and development, and project financing and construction.

The Regional Government of Valparaíso is also progressing an Innovation Fund of Competitiveness (FIC) initiative with Fundación Chile that Carnegie has now also joined. Fundación Chile will participate with other local Chilean companies and the National Institute of Hydrology (INH) to advance the development of marine renewable energy in the coastal communities of the Region of Valparaíso.

The primary objective of this project is to finalize a survey of the energy requirements of the coastal sector of the Region of Valparaíso, including assessing for the first time wave resources at Robinson Crusoe Island. The intention is to include Easter Island in the assessment during a second phase of the project according to the feasibility and support from the Government.

Easter and Robinson Crusoe Islands are two of the most remote inhabited islands in the world, located respectively around 3,500 km and 670 km off the coast of Valparaíso. Both island communities, of 5,800 and 1,000 residents, respectively, are predominately self-sustained on fishing and tourism industries, while reliant on standard diesel generation for power and water supply. Significant savings could be realized through the reduction in diesel by displacing power and water supply with renewable energy and reducing costs for energy and water production.

For more information, visit www.carnegiewave.com.

OPT to proceed to the next phase of U.S. DoE power take-off technology contract

Ocean Power Technologies, Inc. (OPT) announced that it has successfully completed a stage gate review with the Department of Energy (DoE) related to its power take-off (PTO) technology that could be used with both small and large scale PowerBuoys. Evaluation criteria for the stage gate review included PTO cost reduction, simplification of the manufacturing process, increased reliability, increased efficiency and overall reduction in PowerBuoy Levelized Cost of Energy (LCOE).

Ocean Power Technologies demonstrated considerable advancements in all of these criteria and presented what it believes to be a practical approach to aggregating the power output of optimized PowerBuoys.

George Kirby, president and chief executive officer of OPT, commented, "We appreciate the continued investments by the U.S. Department of Energy in support of our efforts to advance the marine renewable energy industry's knowledge of PTO efficiency and costs and look forward to advancing

that knowledge in the next phase of our contract. We believe these findings define a viable path toward developing scalable PowerBuoy commercial products suitable for large- and small-scale power applications."

For more information, visit www.oceanpowertechnologies.com.

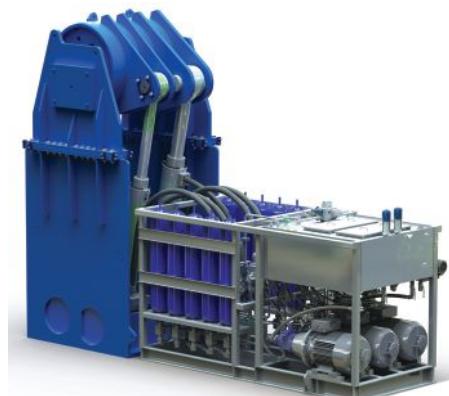
Aquamarine Power's Oyster yields exceptional operational data

Aquamarine Power has published operational information gathered during months of testing their Oyster 800 wave machine at the European Marine Energy Centre (EMEC) in Orkney.

The academic analysis examines data generated by the Oyster 800 machine last year—which includes operating during major storms with waves reaching 8 m—and verifies that the Oyster flap generates power as predicted in wave tank and numerical tests.

The initial results have been published in a blog post by the company's chief technical officer Dr. Paddy O'Kane and can be accessed here.

Commenting on the analysis, Aquamarine Power chief executive officer John Malcom said, "These exception-



al results have been gathered in more than 750 distinct sea states encompassing 94% of Oyster's power matrix and verify, for the first time, that predictions of the energy Oyster can generate in any given sea state are accurate—and in the case of large sea states is actually greater than our original calculations."

"Our business plan is to continue to develop the next-generation Oyster at laboratory scale and focus on areas of the technology which are less reliable, in particular the power take off system."

"To achieve this, we are working with Bosch Rexroth, Carnegie Wave

ROV, AUV buoyancy and umbilical flotation

1 Umbilical floats

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

2 Flexlink™ articulated umbilical buoyancy

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3 ROV buoyancy

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

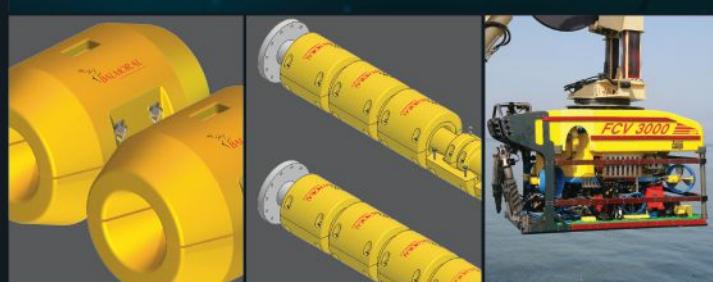
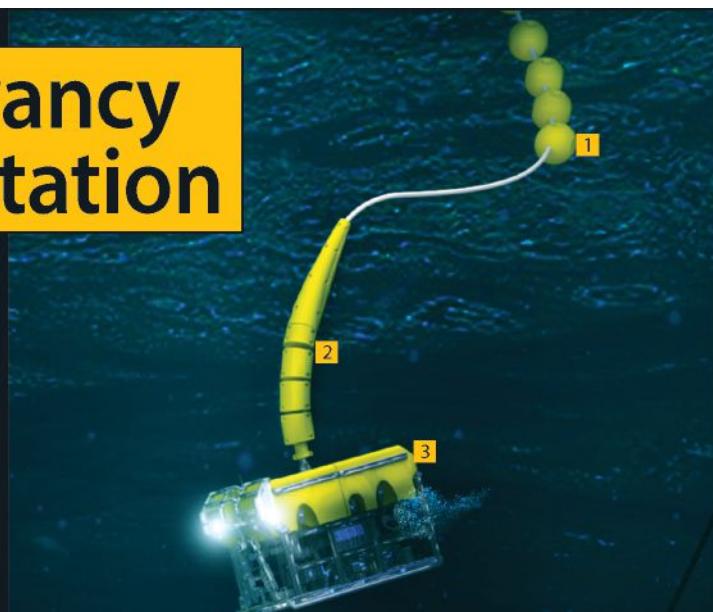
The company's refurbished ROV plant incorporates an end-to-end process that includes temperature controlled curing facilities and a state-of-the-art buoyancy block boring and milling plant.

Balmoral
Offshore Engineering



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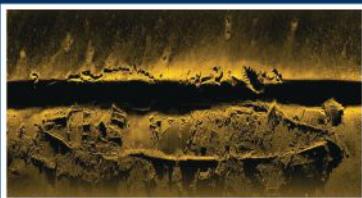
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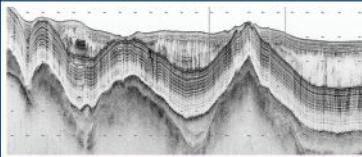
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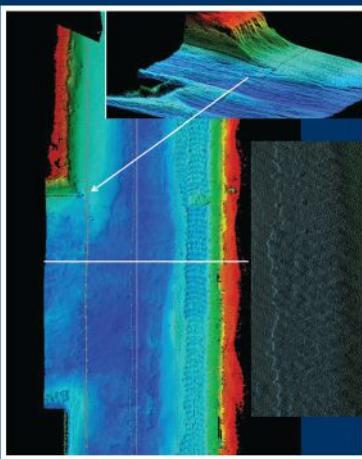
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OCEAN ENERGY

Energy and others to develop WavePOD—a sealed sub-sea generating unit which can be used by a range of wave energy technologies, including of course future iterations of Oyster.”

The WavePOD consortium already includes project founders Aquamarine Power and Bosch Rexroth, along with Carnegie Wave Energy UK and wave technology developers Albatern and M4 WavePower. It also includes Irish utility ESB, the Offshore Renewable Energy Catapult, IFAS, and University College Dublin’s Energy Research Centre.

For more information, visit www.aquamarinepower.com.

FoundOcean awarded the Gemini offshore wind farm grouting project

FoundOcean has been awarded the contract to grout the 150 monopile foundations for the 600-MW Gemini Offshore Wind Farm on behalf of main contractor Van Oord. The project will be the first to use MasterFlow 9800, a revolutionary new material jointly developed by FoundOcean and BASF.

MasterFlow 9800 possesses a unique combination of features that makes it ideal to meet the specific requirements of the project: it combines high strength, low shrinkage properties with the ability to be stored and transported in bulk silos.

FoundOcean proposed the material based on its cutting-edge properties. Sales director Andy Venn states, “Whilst all projects are different and each often presents demands that are specific to its location, design or installation schedule, the offshore wind industry in general faces a number of broader and more fundamental challenges, not least the need to drive down costs. MasterFlow 9800 offers a significant step forward in meeting these needs.”

The launch of MasterFlow 9800 in February of this year was the result of 3 years joint development between FoundOcean and BASF. According to FoundOcean managing director Jim Bell, “FoundOcean and BASF recognised the demand within the offshore wind industry for a material that could provide high early strength development and low temperature performance, yet also offer increased efficiency, safety and cleanliness.”

MasterFlow 9800’s ability to be stored in silos rather than bags facilitates quayside storage in all weathers and eliminates the requirement for bag or container lifting during grouting operations and resupply. Moreover, using FoundOcean’s modified Recirculating Jet Mixer, the new

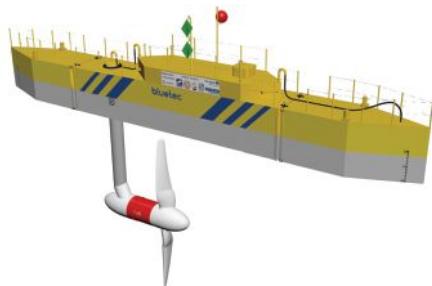
MasterFlow 9800 grout system can achieve consistent grout quality while maintaining mixing and pumping rates exceeding 20 cu.m/hr, saving valuable offshore operating days.

For more information, visit www.foundocean.com.

World's first floating tidal platform ready to generate electricity

The first BlueTEC Tidal Energy platform was formally named by the Mayor of Texel, the Netherlands. The floating platform, which holds tidal turbines below the sea surface, will soon be supplying clean electricity to the Dutch grid.

This first BlueTEC will serve as a demonstration platform targeted at remote locations worldwide, such as islands in Indonesia, Philippines and the Pacific. It is also the start of further development of higher capacity tidal energy platforms to be deployed in large farms.



The platform will be installed offshore the island of Texel and connected to the Dutch electricity grid—starting its electricity production before summer. It is meant to stay there producing electricity for several years, allowing multiple turbines to be tried out. This platform is targeted at a worldwide market; it can be shipped as containers and installed anywhere in the world to provide clean electricity in remote areas and small islands, replacing expensive and polluting diesel generators.

For more information, visit www.bluewater.com.

Report on offshore wind power for New York released

A new study, conducted by the University of Delaware’s Special Initiative on Offshore Wind (SIOW) for the New York State Energy Research and Development Authority (NYSERDA), offers a roadmap of key strategic steps New York State can take to reduce costs of offshore wind power over the next decade.

The study finds that ongoing technology and industry advances combined

with actions New York could take, independently or with other states, could lower costs for offshore wind power as much as 50% and bring the clean-energy source closer to realizing its potential for “delivering utility-scale renewable electric generation” to New York City and nearby areas such as Long Island.

A primary conclusion from the report is that supporting offshore wind development at scale, rather than on a project-by-project basis, could have the greatest impact on reducing costs. Other actions the report cites that could lower costs include creating and using innovative financing mechanisms, developing infrastructure to reduce costs, and supporting site characterization for early projects to reduce development expenses and risk.

The study notes that while onshore wind development has expanded rapidly in the U.S., no operational offshore wind power projects have been completed to date due to complex construction challenges and the need for operational infrastructure that doesn't exist today in the U.S. These factors lead to high costs and have delayed deployment.

A significant benefit of offshore wind power is its proximity to the New York City metropolitan area. Offshore wind has the potential to dramatically increase the percentage of clean energy used within New York City, the largest power consumer in New York State, adding systems benefits to the electric grid while reducing fossil fuel use and greenhouse gas emissions.

For more information, visit www.nyserda.ny.gov.

Clean Energy Group calls for multi-state collaboration for offshore wind

The disappointing news that the Cape Wind Project might never be built highlights a stark conclusion: U.S. offshore wind policy isn't working.

After nearly 15 years of planning, policy making, and contentious debate, the 430-MW wind farm off the coast of Cape Cod was dealt a sharp blow this past January when National Grid and Northeast Utilities terminated their power purchase agreements. Cape Wind was the first offshore wind project proposed in the U.S., and it was poised to be the first built. But now that bold vision for harnessing a robust no-carbon energy resource has been derailed. How can we prevent other offshore wind projects in the United States from going the way of Cape Wind?

A report by Clean Energy Group and Navigant Consulting, Up in the Air: What the Northeast States Should Do Together on Offshore Wind, Before It's Too Late, contends that the Cape Wind project's difficulties serve to highlight a larger policy problem — it is almost impossible for any single state to jump-start the entire U.S. offshore wind industry. The report recommends a multi-state collaboration to create stronger and consistent regional policies, financing actions, and permitting across the Northeast states.

If Northeast states want to reduce the costs of these projects and create offshore wind jobs, they must develop clear and consistent policies across the region to give developers good reason to build projects here. If they don't act together soon, they will lose this clean energy resource for decades to come, which will be bad for the economy and the environment.

These states must work together to develop mechanisms to overcome the major barriers associated with such projects, specifically high capital costs, lack of infrastructure (e.g., transmission, ports), and regulatory issues, according to Bruce Hamilton, director with Navigant's Global Energy Practice and one of the report's co-authors.

For more information, visit www.cleanegroup.org.

Siemens increases power output of direct drive turbine

Siemens has introduced the new SWT-7.0-154 direct drive offshore wind turbine that delivers nearly 10% more energy production than the predecessor under offshore wind conditions while retaining the same proven reliability. The new model is set to go into series production by 2017.

Stronger permanent magnets and generator segments in the permanent magnet generator provide the key to harvesting a higher yield. Additionally, the converter and transformer have been upgraded, in line with the higher electrical output. All other components remain the same tried and proven engineering of the 6-MW wind turbine, giving Siemens' customers the assurance of relying on proven technology and supply chain while significantly increasing energy production. The 6-MW version will continue to be available for sales but following the improvements, Siemens has renamed the product platform D7.

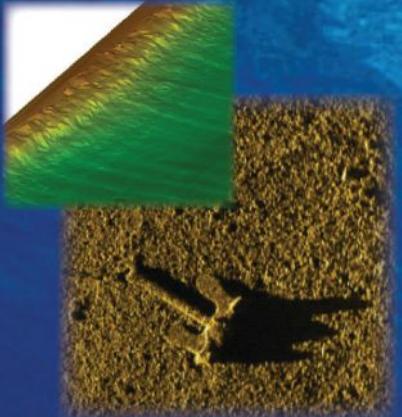
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Low profile photonics mast award

L-3 KEO, Northampton, Massachusetts, is being awarded an \$111,794,194 cost-plus-incentive-fee, fixed-price-incentive-fee, cost-plus-fixed-fee, cost-only, and firm-fixed-price contract for the development, first article, production and support of the Low Profile Photonics Mast (LPPM). The LPPM is a modular non hull-penetrating imaging sensor sited in a telescoping universal modular mast bay that provides submarines with improvements in stealth and survivability. Features include short-wave infrared and high definition visual imaging, laser range finding, special stealth features, and a capable antenna suite with broad spectral coverage and direction finding. This contract includes options that, if exercised, would bring the cumulative value of this contract to \$157,000,000.

HII awarded \$12.3M for support of the LX(R) Amphibious Ship Replacement Program

Huntington Ingalls Inc., Pascagoula, Mississippi, is being awarded a \$12,299,265 modification to previously awarded contract N00024-14-C-2410 for additional LX(R) Amphibious Ship Replacement Program early industry involvement for preliminary design efforts. The LX(R) Amphibious Ship Replacement Program awarded early industry involvement contracts to two U.S. shipyards (Huntington Ingalls Industries Inc., Ingalls Shipbuilding Division, and General Dynamics NASSCO) that have the facilities and resources to build a large amphibious ship without major re-capitalization. The contractor(s) will be required to continue to perform design efforts, special studies, analyses, and reviews in support of the LX(R) Amphibious Ship Replacement Program. The tasking may include efforts related to systems engineering, marine engineering, naval architecture, cost estimating and computer modeling. The early industry involvement contracts will enable the shipyards to investigate ship designs and production cost reduction opportunities and to participate in the preliminary design evolution and reviews. Input from the shipyards will help the government refine its analysis and produce sound design products and cost estimation relationships. The participation of these two shipbuilders in the early design and preliminary design phases captures total ownership cost reduction opportunities upfront when larger savings may be achieved prior to ship detail design and construction.

Thales wins French-UK mine countermeasures contract

On behalf of the French Defence Procurement Agency (DGA) and the United Kingdom MOD's Defence Equipment & Support organization, the Organisation for Joint Armament Cooperation (OCCAr) has awarded the Maritime Mine Counter Measures (MMCM) contract to Thales, in collaboration with BAE Systems and their partners in France (ECA Group) and in the UK (ASV, Wood & Douglas, SAAB). Initiated in 2012 under a cooperation agreement between France and the United Kingdom, the MMCM program develops a prototype autonomous system for detection and neutralization of sea mines and underwater improvised explosive devices (UWIEDs). The MMCM program is a key milestone in the transformation of mine countermeasures capabilities and the future operational use of unmanned naval systems. This major French-UK program will develop a key new industrial capability for underwater and robotic detection. Split equally between the two nations, the program will rely on innovations with an advanced level of technological maturity. The MMCM contract includes three stages, starting with a first phase for design. The next stages, which are subject to contract options, will manufacture and experiment the future mine countermeasures capabilities of both France (SLAM-F future mine countermeasures system) and the United Kingdom (MHC – Minecountermeasures and Hydrography Capability). The program will deliver an autonomous, remotely operated mine countermeasures solution. As part of the MMCM program, Thales is committed to providing systems to both the French Navy and Royal Navy for 2 years of evaluation testing. Each system will comprise a USV equipped with an autonomous navigation system, an obstacle detection and avoidance sonar, a threat identification and neutralization capability based on ROVs, a towed synthetic aperture sonar and AUVs.

Bollinger delivers the CGC Richard Dixon

Bollinger Shipyards LLC has delivered the Richard Dixon, the 13th Fast Response Cutter (FRC) to the United States Coast Guard.

The announcement was made by Bollinger's president and C.E.O., Ben Bordelon. "We are very pleased to announce the delivery of the latest FRC built by Bollinger, the Richard Dixon, to the 7th Coast Guard District in Puerto Rico. We are looking forward to honoring and celebrating the heroic acts of Richard Dixon at the vessel's commissioning."

The 154-ft patrol craft Richard Dixon is the 13th vessel in the Coast Guard's Sentinel-class FRC program. To build the FRC, Bollinger used a proven, in-service parent craft design based on the Damen Stan Patrol Boat 4708. It has a flank speed of 28 kts, state-of-the-art command, control, communications and computer technology, and a stern launch system for the vessel's 26-ft cutter boat. The FRC has been described as an operational "game changer," by senior Coast Guard officials.

The Coast Guard took delivery on 14 April 2015 in Key West, Florida, and is scheduled to commission the vessel in Tampa, Florida during June 2015.

Each FRC is named for an enlisted Coast Guard hero who distinguished him or herself in the line of duty. This vessel is named after Coast Guard Hero Richard Dixon. Dixon, a First Class Boatswains Mate stationed at Tillamook Bay, was awarded two Coast Guard Medals for his heroic actions on the July Fourth weekend in 1980. A series of dangerous storms swept across the Pacific Northwest and two boating incidents could have ended in disaster. Dixon and his crew courageously performed two separate rescues that weekend in the treacherous storm conditions.

For more information, visit www.bollingershipyards.com.

LDUUV-INP on display at Sea-Air-Space Expo

For the first time ever, the Large Displacement Unmanned Undersea Vehicle-Innovative Naval Prototype (LDUUV-INP) was on display to the public 13 to 15 April during the Sea-Air-Space Exposition at the Office of Naval Research (ONR) booth.

LDUUV-INP represents cutting-edge UUV research that will deliver game-changing capabilities to naval warfighters. This LDUUV-INP is the second version of the platform.

"Sea-Air-Space presents a great opportunity for us to



highlight ONR's contributions that are making a marked difference to our warfighters, to our Navy and Marine Corps, and the nation," said ONR executive director Dr. Walter Jones. "Scientific leadership in autonomy and unmanned systems enabled the LDUUV-INP, which will strongly complement our existing undersea capabilities and platforms."

Naval leaders at the expo addressed the significant science and technology advancements that have taken place under the LDUUV-INP program, including leap-ahead capabilities in UUV endurance, power and autonomy.

For more information, visit www.navy.mil.

Navy scientists develop prototype for diver life support

Naval Surface Warfare Center Panama City (NSWC PC) scientists have developed a prototype for a new life support system for divers in the Navy. The goal of the new system is to accelerate the deployment of Navy divers, increase safety, and also conserve helium, a valuable natural resource.

"This new, semi-closed system was conceived to drastically reduce helium requirements," said NSWC PC principal investigator Dr. John Camperman. "And where possible we also incorporated proven technology in the system in order to speed transition to operators." Currently, U.S. Navy mobile diving and salvage units meet their requirement for manned diving operations with the Fly-Away Mixed Gas System (FMGS). The FMGS provides breathing gas through an umbilical to a demand regulated, open circuit, diver-worn helmet. In each breathing cycle, all inhalation is from surface-supplied gas and all exhalant vents to the sea. In the process, a large portion of oxygen and helium are wasted.

"The new system modifies the current helmet and rebreather. Prototype analysis and testing have shown that drastic reduction in helium consumption is possible," said Camperman. "Testing of the new prototype system indicates that the full range of FMGS diving is supportable within Navy life support requirements and that several life support characteristics are improved, including extended emergency come-home gas duration."

Conserving helium can produce a snowball-like effect. FMGS operational cost is driven by transportation, support vessel size, and consumables (largely helium). Reducing helium requirements will reduce deck space requirements, and can thereby positively impact all three cost variables.

The new life support system is part of the Initial Response Diving (IRD) project. IRD is a Navy innovative science and engineering initiative to support faster recovery of objects in deep waters. The ultimate goal of IRD is to provide military diver intervention to depths of 600 ft anywhere in the world. The goal would put diver's hands on

May 2015

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EXHIBITING AT CONGRESO MEXICANO DEL PETROLEO (CMP) 2015
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- JUNE 16TH - 18TH
- JULY 14TH - 17TH
- GUADALAJARA, MEXICO
- SOUTHAMPTON, UK
- PORTLAND, OREGON, USA
- BOOTH #300
- BOOTH #R4
- BOOTH #9074

TE
connectivity



targets for recovery within 36 hours of deployment.

The implications of this project have international and humanitarian significance. The IRD project could support life-saving rescues for survivors trapped in a capsized hull or subsea infrastructure maintenance. The project could also enhance disabled submarine assessment and escape or rapidly recover sensitive debris from vessels, aircraft or spacecraft.

The Naval Surface Warfare Center Panama City Division conducts research, development, test and evaluation; in-service support of mine warfare systems, mines, naval special warfare systems, diving and life support systems; amphibious/expeditionary maneuver warfare systems; and other missions that occur primarily in coastal (littoral) regions. It is a field activity of Naval Sea Systems Command (NAVSEA).

For more information, visit www.navy.mil.

SPAWAR commander releases strategic vision for leading the Navy in cyber warfighting

Space and Naval Warfare Systems Command (SPAWAR) Commander Rear Adm. David Lewis released his strategic vision 6 April in support of the Navy's quest to ensure information dominance throughout its warfighting domains, specifically cyber.

Outlining SPAWAR's role as a leading cyber command, the strategic vision document aligns closely with the recently released Navy Cooperative Strategy

for 21st Century Seapower (CS21). Cyber issues figure prominently throughout CS21 and are a key element of all domain access, an essential function for maritime forces.

"Emerging technology and improved cyber performance are inexorably linked," said Lewis to the SPAWAR workforce during an all-hands meeting. "Navy continues to integrate cyberspace operations as an essential component of fleet operations. Effective, assured cyber operations must become part of our core mission to maintain our warfighting advantage."

This latest vision incorporates SPAWAR's response to evolving cyber threats that could affect advanced and integrated information technologies used by systems ranging from seabed to space.

All domain access, as identified in CS21, contains the following warfighting tenets: battlespace awareness, assured command and control, cyberspace operations, electromagnetic maneuver warfare (ECW), and integrated fires.

According to CS21, when all domain access is applied the Navy can "defeat anti-ship ballistic and cruise missile threats by making use of superior battlespace awareness to employ cyber and EMW capabilities in an integrated fires approach that defeats the threat before it has even been launched." Achieving that kind of end-state requires a common cyber baseline across platforms that support quicker, more relevant upgrades for the fleet.

"We're moving away from traditional 'cutting metal' upgrades to a process of delivering enhanced capabilities in rack replacement and software only changes," explained Lewis. "This approach reduces dependence on ship availabilities, and more importantly, increases the delivery speed of new capabilities."

As the Navy's Information Dominance systems command, SPAWAR designs, develops, and deploys advanced communications and information capabilities. With more than 8,900 active duty military and civil service professionals located around the world and close to the fleet, SPAWAR is at the forefront of research, engineering, acquisition, and support services that provide vital decision superiority to our forces at the right time and for the right cost.

For more information, visit www.navy.mil.

Bluefin Robotics delivers ship hull inspection systems to Navy

Bluefin Robotics has successfully delivered new vehicles to the U.S. Navy that will increase the Navy's capability to remotely search and investigate ship hulls, harbor seafloors, and other underwater infrastructure for limpet mines, Improvised Explosive Devices (IEDs), and other objects of interest. The Navy accepted delivery of Bluefin Robotics' ship hull inspection systems 4 and 5 under the "Explosive Ordnance Disposal, Hull Unmanned Underwater Vehicle Localization System" (EOD HULS) Program of Record in February.

Each EOD HULS System (known as MK19) consists of two vehicles and associated support equipment. Bluefin's third-generation Hovering Autonomous Underwater Vehicle (HAUV-3), used in the MK19 system, was developed under Office of Naval Research and the EOD Program Office (PMS 408). The vehicle allows detection of IEDs and limpet mines on ship hulls, piers, pilings, and quay walls for harbor and force protection.

"The MK19 vehicle operates by hull-relative navigation and control and provides very detailed acoustic images of a ship hull with 100% sonar coverage, without prior knowledge about the ship," said Jerome Vaganay, Bluefin's director of inspection systems.

"Although it looks like a Remotely Operated Vehicle (ROV) with its six thrusters and its fiber optic data tether, the vehicle is powered by an onboard battery and operates primarily autonomously with the ability for the operator to take manual control to investigate contacts," Vaganay said.

With the delivery of systems 4 and 5, the Navy currently owns 10 production vehicles and two prototypes. Another two systems are scheduled to be purchased by the Navy in 2015 under the EOD HULS contract, which is worth \$15 million.

For more information, visit www.bluefinrobotics.com.



HMS Kent joins battle groups in fight against ISIL

The Royal Navy anti-submarine frigate HMS Kent has been part of the battle group of the USS Carl Vinson as the carrier launches bombing strikes against ISIL forces in the Middle East.

The Type 23 frigate has also been on duty with the French FS Charles de Gaulle carrier strike group during her four months in the Gulf.

Aircraft from both carriers have been conducting daily missions against key ISIL targets as part of the coalition involving more than 60 countries.

The anti-submarine frigate has been protecting the battle group vessels – and more than 7,000 personnel – from threats at sea and from the air.

Commanding Officer, Commander Andrew Block said, "HMS Kent provides a secure bubble of international water to support those fighting in Syria and Iraq. Charles de Gaulle relies on us to do our job effectively so that she can concentrate on delivering the strikes against ISIL."

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

General Dynamics Electric Boat hosts keel-laying ceremony for submarine Colorado

Continuing a time-honored shipbuilding tradition, on Saturday, March 7, Ship Sponsor Annie Mabus laid the keel of the submarine Colorado, marking the ceremonial start of construction for the 15th ship of the Virginia Class.

The event was hosted by General Dynamics Electric Boat at its Quonset Point facility and attended by local and Congressional dignitaries, Navy officials and more than 1,000 employees and family members. Mabus, the daughter of Secretary of the Navy Ray Mabus, chalked her initials on a steel plate to be affixed in the submarine. Electric Boat employee John Alves then welded Mabus' initials onto the plate.

"Here in Quonset Point and in Groton, in Newport News and around the country, thousands and thousands of exceptionally skilled shipbuilders will build the USS Colorado, the most advanced ship in the world," said Navy Secretary Mabus. "No one builds warships as well as America. No one."

Along with the other ships of the Virginia Class, Colorado represents a revolution in submarine design, construction and mission capability. Its contract delivery date to the Navy is August 2017.

Virginia-class submarines have been delivered on-budget and ahead-of-schedule, and displace 7,800 tons, with a hull length of 377 ft and a diameter of 34 feet. They are capable of speeds in excess of 25 kts and can dive to a depth greater than 800 ft, while carrying Mark 48 advanced capability torpedoes, Tomahawk land-attack missiles and unmanned underwater vehicles. In April 2014, the Navy awarded a \$17.6 billion contract – the largest in Navy shipbuilding history – to build 10 additional vessels.

"Colorado will be a testament to the dedication of the employees of Electric Boat and Newport News Shipbuilding; our supplier network; the leadership of the U.S. Navy, and our supporters in Congress," said Jeffrey S. Geiger, president of Electric Boat.

Serving as the backdrop for the ceremony was the 100-ft, 1,600-ton module that will contain Colorado's engine room.

For more information, visit www.gdeb.com.

Future USS John Finn (DDG 113) launched

The future USS John Finn (DDG 113) was launched at the Huntington Ingalls Industries (HII) shipyard 28 March. During launch the drydock was flooded allowing the 637-ft floating dock to slowly submerge until the ship was afloat. Once the drydock was fully submerged, the ship was pulled by tugs to HII's south berth where the ship will continue outfitting in preparation for test and activation and eventual delivery to the Navy. The next major milestone is the ship's Aegis system light off planned for later this year.

"This is the first DDG 51 class ship to launch in almost 4 years and we're both proud and excited with the progress the program is making," said Capt. Mark Vandroff, DDG 51 class program manager, program executive office (PEO) ships. "I look forward to John Finn joining the fleet and the other ships of her class to continue in the legacy of success that is the Arleigh Burke destroyer."

John Finn is the 63rd Arleigh Burke (DDG 51) class destroyer, and the first of the DDG 51 Flight IIA restart ships. HII currently has three DDG 51 destroyers under construction at the yard and an additional four under contract. The keel of DDG 113 was laid in November 2013, and the christening ceremony is planned for 2 May.

"DDG 51 production is in full swing at the shipyard," said Vandroff. "The Navy and shipbuilder are working

closely together to ensure continued quality and value as production continues on the restart ships."

John Finn will be equipped with the Navy's Aegis Combat System, the world's foremost integrated naval weapons system. Once operational, the multi-mission surface combatant will serve as an integral player in global maritime security, engaging in air, undersea, surface, strike and ballistic missile defense. DDG 51 Flight IIA ships will provide increased capabilities over previous flights of Arleigh Burke destroyers, including advances in anti-submarine warfare, command and control, and anti-surface warfare.

For more information, visit www.navy.mil.

Navy accepts delivery of USNS Trenton (JHSV 5)

The Navy accepted delivery of the USNS Trenton (JHSV 5), its fifth joint high speed vessel on 13 April.

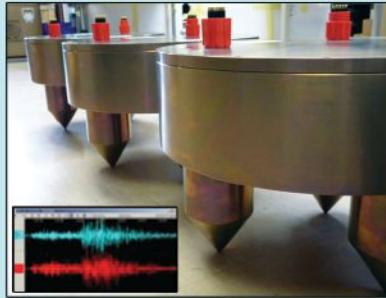
Having completed acceptance trials only a month ago, the ship continues to meet key milestones as it progresses towards operational status. Now delivered to the Navy, the ship's crew will begin move-aboard and familiarization before the ship sails from the shipyard to begin her shakedown period and final contract trials later this year.

The first two ships of the class, USNS Spearhead (JHSV 1) and USNS Choctaw County (JHSV 2), have already demonstrated their inherent flexibility participating in international exercises and missions. Most recently, in conjunction with multinational maritime exercises, USNS Spearhead delivered more than 15,600 lbs of medical equipment and supplies to non-government organizations operating in Ghana.

USNS Trenton will be owned and operated by Military Sealift Command (MSC) and will be manned by a crew of 22 civil service mariners.



Seafloor Communications Specialists



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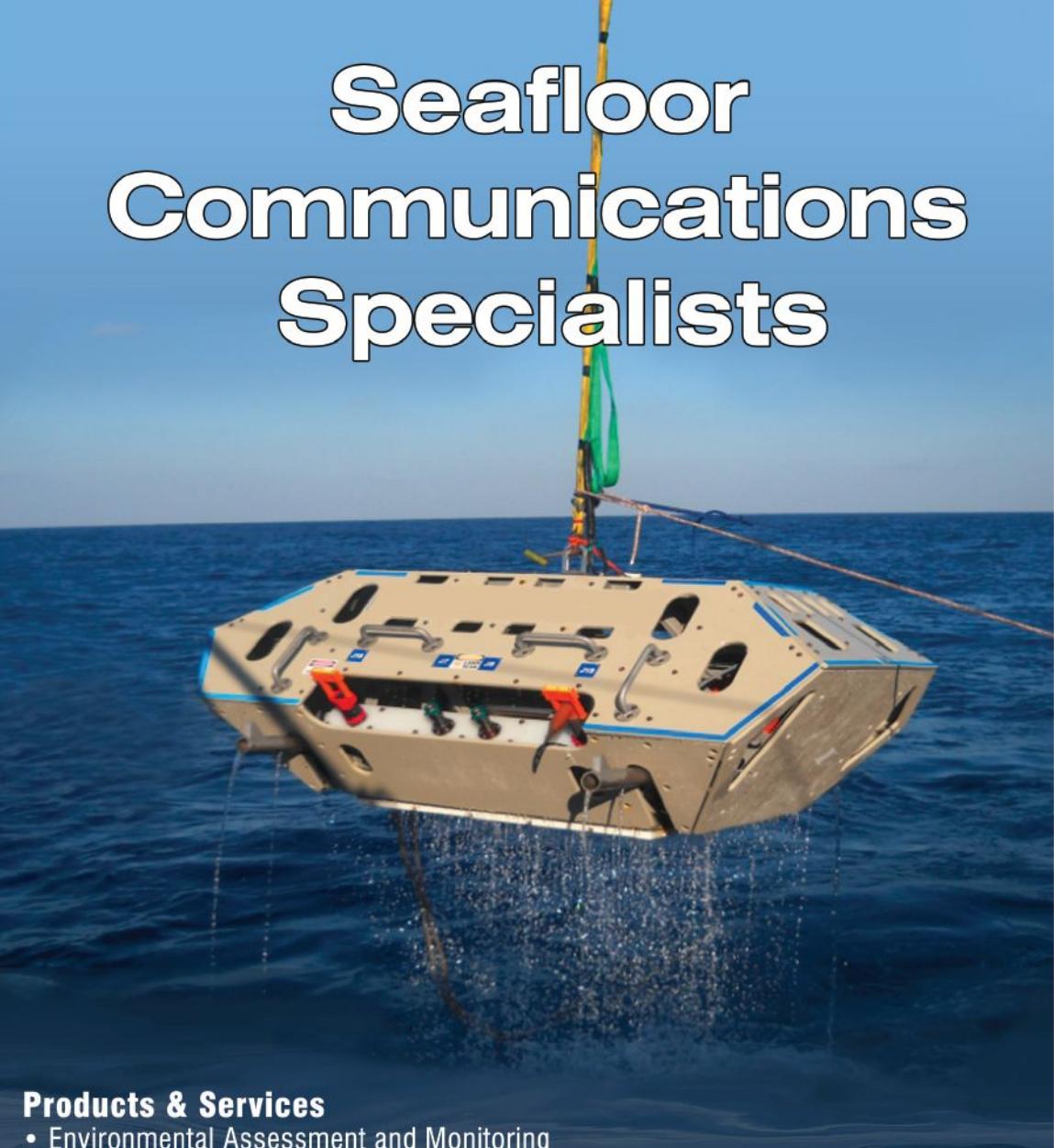
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Experts in Seafloor Communications Network

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

Offshore Communications Backbone

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



OFFSHORE INDUSTRY

UK introduces tax cuts, allowances to support North Sea oil industry

The supplementary tax charge on UK oil and gas companies will be reduced to 20% from 30%, backdating it to January, and petroleum revenue tax will also be cut to 35% from 50%. Chancellor of the Exchequer George Osborne commented in the annual budget speech. The government also will provide U.S. \$29.6 million for a seismic surveys program in under-explored areas of the North Sea.

"While the falling oil price is good news for families across the country, it brings with it challenges for hundreds of thousands whose jobs depend on the North Sea," Osborne said. "But it's clear to me that the fall in the oil price poses a pressing danger to the future of our North Sea industry, unless we take bold and immediate action."

The tax cuts and allowances package is said to offer annual savings of \$1.9 billion to the industry.

According to a review by the Office for Budget Responsibility, the measures could help increase North Sea oil production by 15% by the end of the decade, to at least 120 mmboe of additional production. The reforms could also attract over \$5.9 billion of additional investment to the industry.

Oil companies have been asking the government to simplify the tax regime, to tackle record-high costs and the drop in oil output from North Sea fields. Companies are seeking support for investments worth around \$37.1 billion in the UK Continental Shelf.

Drilling activity to rebound in 2016 after exploration cuts this year: WM

Drilling activity across the global oil and gas industry could return to 2014 levels next year, according to a new report from research firm Wood Mackenzie. Wood Mac said that although the oil and gas industry is currently responding to the low oil price environment, with exploration budget cuts in 2015 expected to average 30%, drilling activity in 2016 is set to recover as many explorers seize their chance to drill at lower costs. In its report "Upstream Cost Deflation: How Much



George Osborne

Could Costs of Exploration Fall?" the firm noted that the industry is now addressing a longstanding cost inflation issue.

"Rising costs are not a new problem for explorers. Over this decade, inflation has more than offset price gains and left much of the industry struggling to create value. Now that prices have fallen sharply, this problem has become acute. In the short term, many explorers will react by simply spending less. But what they really need is lower costs," said Andre Latham, vice president of exploration research for Wood Mac.

Wood Mac estimates that exploration deflation will average 33% by 2016, with like-for-like costs falling by 19%.

"Only about half of these gains will be enjoyed during 2015 as contracts unwind and operators take time to adopt new practices," Latham added. "We expect the full benefit during 2016, unless oil prices recover quickly. Deflation at this rate could allow any companies that hold spending flat into 2016 to fund 50% more exploration versus 2014. Even those with cuts of around the average 30% may see their 2016 activity bounce back to 2014 levels."

U.S. oil growth biggest since 1900, but cooldown coming: EIA

U.S. oil production grew more in 2014 than any year since 1900, the federal Energy Information Administration said. Output climbed 1.2 mmbbl per day, or 16.2%, hitting 8.7 mmbbl daily last year. Much of the boom came from shale regions in North Dakota, Texas, and New Mexico that have become prolific players in the U.S. energy surge.

Crude production has now increased each of the past 6 years and is expected to rise this year and in 2016, the agency said. But it has shaved its forecast by 200,000 bbl per day, down to 9.3 mmbbl for 2015 amid low prices. It projected annual growth of 8.1% this year and 1.5% in 2016.

"Although oil production is expected to rise in 2015 and again in 2016, the growth is not expected to be as strong as in 2014. Since mid-2014, the price of crude oil has fallen about 50%, which has slowed production in marginal drilling areas and focused investment in the more developed areas of tight oil plays," EIA said.

However, low oil prices are threatening the U.S. shale industry's strength because of the high cost of hydraulic fracturing.

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Shell to buy BG for about \$70B amid historic downturn in energy prices

Shell has agreed to acquire British oil and gas major BG Group for \$70 billion in a deal that could be the largest merger between energy companies in a decade. It also would create the world's largest independent producer of liquefied natural gas amid a historic downturn in oil and gas prices.

Formed in 1997, BG is one of the two demerged companies of British Gas and is engaged in exploration and production activities. The company has a workforce of 5,200 across its operations in 24 countries worldwide. Under the recommended cash and share offer, Shell will pay approximately \$20 per BG share, a premium of around 52% to the 90-day trading average.

The merger would create an entity worth \$296 billion that is expected to generate pre-tax synergies of approximately \$2.5 billion a year. BG shareholders will own a 19% stake in the combined company and will receive



dividends of \$1.88 per ordinary share in 2015 and at least that amount in 2016.

The deal, if approved by shareholders and regulators, will bring together two companies that have been buffeted by a sharp drop in oil and gas prices since last summer and would enable the two European energy giants to eliminate overlapping costs to help offset the impact of weaker prices.

"The result will be a more competitive, stronger company for both sets of shareholders in today's volatile oil price world," Shell chairman Jorma Ollila said.

By applying its capabilities to the BG assets, Shell believes that, by around 2020, the combined group will have two strategic growth businesses—deep water and integrated gas—that could potentially each generate \$15 billion to \$20 billion of cash flow from operations a year.

OFFSHORE INDUSTRY HEADLINES

Research & Development • Environmental Assessment • Discovery

Global offshore accommodation market said to grow substantially

The global offshore accommodation market has grown substantially, with Person on Board (PoB) requirements increasing by 27% between 2009 and 2014, according to research firm Douglas-Westwood (DW).

Although the recent oil price dip has impacted the market to some extent, the effect so far has been limited mainly to units supporting capex-related activities.

Of greater significance is opex, the analyst claims, which will account for 69% of PoB requirements during 2015. Accommodation units are deployed to reduce downtime during periods of essential maintenance. In the current oil price environment, sustaining production levels and reducing downtime from maintenance programs becomes more critical. DW, therefore, expects growth in the accommodation market for units supporting opex activities to be sustained at 3% per year through 2020.

Improved crew welfare, with the knock-on impact of improved productivity, is a priority, particularly for IOCs. Newbuild accommodation units are being built with higher levels of crew comfort.

One issue is the maximum number of workers per cabin. The UK Health & Safety Executive's "Double Occupancy" standard limits accommodation units serving UK offshore facilities to two workers maximum per cabin.

Units sleeping four or more workers within the same room are becoming less desirable, DW added, outside of price-sensitive regions such as West Africa or the Middle East. Operators cite WI-FI and quality food as key criteria.

However, if oil prices remain at their current level, it is questionable whether welfare will be sacrificed in favor of accommodation units with lower day rates, DW suggested. The choice could depend on the operator's preferences and regional regulations.

Weak oil prices put damper on Central Gulf of Mexico lease sale

Slumping crude prices tempered industry's enthusiasm for new Gulf of Mexico drilling rights during a government auction in March. Central Gulf Lease Sale 235 attracted \$538.7 million in apparent high bids and \$583.2 million in total bids, down from the \$850.8 million in apparent high bids and \$1.09 billion in total bids seen in last year's Central Gulf Lease Sale 231.

Abigail Hopper, director of the Bureau of Ocean Energy Management (BOEM) that conducted the sale in New Orleans, Louisiana, said the results were

"about what we expected given that oil prices obviously are lower than they have been in the last 6 years."

"That has an impact," she said. "As the companies look at their revenue and their plans for the future, they make different decisions than they would have if the market were in a different place."

Forty-two companies submitted 195 bids on 169 tracts, covering approximately 923,700 acres. Deepwater blocks were a focus of bidding, with 64 blocks in



more than 5,249 ft of water receiving bids. The deepest block receiving a bid, Lloyd Ridge Block 454, lies in 9,901 ft of water. Green Canyon Block 364 received the greatest number of bids in the lease sale, followed by Green Canyon 804 and Atwater Valley Block 153.

Houston Energy LP and Red Willow Offshore LLC made the highest bid in the lease sale with their \$52.2 million offer for Walker Ridge Block 107. The offer also made it the highest bid per acre of the sale with \$9,066/acre.

Shell Offshore Inc., Statoil Gulf of Mexico LLC, Venari Offshore LLC, Chevron U.S.A. Inc., and ExxonMobil Corp. were the top five bidders in the lease sale, with respective bids of 17, 14, 12, 11, and 11. Chevron, Red Willow Offshore, ExxonMobil, Statoil and PXP Offshore LLC were the top five bidders in terms of high bids.

The agency estimates that the sale could result in 460 mmbbl and 890 mmbbl of oil production and 1.9 tcf to 3.9 tcf of natural gas.

"While this sale reflects today's market conditions and industry's current development strategy, it underscores a steady, continued interest in developing these federal offshore oil and gas resources," Secretary of the Interior Sally Jewell said in a press statement.

The sale also included 201 blocks located fully or partially within the 3 statute mi U.S.-Mexico boundary Area as well as blocks in the former Western Gap that lie within 1.4 nautical mi north of the Continental Shelf Boundary between the United States and Mexico. None of these blocks received bids.

Number of U.S. wells down slightly, but depth and distance up: survey

An estimated \$147.7 billion was invested in drilling about 45,000 U.S. oil and natural gas wells in 2013, according to American Petroleum Institute's 2013 Joint Association Survey on Drilling Costs. The number of wells declined slightly from 2012 and costs remained flat, but the average depth and total distance drilled increased, indicating a rise in efficiency.

"Even before the recent decline in oil prices, developers focused on maximizing each well, reducing the costs and surface footprint of energy production," said API statistics director Hazem Arafa. "The well count didn't rise, but the wells are getting deeper and more efficient. As a result, the U.S. is improving its ability to remain a competitive energy superpower, creating jobs and fueling economic growth."

From 2012 to 2013, the number of new wells declined from an estimated 46,548 to 45,039, according to the survey. Expenditures held at an estimated \$147.7 billion compared to \$148.9 billion in 2012. In contrast, the average well depth increased from about 7,981 ft to 8,491 ft and the total well footage (horizontal and vertical distance drilled) grew from an estimated 365.9 to 368.1 million ft.

Total footage among shale wells, about 30% of wells surveyed, increased to an estimated 190.9 million feet from 188.8 million feet. In addition, demand for oil outpaced demand for gas, with oil wells accounting for 65.1% of expenditures in 2013.

Over the same period, U.S. crude oil production increased from an average of 6.5 mmbbl per day in 2012 to an average of 7.5 mmbbl per day in 2013, while marketed natural gas production rose from 25.3 to 25.7 tcf, according to the Energy Information Administration.

"The cost per foot among shale wells has declined over 43% since 2009, and that drive toward efficiency is helping U.S. energy production to stay competitive in a difficult market," said Arafa. "Strong domestic production means savings for consumers, greater energy security, and more economic opportunities for workers here in the U.S."

API's 2013 Joint Association Survey on Drilling Costs is available through API's primary distributor, Information Handling Services (IHS). To purchase this report, contact IHS at 1-800-854-7179 or visit the website at www.global.ihs.com. API's more than 625 members include large integrated companies as well as exploration and production, refining, marketing, pipeline, and marine businesses, and service and supply firms.

COS report finds U.S. offshore operations safer, but can improve

New data from industry operations and independent third-party audits reveals the U.S. offshore oil and natural gas industry's highest commitment to safety, according to the Center for Offshore Safety's (COS) first annual performance report.

"America's offshore oil and natural gas industry is even safer than before, but our goal will always be zero accidents and zero spills," said COS executive director Charlie Williams. "Sharing data and lessons learned throughout the industry is an essential part of the work COS does to continually enhance safety."

The report, based on data collected from COS members about their 2013 operations, highlights key indicators of safety performance, lessons learned from incidents, and information from the first cycle of safety audits now required by federal regulations. These audits are based on an industry standard developed by the American Petroleum Institute covering Safety and Environmental Management Systems.

Key findings of the report include on average, 96% of planned critical maintenance, inspections and testing were performed on schedule; all eligible COS members successfully completed audits of their Safety and Environmental Management Systems; and COS participating members did not suffer a single fatality or loss of well control during more than 42 million work hours in the deepwater Gulf of Mexico.

"This is the first report of its kind to be published by U.S. regulators or industry," Williams noted. "Our strong culture of safety continues to grow along with advances in technology and industry standards. So long as there is any room for improvement, our work at COS will never be complete. This is our livelihood, and our work is critical to America's new energy renaissance."

Based on the report's findings, the top three areas COS has identified for further improvement are safe mechanical lifting, such as the use of cranes and hoists; process safety, with emphasis on risk management and maintenance, inspection and testing; and effectiveness of and adherence to operating procedures and safe work practices, particularly the quality of work plans and preparation.

COS, an industry-led initiative, said it will use the findings of the report as a baseline for future comparisons of year-to-year performance and safety improvement. Subsequent annual performance reports will be published in the year following the data presented.

Lifting crude export ban bolsters economy, energy security: Rice University

Lifting the 40-year-old U.S. ban on exporting crude oil would lead to more stable energy prices and greater North American energy security, according to a new study by the Center for Energy Studies at Rice University, Houston, Texas.

The study, "The U.S. Crude Oil Export Ban: Implications for Price and Energy Security," contends that rapid increases in U.S. oil production from the shale boom have created a glut in light shale crude oil and a U.S. trade imbalance for a nation that is now importing less oil. Allowing more U.S. exports would help balance the industry and the economy and lead to fewer price swings and instability, this report and others argue.

The findings were presented in March at the National Press Club in Washington, D.C., by Kenneth Medlock, the Rice center's senior director and the paper's author.

"The production surge has led to a large decline in U.S. crude oil imports," Medlock said in the release of the study. "The trade balance effects extend to petroleum product markets where, due to stagnant domestic demand, the U.S. has become a net exporter of petroleum products over the last few years."

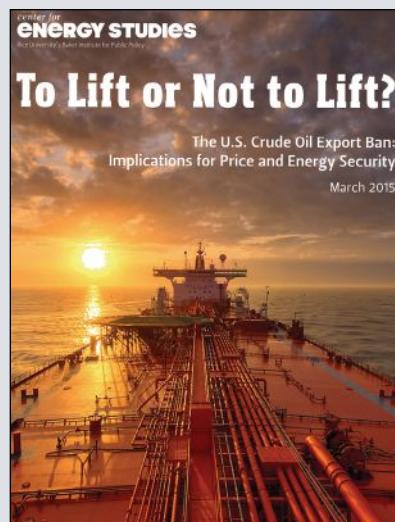
Energy executives are actively pushing to end the ban, and Congress has begun to debate it more openly. The federal government is now allowing some exporting of ultralight crude, called condensate.

His research assessed crude oil prices from \$30 per bbl to \$150 per bbl and showed that big impacts could be had by lifting the ban even in the current low-price environment. Because the majority of light tight oil produced from U.S. shale formations is of higher quality than global Brent oil, the study argues that exporting it would fetch higher prices in the international market.

Most U.S. refining and manufacturing along the Gulf Coast is designed to process heavy crude, not the lighter oil comes from Texas shale plays like the Eagle Ford and Permian. Given the ban on crude exports, this has prompted concerns that domestic crude oil prices are becoming increasingly discounted relative to internationally traded crude, Medlock added.

"In turn, this could dampen U.S. upstream investment. Opening foreign markets to U.S. crude would facilitate new investments in the upstream and midstream sectors, as domestic oil prices would move into greater parity with other international crudes," he stated.

"Counterintuitive to some, removing the ban generates distinct energy security benefits," Medlock added, noting that ending the export ban should not increase the price of gasoline prices because refined products like gasoline can already be exported.



Deepwater spending to total \$210B from 2015-2019: Douglas-Westwood

Deepwater expenditure is expected to increase by 69%, compared to the preceding 5-year period, totaling \$210 billion from 2015 to 2019, according to Douglas-Westwood's "World Deepwater Market Forecast 2015-2019."

"As production from mature basins onshore and in shallow water declines, development of deepwater reserves has

become increasingly vital, particularly to the world's oil majors. However, the recent oil price decline has intensified pressure on operator budgets. Consequently, numerous operators have deferred sanctioning of capital intensive developments," report author Mark Adeosun commented.

Africa, Latin America, and North America will continue to dominate deepwater spending, according to the report.

Three companies win \$2B Freeport LNG contract in U.S. A joint venture between CB&I, Chiyoda International and Zachry Industrial has won a contract worth over \$2 billion from FLNG Liquefaction 3 for a liquefied natural gas (LNG) train at Freeport LNG in Texas. The deal requires the JV to provide engineering, procurement, and construction services for the third of the three-train natural gas liquefaction and export facility on Quintana Island, near Freeport. The contract's scope also includes a double-walled, full-containment 165,000 cu. m LNG storage tank, which will be delivered by CB&I. After completion, the three-train liquefaction facility will have a total capacity of more than 13.9 million tons per year of LNG. CB&I and Zachry started construction on the first and second trains in November 2014. Zachry was the constructor of Freeport LNG's original regasification terminal at the location, which was completed in 2008.

Oceaneering wins Offshore Cape Three Points contract

Oceaneering International has won a contract to deliver equipment for the Offshore Cape Three Points (OCTP) block development project in Ghana. The contract has been awarded by ENI Ghana Exploration and Production and its partners, Vitol and GNPC. The deal requires Oceaneering to supply electro-hydraulic, steel tube umbilicals, totaling around 51 km in length. Oceaneering plans to carry out product manufacturing at its umbilical facility in Panama City, Florida. Work is anticipated to start in the second quarter of 2015 and to be complete by the fourth quarter of 2017. Located approximately 60 km from the Ghanaian Western Region's coast, the OCTP project features oil and non-associated gas fields. It will access around 41 Bcm of gas and 500 mmbbl of oil. First oil is expected in 2017 and initial gas in 2018, with peak production expected to be 80,000 boe per day by 2019.

Bond to provide SAR services in UK Central North Sea

Bond Offshore Helicopters has secured a U.S.\$88.7 million contract to provide search and rescue (SAR) services in the UK Central North Sea. North Sea oil and gas operators have committed the money to fund a SAR helicopter service,

which will supplement the new UK-wide SAR service planned to be launched this month by the Department for Transport. The service would provide rescue and recovery and medevac cover for offshore workers. It will replace the Jigsaw SAR helicopter service, which has been offering rescue and response cover from the BP Miller platform. The SAR helicopter and the back-up aircraft will be located at Bond Offshore's headquarters at Aberdeen International Airport. It will cover a radius of about 160 nautical mi.



service, which has been offering rescue and response cover from the BP Miller platform. The SAR helicopter and the back-up aircraft will be located at Bond Offshore's headquarters at Aberdeen International Airport. It will cover a radius of about 160 nautical mi.

McDermott to supply FMC with Jangkrik subsea hardware

FMC Technologies has awarded McDermott International a contract to supply manifold and subsea safety isolation valve fabrication for the Jangkrik Complex offshore Kalimantan, Indonesia. The scope of the project includes fabrication of approximately 3,200 tons of subsea manifolds and subsea safety isolation valve modules to be installed in water depths ranging from 329 to 1,640 ft. Fabrication has started at McDermott's Batam Island facility in Indonesia, which will also be responsible for factory acceptance testing (FAT)-extended FAT and system integration testing. The Jangkrik Complex is operated by Eni and comprises two main fields.

First production from ExxonMobil's deepest tie-back in U.S. Gulf

ExxonMobil Corp. has started production in the deepwater Gulf of Mexico from Hadrian South field, where gross output is expected to reach 300 mmcft of gas per day and 3,000 bbl of liquids per day from two wells. It is the company's deepest subsea tie-back in 1.5 mi of water.

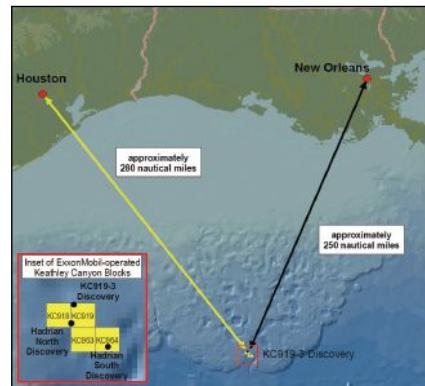
Hadrian South is 230 mi offshore in the Keathley Canyon area in 7,650 ft of water. The Hadrian-2 discovery well was drilled in 2008 and the Hadrian-4 sidetrack was completed in 2009, according to ExxonMobil.

A subsea production system with flowlines is connected to the nearby Anadarko Petroleum Corp.-operated Lucius truss spar, reducing additional infrastructure requirements. Lucius, where ExxonMobil holds 23.3% interest, started production in January.

Net production from Hadrian South and Lucius will reach more than 45,000 boe per day. Gas transport from the fields is supported by a long-term agreement with Williams Partners, operator of the newly launched Keathley Canyon Connector.

"Cooperating closely with Lucius operator, Anadarko, has facilitated the development of a deepwater resource that may not have been possible using a standalone approach," said Neil W. Duffin, president of ExxonMobil Development Co.

ExxonMobil operates Hadrian South with 46.7% interest. Partners are Eni SPA with a 30% stake and Petroleo Brasileiro SA (Petrobras) with a 23.3% interest.



Big Foot platform being prepared for field drilling

Chevron's gargantuan Big Foot platform was headed to its final destination in the Gulf of Mexico. Built in Korea, the massive deepwater offshore platform has been undergoing additional work at Kiewit Offshore Services.

With the finishing touches complete, the Big Foot platform shipped out from Corpus Christi in mid-March en route to the field where it was to be stationed in the Walker Ridge area, 225 mi south of New Orleans in 5,200 ft of water, Chevron said in a press statement.

The platform was to arrive in 8 to 10 days, the company said, noting that it would be anchored to the ocean floor and that commissioning work would commence, followed by a development well drilling and completion campaign. The \$5.1 billion platform was sanctioned by Chevron in 2010.

The Big Foot platform is a dry-tree extended tension leg platform (TLP) with an on-board drilling rig and production capacity of 75,000 bbl of oil per day and 25 mmcft per day of natural gas. Production is expected to begin later this year.

Chevron is operator and 60% owner of the project. Statoil holds a 27.5% stake in the project and Marubeni Oil & Gas has a 12.5% share.

Chevron estimates that the Big Foot field, discovered in 2006, has a 35-year production life and contains more than 200 mmbbl of potentially recoverable oil equivalent.

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Fugro takes delivery of shallow draft survey vessel Fugro Americas

Fugro has taken delivery of the new-build shallow-draft survey vessel, Fugro Americas. It's optimized for working in the Gulf of Mexico, said Fugro, but she is also suitable for other geographical areas, being permanently mobilized and available for deployment throughout North and South America and the Caribbean.

The 194-ft long vessel can conduct a range of offshore services, including high resolution geophysical and light geotechnical surveys in water depths of up to 14,764 ft. Fugro Americas is built to operate Fugro's new 4,500 m-rated Hugin 1000 AUV, Echo Surveyor VII.

Specialist equipment on the new survey vessel includes a dynamic positioning system and state-of-the-art survey systems, including a deepwater EM302 multi-beam echo sounder for gas seep surveys.

iSURVEY Singapore awarded contract with Solstad Offshore

iSURVEY Pte Ltd, Singapore, has been awarded a marine construction support contract by Solstad Offshore Asia Pacific to provide positioning and survey support for its 2015 platform installation program in Thailand on board the DLB Norce Endeavour.

iSURVEY will provide services including positioning and monitoring during jacket setting, together with final positioning, levelling, and survey assistance during pile cut-off. Subsea positioning is to be provided to integrate IKM Subsea's Merlin work-class ROV into installation operations.

"The first few months of 2015 are proving to be extremely positive for iSURVEY's business in the Asia Pacific region, which has been reinforced by this contract award," said Bill Petrie, iSURVEY Singapore's managing director.

"We are pleased to have been selected to handle this work by Solstad Offshore Asia Pacific and look forward to working closely together over the coming months."

Cantilever jack-up targets deeper water in mild, harsh environments

GustoMSC has unveiled the CJ54 cantilever drilling jack-up at the SPE/IADC exhibition in London. The company describes this as a cost-effective rig for fields in water depths up to 450 ft, opening a new operational area in the Gulf of Mexico, near the coast of West Africa, and in Southeast Asia. Main prospects are operations in the range 350 to 450 ft of water, potentially involving large leg penetrations.

The focus of the design of the company's CJ series jack-ups is on stable and efficient operations, with drilling interruptions reduced to a minimum. The CJ54 is equipped to perform exploration and development drilling with a design wave of 70 ft and wave and wind speeds of up to 169 ft/s.

Main features include the robust X-bracing structure of the jack-up legs, the CJ series established X-Y cantilever layout, and the integrated jacking and fixation systems. Compared to competing designs, GustoMSC says, the X-bracing provides the legs with increased structural capability in operational conditions where the fixation system is not engaged.

The X-Y skidding system allows the combined drill floor, substructure, and cantilever to be moved in longitudinal and transversal direction. The cantilever load chart has been enhanced, allowing



The CJ54 cantilever drilling jack-up rig.

the full combined load to be used over the full transverse envelope.

The dimensions of the rig provide space for a 2,000 or 2,500-kips derrick, four standard mud pumps, and related equipment. As the cantilever X-Y skidding system is integral to all the CJ series, the deck area totals more than 48,438 sq ft.

Bigfoot 1 upgraded for larger diameter deepwater pipelay

GSP Offshore said its multi-purpose offshore installation barge Bigfoot 1 has come through sea trials following upgrades. The trials confirmed enhanced operational performance following:

Installation of a Kongsberg DP-2 sys-

tem with six Rolls Royce azimuth retractable thrusters, each of 2.2 MW, and 4 x 3.5 MW Wärtsilä, TIER III emission engines;

Increase of the pipelay capacity by installing a 295-ft stinger and a new fixed frame system that allows the vessel to perform higher diameter pipelay installations in deeper waters; and

Increase of the accommodation capacity from 208 to 240.

GSP Bigfoot 1 has derrick and pipelay features suitable for shallow and



Bigfoot 1 has come through sea trials.

medium deepwater, compliant with the latest ABS and IMCA regulations. It can also be deployed to transport heavy structures, accommodate personnel, and for ROV operations, working in areas where shallow water could be challenging for many other vessels, GSP claims.

GSP Engineering provided the detailed engineering while the GSP Shipyard undertook fabrication of the marine systems, outfitting, installation, and integration of marine and pipelay equipment.

Karoon announces rig contract and plans for WA exploration well

Apache Northwest Pty Ltd. has contracted Diamond Offshore's semi-submersible drilling rig Ocean America to drill exploration well Levitt-1, located in the northern Carnarvon basin exploration permit WA-482-P off Western Australia.

Apache's joint venture partner on the permit, Karoon Gas Australia Ltd., said Levitt-1 is expected to spud this month. It is the first exploration well planned by the duo on the permit, which sprawls across 5,227 sq mi. The WA-482-P permit is located around 8,412 mi north of Karratha, north Western Australia, in water depths ranging between 1,312 to 6,561 ft. Exploration in the permit will evaluate new plays in the northern part of the Carnarvon basin.

The permit contains a multi-billion barrel prospective oil resource in six prospects identified in the Canning 3D seismic survey area that covers one-third of the permit area. Additional prospectivity over the permit area is expected to be identified through the interpretation of existing 2D and 3D seismic data.

Chevron contracts DOF vessels for Australia, Brazil IMR campaigns

DOF Subsea has won a series of contracts offshore Australia, Brazil, and northwest Europe.

Chevron Australia has awarded DOF Subsea Asia Pacific a 3-year master services agreement, inspection, maintenance and repair (IMR) contract related to projects on Australia's North West Shelf.

The contractor will deploy the DP vessel Skandi Protector for this campaign, supported by a management, engineering, and logistics team based in Perth.

Over the past 4 years, the vessel has been on charter to the Australian government. It has since been refurbished and is now incorporated with two new ROV systems.

Chevron Brasil has extended the contract for Skandi Salvador and IMR services for the remainder of this year. The vessel has been operating on the Frade oil field in the Campos basin since 2009.

In the North Atlantic region, the company has secured several contracts for work in the Norwegian and UK sectors, and for installation of flexible flowlines and umbilicals on the Shell-operated Corrib gas field offshore western Ireland.

CGG to shoot record Colombian Caribbean 3D seismic survey

Anadarko Petroleum has contracted CGG to conduct Colombia's largest marine seismic survey to date. It involves acquiring and processing 6,299 sq. mi of 3D seismic survey over portions of the Col-1 and Col-2 blocks on the Caribbean coast.

CGG will assign the Oceanic Sirius and Oceanic Vega to this campaign. Each

resultant data will be processed at CGG's Houston subsurface imaging center. In 2013, CGG completed the 2,123-sq. mi 3D Fuerte survey offshore Colombia for Anadarko.

Shell extends contract to use Helix Energy's Q4000 vessel in GoM

Shell has extended its contract to use Helix Energy Solutions' Q4000 vessel for well intervention services in the U.S. Gulf of Mexico. Helix has been providing well intervention services to Shell since 2011, using the Q4000 semi-submersible under a master service agreement. The latest 3-year contract will run through the end of 2017.

"Shell has remained a customer for Helix over a number of years, and we appreciate their confidence in our company's well intervention services," said Owen Kratz, Helix's president and chief executive officer.

"Given the current state of the oil and gas markets, we view this contract as a step forward in further executing our business strategy."

The Q4000 entered service in the Gulf of Mexico in 2002. It is a DP3 semi-submersible vessel, designed for well intervention in water depths to 10,000 ft. It provides a platform for several tasks, including subsea completion, decommissioning and coiled tubing deployment.

Shell currently operates six deep water and ultra-deep water floating platforms, 12 fixed structure platforms, several subsea production systems, and a contracted drilling rig fleet in the Gulf of Mexico. The company is also part owner of four projects in the Gulf of Mexico, operated by other oil and gas firms.

More work needed on CAT D-1 semi drilling rig Songa Equinox

Songa Offshore said the purpose-built semi-submersible CAT D-1 drilling rig Songa Equinox started its sea trial last week. DSME built the rig in South Korea.

This is a harsh environment, DP-3 semi commissioned by Statoil for year-round drilling, testing and intervention tasks offshore Norway. It can operate in water depths of up to 1,640 ft, but could be adapted in future for deepwater or Arctic operations following minor upgrades, Songa said.

Prior to departure for the sea trial, the inclination test indicated a heavier than expected light unit weight. This will necessitate installation of sponsons and blisters similar to those already installed on the Songa Encourage and Songa Enabler.

DSME will perform the remedial work at its own cost, as the installation



Songa Equinox heads for sea trials.

work will impact the delivery time by up to 4 weeks (using cofferdams). Following agreement with Statoil, Songa said it will use the additional time at the yard to perform some of the work planned to take place in Norway on third-party equipment.

Keppel FELS delivers second newbuild jack-up rig to Pemex

Keppel FELS Ltd. has delivered the Kukulkan jack-up rig to Mexican national oil company, Pemex. Kukulkan is the second jack-up Keppel has built directly for Pemex. It will join sister rig, Yunuen, which was delivered earlier this year, and another nine jack-up rigs that Pemex has chartered from drilling contractors for deployment offshore Mexico.

Keppel also has another seven KFELS B Class jack-up rigs currently under construction for Mexican companies. Kukulkan will be the eighth KFELS B Class jack-up to work in Mexico. The KFELS B Class jack-up is designed to operate in water depths of up to 400 ft and drill to depths of 30,000 ft.

Rosneft cancels contract for Energy Endeavor jack-up in Russian Arctic

North Atlantic Drilling Co. has received a cancellation notice from Rosneft for use of Northern Offshore's jack-up Energy Endeavor. The rig had been contracted as part of a multi-rig program to provide drilling services in the Russian Arctic starting in the 2015 summer drilling season. Northern Offshore president and CEO Gary Casswell said: "While not unexpected, we are disappointed by this development but will nevertheless continue to pursue future opportunities in this region by leveraging our previous experience drilling in the Russian Arctic."



Oceanic Sirius assigned to 3D campaign.

vessel will tow a 39 ft by 393 ft by 26,574 ft spread using Sercel's Sentinel steerable solid streamers and CGG's Dovetail efficient acquisition solution, said to deliver more regular sampling and reduce infill.

The survey will start this spring, subject to regulatory approval, and the

U.S. affirms Chukchi Sea lease sale as Shell sends drilling rigs to Alaska

The U.S. Department of the Interior has affirmed controversial Chukchi Sea Oil and Gas Lease Sale 193 and the leases issued in 2008 as a result of the sale. That means the government can start to review any exploration plans for the area, including Shell's, as the company prepares to drill.

The Anglo-Dutch oil major hopes to revive its Arctic drilling program 2 years after the grounding of a rig in Alaska that led to a huge uproar from environmental groups.

The sale affirmation decision in late March keeps the door open for Shell to return to the Chukchi Sea this summer and drill wells into its Burger Prospect about 70 mi from Alaska. In fact, Shell began moving oil rigs Noble Discoverer and Polar Pioneer to Alaska ahead of the decision to take advantage of Alaska's short summers.

However, it is far from the final regulatory step for Shell, which still must secure individual drilling permits and win the U.S. Bureau of Ocean Energy Management's approval of its broad exploration plan. That includes calling for public comment and additional environ-



mental studies. The Chukchi Sea lease sale has long been under a legal cloud.

The Interior Department previously was ordered to redo its environmental analysis in 2010 after an Alaska-based federal district court found deficiencies with the review. The Interior Department issued a new environmental impact statement and validated the auction a year later, paving the way for Shell's 2012 Arctic drilling campaign.

But the sale entered legal jeopardy again after the 9th Circuit Court of Appeals last year faulted the Interior Department's initial calculation of how much crude would be extracted from the Chukchi Sea leases. Previously, regulators had said up to 1 Bbbl of oil were economically recoverable from the available leases. But in a final environmental impact statement, as well as a draft

released last October, the bureau produced a new estimate: 4.3 Bbbl of oil and 2.2 tcf of natural gas.

The agency said the new, higher prediction was based on better information about where oil companies' interests lie and a deeper understanding about geologic structures in the region. In revising its estimate, the bureau also relied on actual bidding data from the disputed 2008 auction, which brought in a record \$2.6 billion in high bids. Most of them—\$2.1 billion worth—came from Shell, which joined six other companies in nabbing Chukchi Sea drilling rights.

Exxon resumes drilling at Point Thomson on Alaska's North Slope

ExxonMobil has resumed drilling at Point Thomson on Alaska's North Slope as construction continues toward bringing the initial production system online. The initial system is designed to produce up to 10,000 bbl per day of natural gas condensate and is scheduled for startup in 2016. It will be transported 22 mi by pipeline to the Trans-Alaska Pipeline System. The Point Thomson reservoir holds an estimated 8 tcf of natural gas and associated condensate.

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Caspian Sea horizontal well sets new benchmark at Yuri field: Lukoil

Lukoil-Nizhnevolzhskneft said it has established a new world record in horizontal drilling in the Russian sector of the Caspian Sea. Well No.108, drilled from an ice-resistant stationary platform at the Yuri Korchagin field, proceeded for 16,102 ft in the 9.5-in., in one run, without any tripping.

The new record was confirmed in the Schlumberger-Smith Bits world database. Lukoil said it also achieved the previous record while drilling well No.103, which led to discovery of the field's two oil-bearing strata. Well No. 108, drilled to a depth of 5,134 ft, is 26,263 ft long.

Eni scores major gas-condensate discovery in Bahr Essalam off Libya

Eni is claiming a significant gas-condensate discovery in the Bahr Essalam South structure, 51 mi offshore Libya. The location is in Area D, 13.7 mi from the producing Bahr Essalam field. Eni North has a 100% operated interest in the concession.

The B1-16/4 discovery well, drilled in 492 ft of water, encountered gas and condensates in the Eocene-age Metlaoui for-

mation. During testing, constrained by surface facilities, the well flowed 29 mmcf per day of gas and more than 600 bbl per day of condensate with a 64/64-in. choke. In a production scenario, the well could deliver more than 50 mmcf per day and 1,000 bbl per day, Eni added.

Eni currently has three offshore drilling rigs involved in the exploration and delineation of Contract Area D's discoveries. The company started production in 2004 from the area D fields of Wafa and Bahr Essalam, both of which supply gas for Libya's domestic markets and for export to Italy via the Greenstream pipeline in the Mediterranean Sea. Both fields also have high percentages of associated liquids.

First Falklands well proves oil and gas in offshore Zebedee structure

The semi-submersible Eirik Raude has discovered oil and gas in the Zebedee structure in the offshore North Falkland basin. According to Premier Oil, well 14/15b-5 in license PL004b intersected 81 ft of net oil-bearing reservoir and 55 ft of net gas-bearing reservoir.

Along the way, it penetrated multiple targets in the Cretaceous F2 and F3 formations with a total hydrocarbon net pay

of 136 ft. Most of the pay is within two F2 Hector and Zebedee sands. No oil-water contact was observed in Zebedee.

The reservoir at both of these intervals is said to be of good quality and results are in line with prognosis. Good oil shows were recorded at the deeper F3 targets, but at this location the sands are not well developed, according to the company. Partner Falkland Oil & Gas said a 9.8-ft sand interval below the Zebedee sand, containing good oil shows, could be the southerly extension of the Sea Lion oil field Main sand.

Pressure measurements within the Zebedee interval plot are on the same gradient as those observed in the Sea Lion oil leg, FOGL added, and it is therefore likely that the Zebedee reservoir is in pressure communication with, and has the same oil-water contact, as Sea Lion.

After plug and abandoning the well, the rig will drill the Isobel Deep well on the Elaine-Isobel fan complex in the southern part of the North Falkland basin, potentially the highest-impact prospect targeted by the six-well campaign, according to Premier. Results should follow later this month. Various partnerships have commissioned an additional four wells off the Falkland Islands.

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BG Group starts oil production from Knarr field offshore Norway

UK oil and gas firm BG Group has started producing first oil from the Knarr field in the Norwegian North Sea. BG Group operates the field, which was discovered in 2008, with a 45% working interest. Idemitsu Petroleum Norge and Wintershall Norge own 25% and 20% stakes, respectively. DEA Norge owns the remaining 10% interest.

The field was drilled using the Petrojarl Knarr floating production, storage and offloading vessel (FPSO), which has a production capacity of 63,000 boe per day, and a storage capacity of 800,000 bbl. The Knarr field is anticipated to remain in production for about 10 years, generating an estimated 80 mmboe.

The plan for Knarr is the drilling of nine development wells that include four production wells: two at Knarr central and two at Knarr West. The other five wells will be water injectors.

The production wells will be drilled from two drill centers located at water depths of 1,345 ft. Oil and gas will be produced via pressure maintenance by water injection.

The produced oil will be exported from the FPSO through shuttle tankers.



The Knarr field was drilled using the Petrojarl Knarr floating production, storage and offloading vessel. The oil will be transported ashore by shuttle tankers.

Gas will be transported through a new 110-km long, 12-in. diameter pipeline to the St. Fergus gas terminal via the Far North Liquids and Associated Gas pipeline system.

Production starts from Maari MR6A development well off New Zealand

Cue Energy Resources has started production from the Maari MR6A development well in the Taranaki Basin, offshore New Zealand. The initial rate is approximately 7,800 bbl of oil per day. The company will determine the optimal rate after several weeks of production.

The Maari field is currently producing

around 14,000 bbl per day. The latest well is in the Mangahewa formation reservoir unit. It was drilled horizontally to a total depth of 4,577 m, of which approximately 1,300 m was completed in a high net-to-gross, good-quality reservoir section, based on well log data.

Analysis to date suggests the well could exceed pre-drill expectations, and materially contribute to field production.

The Maari Growth Project is targeting remaining undeveloped reserves from the Maari and Manaia accumulations.

The Enasco 107 rig is drilling the MR7A well to provide an additional infill producer in the Moki formation.

The Maari and Manaia fields are situated in PMP 38160, approximately 80 km offshore Taranaki.

Production started in February 2009 from three producing reservoirs to a single wellhead platform adjacent to the Maari field before connecting to the floating production storage and offloading vessel, moored around 1.5 km from the wellhead platform.

OMV New Zealand operates and holds a 69% stake in PMP 38160. Cue Taranaki, Horizon Oil International, and Todd Maari own 5%, 10%, and 16% interests, respectively.

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Mubadala Petroleum to explore large offshore area in Morocco

Mubadala Petroleum has agreed to explore the hydrocarbon potential of a large area off the Morocco Mediterranean coast. The agreement with Morocco's Office National des Hydrocarbures et des Mines (ONHYM) provides Mubadala with an exclusive license to undertake a detailed geological survey of the Méditerranée Ouest area, which comprises 3,433 sq. km. The company will provide the government with the results of the survey after completion.

Mubadala manages assets and operations spanning 12 countries, with a primary geographic focus on the Middle East, Africa, and Central and Southeast Asia.

The company's existing working interest production is approximately 400,000 boe per day. In Southeast Asia, Mubadala operates a range of assets located in Thailand, Indonesia, Malaysia, and Vietnam.

Statoil awarded new exploration license for offshore Indonesia

Statoil has been awarded new exploration acreage through the Aru Trough I license offshore Indonesia. The license covers an area of about 8,300 sq. km, adjacent to Statoil's existing exploration acreage in the Aru and West Papua IV licenses. Statoil will operate the license with a 100% working interest.

"This is a low-cost access into a frontier area with considerable potential where Statoil is already present. This position strengthens the optionality in Statoil's long-term portfolio and secures potential upsides from our existing exploration acreage," said Erling Vågnes, Statoil's senior vice president for exploration in the eastern hemisphere.

Statoil will initially collect seismic data during the first 3 years of the exploration period. The information obtained from the seismic survey will form the decision basis for Statoil's next steps in the license.

Fastnet Oil & Gas expands Celtic Sea portfolio with license option

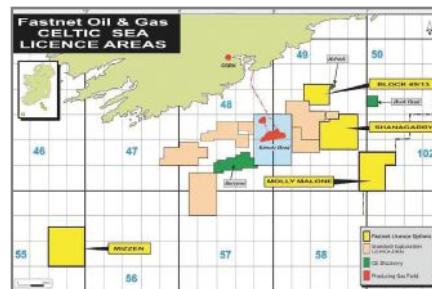
Fastnet Oil & Gas has expanded its footprint in the Celtic Sea, offshore Ireland, with a new licensing option and extensions to several others. The company was awarded the Ventry licensing option for the North Celtic Sea Basin. The licence covers 996 sq. km over blocks 55/13, and parts of blocks 55/7, 55/8, 55/12, 55/17, and 55/19.

"The extensions on our three existing prospective licence areas allow us to carry out the agreed work programs currently underway, which are economical

and fully funded," said Carol Law, Fastnet's chief executive officer.

Fastnet has a 100% working interest in the Ventry licensing option, which covers a period of 18 months and requires the reprocessing of existing 2D seismic data, and several geological studies. After completion of the work program, the company can extend the licensing option by an additional 18 months.

Fastnet has also secured extensions to its licensing options for the East Mizzen, Shanagarry, and Block 49/13 prospects.



License map of North Celtic Sea Basin showing Fastnet acreage as of April 2013.

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First subsea wet gas compression system nears installation



When the reservoir pressure falls below a critical level, compression should help maintain high gas production.

Statoil was expecting the world's first subsea wet gas compression system to be installed offshore Norway in April. Since last October, the equipment has been undergoing final system integration tests at Horsøy outside Bergen. Results to date have been positive, Statoil said.

The company developed the equipment in collaboration with OneSubsea. It comprises a 463-ton protective structure and a 716-ton compressor station, incorporating two 5-MW compressors, and is designed to drive out a further 22 mmboe from the Gullfaks South Brent reservoir for export to the Gullfaks C platform.

The compressor station will be placed on the seafloor in a water depth of 443 ft and connected to existing templates and pipelines 9.3 mi from the Gullfaks C. OneSubsea has also supplied the associated new topsides equipment for power supply to and control of the subsea station.

Over the following months, the connecting umbilical and the modules within the compressor station will be installed, followed by hookup to the platform this summer and start-up during the fall.

When the reservoir pressure falls below a critical level, subsea wet gas compression should help maintain high gas production.

Compression on the seabed is more effective than adding a conventional topsides compressor, which takes up extra weight and space on the platform, Statoil said. A wet gas compression facility does not require any treatment of the well stream prior to compression, allowing the use of smaller modules and simpler construction on the seafloor.

Statoil hopes the technology, combined with conventional low-pressure production in a later phase, will raise the gas recovery rate from Gullfaks South Brent from 62% to 74%.

BP sanctions \$12B gas development offshore Egypt

BP has signed the final agreements for the \$12 billion West Nile Delta (WND) project. This will involve development of 5 tcf of gas from the BP-operated offshore concession blocks North Alexandria and West Mediterranean Deepwater and 55 mmbbl of condensates. BP anticipates start-up in 2017, with output from WND building to 1.2 Bcf per day, equivalent to

around 25% of Egypt's current gas production. All supplies will be fed into the country's national gas grid, helping to meet the anticipated growth in local demand.

This project represents the largest foreign direct investment in Egypt, BP said, adding that the company believes future exploration could add a further 5 to 7 tcf to the project eventually.

"BP will also continue to invest in our existing oil operations at the Gulf of Suez (through GUPCO) and gas operations in the East Nile Delta (through Pharaonic Petroleum Co.)..." said Hesham Mekawi, BP's North Africa regional president.

Additionally, the company plans a subsea development of the Taurus and Libra fields to existing BG-operated Burullus facilities in the Egyptian sector of the Mediterranean Sea; and two long-distance tiebacks to shore of its deepwater Giza-Fayoum and Raven fields, which will require modifications to the Rosetta plant and integration with a new adjacent onshore plant.

Timelines deferred for Johan Castberg, Snorre projects

Statoil and its partners have agreed to delay development decisions on the Johan Castberg and Snorre 2040 projects in the Barents Sea and North Sea. The Johan Castberg group has put back an investment decision until 2017.

"We have made significant progress in reducing costs for Johan Castberg. However, current challenges in relation to costs and oil prices require us to spend more time to ensure that we extract the full benefit of the implemented measures," said Ivar Aasheim, Statoil's senior vice president for field development on the Norwegian continental shelf.

Statoil and other operators, including Eni, Lundin and OMV, are at the same time working on alternative solutions for shared oil infrastructure in the Barents Sea. These include an onshore terminal serving multiple fields in the region. The Snorre field partners have re-scheduled the Snorre 2040 preliminary decision to implement (DG2) to the fourth quarter of 2016.

Snorre holds one of Norway's largest discovered oil resources, with estimated reserves of 1.63 Bbbl, more than double the original estimate when the development plan was submitted in 1989. However, the subsurface is complex and will require major investments to maintain production through 2040, Statoil said. The goals are to reduce investment costs and improve understanding of the reservoir.

Acquisition begins on 2D survey off western Ireland

Searcher Seismic and MAGE have started the acquisition of the Echidna Regional Broadband 2D seismic survey covering the Atlantic Margin off western Ireland.

The Echidna survey covers around 9,000 km of long-offset broadband 2D seismic data, including the Goban Spur, Porcupine and Slyne Basins, and well-tie to over 30 exploration wells. It also incorporates the Connemara and Burren oil fields, and the Spanish Point gas discovery.

The survey will be acquired with an 8-km streamer, and the cable length, combined with new broadband processing techniques, will provide an opportunity for exploration firms to evaluate the acreage.

Searcher Seismic said that recent drilling results have suggested considerable oil potential in the area.

"The rift systems associated with these basins are among the most interesting exploration targets in the North Atlantic, and we are confident the Echidna survey will provide a solid foundation for evaluation of the area," said Jan Gunnar Opsal, Searcher Seismic Norway country manager.



Mooring arrangement strengthens stability of Western Isles floater

Balmoral Offshore Engineering and Global Maritime subsidiary Moorlink have delivered components for the mooring system for Dana Petroleum's Western Isles project in the northern UK North Sea.

The development involves the subsea tieback of at least five production and four water injection wells to the circular, Sevan-designed FPSO.

The buoyancy-connecting system will be incorporated into the vessel's moorings, which comprise 12 lines in three clusters of four.

According to Balmoral, the buoyancy mounting system, which employs elastomeric mountings to reduce any imposed loads, is kept separate from the mooring line to avoid interference with the stress path. The mounting is also offset vertically from the mooring rope to ensure the buoyancy remains stable in the water. There are no welds in the structural load paths, an arrangement that is said to lead to good levels of fatigue resistance.

In total, the partners manufactured 12 buoyancy and connection sets providing a net uplift of 13.22 tons per buoy in a water depth of 558 ft. They anticipate a minimum service life of 12 years.

McDermott lands contract for subsea work at Jack-St. Malo

McDermott International, Inc. said it has been awarded a sizeable contract to transport and install subsea umbilicals, manifolds, jumpers and flying leads for Chevron USA Inc. to support the brownfield expansion of the Jack and St. Malo fields in deepwater U.S. Gulf of Mexico. The value of the award was to be included in McDermott's first quarter 2015 backlog.

McDermott's subsea construction vessel, North Ocean 102, is expected to transport and install 30 mi of umbilicals and associated flying leads. The final jumper assembly is scheduled to be completed at McDermott's Gulfport Spoolbase in Mississippi prior to installation by McDermott's Derrick Barge 50 utilizing its deepwater lowering system.

The installation campaign was expected to commence in the second quarter of 2016. The Jack and St. Malo fields are located within 25 mi of each other in the Walker Ridge area of the U.S. Gulf, approximately 280 mi south of New Orleans, Louisiana. First oil and natural gas production was achieved in December 2014.

The NO102 is a fast-transit, dynamically positioned vessel with a 330-ST vertical lay system for installing flexible subsea product across a variety of water depths. The DB50 is a dynamically positioned (DP2), heavy-lift vessel capable of lifting surface loads up to 4,400 tons and lowering up to 480 tons to 11,500 ft.



McDermott's North Ocean 102.



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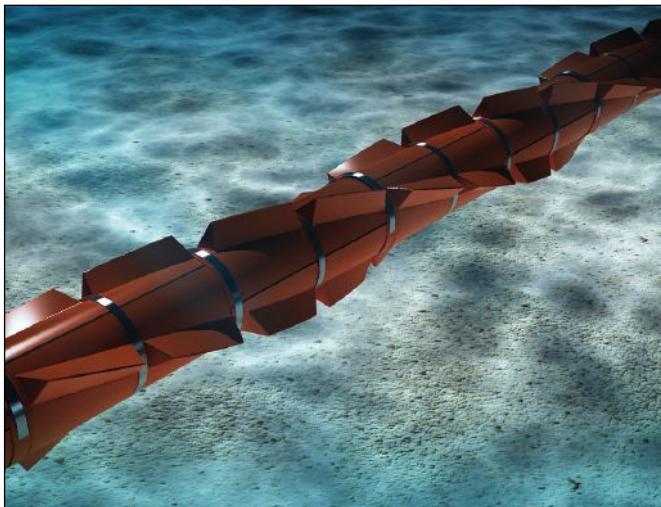


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Trelleborg's new subsea vibration suppression system

Trelleborg's offshore operation has launched an innovative new vortex induced vibration (VIV) system. The high performance T-Strake™ features a unique modular design enabling more efficient transportation and installation.



The VIV suppression system consisting of overlapping and interlocking moldings, with three-start helical strakes to provide an effective triangular or trapezoidal strake profile.

"Pipelines unsupported over free spans, such as steel catenary risers and rigid steel flowlines, are prone to VIV fatigue, which can lead to serious issues such as pipe girth weld failure or premature pipe malfunction. To combat this, the T-Strake™ comprises interlocking moldings, with three-start helical strakes," said Jonathan Fox, senior product development engineer.

Trelleborg utilized its vast offshore and VIV knowledge in the design of the T-Strake™ and carried out extensive computational analysis and physical testing. The system has a high temperature resistance, is capable of withstanding installation loads, and is available in a wide choice of colors.

Each section of the system has been designed as a single component, ensuring it is quick and easy to pre-install onshore or install offshore. The design enables the system to be stacked during shipping, ensuring more efficient and cost-effective transportation.

Trelleborg's innovative manufacturing process also means that the T-Strake™ can be produced up to six times faster than systems manufactured using traditional techniques, ensuring short order times.

Austin Harbison, new product development manager for Trelleborg's offshore operation, added: "The T-Strake™ was developed in response to market demand for a high-quality, cost-effective VIV suppression solution. We utilized an innovative manufacturing technique enabling rapid manufacture, reduced transportation costs, and quick installation.

"Working with polymers across a number of technologies and industries, we were able to use our insight and innovation to improve VIV suppression performance using best-value engineered solutions."

For more information, visit www.trelleborg.com/offshore.

FEI features microCT at Digital Rock Lab in Houston, Texas

FEI has introduced its new HeliScan microCT imaging system during the grand opening of its Digital Rock Lab in Houston, Texas. It provides high-resolution 3D images to support the analysis and modeling of reservoir rocks in hydrocarbon assets.

The HeliScan microCT system is part of a multi-scale imaging solution providing E&P operators a digital approach to visualizing the pore scale internal structure of rocks to help understand flow in and to understand reservoir behavior by integrating the datasets generated by HeliScan microCT, QEMSCAN automated mineralogy, and nano-scale resolution scanning electron microscope (SEM) and focused ion beam/SEM (FIB-SEM) images. "The need to understand structural properties of reservoir rock at smaller scales is particularly important as operators are trying to economically recover hydrocarbons from increasingly complicated reservoir conditions," said Rudy Kellner, vice president of FEI's Industry Group.

Bal Seal to launch high force spring for oilfield connecting

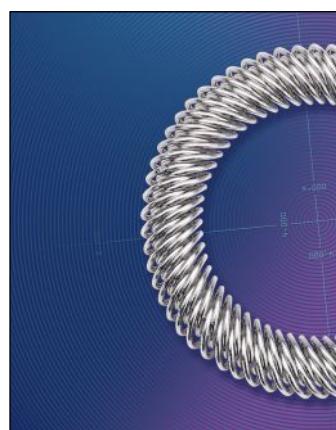
Bal Seal Engineering, Inc. has announced plans to launch the Enforcer™ high force canted coil spring, a mechanical fastening component that gives oil and gas equipment designers the ability to mate critical parts with precisely controllable insertion and removal forces — from 500 to more than 10,000 lb — over multiple service cycles.

Bal Seal Engineering, a global provider of custom-engineered sealing, connecting, conducting, and EMI shielding solutions, says the Enforcer provides "repeatable, heavy-duty latching with minimal axial play," and offers an alternative to disposable shear pins and complex ball detent assemblies. The spring, which can be piston or housing mounted, can also be engineered with relatively low insertion force to simplify the reattachment of parts. Available in a variety of materials, including stainless steels and nickel-based alloys, the spring leverages advanced manufacturing capabilities to offer up to a 10X increase in force over the company's existing Bal Spring™ product line.

When made from a nickel-based alloy wire material with a diameter of 0.031 in., Enforcer high force canted coil springs with a 1-in. ID demonstrated an initial removal force of over 2000 lb, and maintained a removal force of more than 1700 lb after five cycles. In independent testing, larger diameter Enforcer springs consistently demonstrated removal forces greater than 10,000 lb.

The company says it added the Enforcer to its spring product offering in answer to a growing demand for more cost-effective high-force latching options in downhole tools (LWD/MWD, plug setting, retrieval), subsea valves, and other similar oil and gas equipment applications.

For more information, visit www.enforcerspring.com.



Chevron agrees to sell 50% stake in Caltex Australia to investors

Chevron Corp. subsidiary Chevron Global Energy Inc. has entered into an underwriting agreement for the sale of its 50% shareholding in Caltex Australia Ltd. It is expected that these shares will be sold to a broad range of Australian and global equity market institutional investors.

"This transaction reflects Chevron's commitment to regularly review our portfolio and generate cash to support our long-term priorities. It is aligned with our previously announced asset sales commitment," said Michael Wirth, executive vice president, downstream and chemicals.

Mark Nelson, president, international products, downstream and chemicals, Chevron, added: "Asia-Pacific is a core strategic focus for Chevron's downstream business and we remain focused on ensuring our operations, portfolio and investments are well-positioned to meet the region's growing demand for energy."

The deal does not alter Chevron's focus on moving the Gorgon and Wheatstone liquefied natural gas (LNG) projects towards start-up, the company said. Chevron is one of Australia's largest foreign investors and is the largest holder of natural gas resources in the country.

Caltex is a prominent brand in the Australian petroleum market. The current trademark licensing agreement between Chevron and Caltex will remain in effect following the transaction. Chevron will continue to ensure a supply of product is available to Caltex to supply to its retail and reseller franchise network.

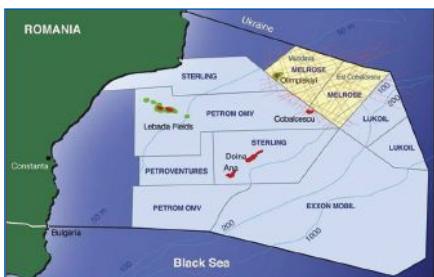
Carlyle to buy Sterling's Black Sea interests off Romania for \$42.5M

Sterling Resources has agreed to sell its interests offshore Romania to Carlyle International Energy Partners (CIEP). The transaction includes operated interests in Black Sea license blocks 13 Pelican, 15 Midia, and 25 Luceafarul and a non-operated stake in 27 Muridava.

It has been structured as a corporate sale of Sterling's subsidiary Midia Resources and is expected to be completed around mid-2015, subject to partner and regulatory approvals.

On completion, CIEP will pay Sterling a cash consideration of \$42.5 million. Sterling's entitlement to further contingent payments from the completed sale of its 65% interest in a carved-out portion of the Midia block to ExxonMobil and OMV Petrom is unaffected by the new agreement. Sterling has had a presence in the Romanian Black Sea since 1997. As operator, Sterling dis-

covered the Ana gas field in 2007 and built up further contingent and prospective resources through further drilling, seismic acquisition and interpretation, and gaining new licenses.



"While we believe firmly in the significant future potential of these assets, we face material ongoing well commitments on our licenses and potentially very material development costs which are inappropriate for a company of our size... We have, therefore, decided to sell in order to focus our financial resources on the UK North Sea," said Jake Ulrich, Sterling's chief executive officer.

Halliburton and Baker Hughes shareholders give nod to merger

Halliburton stockholders have approved Halliburton's proposal to issue shares of Halliburton common stock as contemplated by its merger agreement with Baker Hughes. In addition, Baker Hughes said its stockholders adopted the merger agreement and thereby approved the proposed combination of the two oil-field services companies.

Meanwhile, Halliburton said it will separately sell its fixed cutter and roller cone drill bits, directional drilling, and logging-while-drilling/measurement-while-drilling businesses.

"Although we would prefer to retain these assets, we will be required to divest some of our overlapping businesses to obtain competition authorities' approvals as anticipated when we announced the... transaction," said Dave Lesar, chairman and chief executive officer of Halliburton.

The final sale of these businesses will not be completed until there are acceptable terms and conditions negotiated by Halliburton, the approval of Halliburton's board of directors, and final approvals of the Baker Hughes acquisition by competition authorities. The close of the transaction is expected to occur late in the second half of 2015.

Nearly 99% of the shares voted at Halliburton's special meeting voted in favor of the merger. Separately, more than 98% of the shares voted at Baker Hughes' special meeting voted in favor

of the transaction, representing more than 75% of all outstanding shares of Baker Hughes.

"We look forward to continuing to work collaboratively with Halliburton on the regulatory review process and the creation of a thoughtful integration plan that combines the best of both companies," said Martin Craighead, chairman and chief executive officer of Baker Hughes.

FMC, Technip forming new firm to streamline subsea operations

Subsea equipment maker FMC Technologies and engineering firm Technip are forming a new company together, one they said will be able to help oil companies reach their first barrels of offshore crude faster, for cheaper.

The joint venture, Forsys Subsea, will tie up technology from both firms in order to simplify how subsea oil equipment is designed, installed, and operated, Houston-based FMC and Paris-based Technip said in March.

The firms said this will make it cheaper for oil companies to pursue petroleum buried deep under the ocean floor at a time when producers are seeing their profits squeezed by falling oil prices and construction costs that have risen in recent years.

Forsys, the CEOs of FMC and Technip told investors in a conference call the deal marks a new way of thinking about how oil equipment makers should approach the business—with cost-cutting, standardization of technology and involvement in early-stage project planning as central objectives.

Apache Corp. exits Australia E&P operations with \$2.1B unit sale

U.S.-based Apache Corp. said it would exit its exploration and production business in Australia by selling its unit in the country to a consortium of private equity funds for \$2.1 billion in cash. The sale of Apache Energy Ltd. to a consortium of funds managed by Macquarie Capital Group Ltd and Brookfield Asset Management Inc has an effective date of 1 October 2014, Apache said.

Apache, one of the top U.S. shale oil producers, had said it was exploring a sale of its offshore oil assets in Australia to focus more on domestic shale drilling as well as its operations in Egypt and the U.K.'s North Sea.

"Following the sale of our Australian assets, about 70% of Apache's production will come from North America onshore," noted John Christmann, Apache's chief executive officer.

UNDERWATER INTERVENTION

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Ocean News & Technology

Bibby Subsea contracts two new HD ROVs for Brandon Bordelon

Bibby Subsea, Bibby Offshore's Houston-based division, has commissioned two HD work-class ROVs designed by FMC Technologies Schilling Robotics. Capable of operating at depths of up to 3,000 m, these underwater vehicles will be working in the Gulf of Mexico on Bibby Subsea's new U.S. Flagged Jones Act compliant vessel, the Brandon Bordelon. The HD ROVs are scheduled for delivery in the second quarter of 2015. The purpose built, high specification vessel provides a versatile and cost effective approach to a variety of operations, including IMR operations (inspection, maintenance and repair), light construction, survey and inspection work. This paired with the technically advanced ROVs will bring efficiency and ease of operation to Bibby Subsea's Gulf of Mexico projects. Bordelon Marine is dedicating the ROVs and vessel package to the Warrior Benefit charity for combat wounded U.S. soldiers. "We are very pleased to have selected FMC Technologies Schilling Robotics as our ROV provider in support of our Brandon Bordelon vessel project," says Errol Campbell, ROV operations manager, Bibby Subsea. "We are delighted that Bibby Subsea has decided to rely on our HD model ROVs for their most recent investment. The HD ROV has quickly become one of the most efficient ROVs in the oil and gas market for a wide variety of subsea projects," stated Tyler Schilling, president for FMC Technologies Schilling Robotics.

Record depths for Hugin AUV

Kongsberg Maritime has successfully completed the Customer Acceptance Testing (CAT) for the first delivery of its Hugin AUV with a new cNODE integrated subsea positioning and communication system. During the testing of the innovative new package, which took place during the first quarter of 2015 in the deep waters outside the coast of Bali, Indonesia and the Indian Ocean, Hugin reached a record operational depth of 4,449 m. Kongsberg Maritime's Hugin AUV, which is rated to 4,500 m, has until now been delivered with three separate acoustic systems; a beacon transponder for positioning, an acoustic data link (uplink) and an acoustic command link. The new cNODE system now replaces all three with a single embedded system featuring the established HiPAP 501 acoustic positioning system. By removing the need for a towed transducer for communication purposes, the single topside HiPAP system increases the efficiency of launch and recovery of the AUV and allows for greater agility of the surface vessel. During the CAT, the Hugin AUV was mounted with a 30° transducer head. The new record water depth was achieved not only for the AUV, but also for the cNODE system. Throughout the deepwater dives, the cNODE provided a reliable and high quality data link to the AUV, enabling it to carry out its survey of a large seabed area.

High demand sees international subsea technology training academy increase offering

A first-of-its-kind subsea training academy is marking its first 6 months by expanding its range of courses in response to industry demand. Aberdeen head quartered company Ashtead Technology invested almost £500,000 in the state-of-the-art academy last year in order to meet global demand for improved competency in the configuration, operation and maintenance of increasingly sophisticated equipment required in more complex subsea oil and gas projects in deeper waters and hostile locations around the world. Since its launch in October 2014, the academy has delivered 21 courses to leading subsea companies including Subsea 7, Saipem, Bibby Offshore, Harkand, DOF, Nautronix, Canyon and UTEC Survey and has welcomed delegates from both the UK and overseas. Ross MacLeod, business development director at Ashtead Technology said, "We are providing engineers with an insight into the equipment they use offshore, from deployment to fault-finding to repair through practical, hands-on training that our delegates have told us is much needed. We have been encouraged by the excellent customer feedback received over the last 6 months." In direct response to this feedback, Ashtead Technology has been developing new course material. This includes pipe and cable tracking systems; attitude, heading reference and motion sensing; multibeam sonar and swath bathymetry systems; and hydrographic and geophysical survey systems.

C-Innovation mobilizes six new UHD-III ROVs



C-Innovation mobilized six new UHD-III remotely operated vehicles (ROVs), manufactured by FMC Technologies Schilling Robotics for current contracts. The ROV systems are mobilizing throughout 2015 for work in the Gulf of Mexico.

C-Innovation has long been a well-known ROV operator in the subsea industry, but now with the powerful UHD-III vehicles. First awarded is a 10-year contract for multi-service support of the BP Thunder Horse PDQ in the Gulf of Mexico. UHD-III vehicles #09 and #10 will be installed on the Thunder Horse platform, with additional support from the Jack Edwards offshore supply vessel hosting UHD-III vehicle #01. These vehicles will be equipped with 150-hp ISOL-8 pumps for superior auxiliary tooling power.

Later this year, they will install UHD-III vehicle #02 onto the Kirt Chouest anchor handling supply vessel, performing construction and IRM work for Anadarko as well as ROVs #11 and #12 to the new Island Venture construction vessel for contract towards the end of the year.

"The UHD-III ROV offers 250-hp for standard operations with 150-hp of auxiliary power for the most effective use of power, giving us capabilities to use subsea tooling never thought of on a ROV. We have invested in market-changing technology with the UHD-III ROVs," said Steven Thrasher, technical director for C-Innovation.

For more information, visit www.fmctechnologies.com.

Bluestream picks Panther to cut construction costs

With the subsea industry looking to cut costs, Bluestream Offshore has ordered a fourth Saab Seaeye Panther XT Plus ROV to undertake tasks normally performed by hydraulic vehicles. "Our clients want high-spec equipment to take on more complex construction work at a lower cost," says Bluestream's managing director, Rolf de Vries.

"For instance, we have proved that many construction tasks can be undertaken by a Seaeye Panther XT Plus fitted with Schilling manipulators combined with hydraulic powered ROV tooling, rather than an complex capital intensive hydraulic ROV system."

UNDERWATER INTERVENTION

An electric work ROV system also needs less space, fewer staff and is much faster to deploy, he says, which bring considerable savings in operational costs when compared to a large hydraulic work class ROV. The mobilization window of 12 hours and wide variation of tasks increases the utilization of the systems and so the economics, he adds.

"We chose another Panther because it's a high level system with the technical capability that allows us to develop complex work scopes through integrating more work-class tooling to meet the needs of our clients for subsea intervention tasks."

He explains that the Saab Seaeye system architecture offers a solid base for adding more system options as well as enabling his engineers to further integrate his company's own developed technology for subsea intervention tooling into the system development. "We believe in evolution, step by step, project by project, to develop us further instead of revolution."

Bluestream engineers also benefit from the Panther's 10-strong thruster power and design architecture that allows it to accommodate a wide range of tooling, yet remain maneuverable and able to work in strong currents.

The addition of another Panther now brings Bluestream's fleet of ROVs to 17 Saab Seaeye vehicles.

Bluestream is investing heavily in expanding its field of operations and has recently worked in Russia and the Gulf of Mexico where Rolf de Vries says he could rely upon the Saab Seaeye vehicles to provide a stable platform for whatever task was required.

For more information, visit www.seaeye.com.

Sonardyne Fusion 6G chosen for Moho Nord field development

Sonardyne International Ltd. has been awarded a multi-million pound contract by UTEC, an Acteon company, to supply Fusion 6G acoustic positioning technology for the Moho Nord subsea project situated 75 km off the coast of Congo. The equipment will be used to support the installation of 230 km of rigid pipeline, 23 km of flexible pipes, 50 km of umbilicals and numerous manifolds, plus over 50 subsea structures and rigid jumpers.

The project's construction phase will run for the next 2 years with Technip's rigid pipe S-lay and heavy-lift construction vessel, G1200, and multi-purpose deepwater vessel, Deep

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Pioneer, being utilized as the primary installation vessels. First oil is expected during 2015, rising to an estimated 140,000 bbl of oil per day by 2017.

Fusion 6G is the industry standard tool for subsea construction and survey, specified for its versatility, ease of use, and low risk. The LBL equipment being supplied to UTEC includes high specification Compatt 6 seabed transponders, ROV-mounted transceivers, associated topside hardware and software.

The Compatt 6s will be employed to create a wide area subsea positioning network within which multiple vessels and ROVs, often working simultaneously in the field, will be tracked. Tasks will include pipeline touch down monitoring, mattress installation and jumper metrology in water depths ranging from 650 to 1,100 m.

Oilfield construction requires accurate and precise positioning, a requirement that is met by the digital Wideband 2 signal architecture found exclusively within 6G products. The technology is proven to offer robust acoustic performance in challenging conditions, fast baseline measurements, improved multipath rejection around structures and real-time range diagnostics for quality control. With the availability of over 500 unique operating channels, the risk of interference from adjacent acoustic positioning operations is minimized.

Crawford Tennant, UTEC regional manager, EMEA said, "Sonardyne and UTEC have partnered together on a number of successful projects and we value this relationship."

Announcing the order, Sonardyne's vice president of Europe and Africa, Barry Cairns, said, "Moho Nord joins a premier list of deepwater field developments that are benefiting from the tech-

nical and commercial advantages offered by 6G. UTEC and their project partners have chosen to invest in the best available subsea positioning technology, technology that will add significant value during the entire life of the Moho Nord project."

For more information, visit www.sonardyne.com.

Greensea partners with Deep Ocean Engineering to upgrade Phantom T5

Greensea Systems, Inc., a world leader in automation and navigation for unmanned underwater vehicles, announces its software integration onto Deep Ocean Engineering's Phantom T5 ROV. The rapid deployment high performance ROV system packs power and versatility into a smaller, more manageable vehicle. With Greensea's sensors and software supporting autonomous operations, the T5 is an incredibly capable task-based observation vehicle.

"Working with Greensea during the integration was a pleasure," said John Bergman, DOE's vice president and head of engineering. "It was a very short line to getting the system in the water and demonstrating some truly amazing tasks, ones that have never been seen before."

The Phantom T5 is the newest member of Deep Ocean Engineering's networked family of ROVs. The power and control system is packaged in a singular topside box, making the sensor integration a breeze for Greensea. The full turnkey solution provides integrated data, sonar, and video in a fully automated environment. On-site testing put the partnership to the test and the vehicle performed brilliantly. The T5 flew directly to a subsea target and demonstrated extended loitering and observation tasks that require the ROV to remain in a single location, mid-water.

Company president and CEO, Ben Kinnaman, appreciates what a great match the powerful T5 is for the company's advanced control. "The DOE guys are real professionals. Their engineering is top-tier and we were happy to work

with such a strong, resilient, and rugged vehicle. We know that integrating any of our navigation, control, and autonomy packages on their ROVs will result in really high performance and increased capabilities."

Greensea offers standard support packages for all DOE vehicles and every solution offers incredible stability because they all use openSEA, the company's patent-pending software system anchored by a core library. The library provides native support for thousands of vehicle devices, which gives stability to even the industry's most disruptive technology. Contact Greensea or Deep Ocean Engineering to get your ROV a requirements-driven upgrade today.

For more information, visit www.greenseainc.com.

DOF Subsea launches new technology at Ocean Business

DOF Subsea, a leading provider of integrated subsea services, staged the European launch of a significant new addition to its suite of services.

During the Ocean Business event at the National Oceanography Centre in Southampton, UK from 14 to 16 April, the company showcased its newest service, utilizing three Slocum Gliders, named the DOF Skandi Explorers, a technology that has previously only been seen in academic and defence circles.

The innovative new glider equipment is described as a cornerstone of the company's Ocean Observation System (OOS) due to its ultra-efficient, low-power ability to collect data for up to 9 months before requiring a battery change. The gliders can measure absolute and relative current velocities as well as physical and chemical ocean properties, harvest subsea data via acoustic modems, and detect oil in the water column for a fraction of the cost of conventional methods.

From DOF Subsea's onshore flight control center at the company's regional office in Houston, Texas, the Skandi Explorer AUVs can be deployed in remote areas. Vessels are only required for launch and recovery operations as the gliders were designed to conduct truly autonomous missions without surface support vessels. All operational control of the AUV is accomplished via remote satellite communications with shore-based staff in the Houston center using an advanced piloting and data aggregation program.

For more information, visit www.dofsubsea.com.



Fugro provides ROV systems and innovative tooling for Total

Fugro has been awarded a 5-year contract with an estimated value of USD 100 million by Total E&P Congo. The agreement is for ROV services and remote subsea tooling in the Moho Nord field, situated around 75 km off the coast of Pointe Noire in the Republic of Congo.

Fugro will supply four 200-hp FCV 3,000 work class ROV systems and innovative BOP tooling that will be installed onboard three mobile drilling units and one field support vessel.

Three ROV systems have been mobilized from Fugro's Singapore base and are now operating in Moho Nord. Two of them are onboard ultra-deep water drill ships and will be working in water depths of approximately 1,200 m. The fourth system will be installed on a semi-submersible vessel, which is under construction in China and expected to join operations with its ROV later this year.

A central task is subsea BOP intervention and testing using an ROV equipped with a BOP skid specifically designed for this project by Fugro. Primary responsibility for controlling the BOP lies with the rig, but the ROV-operated BOP skids are also used to operate the BOP in accordance with Total's requirements. When a subsea BOP is installed under Total's test procedures, various rams are operated and tested on a regular basis. The ROVs also routinely inject glycol into the BOP to prevent hydrate build-up.

"Moho Nord is the first major field in which rig BOP test closures have been carried out using Fugro's new BOP skid system," said Richard Mathieson, Fugro Subsea's ROV services project manager. "This uses a special high-flow pump on the ROV to drive further pumps located on the BOP skid, allowing the transfer of large volumes of water-based fluid from the skid reservoirs into the rig's BOP hydraulic rams when directed."

Other ROV tasks include setting up

regular fluid injection; drilling re-entry; bullseye checks; and routine video monitoring, inspection, cleaning, and intervention tasks on and around the BOP as well as alignment control during manifold installation. The ROV on board the field support vessel recently installed transponder arrays on the seafloor to accurately position the drill ship at its drilling location.

Each operational drill ship carries

three ROV personnel for 12-hr coverage, and this can be increased to six people and 24-hr coverage for certain operations such as BOP installation and recovery.

Fugro is expanding its existing Pointe Noire base to provide operational, maintenance and repair services and also training on FCV ROVs and tooling for expatriate and Congolese personnel.

For more information, visit www.fugro.com.

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New subsea dredger trials exceeds all expectations

Trials of a new subsea dredging system that can move one tonne of rocks on the seabed per minute have exceeded all expectations in terms of efficiency and performance.

The Predator Subsea Dredger, a new concept in the world market, underwent a number of trials while fitted to the Triton XL26 work class ROV used for training and trials at The Underwater Centre's Loch Linnhe site in Fort William.

Nine tonnes of 50 to 60 mm rocks were placed on areas of the seabed to recreate a range of terrains typical of the offshore subsea environment to be dredged during the trial, and the task was completed in between 8 and 9 minutes.

Further trials designed to test the integrity of the system, including the dredging of 100 to 130 mm rocks in an attempt to break the machine and to identify any weak spots, highlighted the robustness and strength of the product.

A final test of the agitator system, which shoots out jets of water at the suction head end directly onto the seabed, breaking up the peat at the bottom of Loch Linnhe and dredging it at the same time, worked exceptionally well and did not affect the performance of the dredger. It can also be reconfigured subsea with the use of a second work class ROV or diver.

The Predator Subsea Dredger was designed by Subsea Tooling Services (STS), based in Oldmeldrum, Aberdeenshire, which offers a diverse range of subsea equipment.

STS business development manager Billy Milne said the main objective was to prove that it was as efficient, if not more so, than other dredgers currently on the market.

"We wanted to prove the dredger's capabilities to our clients as well confirm our development tests by filming it in action in conditions close to those it will be used in offshore," he said.

"The Underwater Centre is the only facility within the UK that could have undertaken the task of testing and filming the Predator Dredger. The highly skilled ROV team demonstrated their ability to handle such an operation. From planning the scope of work to operating the ROV with the Predator Dredger and subsequently delivering footage of the trial, The Underwater Centre has provided a service that is invaluable to our company."

The versatility of the Centre's open-water trials and training site, combined with the range of offshore facilities available with the convenience of testing inshore, allows companies such as STS to get maximum benefit from subsea testing.

For more information, visit www.theunderwatercentre.com.

Introducing the Chinook and Steelhead ROVs

In the past several months, the engineering and design team at Seamor Marine Ltd. have been working hard on two new products: the Chinook and Steelhead ROVs.



Named after Pacific species of salmon that can be found in our region of British Columbia, the Steelhead and Chinook have replaced the Seamor 300T (or F) and Seamor 300T (or F) 2/2 and 2/4, respectively.

The new, sleek, and compact Seamor Steelhead is perfect for a variety of underwater jobs where quick and easy deployment is necessary. Light and easy to use, the Steelhead can be used off of any boat or dock (no hoists or cranes needed) and can get into constricted areas for inspection.

The Steelhead comes equipped with a camera, lights, a digital video recorder, an integrated controller and an LCD monitor module that contains auto depth, auto heading and much, much more. It can be upgraded to include sonar, USB links, and other features.

Seamor's heavier-duty Chinook is an industrial grade ROV that can explore depths of 1,000 ft (300 m) to 2,000 ft (600 m) with our deep-water model.



The Chinook is powerful but incredibly stable. Like our other ROV, it is easy to deploy and navigate. While it is larger, it can still easily be stored for transport. In addition to the standard-issue camera, lights and integrated controller, the Chinook can be upgraded to include a gripper or cutter, and a variety of skid-mounted accessories.

For more information, visit www.seamor.com.

ASV wins maritime autonomy funding

ASV Ltd, in partnership with nine other commercial and research organizations, has been awarded funding by Innovate UK to undertake in excess of £3 million worth of research and development for Maritime Autonomous Systems (MAS).

Three separate projects involving ASV will look to address different areas covering the wide spectrum of activities concerning Maritime Autonomous Systems. These include software and communications, operations and regulations, autonomous vehicle interaction and launch and recovery.

"ASV is delighted to be leading this pivotal research and development that will help secure the UK's place at the cutting edge of maritime autonomy," said Dan Hook, ASV managing director.

With growing demand for the operation of Unmanned Surface Vehicles (USVs) over the horizon, ASV will be working with D-RisQ, Cranfield University and Frazer Nash Consultancy to develop and prove this capability. The project will address software development as well as collision avoidance and regulatory considerations.

ASV will be using the C-Enduro alongside the National Oceanography Centre's Autosub Long Range to develop a low-cost, integrated, shore-based method of surveying the full water column. This autonomous surface/sub-surface survey system project also involving Sonardyne and SeeByte will offer long-term and low-cost surveying and monitoring operations for the offshore energy and mining industry.





In addition, the development of a system for launching and recovering an Autonomous Underwater Vehicle (AUV) from a USV will see ASV collaborate with Planet Ocean, NOC and the University of Southampton.

The UK's innovation agency, Innovate UK, funds, supports and connects innovative businesses to accelerate sustainable economic growth.

Formed in 1998, ASV provides rugged, reliable and effective unmanned marine systems using the latest advances in autonomous technology. Based near Portsmouth in the UK, ASV serves international military and security, oil and gas and science and survey industries.

For more information, visit www.asvglobal.com.

Grasshopper rides Falcon for 3D view of dam

A retractable sonar system has been specially designed by underwater engineering services company Subsea Fenix to set atop a Saab Seaeye Falcon ROV.

Nicknamed "The Grasshopper," the concept has made possible a more detailed inspection of a reservoir dam in central Italy than could otherwise be achieved. Faced with the problem of mounting a BlueView 3D sonar system high enough above the ROV to gather all-round images and avoid the vehicle's chassis obstructing the scan, Subsea Fenix knew it would be impossible to swim any distance top-loaded in this way.

Their inspired solution was to create a retractable structure that lowers the topside mass while the Falcon is swimming, then remotely raises it when needed.

With a full inspection package aboard the ROV, it has been possible to provide accurate visual 2D and 3D sonar data of inlets and outlets, grids, tunnels and ramps—while also identifying the presence of debris and sediment.

The clarity of both the high-resolution cameras and advanced sonar has given the inspection team a clear and



accurate view of the condition of the dam and its operational components.

The Falcon helped uncover critical problems such as rock fall damage to the rail used to lower the massive outflow closure gate and rock debris blocking the cable wheels that lower the gate.

Scans also revealed that a third of the grids clearing the water flow were obstructed by sediment.

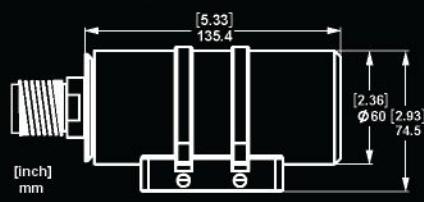
Divers were used for much of the remedial work with the Falcon in sup-


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port. The 2D sonar aboard the ROV was used to view the underwater horizon and monitor diver activity, while at the same time observing crane movement of a dredging pump.

In addition to the top-mounted BlueView sonar system, the total inspection package for the Subsea Fenix Falcon includes a Tritech Super Seaprince scanning sonar, a high-resolution color video camera with 180° tilt platform and low-light mono camera.

The Falcon's intelligent control architecture makes it easy to add and change such systems as needed.

Although small enough to be man-handled, even from a small boat, its five powerful thrusters make the Falcon highly maneuverable and able to hold steady in moving water while filming or undertaking various missions.

Subsea Fenix's future plans include using the Falcon at the same lake for a deep tunnel inspection to an interconnected lake.

For more information, visit www.seaeye.com.

Partrac deploys two AXYS Technologies WindSentinel at the ORE Catapult site

Leading UK marine survey company Partrac Ltd has deployed two WindSentinel floating LiDAR systems for AXYS Technologies for validation trials at the Offshore Renewable Energy Catapult's (ORE) met mast, off the coast of Blyth, UK.

Partrac provided a complete installation and project management service and was chosen by AXYS due to the depth of experience in deploying large metocean equipment and flexible approach to their requirements. Seeking to bring efficiencies while deploying this innovative technology, Partrac put forward a deployment plan that not only delivered on these KPIs but also provided AXYS with a wealth of management

and health and safety experience that was crucial in making the deployments a success.

Partrac managed all health and safety, quality, and environmental aspects as well as securing the necessary site licensing, logistics and certifications. Partrac's input continued with vessel management, assisting with pre-deployment compass calibration tests, towing of the buoys out to site (a feature of the WindSentinel innovative hull design), and installation. Partrac will also be working with AXYS on recovery of the two systems before onward transport to a commercial site in France.

"We are delighted that AXYS Technologies selected Partrac to deploy the WindSentinel at the ORE Catapult site. Partrac has a wealth of experience in mobilizing and installing metocean instrumentation for innovative and technically challenging projects, and we are proud that our experience has enabled us to work with AXYS on these flagship installations," said Partrac operations director, Peter Wilson.

Graham Howe, director of sales for AXYS Technologies, said, "Partrac has been extremely helpful throughout the organising and undertaking of the deployments. We will certainly be looking to partner with them on future projects for both the WindSentinel and our marine product lines."

For more information, visit www.partrac.com.

Bibby HydroMap first to invest in and install Sonardyne's new Mini-Ranger 2 tracking system

Sonardyne International Ltd, UK, has announced that Bibby HydroMap, a specialist seabed survey company, has upgraded the Sonardyne Scout acoustic positioning system installed on its coastal survey vessel, Bibby Athena, to the new ultra-portable and ultra-high performance Sonardyne Mini-Ranger 2 USBL system.

Mini-Ranger 2 is the latest addition to Sonardyne's family of sixth-generation (6G) Ultra-Short Baseline (USBL) underwater target tracking systems and was introduced at the start of April to meet demand for a survey grade positioning system without the cost and complexity of a deep water USBL solution.

The Mini-Ranger 2 equipment, along with Sonardyne's new Wideband Sub-Mini 6 Plus (WSM 6+) USBL transponder/responder, was delivered directly to the Bibby Athena on the opening day of the Ocean Business exhibition in Southampton in time for it



to be installed and made available to support the underwater vehicle tracking demonstrations Bibby HydroMap will be carrying out during the event.

With the order, Bibby HydroMap is now officially the first company to begin benefiting from the same Wideband 2 digital signal processing technology that's earned Ranger 2, Sonardyne's deepwater USBL tracking system, its enviable reputation for precision and accuracy, but for significantly less cost.

Offering an operating range of 2,000 m and the ability to simultaneously track up to 10 subsea targets at very fast update rates (e.g., divers, AUVs and towfish), Mini-Ranger 2 is ideal for nearshore operations on small, quiet vessels such as the Bibby Athena.

The Sonardyne 6G and Wideband 2 digital signal technology inside Mini-Ranger 2 USBL offers precise acoustic ranging and hardware that is easier to set up and operate, even in the most challenging subsea operating environments. These features will help Bibby HydroMap to improve the efficiency of their subsea survey operations, reduce vessel delays and generate cost savings.

At the core of the Mini-Ranger 2 USBL system is the smallest and lightest 6G transceiver currently on the market, the new HPT 3000. HPT 3000 is a 6G compatible "High Performance Transceiver" featuring a new design of receiver array and transmitter that are optimized to provide excellent performance in shallow water at high elevations as well as in deeper water.

With the HPT 3000 transceiver installed through the hull of the Bibby Athena, Bibby HydroMap will be using their Mini-Ranger 2 system during Ocean Business 2015 to precisely track the position of their Dynamic Remotely Operated Platform (d'ROP) as it conducts daily demonstrations of its capabilities around the Empress Dock and beyond.

For more information, visit www.sonardyne.com.



Steatite win Innovate UK funding

Steatite is delighted to announce that it has been awarded collaborative funding of £1.1 million towards the research and development of the next generation of Lithium Batteries for Marine Autonomous Systems (MAS).

A consortium of UK companies and academic partners, led by Steatite and co-funded by the UK's innovation agency, Innovate UK, will produce a battery pack that will be pressure tolerant up to depths of 6,000 m. The collaboration includes cell manufacturer OXIS Energy Ltd, underwater vehicle designers and manufacturers MSubs Ltd and scientific expertise from the National Oceanography Centre (NOC).

Collectively, this team will benefit from expertise at an academic level, a cell research level, pack assembly and as operational end users of MAS in the most challenging environments. This is a unique opportunity to establish a high pedigree consortium with an extensive knowledge of MAS, their operational requirements, and product opportunities, with already established routes to market. OXIS Energy has been at the forefront of innovative R&D, building next generation Lithium Sulfur battery technology since 2005, while MSsubs have a wealth of experience in all aspects of innovative underwater vehicle design and manufacture. The NOC has consistently been at the forefront of pioneering marine autonomous developments.

Schmidt Ocean Institute selects Greensea to help build full ocean depth robotic research vehicle

Greensea Systems, Inc., a world leader in automation and navigation for unmanned underwater vehicles, announces its selection by Schmidt Ocean Institute (SOI), a non-profit foundation advancing the frontiers of ocean research and exploration, to join the team developing SOI's new robotic undersea research vehicle. Schmidt Ocean Institute will produce a series of three vehicles with advancing depth and research capabilities to comprise the Hybrid Remotely Operated Vehicle (HROV). Greensea was selected to support SOI's HROV program.

Schmidt Ocean Institute has already begun work designing the full ocean depth undersea robotic research vehicle and will operate at depths of 11,000 m. It will be one of the world's only robotic vehicles capable of providing scientists real-time access to the deepest parts of the ocean. In 2014, SOI

deployed its 82.9-m ship RV Falkor twice to the Mariana Trench, which is the deepest part of the world's oceans. The HROV will be the next-generation vehicle to help researchers gather data from those unexplored depths.

With a background that includes diver, ROV operator and physicist, Greensea president and CEO Ben Kinnaman understands what it takes to create an ROV that will deliver the precise, accurate, and repeatable data the scientific community needs. "Greensea's technology is specifically designed to improve the relationship between man and machine. We make powerful, integrated technology that is intuitive to operators, so they can work smarter not harder." Greensea's turnkey solution for Schmidt will provide integrated data, sonar and video in a fully automated environment.

For more information, visit www.greenseainc.com.

ALSEAMAR plays a key role in a major European H2020 Blue Growth project

The BRIDGES consortium has won 8 million Euros in the latest EU Horizon 2020 competitive funding in the areas of Blue Growth, under priority "Unlocking the potential of seas and oceans." By funding this research & innovation action, the European Commission clearly supports the emergence of a European champion in underwater glider technology and the miniaturized sensor industry.

To address the European long-term strategy for sustainable growth in the ocean economy, the Horizon 2020 call "delivering the sub-sea technologies for new services at sea" supports the design and delivery of new underwater vehicles able to increase the competitiveness of the existing and new offshore economy; enable sustainable and safe offshore operations by European industries in extreme conditions; and improve the scientific capacity to observe and understand the oceans, the deep sea environment and their resources.

Bringing together Research and Industry for the Development of Glider Environmental Services (BRIDGES) will provide a solution for further understanding, improved monitoring, and responsible exploitation of the marine environment while assuring its long-term preservation. This new tool consisting of deepocean gliders is robust, cost-effective, re-locatable, versatile, and easily-deployable; it will support

autonomous long-term *in-situ* exploration of the deep ocean over a wide range of spatial and temporal scales.

The two deep Explorer gliders to be developed will be built on the successful unique European underwater glider Sea Explorer. The Sea Explorer was designed in the frame of a 6-year cooperative R&D program labeled by the French marine business and innovation Pôle Mer Méditerranée cluster. The Sea Explorer consortium was composed by the ALSEAMAR company (ex-ACSA) as system architect and the ACRI company, as well as, public laboratories such as MIO (Mediterranean Institute of Oceanography), the IFREMER (Institut Français de Recherche pour l'Exploitation de la Mer) and the LOV (Laboratoire d'Océanographie de Villefranche-sur-mer). The French Pôle Mer Méditerranée cluster strongly supports the Sea Explorer program and the BRIDGES project since the beginning.

During BRIDGES, it is planned that the sole European underwater glider Sea Explorer will be modularized and adapted to more diverse operations, able to dive deeper and to carry new sensors that will be developed, while the operational methodology will be modified in such a way new horizons of services could be opened. The Sea Explorer glider, a rocket-shaped vehicle, typically navigates autonomously in the ocean for months at a low speed (~30 km/day) to collect a variety of data and report back to the land station. New Explorer gliders will be improved by: 1) adapting for deep basins (up to 5,000 m); 2) implementing a novel payload architecture to increase autonomy and to accommodate the range of sensing capabilities needed; and 3) integrating the associated control support system for single and networked operations (mission behavior, data management, planning, communications).

For more information, visit www.alseamar-alcen.com.



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Harris CapRock delivering enhanced Internet access for Carnival Cruise Line fleet

Harris CapRock Communications is delivering increased bandwidth levels to enhance Internet access on Carnival Cruise Line ships as part of a fleet-wide rollout that enables the line to provide the optimal amount of bandwidth and communications services to its guests. As part of the program, Carnival is offering passengers a wide range of convenient Internet access options as well as the cruise industry's first-ever social media package including unlimited access to popular sites and apps such as Twitter, Facebook, Instagram, Pinterest, LinkedIn and Snapchat, for a flat rate of \$5 per day. Unlike other Internet packages, Carnival's social media packages provide guests with a flexible, convenient and highly affordable option for updating their favorite social media channels while cruising the open seas. "Technology plays an increasingly important role in today's world, even while on vacation. Introducing these new Internet packages offers a strong platform for incorporating additional innovations and ways for utilizing technology to further enhance our guest on-board experience," said Gabriela Gonzalez, vice president, guest technology and photo operations, Carnival Cruise Line. Carnival is upgrading its ship-board Internet infrastructure and satellite communications capability in order to offer these compelling connectivity options for its guests. "This groundbreaking program is testament to Carnival putting its guests and team members first," said Rick Simonian, president, Maritime, Harris CapRock. "The demand for bandwidth continues to grow and Harris CapRock is focused on providing it in the most advanced and efficient way possible. Working together, we can ensure that Carnival's customers enjoy the right level of communications no matter where they are cruising." Harris CapRock provides communications services on board more than 100 Carnival ships across its portfolio of nine global brands, including Carnival Cruise Line. Each ship, including those Carnival Cruise Line vessels involved in the program, leverages Harris CapRock's hybrid C- and Ku-band network solution.

May 2015

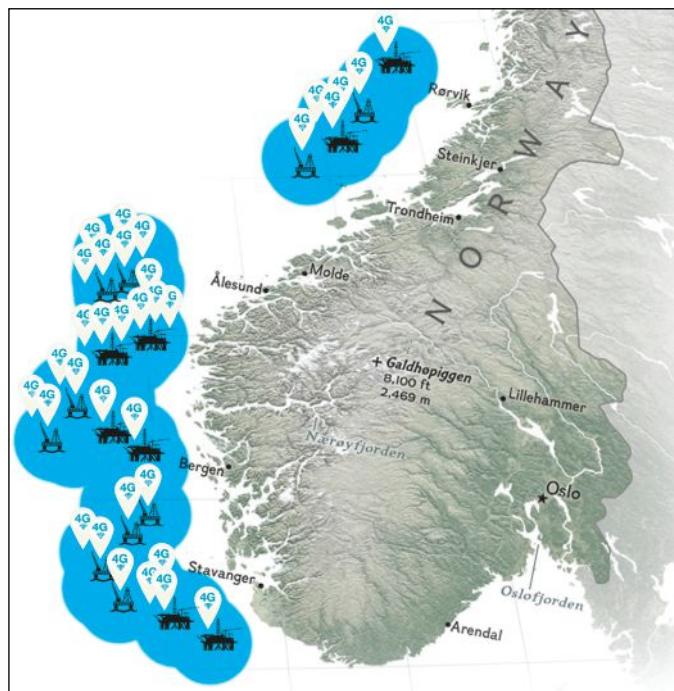
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Ocean News & Technology

MTN launches live HDTV at sea

MTN Communications (MTN) announces another maritime industry first with the launch of its high-definition live television service at sea, MTN Worldwide TV HD (MTN-TV HD). "MTN-TV HD delivers an amazing viewing experience on board," said Graham Douglas, media and communications manager, P&O Cruises and Cunard. "We can now experience TV at sea like we can at home. As we transformed the technology and ambience in our common areas, theaters and cabins, we evolved from small to large screens, so our requirement for HD became paramount. We are so pleased with the service that we just used it on all our ships to broadcast the naming ceremony for our new build, Britannia." This service launch starts with IMG's Sport 24 Channel in HD. The first-ever 24/7 sports channel designed for the maritime market, it is the most watched sports channel on board MTN-TV customer vessels. Its 2015 line-up includes Premier League Soccer, Formula 1™, U.S. Open Tennis, Wimbledon, the Masters, and Bundesliga Soccer delivered in HD to vessels around the world. MTN-TV HD is available to the maritime market only through MTN. This is because the company manages and optimizes its network with some of the industry's most sophisticated propriety tools. This new service enhances the broadcast quality of all the other MTN-TV channels as well. In an effort to stay ahead of customer needs, MTN constantly is transforming its infrastructure to deliver the industry's highest quality of service. The company has plans for further MTN-TV technology investments, particularly nearing the roll-out of the MTN High-Throughput Multi Spot Beam (MTN HTMS™) service next year. Around the world, 137 ships subscribe to MTN-TV. The service broadcasts 11 channels of news, sports, entertainment and special events. In service 5 years this month, MTN-TV has broadcast 1,743 live special events, totaling 5,236 hours of major sporting events, awards shows, operas and ship-specific gatherings. MTN-TV HD is a turnkey solution for MTN partners as well as vessel operators just using this particular service.

MCP to deploy largest 4G offshore network in the world



Statoil has chosen Maritime Communications Partner (MCP) to deploy and operate their high speed 4G-network on the Norwegian Continental Shelf (NCS). Statoil and MCP have signed a 6-year contract with an option to extend for another 4 years. With that MCP will immediately start building the world's largest 4G network at sea.

Statoil will benefit from high-speed mobile coverage on all of its 34 platforms on the NCS. This will greatly improve communications among platforms, rigs and supply-vessels. Initially, 15 rigs, 2 light well intervention vessels (LWI), 2 subsea inspection and maintenance vessels (IMR), and 50 supply ships will be covered. High capacity, stability and availability will promote opportunities for integrated operations.

"Mobile operators and technology have through time, transformed how businesses operate. A state-of-the-art high-speed 4G network will facilitate even more innovation and efficiency improvement in the oil- and gas-industry," said MCP's CEO Frode Støldal. "This contract is a significant milestone in our offshore strategy where we apply an industrial approach, standardized infrastructure and a long-term plan for further expansion."

The agreement includes existing and new oilfields operated by Statoil. In addition to opening up for expansion into the UK Continental Shelf and other areas of Statoil's international operation, the contract strongly supports MCP's strategy in becoming the world's leading maritime operator.

"Statoil is the leading operator on the NCS. The agreement is an important contribution in enabling a significant modernization of the mobile network, and we are looking forward to cooperating with the company," said Støldal.

Telenor-owned MCP specializes in communications solutions for shipping and offshore installations. MCP already owns 16 base stations on NCS that will be upgraded to high speed 4G during 2015. As new oilfields are developed, coverage and capacity will follow. An additional benefit for the maritime businesses such as merchant marine and fisheries is the general availability of mobile communications for all at sea.

For more information, visit www.mcp.com.

KVH outlines next generation of ship-to-shore connectivity

The next generation of connectivity between ship and shore will be dominated by the development of applications to help ship owners and managers reduce costs by enhancing operational efficiency, automating processes, and avoiding expensive repairs, according to one of the world's leading suppliers of satellite communications to the maritime industry.

Brent Bruun, executive vice president of mobile broadband at KVH Industries, Inc., spoke at the CMA Shipping 2015 conference in Stamford, Connecticut, as part of a panel of experts addressing the impact of "big data" on maritime operations. Mr. Bruun said advances were being seen in key areas such as engine monitoring; remote maintenance; and satellite delivery of electronic charts, weather data, and e-Learning services. Efforts were also underway to improve a ship's ability to comply with the demands of international regulations.

This is all against a backdrop of an industry fighting to reduce crew turnover and improve training of its seafarer asset. Attracting and retaining quality crew is still a major challenge facing industry

leaders with "a tech-savvy, digital native crew" being asked to work on increasingly sophisticated equipment against increasingly complex regulatory expectations, he told delegates.

Today's seafarers are now demanding better communications connections to home; they want to access social media and the Internet at sea as well as have access to news, movie and TV entertainment, and music, "all of which must be licensed." They also want better training and professional development, Mr. Bruun said.

"The shipping industry needs to change how it thinks about connectivity and content delivery," with the maritime industry facing exploding demand for broadband connectivity at sea accessed via mobile devices. This trend is being driven by the entrance of digital natives into the seafaring workforce, he noted.

Trends on land that are forcing cell phone companies to sell access by the gigabyte are starting to transfer to maritime services, Mr. Bruun said. Services for data access at sea need to address increasing operational demand and the threat that crew's broadband data usage could overwhelm a vessel's data network: "Simply adding bandwidth capac-

ity and data speed is not enough as there are always new ways to fill up that capacity," he said.

Ship operators also want greater transparency when it comes to understanding how much data is being used and how much is needed, he noted. Owners and operators want clarity in usage trends and also want to better understand the implications of data use.

Mr. Bruun said there was a growing trend towards the use of multicasting, where one transmission sends files to all vessels. These are cached on an on board server for immediate access.

"KVH's IP-MobileCast™ content delivery service is designed so it never affects the quality of, or competes with, an owner's Internet or VoIP service. Beam capacity is sized for peak loads, leaving about half the network capacity unused. Multicast data is transmitted in unused bandwidth, at a lower priority than standard IP traffic and it does not use the vessel's or customer's mini-VSAT Broadband(sm) plan's data allotment," he said. "A multicast approach like IP-MobileCast sharply reduces the crew's demand for bandwidth."

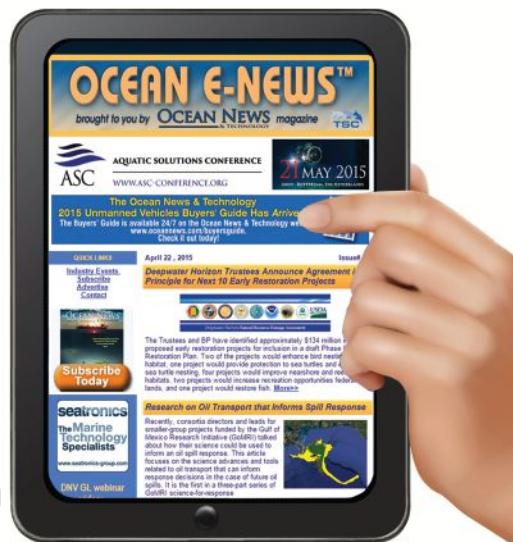
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Airbus, Intelsat double maritime VSAT sales following partnership

Airbus Defence and Space and Intelsat S.A. announced that the companies' strategic agreement concluded in 2014 has yielded value for end-users and is setting the course for even more maritime customer advantages as part of a seamless transition to Intelsat EpicNG high throughput satellites.

One year ago, Airbus Defence and Space and Intelsat announced a strategic agreement to introduce improved maritime VSAT offerings to the marketplace. The agreement was to enable Airbus Defence and Space to bridge its existing maritime VSAT services to Intelsat's high throughput satellite (HTS) Intelsat EpicNG platform, the first of which, Intelsat 29e, is scheduled to launch in the first quarter of 2016.

Since that announcement, the companies have made strides toward enhancing existing VSAT services for Airbus Defence and Space's maritime customers while ensuring the combined offering is "EpicNG ready." The agreement secured Airbus Defence and Space's access to Intelsat's global Ku-band satellite capacity and terrestrially managed network, IntelsatOne®. Stimulating significant market demand, the partnership resulted in connecting more than 600 vessels with VSAT communications in 2014 alone. This included shipping companies such as Stolt, CMA CGM, Scorpio, and DOF, and represented a doubling of Airbus Defence and Space's maritime VSAT sales over the previous year.

"Our partnership with Intelsat has given us further flexibility to develop the connectivity services the maritime market requires today, but also for the future with the Intelsat EpicNG HTS satellites coming soon," said Evert Dudok, head of communications, intelligence and security (CIS) business line at Airbus Defence and Space. "Our mission is to stay close to the customers and integrate the services they need into a single solution. This approach has resulted in significant sales growth since our agreement with Intelsat last year, and given the progress and offering delivered to date, we are expecting even more growth in the maritime VSAT segment."

Kurt Riegelman, senior vice president, global sales, Intelsat, said, "Airbus Defense and Space have been a great partner; their recognition of the innovative value that Intelsat EpicNG will bring to their customers has set apart their offering to this segment. As a result, maritime customers are deriving



benefits today from a fully integrated, global satellite solution that will progressively and seamlessly incorporate new technology as it becomes available. We look forward to continuing to work with Airbus Defence and Space to deliver higher performing, more efficient and flexible satellite solutions to a wide range of maritime customers."

"As we move towards a smarter approach to operations, our requirement for reliable connectivity grows. We need bandwidth that can be relied upon to deliver IP connectivity for a wide range of applications from engine monitoring to admin functions, which help us to operate safer and more efficiently. The service offered by Airbus, and provided on Intelsat satellites, has delivered the reliability and availability we need to embrace for smart operations at sea," commented Tor Skeie, CEO Marin IT AS (DOF).

The planned transition to Intelsat EpicNG will enable additional capacity in key maritime routes. The flexible and backward compatible architecture of Intelsat EpicNG makes it easy for Airbus Defence and Space's existing customers to leverage the digital payload for greater flexibility, network adaptability and more efficient use of spectrum with throughput up to 10 times that of traditional satellites.

For more information, visit www.airbusdefenceandspace.com.

Cruise ship stats illustrate transformation of Internet speeds, revenues and value

MTN Communications (MTN) announced statistical results of its 2-year transformation of at-sea connectivity. The statistics are the product of a customer toolset MTN rolled out starting in 2012, including:

- The industry's first hybrid satellite and terrestrial broadband network for improved bandwidth delivery;
- An Internet billing method akin to land-based resorts for increased revenue growth; and
- An Internet Café solution delivering seamless access at sea through any device

and offering shared plans with improved management of data consumption.

"The cruise industry competes with the land-based resort industry," said Brent Horwitz, senior vice president and general manager, cruise and ferry services, MTN. "But when it came to communications, due to satellite technology limitations and costs, passengers and crew got slow Internet that was expensive compared to what they were used to at home."

MTN also saw a dramatic shift in devices used for connectivity on its customer ships. In 2010, the breakout of devices used to purchase and access the Internet were 94% desktops or laptops, 5% tablets, and 1% mobile phones. In 2014, the device split changed dramatically to 60% mobile phones, 20% tablets, and 20% desktops or laptops.

The industry's response to this and the exploding demand for data was to "increase the pipe" by adding bandwidth to ship service plans.

"Satellite connectivity comes at a high price, though, so operators continued to challenge the industry to improve the passenger and crew Internet experience, decrease credits issued and increase revenues," Horwitz said.

By launching the MTN Terrestrial Broadband Network (TBN), the company introduced the industry's first hybrid network of satellite and terrestrial connectivity. Four major cruise operators leverage the MTN TBN today and have for 3 years. Made up of access points at 29 of the world's busiest cruising ports, the MTN TBN switches ships from satellite to terrestrial connectivity seamlessly using a suite of patented and patent-pending technology. The experience is equal to mobile users moving from one cell tower to another. Switching to the MTN TBN enables faster Internet speeds and higher reliability. The MTN TBN has the capacity to deliver 588 GB per hour in all connected ports. Vessels have exceeded speeds of 50 Mbps downstream at one time, consuming 175 to 200 GB of data per average port visit. The average import capacity is more than five times that of a vessel with 10 Mbps of satellite capacity, and almost seven times that of a ship with 7 Mbps of satellite capacity. MTN TBN connectivity lowers costs and increases network performance, improving service quality and generating increased revenues.

MTN shifted Internet pricing so passengers and crew are billed per MB versus per minute. Users can browse web sites as long as they want now, leisurely read email, or wait on a text reply with-

out paying more. The company also eliminated the need to keep logging on and off. This consumption-based shift increased usage and improved the experience dramatically on ships MTN serves. As a result, operators saw Internet refunds decrease >50%.

The company also enhanced its Internet Café solution on board ships. Passengers and crew can use any device to seamlessly connect to the Internet in an integrated fashion. This enables operators to better manage data consumption. MTN rolled out this enhanced platform as a tool for passengers and crew to monitor and self-regulate their Internet usage.

"Cruise passengers and crew have reported back that their connectivity experience at sea has improved significantly over the past 2 years," Horwitz said. "The cost of connectivity may never fully come down to where it is on land, but passengers demand—and deserve—more value for the amount of money they pay. This increases consumption, which drives operator revenues."

For more information, visit www.mtnsat.com.

KVH expands capacity in key areas of global maritime activity

KVH Industries, Inc. has completed several capacity increases for its mini-VSAT Broadband network to support heightened demand from customers engaged in a wide range of commercial maritime activities around the world, including offshore oil and gas, fishing, and shipping. Utilizing 17 satellites and 24 transponders to provide global coverage, KVH's mini-VSAT Broadband is the most extensive C/Ku-band maritime VSAT network in the world and is designed for rapid expansion by accessing abundant commercial satellite capacity. Working with leading commercial satellite providers, KVH implemented the recent capacity expansions to meet the ever-growing demand for broadband services at sea.

"The commercial maritime industry is increasingly reliant on broadband services to improve operational efficiency," says Martin Kits van Heyningen, KVH chief executive officer. "Data and connectivity enable ship owners to accomplish many goals, from reduced

fuel consumption through voyage planning to increased safety through updated training programs delivered to crew while they are on board. We are continually monitoring and improving the mini-VSAT Broadband network to ensure our maritime customers have the critical connectivity they need at all times onboard their vessels."

KVH's recent capacity expansions for the mini-VSAT Broadband network include:

- Asia-Pacific: The capacity of a key satellite beam for the Asia-Pacific region was increased 60%, providing support for commercial shipping and offshore oil and gas activities in the area.

- Pacific Northwest: A new beam covering the Pacific Northwest was added, providing support for the many commercial fishing fleets located in this area.

- Eastern Canada and U.S. coast: A new beam was added to more than double the network capacity for the eastern coast of Canada and the United States, a key area for commercial shipping, fishing, and yacht chartering.

For more information, visit www.kvh.com.

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ABB wins cable order for one of the world's biggest wind farms

ABB has won an order worth around \$130 million from DONG Energy, the Danish integrated energy company, to supply a high-voltage cable system that will bring power from the Walney Extension wind park off the northwest coast of England to more than a million people in the UK. The Walney Extension will provide additional generation potential of 660 MW on top of the existing offshore wind farm's 367 MW. When completed, both offshore wind farms will be capable of providing clean electricity to over 800,000 households, making a significant contribution to the UK's target of achieving 15% of its total energy production from renewable sources by 2020 and reducing carbon dioxide emissions. Europe now has around 8 GW of offshore wind power connected to the grid. UK is the leading contributor, accounting for nearly half the installed capacity and a further 11.9 GW of offshore capacity under construction or having planning approval. The existing Walney offshore wind farm is located 15 km west of Walney Island off the coast of Cumbria in the Irish Sea, with its turbines covering an area of approximately 73 sq. km. The Walney Extension Wind Farm site where ABB is supplying the high-voltage cable system is northwest of the existing installation and will cover an area twice as large at 149 sq. km. Walney will be one of Europe's biggest wind farms when the new extension is ready. ABB will design, manufacture, supply and commission the 220 kV AC extruded cable system. The link includes more than 157 km of submarine cable to connect the two wind farm platforms to each other and to shore as well as 24 km of underground cable for the grid connection.

Huawei Marine wins contract to build Ceiba-2

Huawei Marine Networks Co. Ltd. has been awarded a contract by the government of the Republic of Equatorial Guinea to build the Ceiba-2 Submarine Cable System expected to be ready for service in the fourth quarter of 2015. Utilizing Huawei Marine's leading-edge Wavelength Division Multiplex (WDM) and Optical Transport Network (OTN) technologies, the 290-km system will feature a design capacity of 8 Tbps and link the capital of Malabo to Bata, the country's economic hub with a branching unit towards Kribi, Cameroon. Once completed, the system will enable Equatorial Guinea to connect to larger submarine cable systems including WACS, SAT-3, and Main One via Kribi, eventually providing access to a vast European network. It will also provide restoration or redundancy routes for existing traffic on Ceiba-1, the direct link between Malabo and Bata, and the Africa Coast to Europe (ACE) submarine cable branch to Bata. Mr. Olo Bahamonde, Minister of Equatorial Guinea's Ministry of Transport, Post and Telecommunications, said, "The development of a robust telecommunications infrastructure is vital to the future of Equatorial Guinea. We are pleased to work with Huawei Marine to implement the Ceiba-2 Submarine Cable System, which will substantially boost the economic and commercial development of the country." Mr. Mike Constable, chief executive officer, Huawei Marine Networks, commented. "It is our privilege to support the government of Equatorial Guinea by enhancing their international connectivity through the latest high-speed submarine cable infrastructure. Huawei Marine's leading-edge solutions continue to be the preferred choice of governments, carriers and private sector partners providing critical telecommunications solutions and value to regions around the world."

ABB to provide cable system in Stockholm

ABB has won an order worth around \$11 million from the Swedish utility Svenska kraftnät to design, manufacture and supply a submarine cable system under the bay of Edsviken in northern Stockholm. The link is part of the larger grid project Stockholms Ström, which will provide an entirely new structure for the electrical grid in the growing Stockholm region. The project is scheduled to be commissioned by the end of 2016. The high-voltage alternating current 220-kV cable system contains five circuits with single-core cables with a total length of 21 km, which will have the capacity to transmit power across the bay between the areas of Kvinge and Bergshamra, a distance of 1.25 km. By connecting the submarine cable to existing underground cables, energy will be transmitted below ground and under water, replacing overhead lines in the region and reclaiming valuable land. The Edsviken project is the sixth high-voltage cable system that Svenska kraftnät has awarded to ABB over the past 6 years.

Van Oord's cable-laying vessel Nexus is operational



Van Oord deployed the Nexus, its first cable-laying vessel for constructing offshore wind parks, with a 2-day event on the Wilhelminakade in Rotterdam. Students and business contacts were given a tour of the vessel on 6 March. On 7 March, the vessel was christened by Ms. J. Damen-Carli, the wife of Mr. K. Damen, member of the supervisory board at Van Oord and chairman of Damen Shipyards Group, in the presence of Van Oord's guests and employees.

The vessel was built by Damen Shipyards Group at its shipyard in Galati, Romania. The modern vessel is nearly 123 m long and more than 27 m in the beam. The Nexus has been equipped with a cable carousel with a capacity of 5,000 tons to install long export cables. The deck layout is the result of in-house engineering and development in anticipation of future market requirements for challenging cable installation works. There are accommodations for 90 people on board. Nexus is the Latin word for connection—a suitable name for a ship that will connect offshore wind turbines with each other and to the mainland.

The first project for the Nexus will be the Gemini offshore wind park that will be built 85 km off the coast of Groningen. The construction phase has started and will be fully operational in 2017. The 600-MW wind park will consist of 150 wind turbines with a capacity of 4 MW each. After construction, the park will deliver electricity to more than 1.5 million people. Van Oord is involved in the Gemini project in two ways. First, as a 10% shareholder in the project, and second as the EPC (engineering, procurement and construction) contractor that will build the wind park. The EPC contract encompasses supplying and installing the foundations, the entire electrical infrastructure, including the offshore and onshore high voltage stations, the cables, and the installation of the Siemens wind turbines. Van Oord will be deploying several vessels, including the specially developed offshore installation vessel Aeolus and the cable-laying vessel Nexus, for the construction of the wind park.

Van Oord's strategy is to further expand its role as an EPC contractor for the construction of offshore wind parks. To that end, Van Oord is investing in specialized vessels and recently acquired Ballast Nedam Offshore's equipment and operations.

Pieter van Oord, CEO, said, "The Nexus is tangible proof of the strength of the Dutch maritime cluster. The ship was built on the order of a Dutch ship owner, at a shipyard owned by a Dutch company, to be used to build the largest Dutch offshore wind park that will contribute significantly to the implementation of the Dutch Energy Agreement."

For more information, visit www.vanoord.com.

Agreement reached on world's longest interconnector

National Grid and Statnett have reached an agreement to construct an interconnector between UK and Norway. The 1,400-MW subsea electricity cable will connect the two countries' electricity markets directly for the first time.

Statnett and National Grid signed the ownership agreement that signals the start of the construction phase for the 730-km interconnector between the UK and Norway.

The NSN Link would be the first electricity interconnector between the two countries and has a planned capacity of 1,400 MW. It will be the world's longest sub-sea power cable.

Auke Lont, Statnett CEO, said, "We are proud to be part of this project. Not only is this a technically impressive project where we will set a new world record, it is also an important contribution to facilitate renewable energy production on both sides, and thereby an essential part of the future electricity system. In addition it will contribute to security of supply and value creation for both Norway and the UK."

Alan Foster, director of European business development for National Grid, said, "Access to low-carbon energy from Norway hydropower stations will help us meet the challenge of greener, affordable energy. It also adds to the diversity of energy sources for UK and potentially can reduce peak prices with benefits for consumers and businesses."

The interconnector would run from Blyth in Northumberland to Kvilldal in Rogaland on the Norwegian side. There will be a converter station on each side where the interconnector is connected to the on-shore grid. The project is estimated to cost around €1.5 to €2 billion to be shared jointly. The interconnector is planned to be completed by 2021.

For more information, visit www2.nationalgrid.com.

NordLink contract signed with Nexans

A contract with supplier Nexans Norway for delivery of more than 700 km subsea power cable was signed on 24 March. The previously announced contract is part of the NordLink interconnector between Norway and Germany.

Nexans is one of the main suppliers to NordLink, the interconnector that will be built between Norway and

Germany. Agreement was signed on the 24th by Nexans Norway and project partners, Statnett, Dutch TenneT and the German promotional bank KfW.

"This is one of the largest contracts we have entered into in Statnett and one of the largest and most important projects we will undertake in the coming years. We look forward to working with Nexans, which we also have worked

with over many years in similar projects," said executive vice president Håkon Borgen in Statnett.

Nexans will manufacture and install HVDC (high voltage direct current) cable for the part of the project that is in Norwegian and Danish sectors. This is a route of 362 km with two parallel cables and involves delivery of 724 km high voltage DC (HVDC) cable from the

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Nexans factory in Halden. ABB will manufacture and install corresponding cable in the German sector and converters in Norway and Germany.

The NordLink project is scheduled for commissioning and trial operation in Q4 2019; after the trial period, the interconnector will go into commercial operations in 2020. The interconnector comprises a total investment volume of approximately EUR 1.5 to 2 billion.

The NordLink project will be realized by the Norwegian TSO Statnett SF and DC Nordseekabel GmbH & Co. KG, each with 50% ownership. TenneT TSO and German promotional bank KfW both have shares of 50% in DC Nordseekabel. DC Nordseekabel is responsible for the construction of the German part of the project, including permits. The HVDC interconnector will have a capacity of 1,400 MW and will be installed between Tonstad in Sirdal, Norway and Wilster in Schleswig-Holstein, Germany.

For more information, visit www.nexans.com.

Offshore transmission project acquisition completed

International infrastructure group Balfour Beatty has reached financial close and completed the acquisition of the £352 million Gwynt y Môr offshore transmission project (OFTO) in the UK. Balfour Beatty will jointly own Gwynt y Môr OFTO with Equitix. Balfour Beatty will invest £28 million of equity, which represents 60% of equity required.

The Gwynt y Môr OFTO, previously operated by Gwynt y Môr Offshore Wind Farm Limited, is the high-voltage electricity transmission system connecting the 576-MW offshore wind farm in North Wales, to the onshore transmission grid. The wind farm will be capable of generating enough electricity for around 400,000 homes each year. The assets include three substations—two offshore and one onshore—and over 80 km of subsea cables. Balfour Beatty's Services division is responsible for the assets' operations and maintenance under a license granted by Ofgem with a 20-year revenue stream.

To date, Balfour Beatty has achieved financial close on three OFTO projects and now has responsibility for OFTO transmission assets worth £833 million with a combined transmission capacity of 1,380 MW. Financial close was

achieved on the £317 million Greater Gabbard OFTO in November 2013 and the £164 million Thanet OFTO in December 2014.

Leo Quinn, Balfour Beatty Group chief executive, said, "The offshore transmission market has a future pipeline to 2020 of up to £10 billion, which represents a sizable growth opportunity for our investments business. Combining our investment and operational capabilities gives us a leading offering in this market and we have already used this to establish a strong early presence."

For more information, visit www.balfourbeatty.com.

Global consortium, NEC begin construction of SEA-US

A global consortium of telecommunications companies, formed to build and operate the South-East Asia - United States (SEA-US) submarine cable system, officially announced the start of construction for the landmark project, the first to directly connect Indonesia and the United States. NEC Corporation and NEC Corporation of America are the system suppliers for the US\$250 million project that is expected to be completed in the fourth quarter of 2016.

The SEA-US system will link the five areas and territories of Manado in Indonesia; Davao in Southern Philippines; Pitti in the territory of Guam; and Honolulu, Hawaii and Los Angeles, California in the continental U.S. The system will be approximately 15,000 km in length, stretched along a unique route and has been designed and engineered to bypass earthquake prone areas in East Asia, thereby providing a strategic diversity in the range of connectivity to transpacific networks with ensured stable connectivity.

The cable system will provide an initial 20 Tbps capacity, with state-of-the-art 100 Gbps technology. This capacity will help to meet the exponentially growing demand for bandwidth between Southeast Asia and North America in unparalleled performance, especially for those two ASEAN countries. With further connectivity using existing and planned submarine cable systems in the region, other countries such as Singapore, Malaysia, Brunei, Papua New Guinea, and Australia can enjoy the benefit of the SEA-US.

The SEA-US consortium consists of PT. Telekomunikasi Indonesia International (Telin), Globe Telecom, RAM Telecom International (RTI), Hawaiian Telcom, Teleguam Holdings (GTA), GTI Corporation (a member of the Globe Telecom group of companies) and Telkom USA.

For more information, visit www.nec.com.

E-marine marks the start of ambitious fleet expansion

E-marine, the principal provider of submarine cable installation and repair solutions in the Middle East and Sub-Continent region, has unveiled ambitious plans to expand its fleet of cable ships in 2015, with the first ship, the CS Maram, beginning dock trials ahead of its maiden voyage this year.

The CS Maram, which was built in Abu Dhabi, UAE, has been designed to manage the installation and maintenance of all types of submarine cables, including fiber optic telecommunications cables and energy cables. The ship is expected to successfully complete dock trials and be ready for launch within the coming months.

E-marine's planned fleet expansion will see the addition of further multi-purpose vessels in the coming years, boosting its coverage across the region, with a particular focus on East Africa and the wider region. The expansion will help strengthen the firm's presence in the high-growth subsea cable market and undertake activities to stem demand from telecoms and energy sectors.

Omar Jassim Bin Kalban, Managing director & chief executive officer of E-marine, said, "Our commitment to increasing market share in the region will see a significant expansion to our fleet. By increasing our number of vessels, we are positioning E-marine to provide a faster, wider and far reaching service to cable owners through reduced transit times and closer proximity to cable systems. This investment in our fleet signifies a renewed confidence and optimism in the region's digital future and will support the roll-out and maintenance of submarine cables. The CS Maram is a state-of-the-art cable ship that will provide our customers with the latest subsea cabling technology."

The fully loaded maintenance and installation vessel will incorporate an ROV that will enable the vessel to

undertake pre-inspections and surveys of the seabed and cut trenches to bury the cable.

Once the CS Maram is fully operational, it will generate direct employment opportunities in the region. The company already has a highly skilled and diverse workforce of more than 20 nationalities and will be seeking an international crew of captains, seamen and technicians for the new ship from across the region to take up positions on board the vessel.

For more information, visit www.emarine.ae.

Alcatel-Lucent streamlines its cable ship operations

Alcatel-Lucent and Louis Dreyfus Armateurs (LDA), a leading global player in transport and logistics, have renewed their long-term partnership and streamlined their cable ship operations. With the completion of the transaction, Alcatel-Lucent Submarine Networks (ASN) now has full ownership of ALDA Marine and its fleet, while LDA remains ASN's long-term partner for cable ship management and fleet development. This will allow the companies to better answer the expected growth of the telecom market and the development of oil and gas activities.

Since the year 2000, Alcatel-Lucent Submarine Networks (ASN) and LDA have grown a successful partnership under the joint venture ALDA Marine, building, owning and operating a fleet of cable ships. Thanks to this collaboration, ASN has positioned itself as one of the two leading turnkey players in the field of subsea telecom cable systems, with marine operations as one of ASN's key differentiators on this market.

Commenting on the transaction, Philippe Louis-Dreyfus, president of LDA, said, "We are pleased to continue our partnership with Alcatel-Lucent, thus continuing a strong, long-standing and successful cooperation. This transaction will also allow us to further reinforce our strategy of partnerships with large industrial groups to ensure our marine services are always at the forefront."

Philippe Dumont, president of Alcatel-Lucent Submarine Networks, added, "As we enter in an upward cycle of submarine cables constructions, streamlining operations provide a simpler governance model, ensure the excellence of our marine operations and deliver financial benefit to the company."

For more information, visit www.alcatel-lucent.com or www lda.fr.



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Xtera reports record-breaking unrepeated transmission

Xtera Communications, Inc. announced the demonstration of record unrepeated transmission distances using commercial Xtera's Wise Raman™ solution and large effective area ultra-low loss fiber from Corning Incorporated. 100G and 10G transmissions were demonstrated over 607 km and 632 km, respectively, with no active equipment between the end points of the links. These demonstrations were made with the support of State Grid Information & Telecommunication (SGIT) Company.

These industry's leading achievements outline the unrivaled unrepeated reach performance obtained by combining Xtera's Wise Raman™ optical amplification solution and Corning® Vascade® EX2000 optical fiber. Both products are commercially available today and already deployed in the field.

Xtera's Wise Raman™ technology increases the optical span length by turning some parts of the line fiber into an amplification medium; this is achieved via the Raman nonlinear effect where optical pump waves are launched into the fiber to create optical gain for the optical signal carriers. In addition, enhanced, patented Remote Optically Pumped Amplifier (ROPA) configuration was used in the demonstrations.

The span was assembled using Corning Vascade EX2000 optical fiber. The average fiber (including splices and connectors) attenuation was 0.160 dB/km. The Vascade EX2000 optical fiber has an average effective area of 112 μm^2 enabling higher optical launch powers for Raman pumping, ROPA, and data transmission. The video describing these 100G, 607 km and 10G, 632 km unrepeated transmission demonstrations can be viewed in Corning booth 1711 during Optical Fiber Communication (OFC) Conference® and Exposition, March 24-26, 2015 in the Los Angeles Convention Center.

Ultra-long, "thin" (low-capacity) unrepeated transmission systems provide a cost-effective and simpler-to-operate solution over a repeatered solution for many applications, including subsea links connecting sparsely populated islands and communication links to offshore oil and gas platforms, and over power utility grids in remote areas.

Xtera pioneered Raman optical

amplification in backbone networks with its Wise Raman™ solution and the installation of Raman amplifiers with a 100-nm optical spectrum in 2004. Xtera was also the first supplier to introduce Soft-Decision Forward Error Correction (SD-FEC) in a commercial 100G network in 2011. In April 2013, Xtera launched the industry's first optical wideband repeater featuring Raman amplification for long-haul subsea cable systems. In December 2013, Xtera introduced the XWDM solution that makes possible a [Capacity x Reach] metric that exceeds, by a factor of six, what is normally achievable by today's 100G optical transport systems that use Erbium-Doped Fiber Amplifiers (EDFAs).

For terrestrial backbone networks, the multi-purpose Nu-Wave Optima™ optical networking platform delivers unrivaled line capacities of 15 Tbps on more than 4,500 km and 64 Tbps on more than 1,500 km over existing fiber infrastructure with no intermediate regeneration. For unrepeated applications, a capacity of 15 Tbps was recently transmitted on 410 km.

For more information, visit www.xtera.com.

ICPC, SubOptic sign MoU to formalize mutual co-operation

The two premier global organizations representing the submarine cable communication industry – the International Cable Protection Committee (ICPC) and SubOptic – have formally signed a Memorandum of Understanding (MoU) to formalize their relationship and will be seeking to further co-ordinate their activities to the benefit of the submarine cable networks community as a whole.

The role of the two organizations is complimentary, with ICPC focusing on how better to protect the submarine cable critical infrastructure that underpins the world's global economy, while SubOptic organizes the most important conference event in the industry, at which not only cable protection but also the other critical commercial and technical aspects of the industry are discussed and showcased.

As part of this MoU, SubOptic will be presenting at the ICPC Plenary in Hong Kong from 28 to 30 April 2015, outlining the SubOptic organization, its activities, and how it will evolve in the future. Reciprocally, ICPC will be a key

presenter at SubOptic 2016, in Dubai from 18 to 21 April 2016 to explain the work they are doing to help protect strategic cable infrastructure and how they are informing governments and industries alike about how essential this is to the global economy.

As both organizations work more closely, they will be planning further opportunities to support one another's activities.

The International Cable Protection Committee (ICPC) was formed in 1958 and its primary goal is to promote the safeguarding of international submarine cables against man-made and natural hazards. The organization provides a forum for the exchange of technical, legal and environmental information about submarine cables and, with 145 members from over 60 nations, including cable operators, owners, manufacturers, and supporting service providers as well as governments, it is the World's premier submarine cable organization.

SubOptic is an organization that exists to promote, foster debate, exchange ideas and act as an educational resource for the entire submarine telecommunications community. SubOptic is a non-profit, non-incorporated international organization, that is steered and sponsored by leading members of the industry. Its activities are open to every level of the industry, including those who manufacture cable systems and their components to purchasers of cable networks, purchasers of system capacity, business analysts, regulators, financiers and investors. SubOptic 2016 will be the ninth in the series of conferences, the first being held in 1986.

For more information, visit www.suboptic.org or www.iscpc.org.

Mitsubishi completes upgrade of SEA-ME-WE 4

Mitsubishi Electric Corporation has completed the upgrade and the expansion of the South East Asia – Middle East – Western Europe 4 (SEA-ME-WE 4) Cable System on February 3, 2015.

The SEA-ME-WE 4 Cable System, which was commissioned in 2005, is an ultra-high-capacity fiber optic submarine cable system linking SouthEast Asia to Western Europe via the Middle East. The cable network, measuring approximately 20,000 km and linking 16 landing stations, is owned by a consortium of 16 leading telecom carriers in 14 countries.

Mitsubishi Electric supplied its 100G MF-6900GWS Submarine Line Terminal Equipment (SLTE) with incorporated superior coherent technology for all 16 landing stations to upgrade the current 40-Gbps cable system to 100 Gbps and expand the ultimate design capacity from 2,800 Gbps to 4,600 Gbps. The new SLTE doubled the data capacity per rack and reduce power consumption per unit of data volume by 47% for each station.

Mitsubishi Electric has been a leader in submarine cable systems ever since supplying the world's first 5-Gbps optically amplified repeaters for TPC-5 project in 1994. Subsequently, in 1999 Mitsubishi Electric supplied the world's first 10-Gbps submarine transmission technology for transoceanic cables. The incorporation of 40-Gbps transmission technology into the TAT-14 cable network (May 2011), Asia-America Gateway (November 2011) and the IMEWE (India – Middle East –Western Europe) cable system (December 2011) established Mitsubishi Electric's reputation worldwide as a leader in the move

towards the terabit era. In 2013, Mitsubishi Electric completed development of its 100-Gbps transmission technology, which is expected to revolutionize people's style of communication.

Development of 100G SLTE incorporating superior coherent technology was partly supported by Japan's Ministry of Internal Affairs and Communication R&D projects for "High Speed Optical Transport System Technologies" and "High-speed Optical Edge Node Technologies."

For more information, visit www.mitsubishielectric.com.

APTelecom to market MENA Cable

APTelecom has been engaged by Middle East and North Africa Submarine Cable System (MENA-SCS) to assist with international sales and the commercialization of a new submarine cable system known as MENA Cable, connecting Europe to Middle East and India.

The MENA cable system is independent of other builds in the region and is, according to APTelecom, set to become the primary route for those seeking con-

nnectivity between Europe and Asia.

The MENA cable system spans three continents (Europe, Africa and Asia). Currently the cable lands in five countries (Italy, Egypt, KSA, Oman, and India) and in conjunction with TW1 cable to UAE and Pakistan. The cable also includes branching units to cover further expansions to Europe, Levant and East Africa. It consists of five fiber pairs, each pair expandable to 8 TB/s totaling to an ultimate capacity of 40 TB/s. MENA cable length is 9,030 km of which 930 km is a terrestrial fiber cable crossing Egypt.

As part of the remit, APTelecom will assist MENA-SCS with the commercialization aspects of their network. "We are honored to be a part of such an important project in one of the world's fastest-growing telecom markets and working within the MENA-SCS team to help bring their plans to fruition," said Sean Bergin, co-founder and president of APTelecom and advisory council member of the Pacific Telecommunications Council (PTC).

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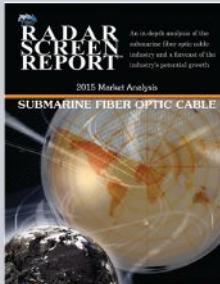
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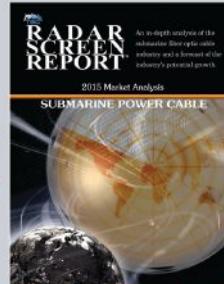
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OIL & GAS

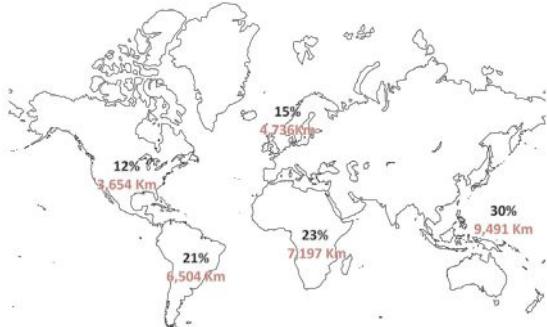


www.teledyneoilandgas.com

Reliable power, communication, and sensing solutions for subsea environments.

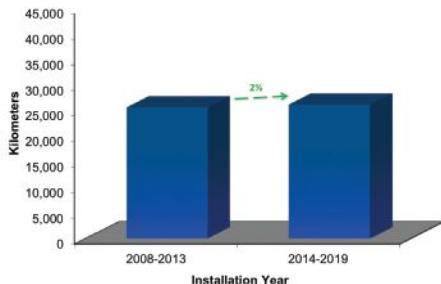
Quest Offshore Activity Report

Deepwater Pipeline Demand: Regional Share
2014 – 2019 Installation

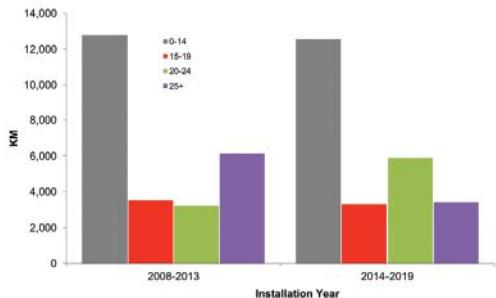


Worldwide Pipeline Demand Growth

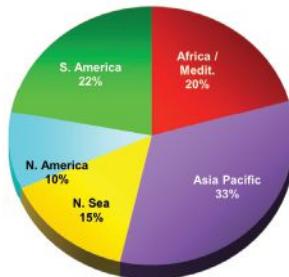
2008 – 2013 vs. 2014 – 2019



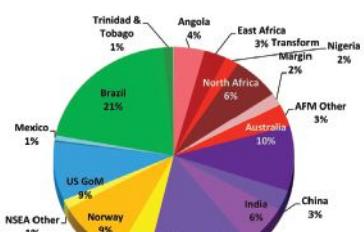
Worldwide Pipeline Demand Growth
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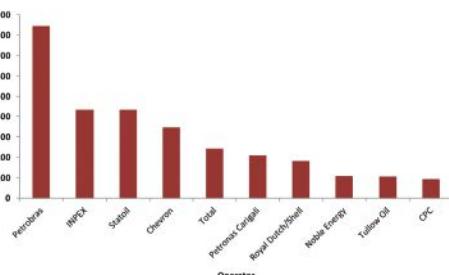
Worldwide Pipeline Demand by Region
2014 – 2019 Installations (31,582 KM)



Worldwide Pipeline Demand
2014 – 2019 by Province (31,582 KM)



2015e Top Operators by Pipeline Installation (KM)



Note: Top Operator Analysis is inclusive of infield flowline and export pipelines only. Trunk lines are excluded.

Monthly Stock Figures & Composite Index

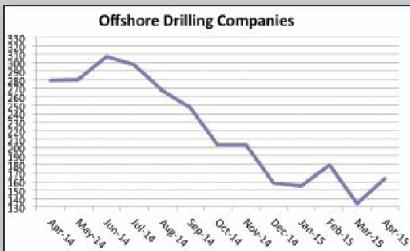
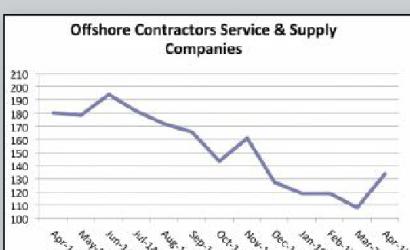
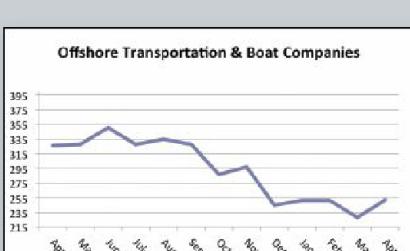
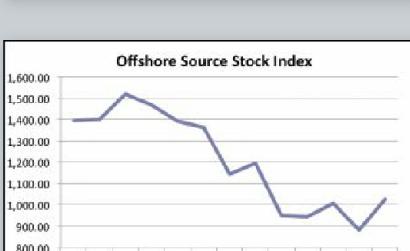
Industry Company Name	Symbol	Close(Mid) April	Close(Mid) March	Change	Change %	High	Low
						52 week	
Diversified, Production Support and Equipment Companies							
Baker Hughes, Inc.	BHI	68.26	59.17	9.09	15.4%	75.64	47.51
Cameron Intl. Corp.	CAM	50.71	43.38	7.33	16.9%	74.89	39.52
Drill-Quip, Inc.	DRQ	74.91	66.38	8.53	12.9%	115.00	65.28
Halliburton Company	HAL	47.84	40.04	7.80	19.5%	74.33	37.21
Tenaris SA	TS	31.65	26.68	4.97	18.6%	48.45	26.28
Newpark Resources, Inc.	NR	10.53	9.08	1.45	16.0%	13.60	8.07
Schlumberger Ltd.	SLB	91.08	80.60	10.48	13.0%	118.76	75.60
Superior Energy Services, Inc.	SPN	25.44	20.11	5.33	26.5%	37.05	16.70
Weatherford International, Inc.	WFT	14.37	11.56	2.81	24.3%	24.88	9.40
Deep Down, Inc.	DPDW	1.02	0.85	0.17	20.0%	2.10	0.61
FMC Technologies	FTI	40.57	36.53	4.04	11.1%	63.92	34.85
Total Diversified, Production, Support and Equipment.....	456.38	394.38	62.00	15.7%	648.62	361.03	
Geophysical / Reservoir Management							
Dawson Geophysical Company	DWSN	5.91	4.65	1.26	27.1%	17.85	4.22
Mitcham Industries, Inc.	MIND	5.12	5.35	-0.23	-4.3%	15.80	4.30
Compagnie Gnrale de Gophysique-Veritas	CGV	7.19	5.81	1.38	23.8%	17.55	5.31
Total Geophysical / Reservoir Management.....	18.22	15.81	2.41	15.2%	51.20	13.83	
Offshore Drilling Companies							
Atwood Oceanics, Inc.	ATW	32.63	27.49	5.14	18.7%	53.90	26.12
Diamond Offshore Drilling, Inc.	DO	30.55	26.62	3.93	14.8%	55.37	26.02
ENSCO International, Inc.	ESV	25.05	20.36	4.69	23.0%	55.89	19.78
Nabors Industries, Inc.	NBR	15.51	11.60	3.91	33.7%	30.24	9.91
Noble Drilling Corp.	NE	17.45	13.63	3.82	28.0%	30.29	13.15
Parker Drilling Company	PKD	4.44	2.88	1.56	54.3%	7.18	2.51
Rowan Companies, Inc.	RDC	20.20	17.89	2.31	12.9%	32.85	17.33
Transocean Offshore, Inc.	RIG	18.25	13.66	4.59	33.6%	46.12	13.28
Total Offshore Drilling.....	164.08	134.13	29.95	22.3%	311.84	128.10	
Offshore Contractors, Services, and Support Companies							
Helix Energy Solutions Group, Inc.	HLX	16.8	13.65	3.15	23.1%	28.00	13.06
Gulf Island Fabrication	GIFI	16.18	13.65	2.53	18.5%	23.89	12.32
McDermott International, Inc.	MDR	5.38	3.26	2.12	65.0%	8.43	2.10
Oceaneering International	OII	58.85	48.88	9.97	20.4%	79.05	48.37
Subsea 7 SA	SUBCY.PK	11.28	8.25	3.03	36.7%	21.10	8.17
Technip ADS	TKPPY.PK	18.1	15.18	2.92	19.2%	28.75	13.39
Tetra Technologies, Inc.	TTI	7.30	5.25	2.05	39.0%	13.43	4.72
Total Offshore Contractors, Service, and Support.....	133.89	108.12	25.77	23.8%	202.65	102.13	
Offshore Transportation and Boat Companies							
Seacor Holdings, Inc.	CKH	77.62	69.15	8.47	12.2%	87.78	67.36
Gulfmark Offshore, Inc.	GLF	15.66	13.98	1.68	12.0%	46.82	12.80
Bristow Group	BRS	63.27	58.92	4.35	7.4%	81.60	50.80
PHI, Inc.	PHII	31.41	31.00	0.41	1.3%	52.98	29.10
Tidewater, Inc.	TDW	26.97	22.70	4.27	18.8%	56.98	18.84
Trico Marine Services, Inc.	TRMAQ.PK	13.18	13.22	-0.04	-0.3%	11.27	14.35
Hornbeck Offshore	HOS	24.19	19.06	5.13	26.9%	47.45	17.91
Total Offshore Transportation and Boat	252.30	228.03	24.27	10.6%	384.88	211.16	

May 2015

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Ocean News & Technology

Monthly Stock Figures & Composite Index

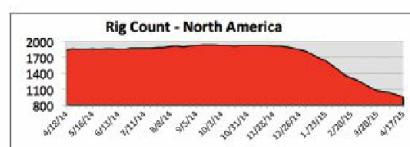
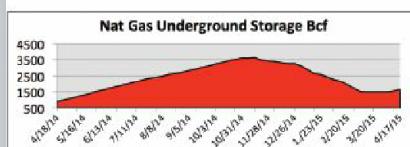
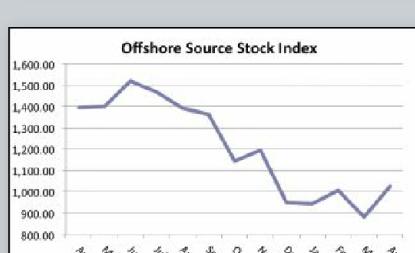
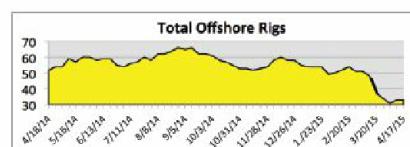
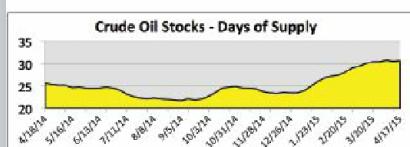
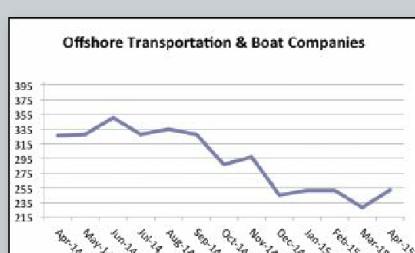
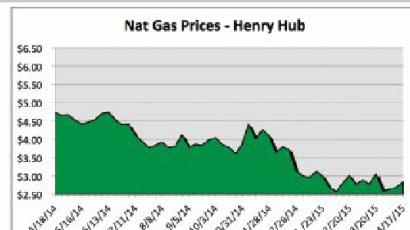
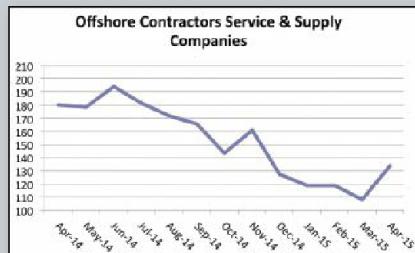
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	Total Diversified, Production, Support and Equipment	456.38	394.38	62.00	15.7%	648.62	361.03
Geophysical & Reservoir Management Companies							
	Total Geophysical / Reservoir Management	18.22	15.81	2.41	15.2%	51.20	13.83
Offshore Drilling Companies							
	Total Offshore Drilling	164.08	134.13	29.95	22.3%	311.84	128.10
Offshore Contractors Service & Supply Companies							
	Total Offshore Contractors, Service and Support	133.89	108.12	25.77	23.8%	202.65	102.13
Offshore Transportation & Boat Companies							
	Total Offshore Transportation and Boat	252.30	228.03	24.27	10.6%	384.88	211.16
Offshore Source Stock Index							
	Total Offshore Source Index	1,024.87	880.47	144.40	16.4%	1,599.19	816.25

DISCLAIMER

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

Oil & Gas Industry Trends

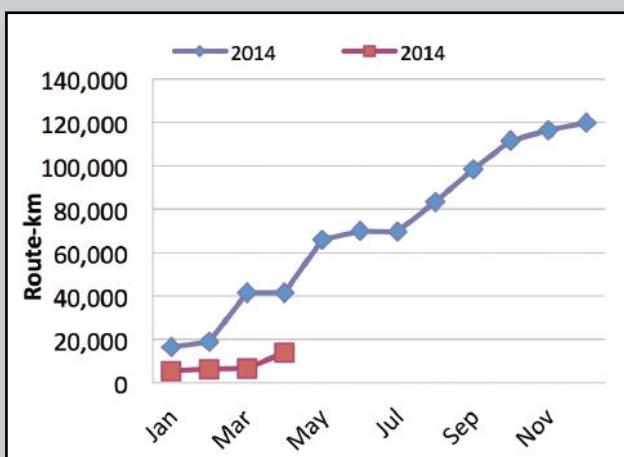
Monitoring the Pulse of the U.S. Offshore Oil & Gas Industry



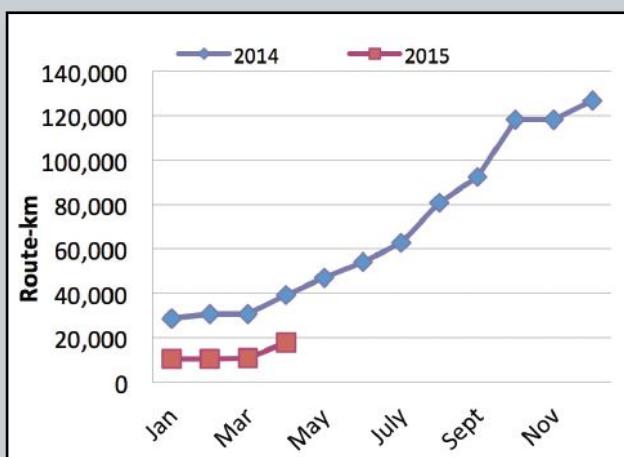
Positive trend, at least 3 weeks
Changing trend, less than 3 weeks
Negative trend, at least 3 weeks

Subsea Telecom & Power Cable Data

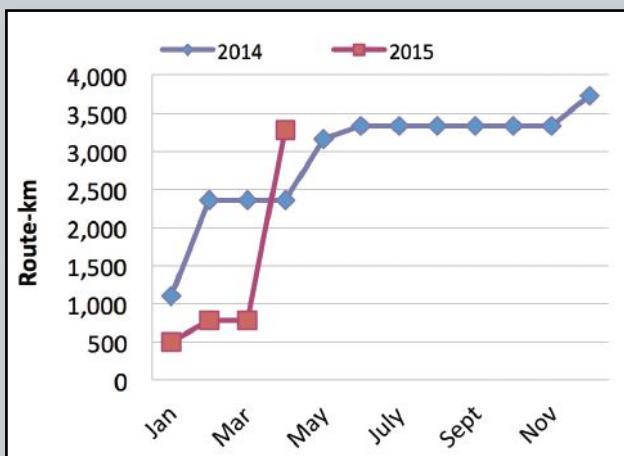
FO Cable Awards by Month



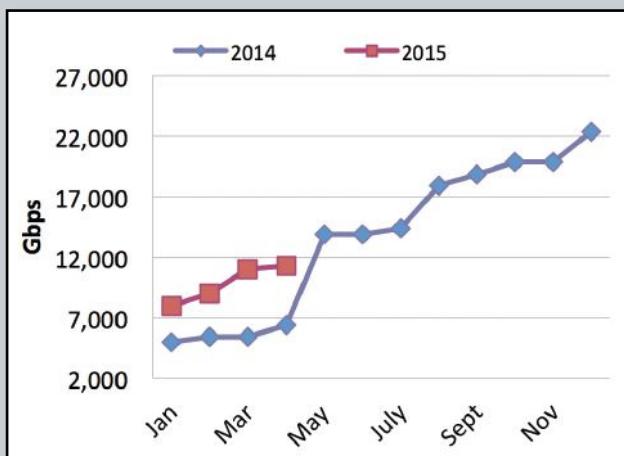
FO Cable Announcements



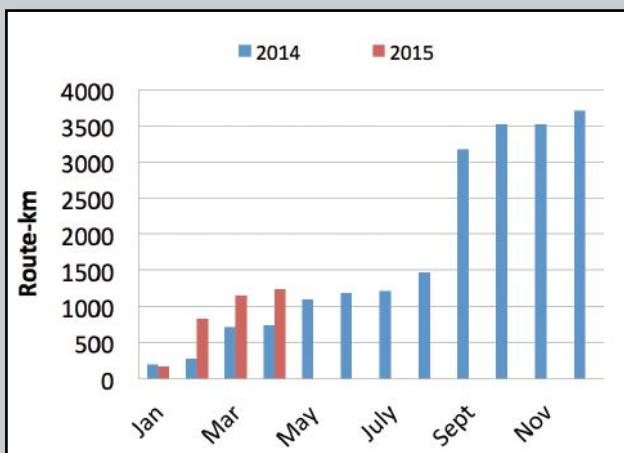
Submarine FO Cables Entering Service in Route-km



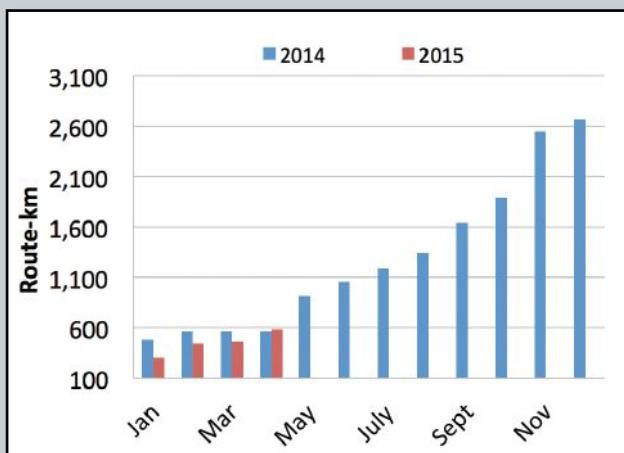
Upgrades of Existing Cable Systems in Gbps



Submarine Power Cable Awards in Route-km



Submarine Power Cable Announcements in Route-km



Gulf of Mexico Data

Current Deepwater Activity

Operator	Area	Block	OCS Lease	Rig Name	Prospect Name	Water Depth (ft)
Shell Offshore Inc.	WR	508	G17001	NOBLE JIM DAY	Stones	9,568
Anadarko Petroleum	LL	399	G23480	DIAMOND OCEAN BLACKHORNET	Independence Hub	8,960
Petrobras America Inc.	WR	469	G16997	VANTAGE TITANIUM EXPLORER	Chinook	8,835
ExxonMobil Corp.	WR	584	G20351	MAERSK VIKING	Julia	7,120
Union Oil Co. of California	WR	677	G18753	PACIFIC SHARAV	Saint Malo	7,038
Chevron USA Inc.	MC	696	G14650	T.O. DEEPWATER ASGARD	Blind Faith	6,989
Chevron USA Inc.	WR	758	G17015	T.O. DISCOVERER CLEAR LEADER	Jack	6,960
BP Exploration & Production, Inc.	GC	743	G15607	SEADRILL WEST AURIGA	Atlantis	6,816
Union Oil Co. of California	KC	814	G25810	PACIFIC SANTA ANA		6,758
Deep Gulf Energy II	MC	563	G21176	ENSCO 8505		6,548
LLOG Exploration Offshore, LLC	MC	816	G33178	SEADRILL SEVEN LOUISIANA		5,655
Eni U.S. Operating Co. Inc.	MC	772	G16647	ENSCO 8500	Triton	5,639
Eni U.S. Operating Co. Inc.	MC	773	G19996	NABORS POOL 140	Devil's Tower	5,610
BP Exploration & Production Inc.	MC	777	G09867	SEADRILL WEST CAPRICORN	Thunder Horse South	5,609
Chevron USA Inc.	KC	414	G26748	T.O. DISCOVERER INDIA		5,515
BP Exploration & Production Inc.	GC	743	G15607	T.O. DEVELOPMENT DRILLER III	Atlantis	5,413
Anadarko Petroleum Corp.	GC	859	G24194	ROWAN RESOLUTE	Heidelberg	5,346
Anadarko Petroleum Corp.	GC	903	G24197	ENSCO 8506	Heidelberg	5,274
Freeport-McMoRan Oil & Gas LLC	MC	85	G08484	NOBLE TOM MADDEN	King	5,190
Anadarko Petroleum Corp.	GC	680	G22987	BLAKE 1007	Constitution	4,972
BP Exploration & Production, Inc.	KC	93	G25780	ENSCO DS-4	Gila	4,860
Deep Gulf Energy II, LLC	MC	727	G24107	NOBLE DANNY ADKINS	Kodiak	4,829
Statoil Gulf of Mexico LLC	MC	814	G34462	MAERSK DEVELOPER		4,756
LLOG Exploration Offshore, LLC	MC	208	G24055	SEADRILL WEST NEPTUNE	MC 208-253	4,654
Hess Corp.	MC	726	G22898	STENA FORTH	Tubular Bells	4,570
Shell Offshore, Inc.	MC	812	G34460	NOBLE GLOBETROTTER		4,475
BP Exploration & Production Inc.	GC	782	G15610	MAD DOG SPAR RIG	Mad Dog Phase 2	4,428
BP Exploration & Production Inc.	GC	627	G25174	SEADRILL WEST SIRIUS		4,416
BHP Billiton Petroleum (GOM) Inc.	GC	609	G16764	T.O. DEEPWATER INVICTUS	Shenzi	4,288
BP Exploration & Production Inc.	KC	147	G30926	SEADRILL WEST VELA		4,248
Shell Offshore, Inc.	MC	943	G34467	STENA ICEMAX	Oasis	4,213
Chevron USA Inc.	GC	596	G16760	T.O. DISCOVERER INSPIRATION	Tahiti North	4,023
Anadarko Petroleum Corp.	GC	562	G11075	DIAMOND OCEAN BLACKHAWK	K-2	4,017
Freeport-McMoRan Oil & Gas LLC	GC	643	G35001	NOBLE SAM CROFT		3,885
Shell Offshore, Inc.	MC	809	G09883	H&P 204	Ursa	3,797
Shell Offshore, Inc.	MC	809	G12166	NOBLE DON TAYLOR	Ursa	3,641
Shell Offshore, Inc.	GC	248	G15565	T.O. DEEPWATER NAUTILUS	Glider	3,225
Shell Offshore, Inc.	VK	956	G06896	NABORS 202	Ram-Powell	3,214
Shell Offshore, Inc.	MC	762	G07957	NOBLE BULLY I	Deimos	3,144
ConocoPhillips Co.	MC	118	G27994	MAERSK VALIANT		3,091
Shell Offshore, Inc.	GC	158	G07998	WIRELINE UNIT (HOUma DIST)	Brutus	2,985
LLOG Exploration Offshore, LLC	MC	546	G25098	NOBLE AMOS RUNNER	Longhorn MC 502 546	2,566
Energy Resource Technology GOM, Inc.	GC	237	G34971	ENSCO 8503	Phoenix	2,240
Murphy Exploration & Production Co.	MC	538	G16614	T.O. DISCOVERER DEEP SEAS	Medusa North	2,047
Chevron USA Inc.	VK	786	G12119	NABORS 87	Petronius	1,751
Stone Energy Corp.	VK	989	G09771	COIL TUBING UNIT (N.O. #2)	Pompano	1,295
Fieldwood SD Offshore LLC	EB	165	G06280	WIRELINE UNIT (L.J. DIST)	East Breaks 164	863
Marathon Oil Co.	EW	873	G12136	NABORS SUPER SUNDOWNER XXI	Lobster	773
Whistler Energy 11, LLC	GC	18	G04940	NABORS MODS 201	Boxer	750
Ankor Energy LLC	MC	21	G22850	NABORS MODS 200		668
W&T Offshore, Inc.	EW	910	G13079	H&P 203		560

Deepwater prospects with drilling and workover activity: 51

Current Deepwater Activity as of Monday, 13 April 2015

Activity by Water Depth

Water Depth (m)	Active Leases	Approved Applications	Active
0 to 200	1,394	36,079	2,329
201 to 400	98	1,125	20
401 to 800	210	890	10
801 to 1,000	347	585	9
1,000 & above	3,164	2,015	28

Rig Activity Report 10 April 2015

Location	Week of 04/10	Week +/- Ago	Week +/- Ago	Year Ago
Land	951	-42	993	-808
Inland Waters	4	0	4	-15
Offshore	33	+2	31	-20
U.S. Total	988	-40	1028	-843
Gulf of Mexico	31	+2	29	-21
Canada	99	-1	100	-113
N. America	1087	-41	1128	-956
				2043

Activity by Water Depth Information current as of Monday, 13 April 2015

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 and Baker Hughes

Sonardyne launches new 'Syrinx' doppler velocity log

Sonardyne International Ltd., UK, has announced the introduction of its first ever Doppler Velocity Log, Syrinx. Developed to meet the needs of surface and subsea vehicles that require high integrity, high performance navigation aiding over a wide range of water depths and seabed types, the new Syrinx DVL made its worldwide debut at the Ocean Business exhibition in Southampton.

Sonardyne is well known for its market-leading subsea acoustic and inertial navigation systems. The introduction of Syrinx is a natural extension of the company's existing 6G and Sprint product lines and follows a major investment in research and engineering aimed at creating the industry's best performing 600-kHz DVL.

The Syrinx DVL employs full linear signal processing to provide very low noise, high precision velocity measurements over a wide range of seabed bottom types and altitudes. During extensive testing, Syrinx has demonstrated its ability to achieve consistent and reliable "bottom lock" at high altitudes comparable to a 300-kHz DVL, with the high resolution performance of a 1,200-kHz DVL.

Syrinx can be used as a standalone DVL, as part of an integrated navigation system, or perform both functions at once due to concurrent Ethernet and serial output capability at ping rates of up to 10 Hz. Its dual output capability also now means that only one DVL instrument is required on a vehicle as both pilots and survey teams can simultaneously share the output from Syrinx. This offers valuable savings, both in terms of cost and vehicle payload space.

Sonardyne worked closely with users during the development of Syrinx to address the performance and ownership limitations of existing DVLs. One innovation to come out of this process is individual, factory replaceable "capsule" transducers. DVLs are typically installed on the underside of

vehicle so their transducers are highly susceptible to becoming damaged during normal operations. Repairing this damage usually involves replacing the entire transducer assembly, which is an expensive option, especially if only one transducer is damaged. With Syrinx, however, each transducer is individually replaceable making servicing and repair fast and cost effective.

The Syrinx DVL has also been designed to be easy to install, set up and use and can be fitted to existing instrument mounting brackets. This makes it straightforward for users to equip their vehicles with Syrinx without any modification. A 4,000-m depth rated titanium version is available to meet the requirements of modern Work-Class ROVs, with 3,000-m and 6,000-m models also available.

For more information, visit www.sonardyne.com.



Teledyne Odom Hydrographic introduces the fully integrated MB2 multibeam echosounder for fast mobilization on smaller vessels

Teledyne Odom Hydrographic, one of the world's leading providers of hydrographic sonar solutions, announces the launch of the MB2, the first product eagerly awaited after the MB1 introduction in 2012.

The MB2 multibeam echosounder is developed for fast mobilization on smaller vessels and is optimized for shallow water survey companies, port and harbor authorities, dredging companies and other users looking for an easy-to-use, quick-to-deploy, high-resolution system.



As an option, MB2 can be supplied with an Integrated GNSS-aided INS powered by Applanix' POS MV WaveMaster engine as well as an integrated real-time SVP sensor to simplify installation and calibration, making the MB2 perfect for use on vessels of opportunity, small survey launches and ASVs.

MB2 features a dedicated cylindrical transmit array and broad range of sounding frequencies from 200 to 460 kHz improving on the performance of the MB1 by offering a wider coverage and narrower acoustic beam. Using both amplitude and phase bottom detection, the MB2 is capable of sounding a swath of up to 140° in up to 110-m of water depth.

With 24-bit raw data, both water column and seabed information can be collected within the controller software. The Real Time Appliance (RTA) synchronizes all of the sensors with accuracy better than 0.1 ms.

"The new MB2 is the outcome of a dedicated product development effort over the last 3 years, building on customer feedback and experiences gathered in the market for ultra-compact Echosounders for fast mobilization. Our product range of MB1 and MB2 will now fit a much broader span of both budget and performance expectations," says Stephen F. Apsey, general manager for Teledyne Odom Hydrographic.

For more information, visit www.teledyne.com.

EdgeTech demonstrates the new 6205 MPES

EdgeTech, the leader in high-resolution sonar imaging systems and underwater technology, concluded Ocean Business 2015 with a record number of on-water demonstrations. Additionally, the company took part in an on-site video production that highlighted the company and the 6205 Multi Phase Echo Sounder (MPES).



During the on-water demonstrations, EdgeTech's recently introduced 6205 bathymetry system collected co-registered bathymetry and side-scan sonar data during each 1-hour outing. During the sessions interested parties were provided a detailed briefing of the product and its truly unique shallow water capabilities. The system provides 200° IHO quality bathymetric coverage and co-registered simultaneous dual-frequency side-scan sonar data. As RJ Jablonski, director of sales and marketing, noted during the show, "EdgeTech's 6205 is really the next generation of technology for traditional multibeam users." The 6205 also comes in AUV, ROV, ASV and deep tow configurations.

For more information, visit www.edgetech.com.

EvoLogics launches new high-speed mini-modem

EvoLogics GmbH, German experts in underwater information technologies, announce the S2CM-HS—a high-speed "mini" modem that offers rates up to 62.5 kbps for short-range data transmissions.

EvoLogics S2CM-HS is an addition to the S2CM range of "mini" modems, boasting the company's patented S2C technology in a light and compact design. EvoLogics further tackles speed



and size- and weight-sensitive applications, supporting the industry trend for smaller and power-efficient solutions. S2CM-HS will be available with a cable-mounted transducer, offering more options for system integration, for example, into diver communication systems.

The M-series is fully compatible with the company's standard S2C R and S2C R USBL series that rely on the patented broadband communication technology, overcoming the challenges of dynamic underwater environment to deliver a great performance in various subsea conditions. M-modems are smaller and lighter than the standard EvoLogics R-series devices, but offer an uncompromised performance of the full-sized product line.

For more information, visit www.evologics.de.

Soundnine launches Enduro APT recorder and Ulti-modem

Soundnine (S9) is pleased to announce the launch of two new products. The new Enduro APT Recorder and Ulti-modem inductive modem. With high-accuracy sensors and advanced real-time underwater telemetry, they offer exciting new capability and exceptional value in ocean observing.

The Enduro APT Recorder is a uniquely small, robust instrument that measures acceleration, pressure and temperature, logs internally and transmits data in real time over plastic-jacketed wire rope commonly used on moorings. S9's innovative dual mode inductive technology is fully compatible with the prevailing inductive telemetry (Sea-Bird) and also offers a fast transmit mode when communicating with an Ulti-modem.

The size and power requirements of the Enduro were reduced by using electronic technology also found in cell phones. This enabled a more compact mechanical design with low manufacturing cost and allowed more design detail to be devoted to solving problems experienced using other moored sensors. The Enduro is easily held in one hand during mooring assembly and installs concentrically on the mooring wire in seconds using a cordless driver. Its tapered shape reduces dynamic stress on the mooring and fends off fishing lines or debris that might otherwise snag the instrument.

The modem used in the Enduro is also built into the Ulti-modem, a clamp-on-the-wire companion module that adapts most instruments having a serial



interface to real-time inductive telemetry. The Ulti-modem is also used with S9's DANTE Buoy Controller or common data loggers to communicate with other Ulti-modems, Enduro APT Recorders or Sea-Bird inductive modems on the same mooring wire.

The Ulti-modem's fast transmit mode is capable of data rates up to 19.2 kBaud between Ulti-modem-equipped instruments, depending on wire length.

For more information, visit www.soundnine.com.

SeaRobotics announces delivery of environmental sampling equipment

SeaRobotics Corporation (SeaRobotics) is pleased to announce the successful design, construction and delivery of two pairs of sediment sampling grabs to the field operations division of CSA Ocean Sciences Inc. (CSA), a Florida-based marine environmental consulting firm.

SeaRobotics designed, manufactured and delivered a pair of Smith-MacIntyre grab samplers and a pair of Van Veen grab samplers, both part of its catalog of environmental sampling equipment. Constructed in SeaRobotics' new high-specification manufacturing facility, each grab is built from 316 stainless steel and electro-polished for resistance to corrosion and contamination.

"In designing and building these grabs, SeaRobotics was able to provide our client with sampling equipment specially designed for its needs. It is a great example of the type of high-quality manufactured product we deliver to our



customers every day," commented Don Darling, president of SeaRobotics.

Smith-MacIntyre grab samplers are commonly used to collect sediment of a coarser grain size, such as sand and shell hash. Van Veen grabs are clamshell bucket samplers designed to collect medium-grain sediment and clay sediments commonly found on the continental shelf. CSA is adding the units to its extensive inventory of environmental sampling equipment deployed around the world for various sampling and monitoring efforts.

"The SeaRobotics samplers have been constructed with design improvements that will improve project safety and efficiency," said Steve Viada, Senior Scientist at CSA. "We look forward to taking advantage of these design features in our environmental baseline studies and monitoring programs for our clients."

For more information, visit www.searobotics.com.

SBG Systems selects Septentrio's AsteRx4 GNSS receiver for Apogee product line

Septentrio and SBG Systems jointly announced at Ocean Business (OB) 2015 that SBG Systems, a leading manufacturer of miniature and accurate Inertial Navigation Systems (INS), has selected the Septentrio AsteRx4 OEM GNSS receiver to equip the Apogee product line thanks to its unmatched



level of performance and versatility.

The Apogee is a new product line of highly accurate inertial navigation systems based on robust and cost-effective MEMS technology. The INS/GNSS solution combines the latest generation of MEMS sensors and the OEM version of the AsteRx4, a newly introduced high-precision GNSS receiver from Septentrio. The Apogee series is especially suited for applications such as hydrography, mobile mapping, and aerial survey where survey-grade attitude and positioning measurements are required.

The AsteRx4 OEM is a multi-frequency and multi-constellation dual antenna receiver that incorporates the latest innovative GNSS tracking and positioning algorithms from Septentrio. The AsteRx4 delivers the highest possible accuracy, scalable to a centimeter, while integrating the entire suite of acclaimed GNSS+ algorithms proposed by Septentrio to maintain tracking during heavy vibration of machines, assure position accuracy even under difficult ionosphere conditions, and mitigate or reject intentional or unintentional interference with GNSS signals.

For more information, visit www.septentrio.com.

Falmouth Scientific announce new dual-frequency 24-bit transceiver

Falmouth Scientific, Inc. (FSI), a Cataumet, Massachusetts-based designer and manufacturer of precision oceanographic instrumentation and systems, has announced a new addition to their sub-bottom systems product line—a true 24-bit CHIRP sub-bottom profiling transceiver.

The FSI HMS-622 CHIRPceiver™ and its associated transducers and arrays can fill a wide range of survey needs. It is the result of the strong engineering knowledge and experience that FSI possesses in this arena.

The HMS-622 is available in dual and single frequency configurations, and supports three frequency bands: standard LF (1 to 10 KHz), optional ULF (200 Hz to 2KHz), and HF (8 to 23 KHz). A direct A/D input is available for the FSI Bubble Gun™ or other seismic systems, and it has an industry-standard Ethernet interface for data and control signals.

The HMS-622 CHIRPceiver™ rounds out the FSI sub-bottom system product line that includes the Bubble Gun™ Family of portable seismic systems, hull-mounted transducers,



arrays, and preamplifiers for deepwater survey applications, and other customizable solutions.

Falmouth Scientific offers other sensor-based products such as the PLUS Family of current, wave, and tide meters; rugged and portable side-scan sonar imaging systems; solutions for drilling and vortex-induced vibration monitoring; and other acoustics-based underwater instrumentation. Service areas include custom design, development, integration, and production of marine systems and acoustic transducers; and value-added services such as prototyping, product assembly, encapsulation, calibration, and pressure testing.

For more information, visit www.falmouth.com.

Revealing the latest in sound velocity technology

Recognized as world leaders in sound velocity technology, Valeport's latest addition to its portfolio of sound velocity sensors and profilers is the SWIFT SVP. This new compact unit will feature high accuracy SV, pressure and temperature, plus integral GPS to geo-located every profile. Data can be easily and quickly downloaded, reviewed, and translated to common SVP formats wirelessly via Bluetooth Smart using the free SWIFT APP on iOS devices. The data can also be instantly shared via FTP, e-mail, and cloud services.

With a battery endurance of up to 1 week and easy charging via USB, the SWIFT SVP is intended for coastal, harbor and inland hydrographic survey use and offers the highest quality sound velocity profiles in a compact, robust, and portable package.

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



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Teledyne Marine releases new 64bit software version of "Teledyne PDS"

Teledyne PDS is now a 64-bit Windows version offering faster performance, optimized memory management and better feature utilization. Teledyne PDS is a multipurpose software platform and supports a wide range of tasks within hydrography, dredge guidance, construction support, search and recovery operations and port entrance monitoring.

Teledyne PDS is off-the-shelf software and developed to solve the variety of challenges that arise from each specific task in the main business segments served by Teledyne Marine. It interfaces with a wide range of survey instruments such as lidar, multibeam and singlebeam echosounders, and is an optimal tool for interfacing to a variety of periphery sensors, including dredge and construction sensors, sound velocity measurements, positioning, motion systems and most other devices that output data.

Teledyne PDS is an optimized solution for both Teledyne Marine products and almost all other available systems in the market from recognized manufacturers, and enables immediate data visualization and quality control, so you can view results as images or numerically in real time. The software is designed to be used in the maritime world with an intuitive user interface that is easy to learn. Support is provided worldwide by Teledyne Marine expert surveyors including survey assistance and training of operators.

"With the new Teledyne PDS software suite, we are targeting an even wider global customer base with improved workflow and data management capabilities for processing large datasets, support for nearly any sensor you can find in the market and extensive support for all established survey instruments, and we foresee our software offering to be a continued growth area for the Teledyne Marine group," says president for Teledyne Marine Acoustic Imaging Group, Mr. Kim Lehmann.

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

MacArtney launches new NEXUS MK VII multiplexer

MacArtney is delighted to launch the brand new NEXUS MK VII multiplexer. It is a highly versatile HD and standard video, Ethernet, serial and multi-beam sonar multiplexer based on Moog Focal 907 telemetric technology.

The NEXUS MK VII represents the



most advanced MacArtney telemetry system to date. Power switching is software controlled via PC software or using a tablet online via LAN or WiFi. Sensor power status, telemetry link, leak alarm etc. are also continuously monitored by the software. Advanced features include programmable fuses and software-enabled interface selection. Moreover, the NEXUS MK VII carries all signals over one single mode optical fiber via coarse wavelength division multiplexing, hereby providing a highly efficient link between surface and seabed.

The NEXUS MK VII is highly configurable and allows for an easy upgrade and modification path when operational or applicational requirements change. Multiplexer options can be installed between jobs or even at sea without the need for an electronics workshop. Typical applications for the NEXUS MK VII include ROV/ROTV systems requiring a HD video and multibeam sonar survey sensor setup, cable trencher systems, towed camera and sensor systems and seabed monitoring applications including landers and observatory systems.

For more information, visit www.macartney.com.

Data•Xchange deliveries bring WiFi data transfer to surveyors

AML Oceanographic has marked the much anticipated release of Data•Xchange with deliveries of pre-ordered units to customers around the globe. Owners of X-Series profilers have been eager to procure the device, which brings wireless data transfer and embedded GPS to their instruments, resulting in a streamlined workflow and significant time savings. Likewise, the simplification of SVP data collection provided by Data•Xchange has attracted interest from newcomers to AML's X-Series line. Released in conjunction with AML's new SeaCast 4 software, the pairing promises increased automation and customization, making the processing of SVP data easier than ever before.

For more information, visit www.amloceanographic.com.

iXBlue expands DELPH 3.1 seabed mapping software suite

iXBlue has released the new synthetic aperture sonar (SAS) processing software module, a new addition to iXBlue's proven DELPH 3.1 seabed mapping software suite. DELPH 3.1 software suite now comprises DELPH SAS, seismic, sonar, and magnetic components built on a modular common architecture with acquisition, processing, and interpretation layers.

DELPH is an industry-leading software suite providing the best productivity in a user-friendly environment thanks to a highly optimized workflow. It now allows the full integration of SAS data together with conventional side-scan sonar, bathymetry, sub-bottom profiling, magnetic and other information layers. In addition, all existing features available in DELPH Sonar Interpretation like batch data processing and mosaicking, target picking and management, interpretation and seabed classification are now also available for SAS imagery.

DELPH SAS processing goes further than regular processing as it tightly couples sonar and positioning data, thus naturally producing accurately geo-referenced images with a very robust algorithm not sensible to vehicle movements. Several benefits come to play in improving data interpretation like the near-perfect line matching and the minimal positioning ambiguity that helps in targeting accuracy.

Many advantages come with this new module. Firstly, multi-ping integration in SAS processing results in superior image quality, resolution and range. Secondly, DELPH SAS can also integrate co-registered gap-filler images of the seabed at nadir allowing full-swath sonar coverage. Additionally, the need for overlapping survey lines is reduced, therefore, further optimization in survey planning is possible and duplicate data management is limited,



saving time and money. Finally, as data processing and mosaicking are faster than real-time, online data interpretation is even made possible.

DELPH SAS software complements iXBlue's offer in scalable SAS tow-fish and AUV solutions for the commercial and scientific survey needs. DELPH SAS runs on any standard computer and is compatible with any SAS that delivers raw data.

For more information, visit www.ixblue.com.

Chesapeake Technology, Inc. launches new SonarWiz

Chesapeake Technology, Inc. (CTI) launched its biggest SonarWiz release since 2010 at the Ocean Business show in April. The new SonarWiz has a modern look, visible enhancements to all modules (side-scan, sub-bottom, bathymetry, and magnetometry), more integrated plan-view and 3D visualizations, and for the first time introduces bathymetry amplitude processing.

Backscatter post-processing is now available for bathymetric data including beam averaged and time-series (snippets) amplitude records. Automatic, whole-survey gain optimization can produce near-seamless amplitude mosaics with almost no user interaction. Don't spend another hour balancing gray levels between track lines again.

SonarWiz has expanded its grid creation and editing tooling. A suite of automatic and semi-automatic statistical filters work in concert with smart manual editing modes to allow users to easily polish good data and rescue data collected under less-than-perfect conditions. SonarWiz has strong support for interferometers, AUVs and other swath systems that are used in challenging environments. For example, grid data and grid QA indicators can be used concurrently to enable surveyors to ensure adequate survey coverage and quality. The SonarWiz suite of filters will help you get the best possible results from these specialized instruments.

Of the developments to SonarWiz, the most obvious is its modern look. This latest version exudes a fresh look through new icons, a bright color scheme and an intuitive interface. The less visible internal redesign not only makes SonarWiz a leaner application to allow faster processing speeds, it also opens the doors for future developments.

For more information, visit www.chesapeaketech.com.

Applanix unveils new, expanded marine product portfolio

Applanix, a world leader in products and solutions for mobile mapping and positioning, introduced a new and expanded portfolio of marine georeferencing and motion compensation solutions designed to deliver best-in-class performance at a variety of price points. Taking advantage of Applanix proprietary technology, this new line-up of marine products offers high-performance solutions to a broader cross-section of the hydrographic survey industry. All Applanix marine products benefit from the optimal integration of GNSS and Inertial observables, with access to Trimble® GNSS technology affording unique performance advantages.

At the entry-level of the expanded product portfolio, Applanix introduced the new POS MV™ SurfMaster. Incorporating Applanix's proprietary SmartCal™ inertial calibration techniques, POS MV SurfMaster delivers robust georeferencing for small platforms, both manned and unmanned. SurfMaster is fully supported by

Applanix' industry leading post-processing software POSPac™ MMS and can deliver roll and pitch accuracy to 0.03 degrees, regardless of latitude or rate of vessel motion.

Applanix' new marine product line-up also includes POS MV WaveMaster II and POS MV OceanMaster. Using newly developed inertial technology, POS MV WaveMaster II delivers performance equal to the well-established and proven WaveMaster E, but at a new lower price point. POS MV OceanMaster replaces the POS MV 320 E as the georeferencing and motion compensation solution of choice for the hydrographic professional, integrating next generation inertial sensors that enable performance and pricing previously unavailable with this class of technology. POS MV OceanMaster provides reliable and robust surveying in even the most demanding sea conditions. POS MV Elite remains the ultimate option for those users seeking the very highest level of performance available to the industry.

For more information, visit www.applanix.com.

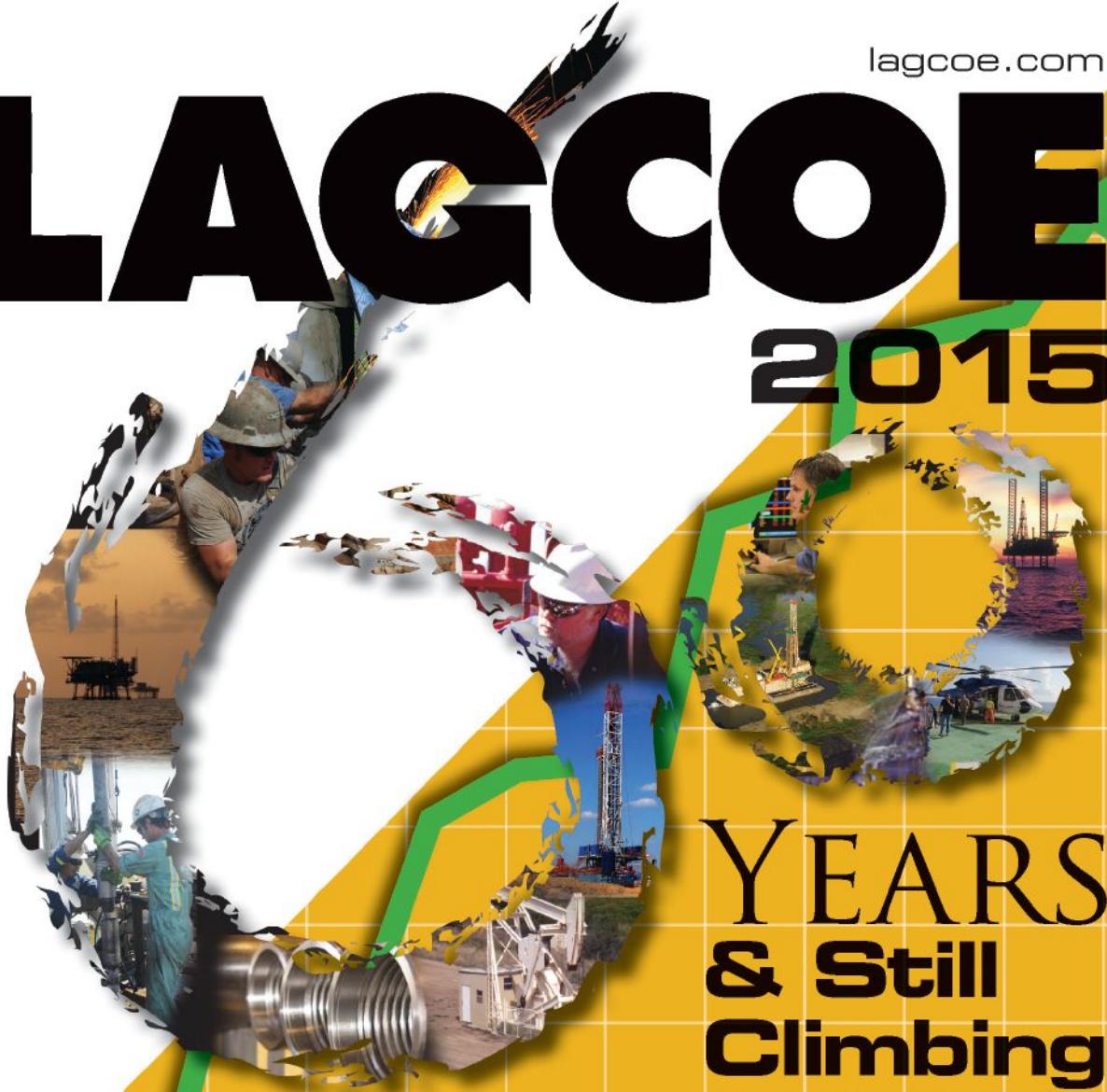
The advertisement features a stylized illustration of three musicians: a man in a suit playing a trumpet, a man in a tuxedo playing a double bass, and a woman in a red dress playing a cello. They are performing on a stage against a dark background with city silhouettes. The text "UI 2016" is prominently displayed in large, bold letters at the top. Below the musicians, the text "FEBRUARY 23-25, NEW ORLEANS" is written in a smaller, bold font. At the bottom, there is descriptive text about the event.

The world's premier event for Commercial Diving Contractors, Remotely Operated Vehicles, Manned Submersibles, and all other aspects of the Underwater Operations Industry will take place at the Morial Convention Center in New Orleans, LA., February 23-25, 2016.

FOR MORE INFORMATION, PLEASE VISIT
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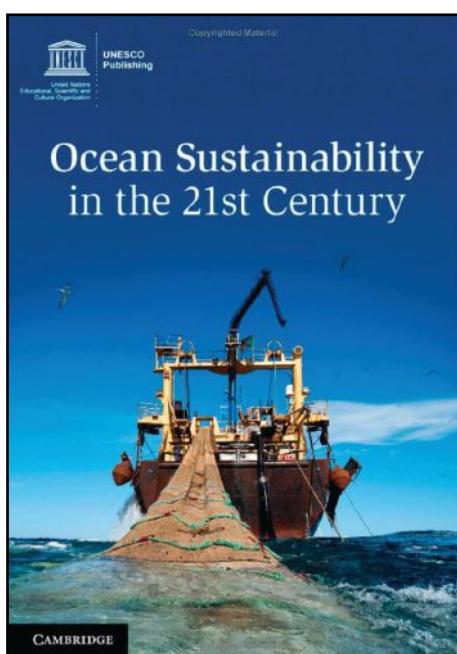
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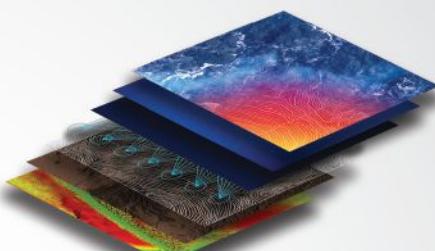
by Salvatore Aricò (Editor)

Describing the emerging and unresolved issues related to the oceans and the marine environment, this book presents the developments made in marine science and policy since the implementation of the United Nations Convention on the Law of the Sea (UNCLOS) and implications for the sustainable management of ocean areas and resources. This comprehensive volume also provides a number of scientific, policy, and legal tools to address such issues and to ensure better science-based management of the oceans. Topics covered include the impacts of human-induced climate change on the oceans, the marine genetic resources debate, the current legal framework for the oceans, and a comparative study of the legal issues associated with outer space. Including practical examples and worldwide case studies, this book is a valuable resource for policy makers, students and academics in marine science and policy, ocean affairs, and the law of the sea.

Cambridge University Press, ISBN: 978-1107100138
Hardcover, 320 pages, May 2015

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Helix Energy Solutions Group, Inc. said that effective 11 May **Cliff Chamblee** would retire after 36 years in the offshore services business and would resign as executive vice president and chief operating officer of the company. **Scotty Sparks** is to be promoted to the position of executive vice president of operations. Sparks has 25 years of industry experience and has been with Helix since 2001. He currently holds the office of vice president of commercial and strategic development and has served in various positions within Helix's robotics subsidiary, including as senior vice president, during his tenure at Helix. Prior to that he held various positions within the industry, including operations manager at Global Marine Systems. In his new role, Sparks' responsibilities will include operational and commercial responsibility for all of Helix's business units.

Anders Opedal was appointed executive vice president of Statoil and will take on a new position as chief operating officer in the corporate executive committee on 1 April. Opedal will be responsible for the corporate improvement programs and for driving operational efficiency across Statoil's business areas. Opedal comes from the position as senior vice president

of projects in Statoil's technology, projects and drilling business area, where since 2010 he has been responsible for Statoil's approximately NOK 300 billion project portfolio. Previously, he has held a range of positions in drilling and well, procurement and projects. Opedal joined Statoil in 1997 as a petroleum engineer in the Statfjord operations.



Opedal

Oceaneering International, Inc. said **Steven A. Webster** was appointed to serve on its board of directors. Webster is a director and chairman of Carrizo Oil & Gas, Inc. and Basic Energy Services, Inc. and serves as a director on the boards of other energy-related companies. He is also co-managing partner and co-chief executive officer of Avista Capital Partners LP, a private equity firm, in charge of energy investments. Throughout his 40-year business career, Webster has been active in the energy industry, notably in the exploration and production and service sectors. He has a bachelor's degree in industrial management and an honorary doctorate degree in

management from Purdue University. He also holds a master of business administration degree from the Harvard Business School where he was a Baker Scholar. Webster is joining Oceaneering's board following the decision by **Jerold J. DesRoche** to retire from the board.

InterMoor said **Cohen Guidry** was appointed regional manager, West Africa. This is InterMoor's lead West Africa management role, and Guidry will report to Tom Fulton, InterMoor's global president. Guidry joined InterMoor in 2006 as HSE manager and has more than 20 years of experience in the offshore oil and gas industry in quality, health, safety and security roles. He served as InterMoor's West Africa operations manager and grew the business in Nigeria, Ghana and Angola as well as coordinating mobile offshore drilling units for mooring systems installations. Guidry served in the U.S. Army from 1988 to 1992 and is a Desert Storm veteran. He graduated from Nicholls State University with a bachelor of science degree in business in 1996. Guidry is a certified lead auditor. He will be based at InterMoor's offices in Morgan City, Louisiana. InterMoor has been working in West Africa for more than 10 years.

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ABS Group of Companies, Inc. is pleased to announce the appointment of **Todd Grove** as its new president and CEO. Grove most recently served as senior vice president and chief technology officer for ABS Group's parent company, American Bureau of Shipping (ABS). With more than 30 years at ABS, in various senior technical and operational management roles across the world, Grove is a proven leader with a successful track record. Grove holds a bachelor's degree in naval architecture and marine engineering from the University of Michigan, an MBA from the University of Houston, and is a graduate of the Harvard Business School's advanced management program.

The Underwater Centre has appointed **Steve Cullen** to the newly created role of ROV operations manager, where he will lead the development of the Centre's ROV training and trials activities. He joins the Centre from Ashtead Technology and Subsea 7 where he took up similar training roles, with responsibility for ROV personnel's technical and engineering training. Cullen brings a wealth of experience to the Centre, having worked offshore for more than 23 years in various positions from ROV pilot to offshore operations manager. He also has a master's degree in education and spent 6 years working for the Highland Council as a secondary school teacher, teaching a variety of STEM (Science, Technology, Engineering and Maths) subjects.

Callum Magee has joined Remote Ocean Systems Ltd. (ROS) as business development manager and is looking to drive forward this world-renowned sub-sea manufacturer in the North Sea. With over a decade of experience in the industry, Magee was instantly interested when informed of the position. Having previously held similar roles with AC-CESS Co UK Ltd. and OceanTools Ltd., Magee has set the objectives of establishing third party servicing in Aberdeen to support the existing ROS sales office and positioning ROS as a preferred supplier to ROV operators and manufacturers alike.

Fuelled by a steady increase in demand for complete integrated underwater system solutions, the MacArtney Group has opted to significantly bolster its system sales focus in Australia and New Zealand. Spearheaded by the hiring of experienced engineer and underwater technology specialist **Tom Zezou** as system sales manager, MacArtney is well-equipped to handle even more complex

projects and system challenges in the future. Prior to joining MacArtney, Zezou entered the industry as an electronics engineer with Racal Survey Australia where he progressed to become a workshop manager. Following his employment with Racal, Zezou was a co-proprietor of Cadlink and Jemal PCB before joining Fugro as a senior survey engineer. Most recently, he held a central position as electronics engineer with local Ashtead Technologies agent, Scope Engineering, where his role was to maintain and manage the entire rental pool including geophysical and hydrographic systems, ROV tooling and sensors, positioning systems, NDT equipment and visual inspection systems.

Due to an increased demand for its services globally, independent subsea ROV services provider **ROVOP** has established a Western Hemisphere headquarters and support base in Houston as well as appointed three highly-regarded ROV industry professionals to lead the business. **Scott Wagner**, **Brett "Gonzo" Eychner** and **Wayne Betts** bring a combined total of more than 100 years' global experience in the ROV services sector to ROVOP. They join an established management team and staff of 130 based in Aberdeen, Scotland, who have developed ROVOP into a leading player in the ROV field.

Kongsberg Maritime AS, a wholly owned subsidiary of Kongsberg Gruppen ASA, has acquired the remaining 90% of the shares of the Germany-based underwater chemical sensors specialist **Contros Systems & Solutions GmbH**. Contros was established in 2006 and is based in Kiel, close to Hamburg. The company develops, produces and markets underwater sensor systems to detect dissolved gasses such as hydrocarbons, CO₂ and oxygen, as well as pH and total alkalinity (TA). Contros has built a strong reputation as a provider of complete systems for offshore early leak detection and environmental monitoring.

The **MacArtney Group** is delighted to announce the signing of an official representative agreement with **Geomarine**, an Italian geophysical and geotechnical marine survey service provider. The two companies will team to offer state-of-the-art underwater technology solutions and services in primarily Italy and Mozambique. Based in Senigallia on the coast of the Adriatic Sea, Geomarine provides services, solutions and advice on marine and land applications, in particular any geophysical, geotechnical and

environmental issues linked to inshore and offshore activities. Based on an assessment of client needs and purposes, the company provides thorough technological support using top-of-the-range instruments. Geomarine employs a team of 15 highly qualified specialists keen to meet client requirements and ensure outstanding technical, scientific and technological support.

Osiris Projects has been rebranded as **Bibby HydroMap**. A specialist seabed survey company, the UK-based Osiris Projects was acquired by Bibby Line Group in May 2012 but has continued to operate under its own name. The decision to rebrand and adopt the instantly recognizable Bibby branding supports its strategic vision to become "the survey company of choice". Since being acquired by Bibby Line Group, the company has grown from 40 to over 100 full-time employees and has invested significantly in new survey vessels, including the recently launched Bibby Athena, and new offerings such as the d'ROP, an innovative remotely operated survey platform.

Eco Wave Power, a world leader in electricity from ocean waves, established a subsidiary in Changshu under the name **Suzhou Eco Wave Technology**. The company was established with investment from a Chinese Government fund that believes in EWP's innovative technology and provides funding for EWP's first 100 KW grid connected plant, to be completed by the end of this year. In a short time frame, Suzhou Eco Wave Technology was able to secure consent to construct a pilot plant in Zoushan Island and is in advanced negotiations regarding additional 50-MW projects in Zhejiang.

As part of an ongoing strategic push to provide global access with local support to MacArtney solutions in all key markets for underwater technology, MacArtney is delighted to have signed a representative agreement with its long-standing business partner, **EMS Sistemas de Monitorización Medio Ambiental** in Barcelona, to promote and support MacArtney across all Spanish and Portuguese marine-related markets. Founded in 1995 by initiative of oceanographic engineers at ICM Barcelona, EMS provides a solid background in instrumentation, equipment and systems, serving the oceanographic community and users of marine and underwater technology. EMS represents leading international manufacturers in this sector and has its own advanced technical capabilities to integrate systems for the local user.

CALENDAR & EVENTS

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